

CERATIZIT

hard material matters

ULTIMATE TOOLING BY PIONEERING SPIRIT

MAIN CATALOGUE

EN

hard material matters

CUTTING TOOLS

MAIN CATALOGUE

Dear customers,



Thierry Wolter – Member of the Executive Board

For the first time a main tooling catalogue including all CERATIZIT inserts and tooling solutions is available to our customers. What was once exclusively available subdivided into segment or application-specific compact individual brochures, has now been concentrated in a structured and systematic way for the entire range of cutting tools applications.

For all users in highly complex fields of activity across all segments we have now created a valuable companion listing the entire line-up of high-quality and highly specialized tools for turning, parting and grooving, milling and drilling collected in one place, in accordance with your work processes, and defining all relevant parameters and grade descriptions. From now on a great deal of valuable time will be saved, as searching for the appropriate brochure in your documentation will no longer be necessary. All the crucial data can instantly and easily be accessed in the CERATIZIT ULTIMATE TOOLING compendium.

After only a short time you will find that you wish to keep the C.U.T. catalogue within easy reach, as you will come to appreciate its uncomplicated practicality as a valuable support for your applications.

With ‘ULTIMATE TOOLING’ we wish to express how important we consider the availability of comprehensive qualified information and data for targeted optimization of your application processes, in addition to unequalled



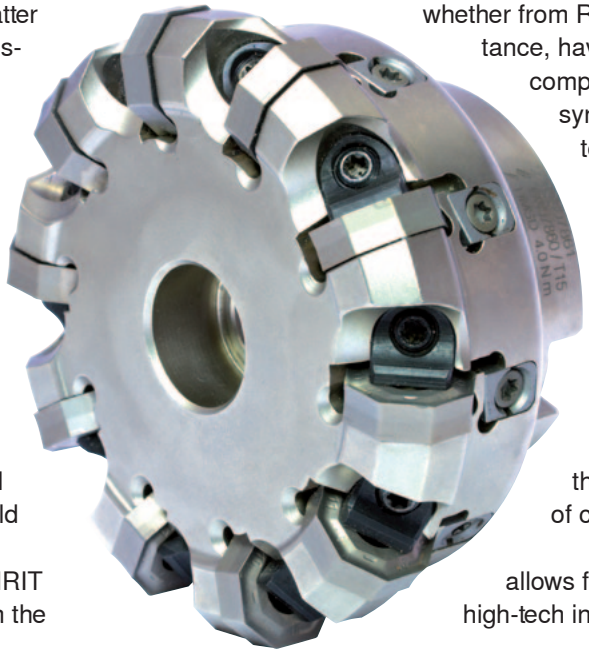
ULTIMATE by pione

quality and performance reliability. The performance standards of our products are always based on the require-ments of the most advanced industrial segments, such as aerospace or automotive, and have for the most part been developed by CERATIZIT for the company‘s worldwide leading high-tech production processes.

This development has always been fuelled by an unparal-leled agglomeration of technical know-how and methodological competence, which for decades

has made our Reutte site a worldwide leading, acknowledged scientific centre of powder-metallurgical research and application.

All employees involved, no matter whether from R&D, productions process development or customer assistance, have always been driven by the pioneering spirit of the company‘s founding fathers, who in the 1920‘s were already synonymous with inventions and developments which led to the utilization of carbide in today‘s form.



The constant questioning of boundaries, resulting in the development of new standards and the search for totally new ways of using materials as well as the design of optimized tool finish and tooling systems have led to uncountable patents and first developments since the foundation of the technological leader companies in Reutte and Luxembourg, PLANSEE-TIZIT and CERA-METAL, until their merger as CERATIZIT, the innovation leader in the field of carbides.

Only a vital PIONEERING SPIRIT allows for a technological standard which enables the operators in the high-tech industries to ensure their

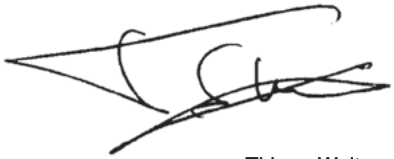
TOOLING

ering spirit

decisive competitive edge in the world market again and again. After all, only someone who, like our customers from the leading industrial segments, thinks and acts as a PIONEER himself has the chance to achieve both progress and growth.

Consequently, in the cutting tools sector we have unconditionally committed ourselves to ULTIMATE TOOLING in order to demonstrate that we are a genuine service partner for all those who are always at the head of development. Take this ULTIMATE TOOLING catalogue as a first step towards the targeted adaptation of our service structures to your need for qualified support, on the way to your own top products.

Put us to the test - we know that real class must prove itself on a day to day basis!



Thierry Wolter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Welcome to the world of CERATIZIT ...

... a world of unique and consistently innovative solutions for wear parts, cutting tools and wood and stone machining. CERATIZIT is your partner for exceptional and highly personalized hard material products which guarantee economy, resistance and performance. Increasing both the productivity and service life of your products in a very diverse range of industrial sectors is our core competency.

... because 'hard material matters'

Hard materials in general and hard metals in particular are characterized by a range of interesting properties for all applications where maximum wear resistance is required. High pressure, high temperature, the application of abrasive or aggressive media, and the machining of hard materials are only some examples of factors that cause wear and to which hard materials and hard metals must be resistant. The powder-metallurgical production of cutting tools and wear parts enables tailored adaptation of the material properties to the wear criteria.

Ever more powerful machines, facilities and machining methods constantly create new challenges for our development engineers. Intensive research and development activities are our today's investment for the solutions of tomorrow – and beyond.

Our top-quality product range covers all machining methods common in the cutting tools sector: turning, milling, drilling, parting and grooving. Our tools increase productivity in the fields of automotive and mechanical engineering, construction, aerospace and many more.



Guided by corporate values

We employ more than 5,900 people worldwide who are guided by our corporate values in their daily work:



1 The views and focus of our business partners matter
Instead of talking product with customers, we work on real solutions for business partners.

2 Innovative and flexible thinking matters
We have the power to challenge state-of-the-art technologies and the courage to develop intelligent alternatives. Our speed of thought and decisive actions give us a leading edge.

3 Communication matters
Trust and respect enable open communication. We show who we are and what we feel. We keep our promises. We are open to and accept constructive criticism.

4 Employee development matters
We continuously invest in personnel and offer outstanding internal development opportunities. We attract talents around the world and create a favourable environment for long-term personal growth.

5 Professionalism matters
We strive to be professional in everything we do. Our performance leads to results and growth which are always above average.

6 Our environment matters
Environmental protection is a matter of each employee – at home and at work. As a company we guarantee the community to be a ‘considerate neighbour’.

Carbide – a composite material with valuable properties

Cemented carbides are composite materials consisting of a hard component, normally tungsten carbide (WC) and a comparatively soft binder metal, like cobalt (Co). The performance characteristics of carbide are determined by hardness, transverse rupture strength and fracture toughness. With regard to their application, important parameters for the optimization of these characteristics are the cobalt content and the grain size of the metal binder phase. The tungsten carbide grains have an average size of 0.5 up to several micrometres (µm). The cobalt fills the gaps between the carbide grains. When extremely high toughness is required, the cobalt content can amount up to 30%, whereas, for maximum wear resistance, the cobalt content is reduced and the grain size decreased to the submicron range (for example .3 µm).

CERATIZIT produces far above 100 different carbide grades particularly for wear parts, thus offering a customized solution for every application.

Carbide production

W-Ti-Ta oxides

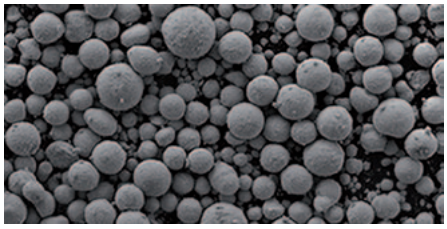


Reduction

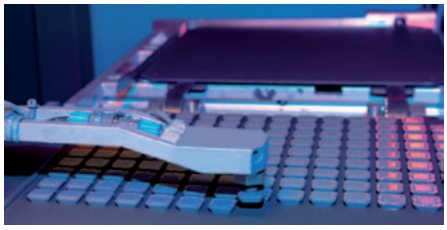
Carbur-izing, mixing and milling process



Granulation



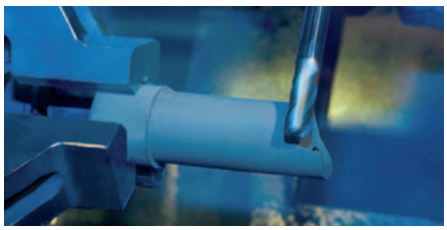
Pressing



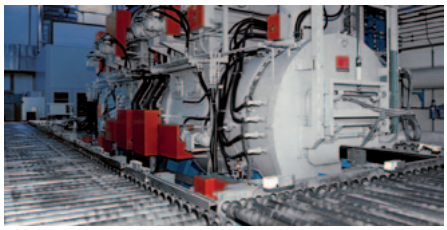
Presintering



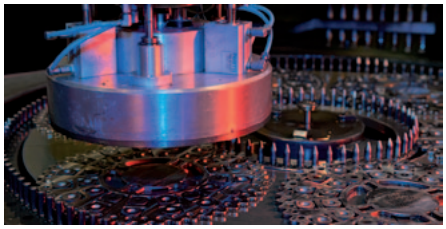
Forming



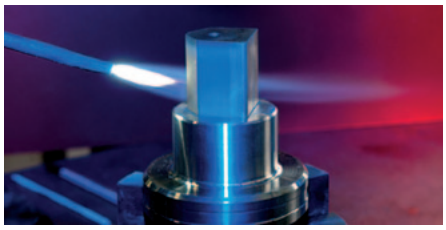
Final sintering



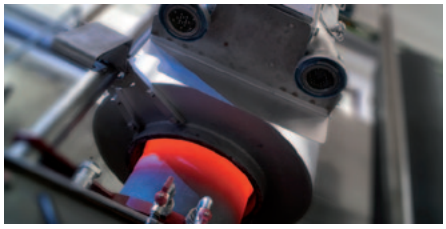
Finishing



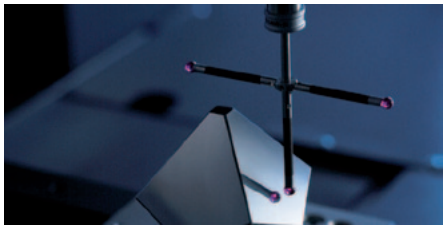
Tool and die construction, mechanical engineering



Coating



Control



Testing (Tooling Academy)



Packaging



Dispatch



CERATIZIT WinTool

Our electronic tooling catalogue CERATIZIT WinTool is a modern tooling information system which provides additional support for you when choosing and applying tools for machining.

Electronic tooling catalogue
CERATIZIT WinTool presents up-to-date and complete data. Well-structured and user-friendly features will help you to find any tool data you may need. You may enter your personal comments for each product.

Easy to use PC software
WinTool is a comprehensive and specialized solution which enables you to organize your CNC production. For additional information go to www.wintool.com. The CERATIZIT catalogue is easy to install. After a short training period you can get started right away.

Extendable
You may export your own data as well as the data of other manufacturers into the electronic tooling catalogue effortlessly.

Continuous 1:1 graphic support
All tool components are described in detail: from the geometries and dimensions to optimal mounting procedures. In addition, complete tools are described and depicted true to scale.

Two versions available: ‘Compact’ and ‘Professional’

Compact
The basic version of WinTool is available at a very low acquisition price.

Professional
In the extended system you may collect your own components and create lists of your own tools. Furthermore, over 20 complete tools can be assembled. All data can be exported.



CERATIZIT E-Techstore

The CERATIZIT online shop offers a comprehensive range of cutting tools, rods and wear parts. According to the application you may choose from a variety of inserts, geometries and grades. We promise you a well-structured navigation and easy user guide!



Speed
You have access to more than 20,000 products online. The extended rapid product search via the material number, ISO designation or characteristics allows you to find the product you need. After ordering you will immediately receive an order confirmation. You may inform yourself online at any time on the delivery status of your products. (Track & Trace)

Services
The CERATIZIT E-Techstore is available to you around the clock. You may check the offer, order, consignments and invoice online. Open orders can be changed at the last minute if you wish to correct them. For this purpose you always use your personal order templates. Should you have any questions, a personal contact partner will additionally be available.

Information
You will receive up-to-date detailed technical information and graphic illustrations for all products in the E-Techstore. You will also be informed about possible connections and suitable accessories. Thanks to the up-to-date availability check applicable to all standard articles you can immediately see when you will receive the requested products.

Business
All products are ordered at net prices and conditions. We guarantee optimal safety through SSL-encoding.



CERATIZIT linkage

Would you like to link your system with CERATIZIT? CERATIZIT supports all common link formats (EDI, XML, OCI, etc.).

Get in touch with your contact person! Our technical engineer will analyze your requirements together with you and will help you when choosing the suitable technology.

Tooling Academy

Inaugurating the Tooling Academy in the year 2007 CERATIZIT set new standards in the technical service field. From classical research, customer-oriented problem solutions to application-specific training courses and seminars both employees and customers make use of the Tooling Academy. New and optimized products are created, some of them are even developed tailored to the customer's needs!
We use seven machines to demonstrate all machining processes common in the field of cutting tools: turning, milling, drilling, parting and grooving. We assess tooling performance and the resulting work piece quality. Simultaneously we analyze the processes by means of cutting tools simulation and are thus able to evaluate their results as compared with practical tests.
The Tooling Academy is always up-to-date - not only in technology but also machinery systems. We apply the latest high-speed camera where the machining processes can be shown in extreme slow motion. In this way we receive detailed information about the entire machining process.

The proximity to our customers is a highly important matter. For this reason, in 2011 we inaugurated another Tooling Academy in Tianjin, China.



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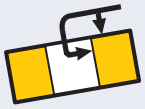
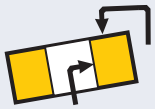
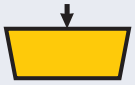
Introduction	Application	Inserts	Tools	Technical information
A2-A7	A60	Maxilock D / Maxilock N A72-A87	A116-A187	A227-A234
A8-A33	A62	Maxilock S A88-A97	A188-A216	A235-A247
A35-A50	A63	Maxilock P A98	A217+A223	A248-A259
A51-A52	A64	Simplex N A99-A104	A224+A225	
A53-A56	A66	Simplex P A105+A108		
	A67	EcoCut A109-A111		
	A68	Profile Master A112		
	A69			
	A69			

CERATIZIT designation system

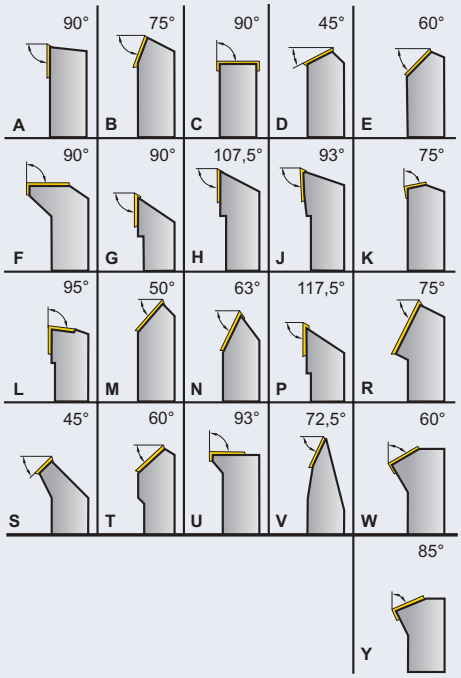
Tool holders

Clamping method

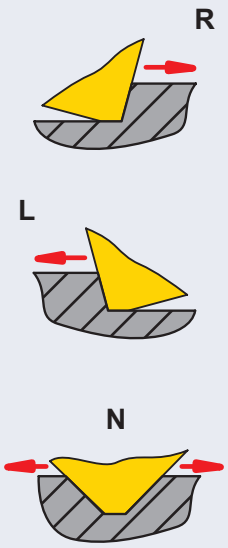
D  Retained from above and via bore	**S**  Retained via centre screw
M  Retained from above and via bore	**P**  Retained via the bore
C  Retained from above	

X Special version

Style



Cutting direction

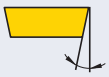


1	2	3	4	5
S	C	L	C	R

Insert shape

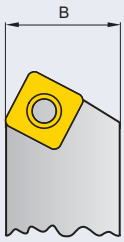
Included angle				35°	V
				55°	D
				75°	E
				80°	C
				86°	M
Included angle				55°	K
				82°	B
				85°	A
Other shapes	90°	L	–		R
	108°	P	90°		S
	120°	H	60°		T
	135°	O	80°		W

Clearance angle

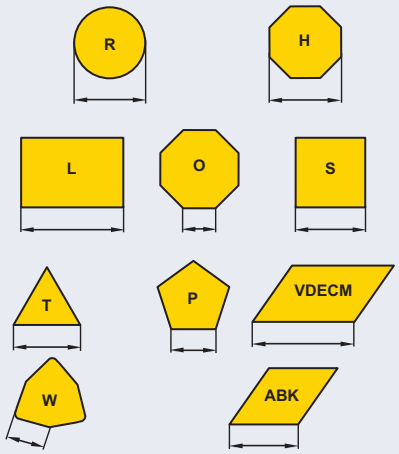


3°	A	25°	F
5°	B	30°	G
7°	C	0°	N
15°	D	11°	P
20°	E		

Clearance angles not included within the standard for which particular information is necessary } O



Shank width



Cutting edge length

25	25	M	12	
6	7	8	9	

Shank height

Tool holder



Cartridge



Round shank

00

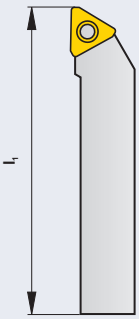
Cartridge

1st position:
C = cartridge

2nd position:
A = ISO 5611

Tool length

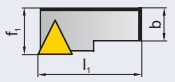
l_1 mm		l_1 mm	
32	**A**	160	**N**
40	**B**	170	**P**
50	**C**	180	**Q**
60	**D**	200	**R**
70	**E**	250	**S**
80	**F**	300	**T**
90	**G**	350	**U**
100	**H**	400	**V**
110	**J**	450	**W**
125	**K**	500	**Y**
140	**L**	Special	**X**
150	**M**		



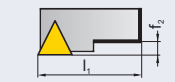
Special tolerances

Qualified
high-precision
tools

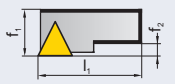
Q



F



B



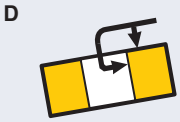
CERATIZIT designation system

Boring bars

Shank version

S	Steel shank	E	As C with coolant hole
A	Steel shank with coolant hole	F	As C with anti-vibration system
B	Steel shank with anti-vibration system	G	As C with coolant hole and anti-vibration system
D	Steel shank with coolant hole and anti-vibration system	H	Heavy metal
C	Carbide shank with steel head	J	Heavy metal with coolant hole

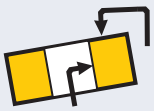
Clamping method



D — Retained from above and via bore



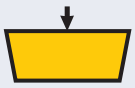
S — Retained via centre screw



M — Retained from above and via bore



P — Retained via the bore



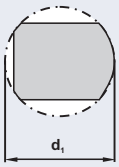
C — Retained from above

X Special version

1	2	3	4	5
S	32	U	S	S

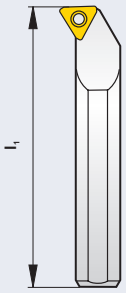
Shank Ø

d_1 mm
08
10
12
16
20
25
32
40
50
60



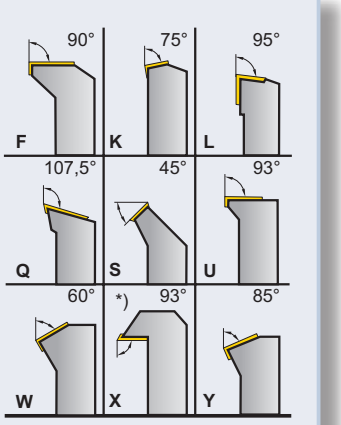
Tool length

l_1 mm	
80	F
100	H
110	J
125	K
140	L
150	M
160	N
170	P
180	Q
200	R
250	S
300	T
350	U
400	V
450	W
500	Y
Special length	X



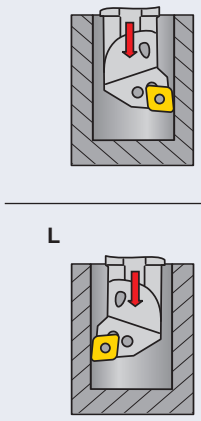
Insert shape

Included angle				35°	V
				55°	D
				75°	E
				80°	C
				86°	M
Included angle				55°	K
				82°	B
				85°	A
Other shapes	90°	L	–		R
	108°	P	90°		S
	120°	H	60°		T
	135°	O	80°		W

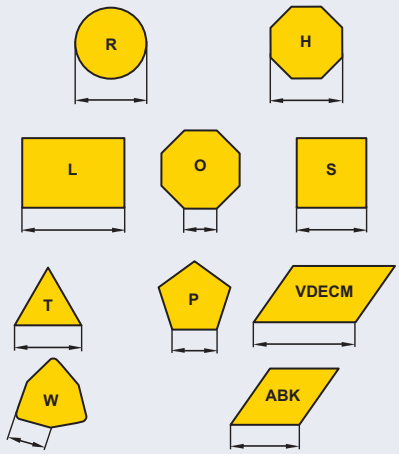


*) CERATIZIT factory standard

Style



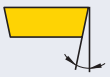
Cutting direction



Cutting edge length

K	C	R	3	
6	7	8	9	

Clearance angle



3°	A	25°	F
5°	B	30°	G
7°	C	0°	N
15°	D	11°	P
20°	E		

Clearance angles not included within the standard for which particular information is necessary } O

CERATIZIT designation system

Inserts

Insert shape

Included angle	35°	V
	55°	D
	75°	E
	80°	C
	86°	M
Included angle	55°	K
	82°	B
	85°	A
Other shapes	90°	L
	108°	P
	120°	H
	135°	O
	–	R
	90°	S
	60°	T
	80°	W

Clearance angles

3°	A	25°	F
5°	B	30°	G
7°	C	0°	N
15°	D	11°	P
20°	E		

Clearance angles not included within the standard for which particular information is necessary } O

Tolerances

	d ±	m ±	s ±
A	0,025	0,005	0,025
F	0,013	0,005	0,025
C	0,025	0,013	0,025
H	0,013	0,013	0,025
E	0,025	0,025	0,025
G	0,025	0,025	0,13
J	0,05-0,15*	0,005	0,025
K	0,05-0,15*	0,013	0,025
L	0,05-0,15*	0,025	0,025
M	0,05-0,15*	0,08-0,20	0,13
N	0,05-0,15*	0,08-0,20	0,025
U	0,08-0,25*	0,13-0,38	0,13

Form of top surface

N	
R	
F	
A	
M, P	
G, P	
W	
T	
Q	
U	
B	
H	
C	
J	
X	Special version

T P U N

1 2 3 4

Tolerances in inch

	d ±	m ±	s ±		d ±	m ±	s ±
A	0,0010	0,0002	0,001	J	0,002-0,006*	0,0002	0,001
F	0,0005	0,0002	0,001	K	0,002-0,006*	0,0005	0,001
C	0,0010	0,0005	0,001	L	0,002-0,006*	0,0010	0,001
H	0,0005	0,0005	0,001	M	0,002-0,006*	0,003-0,008*	0,005
E	0,0010	0,0010	0,001	N	0,002-0,006*	0,003-0,008*	0,001
G	0,0010	0,0010	0,005	U	0,003-0,010*	0,005-0,015*	0,005

* Depends on insert size

Form of top surface

Symbols as above. Changes at inscribed circle IK < 1/4"

IK >1/4"	IK <1/4"
N / R / F	E
A / M / G	D
X	X

ASA and BHMA deviation with regard to ISO
X = special version not according to ISO

	d mm	
	06	16
	08	20
	10	25
	12	32

mm	Inch	mm	mm
06	5/32	3,96	03
09	7/32	5,56	05
11	1/4	6,35	06
16	3/8	9,52	09
22	1/2	12,7	12
27	5/8	15,8	15
33	3/4	19,0	19
44	1	25,4	25

Cutting edge length

Inch	mm	Index
1/16	1,59	01
3/32	2,38	02
1/8	3,18	03
5/32	3,97	T3
3/16	4,76	04
7/32	5,56	05
1/4	6,35	06
5/16	7,94	07
3/8	9,52	09

Insert thickness

Code	Corner radius mm
00	≤ 0,05
01	0,1
02	0,2
04	0,4
08	0,8
12	1,2
16	1,6
24	2,4
32	3,2

RN **00**
RC **MO**

Corner radius

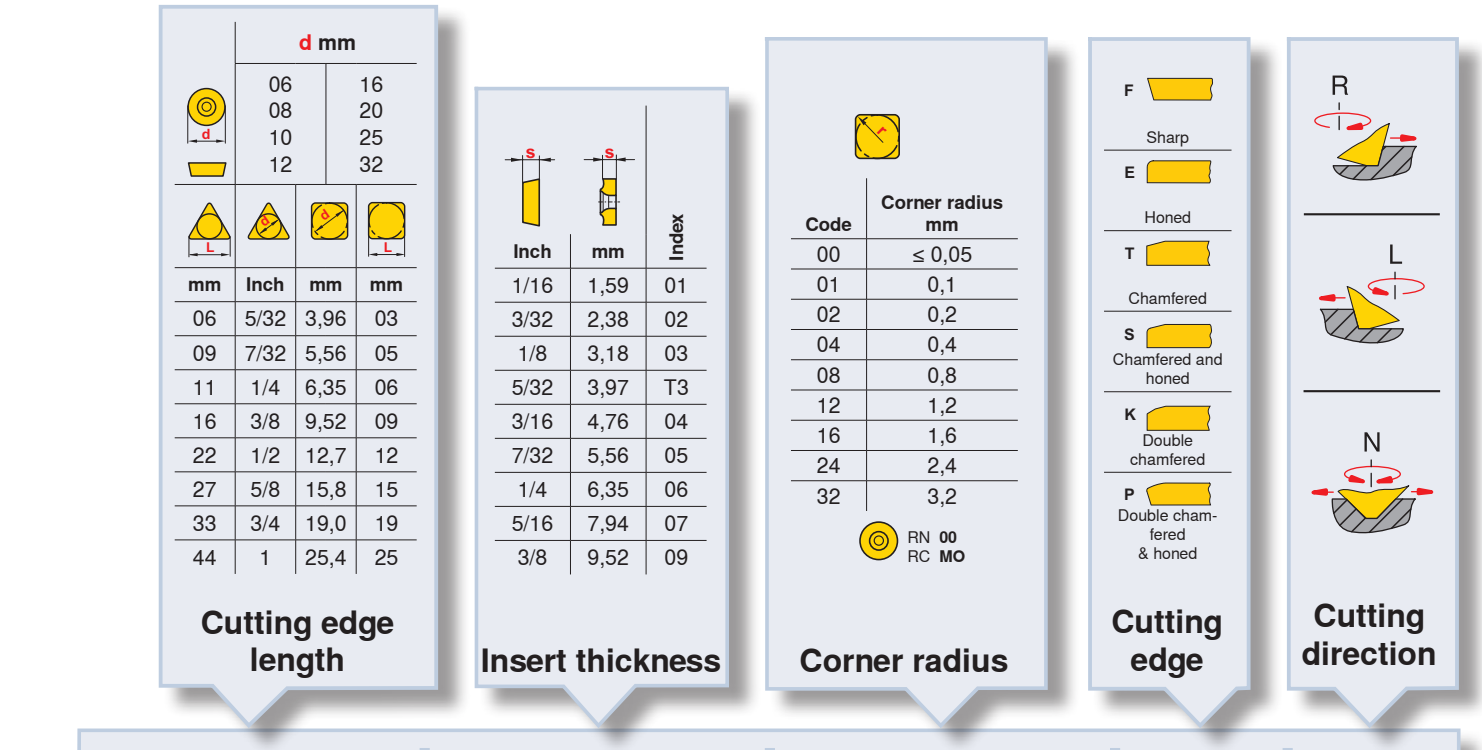
F Sharp
E Honed
T Chamfered
S Chamfered and honed
K Double chamfered
P Double chamfered & honed

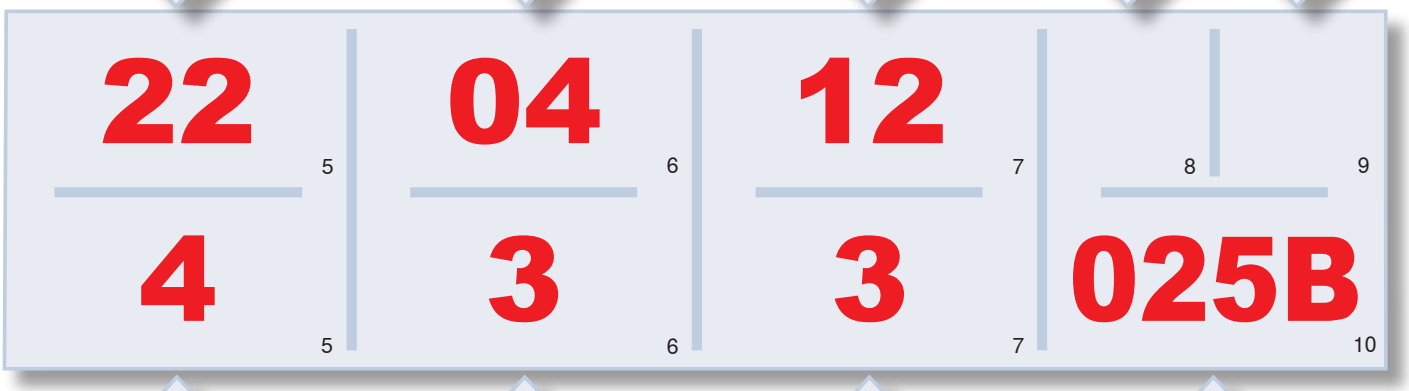
Cutting edge

R
L
N

Cutting direction

22	04	12		
5	6	7	8	9
4	3	3	025B	
5	6	7	10	





Cutting edge length

Code	Inch
2	1/4
3	3/8
4	1/2
5	5/8
6	3/4
8	1

Insert thickness

Code	Inch
1	1/16
2	1/8
3	3/16
4	1/4
5	5/16
6	3/8

Corner radius

Code	Corner radius in inch
X0	.0015
0	.004
.5	.008
1	1/64
2	1/32
3	3/64
4	1/16
5	5/64
6	3/32
7	7/64
8	1/8

RN **00**
RC **MO**

Chamfer type

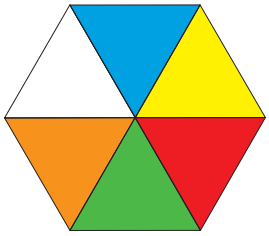
T / S		K / P [1]	
015	0,15 mm	A	05°
020	0,20 mm	B	10°
025	0,25 mm	C	15°
050	0,50 mm	D	20°
075	0,75 mm	E	25°
100	1,00 mm	F	30°

1) For double chamfered cutting edges two letters are used.

For example:

BE = chamfer angle 1 = 10°
chamfer angle 2 = 25°

Material



Based on VDI 3323 CERATIZIT's MasterGuide divides materials into six main groups (P, M, K, N, S, H).
Each is given a colour, according to the system partly adopted in ISO 513.

Blue: steel
Machining, cementation, tempered and constructional steels

Yellow: stainless steel
Ferritic Cr-steels, austenitic CrNi-steels, martensitic Cr-steels, duplex steels

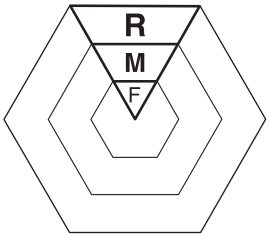
Red: cast iron
Cast iron, grey cast iron, tempered iron, spheroidal cast iron, CGI, sintered iron

Green: non ferrous metals and non metals
Al wrought and Al cast alloys, copper, copper alloys, non metal materials

Orange: heat resistant alloys / titanium
Ni/Co-base alloys, Ti alloys

White: hard materials
Hardened steels (≥ 45 HRC), chilled castings, hard cast irons

Machining application type



Each coloured segment is divided into three sections, and each section indicates the relevant machining application type:

R = rough machining



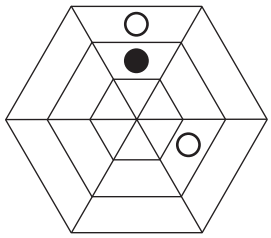
M = medium machining



F = fine machining



Application

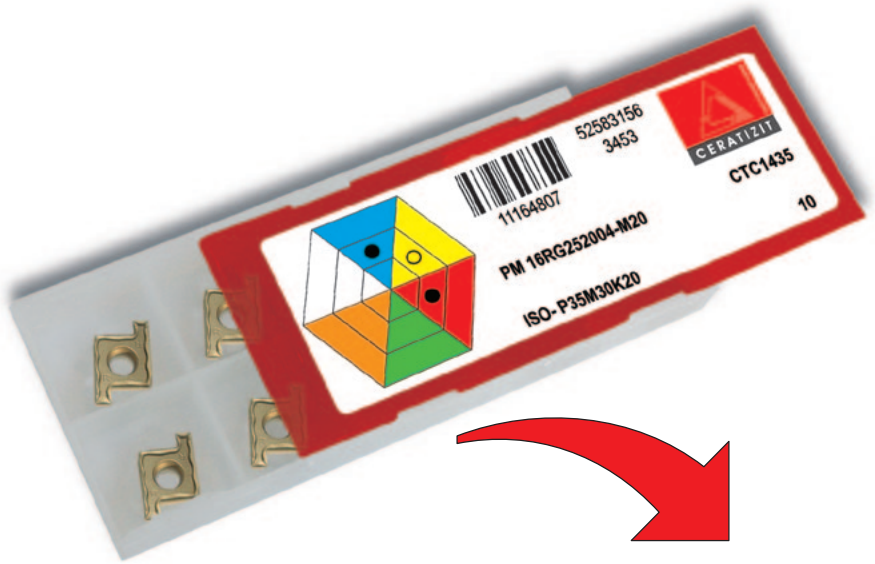


The ideal application area for the insert is indicated by a black circle. Extended applications are indicated by an open circle. The CERATIZIT MasterGuide provides you with an easily understandable structure for choosing a product and enables you to reduce grade and geometry stocks.

● **Main application**

○ **Extended application**

The right indexable insert at a glance



Main application:
Medium machining of steel and cast iron

Extended application:
Medium machining of stainless steel

The CERATIZIT designation system

for new cutting materials

C T C P 1 2 5

Manufacturer: CERATIZIT

Cutting material

W	Uncoated carbide
C	CVD coated carbide
P	PVD coated carbide
T	Uncoated cermet
E	Coated cermet
N	Uncoated silicon nitride
M	Coated silicon nitride
S	Mixed ceramic
I	Sialon
D	PCD
B	CBN
L	CBN coated
H	Sintered HSS

ISO 513 Application range

For example:

05	ISO K05/P05
10	
15	
25-	

Main application (material) Variant 1: number

1	Steel
2	Stainless steel
3	Cast iron
4	Light and non ferrous metals, non metals
5	Heat resistant alloys, titanium
6	Hard materials
7	Universal grade for a variety of applications

Main application (machining method)

1	Turning
2	Milling
3	Parting and grooving
4	Drilling
5	Threading
6	Others
7	Universal grade for a variety of applications

Main application (material) Variant 2: ISO letter

P	Steel
M	Stainless steel
K	Cast iron
N	Light and non ferrous metals, non metals
S	Heat resistant alloys, titanium
H	Hard materials
X	Universal grade for a variety of applications

Grade designation	Standard designation	*Cutting material	Application range 01 05 10 15 20 25 30 35 40 45 50	P Steel	M Stainless	K Cast iron	N Non ferrous metals	S Heat resistant	H Hard materials
AMZ	HC-K10	P		○	○	○	●	○	
CM45	HC-P45	P		●					
	HC-M40	P			●			○	
	HC-K25	P				○	○		
CTC1135	HC-P35	C		●					
	HC-M25	C			○			○	
CTC1425	HC-P25	C		●					
	HC-M20	C			○				
	HC-K15	C				●			
CTC1435	HC-P35	C		●					
	HC-M30	C			○				
	HC-K20	C				○			
CTC2135	HC-P35	C		○					
	HC-M30	C			●			○	
CTC3110	HC-P10	C		○					
	HC-K10	C				●			
CTCK120	HC-P10	C		●					
	HC-K20	C				●			
CTCP115	HC-P15	C		●					
	HC-M10	C			○				
	HC-K25	C				●			
CTCP125	HC-P25	C		●					
	HC-M20	C			○				
	HC-K30	C				●			
CTP2120	HC-M20	P			●			○	
	HC-K20	P				○	○		

● Main application

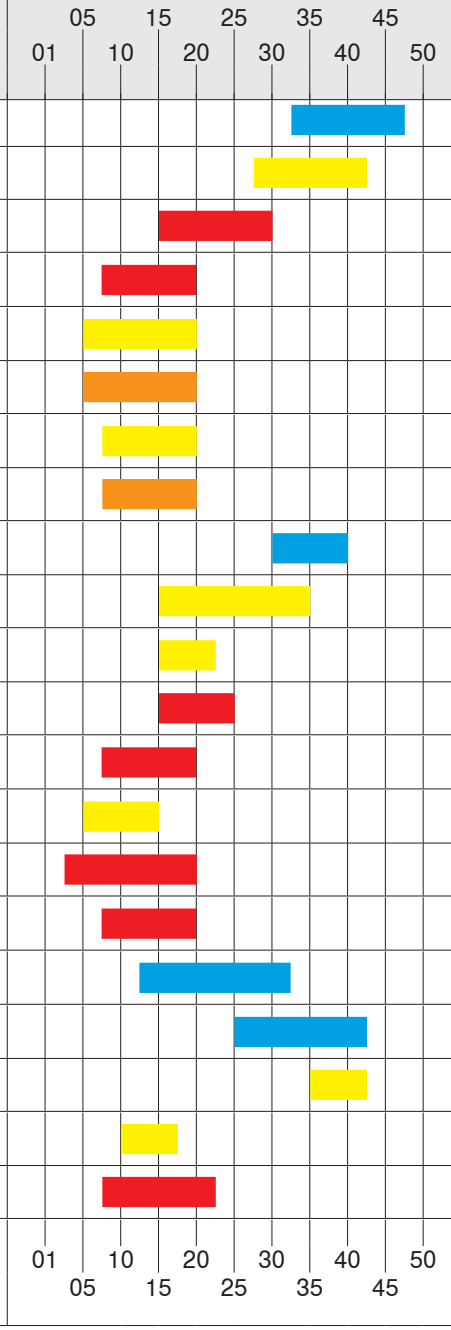
○ Extended application

*Type of cutting material

A10

Grade overview

Grade designation	Standard designation	*Cutting material	Application range	P Steel	M Stainless	K Cast iron	N Non ferrous metals	S Heat resistant	H Hard materials
CTP2440	HC-P40	P		●					
	HC-M35	P			●				
	HC-K25	P					○	○	
CTP4115	HC-K15	P					●		
CTP5110	HC-M15	P			○				
	HC-S15	P						●	
CTP5115	HC-M15	P			○				
	HC-S15	P						●	
CTPM125	HC-P35	P		●					
	HC-M25	P			●			○	
CTW7120	HW-M20	W			○				
	HW-K20	W					●	○	
H10T	HW-K15	W				●	●		
H210T	HW-M10	W			○				
	HW-K10	W				○	●	●	
H216T	HW-K15	W				●	●		
S26T	HW-P20	W		●	○				
S40T	HW-P40	W		●					
	HW-M40	W			●				
U17T	HW-M15	W						○	
	HW-K15	W					●		



● Main application

○ Extended application

***Type of cutting material**

A10

Grade designation	Standard designation	*Cutting material	Application range	P Steel	M Stainless	K Cast iron	N Non ferrous metals	S Heat resistant	H Hard materials
TCC410	HC-P10	E		●					
	HC-M10	E			○				
	HC-K05	E				●			
TCM10	HT-P15	T		●					
	HT-M10	T			●				
	HT-K10	T				○			
TCM407	HT-P10	T		●					
	HT-M05	T			○				
	HT-K05	T				○			
TSM20	HW-K15	W				●	●	●	
TSM30	HW-K30	W				○	●	○	
U17T	HW-M15	W						○	
	HW-K15	W					●		

Application range: 01 05 10 15 20 25 30 35 40 45 50

● Main application

○ Extended application

*Type of cutting material

A10

Grade overview

Grade designation	Standard designation	*Cutting material	Application range 0 05 10 15 20 25	P Steel	M Stainless	K Cast iron	N Non ferrous metals	S Heat resistant	H Hard materials
CTD4110	DP-K05	D					●		
CTD4125	DP-K01	D					●		
CTM3110	CC-K10	M				●			
CTN3105	CN-K05	N				●			
CTN3110	CN-K10	N				●			
CTS3105	CM-K05	S				●			●
TA100	BN-K03	B				●			●
TA120	BN-K05	B				○			●
TA201	BN-K10	B				○		○	●

● Main application

○ Extended application

*Type of cutting material

A10

Carbide

Reference	Carbide group
HW	Uncoated carbide, consisting mainly of tungsten carbide (WC)
HT[1)]	Uncoated carbide, consisting mainly of titanium carbide (TiC) or titanium nitride (TiN) or both
HC	Carbides as above, but coated

Ceramic

Reference	Ceramic group
CA	Oxide ceramic, consisting mainly of aluminium oxide (Al_2O_3)
CM	Mixed ceramic, based on aluminium oxide (Al_2O_3), but with different oxide components
CN	Nitride ceramic, consisting mainly of silicon nitride (Si_3N_4)
CC	Ceramics as above, but uncoated

Diamond

Reference	Diamond group
DP	Polycrystalline diamond[2)]

[2)] Polycrystalline diamond and polycrystalline boron nitride are also called ultra-hard cutting materials.

Boron nitride

Reference	Boron nitride group
BN	Cubic crystalline boron nitride (polycrystalline boron nitride) [2)]

[1)] These carbides are also called ‘cermets’.

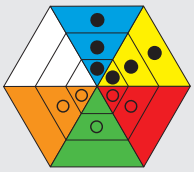
[2)] Polycrystalline diamond and polycrystalline boron nitride are also called ultra-hard cutting materials.

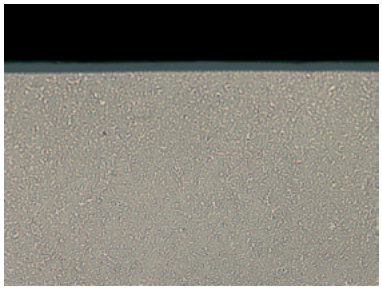
Grade description

Steel

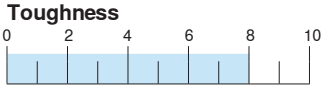
CM45

HC-P45
HC-M40
HC-K25

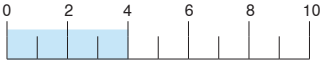




Toughness



Wear resistance



Composition:
Co 10.0%; WC balance

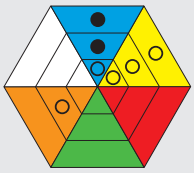
Grain size:
.7 µm (submicron grade)

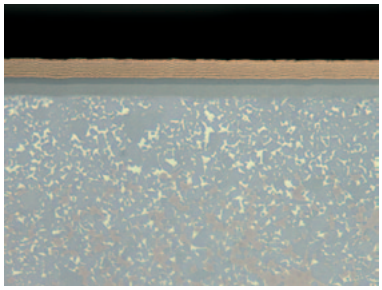
Hardness:
HV 1600

Coating specification:
PVD
TiAlN; 2 - 4 µm

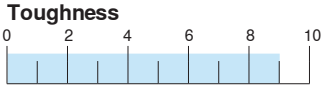
CTC1135

HC-P35
HC-M25

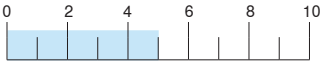




Toughness



Wear resistance



Composition:
Co 9.6%; mixed carbides 7.4%; WC balance

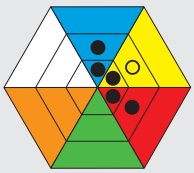
Grain size:
1 - 2 µm

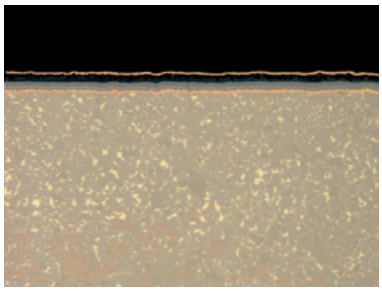
Hardness:
HV 1400

Coating specification:
CVD
Ti (C,N) + Ti (C,N) + TiN + Ti (N,B) + Ti (C,N) + TiN; 12 µm

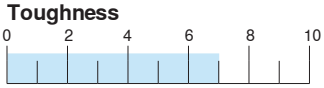
CTC1425

HC-P25
HC-M20
HC-K15

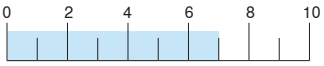




Toughness



Wear resistance



Composition:
Co 7.0%; mixed carbides 8%; WC balance

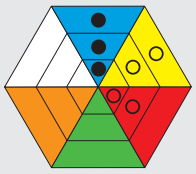
Grain size:
1 - 2 µm

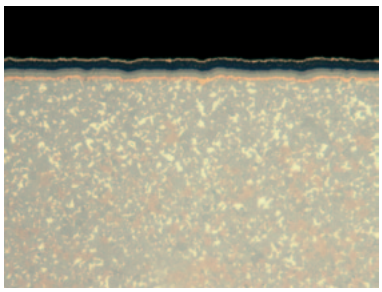
Hardness:
HV 1450

Coating specification:
CVD
TiN + Ti (C,N) + Ti (N,B) + Al_2O_3 + Ti (C,N,B); 6 µm

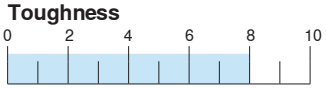
CTC1435

HC-P35
HC-M30
HC-K20

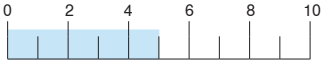




Toughness



Wear resistance



Composition:
Co 9.6%; mixed carbides 7.4%; WC balance

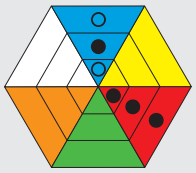
Grain size:
1 - 2 μm

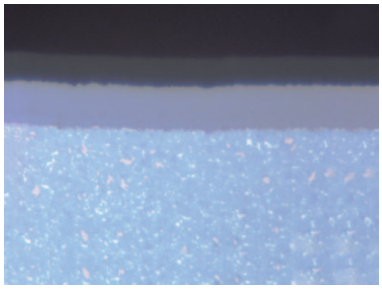
Hardness:
HV 1400

Coating specification:
CVD
TiN + Ti (C,N) + Ti (N,B) + Al_2O_3 + Ti (C,N,B);
6 μm

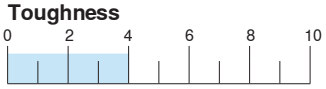
CTCK120

HC-P10
HC-K20





Toughness



Wear resistance



Composition:
Co 6.0%; TaC 2.0%; WC balance

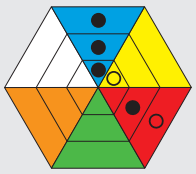
Grain size:
1 μm

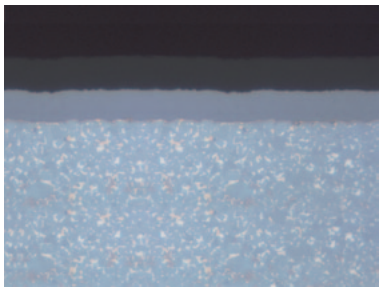
Hardness:
HV 1630

Coating specification:
CVD
Ti (C,N) + Al_2O_3; 15.5 μm

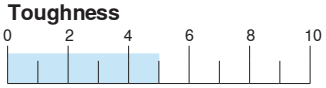
CTCP115

HC-P15
HC-M10
HC-K25

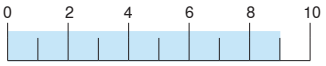




Toughness



Wear resistance



Composition:
Co 5.8%; mixed carbides 6.4%; WC balance

Grain size:
1 - 2 μm

Hardness:
HV 1550

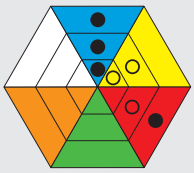
Coating specification:
CVD
Ti (C,N) + Al_2O_3; 18.5 μm

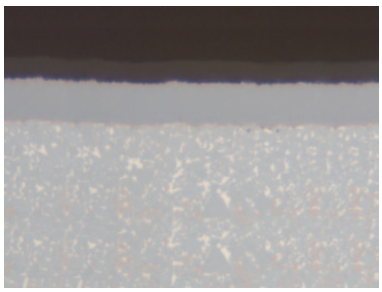
Grade description

Steel

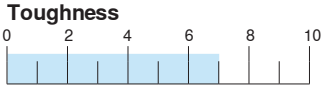
CTCP125

HC-P25
HC-M20
HC-K25

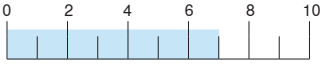




Toughness



Wear resistance



Composition:
Co 7.0%; mixed carbides 8.0%; WC balance

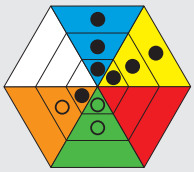
Grain size:
1 - 2 µm

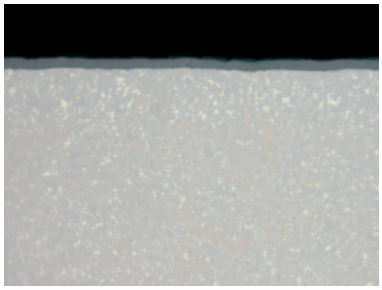
Hardness:
HV 1450

Coating specification:
CVD
Ti (C,N) + Al_2O_3; 15 µm

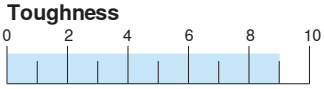
CTP2440

HC-P40
HC-M35
HC-K25

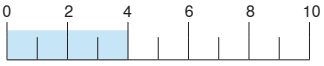




Toughness



Wear resistance



Composition:
Co 9.6%; mixed carbides 7.4%; WC balance

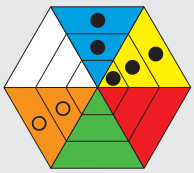
Grain size:
1 - 2 µm

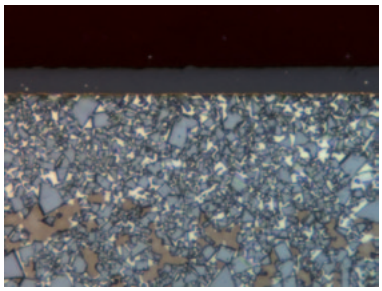
Hardness:
HV 1400

Coating specification:
PVD
TiAlN; 3 - 5 µm

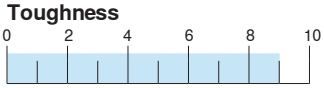
CTPM125

HC-P35
HC-M25

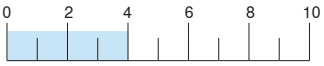




Toughness



Wear resistance



Composition:
Co 9.6%; mixed carbides 7.8%; other .4%; WC balance

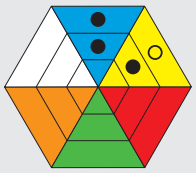
Grain size:
1 - 2 µm

Hardness:
HV 1460

Coating specification:
PVD
TiN / TiAlN; 6 µm

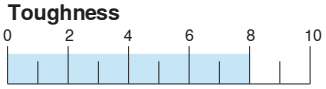
S40T

HW-P40
HW-M40





Toughness



Wear resistance



Composition:
Co 11.0%; mixed carbides 12.0%; WC balance

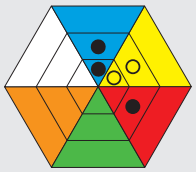
Grain size:
1 - 2 μm

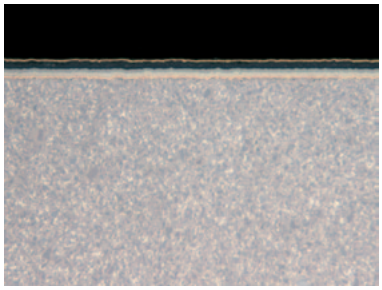
Hardness:
HV_{30} 1420

Properties, application:
- High toughness
- Medium to low cutting speed
- For universal application on steel

TCC410

HC-P10
HC-M10
HC-K05





Toughness



Wear resistance



Composition: cermet
Co/Ni 12.2%; WC 15.0%; TaNbC 10.0%; TiCN balance

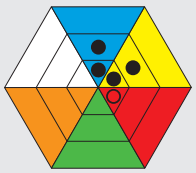
Hardness:
HV 1620

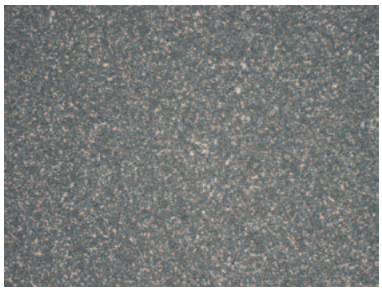
Coating specification:
CVD
TiN + Ti (C,N) + Ti (C,N) + Al_2O_3 + Ti (C,N,B); 6 μm

Properties, application:
- Excellent resistance to oxidation

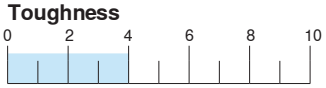
TCM10

HT-P15
HT-M10
HT-K10

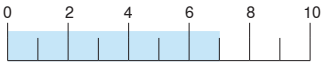




Toughness



Wear resistance



Composition: cermet
Co/Ni 12.2%; WC 15.0%; TaNbC 10.0%; TiCN balance

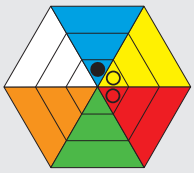
Hardness:
HV 1620

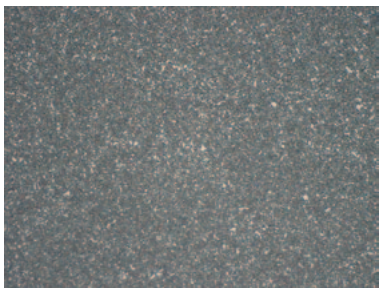
Grade description

Steel

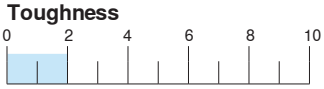
TCM407

HT-P10
HT-M05
HT-K05

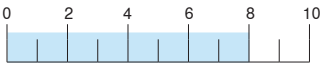




Toughness



Wear resistance



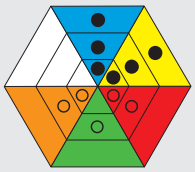
Composition: cermet
Co/Ni 8.0%; WC 16.0%; TaNbC 10.0%; TiCN balance

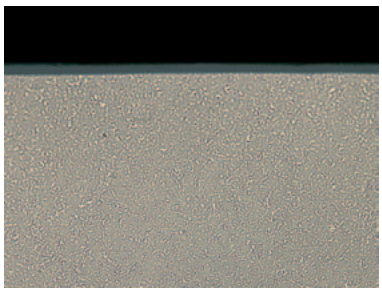
Hardness:
HV 1780

Properties, application:
- For very high cutting speeds
- Ideal for finishing

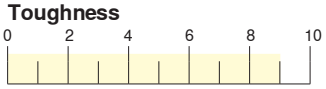
CM45

HC-P45
HC-M40
HC-K25





Toughness



Wear resistance



Composition:
Co 10.0%; WC balance

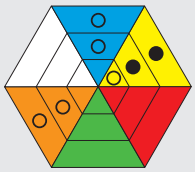
Grain size:
.7 µm (submicron grade)

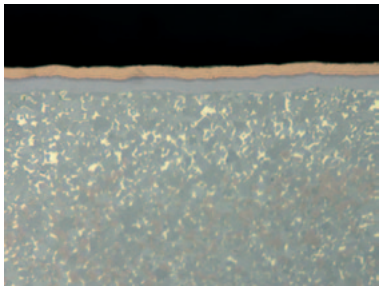
Hardness:
HV 1600

Coating specification:
PVD
TiAlN; 2 - 4 µm

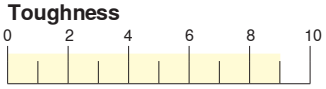
CTC2135

HC-P35
HC-M30

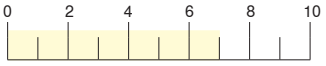




Toughness



Wear resistance



Composition:
Co 9.6%; mixed carbides 7.4%; WC balance

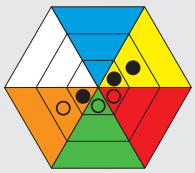
Grain size:
1 - 2 µm

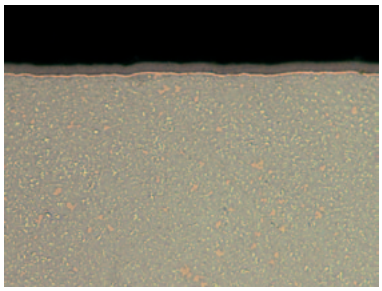
Hardness:
HV 1400

Coating specification:
CVD; Ti (C,N) + Ti (C,N) + TiN + Ti (N,B) + Ti (C,N) + TiN; 6 µm

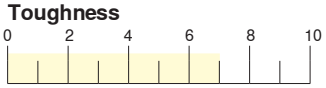
CTP2120

HC-M20
HC-K20





Toughness



Wear resistance



Composition:
Co 10.0%; mixed carbides 2.0%; WC balance

Grain size:
1 µm

Hardness:
HV 1560

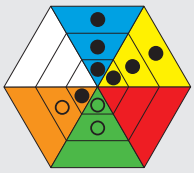
Coating specification:
PVD
TiAlN; 2 - 5 µm

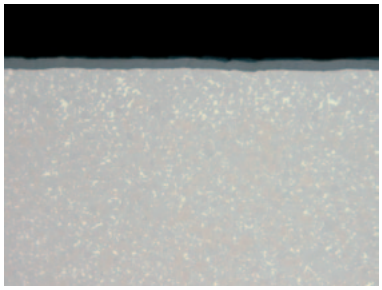
Grade description

Stainless steel

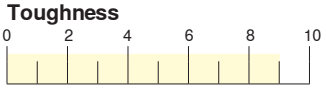
CTP2440

HC-P40
HC-M35
HC-K25





Toughness



Wear resistance



Composition:
Co 9.6%; mixed carbides 7.4%; WC balance

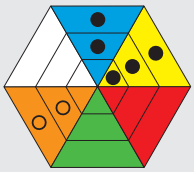
Grain size:
1 - 2 µm

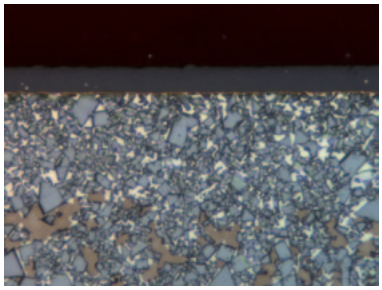
Hardness:
HV 1400

Coating specification:
PVD
TiAlN; 3 - 5 µm

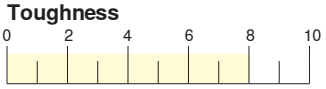
CTPM125

HC-P35
HC-M25





Toughness



Wear resistance



Composition:
Co 9.6%; mixed carbides 7.8%; other .4%; WC balance

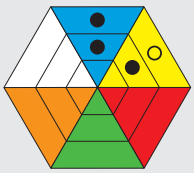
Grain size:
1 - 2 µm

Hardness:
HV 1460

Coating specification:
PVD
TiN / TiAlN; 6 µm

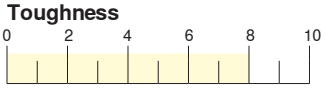
S40T

HW-P40
HW-M40





Toughness



Wear resistance



Composition:
Co 11.0%; mixed carbides 12.0%; WC balance

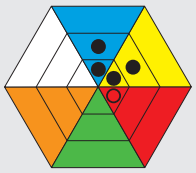
Grain size:
1 - 2 µm

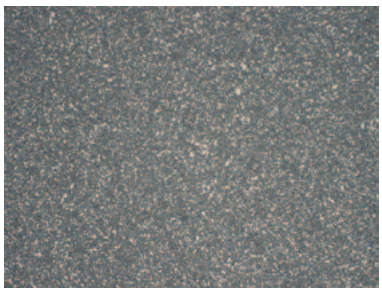
Hardness:
HV_{30} 1420

Properties, application:
- High toughness
- Medium to low cutting speed
- For universal application on steel

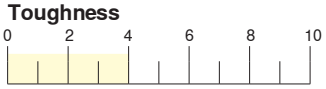
TCM10

HT-P15
HT-M10
HT-K10

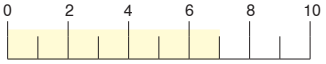




Toughness



Wear resistance



Composition: cermet
Co/Ni 12.2%; WC 15.0%; TaNbC 10.0%; TiCN balance

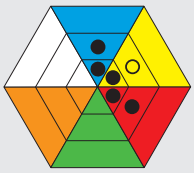
Hardness:
HV 1620

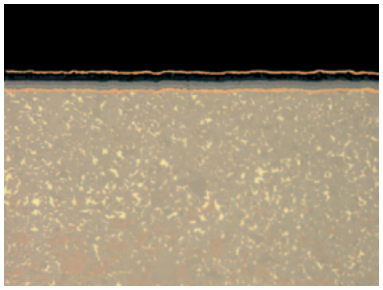
Grade description

Cast iron

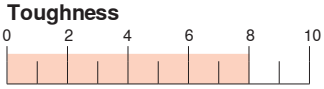
CTC1425

HC-P25
HC-M20
HC-K15

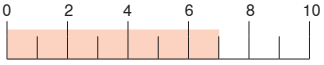




Toughness



Wear resistance



Composition:
Co 7.0%; mixed carbides 8%; WC balance

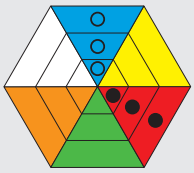
Grain size:
1 - 2 µm

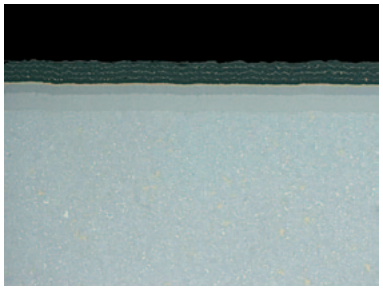
Hardness:
HV 1450

Coating specification:
CVD
TiN + Ti (C,N) + Ti (N,B) + Al_2O_3 + Ti (C,N,B); 6 µm

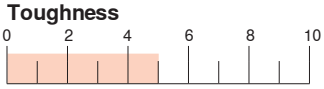
CTC3110

HC-P10
HC-K10

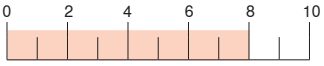




Toughness



Wear resistance



Composition:
Co 6.0%; TaC 2.0%; WC balance

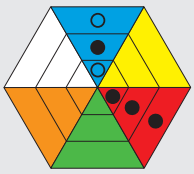
Grain size:
1 µm

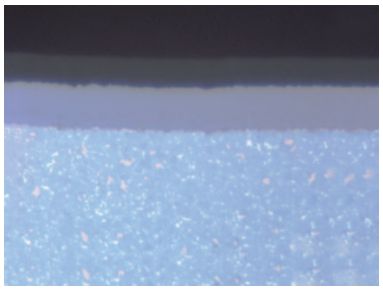
Hardness:
HV 1650

Coating specification:
CVD
Ti (C,N) Ti (C,N) Ti (C,N,B) + Al_2O_3; 16 µm

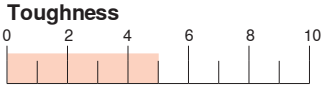
CTCK120

HC-P10
HC-K20

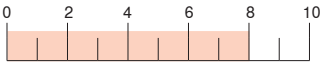




Toughness



Wear resistance



Composition:
Co 6.0%; TaC 2.0%; WC balance

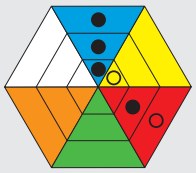
Grain size:
1 µm

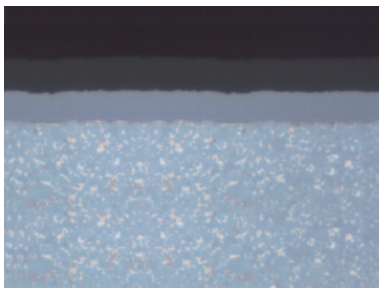
Hardness:
HV 1630

Coating specification:
CVD
Ti (C,N) + Al_2O_3; 15.5 µm

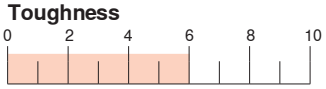
CTCP115

HC-P15
HC-M10
HC-K25

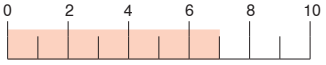




Toughness



Wear resistance



Composition:
Co 5.8%; mixed carbides 6.4%; WC balance

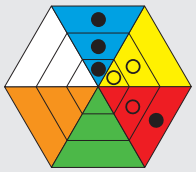
Grain size:
1 - 2 µm

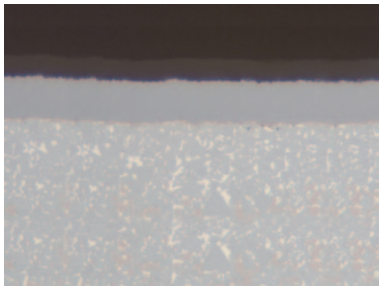
Hardness:
HV 1550

Coating specification:
CVD
Ti (C,N) + Al_2O_3; 18.5 µm

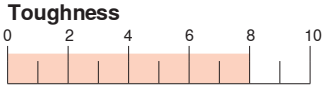
CTCP125

HC-P25
HC-M20
HC-K25

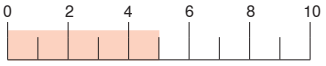




Toughness



Wear resistance



Composition:
Co 7.0%; mixed carbides 8.0%; WC balance

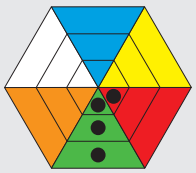
Grain size:
1 - 2 µm

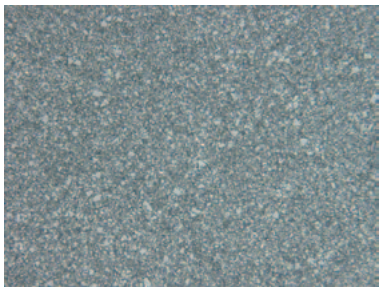
Hardness:
HV 1450

Coating specification:
CVD
Ti (C,N) + Al_2O_3; 15 µm

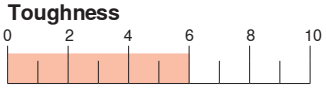
H10T

HW-K15

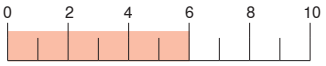




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

Grain size:
1 µm

Hardness:
HV_{30} 1630

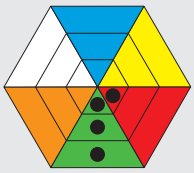
Properties, application:
- Optimally suitable for aluminium
- High wear resistance
- High heat resistance
- Low tendency to adhesion

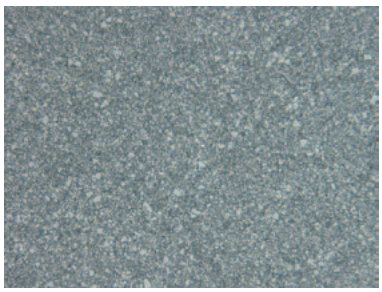
Grade description

Cast iron

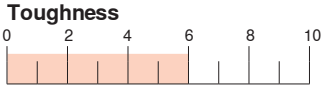
H216T

HW-K15

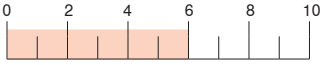




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

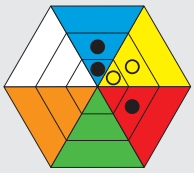
Grain size:
1 μm

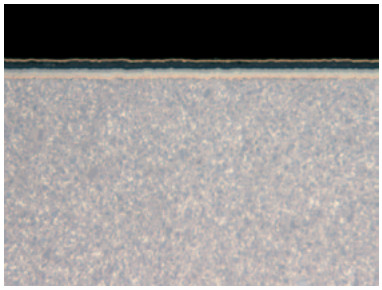
Hardness:
HV_{30} 1630

Properties, application:
- Optimally suitable for aluminium
- High wear resistance
- High heat resistance
- Low tendency to adhesion

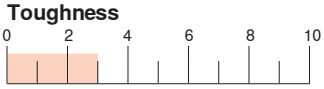
TCC410

HC-P10
HC-M10
HC-K05

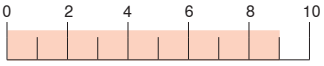




Toughness



Wear resistance



Composition: cermet
Co/Ni 12.2%; WC 15.0%; TaNbC 10.0%; TiCN balance

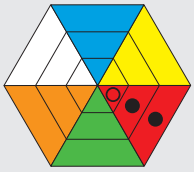
Hardness:
HV 1620

Coating specification:
CVD
TiN + Ti (C,N) + Ti (C,N) + Al_2O_3 + Ti (C,N,B); 6 μm

Properties, application:
- Excellent resistance to oxidation

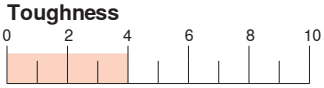
CTM3110

CC-K10

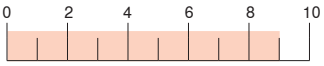




Toughness



Wear resistance



Composition:
Si_3N_4

Grain size:
> 2 μm

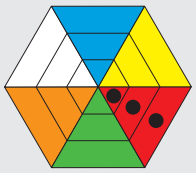
Hardness:
HV 1550

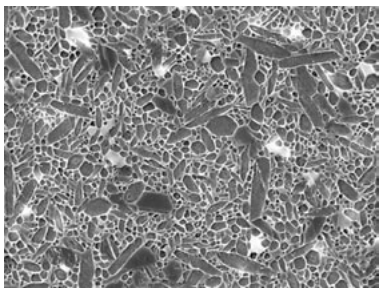
Coating specification:
CVD
Ti (C,N) + TiN; > 2μm

Properties, application:
- For chromium cast alloys

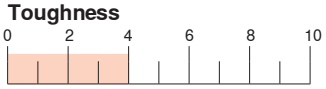
CTN3105

CN-K05

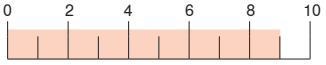




Toughness



Wear resistance



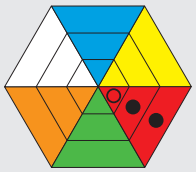
Composition:
β - Si_3N_4

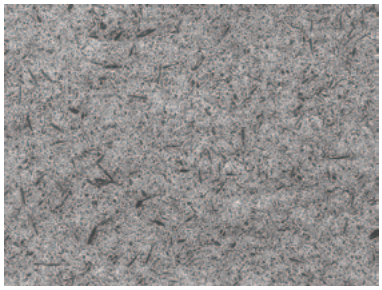
Hardness:
HV10 1620

Properties, applications:
- Turning and milling of grey cast and spheroidal cast iron at high cutting speeds

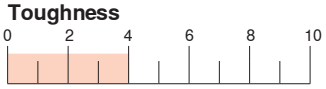
CTN3110

CN-K10





Toughness



Wear resistance



Composition:
Si_3N_4

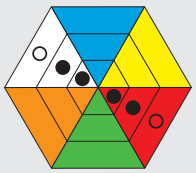
Grain size:
> 2 µm

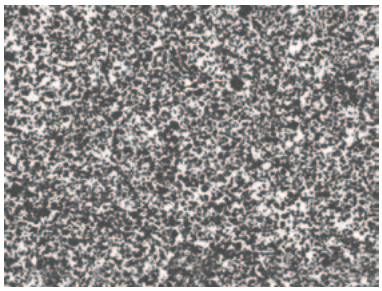
Hardness:
HV10 1500

Properties, application:
- For roughing

CTS3105

CM-K05

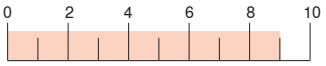




Toughness



Wear resistance



Composition:
Al_2O_3; TiC

Grain size:
> 1 µm

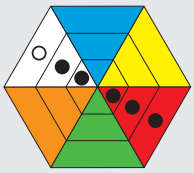
Hardness:
HV 2100

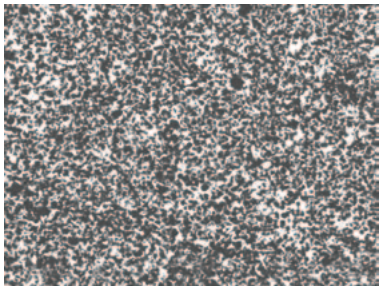
Grade description

Cast iron

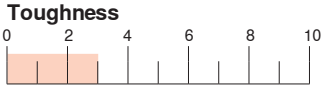
CTS3110

CM-K10





Toughness



Wear resistance



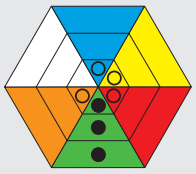
Composition:
Al_2O_3 + Ti (C,N)

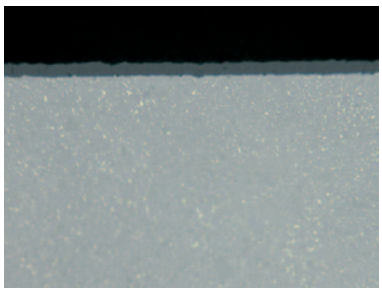
Grain size:
> 1 μm

Hardness:
HV10 2200

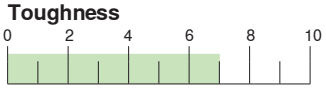
AMZ

HC-K10





Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

Grain size:
1 µm

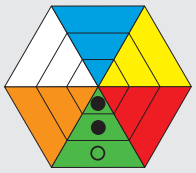
Hardness:
HV 1630

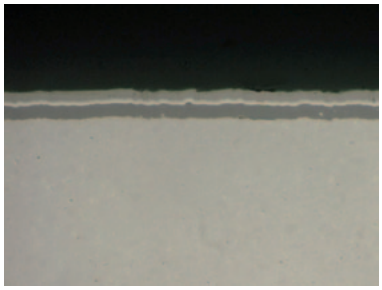
Coating specification:
PVD
TiAlN; 2 - 4 µm

Properties, application:
- Optimally suitable for aluminium and cast iron
- Low tendency to adhesion

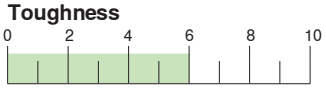
CTP4115

HC-K15





Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

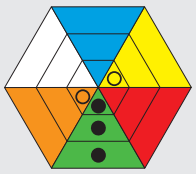
Grain size:
0.8 µm

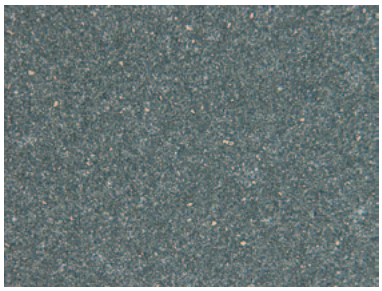
Hardness:
HV 1820

Coating specification:
PVD
(Ti,Al)N; 5 µm

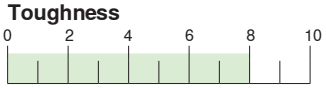
CTW7120

HW-M20
HW-K20





Toughness



Wear resistance



Composition:
Co 10.0%; WC balance

Grain size:
.7 µm (submicron grade)

Hardness:
HV_{30} 1550

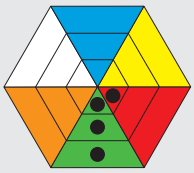
Properties, application:
- Ideal for non ferrous metals
- Substrate for PVD coatings

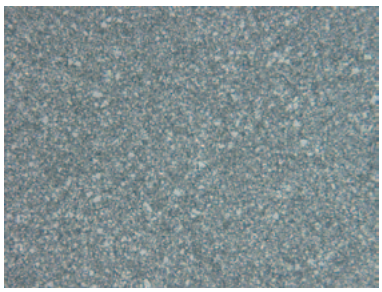
Grade description

Non ferrous metals and non metals

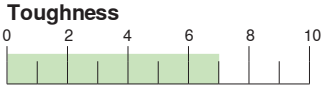
H10T

HW-K15

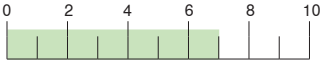




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

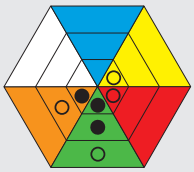
Grain size:
1 μm

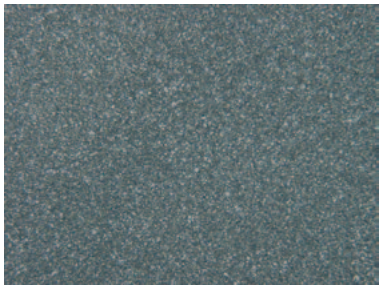
Hardness:
HV_{30} 1630

Properties, application:
- Optimally suitable for aluminium
- High wear resistance
- High heat resistance
- Low tendency to adhesion

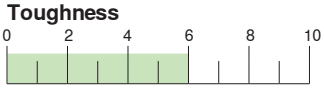
H210T

HW-M10
HW-K10

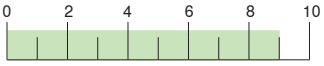




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

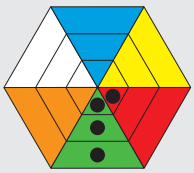
Grain size:
.8 μm (submicron grade)

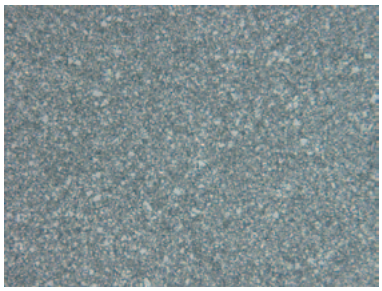
Hardness:
HV 1850

Properties, application:
- Ideal for heat resistant alloys, titanium, refractory metals (W, Mo), aluminium, glass & carbon fibre reinforced plastics
- Low tendency to adhesion

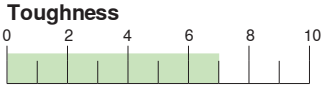
H216T

HW-K15

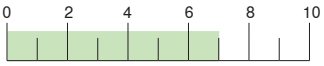




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

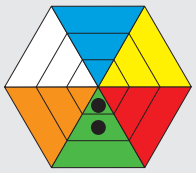
Grain size:
1 μm

Hardness:
HV_{30} 1630

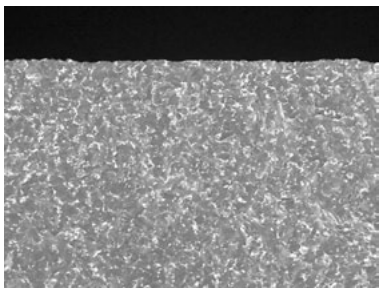
Properties, application:
- Optimally suitable for aluminium
- High wear resistance
- High heat resistance
- Low tendency to adhesion

CTD4110

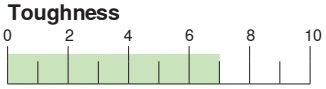
DP-K05



For abrasive non ferrous metals, plastic, graphite



Toughness



Wear resistance



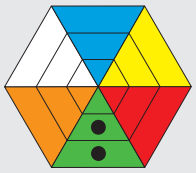
Composition:
Polycrystalline diamond (PCD)

Polycrystalline diamond:
~ 5 µm

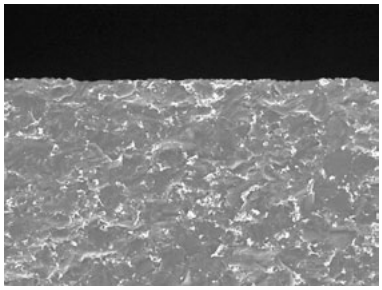
Properties, application:
- Maximum wear resistance and hardness
- Low toughness

CTD4125

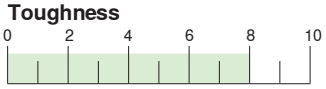
DP-K01



For non ferrous metals, plastic



Toughness



Wear resistance



Composition:
Polycrystalline diamond (PCD)

Grain size:
~ 25 µm

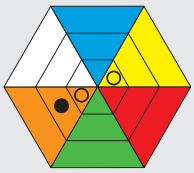
Properties, application:
- High wear resistance
- Good toughness
- Suitable for interrupted cut

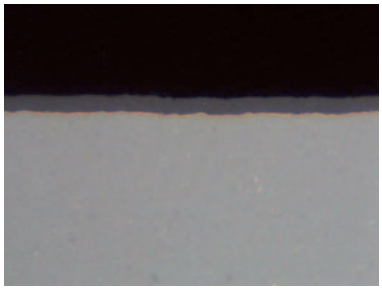
Grade description

Heat resistant alloys / titanium

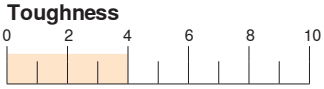
CTP5110

HC-M15
HC-S15

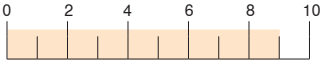




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

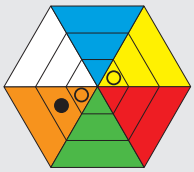
Grain size:
.8 µm

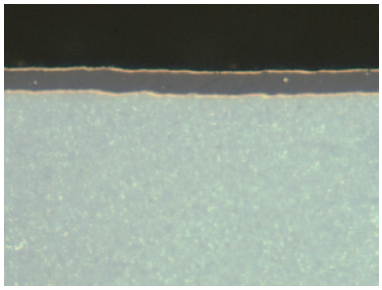
Hardness:
HV 1820

Coating specification:
PVD
(Ti,Al)N; 4 µm

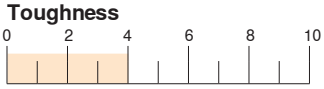
CTP5115

HC-M15
HC-S15

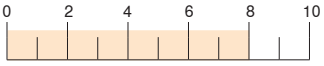




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

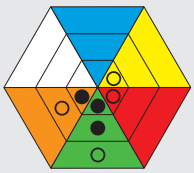
Grain size:
.8 µm

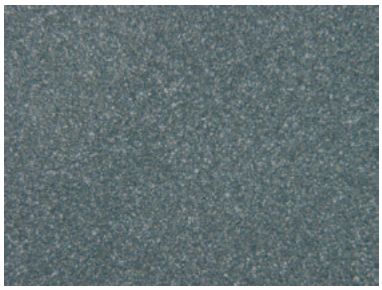
Hardness:
HV 1820

Coating specification:
PVD
TiN + (Ti,Al)N + TiN; 4 µm

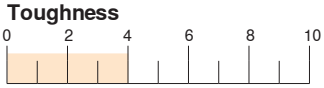
H210T

HW-M10
HW-K10

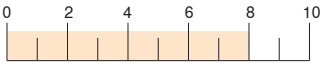




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

Grain size:
.8 µm (submicron grade)

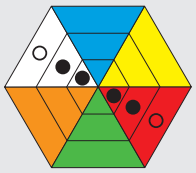
Hardness:
HV 1850

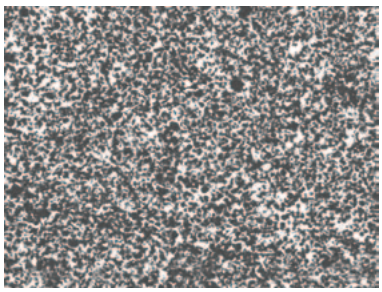
Properties, application:

- Ideal for heat resistant alloys, titanium, refractory metals (W, Mo), aluminium, glass & carbon fibre reinforced plastics
- Low tendency to adhesion

CTS3105

CM-K05

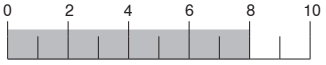




Toughness



Wear resistance



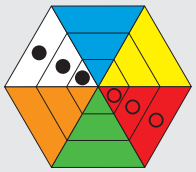
Composition:
Al_2O_3; TiC

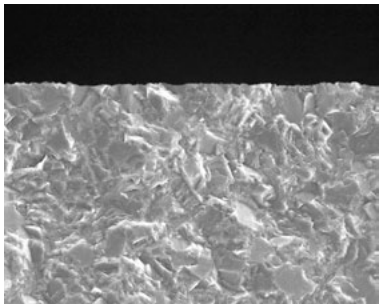
Grain size:
> 1 µm

Hardness:
HV 2100

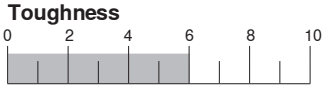
TA100

BN-K03

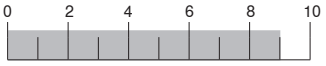




Toughness



Wear resistance



Composition:
Cubic boron nitride (CBN), 90 vol.% + binder (Al-Si)

Grain size:
~ 20 µm

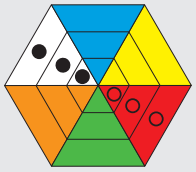
Insert form:
Solid CBN

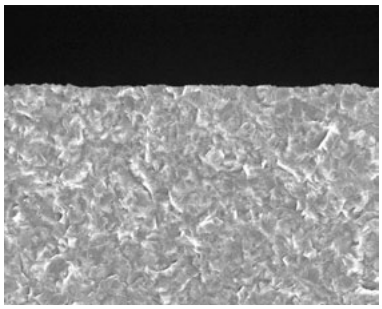
All tempered materials, sintered metals

Properties, appliaction:
- Very high hardness
- Very good suitability for dry machining

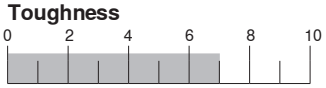
TA120

BN-K05

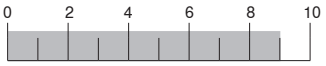




Toughness



Wear resistance



Composition:
Cubic boron nitride (CBN), 80 vol.% + binder (ceramic)

Grain size:
~ 15 µm

Insert form:
Solid CBN

Particularly suitable for chilled castings

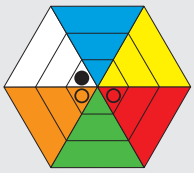
Properties, application:
- Very good suitability for dry machining

Grade description

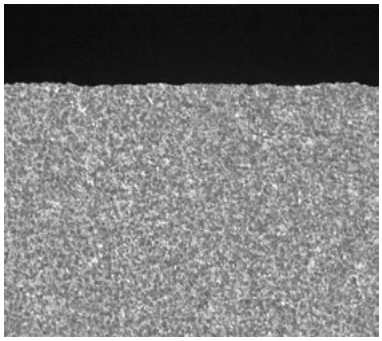
Hard materials

TA201

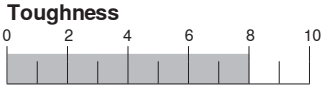
BN-K10



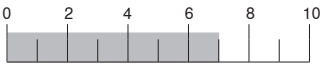
Particularly suitable for tempered steels



Toughness



Wear resistance

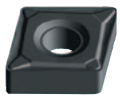
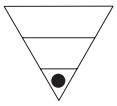
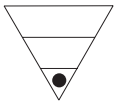
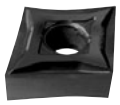
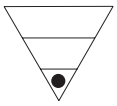
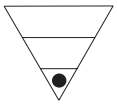
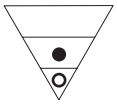


Composition:
Cubic boron nitride (CBN), 65 vol.% + binder (TiN)

Grain size:
~ 2 μm

Insert type:
Brazed segment

Properties, application:
- Very good suitability for dry machining
- For finishing

Chip groove (R / M / F)		Machining type	Material	Consistent cutting depth	Inconsistent cutting depth	Interrupted cut
-CF			●	TCC410	–	–
			●	TCM10	–	–
			●	TCC410	–	–
				–	–	–
				–	–	–
-F30			○	CTPM125	CTPM125	–
			●	CTPM125	CTPM125	–
				–	–	–
				–	–	–
				–	–	–
-F32				–	–	–
			●	CTP2120	CTP2120	–
			○	CTP2120	–	–
			○	CTP2120	CTP2120	–
			●	CTP2120	–	–
-TF			●	CTCP115	CTCP125	CTC1135
			●	CTCP125	CTC1135	CTC1135
			○	CTCP125	CTCP125	CTCP125
				–	–	–
			○	CTCP125	CTC1135	–
-M30			○	CTPM125	CTPM125	CTPM125
			●	CTPM125	CTPM125	CTPM125
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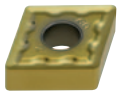
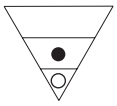
				–	–	–
			○	–	CTPM125	–
-M34				–	–	–
			●	CTP5110/CTP5115	CTP5115	–
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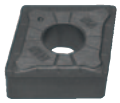
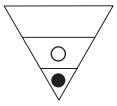
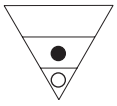
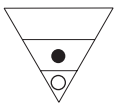
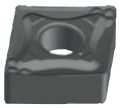
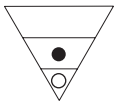
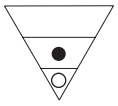
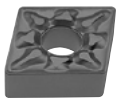
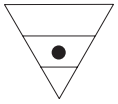
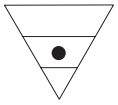
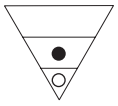
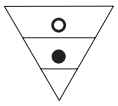
				–	–	–
			●	CTP5110/CTP5115	CTP5110/CTP5115	–
-TFQ			●	TCC410	CTCP115	–
			○	TCC410	CTCP125	–
			○	TCC410	–	–
				–	–	–
				–	–	–
-TMQ			●	CTCP115	CTCP125	–
			○	CTCP115	CTCP125	–
			○	CTCP115	CTCP125	–
				–	–	–
				–	–	–
-TMF			●	CTCP115	CTCP125	CTC1135
			●	CTCP125	CTC1135	CTC1135
				–	–	–
				–	–	–
			○	CTC1135	–	–

CERATIZIT hard material matters

The easy way to success

Inserts for the MaxiLock D / N system

Chip groove (R / M / F)	Machining type	Material	Consistent cutting depth	Inconsistent cutting depth	Interrupted cut
-TMM 		●	CTCP115	CTCP115	–
		○	CTCP115	–	–
			–	–	–
			–	–	–
			–	–	–
-M42 			–	–	–
		●	CTP2120	CTP2135	CTP2135
			–	–	–
			–	–	–
			–	–	–
-TM 		●	CTCP115	CTCP125	CTC1135
		●	CTCP125	CTC1135	CTP2135
			–	–	–
			–	–	–
		○	CTC2135	CTP2135	–
-M52 			–	–	–
		●	CTP2120	CTP2120	–
		○	CTP2120	CTP2120	CTP2120
			–	–	–
		●	CTP2120	–	–
-M50 		●	CTCP125	CTCP125	CTCP125
		○	CTCP125	CTCP125	–
		●	–	CTCP125	CTCP125
			–	–	–
			–	–	–
-M60 		○	CTPM125	CTPM125	CTPM125
		●	CTPM125	CTPM125	CTPM125
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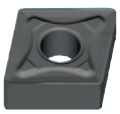
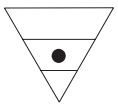
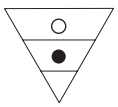
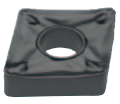
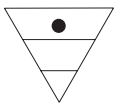
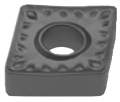
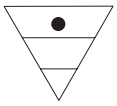
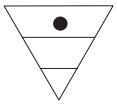
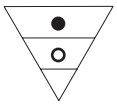
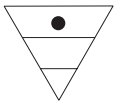
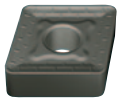
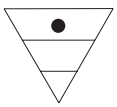
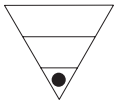
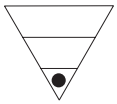
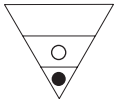
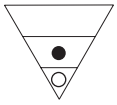
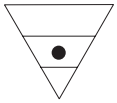
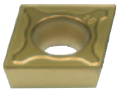
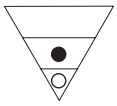
			–	–	–
		○	–	CTPM125	CTPM125
-TRM 		●	CTCP115	CTCP125	CTC1135
		●	CTCP125	CTC1135	CTC1135
			–	–	–
			–	–	–
		○	CTCP125	CTC1135	–
-TMR 		●	CTCP115	CTCP125	CTC1135
		●	CTCP125	CTC2135	CTC2135
		●	CTC3110/CTCP115	CTC3110	CTCP125
			–	–	–
		○	CTCP125	CTC2135	–
-TRR 		●	CTCP125/CTCP115	CTC1135	CTC1135
		●	CTCP125	CTC1135	CTC1135
			–	–	–
			–	–	–
		○	CTCP125	CTC1135	–

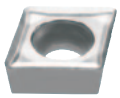
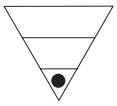
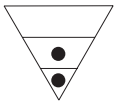
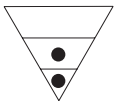
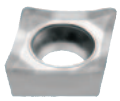
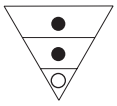
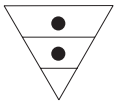
Chip groove (R / M / F)		Machining type	Material	Consistent cutting depth	Inconsistent cutting depth	Interrupted cut
-TR			●	CTCP125/CTCP115	CTCP125	CTC1135
			●	CTCP125	CTC1135	CTC2135
			●	CTCP125	CTCP125	–
				–	–	–
			○	CTC1135	CTC2135	–
-R80			●	CTCP125	CTCP125	CTCP125
			●	CTCP125	CTCP125	CTCP125
				–	–	–
				–	–	–
				–	–	–
-R28			●	CTCP115	CTCP115/CTCP125	CTCP125
			○	CTCP115	CTCP115/CTCP125	CTCP125
			●	CTCP115	CTCP115/CTCP125	CTCP125
				–	–	–
				–	–	–
-R58			●	CTCP115	CTCP115/CTCP125	CTCP125
			○	CTCP115	CTCP115/CTCP125	CTCP125
			●	CTCP115	CTCP115/CTCP125	CTCP125
				–	–	–
				–	–	–
-R88			●	CTCP115	CTCP115/CTCP125	CTCP125
			○	CTCP115	CTCP115/CTCP125	CTCP125
			●	CTCP115	CTCP115/CTCP125	CTCP125
				–	–	–
				–	–	–

CERATIZIT hard material matters

The easy way to success

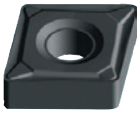
Inserts for the MaxiLock S system

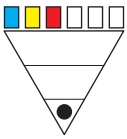
Chip groove (R / M / F)	Machining type	Material	Consistent cutting depth	Inconsistent cutting depth	Interrupted cut
-F23 		○	–	–	–
		●	CTP2120	CTP2120	–
		○	CTP2120	–	–
		○	CTP2120	–	–
		○	CTP2120	–	–
-SF 		●	TCM407	TCM10	CTC1135
		●	CTCP125	CTC2135	CTC2135
		●	TCM410	CTCP125	CTCP125
			–	–	–
		○	CTCP125	CTC2135	–
-SMF 		●	TCC410/CTCP115	CTC1135	CTC1135
		●	CTCP125	CTC1135	CTC1135
		○	TCC410/CTCP115	–	–
			–	–	–
			–	–	–
-F43 			–	–	–
		●	CTC2135	CTC2135	CTC2135
			–	–	–
			–	–	–
			–	–	–
-SM 		●	CTCP115	CTCP125	CTC1135
		●	CTCP125	CTC2135	CTC2135
		●	CTC3110	CTC3110	CTC3110
			–	–	–
		○	CTCP125	CTC2135	–
-SMQ 		●	CTCP115	CTCP125	–
		○	CTCP115	CTCP125	–
		○	CTCP115	CTCP125	–
			–	–	–
			–	–	–

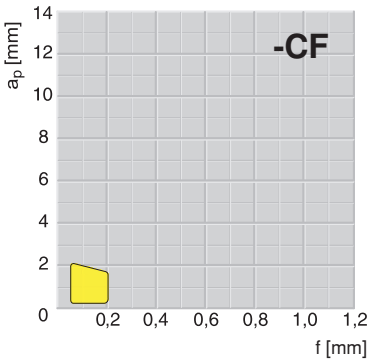
Chip groove (R / M / F)		Machining type	Material	Consistent cutting depth	Inconsistent cutting depth	Interrupted cut
-23P			■	–	–	–
			■	–	–	–
			■	–	–	–
			●	H216T	–	–
			■	–	–	–
-25Q			○	H210T	–	–
			○	H210T	H210T	–
			●	H210T	H210T	–
			●	H210T	H210T	H210T
			●	H210T	H210T	–
-25P			■	AMZ	AMZ	–
			○	AMZ	AMZ	–
			●	AMZ	AMZ	–
			●	H210T	H210T	H210T
			●	AMZ	AMZ	–
-27			○	AMZ	AMZ	–
			○	AMZ	AMZ	–
			●	AMZ	AMZ	H10T
			●	H10T	H10T	H10T
			■	–	–	–
-29			○	AMZ	AMZ	–
			○	AMZ	AMZ	–
			●	AMZ	AMZ	–
			●	H216T	H216T	H216T
			○	AMZ	AMZ	–

Chip grooves

-CF / -F30 / -F32 / -TF







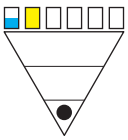
Application range:

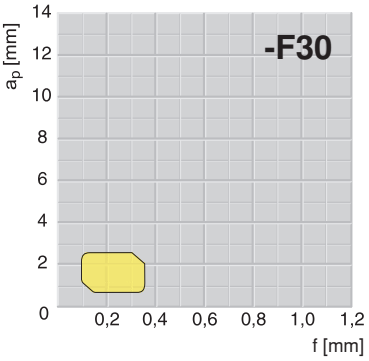
CNMG 1204..EN-CF
a_p: 0,05 - 2,0 mm
f: 0,05 - 0,2 mm

- **Steel in general**
- **Stainless steels**
- **Spheroidal cast iron (GGG)**

For cermet only





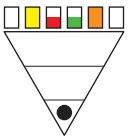


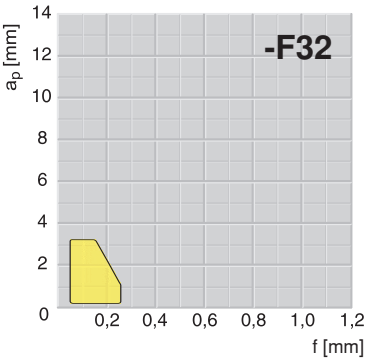
Application range:

CNMG 120408EN-F30
a_p: 0,8 - 2,5 mm
f: 0,1 - 0,35 mm

- **Stainless steels**
- Steel in general





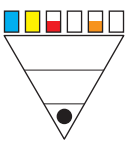


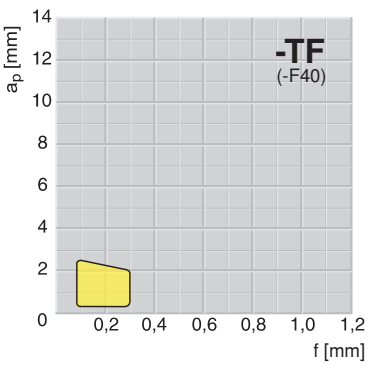
Application range:

CNGP 120408FN-F32
a_p: 0,05 - 4,0 mm
f: 0,05 - 0,25 mm

- **Stainless steels**
- **Super alloys**
- **Titanium**
- Non ferrous metals





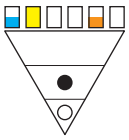


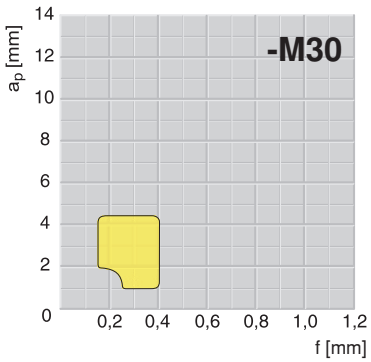
Application range:

CNMG 1204..EN-TF
a_p: 0,2 - 2,5 mm
f: 0,08 - 0,3 mm

- **Steel in general**
- **Cementation steels**
- **Stainless steels**
- Cast iron
- Super alloys



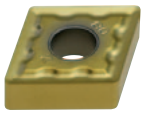


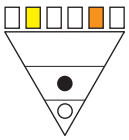


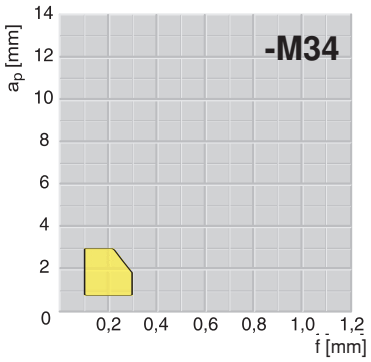
Application range:

CNMG 120408EN-M30
a_p: 1,0 - 4,5 mm
f: 0,15 - 0,4 mm

- **Stainless steels**
- Steel in general
- Super alloys



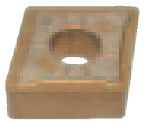


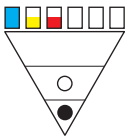


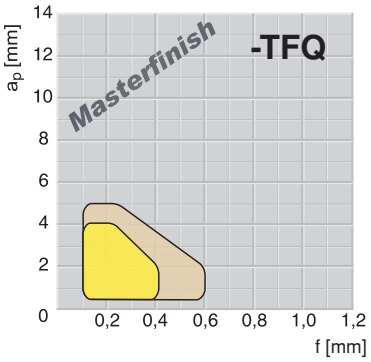
Application range:

CNMG 120408
a_p: 0,8 - 3,0 mm
f: 0,1 - 0,3 mm

- **Stainless steels**
- **Super alloys**
- **Titanium**







Application range:

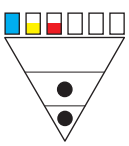
CNMG 120408EN-TFQ
a_p: 0,5 - 4,0 mm
f: 0,1 - 0,4 mm

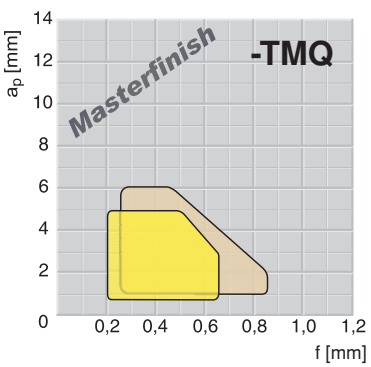
CNMG 120412EN-TFQ
a_p: 0,5 - 5,0 mm
f: 0,1 - 0,6 mm

- **Steel in general**
- Stainless steel
- Grey cast iron (GG)

For more detailed information on **MASTERFINISH** see section ‘Technical information’.







Application range:

CNMG 120408EN-TMQ
a_p: 0,8 - 5,0 mm
f: 0,2 - 0,65 mm

CNMG 120412EN-TMQ
a_p: 1,0 - 6,0 mm
f: 0,25 - 0,85 mm

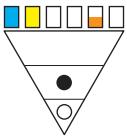
- **Steel in general**
- Stainless steel
- Grey cast iron (GG)

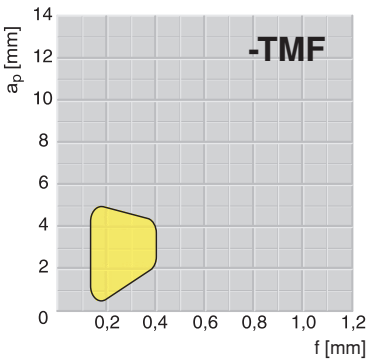
For more detailed information on **MASTERFINISH** see section ‘Technical information’.

Chip grooves

-TMF / -TMM / -M42 / -TM







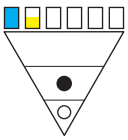
Application range:

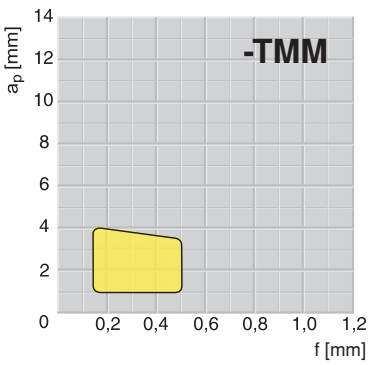
CNMG 1204..EN-TMF
a_p: 0,5 - 5,0 mm
f: 0,12 - 0,4 mm

- **Cementation steels**
- **Carbon steels**
- **Steels with low to medium strength**
  (up to approx. 700 N/mm^2)
- **Stainless steels**
- Super alloys

For cementation steels







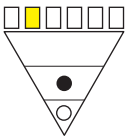
Application range:

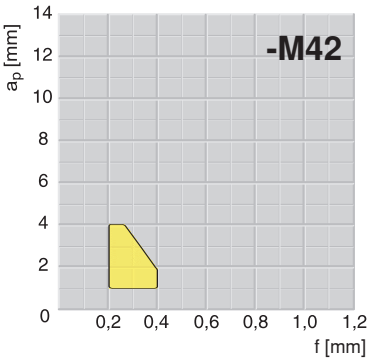
CNMG 1204..EN-TMM
a_p: 1,0 - 4,0 mm
f: 0,15 - 0,5 mm

- **Steel in general**
- **Low alloyed steels**
  (up to 900 N/mm^2)
- Stainless steels

For profile boring





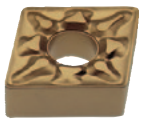


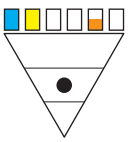
Application range:

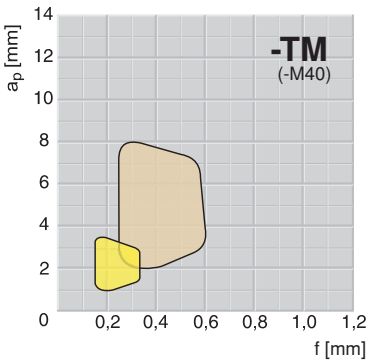
CNMG 120408EN-M42
a_p: 1,0 - 4,0 mm
f: 0,2 - 0,4 mm

- **Stainless steels**

For stainless steels







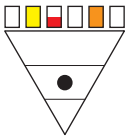
Application range:

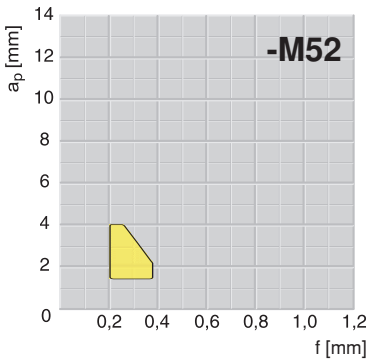
CNMG 120408EN-TM
a_p: 1,0 - 3,5 mm
f: 0,15 - 0,35 mm

CNMG 190616EN-TM
a_p: 2,0 - 8,0 mm
f: 0,25 - 0,6 mm

- **Steel in general**
- **Stainless steels**
- Super alloys



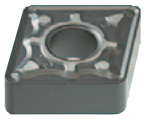


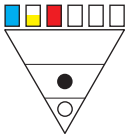


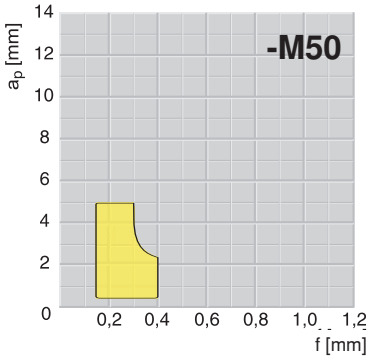
Application range:

CNMG 120408EN-M52
a_p: 1,5 - 4,0 mm
f: 0,2 - 0,38 mm

- **Stainless steels**
- **Super alloys**
- Spheroidal cast iron (GGG)





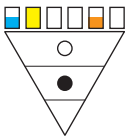


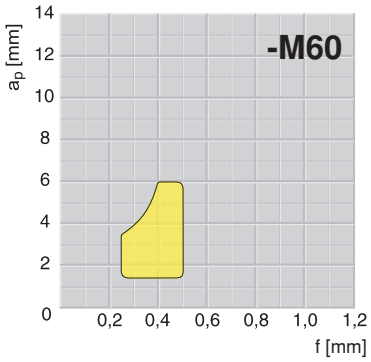
Application range:

CNMG 120408
a_p: 0,5 - 5,0 mm
f: 0,15 - 0,4 mm

- **Steel in general**
- Stainless steels
- **Spheroidal cast iron (GGG)**





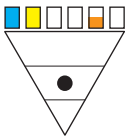


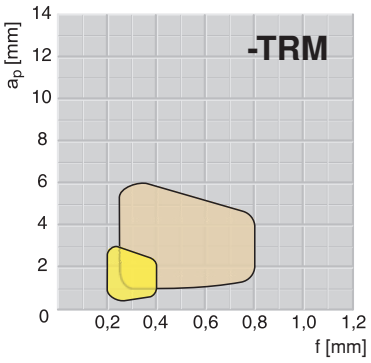
Application range:

CNMG 120408EN-M60
a_p: 1,5 - 6,0 mm
f: 0,25 - 0,5 mm

- Steel in general
- **Stainless steels**
- Super alloys







Application range:

CNMG 120408EN-TRM
a_p: 0,5 - 3,0 mm
f: 0,2 - 0,4 mm

CNMG 160616EN-TRM
a_p: 1,0 - 6,0 mm
f: 0,25 - 0,8 mm

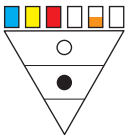
- **Bearing steel**
- **Steel in general**
- **Stainless steels**
- Super alloys

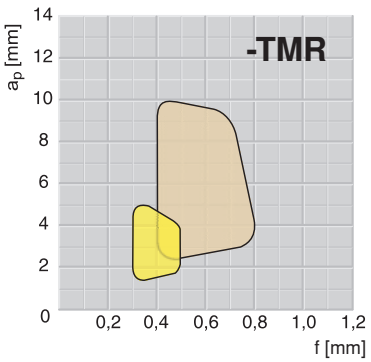
For roller bearing steels

Chip grooves

-TMR / -TRR / -TR / -R80







Application range:

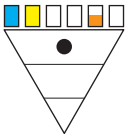
CNMG 120408EN-TMR
a_p: 1,5 - 5,0 mm
f: 0,3 - 0,5 mm

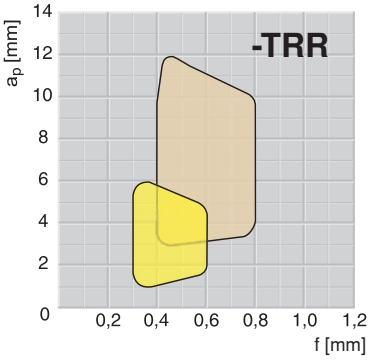
CNMG 160616EN-TMR
a_p: 2,5 - 10,0 mm
f: 0,4 - 0,8 mm

For steel and cast iron

- **Steel in general**
- **Bearing steel**
- **Stainless steels**
- **Cast iron**
- Super alloys







Application range:

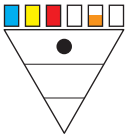
CNMM 120412SN-TRR
a_p: 1,0 - 6,0 mm
f: 0,3 - 0,6 mm

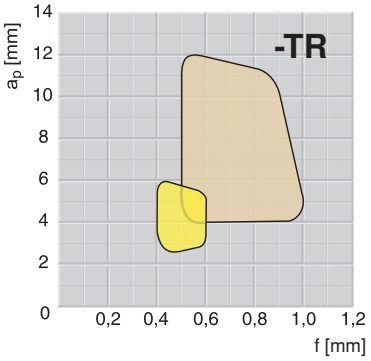
CNMM 190616SN-TRR
a_p: 3,0 - 12,0 mm
f: 0,4 - 0,8 mm

For forged parts

- **Steels with low to medium strength** (300-800 N/mm^2)
- **Stainless steels**
- Super alloys





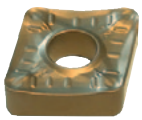


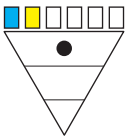
Application range:

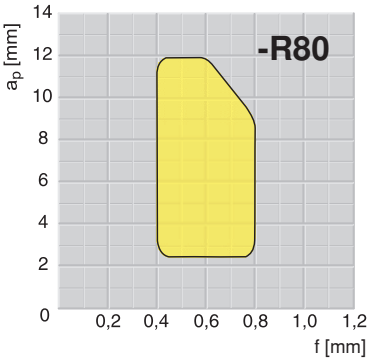
CNMM 120412EN-TR
a_p: 2,5 - 6,0 mm
f: 0,4 - 0,6 mm

CNMM 190616EN-TR
a_p: 4,0 - 12,0 mm
f: 0,5 - 1,0 mm

- **Steel in general**
- **Stainless steels**
- **Spheroidal cast iron (GGG)**
- Super alloys





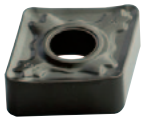


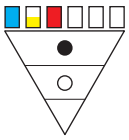
Application range:

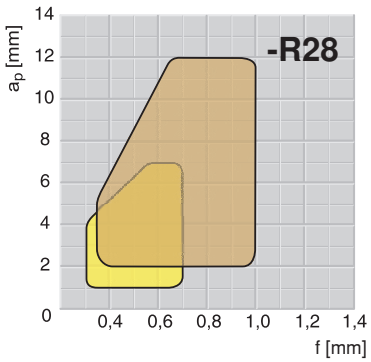
CNMM 190624SN-R80
a_p: 2,5 - 12 mm
f: 0,4 - 0,80 mm

For stainless steels

- **Bearing steel**
- **Stainless steels**







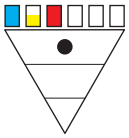
Application range:

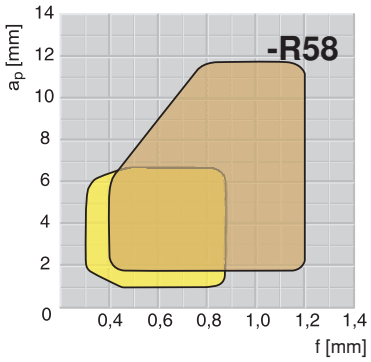
CNMM 120412EN-R28
a_p: 1,0 - 7,0 mm
f: 0,3 - 0,7 mm

CNMM 190624EN-R28
a_p: 2,0 - 12,0 mm
f: 0,35 - 1,0 mm

- **Steel in general**
- **Cast iron**
- Stainless steel





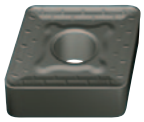


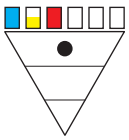
Application range:

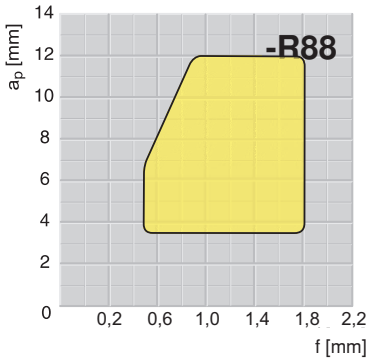
CNMM 120412EN-R58
a_p: 1,0 - 7,0 mm
f: 0,3 - 0,7 mm

CNMM 190624EN-R58
a_p: 2,5 - 12,0 mm
f: 0,4 - 1,2 mm

- **Steel in general**
- **Cast iron**
- Stainless steel







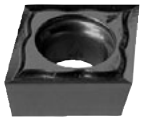
Application range:

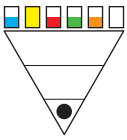
CNMM 190624SN-R88
a_p: 3,5 - 12,0 mm
f: 0,5 - 1,5 mm

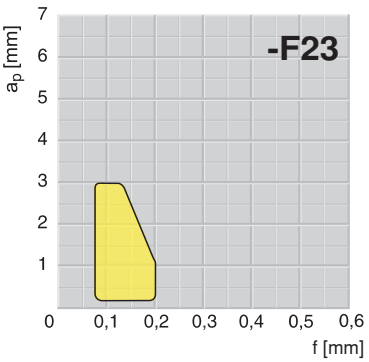
- **Steel in general**
- **Cast iron**
- Stainless steel

Chip grooves

-F23 / -SF / -SMF / -F43





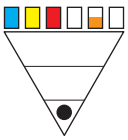


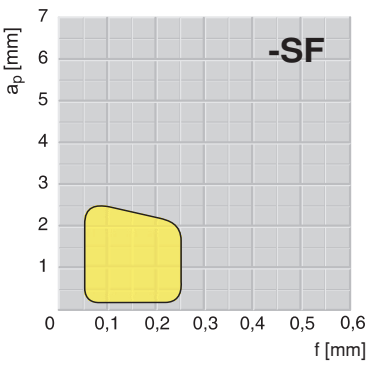
Application range:

CCGT 09T3..FN-F23
a_p: 0,10 - 2,0 mm
f: 0,06 - 0,13 mm

- **Stainless steels**
- Steel
- Cast iron
- Super alloys
- Non ferrous metals





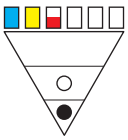


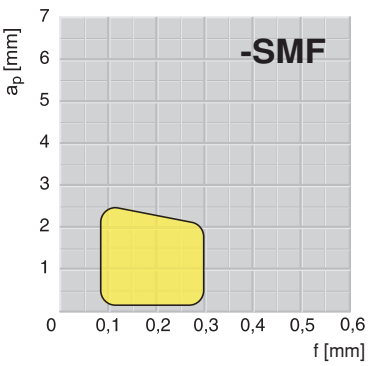
Application range:

CCMT 1204..EN-SF
a_p: 0,05 - 2,5 mm
f: 0,05 - 0,25 mm

- **Steel in general**
- **Stainless steels**
- **Spheroidal cast iron (GGG)**
- Super alloys



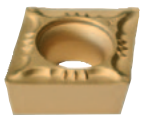


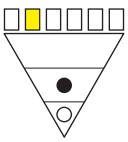


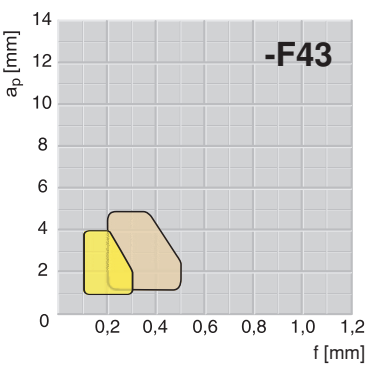
Application range:

CCMT 1204..EN-SMF
a_p: 0,1 - 2,5 mm
f: 0,08 - 0,3 mm

- **Steel in general**
- **Stainless steels**
- Cast iron







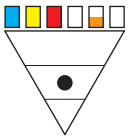
Application range:

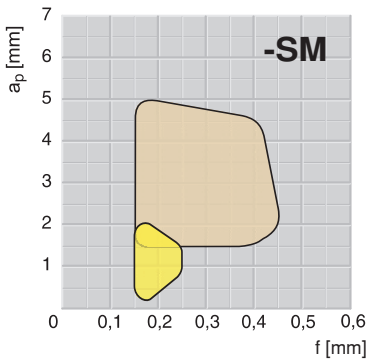
CCMT 09T304EN-F43
a_p: 0,5 - 2,0 mm
f: 0,05 - 0,15 mm

CCMT 09T308EN-F43
a_p: 0,65 - 2,5 mm
f: 0,10 - 0,25 mm

- **Stainless steels**







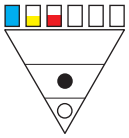
Application range:

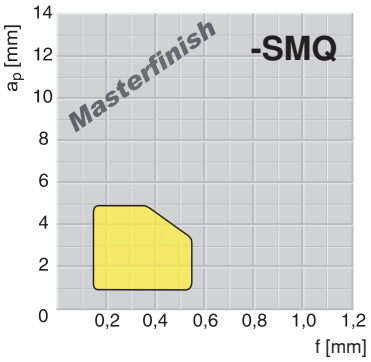
CCMT 060204EN-SM
a_p: 0,05 - 2,0 mm
f: 0,15 - 0,25 mm

CCMT 120412EN-SM
a_p: 1,5 - 5,0 mm
f: 0,15 - 0,45 mm

- **Steel in general**
- **Stainless steels**
- **Cast iron**
- Super alloys







Application range:

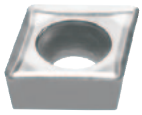
CCMT 120408EN-SMQ
a_p: 1,0 - 5,0 mm
f: 0,15 - 0,55 mm

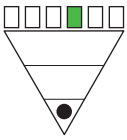
- **Steel in general**
- Stainless steel
- Grey cast iron (GG)

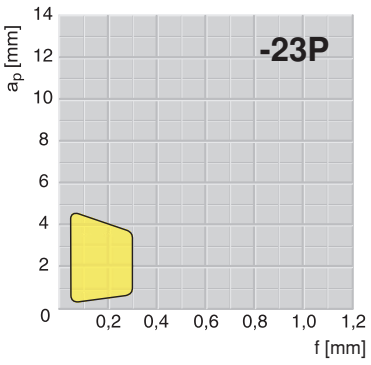
For more detailed information on **MASTERFINISH** see section ‘Technical information’.

Chip grooves

-23P / -25Q / -25P / -27







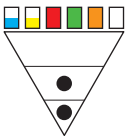
Application range:

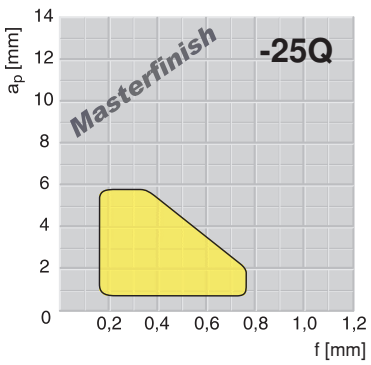
CCGT 09T308FN-23P
a_p: 0,5 - 4,5 mm
f: 0,05 - 0,3 mm

- **Soft aluminium wrought alloys** (AlMn / AlMg)

Particularly suitable for extrusion moulded work pieces







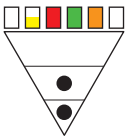
Application range:

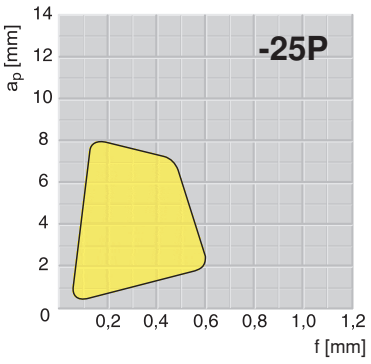
CCGT 120408FN-25Q
a_p: 0,75 - 6,0 mm
f: 0,15 - 0,75 mm

- **Aluminium cast and wrought alloys, also with a low content of Si** (G-AlSi$_2$, AlMgSi)
- **Cast iron**
- Super alloys
- Steel
- Stainless steel

For more detailed information on **MASTERFINISH** see section ‘Technical information’.





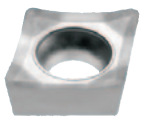


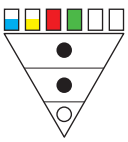
Application range:

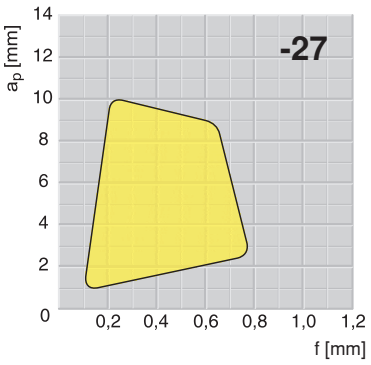
CCGT 120408FN-25P
a_p: 0,5 - 8,0 mm
f: 0,05 - 0,6 mm

- **Aluminium cast and wrought alloys, also with a low content of Si** (G-AlSi$_2$, AlMgSi)
- **Cast iron**
- Super alloys
- Steel
- Stainless steel

Well-suited for profile boring







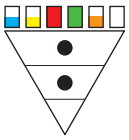
Application range:

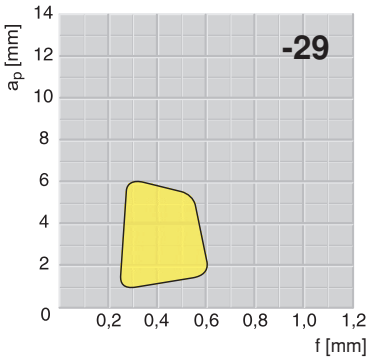
CCGT 1204..FN-27
a_p: 1,0 - 10,0 mm
f: 0,1 - 0,75 mm

- **Aluminium cast and wrought alloys in general**
- **Non ferrous metals**
- **Cast iron**
- Steel
- Stainless steel

For universal application







Application range:

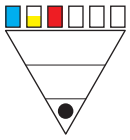
CCMT 09T308EN-29
a_p: 1,0 - 6,0 mm
f: 0,25 - 0,6 mm

- **Aluminium cast and wrought alloys, also with a low content of Si** (G-AlSi$_2$, AlMgSi)
- **Cast iron**
- Super alloys
- Steel
- Stainless steel

Additional chip grooves

-11

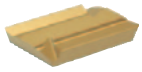


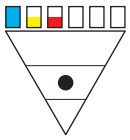


Application range:

- Profile boring
- Small feed rates

-12



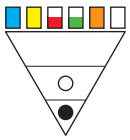


Application range

- Profile boring
- Medium feed rates

-42



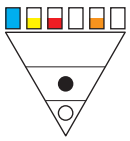


Application range:

- Super alloys
- Titanium
- Aluminium
- Stainless steels

-57



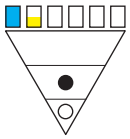


Application range:

- Steel and cast iron in general

-ER/-EL



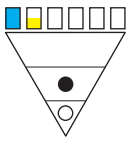


Application range:

- Steel
- Stainless steels

-EN

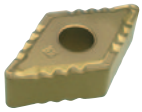


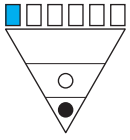


Application range:

- Steel in general

-M36



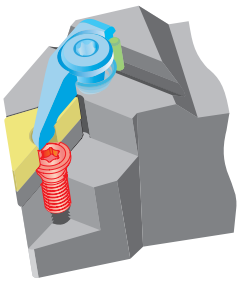


Application range:

- Steel in general

MaxiLock D

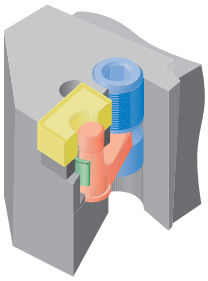
First choice for cutting with negative inserts with hole.
Safe and **precise positioning** of the insert through **double clamping effect**.



- Clamping element
- Insert
- Shim
- Pin
- Screw

MaxiLock N

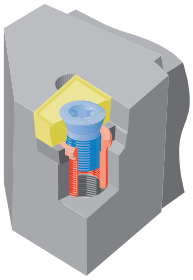
This clamping system is suitable for all negative form inserts with holes. The actuation screw can easily be reached from the upper and the lower side of the holder. In the unlocked position constituent parts remain intact.



- Clamping screw
- Insert
- Shim
- Wedge
- Lever

MaxiLock S

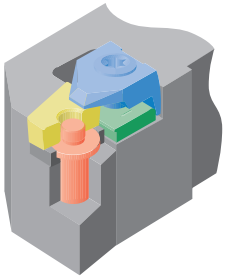
The form lock screw guarantees a safe connection of the insert and the tool holder. Chip evacuation is not hindered by obstructive clamping elements. Due to the neutral insert position the effective rake angle is identical to that of the insert form and geometry.



- Clamping screw
- Insert
- Shim
- Threaded shim screw

MaxiLock P

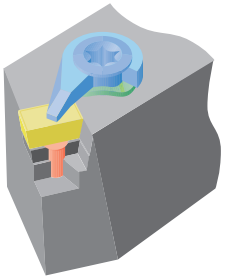
The insert with a clearance angle of 7° and a cylindrical bore is fixed with a wedge and claw lock against a fix pin. Up to three cutting edges can be used (1 support face).



- Clamping element
- Insert
- Shim
- Wedge
- Pad pin

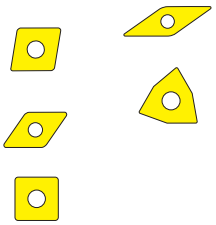
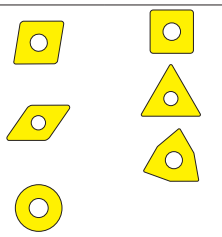
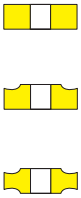
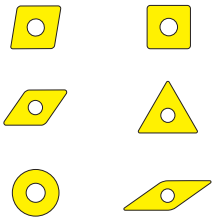
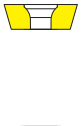
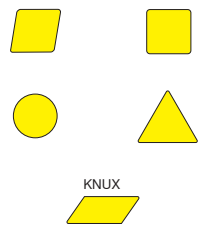
Simplex N / P

The tried and tested CERATIZIT Simplex clamping systems are characterized by their simplicity. The insert is clamped by means of a claw.
Not suitable for drawing cuts.



- Clamping screw and clamping claw
- Insert
- Shim
- Shim pin

Selection of the correct clamping system

Clamping system	Cutting depth / feed rate (mm)						Insert shape	Insert - form of top surface
	a_p	f	a_p	f	a_p	f		
	0,3 - 2,0	0,08 - 0,25	2,0 - 6,0	0,2 - 0,6	5,0 - 15,0	0,5 - 1,5		
MaxiLock D 	✓		✓		✓			
MaxiLock N 	✓		✓		✓			
MaxiLock S 	✓		✓					
MaxiLock P 			✓					
Simplex N 			✓				 KNUX	 KNUX
Simplex P 	✓		✓					

CTCP125 inserts show unbeatable performance.

HYPERCOAT

Product advantages

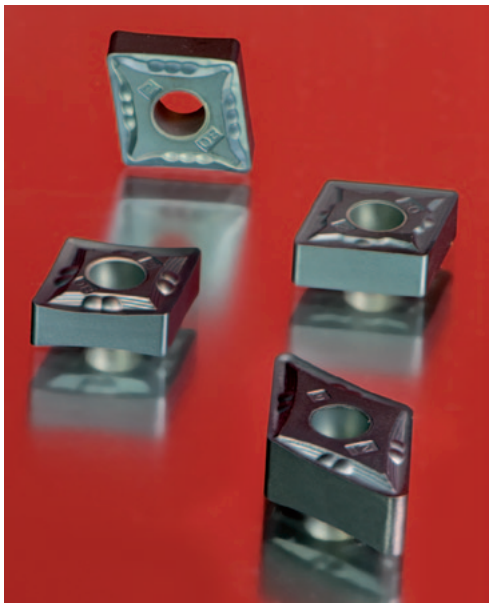
> High cutting edge stability – consistent results
> Longer tool life – higher metal removal rates
> Wide application range
> Suitable for all steel alloys. Good performance potential also on cast iron and stainless steels.
> Ideal combinations of cutting materials and chip grooves

CTCP115/CTCP125



CTCP115, CTCP125

CTCP115, CTCP125



CTCPM125

ISO M

CTPM125 covers a variety of turning applications in the stainless steel range: from finishing to roughing, with outstanding security and durability.

Product advantages

> High resistance to flank wear
> Reduced built-up edge
> Wide application range
> Good resistance to notching

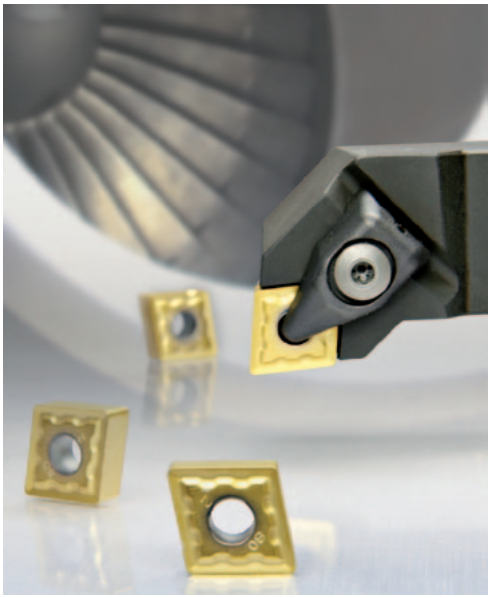
CTPM125

CTPM125

‘Best in class’ for super alloys

HYPERCOAT

CTP5115/-M34



Product advantages

> Excellent heat resistance and resistance to notching
> HyperCoat P coating for long tool life and reliability
> Swarf control with low cutting forces

CTP5115 /-M34 /-F34



CTP5110/-M34

‘Best in class’ for titanium alloys

HYPERCOAT

Product advantages

> Special treatment of coating and cutting edges to increase both heat resistance and resistance to notching
> HyperCoat P technology

Ti **CTP5110 /-M34**

Easy milling of high-tech materials!

CTC5240



Product advantages

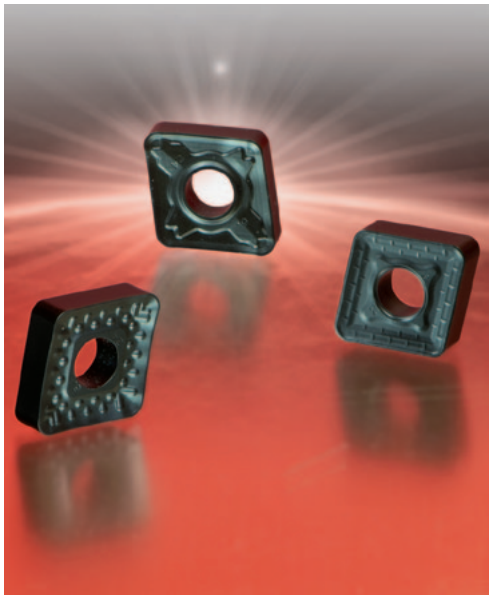
> Standard and special tools for the turning of difficult to machine titanium alloys.
> HyperCoat CTC5240 when reliability and maximum chip removal rates are required in milling operations.



Ti **CTC5240**

Single-ended ISO inserts - chip into the next machining level

CTCP115/CTCP125



Product advantages

> High feed rates
> Stable cutting edges
> Swarf control
> Ideal combination of cutting material and chip groove
> Masterfinish (with CNMM 190624...-R58/ -R88)

CTCP125, CTCP115

CTCP125, CTCP115

Complete tooling program for complete machining

The CERATIZIT HSK-T tooling program is specifically designed for machining in one set-up.
At present it is available in sizes HSK-T63 and HSK-100 ex stock and optimally covers all machining types.

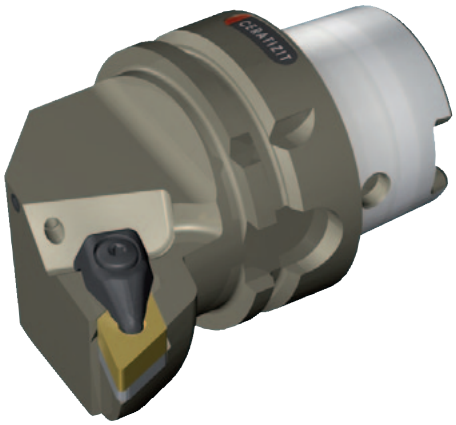
HSK-T



OEM

Product advantages

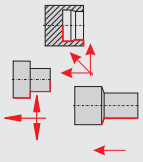
> Universal tool connection independent of the manufacturer - for stationary and rotating tools
> Perfect accuracy - also when it comes to the cutting edge tip
> High stability
> Standardized reference dimensions
> High flexibility through modular system
> Innovative coolant supply means more efficient production processes





The innovative coolant supply directs the cool-jet over a very short distance ensuring that it precisely hits the cutting edge.
This leads to longer service life of the cutting edge and reduced process time.

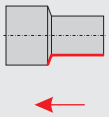
Overview of machining operations



A58-A59

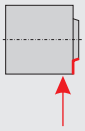


External machining CERATIZIT MaxiLock & Simplex



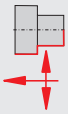
Longitudinal turning

A60-A61



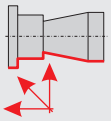
Face turning

A62



Longitudinal and face turning

A63



Profiling

A64-A65

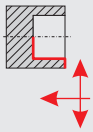


Internal machining CERATIZIT MaxiLock & Simplex



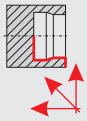
Boring

A66



Boring and face turning

A67

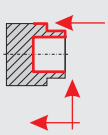


Profiling

A68

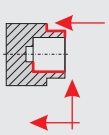


Drilling, external and internal machining with CERATIZIT multi-function tools



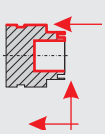
EcoCut

A69



EcoCut Rebore

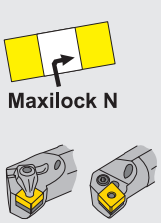
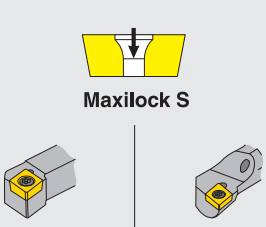
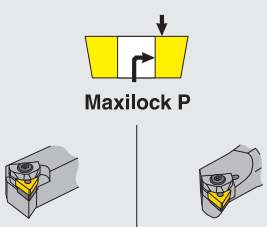
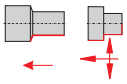
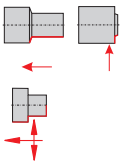
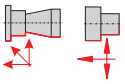
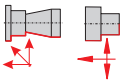
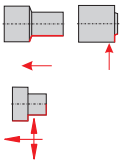
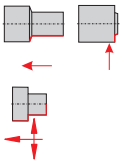
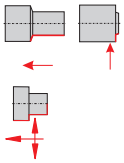
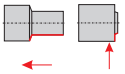
A69

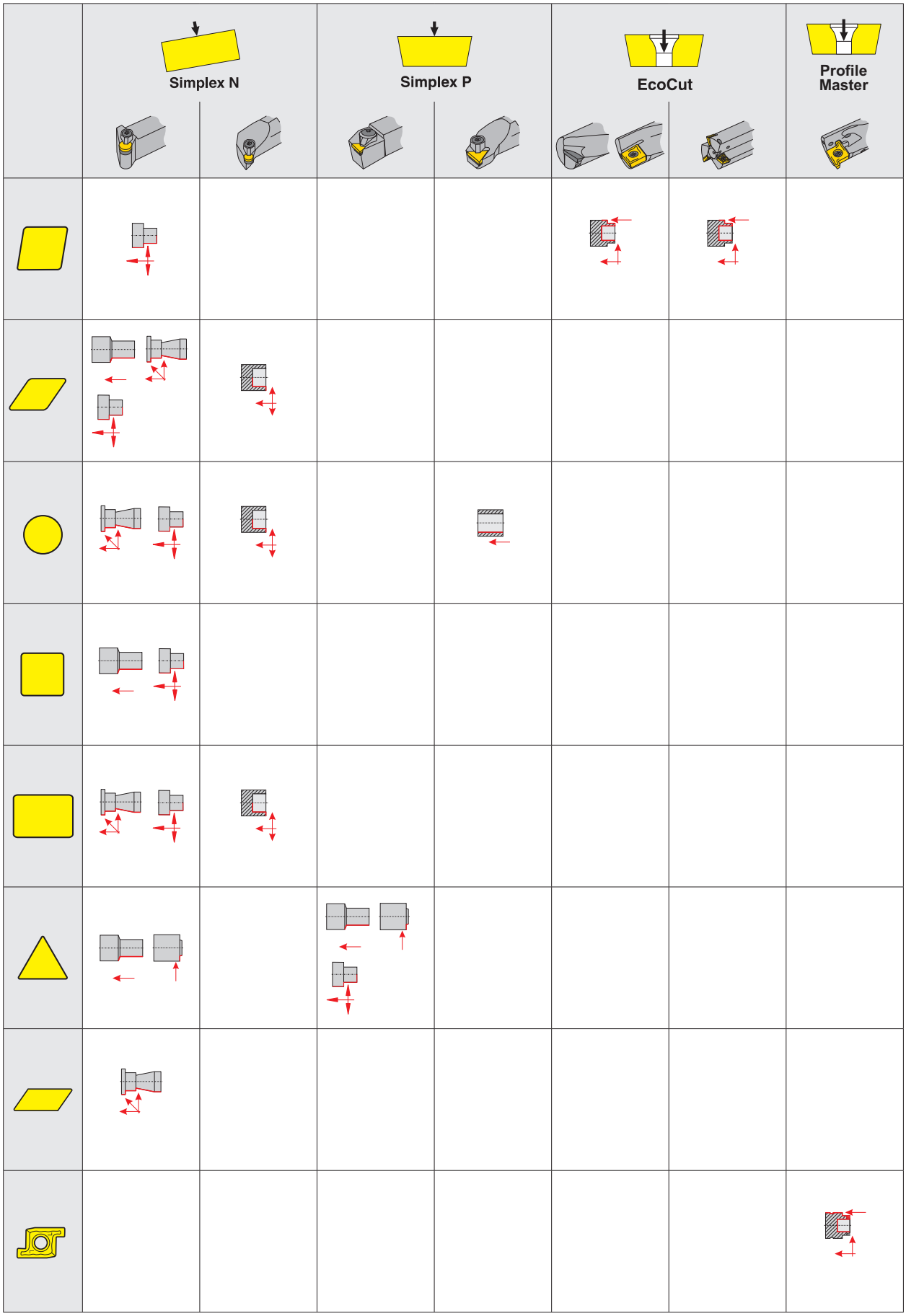


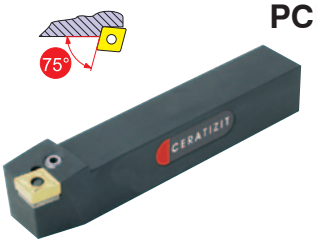
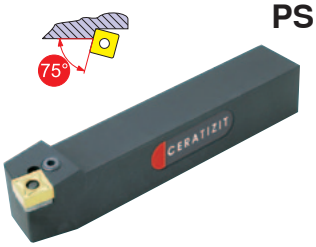
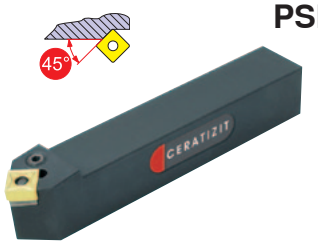
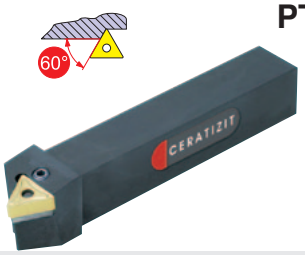
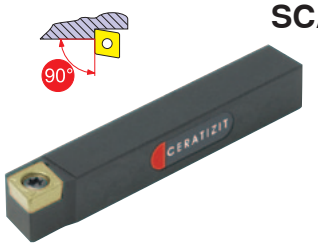
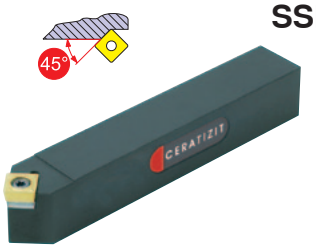
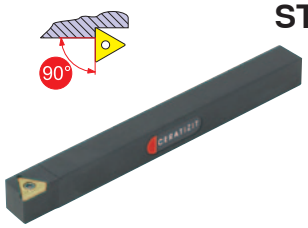
ProfileMaster

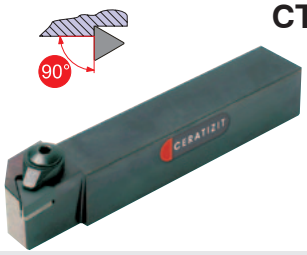
A69

Overview of machining operations

	Maxilock D	Maxilock N	Maxilock S		Maxilock P	
						
						
						
						
						
						
						
						


Simplex N
Simplex P
EcoCut
Profile Master

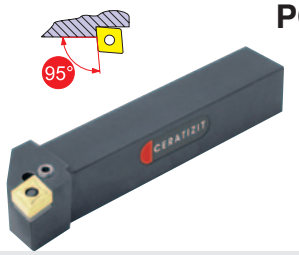
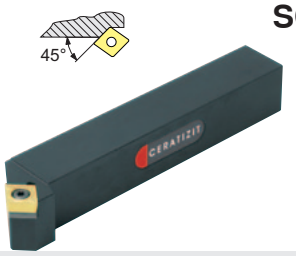
DCBN...  ⌀ = 25 mm A116	**DCLN...**  ⌀ = 16 - 40 mm A118	**DSBN...**  ⌀ = 20 - 40 mm A120
DSDN...  ⌀ = 20 - 25 mm A121	**PCBN...**  ⌀ = 25 - 32 mm A128	**PSBN...**  ⌀ = 20 - 40 mm A135
PSDN...  ⌀ = 16 - 40 mm A136	**PTGN...**  ⌀ = 16 - 32 mm A140	**PTTN...**  ⌀ = 20 - 25 mm A141
SCAC...  ⌀ = 8 - 20 mm A143	**SCDC...**  ⌀ = 8 - 14 mm A144	**SCMC...**  ⌀ = 16 - 32 mm A147
SCRC...  ⌀ = 10 - 32 mm A148	**SSBC...**  ⌀ = 16 - 25 mm A156	**SSDC...**  ⌀ = 12 - 25 mm A157
STAC...  ⌀ = 10 - 14 mm A160	**STGC...**  ⌀ = 10 - 25 mm A163	**CSBN...**  ⌀ = 25 mm A178

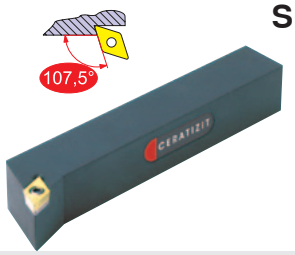
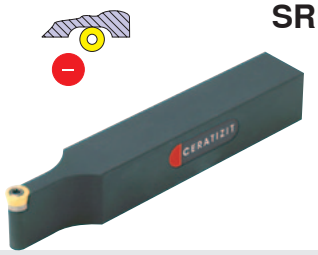
CSDN... 	**CTAN...** 	**CTGN...** 
⌀ = 25 - 32 mm A179	⌀ = 20 - 25 mm A180	⌀ = 12 - 25 mm A182
CTRN... 	**CTAP...** 	**CTGP...** 
⌀ = 12 mm A183	⌀ = 20 - 25 mm A184	⌀ = 10 - 12 mm A186

External machining

Face turning

DCKN...  ⌀ = 25 mm A117	**DSKN...**  ⌀ = 25 mm A122	**PCKN...**  ⌀ = 25 mm A129
PSKN...  ⌀ = 16 - 40 mm A137	**PTFN...**  ⌀ = 16 - 32 mm A139	**SCFC...**  ⌀ = 8 - 20 mm A145
SSKC...  ⌀ = 16 - 25 mm A158	**STCC...**  ⌀ = 8 - 16 mm A161	**STFC...**  ⌀ = 12 - 25 mm A162
MTFC...  ⌀ = 20 - 25 mm A170	**CTFN...**  ⌀ = 12 mm A181	**CTFP...**  ⌀ = 12 - 25 mm A185

DSSN...  ⌀ = 20 - 32 mm A123	**DWLN...**  ⌀ = 16 - 25 mm A127	**PCLN...**  ⌀ = 16 - 40 mm A130
PRGC...  ⌀ = 25 - 40 mm A134	**PSSN...**  ⌀ = 16 - 40 mm A138	**PWLN...**  ⌀ = 16 - 32 mm A142
SCLC...  ⌀ = 8 - 32 mm A146	**SCSC...**  ⌀ = 16 - 25 mm A149	**SRGC...**  ⌀ = 12 - 25 mm A155
SSSC...  ⌀ = 12 - 32 mm A159	**MCLC...**  ⌀ = 20 - 25 mm A168	**MSSC...**  ⌀ = 20 - 32 mm A169
CCLN...  ⌀ = 25 mm A174	**CRGN...**  ⌀ = 20 - 40 mm A177	**CTSP...**  ⌀ = 12 mm A187

DDJN... 	**DTJN...** 	**DVJN...** 
⌀ = 16 - 32 mm A119	⌀ = 20 - 25 mm A124	⌀ = 20 - 25 mm A125
DVVN... 	**PDJN...** 	**PDNN...** 
⌀ = 20 - 25 mm A126	⌀ = 16 - 32 mm A131	⌀ = 25 mm A132
PRDC... 	**SDAC...** 	**SDHC...** 
⌀ = 25 - 40 mm A133	⌀ = 8 - 14 mm A150	⌀ = 10 - 25 mm A151
SDJC... 	**SDNC...** 	**SRDC...** 
⌀ = 8 - 32 mm A152	⌀ = 8 - 25 mm A153	⌀ = 12 - 25 mm A154
SVHC... 	**SVJC...** 	**SVVC...** 
⌀ = 12 - 32 mm A164	⌀ = 12 - 32 mm A165	⌀ = 12 - 32 mm A166
SVZC/SVZP... 	**MTGC...** 	**MTJC...** 
⌀ = 25 mm A167	⌀ = 20 - 25 mm A171	⌀ = 20 - 32 mm A172

MTNC...	CKJN...	CRDN...
		
⌀ = 20 - 25 mm A173	⌀ = 25 mm A175	⌀ = 25 - 40 mm A176

Internal machining

Boring

DSKN...



Ø d_A = 32 mm
Ø D ≥ 40 mm

A190

PSKN...



Ø d_A = 25 - 40 mm
Ø D ≥ 32 mm

A194

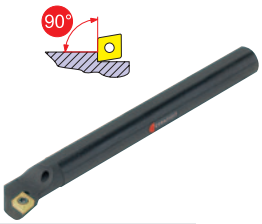
PTFN...



Ø d_A = 16 - 50 mm
Ø D ≥ 21 mm

A195

SCFC...



Ø d_A = 8 - 12 mm
Ø D ≥ 11 mm

A197

SSKC...



Ø d_A = 16 - 25 mm
Ø D ≥ 20 mm

A206

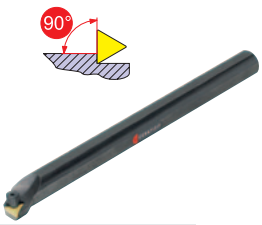
STFC...



Ø d_A = 10 - 40 mm
Ø D ≥ 13 mm

A208

CTFP...



Ø d_A = 12 - 32 mm
Ø D ≥ 16 mm

A216



DCLN...

Ø d_A = 20 - 50 mm
Ø D ≥ 40 mm

A188



DWLN...

Ø d_A = 25 - 40 mm
Ø D ≥ 32 mm

A191



PCLN...

Ø d_A = 25 - 50 mm
Ø D ≥ 32 mm

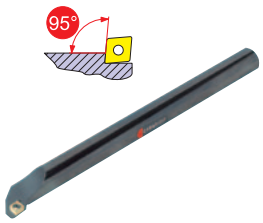
A192



PWLN...

Ø d_A = 16 - 40 mm
Ø D ≥ 21 mm

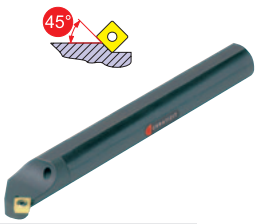
A196



SCLC...

Ø d_A = 8 - 40 mm
Ø D ≥ 11 mm

A198-A200



SSSC...

Ø d_A = 16 - 40 mm
Ø D ≥ 20 mm

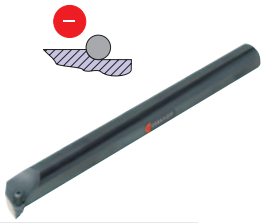
A207



MSSC...

Ø d_A = 32 mm
Ø D ≥ 40 mm

A213



CRSN...

Ø d_A = 32 mm
Ø D ≥ 40 mm

A215

DDUN...



Ø d_A = 25 - 40 mm
Ø D ≥ 32 mm
A189

PDUN...



Ø d_A = 20 - 50 mm
Ø D = 25 mm
A193

SDQC...



Ø d_A = 12 - 40 mm
Ø D ≥ 16 mm
A201

SDUC...



Ø d_A = 12 - 40 mm
Ø D ≥ 16 mm
A202-A204

SDXC...



Ø d_A = 12 - 25 mm
Ø D ≥ 16 mm
A205

SVQC...



Ø d_A = 16 - 40 mm
Ø D ≥ 20 mm
A209

SVUC...

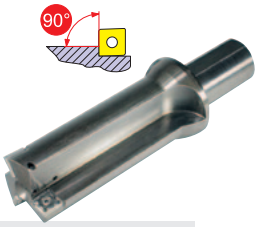
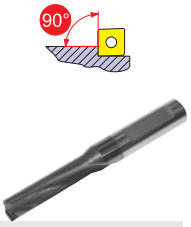


Ø d_A = 16 - 40 mm
Ø D ≥ 20 mm
A210-A211

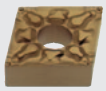
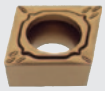
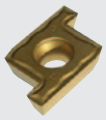
MTUC...



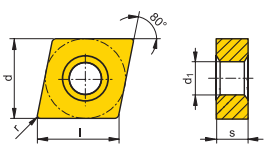
Ø d_A = 32 - 40 mm
Ø D ≥ 40 mm
A214

EC...	ECR...	EC...
		
Ø d_A = 10 - 40 mm Ø D = 8 - 32 mm	Ø d_A = 40 mm Ø D = 40 - 60 mm	Ø d_A = 6 - 8 mm Ø D = 4 - 8 mm
A218-A222	A223	A217


hard material matters
CERATIZIT

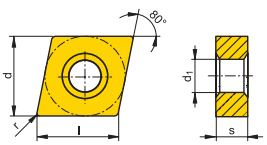
MaxiLock D/N	MaxiLock S	MaxiLock P	Simplex N	Simplex P	EcoCut	ProfileMaster
						
80°	80°	80°	80°	55°	88°	90°
 A72-A75	 A88	 A98	 A99	 A105	 A109-A110	 A112
55°	55°	90°	55°	0°		
 A76-A78	 A88-A89	 A98	 A100	 A106		
90°	0°	60°	75°	90°		
 A79	 A92	 A98	 A100	 A107		
60°	90°		90°	60°		
 A81-A82	 A93		 A100	 A108		
35°	60°		0°			
 A83	 A94		 A101			
80°	35°		90°			
 A84-A85	 A95-A97		 A102-A103			
-	-		60°			
 A86-A87	 A97		 A104			

			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P					O	●		●		●	●	●	O	●	●						
M				O			O	O	●	O	O	●	O	●	O	●					
K	●			●	●		●	O	●						●	O					
N	●	O							O												
S		●	●			●		O		O	O	O									
H																					
-27		CNGM 190612FN-27	●														19.05	19.30	6.35	1.20	7.94
-CF		CNMG 120404EN-CF													●	●	12.70	12.90	4.76	0.40	5.16
		CNMG 120408EN-CF													●	●	12.70	12.90	4.76	0.80	5.16
		CNMG 120412EN-CF													●		12.70	12.90	4.76	1.20	5.16
-F32		CNGP 120402FN-F32								●							12.70	12.90	4.76	0.20	5.16
		CNGP 120404FN-F32								●							12.70	12.90	4.76	0.40	5.16
		CNGP 120408FN-F32								●							12.70	12.90	4.76	0.80	5.16
-F30		CNMG 120404EN-F30										●					12.70	12.90	4.76	0.40	5.16
		CNMG 120408EN-F30										●					12.70	12.90	4.76	0.80	5.16
-TF		CNMG 090304EN-TF							●								9.52	9.70	3.18	0.40	3.81
		CNMG 120404EN-TF							●				●				12.70	12.90	4.76	0.40	5.16
		CNMG 120408EN-TF									●		●				12.70	12.90	4.76	0.80	5.16
-F34		CNMG 120404EN-F34						●									12.70	12.90	4.76	0.40	5.16
		CNMG 120408EN-F34						●									12.70	12.90	4.76	0.80	5.16
		CNMG 120412EN-F34						●									12.70	12.90	4.76	1.20	5.16
-M30		CNMG 120408EN-M30										●					12.70	12.90	4.76	0.80	5.16
		CNMG 120412EN-M30										●					12.70	12.90	4.76	1.20	5.16
		CNMG 120416EN-M30										●					12.70	12.90	4.76	1.60	5.16
-M34		CNMG 120404EN-M34			●			●									12.70	12.90	4.76	0.40	5.16
		CNMG 120408EN-M34			●			●									12.70	12.90	4.76	0.80	5.16
		CNMG 120412EN-M34			●			●									12.70	12.90	4.76	1.20	5.16
		CNMG 120416EN-M34						●									12.70	12.90	4.76	1.60	5.16
-42		CNMG 120404EN-42		●													12.70	12.90	4.76	0.40	5.16
		CNMG 120408EN-42		●									●	●			12.70	12.90	4.76	0.80	5.16
-TFQ		CNMG 120404EN-TFQ									●				●		12.70	12.90	4.76	0.40	5.16
		CNMG 120408EN-TFQ							●		●				●		12.70	12.90	4.76	0.80	5.16
		CNMG 120412EN-TFQ							●		●				●		12.70	12.90	4.76	1.20	5.16
-TMF		CNMG 120404EN-TMF							●		●		●				12.70	12.90	4.76	0.40	5.16
		CNMG 120408EN-TMF							●		●		●				12.70	12.90	4.76	0.80	5.16
			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d	l	s	r	d_1



A16-A33 A40-A50 A58-A59 A248-A257 A116-A118 A128-A130 A188 A192

			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
		P				○	●		●		●	●	●	○	●	●					
		M			○			○	○	●	○	●	○	●	○	●					
		K	●			●	●		●	○	●				●	○					
		N	●	○						○											
		S		●	●			●		○		○	○	○							
		H																			
-M42		CNMG 120404EN-M42								●				●			12.70	12.90	4.76	0.40	5.16
		CNMG 120408EN-M42								●				●			12.70	12.90	4.76	0.80	5.16
		CNMG 120412EN-M42												●			12.70	12.90	4.76	1.20	5.16
-M52		CNMG 120404EN-M52								●							12.70	12.90	4.76	0.40	5.16
		CNMG 120408EN-M52								●							12.70	12.90	4.76	0.80	5.16
		CNMG 120412EN-M52								●							12.70	12.90	4.76	1.20	5.16
-M50		CNMG 120404EN-M50							●		●						12.70	12.90	4.76	0.40	5.16
		CNMG 120408EN-M50							●		●						12.70	12.90	4.76	0.80	5.16
		CNMG 120412EN-M50							●		●						12.70	12.90	4.76	1.20	5.16
		CNMG 160616EN-M50							●		●						15.88	16.10	6.35	1.60	6.35
-TM		CNMG 090308EN-TM					●				●						9.52	9.70	3.18	0.80	3.81
		CNMG 120408EN-TM							●		●		●	●			12.70	12.90	4.76	0.80	5.16
		CNMG 120412EN-TM									●		●	●			12.70	12.90	4.76	1.20	5.16
		CNMG 120416EN-TM											●				12.70	12.90	4.76	1.60	5.16
		CNMG 160608EN-TM									●		●				15.88	16.10	6.35	0.80	6.35
		CNMG 160612EN-TM									●		●				15.88	16.10	6.35	1.20	6.35
		CNMG 190612EN-TM									●						19.05	19.30	6.35	1.20	7.94
		CNMG 190616EN-TM									●						19.05	19.30	6.35	1.60	7.94
-TMQ		CNMG 120408EN-TMQ									●						12.70	12.90	4.76	0.80	5.16
		CNMG 120412EN-TMQ							●		●						12.70	12.90	4.76	1.20	5.16
-TRM		CNMG 120408EN-TRM							●		●		●				12.70	12.90	4.76	0.80	5.16
		CNMG 120412EN-TRM									●		●				12.70	12.90	4.76	1.20	5.16
		CNMG 120416EN-TRM									●						12.70	12.90	4.76	1.60	5.16
		CNMG 160612EN-TRM							●		●						15.88	16.10	6.35	1.20	6.35
		CNMG 160616EN-TRM									●						15.88	16.10	6.35	1.60	6.35
		CNMG 190612EN-TRM									●						19.05	19.30	6.35	1.20	7.94
-M60		CNMG 120408EN-M60										●					12.70	12.90	4.76	0.80	5.16
		CNMG 120412EN-M60										●					12.70	12.90	4.76	1.20	5.16
		CNMG 120416EN-M60										●					12.70	12.90	4.76	1.60	5.16
		CNMG 160612EN-M60										●					15.88	16.10	6.35	1.20	6.35
-TMR		CNMG 120408EN-TMR				●	●		●		●		●	●			12.70	12.90	4.76	0.80	5.16
		CNMG 120412EN-TMR				●	●		●		●		●	●			12.70	12.90	4.76	1.20	5.16
		CNMG 120416EN-TMR				●	●				●						12.70	12.90	4.76	1.60	5.16
		CNMG 160612EN-TMR				●			●		●			●			15.88	16.10	6.35	1.20	6.35
		CNMG 160616EN-TMR				●			●		●						15.88	16.10	6.35	1.60	6.35
		CNMG 190612EN-TMR							●		●		●	●			19.05	19.30	6.35	1.20	7.94
		CNMG 190616EN-TMR									●			●			19.05	19.30	6.35	1.60	7.94
			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d	l	s	r	d_1



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CERATIZIT hard material matters

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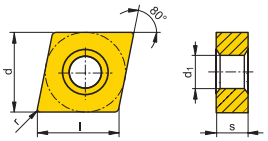
CN..

			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P					O	●		●		●	●	●	O	●	●						
M				O			O	O	●	O	●	O	●	O	●						
K	●			●	●		●	O	●					●	O						
N	●	O							O												
S		●	●			●		O		O	O	O									
H																					
-R28		CNMM 120408EN-R28							●		●						12.70	12.90	4.76	0.80	5.16
		CNMM 120412EN-R28							●		●						12.70	12.90	4.76	1.20	5.16
		CNMM 120416EN-R28							●		●						12.70	12.90	4.76	1.60	5.16
		CNMM 160612EN-R28							●		●						15.88	16.10	6.35	1.20	6.35
		CNMM 160616EN-R28							●		●						15.88	16.10	6.35	1.60	6.35
		CNMM 190612EN-R28							●		●						19.05	19.30	6.35	1.20	7.94
		CNMM 190616EN-R28							●		●						19.05	19.30	6.35	1.60	7.94
		CNMM 190624EN-R28							●		●						19.05	19.30	6.35	2.40	7.94
-R58		CNMM 120412EN-R58							●		●						12.70	12.90	4.76	1.20	5.16
		CNMM 120416EN-R58							●		●						12.70	12.90	4.76	1.60	5.16
		CNMM 160612EN-R58							●		●						15.88	16.10	6.35	1.20	6.35
		CNMM 160616EN-R58							●		●						15.88	16.10	6.35	1.60	6.35
		CNMM 190612EN-R58							●		●						19.05	19.30	6.35	1.20	7.94
		CNMM 190616EN-R58							●		●						19.05	19.30	6.35	1.60	7.94
		CNMM 190624EN-R58							●		●						19.05	19.30	6.35	2.40	7.94
		CNMM 250924EN-R58							●		●						25.40	25.80	9.52	2.40	9.12
-TR		CNMM 120408EN-TR									●		●				12.70	12.90	4.76	0.80	5.16
		CNMM 120412EN-TR									●		●				12.70	12.90	4.76	1.20	5.16
		CNMM 160612EN-TR									●		●				15.88	16.10	6.35	1.20	6.35
		CNMM 160616EN-TR									●						15.88	16.10	6.35	1.60	6.35
		CNMM 190616EN-TR									●						19.05	19.30	6.35	1.60	7.94
-TRR		CNMM 120408SN-TRR									●						12.70	12.90	4.76	0.80	5.16
		CNMM 120412SN-TRR									●						12.70	12.90	4.76	1.20	5.16
		CNMM 160612SN-TRR									●						15.88	16.10	6.35	1.20	6.35
		CNMM 160616SN-TRR									●						15.88	16.10	6.35	1.60	6.35
		CNMM 190612SN-TRR											●				19.05	19.30	6.35	1.20	7.94
		CNMM 190616SN-TRR									●		●				19.05	19.30	6.35	1.60	7.94
-R80		CNMM 190616SN-R80									●						19.05	19.30	6.35	1.60	7.94
		CNMM 190624SN-R80									●						19.05	19.30	6.35	2.40	7.94
-R88		CNMM 190616SN-R88							●		●						19.05	19.30	6.35	1.60	7.94
		CNMM 190624SN-R88							●		●						19.05	19.30	6.35	2.40	7.94
		CNMM 250924SN-R88							●		●						25.40	25.80	9.52	2.40	9.12
		CNMT 320932SN-R88							●								31.75	32.24	9.52	3.20	9.12
-R88Q		CNMM 190624SN-R88Q							●		●						19.05	19.30	6.35	2.40	7.94
			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d	l	s	r	d_1



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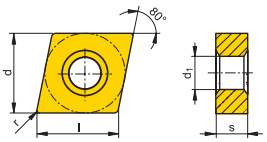
		H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P					○	●		●		●	●	●	○	●	●					
M				○			○	○	●	○	●	○	●	○	●					
K		●			●	●		●	○	●				●	○					
N		●	○						○											
S			●	●			●		○		○	○	○							
H																				
CN..A	CNMA 120404EN				●											12.70	12.90	4.76	0.40	5.16
	CNMA 120408EN				●	●										12.70	12.90	4.76	0.80	5.16
	CNMA 120412EN				●	●										12.70	12.90	4.76	1.20	5.16
	CNMA 120416EN					●										12.70	12.90	4.76	1.60	5.16
	CNMA 160608EN				●											15.88	16.10	6.35	0.80	6.35
	CNMA 160612EN				●											15.88	16.10	6.35	1.20	6.35
	CNMA 160616EN				●											15.88	16.10	6.35	1.60	6.35
	CNMA 190612EN				●											19.05	19.30	6.35	1.20	7.94
	CNMA 190616EN				●											19.05	19.30	6.35	1.60	7.94



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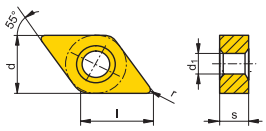
			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
	P				O	●		●		●	●	●	O	●	●						
	M			O			O	O	●	O	●	O	●	O	●						
	K	●			●	●		●	O	●				●	O						
	N	●	O						O												
	S		●	●			●		O		O	O	O								
	H																				
-CF		DNMG 110404EN-CF													●	●	9.52	11.60	4.76	0.40	3.81
		DNMG 110408EN-CF													●		9.52	11.60	4.76	0.80	3.81
		DNMG 150604EN-CF													●	●	12.70	15.50	6.35	0.40	5.16
		DNMG 150608EN-CF													●		12.70	15.50	6.35	0.80	5.16
		DNMG 150612EN-CF													●		12.70	15.50	6.35	1.20	5.16
-F32		DNGP 150402FN-F32								●							12.70	15.50	4.76	0.20	5.16
		DNGP 150404FN-F32								●							12.70	15.50	4.76	0.40	5.16
		DNGP 150408FN-F32								●							12.70	15.50	4.76	0.80	5.16
		DNGP 150602FN-F32								●							12.70	15.50	6.35	0.20	5.16
		DNGP 150604FN-F32								●							12.70	15.50	6.35	0.40	5.16
		DNGP 150608FN-F32								●							12.70	15.50	6.35	0.80	5.16
-F30		DNMG 110404EN-F30										●					9.52	11.60	4.76	0.40	3.81
		DNMG 110408EN-F30										●					9.52	11.60	4.76	0.80	3.81
		DNMG 150604EN-F30										●					12.70	15.50	6.35	0.40	5.16
		DNMG 150608EN-F30										●					12.70	15.50	6.35	0.80	5.16
-TF		DNMG 110404EN-TF							●		●						9.52	11.60	4.76	0.40	3.81
		DNMG 110408EN-TF									●						9.52	11.60	4.76	0.80	3.81
		DNMG 150604EN-TF							●		●						12.70	15.50	6.35	0.40	5.16
		DNMG 150608EN-TF							●		●						12.70	15.50	6.35	0.80	5.16
		DNMG 150612EN-TF							●								12.70	15.50	6.35	1.20	5.16
-M30		DNMG 110408EN-M30										●					9.52	11.60	4.76	0.80	3.81
		DNMG 110412EN-M30										●					9.52	11.60	4.76	1.20	3.81
		DNMG 150608EN-M30										●					12.70	15.50	6.35	0.80	5.16
		DNMG 150612EN-M30										●					12.70	15.50	6.35	1.20	5.16
-M34		DNMG 150404EN-M34			●			●									12.70	15.50	4.76	0.40	5.16
		DNMG 150408EN-M34			●			●									12.70	15.50	4.76	0.80	5.16
		DNMG 150412EN-M34			●			●									12.70	15.50	4.76	1.20	5.16
		DNMG 150608EN-M34			●			●									12.70	15.50	6.35	0.80	5.16
		DNMG 150612EN-M34			●			●									12.70	15.50	6.35	1.20	5.16
-TFQ		DNMG 150604EN-TFQ									●				●		12.70	15.50	6.35	0.40	5.16
		DNMG 150608EN-TFQ							●		●				●		12.70	15.50	6.35	0.80	5.16
-TMF		DNMG 110404EN-TMF							●		●						9.52	11.60	4.76	0.40	3.81
		DNMG 110408EN-TMF							●				●				9.52	11.60	4.76	0.80	3.81
		DNMG 110412EN-TMF							●								9.52	11.60	4.76	1.20	3.81
		DNMG 150604EN-TMF							●		●		●				12.70	15.50	6.35	0.40	5.16
		DNMG 150608EN-TMF							●		●		●				12.70	15.50	6.35	0.80	5.16
-M42		DNMG 110404EN-M42												●			9.52	11.60	4.76	0.40	3.81
		DNMG 110408EN-M42												●			9.52	11.60	4.76	0.80	3.81
		DNMG 150404EN-M42								●				●			12.70	15.50	4.76	0.40	5.16
		DNMG 150408EN-M42												●			12.70	15.50	4.76	0.80	5.16
		DNMG 150604EN-M42								●				●			12.70	15.50	6.35	0.40	5.16
		DNMG 150608EN-M42								●				●			12.70	15.50	6.35	0.80	5.16
			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d	l	s	r	d_1



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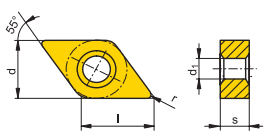
			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P					○	●		●		●	●	●	○	●	●						
M				○			○	○	●	○	●	○	●	○	●						
K			●			●	●		●	○	●				●	○					
N			●	○						○											
S				●	●			●		○		○	○	○							
H																					
-M52		DNMG 150404EN-M52								●							12.70	15.50	4.76	0.40	5.16
		DNMG 150408EN-M52								●							12.70	15.50	4.76	0.80	5.16
		DNMG 150604EN-M52								●							12.70	15.50	6.35	0.40	5.16
		DNMG 150608EN-M52								●							12.70	15.50	6.35	0.80	5.16
-M50		DNMG 110404EN-M50							●		●						9.52	11.60	4.76	0.40	3.81
		DNMG 110408EN-M50							●		●						9.52	11.60	4.76	0.80	3.81
		DNMG 150404EN-M50									●						12.70	15.50	4.76	0.40	5.16
		DNMG 150408EN-M50									●						12.70	15.50	4.76	0.80	5.16
		DNMG 150412EN-M50									●						12.70	15.50	4.76	1.20	5.16
		DNMG 150604EN-M50							●		●						12.70	15.50	6.35	0.40	5.16
		DNMG 150608EN-M50							●		●						12.70	15.50	6.35	0.80	5.16
		DNMG 150612EN-M50							●		●						12.70	15.50	6.35	1.20	5.16
-TM		DNMG 110408EN-TM							●		●						9.52	11.60	4.76	0.80	3.81
		DNMG 150608EN-TM							●		●		●	●			12.70	15.50	6.35	0.80	5.16
		DNMG 150612EN-TM									●		●				12.70	15.50	6.35	1.20	5.16
		DNMG 150616EN-TM									●		●				12.70	15.50	6.35	1.60	5.16
-TMQ		DNMG 150608EN-TMQ									●						12.70	15.50	6.35	0.80	5.16
		DNMG 150612EN-TMQ									●						12.70	15.50	6.35	1.20	5.16
-TRM		DNMG 110408EN-TRM									●						9.52	11.60	4.76	0.80	3.81
		DNMG 110412EN-TRM							●								9.52	11.60	4.76	1.20	3.81
		DNMG 150412EN-TRM									●						12.70	15.50	4.76	1.20	5.16
		DNMG 150608EN-TMR							●								12.70	15.50	6.35	0.80	5.16
		DNMG 150608EN-TRM									●						12.70	15.50	6.35	0.80	5.16
		DNMG 150612EN-TRM							●		●						12.70	15.50	6.35	1.20	5.16
		DNMG 150616EN-TRM									●						12.70	15.50	6.35	1.60	5.16
-M60		DNMG 150608EN-M60										●					12.70	15.50	6.35	0.80	5.16
		DNMG 150612EN-M60										●					12.70	15.50	6.35	1.20	5.16
-TMR		DNMG 110408EN-TMR												●			9.52	11.60	4.76	0.80	3.81
		DNMG 110412EN-TMR									●						9.52	11.60	4.76	1.20	3.81
		DNMG 150608EN-TMR				●					●		●				12.70	15.50	6.35	0.80	5.16
		DNMG 150612EN-TMR				●	●				●						12.70	15.50	6.35	1.20	5.16
		DNMG 150616EN-TMR					●										12.70	15.50	6.35	1.60	5.16
-R28		DNMM 150612EN-R28							●		●						12.70	15.50	6.35	1.20	5.16
		DNMM 150616EN-R28							●		●						12.70	15.50	6.35	1.60	5.16
-R58		DNMM 150612EN-R58							●		●						12.70	15.50	6.35	1.20	5.16
		DNMM 150616EN-R58							●		●						12.70	15.50	6.35	1.60	5.16
			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d	l	s	r	d_1



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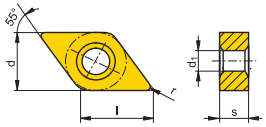
MaxiLock D/N

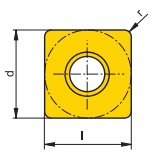
DN..

			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P					O	●		●		●	●	●	O	●	●						
M				O			O	O	●	O	●	O	●	O	●						
K	●			●	●		●	O	●					●	O						
N	●	O							O												
S		●	●			●			O		O	O	O								
H																					
-TR		DNMM 150608EN-TR									●						12.70	15.50	6.35	0.80	5.16
		DNMM 150612EN-TR									●		●				12.70	15.50	6.35	1.20	5.16
DN..A		DNMA 150608EN				●											12.70	15.50	6.35	0.80	5.16
		DNMA 150612EN				●											12.70	15.50	6.35	1.20	5.16



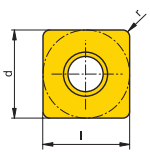
A16-A33 A40-A50 A58-A59 A248-A257 A119 A131-A132 A189 A193

		H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P				O	●		●		●	●	●	O	●	●						
M			O			O	O	●	O	●	O	●		O	●					
K	●			●	●		●	O	●					●	O					
N	●	O							O											
S		●	●			●		O		O	O	O								
H																				
-F30		SNMG 120404EN-F30									●						12.70	12.70	4.76	0.40	5.16
		SNMG 120408EN-F30									●						12.70	12.70	4.76	0.80	5.16
-TF		SNMG 120404EN-TF								●							12.70	12.70	4.76	0.40	5.16
-M30		SNMG 120408EN-M30									●						12.70	12.70	4.76	0.80	5.16
		SNMG 120412EN-M30									●						12.70	12.70	4.76	1.20	5.16
-M34		SNMG 120408EN-M34			●			●									12.70	12.70	4.76	0.80	5.16
		SNMG 120412EN-M34			●			●									12.70	12.70	4.76	1.20	5.16
-TMF		SNMG 120408EN-TMF							●								12.70	12.70	4.76	0.80	5.16
		SNMG 120412EN-TMF										●					12.70	12.70	4.76	1.20	5.16
-M42		SNMG 120408EN-M42											●				12.70	12.70	4.76	0.80	5.16
		SNMG 120412EN-M42											●				12.70	12.70	4.76	1.20	5.16
-M52		SNMG 120408EN-M52							●								12.70	12.70	4.76	0.80	5.16
-M50		SNMG 120408EN-M50						●		●							12.70	12.70	4.76	0.80	5.16
		SNMG 120412EN-M50						●		●							12.70	12.70	4.76	1.20	5.16
-TM		SNMG 120408EN-TM						●		●		●	●				12.70	12.70	4.76	0.80	5.16
		SNMG 120412EN-TM								●		●					12.70	12.70	4.76	1.20	5.16
		SNMG 120416EN-TM								●		●					12.70	12.70	4.76	1.60	5.16
-TRM		SNMG 120412EN-TRM								●							12.70	12.70	4.76	1.20	5.16
		SNMG 120416EN-TRM								●							12.70	12.70	4.76	1.60	5.16
-M60		SNMG 120408EN-M60									●						12.70	12.70	4.76	0.80	5.16
		SNMG 120412EN-M60									●						12.70	12.70	4.76	1.20	5.16
		SNMG 120416EN-M60									●						12.70	12.70	4.76	1.60	5.16
			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d	l	s	r	d_1



A16-A33 A40-A50 A58-A59 A248-A257 A120-A123 A135-A138 A190

			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
		P			O	●		●		●	●	●	O	●	●						
		M			O		O	O	●	O	●	O	●	O	●						
		K	●			●	●		●	O	●				●	O					
		N	●	O						O											
		S		●	●			●		O		O	O	O							
		H																			
-TMR		SNMG 120408EN-TMR				●			●		●		●	●			12.70	12.70	4.76	0.80	5.16
		SNMG 120412EN-TMR				●					●			●			12.70	12.70	4.76	1.20	5.16
		SNMG 120416EN-TMR				●					●						12.70	12.70	4.76	1.60	5.16
		SNMG 150612EN-TMR									●						15.88	15.88	6.35	1.20	6.35
		SNMG 150616EN-TMR				●					●						15.88	15.88	6.35	1.60	6.35
		SNMG 190612EN-TMR									●		●				19.05	19.05	6.35	1.20	7.94
		SNMG 190616EN-TMR									●			●			19.05	19.05	6.35	1.60	7.94
-R28		SNMM 150612EN-R28							●		●						15.88	15.88	6.35	1.20	6.35
		SNMM 150616EN-R28							●		●						15.88	15.88	6.35	1.60	6.35
-R58		SNMM 150612EN-R58							●		●						15.88	15.88	6.35	1.20	6.35
		SNMM 150616EN-R58							●		●						15.88	15.88	6.35	1.60	6.35
		SNMM 190612EN-R58							●		●						19.05	19.05	6.35	1.20	7.94
		SNMM 190616EN-R58							●		●						19.05	19.05	6.35	1.60	7.94
		SNMM 190624EN-R58							●		●						19.05	19.05	6.35	2.40	7.94
		SNMM 250724EN-R58							●		●						25.40	25.40	7.94	2.40	9.12
		SNMM 250924EN-R58							●		●						25.40	25.40	9.52	2.40	9.12
-TR		SNMM 120408EN-TR									●		●				12.70	12.70	4.76	0.80	5.16
		SNMM 120412EN-TR									●		●				12.70	12.70	4.76	1.20	5.16
		SNMM 150612EN-TR									●						15.88	15.88	6.35	1.20	6.35
		SNMM 190616EN-TR									●		●				19.05	19.05	6.35	1.60	7.94
		SNMM 250724EN-TR									●		●				25.40	25.40	7.94	2.40	9.12
-TRR		SNMM 190616SN-TRR									●		●				19.05	19.05	6.35	1.60	7.94
		SNMM 250724SN-TRR									●		●				25.40	25.40	7.94	2.40	9.12
-R88		SNMM 190616SN-R88							●		●						19.05	19.05	6.35	1.60	7.94
		SNMM 190624SN-R88							●		●						19.05	19.05	6.35	2.40	7.94
		SNMM 250724SN-R88							●		●						25.40	25.40	7.94	2.40	9.12
		SNMM 250732SN-R88							●		●						25.40	25.40	7.94	3.20	9.12
		SNMM 250924SN-R88							●		●						25.40	25.40	9.52	2.40	9.12
		SNMM 250932SN-R88							●		●						25.40	25.40	9.52	3.20	9.12
		SNMM 310932SN-R88							●		●						31.75	31.75	9.52	3.20	9.12
		SNMT 310932SN-R88							●		●						31.75	31.75	9.52	3.20	9.12
SN..A		SNMA 120408EN				●	●										12.70	12.70	4.76	0.80	5.16
		SNMA 120412EN				●	●										12.70	12.70	4.76	1.20	5.16
		SNMA 120416EN				●	●										12.70	12.70	4.76	1.60	5.16
		SNMA 150616EN				●											15.88	15.88	6.35	1.60	6.35
		SNMA 190616EN				●											19.05	19.05	6.35	1.60	7.94
EN		SNMG 090308EN					●				●		●				9.52	9.52	3.18	0.80	3.81
			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d	l	s	r	d_1



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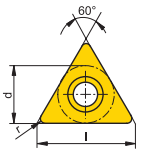
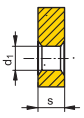
			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
	P				O	●		●		●	●	●	●	O	●	●					
	M			O			O	O	●	O	●	O	●	O	O	●					
	K	●			●	●		●	O	●					●	O					
	N	●	O							O											
	S		●	●			●		O		O	O	O								
	H																				
-CF		TNMG 160404EN-CF													●		9.52	16.50	4.76	0.40	3.81
		TNMG 160408EN-CF													●		9.52	16.50	4.76	0.80	3.81
		TNMG 160412EN-CF													●		9.52	16.50	4.76	1.20	3.81
-F30		TNMG 160404EN-F30										●					9.52	16.50	4.76	0.40	3.81
		TNMG 160408EN-F30										●					9.52	16.50	4.76	0.80	3.81
-TF		TNMG 110304EN-TF									●						6.35	11.00	3.18	0.40	2.26
		TNMG 160404EN-TF							●		●		●				9.52	16.50	4.76	0.40	3.81
		TNMG 160408EN-TF							●		●						9.52	16.50	4.76	0.80	3.81
-M30		TNMG 160408EN-M30										●					9.52	16.50	4.76	0.80	3.81
		TNMG 160412EN-M30										●					9.52	16.50	4.76	1.20	3.81
-M34		TNMG 160408EN-M34						●									9.52	16.50	4.76	0.80	3.81
		TNMG 220404EN-M34						●									12.70	22.00	4.76	0.40	5.16
		TNMG 220408EN-M34						●									12.70	22.00	4.76	0.80	5.16
		TNMG 220416EN-M34						●									12.70	22.00	4.76	1.60	5.16
-TMF		TNMG 160404EN-TMF							●		●		●				9.52	16.50	4.76	0.40	3.81
		TNMG 160408EN-TMF									●		●				9.52	16.50	4.76	0.80	3.81
		TNMG 160412EN-TMF							●								9.52	16.50	4.76	1.20	3.81
-M42		TNMG 160404EN-M42								●				●			9.52	16.50	4.76	0.40	3.81
		TNMG 160408EN-M42								●				●			9.52	16.50	4.76	0.80	3.81
-M52		TNMG 160404EN-M52								●							9.52	16.50	4.76	0.40	3.81
		TNMG 160408EN-M52								●							9.52	16.50	4.76	0.80	3.81
-M50		TNMG 160404EN-M50							●		●						9.52	16.50	4.76	0.40	3.81
		TNMG 160408EN-M50							●		●						9.52	16.50	4.76	0.80	3.81
		TNMG 160412EN-M50							●		●						9.52	16.50	4.76	1.20	3.81
-TM		TNMG 160408EN-TM							●		●		●	●			9.52	16.50	4.76	0.80	3.81
		TNMG 160412EN-TM									●		●				9.52	16.50	4.76	1.20	3.81
		TNMG 220408EN-TM							●		●		●				12.70	22.00	4.76	0.80	5.16
		TNMG 220412EN-TM									●		●				12.70	22.00	4.76	1.20	5.16
		TNMG 220416EN-TM											●				12.70	22.00	4.76	1.60	5.16
			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d	l	s	r	d_1





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CERATIZIT hard material matters

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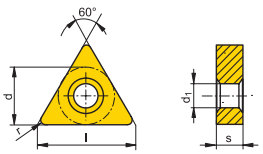
			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
		P				O	●		●		●	●	●	O	●	●					
		M			O			O	O	●	O	●	O	●	O	●					
		K	●			●	●		●	O	●				●	O					
		N	●	O						O											
		S		●	●			●		O		O	O	O							
		H																			
-TRM		TNMG 160408EN-TRM									●						9.52	16.50	4.76	0.80	3.81
		TNMG 160412EN-TRM									●						9.52	16.50	4.76	1.20	3.81
		TNMG 220408EN-TRM									●						12.70	22.00	4.76	0.80	5.16
		TNMG 220412EN-TRM									●		●				12.70	22.00	4.76	1.20	5.16
		TNMG 220416EN-TRM									●						12.70	22.00	4.76	1.60	5.16
-M60		TNMG 160408EN-M60										●					9.52	16.50	4.76	0.80	3.81
		TNMG 160412EN-M60										●					9.52	16.50	4.76	1.20	3.81
-TMR		TNMG 160408EN-TMR				●	●				●			●			9.52	16.50	4.76	0.80	3.81
		TNMG 160412EN-TMR				●					●						9.52	16.50	4.76	1.20	3.81
		TNMG 220404EN-TMR									●						12.70	22.00	4.76	0.40	5.16
		TNMG 220408EN-TMR					●				●		●				12.70	22.00	4.76	0.80	5.16
		TNMG 220412EN-TMR					●				●						12.70	22.00	4.76	1.20	5.16
		TNMG 220416EN-TMR					●				●						12.70	22.00	4.76	1.60	5.16
-TR		TNMM 160412EN-TR									●						9.52	16.50	4.76	1.20	3.81
		TNMM 220408EN-TR									●						12.70	22.00	4.76	0.80	5.16
		TNMM 220412EN-TR									●		●				12.70	22.00	4.76	1.20	5.16
		TNMM 220416EN-TR									●						12.70	22.00	4.76	1.60	5.16
		TNMM 270616EN-TR									●						15.88	27.50	6.35	1.60	6.35
-TRR		TNMM 160408SN-TRR									●						9.52	16.50	4.76	0.80	3.81
		TNMM 220412SN-TRR									●						12.70	22.00	4.76	1.20	5.16
TN..A		TNMA 160408EN				●	●										9.52	16.50	4.76	0.80	3.81
		TNMA 160412EN				●	●										9.52	16.50	4.76	1.20	3.81
		TNMA 160416EN					●										9.52	16.50	4.76	1.60	3.81
		TNMA 220408EN				●	●										12.70	22.00	4.76	0.80	5.16
		TNMA 220412EN				●	●										12.70	22.00	4.76	1.20	5.16
		TNMA 220416EN				●	●										12.70	22.00	4.76	1.60	5.16
EN		TNMG 110302EN											●				6.35	11.00	3.18	0.20	2.26
ER-EL		TNMG 160404ER									●		●				9.52	16.50	4.76	0.40	3.81
		TNMG 160408EL									●						9.52	16.50	4.76	0.80	3.81
		TNMG 160408ER									●		●				9.52	16.50	4.76	0.80	3.81
EN		TNMG 330924EN									●						19.05	33.00	9.52	2.40	7.94
			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d	l	s	r	d_1



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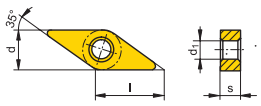
			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
		P				○	●		●		●	●	●	○	●	●					
		M			○			○	○	●	○	●	○	●	○	●					
		K	●			●	●		●	○	●				●	○					
		N	●	○						○											
		S		●	●			●		○		○	○	○							
		H																			
-F32		VNGP 160402FN-F32								●							9.52	16.60	4.76	0.20	3.81
		VNGP 160404FN-F32								●							9.52	16.60	4.76	0.40	3.81
-F30		VNMG 160404EN-F30										●					9.52	16.60	4.76	0.40	3.81
		VNMG 160408EN-F30										●					9.52	16.60	4.76	0.80	3.81
-F40		VNMG 160404EN-F40									●						9.52	16.60	4.76	0.40	3.81
		VNMG 160408EN-F40									●						9.52	16.60	4.76	0.80	3.81
-M30		VNMG 160408EN-M30									●						9.52	16.60	4.76	0.80	3.81
-M34		VNMG 160404EN-M34			●			●									9.52	16.60	4.76	0.40	3.81
		VNMG 160408EN-M34			●			●									9.52	16.60	4.76	0.80	3.81
		VNMG 160412EN-M34			●			●									9.52	16.60	4.76	1.20	3.81
-M50		VNMG 160404EN-M50							●		●						9.52	16.60	4.76	0.40	3.81
		VNMG 160408EN-M50					●		●		●						9.52	16.60	4.76	0.80	3.81
		VNMG 160412EN-M50					●				●						9.52	16.60	4.76	1.20	3.81
-M40		VNMG 160404EN-M40									●						9.52	16.60	4.76	0.40	3.81
		VNMG 160408EN-M40									●						9.52	16.60	4.76	0.80	3.81
			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d	l	s	r	d_1



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CERATIZIT hard material matters

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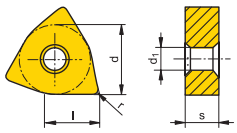
			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
		P			O	●		●		●	●	●	O	●	●						
		M			O			O	O	●	O	●	O	●	O	●					
		K	●			●	●		●	O	●				●	O						
		N	●	O						O											
		S		●	●			●		O		O	O	O							
		H																			
-CF		WNMG 060404EN-CF													●		9.52	6.50	4.76	0.40	3.81
		WNMG 060408EN-CF													●		9.52	6.50	4.76	0.80	3.81
-F30		WNMG 060404EN-F30										●					9.52	6.50	4.76	0.40	3.81
		WNMG 060408EN-F30										●					9.52	6.50	4.76	0.80	3.81
		WNMG 080404EN-F30										●					12.70	8.69	4.76	0.40	5.16
		WNMG 080408EN-F30										●					12.70	8.69	4.76	0.80	5.16
-TF		WNMG 060404EN-TF							●								9.52	6.50	4.76	0.40	3.81
		WNMG 080404EN-TF							●								12.70	8.69	4.76	0.40	5.16
		WNMG 080408EN-TF									●						12.70	8.69	4.76	0.80	5.16
-F34		WNMG 080408EN-F34						●									12.70	8.69	4.76	0.80	5.16
-M30		WNMG 060408EN-M30										●					9.52	6.50	4.76	0.80	3.81
		WNMG 060412EN-M30										●					9.52	6.50	4.76	1.20	3.81
		WNMG 080408EN-M30										●					12.70	8.69	4.76	0.80	5.16
		WNMG 080412EN-M30										●					12.70	8.69	4.76	1.20	5.16
-M34		WNMG 080408EN-M34			●			●									12.70	8.69	4.76	0.80	5.16
		WNMG 080412EN-M34			●			●									12.70	8.69	4.76	1.20	5.16
-TFQ		WNMG 060404EN-TFQ									●						9.52	6.50	4.76	0.40	3.81
		WNMG 060408EN-TFQ									●				●		9.52	6.50	4.76	0.80	3.81
		WNMG 080404EN-TFQ													●		12.70	8.69	4.76	0.40	5.16
		WNMG 080408EN-TFQ							●		●				●		12.70	8.69	4.76	0.80	5.16
		WNMG 080412EN-TFQ									●						12.70	8.69	4.76	1.20	5.16
-TMF		WNMG 060404EN-TMF									●		●				9.52	6.50	4.76	0.40	3.81
		WNMG 060408EN-TMF							●		●						9.52	6.50	4.76	0.80	3.81
		WNMG 080404EN-TMF					●				●		●				12.70	8.69	4.76	0.40	5.16
		WNMG 080408EN-TMF							●		●		●				12.70	8.69	4.76	0.80	5.16
-M42		WNMG 060404EN-M42												●			9.52	6.50	4.76	0.40	3.81
		WNMG 060408EN-M42												●			9.52	6.50	4.76	0.80	3.81
		WNMG 080404EN-M42												●			12.70	8.69	4.76	0.40	5.16
		WNMG 080408EN-M42								●				●			12.70	8.69	4.76	0.80	5.16
		WNMG 080412EN-M42												●			12.70	8.69	4.76	1.20	5.16
-M52		WNMG 060404EN-M52								●							9.52	6.50	4.76	0.40	3.81
		WNMG 060408EN-M52								●							9.52	6.50	4.76	0.80	3.81
		WNMG 080404EN-M52								●							12.70	8.69	4.76	0.40	5.16
		WNMG 080408EN-M52								●							12.70	8.69	4.76	0.80	5.16
			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d	l	s	r	d_1



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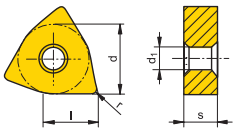
			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
		P				○	●		●		●	●	●	○	●	●					
		M			○			○	○	●	○	●	○	●	○	●					
		K	●			●	●		●	○	●				●	○					
		N	●	○						○											
		S		●	●			●		○		○	○	○							
		H																			
-M50		WNMG 060408EN-M50							●		●						9.52	6.50	4.76	0.80	3.81
		WNMG 060412EN-M50							●		●						9.52	6.50	4.76	1.20	3.81
		WNMG 080408EN-M50									●						12.70	8.69	4.76	0.80	5.16
		WNMG 080412EN-M50							●		●						12.70	8.69	4.76	1.20	5.16
-TM		WNMG 060408EN-TM							●		●		●	●			9.52	6.50	4.76	0.80	3.81
		WNMG 080408EN-TM							●								12.70	8.69	4.76	0.80	5.16
		WNMG 080408EN-M50							●								12.70	8.69	4.76	0.80	5.16
		WNMG 080408EN-TM									●		●	●			12.70	8.69	4.76	0.80	5.16
		WNMG 080412EN-TM									●			●			12.70	8.69	4.76	1.20	5.16
-TMQ		WNMG 080408EN-TMQ									●						12.70	8.69	4.76	0.80	5.16
		WNMG 080412EN-TMQ							●		●						12.70	8.69	4.76	1.20	5.16
-TRM		WNMG 060408EN-TRM									●						9.52	6.50	4.76	0.80	3.81
		WNMG 060412EN-TRM									●						9.52	6.50	4.76	1.20	3.81
		WNMG 080408EN-TRM									●						12.70	8.69	4.76	0.80	5.16
		WNMG 080412EN-TRM									●						12.70	8.69	4.76	1.20	5.16
		WNMG 080416EN-TRM									●						12.70	8.69	4.76	1.60	5.16
-M60		WNMG 060408EN-M60										●					9.52	6.50	4.76	0.80	3.81
		WNMG 060412EN-M60										●					9.52	6.50	4.76	1.20	3.81
		WNMG 080408EN-M60										●					12.70	8.69	4.76	0.80	5.16
		WNMG 080412EN-M60										●					12.70	8.69	4.76	1.20	5.16
-TMR		WNMG 080408EN-TMR				●	●				●		●	●			12.70	8.69	4.76	0.80	5.16
		WNMG 080412EN-TMR				●	●				●						12.70	8.69	4.76	1.20	5.16
		WNMG 080416EN-TMR				●	●		●								12.70	8.69	4.76	1.60	5.16
			H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d	l	s	r	d_1



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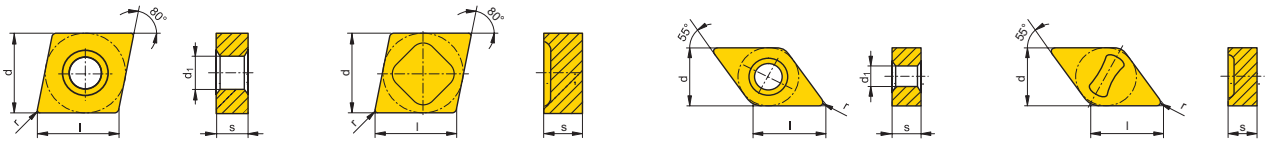
MaxiLock D/N

CN.. - DN.. (other cutting materials)

			P	M	K	N	S	H	TA100	TA201	CTI3105	CTN3105	CTS3105	CTN3110	CTM3110	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
CN..A		CNGA 120408SN-025C			●		O	●						●		12.70	12.90	4.76	0.80	5.16
		CNGA 120408TN-020D			●			●					●			12.70	12.90	4.76	0.80	5.16
		CNGA 120412SN-020D			●							●				12.70	12.90	4.76	1.20	5.16
		CNGA 120412SN-025C			●									●		12.70	12.90	4.76	1.20	5.16
		CNGA 160608SN-028C			●										●	15.88	16.10	6.35	0.80	6.35
		CNGA 160616SN-028C			●									●		15.88	16.10	6.35	1.60	6.35
		CNGA 160616TN-020D			●								●			15.88	16.10	6.35	1.60	6.35
CN..X		CNGX 120712TN-020D			●						●	●				12.70	12.90	7.94	1.20	
		CNGX 120716TN-020D			●						●	●				12.70	12.90	7.94	1.60	
		CNGX 160716TN-020D			●						●					15.88	16.10	7.94	1.60	
CN..A		CNMA 120412FN			●				●							12.70	12.90	4.76	1.20	5.16
		CNMA 120412TN-020D			●				●							12.70	12.90	4.76	1.20	5.16
		CNMA 120416FN			●				●							12.70	12.90	4.76	1.60	5.16
		CNMA 120416TN-020D			●				●							12.70	12.90	4.76	1.60	5.16
CN..X		CNMX 120404SN			●					●						12.70	12.90	4.76	0.40	5.16
		CNMX 120408EN			●					●						12.70	12.90	4.76	0.80	5.16
		CNMX 120408SN			●					●						12.70	12.90	4.76	0.80	5.16
		CNMX 120412SN			●					●						12.70	12.90	4.76	1.20	5.16
		CNNX 120716TN-020D			●						●	●				12.70	12.90	7.94	1.60	
DN..A		DNGA 150604TN-020D			●								●			12.70	15.50	6.35	0.40	5.16
		DNGA 150608TN-020D			●								●			12.70	15.50	6.35	0.80	5.16
		DNGA 150612TN-020D			●								●			12.70	15.50	6.35	1.20	5.16
		DNGA 150616TN-020D			●								●			12.70	15.50	6.35	1.60	5.16
DN..X		DNGX 120712TN-020D			●							●				10.00	12.30	7.94	1.20	
		DNGX 150712TN-020D			●							●				12.70	15.50	7.94	1.20	
		DNGX 150716TN-020D			●							●				12.70	15.50	7.94	1.60	
		DNMX 150608SN			●					●						12.70	15.50	6.35	0.80	5.16
			P	M	K	N	S	H	TA100	TA201	CTI3105	CTN3105	CTS3105	CTN3110	CTM3110	d	l	s	r	d_1
																[mm]	[mm]	[mm]	[mm]	[mm]



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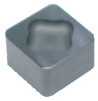
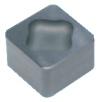
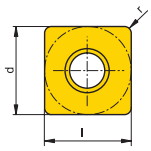
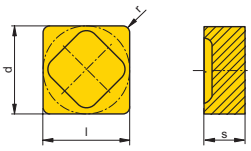
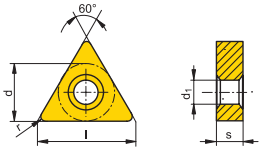
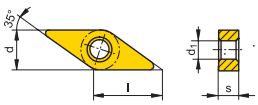
			P	M	K	N	S	H	TA100	TA201	CTI3105	CTN3105	CTS3105	CTN3110	CTM3110	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
SN..A		SNGA 120408SN-025C			●			●							●	12.70	12.70	4.76	0.80	5.16
SN..X		SNGX 120712TN-020D			●		O	●			●	●				12.70	12.70	7.94	1.20	
		SNGX 120716TN-020D			●		O	●			●	●				12.70	12.70	7.94	1.60	
		SNGX 150716TN-020D			●		O	●			●	●				15.88	15.88	7.94	1.60	
		SNGX 150716TN-040D			●		O	●			●					15.88	15.88	7.94	1.60	
SN..A		SNMA 120412FN			●			●	●							12.70	12.70	4.76	1.20	5.16
		SNMA 120412TN-020D			●			●	●							12.70	12.70	4.76	1.20	5.16
SN..X		SNNX 120716TN-020D			●			●			●	●				12.70	12.70	7.94	1.60	
TN..A		TNGA 160408TN-020D			●			●					●			9.52	16.50	4.76	0.80	3.81
TN..X		TNMX 160408SN			●			●		●						9.52	16.50	4.76	0.80	3.81
VN..A		VNGA 160408TN-020D			●			●					●			9.52	16.60	4.76	0.80	3.81
		VNGA 160412TN-020D			●			●					●			9.52	16.60	4.76	1.20	3.81









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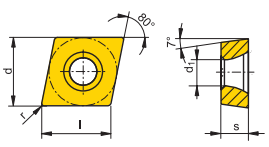
CERATIZIT hard material matters

MaxiLock S

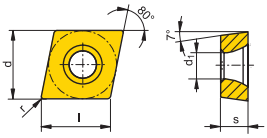
CC..

			H210T	H10T	H216T	U17T	CTW7120	S40T	AMZ	CTP4115	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTC1135	CTC2135	TCC410	TCM407	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
-23P		CCGT 060202FN-23P			●																	6.35	6.40	2.38	0.20	2.80
		CCGT 060204FN-23P			●																	6.35	6.40	2.38	0.40	2.80
		CCGT 09T304FN-23P			●																	9.52	9.70	3.97	0.40	4.40
		CCGT 09T308FN-23P			●																	9.52	9.70	3.97	0.80	4.40
-25P		CCGT 060202FN-25P	●						●													6.35	6.40	2.38	0.20	2.80
		CCGT 060204FN-25P	●						●													6.35	6.40	2.38	0.40	2.80
		CCGT 09T302FN-25P	●						●													9.52	9.70	3.97	0.20	4.40
		CCGT 09T304FN-25P	●						●													9.52	9.70	3.97	0.40	4.40
		CCGT 09T308FN-25P	●						●													9.52	9.70	3.97	0.80	4.40
		CCGT 120402FN-25P	●																			12.70	12.90	4.76	0.20	5.50
		CCGT 120404FN-25P	●						●													12.70	12.90	4.76	0.40	5.50
		CCGT 120408FN-25P	●						●													12.70	12.90	4.76	0.80	5.50
-25Q		CCGT 060204FN-25Q	●																			6.35	6.40	2.38	0.40	2.80
		CCGT 09T304FN-25Q	●																			9.52	9.70	3.97	0.40	4.40
		CCGT 09T308FN-25Q	●																			9.52	9.70	3.97	0.80	4.40
		CCGT 120404FN-25Q	●																			12.70	12.90	4.76	0.40	5.50
		CCGT 120408FN-25Q	●		●																	12.70	12.90	4.76	0.80	5.50
-27		CCGT 060202FN-27		●					●													6.35	6.40	2.38	0.20	2.80
		CCGT 060204FN-27		●					●													6.35	6.40	2.38	0.40	2.80
		CCGT 09T302FN-27		●					●													9.52	9.70	3.97	0.20	4.40
		CCGT 09T304FN-27		●					●													9.52	9.70	3.97	0.40	4.40
		CCGT 09T308FN-27		●					●													9.52	9.70	3.97	0.80	4.40
		CCGT 120402FN-27		●					●													12.70	12.90	4.76	0.20	5.50
		CCGT 120404FN-27		●					●													12.70	12.90	4.76	0.40	5.50
		CCGT 120408FN-27		●					●													12.70	12.90	4.76	0.80	5.50
-29		CCMT 060204EN-29			●				●													6.35	6.40	2.38	0.40	2.80
		CCMT 09T304EN-29			●				●													9.52	9.70	3.97	0.40	4.40
		CCMT 09T308EN-29			●				●													9.52	9.70	3.97	0.80	4.40
-F23		CCGT 060200FN-F23													●							6.35	6.40	2.38	0.00	2.80
		CCGT 060201FN-F23													●							6.35	6.40	2.38	0.10	2.80
		CCGT 09T300FN-F23													●							9.52	9.70	3.97	0.00	4.40
		CCGT 09T301FN-F23													●							9.52	9.70	3.97	0.10	4.40
-SF		CCGT 060202EN-SF														●	●		●	●		6.35	6.40	2.38	0.20	2.80
		CCGT 060204EN-SF																	●	●	●	6.35	6.40	2.38	0.40	2.80
		CCGT 09T302EN-SF																	●	●	●	9.52	9.70	3.97	0.20	4.40
		CCGT 09T304EN-SF																	●	●	●	9.52	9.70	3.97	0.40	4.40
		CCGT 09T308EN-SF																			●	9.52	9.70	3.97	0.80	4.40
		CCGT 120404EN-SF																			●	12.70	12.90	4.76	0.40	5.50
		CCMT 060204EN-SF												●		●	●	●				6.35	6.40	2.38	0.40	2.80
		CCMT 09T304EN-SF												●		●	●	●				9.52	9.70	3.97	0.40	4.40
		CCMT 09T308EN-SF												●		●						9.52	9.70	3.97	0.80	4.40
		CCMT 120404EN-SF														●						12.70	12.90	4.76	0.40	5.50
		CCMT 120408EN-SF														●						12.70	12.90	4.76	0.80	5.50
			H210T	H10T	H216T	U17T	CTW7120	S40T	AMZ	CTP4115	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTC1135	CTC2135	TCC410	TCM407	TCM10	d	l	s	r	d_1



A16-A33 A40-A50 A58-A59 A248-A257 A143-A149 A197-A200

			H210T	H10T	H216T	U17T	CTW7120	S40T	AMZ	CTP4115	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTC1135	CTC2135	TCC410	TCM407	TCM10						d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P							●	○		○	●		●		●	●	○	●	●	●										
M			○				○	●	○				○	○	●	○	○	●	○	○	●									
K			○	●	●				○		●	●		●	○	●			●	○	○									
N			●	●	●		●		●	●					○															
S			●				○		○				●		○		○	○												
H																														
-SMF		CCMT 060204EN-SMF														●	●		●		●						6.35	6.40	2.38	0.40	2.80
		CCMT 060208EN-SMF														●											6.35	6.40	2.38	0.80	2.80
		CCMT 09T304EN-SMF												●		●	●		●		●						9.52	9.70	3.97	0.40	4.40
		CCMT 09T308EN-SMF												●		●					●						9.52	9.70	3.97	0.80	4.40
		CCMT 120404EN-SMF														●			●		●						12.70	12.90	4.76	0.40	5.50
		CCMT 120408EN-SMF												●			●										12.70	12.90	4.76	0.80	5.50
-F43		CCMT 09T304EN-F43																●									9.52	9.70	3.97	0.40	4.40
		CCMT 09T308EN-F43																●									9.52	9.70	3.97	0.80	4.40
-SM		CCGT 060202EN-SM														●	●										6.35	6.40	2.38	0.20	2.80
		CCMT 060204EN-SM						●			●			●		●	●	●									6.35	6.40	2.38	0.40	2.80
		CCMT 060208EN-SM									●			●			●										6.35	6.40	2.38	0.80	2.80
		CCMT 09T304EN-SM									●			●		●	●	●									9.52	9.70	3.97	0.40	4.40
		CCMT 09T308EN-SM									●	●		●		●	●	●									9.52	9.70	3.97	0.80	4.40
		CCMT 09T312EN-SM										●															9.52	9.70	3.97	1.20	4.40
		CCMT 120404EN-SM												●		●	●	●									12.70	12.90	4.76	0.40	5.50
		CCMT 120408EN-SM									●			●		●	●	●									12.70	12.90	4.76	0.80	5.30
		CCMT 120412EN-SM														●											12.70	12.90	4.76	1.20	5.50
-SMQ		CCMT 09T304EN-SMQ														●											9.52	9.70	3.97	0.40	4.40
		CCMT 09T308EN-SMQ														●											9.52	9.70	3.97	0.80	4.40
		CCMT 120404EN-SMQ														●											12.70	12.90	4.76	0.40	5.50
		CCMT 120408EN-SMQ												●		●											12.70	12.90	4.76	0.80	5.50
CC..W		CCGW 09T304FN					●																				9.52	9.70	3.97	0.40	4.40
			H210T	H10T	H216T	U17T	CTW7120	S40T	AMZ	CTP4115	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTC1135	CTC2135	TCC410	TCM407	TCM10						d	l	s	r	d_1



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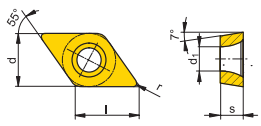
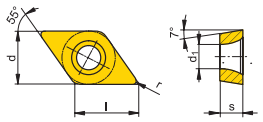
			H210T	H10T	H216T	U17T	CTW7120	S40T	AMZ	CTP4115	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTC1135	CTC2135	TCC410	TCM407	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
-23P		DCGT 070204FN-23P			●																	6.35	7.75	2.38	0.40	2.80
		DCGT 11T304FN-23P			●																	9.52	11.60	3.97	0.40	4.40
		DCGT 11T308FN-23P			●																	9.52	11.60	3.97	0.80	4.40
-25P		DCGT 070202FN-25P	●						●													6.35	7.75	2.38	0.20	2.80
		DCGT 070204FN-25P	●						●													6.35	7.75	2.38	0.40	2.80
		DCGT 11T302FN-25P	●						●													9.52	11.60	3.97	0.20	4.40
		DCGT 11T304FN-25P	●						●													9.52	11.60	3.97	0.40	4.40
		DCGT 11T308FN-25P	●						●													9.52	11.60	3.97	0.80	4.40
-25Q		DCGT 11T304FL-25Q	●																			9.52	11.60	3.97	0.40	4.40
		DCGT 11T304FN-25Q	●																			9.52	11.60	3.97	0.40	4.40
		DCGT 11T304FR-25Q	●																			9.52	11.60	3.97	0.40	4.40
		DCGT 11T308FL-25Q	●																			9.52	11.60	3.97	0.80	4.40
		DCGT 11T308FN-25Q	●																			9.52	11.60	3.97	0.80	4.40
		DCGT 11T308FR-25Q	●																			9.52	11.60	3.97	0.80	4.40
-27		DCGT 070202FN-27		●					●													6.35	7.75	2.38	0.20	2.80
		DCGT 070204FN-27		●					●													6.35	7.75	2.38	0.40	2.80
		DCGT 11T302FN-27		●					●													9.52	11.60	3.97	0.20	4.40
		DCGT 11T304FN-27		●					●													9.52	11.60	3.97	0.40	4.40
		DCGT 11T308FN-27		●					●													9.52	11.60	3.97	0.80	4.40
-29		DCMT 070204EN-29			●				●													6.35	7.75	2.38	0.40	2.80
		DCMT 11T304EN-29			●				●													9.52	11.60	3.97	0.40	4.40
		DCMT 11T308EN-29			●				●													9.52	11.60	3.97	0.80	4.40
-F23		DCGT 070200FN-F23													●							6.35	7.75	2.38	0.00	2.80
		DCGT 070201FN-F23													●							6.35	7.75	2.38	0.10	2.80
		DCGT 11T300FN-F23													●							9.52	11.60	3.97	0.00	4.40
		DCGT 11T301FN-F23													●							9.52	11.60	3.97	0.10	4.40
-SF		DCGT 070201EN-SF																			●	6.35	7.75	2.38	0.10	2.80
		DCGT 070202EN-SF														●		●	●	●	●	6.35	7.75	2.38	0.20	2.80
		DCGT 070204EN-SF																	●	●	●	6.35	7.75	2.38	0.40	2.80
		DCGT 11T302EN-SF																	●	●	●	9.52	11.60	3.97	0.20	4.40
		DCGT 11T304EN-SF																	●	●	●	9.52	11.60	3.97	0.40	4.40
		DCGT 11T308EN-SF																	●	●	●	9.52	11.60	3.97	0.80	4.40
		DCMT 070204EN-SF												●		●	●	●				6.35	7.75	2.38	0.40	2.80
		DCMT 11T304EN-SF												●		●	●	●				9.52	11.60	3.97	0.40	4.40
		DCMT 11T308EN-SF												●		●	●	●				9.52	11.60	3.97	0.80	4.40
-SMF		DCMT 070202EN-SMF																			●	6.35	7.75	2.38	0.20	2.80
		DCMT 070204EN-SMF														●	●				●	6.35	7.75	2.38	0.40	2.80
		DCMT 070208EN-SMF															●					6.35	7.75	2.38	0.80	2.80
		DCMT 11T304EN-SMF												●		●	●				●	9.52	11.60	3.97	0.40	4.40
		DCMT 11T308EN-SMF												●		●	●				●	9.52	11.60	3.97	0.80	4.40
			H210T	H10T	H216T	U17T	CTW7120	S40T	AMZ	CTP4115	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTC1135	CTC2135	TCC410	TCM407	TCM10	d	l	s	r	d_1



A16-A33 A40-A50 A58-A59 A248-A257 A150-A153 A201-A205

			H210T	H10T	H216T	U17T	CTW7120	S40T	AMZ	CTP4115	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTC1135	CTC2135	TCC410	TCM407	TCM10						d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P							●	○		○	●		●		●	●	○	●	●	●										
M			○				○	●	○				○	○	●	○	○	●	○	○	●									
K			○	●	●				○		●	●		●	○	●			●	○	○									
N			●	●	●		●		●	●					○															
S			●				○		○				●		○		○	○												
H																														
-F43		DCMT 070202EN-F43																●									6.35	7.75	2.38	0.20	2.80
		DCMT 070204EN-F43																●									6.35	7.75	2.38	0.40	2.80
		DCMT 11T302EN-F43																●									9.52	11.60	3.97	0.20	4.40
		DCMT 11T304EN-F43																●									9.52	11.60	3.97	0.40	4.40
		DCMT 11T308EN-F43																●									9.52	11.60	3.97	0.80	4.40
-SM		DCGT 070202EN-SM														●	●										6.35	7.75	2.38	0.20	2.80
		DCMT 070204EN-SM						●			●			●		●	●	●									6.35	7.75	2.38	0.40	2.80
		DCMT 070208EN-SM												●		●	●	●									6.35	7.75	2.38	0.80	2.80
		DCMT 11T304EN-SM									●			●		●	●	●									9.52	11.60	3.97	0.40	4.40
		DCMT 11T308EN-SM									●			●		●	●	●									9.52	11.60	3.97	0.80	4.40
		DCMT 11T312EN-SM														●											9.52	11.60	3.97	1.20	4.40
-SMQ		DCMT 070204EN-SMQ												●		●											6.35	7.75	2.38	0.40	2.80
		DCMT 11T304EL-SMQ														●											9.52	11.60	3.97	0.40	4.40
		DCMT 11T304EN-SMQ														●											9.52	11.60	3.97	0.40	4.40
		DCMT 11T304ER-SMQ														●											9.52	11.60	3.97	0.40	4.40
		DCMT 11T308EN-SMQ														●											9.52	11.60	3.97	0.80	4.40
DC..W		DCGW 070204FN					●																				6.35	7.75	2.38	0.40	2.80
			H210T	H10T	H216T	U17T	CTW7120	S40T	AMZ	CTP4115	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTC1135	CTC2135	TCC410	TCM407	TCM10						d	l	s	r	d_1



A16-A33
A40-A50
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A248-A257
A150-A153
A201-A205

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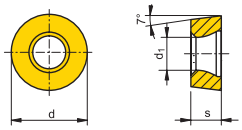
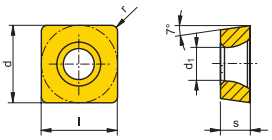
RC..

			H210T	H10T	H216T	U17T	CTW7120	S40T	AMZ	CTP4115	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTC1135	CTC2135	TCC410	TCM407	TCM10					d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P			●					●	O		O	●		●		●	●	O	●	●	●									
M			O				O	●	O				O	O	●	O	O	●	O	O	●									
K			O	●	●				O		●	●		●	O	●			●	O	O									
N			●	●	●		●		●	●					O															
S			●				O		O				●		O		O	O												
H																														
-25P		RCGT 0803MOFN-25P	●																							8.00	8.00	3.18	4.00	3.40
		RCMT 0803MOEN-25	●																							8.00	8.00	3.18	4.00	3.40
-27		RCGT 0602MOFN-27		●																						6.00	6.00	2.38	3.00	2.80
		RCGT 0803MOFN-27		●					●																	8.00	8.00	3.18	4.00	3.40
		RCGT 1003MOFN-27		●					●																	10.00	10.00	3.18	5.00	4.00
-SMF		RCMT 1606MOEN-SMF									●															16.00	16.00	6.35	8.00	5.30
-SM		RCGT 0602MOEN-SM														●	●									6.00	6.00	2.38	3.00	2.80
		RCGT 0803MOEN-SM														●	●									8.00	8.00	3.18	4.00	3.40
		RCMT 1003MOSN-SM														●	●									10.00	10.00	3.18	5.00	4.00
		RCMT 1204MOSN-SM												●		●	●									12.00	12.00	4.76	6.00	4.90
		RCMT 1606MOSN-SM												●		●	●									16.00	16.00	6.35	8.00	5.30
		RCMT 2006MOSN-SM														●	●									20.00	20.00	6.35	10.00	6.50
		RCMT 2507MOSN-SM												●		●	●									25.00	25.00	7.94	12.50	7.20
		RCMT 3209MOSN-SM												●		●										32.00	32.00	9.52	16.00	9.50
-R83		RCMX 2507MOSN-R83												●		●										25.00	25.00	8.28	12.70	7.70
		RCMX 3209MOSN-R83												●		●										32.00	32.00	9.52	16.00	9.50
			H210T	H10T	H216T	U17T	CTW7120	S40T	AMZ	CTP4115	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTC1135	CTC2135	TCC410	TCM407	TCM10					d	l	s	r	d_1



A16-A33 A40-A50 A58-A59 A248-A257 A133-A134 A154-A155

			H210T	H10T	H216T	U17T	CTW7120	S40T	AMZ	CTP4115	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTC1135	CTC2135	TCC410	TCM407	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
		P					●	○		○	●		●		●	●	○	●	●	●						
		M	○				○	●	○				○	○	●	○	○	●	○	○	●					
		K	○	●	●				○		●	●		●	○	●			●	○	○					
		N	●	●	●		●		●	●					○											
		S	●				○		○				●		○		○	○								
		H																								
-25P		SCGT 120408FN-25P	●						●													12.70	12.70	4.76	0.80	5.50
-27P		SCGT 09T304FN-27		●																		9.52	9.52	3.97	0.40	4.40
		SCGT 09T308FN-27							●													9.52	9.52	3.97	0.80	4.40
		SCGT 09T308FN-27P		●																		9.52	9.52	3.97	0.80	4.40
		SCGT 09T308FN-27		●																		9.52	9.52	3.97	0.80	4.40
		SCGT 120408FN-27		●																		12.70	12.70	4.76	0.80	5.50
-SF		SCGT 09T304EN-SF																	●	●	●	9.52	9.52	3.97	0.40	4.40
		SCGT 09T308EN-SF																	●		●	9.52	9.52	3.97	0.80	4.40
		SCMT 09T304EN-SF														●						9.52	9.52	3.97	0.40	4.40
		SCMT 09T308EN-SF														●						9.52	9.52	3.97	0.80	4.40
		SCMT 120408EN-SF														●						12.70	12.70	4.76	0.80	5.30
-SMF		SCMT 09T304EN-SMF												●					●			9.52	9.52	3.97	0.40	4.40
		SCMT 09T308EN-SMF												●					●			9.52	9.52	3.97	0.80	4.40
		SCMT 120408EN-SMF															●					12.70	12.70	4.76	0.80	5.50
-SM		SCMT 09T304EN-SM												●		●	●					9.52	9.52	3.97	0.40	4.40
		SCMT 09T308EN-SM									●			●		●	●	●				9.52	9.52	3.97	0.80	4.40
		SCMT 120408EN-SM									●			●		●	●	●				12.70	12.70	4.76	0.80	5.30
		SCMT 120412EN-SM						●			●					●						12.70	12.70	4.76	1.20	5.30
			H210T	H10T	H216T	U17T	CTW7120	S40T	AMZ	CTP4115	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTC1135	CTC2135	TCC410	TCM407	TCM10	d	l	s	r	d_1



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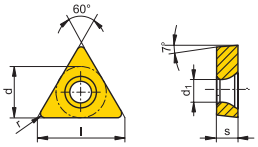
TC..

			H210T	H10T	H216T	U17T	CTW7120	S40T	AMZ	CTP4115	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTC1135	CTC2135	TCC410	TCM407	TCM10					d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P								●	O		O	●		●		●	●	O	●	●	●								
M			O				O	●	O				O	O	●	O	O	●	O	O	●								
K			O	●	●				O		●	●		●	O	●			●	O	O								
N			●	●	●		●		●	●					O														
S			●				O		O				●		O		O	O											
H																													
-27		TCGT 110202FN-27		●																						6.35	11.00	2.38	0.20	2.80
		TCGT 110204FN-27		●					●																	6.35	11.00	2.38	0.40	2.80
		TCGT 16T302FN-27		●																						9.52	16.50	3.97	0.20	4.40
		TCGT 16T304FN-27		●																						9.52	16.50	3.97	0.40	4.40
		TCGT 16T308FN-27		●					●																	9.52	16.50	3.97	0.80	4.40
-SF		TCGT 110202EN-SF																			●					6.35	11.00	2.38	0.20	2.80
		TCGT 110204EN-SF																		●	●	●				6.35	11.00	2.38	0.40	2.80
		TCGT 110208EN-SF																		●						6.35	11.00	2.38	0.80	2.80
		TCGT 16T304EN-SF																				●				9.52	16.50	3.97	0.40	4.40
		TCMT 110204EN-SF														●										6.35	11.00	2.38	0.40	2.80
		TCMT 110208EN-SF														●										6.35	11.00	2.38	0.80	2.80
		TCMT 16T304EN-SF														●										9.52	16.50	3.97	0.40	4.40
		TCMT 16T308EN-SF														●										9.52	16.50	3.97	0.80	4.40
-SMF		TCMT 110204EN-SMF																				●				6.35	11.00	2.38	0.40	2.80
		TCMT 110208EN-SMF												●				●								6.35	11.00	2.38	0.80	2.80
		TCMT 16T304EN-SMF												●												9.52	16.50	3.97	0.40	4.40
		TCMT 16T308EN-SMF												●								●				9.52	16.50	3.97	0.80	4.40
-F43		TCMT 110204EN-F43																	●							6.35	11.00	2.38	0.40	2.80
		TCMT 16T304EN-F43																	●							9.52	16.50	3.97	0.40	4.40
		TCMT 16T308EN-F43																	●							9.52	16.50	3.97	0.80	4.40
-SM		TCGT 110202EN-SM																●								6.35	11.00	2.38	0.20	2.80
		TCMT 090204EN-SM														●	●	●								5.56	9.60	2.38	0.40	2.50
		TCMT 110204EN-SM									●			●		●	●	●								6.35	11.00	2.38	0.40	2.80
		TCMT 110208EN-SM									●			●			●									6.35	11.00	2.38	0.80	2.80
		TCMT 16T304EN-SM												●		●	●									9.52	16.50	3.97	0.40	4.40
		TCMT 16T308EN-SM						●			●	●		●		●	●	●								9.52	16.50	3.97	0.80	4.40
		TCMT 16T312EN-SM										●														9.52	16.50	3.97	1.20	4.40
		TCMT 220408EN-SM														●	●									12.70	22.00	4.76	0.80	5.30
TC..W		TCMW 16T304FN				●																				9.52	16.50	3.97	0.40	4.40
			H210T	H10T	H216T	U17T	CTW7120	S40T	AMZ	CTP4115	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTC1135	CTC2135	TCC410	TCM407	TCM10					d	l	s	r	d_1



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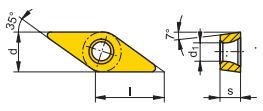
			H210T	H10T	H216T	U17T	CTW7120	S40T	AMZ	CTP4115	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTC1135	CTC2135	TCC410	TCM407	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P			●				●	○	●		○	●		●		●	●	○	●	●	●					
M			○				○	●	○				○	○	●	○	○	●	○	○	●					
K			○	●	●				○		●	●		●	○	●			●	○	○					
N			●	●	●		●		●	●					○											
S			●				○		○				●		○		○	○								
H																										
-25P		VCGT 110302FN-25P	●						●													6.35	11.10	3.18	0.20	2.90
		VCGT 110304FN-25P	●						●													6.35	11.10	3.18	0.40	2.90
		VCGT 160404FN-25P	●						●	●												9.52	16.60	4.76	0.40	4.40
		VCGT 160408EN-25P											●									9.52	16.60	4.76	0.80	4.40
		VCGT 160408FN-25P	●						●	●												9.52	16.60	4.76	0.80	4.40
		VCGT 160412EN-25P											●									9.52	16.60	4.76	1.20	4.40
		VCGT 160412FN-25P	●						●	●												9.52	16.60	4.76	1.20	4.40
		VCGT 220530FN-25P	●						●	●												12.70	22.10	5.56	3.00	5.50
		VCMT 160412EN-25	●																			9.52	16.60	4.76	1.20	4.40
		VCMT 220530EN-25	●																			12.70	22.10	5.56	3.00	5.50
		VPGT 220516FN-25P	●							●												12.70	22.10	5.56	1.60	5.50
-25Q		VCGT 110304FL-25Q	●																			6.35	11.10	3.18	0.40	2.90
		VCGT 110304FR-25Q	●																			6.35	11.10	3.18	0.40	2.90
-27		VCGT 110302FN-27		●					●													6.35	11.10	3.18	0.20	2.90
		VCGT 110304FN-27		●					●													6.35	11.10	3.18	0.40	2.90
		VCGT 110308FN-27		●																		6.35	11.10	3.18	0.80	2.90
		VCGT 160404FN-27		●					●													9.52	16.60	4.76	0.40	4.40
		VCGT 160408FN-27		●					●													9.52	16.60	4.76	0.80	4.40
		VCGT 160412FN-27		●																		9.52	16.60	4.76	1.20	4.40
		VCGT 220530FN-27		●																		12.70	22.10	5.56	3.00	5.50
		VPGT 220516FN-27		●																		12.70	22.10	5.56	1.60	5.50
-29		VCMT 160404EN-29			●				●													9.52	16.60	4.76	0.40	4.40
		VCMT 160408EN-29			●				●													9.52	16.60	4.76	0.80	4.40
		VCMT 160412EN-29			●				●													9.52	16.60	4.76	1.20	4.40
-F23		VCGT 110300FN-F23													●							6.35	11.10	3.18	0.00	2.80
		VCGT 110301FN-F23													●							6.35	11.10	3.18	0.10	2.80
		VCGT 160401FN-F23													●							9.52	16.60	4.76	0.10	4.40
-SF		VCGT 110301EN-SF																			●	6.35	11.10	3.18	0.10	2.80
		VCGT 110302EN-SF												●		●	●	●	●	●	●	6.35	11.10	3.18	0.20	2.80
		VCGT 110304EN-SF												●		●	●	●	●	●	●	6.35	11.10	3.18	0.40	2.90
		VCGT 110308EN-SF												●		●	●					6.35	11.10	3.18	0.80	2.90
		VCGT 160404EN-SF																	●	●	●	9.52	16.60	4.76	0.40	4.40
		VCGT 160408EN-SF																	●	●	●	9.52	16.60	4.76	0.80	4.40
		VCMT 160404EN-SF												●		●	●	●				9.52	16.60	4.76	0.40	4.40
		VCMT 160408EN-SF												●		●						9.52	16.60	4.76	0.80	4.40
-SMF		VCGT 110302EN-SMF															●					6.35	11.10	3.18	0.20	2.80
		VCMT 110304EN-SMF												●		●	●				●	6.35	11.10	3.18	0.40	2.90
		VCMT 160404EN-SMF												●		●	●		●		●	9.52	16.60	4.76	0.40	4.40
		VCMT 160408EN-SMF												●		●	●				●	9.52	16.60	4.76	0.80	4.40
			H210T	H10T	H216T	U17T	CTW7120	S40T	AMZ	CTP4115	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTC1135	CTC2135	TCC410	TCM407	TCM10	d	l	s	r	d_1



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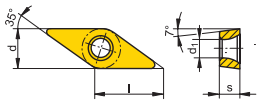
MaxiLock S

VC..

			H210T	H10T	H216T	U17T	CTW7120	S40T	AMZ	CTP4115	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTC1135	CTC2135	TCC410	TCM407	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P								●	O		O	●		●		●	●	O	●	●	●					
M			O				O	●	O				O	O	●	O	O	●	O	O	●					
K			O	●	●				O		●	●		●	O	●			●	O	O					
N			●	●	●		●		●	●					O											
S			●				O		O				●		O		O	O								
H																										
-SM		VCMT 160404EN-SM									●			●		●	●	●				9.52	16.60	4.76	0.40	4.40
		VCMT 160406EN-SM												●								9.52	16.60	4.76	0.60	4.40
		VCMT 160408EN-SM									●			●		●	●	●				9.52	16.60	4.76	0.80	4.40
		VCMT 160412EN-SM									●						●					9.52	16.60	4.76	1.20	4.40
VC..W		VCMW 160404FN				●																9.52	16.60	4.76	0.40	4.40
			H210T	H10T	H216T	U17T	CTW7120	S40T	AMZ	CTP4115	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTC1135	CTC2135	TCC410	TCM407	TCM10	d	l	s	r	d_1



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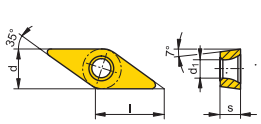
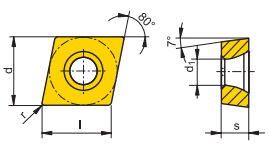
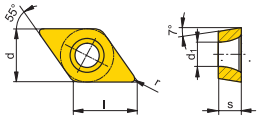
			P	M	K	N	S	H	TA201	CTD4110	CTD4125	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
					O		O	●								
-M4		VCUW 160412TN-M4				●				●		9.52	16.60	4.76	1.20	4.40
		VCUW 220530FN-M4				●				●		12.70	22.10	5.56	3.00	5.50
		VCUW 220530TN-M4				●				●		12.70	22.10	5.56	3.00	5.50
		VPUW 220516FN-M4				●				●		12.70	22.10	5.56	1.60	5.50
		VPUW 220516TN-M4				●				●		12.70	22.10	5.56	1.60	5.50
-M41		VCUT 160408FN-M41				●				●		9.52	16.60	4.76	0.80	4.40
		VCUT 160408TN-M41				●				●		9.52	16.60	4.76	0.80	4.40
		VCUT 160412FN-M41				●				●		9.52	16.60	4.76	1.20	4.40
		VCUT 160412TN-M41				●				●		9.52	16.60	4.76	1.20	4.40
		VCUT 220530FN-M41				●				●		12.70	22.10	5.56	3.00	5.50
		VCUT 220530TN-M41				●				●		12.70	22.10	5.56	3.00	5.50
		VPUT 220516FN-M41				●				●		12.70	22.10	5.56	1.60	5.50
		VPUT 220516TN-M41				●				●		12.70	22.10	5.56	1.60	5.50
CC..X		CCMX 09T304SN						●	●			9.52	9.70	3.97	0.40	4.40
		CCMX 09T308SN						●	●			9.52	9.70	3.97	0.80	4.40
DC..X		DCMX 11T304SN						●	●			9.52	11.60	3.97	0.40	4.40
		DCMX 11T308SN						●	●			9.52	11.60	3.97	0.80	4.40
FN		VCUW 160404FL									●	9.52	16.60	4.76	0.40	4.40
		VCUW 160404FN				●				●		9.52	16.60	4.76	0.40	4.40
		VCUW 160404FR									●	9.52	16.60	4.76	0.40	4.40
		VCUW 160408FL									●	9.52	16.60	4.76	0.80	4.40
		VCUW 160408FN									●	9.52	16.60	4.76	0.80	4.40
		VCUW 160408FR				●				●	●	9.52	16.60	4.76	0.80	4.40
		VCUW 160412FN				●				●		9.52	16.60	4.76	1.20	4.40
		VCUW 160416FN				●				●		9.52	16.60	4.76	1.60	4.40
		VCUW 220530FN				●				●		12.70	22.10	5.56	3.00	5.50
									TA201	CTD4110	CTD4125	d	l	s	r	d_1







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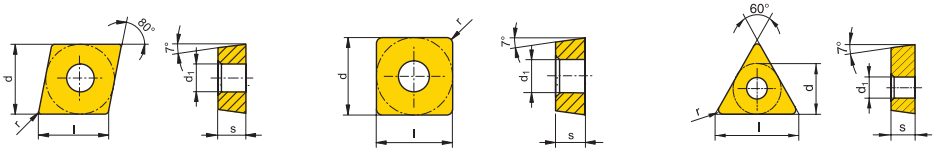
MaxiLock P

CC.. SC.. TC..

			CTCP115	CTCP125	CTC1135	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
CC..X		CCMX 120408EN		●		12.70	12.90	4.76	0.80	5.16
SC..X		SCMX 120408EN		●	●	12.70	12.70	4.76	0.80	5.16
		SCMX 190616EN			●	19.05	19.05	6.35	1.60	7.93
TC..X		TCMX 160404EN	●	●	●	9.52	16.50	4.76	0.40	3.81
		TCMX 160408EN	●	●	●	9.52	16.50	4.76	0.80	3.81
		TCMX 160412EN		●		9.52	16.50	4.76	1.20	3.81
		TCMX 220404EN			●	12.70	22.00	4.76	0.40	5.16
		TCMX 220408EN			●	12.70	22.00	4.76	0.80	5.16
		TCMX 220412EN		●		12.70	22.00	4.76	1.20	5.16
			CTCP115	CTCP125	CTC1135	d	l	s	r	d_1



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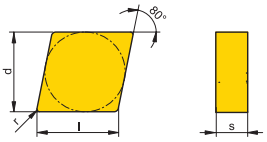
			S40T	CTC3110	CTCK120	TA100	TA120	CTN3105	CTS3105	CTN3110	CTM3110	CTS3110	d [mm]	l [mm]	s [mm]	r [mm]
		P	●	O	●											
		M	●													
		K		●	●	●	O	●	●	●	●	●				
		N														
		S														
		H				●	●		●			●				
CN..N		CNGN 120404TN-020D							●				12.70	12.90	4.76	0.40
		CNGN 120408TN-020D							●				12.70	12.90	4.76	0.80
		CNGN 120712PN-100CF							●				12.70	12.90	7.94	1.20
		CNGN 120712SN-025C								●			12.70	12.90	7.94	1.20
		CNGN 120716PN-100CF							●				12.70	12.90	7.94	1.60
		CNGN 120716PN-150CF								●			12.70	12.90	7.94	1.60
		CNGN 120716SN-025C								●			12.70	12.90	7.94	1.60
		CNGN 160716SN-025C								●			15.88	16.10	7.94	1.60
		CNGN 160716SN-200C							●				15.88	16.10	7.94	1.60
		CNMN 090308FN				●							9.52	9.70	3.18	0.80
		CNMN 090308TN-020D				●	●						9.52	9.70	3.18	0.80
		CNMN 090312TN-020D				●	●						9.52	9.70	3.18	1.20
		CNMN 090316TN-020D					●						9.52	9.70	3.18	1.60
		CNMN 120412FN				●							12.70	12.90	4.76	1.20
		CNMN 120412TN-020D				●							12.70	12.90	4.76	1.20
		CNMN 120416FN				●							12.70	12.90	4.76	1.60
		CNMN 120416TN-020D				●							12.70	12.90	4.76	1.60



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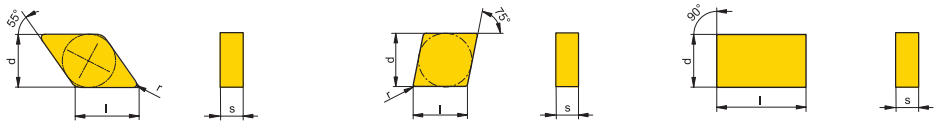
Simplex N

DN.. EN.. LN..

			S40T	CTC3110	CTCK120	TA100	TA120	CTN3105	CTS3105	CTN3110	CTM3110	CTS3110	d [mm]	l [mm]	s [mm]	r [mm]
		P	●	O	●											
		M	●													
		K		●	●	●	O	●	●	●	●	●				
		N														
		S														
		H				●	●		●			●				
DN..N		DNGN 150704TN-020D							●				12.70	15.50	7.94	0.40
		DNGN 150708TN-020D							●				12.70	15.50	7.94	0.80
		DNGN 150712SN-200C							●				12.70	15.50	7.94	1.20
		DNGN 150712TN-020D							●				12.70	15.50	7.94	1.20
		DNGN 150716PN-100CF							●				12.70	15.50	7.94	1.60
		DNGN 150716SN-200C							●				12.70	15.50	7.94	1.60
		DNGN 150716TN-020D							●				12.70	15.50	7.94	1.60
EN..N		ENGN 130704TN-020D							●				12.70	13.20	7.94	0.40
		ENGN 130708TN-020D							●				12.70	13.20	7.94	0.80
		ENGN 130712TN-020D							●				12.70	13.20	7.94	1.20
		ENGN 130716SN-200C							●				12.70	13.20	7.94	1.60
		ENGN 130732TN-020D							●				12.70	13.20	7.94	3.20
LN..N		LNMN 6688PN-150CE								●			19.00	38.10	12.70	1.60
		LNMN 6688PN-200CE							●				19.00	38.10	12.70	1.60
			S40T	CTC3110	CTCK120	TA100	TA120	CTN3105	CTS3105	CTN3110	CTM3110	CTS3110	d	l	s	r



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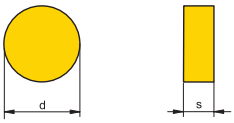
			S40T	CTC3110	CTCK120	TA100	TA120	CTN3105	CTS3105	CTN3110	CTM3110	CTS3110	d [mm]	s [mm]
		P	●	O	●									
		M	●											
		K		●	●	●	O	●	●	●	●	●		
		N												
		S												
		H				●	●		●			●		
RN..N		RNGN 060400TN-020D							●				6.35	4.76
		RNGN 090400TN-020D							●				9.52	4.76
		RNGN 120400PN-150CF								●	●		12.70	4.76
		RNGN 120700PN-100CF							●				12.70	7.94
		RNGN 120700SN-020D						●					12.70	7.94
		RNGN 120700SN-200C							●				12.70	7.94
		RNGN 120700TN-020D							●				12.70	7.94
		RNGN 150700PN-150CE								●			15.80	7.94
		RNGN 150700SN-200C							●				15.80	7.94
		RNGN 190700PN-100CF							●				19.00	7.94
		RNGN 190700TN-020D							●				19.00	7.94
		RNGN 250700PN-100CF							●			●	25.40	7.94
		RNGN 250700PN-200CE							●	●	●		25.40	7.94
		RNGN 250700TN-020D							●				25.40	7.94
		RNGN 310900PN-100CF							●				31.75	9.52
		RNMN 090300FN				●	●						9.52	3.18
		RNMN 090300TN-020D				●	●						9.52	3.18
		RNMN 120300TN-020D				●	●						12.70	3.18
		RNMN 120300TN-035D					●						12.70	3.18
		RNMN 120400FN				●							12.70	4.76
		RNMN 120400TN-020D				●							12.70	4.76
		RNMN 250400TN-050D				●							25.40	4.76
		RNMN 250600TN-050D				●							25.40	6.35
			S40T	CTC3110	CTCK120	TA100	TA120	CTN3105	CTS3105	CTN3110	CTM3110	CTS3110	d	s



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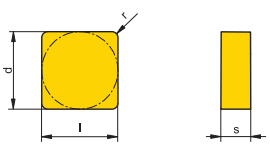
CERATIZIT hard material matters

Simplex N

SN..

			S40T	CTC3110	CTCK120	TA100	TA120	CTN3105	CTS3105	CTN3110	CTM3110	CTS3110	d [mm]	l [mm]	s [mm]	r [mm]
		P	●	O	●											
		M	●													
		K		●	●	●	O	●	●	●	●	●				
		N														
		S														
		H				●	●		●			●				
SN..N		SNGN 090308SN-025C							●				9.52	9.52	3.18	0.80
		SNGN 120408SN-015D							●				12.70	12.70	4.76	0.80
		SNGN 120408TN-020D							●				12.70	12.70	4.76	0.80
		SNGN 120412PN-150CF								●			12.70	12.70	4.76	1.20
		SNGN 120412SN-015D								●			12.70	12.70	4.76	1.20
		SNGN 120412TN-020D							●				12.70	12.70	4.76	1.20
		SNGN 120704TN-020D							●				12.70	12.70	4.76	0.40
		SNGN 120716PN-100CF							●				12.70	12.70	7.94	1.60
		SNGN 120716SN-025C								●			12.70	12.70	7.94	1.60
		SNGN 120716SN-200C							●				12.70	12.70	7.94	1.60
		SNGN 120716TN-020D							●				12.70	12.70	7.94	1.60
		SNGN 120720PN-100CF							●				12.70	12.70	7.94	2.00
		SNGN 120720SN-200C							●				12.70	12.70	7.94	2.00
		SNGN 150712TN-020D							●				15.80	15.80	7.94	1.20
		SNGN 150716PN-150CF								●			15.80	15.80	7.94	1.60
		SNGN 150720SN-200C							●				15.80	15.80	7.94	2.00
		SNGN 190716PN-150CF								●			19.00	19.00	7.94	1.60
		SNGN 190716SN-025E								●			19.00	19.00	7.94	1.60
		SNGN 190716TN-020D							●				19.00	19.00	7.94	1.60
		SNGN 190720PN-100CF							●				19.00	19.00	7.94	2.00
		SNGN 190720SN-200C							●				19.00	19.00	7.94	2.00
		SNGN 190720TN-020D							●				19.00	19.00	7.94	2.00
		SNGN 250724PN-100CF							●				25.40	25.40	7.94	2.40
		SNGN 250724PN-150CE								●			25.40	25.40	7.94	2.40
		SNGN 250724PN-200CE							●				25.40	25.40	7.94	2.40
		SNGN 250724SN-050C							●				25.40	25.40	7.94	2.40
		SNGN 250724SN-200C							●				25.40	25.40	7.94	2.40
		SNGN 250924PN-150CE								●			25.40	25.40	9.52	2.40
		SNGN 250924SN-030E								●			25.40	25.40	9.52	2.40
		SNGN 250924SN-200C							●				25.40	25.40	9.52	2.40
		SNGN 250924TN-020D							●				25.40	25.40	9.52	2.40
		SNMN 090308TN-020D				●	●						9.52	9.52	3.18	0.80
		SNMN 090312TN-020D				●							9.52	9.52	3.18	1.20
		SNMN 090316TN-020D				●	●						9.52	9.52	3.18	1.60
		SNMN 120312TN-020D				●	●						12.70	12.70	3.18	1.20
		SNMN 120316TN-020D				●	●						12.70	12.70	3.18	1.60
		SNMN 120412TN-020D				●							12.70	12.70	4.76	1.20
		SNMN 120416TN-020D				●							12.70	12.70	4.76	1.60
SNUN		SNUN 120412EN	●	●									12.70	12.70	4.76	1.20
		SNUN 120416EN		●	●								12.70	12.70	4.76	1.60
			S40T	CTC3110	CTCK120	TA100	TA120	CTN3105	CTS3105	CTN3110	CTM3110	CTS3110	d	l	s	r



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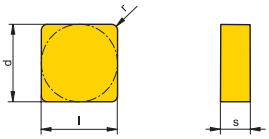
			S40T	CTC3110	CTCK120	TA100	TA120	CTN3105	CTS3105	CTN3110	CTM3110	CTS3110	d [mm]	l [mm]	s [mm]	r [mm]
P			●	O	●											
M			●													
K				●	●	●	O	●	●	●	●	●				
N																
S																
H						●	●		●			●				
-FN		SNMN 090308FN				●							9.52	9.52	3.18	0.80
		SNMN 090312FN				●							9.52	9.52	3.18	1.20
		SNMN 090316FN				●							9.52	9.52	3.18	1.60
		SNMN 120312FN				●							12.70	12.70	3.18	1.20
		SNMN 120316FN				●	●						12.70	12.70	3.18	1.60
		SNMN 120412FN				●							12.70	12.70	4.76	1.20
		SNMN 120416FN				●							12.70	12.70	4.76	1.60
			S40T	CTC3110	CTCK120	TA100	TA120	CTN3105	CTS3105	CTN3110	CTM3110	CTS3110	d	l	s	r



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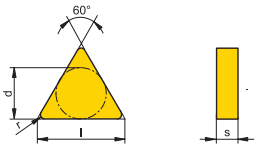
Simplex N

TN..

			S40T	CTC3110	CTCK120	TA100	TA120	CTN3105	CTS3105	CTN3110	CTM3110	CTS3110	d [mm]	l [mm]	s [mm]	r [mm]
		P	●	O	●											
		M	●													
		K		●	●	●	O	●	●	●	●	●				
		N														
		S														
		H				●	●		●			●				
TN..N		TNGN 110308TN-020D							●				6.35	11.00	3.18	0.80
		TNGN 160408TN-020D							●				9.52	16.50	4.76	0.80
		TNGN 220408TN-020D							●				12.70	22.00	4.76	0.80
		TNMN 110304FN				●							6.35	11.00	3.18	0.40
		TNMN 110304TN-020D				●							6.35	11.00	3.18	0.40
		TNMN 110308FN				●	●						6.35	11.00	3.18	0.80
		TNMN 110308TN-020D				●	●						6.35	11.00	3.18	0.80
		TNMN 110312TN-020D					●						6.35	11.00	3.18	1.20
TNUN		TNUN 160412EN		●									9.52	16.50	4.76	1.20
		TNUN 160416EN		●									9.52	16.50	4.76	1.60
			S40T	CTC3110	CTCK120	TA100	TA120	CTN3105	CTS3105	CTN3110	CTM3110	CTS3110	d	l	s	r



Inserts

Tools and inserts for turning

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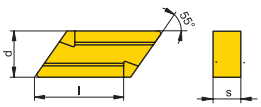
			H10T	S26T	S40T	CTC3110	CTCP125	CTC1135	CTD4110	CTD4125	CTS3105	CTN3110	d [mm]	l [mm]	s [mm]	r [mm]
P				●	●	O	●	●								
M					●		O	O								
K			●			●	●				●	●				
N			●						●	●						
S								O								
H											●					
-11		KNUX 160405EL-11				●	●	●					9.52	16.00	4.76	0.50
		KNUX 160405ER-11			●	●	●	●					9.52	16.00	4.76	0.50
		KNUX 160410EL-11						●					9.52	16.00	4.76	1.00
		KNUX 160410ER-11					●	●					9.52	16.00	4.76	1.00
-12		KNUX 160405EL-12						●					9.52	16.00	4.76	0.50
		KNUX 160405ER-12						●					9.52	16.00	4.76	0.50
		KNUX 160410EL-12						●					9.52	16.00	4.76	1.00
		KNUX 160410ER-12						●					9.52	16.00	4.76	1.00
			H10T	S26T	S40T	CTC3110	CTCP125	CTC1135	CTD4110	CTD4125	CTS3105	CTN3110	d	l	s	r



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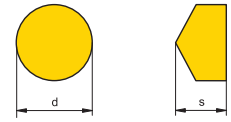
Simplex P

RC..

	H10T	S26T	S40T	CTC3110	CTCP125	CTC1135	CTD4110	CTD4125	CTS3105	CTN3110	d [mm]	s [mm]
P		●	●	O	●	●						
M			●		O	O						
K	●			●	●				●	●		
N	●						●	●				
S						O						
H									●			
RC..X		RCGX 070400SN-050C								●		7.00	4.76
		RCGX 090700PN-075CF									●	9.52	8.00
		RCGX 090700PN-100CF								●		9.52	8.00
		RCGX 090700SN-200C								●		9.52	8.00
		RCGX 090700TN-020D								●		9.52	8.00
		RCGX 120700PN-100CF								●		12.70	8.00
		RCGX 120700PN-150CF									●	12.70	8.00
		RCGX 120700SN-200C								●		12.70	8.00
		RCGX 120700TN-020D								●		12.70	8.00
		RCGX 151000PN-100CF								●		15.80	10.00
		RCGX 151000SN-200C								●		15.80	10.00
		RCGX 191000PN-100CF								●		19.05	10.00
		RCGX 191000SN-200C								●		19.05	10.00
		RCGX 251200PN-100CF								●		25.40	12.00
		RCGX 251200PN-200CE								●		25.40	12.00
		RCGX 251200SN-200C								●		25.40	12.00



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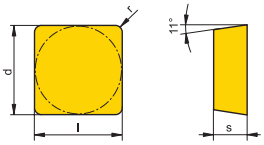
			H10T	S26T	S40T	CTC3110	CTCP125	CTC1135	CTD4110	CTD4125	CTS3105	CTN3110	d [mm]	l [mm]	s [mm]	r [mm]
	P			●	●	O	●	●								
	M				●		O	O								
	K		●			●	●				●	●				
	N		●						●	●						
	S							O								
	H										●					
-57		SPMR 090308EN-57						●					9.52	9.52	3.18	0.80
SPMR		SPMR 090304EN						●					9.52	9.52	3.18	0.40
		SPMR 120304EN						●					12.70	12.70	3.18	0.40
		SPMR 120308EN					●	●					12.70	12.70	3.18	0.80
		SPMR 120308ER						●					12.70	12.70	3.18	0.80
SP..N		SPUN 120308EN				●		●					12.70	12.70	3.18	0.80
		SPUN 120308FN	●										12.70	12.70	3.18	0.80



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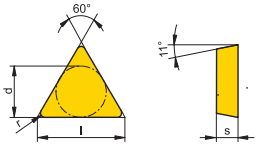
Simplex P

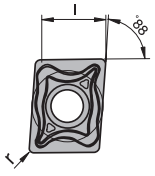
TP..

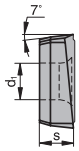
			H10T	S26T	S40T	CTC3110	CTCP125	CTC1135	CTD4110	CTD4125	CTS3105	CTN3110	d [mm]	l [mm]	s [mm]	r [mm]
		P		●	●	O	●	●								
		M			●		O	O								
		K	●			●	●				●	●				
		N	●						●	●						
		S						O								
		H									●					
-D		TPUN 160304FN							●					9.52	16.50	3.18	0.40
		TPUN 160308FN								●				9.52	16.50	3.18	0.80
-57		TPMR 160308EN-57						●						9.52	16.50	3.18	0.80
TPGN		TPGN 160304TN-020D									●			9.52	16.50	3.18	0.40
TPMR		TPMR 110304EL						●						6.35	11.00	3.18	0.40
		TPMR 110304EN					●	●						6.35	11.00	3.18	0.40
		TPMR 110304ER						●						6.35	11.00	3.18	0.40
		TPMR 110308EN						●						6.35	11.00	3.18	0.80
		TPMR 160304EL						●						9.52	16.50	3.18	0.40
		TPMR 160304EN					●	●						9.52	16.50	3.18	0.40
		TPMR 160304ER						●						9.52	16.50	3.18	0.40
		TPMR 160308EL						●						9.52	16.50	3.18	0.80
		TPMR 160308EN				●	●	●						9.52	16.50	3.18	0.80
		TPMR 160308ER						●						9.52	16.50	3.18	0.80
TP..N		TPUN 110304EN						●						6.35	11.00	3.18	0.40
		TPUN 110304FN	●											6.35	11.00	3.18	0.40
		TPUN 110308EN				●								6.35	11.00	3.18	0.80
		TPUN 160304EN				●	●	●						9.52	16.50	3.18	0.40
		TPUN 160304FN	●											9.52	16.50	3.18	0.40
		TPUN 160308EN		●	●		●	●						9.52	16.50	3.18	0.80
		TPUN 160308FN	●											9.52	16.50	3.18	0.80
		TPUN 160312EN						●						9.52	16.50	3.18	1.20
		TPUN 220408EN			●			●						12.70	22.00	4.76	0.80
		TPUN 220412EN			●			●						12.70	22.00	4.76	1.20
			H10T	S26T	S40T	CTC3110	CTCP125	CTC1135	CTD4110	CTD4125	CTS3105	CTN3110		d	l	s	r



A16-A33 A50 A58-A59 A248-A257 A184-A187 A216

			H210T	H216T	CTC1425	CTC1435	CTP2440	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P					●	●	●					
M			O		O	O	●					
K			O	●	●	O						
N			●	●			O					
S			●				O					
H												
-27P		XCET 040102FL-27P		●				4.50	4.00	1.80	0.20	2.10
		XCET 040102FR-27P		●				4.50	4.00	1.80	0.20	2.10
		XCET 040104FL-27P		●				4.50	4.00	1.80	0.40	2.10
		XCET 040104FR-27P		●				4.50	4.00	1.80	0.40	2.10
-27Q		XCET 040102FL-27Q	●					4.50	4.00	1.80	0.20	2.10
		XCET 040102FR-27Q	●					4.50	4.00	1.80	0.20	2.10
		XCET 040104FL-27Q	●					4.50	4.00	1.80	0.40	2.10
		XCET 040104FR-27Q	●					4.50	4.00	1.80	0.40	2.10
ER-EL		XCNT 040102EL			●	●	●	4.50	4.00	1.80	0.20	2.10
		XCNT 040102ER			●	●	●	4.50	4.00	1.80	0.20	2.10
		XCNT 040104EL			●	●	●	4.50	4.00	1.80	0.40	2.10
		XCNT 040104ER			●	●	●	4.50	4.00	1.80	0.40	2.10
-M50Q		XCNT 040104EL-M50Q				●		4.50	4.00	1.80	0.40	2.10
		XCNT 040104ER-M50Q				●		4.50	4.00	1.80	0.40	2.10
			H210T	H216T	CTC1425	CTC1435	CTP2440	d	l	s	r	d_1





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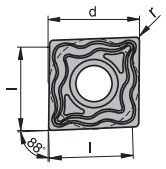
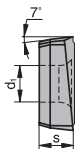
EcoCut

XC..

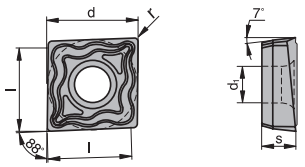
			H210T	H216T	CTC1425	CTC1435	CTP2440	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P					●	●	●					
M			O		O	O	●					
K			O	●	●	O						
N			●	●			O					
S			●				O					
H												
-27P		XCET 050202FN-27P		●				5.80	5.00	2.10	0.20	2.25
		XCET 050204FN-27P		●				5.80	5.00	2.10	0.40	2.25
		XCET 060202FN-27P		●				6.50	6.00	2.38	0.20	2.50
		XCET 060204FN-27P		●				6.50	6.00	2.38	0.40	2.50
		XCET 070304FN-27P		●				7.60	7.00	3.18	0.40	2.80
		XCET 080304FN-27P		●				8.50	8.00	3.18	0.40	3.40
		XCET 09T304FN-27P		●				9.60	9.00	3.97	0.40	3.40
		XCET 10T304FN-27P		●				10.60	10.00	3.97	0.40	4.40
		XCET 10T308FN-27P		●				10.60	10.00	3.97	0.80	4.40
		XCET 130404FN-27P		●				13.50	12.50	4.76	0.40	5.30
		XCET 130408FN-27P		●				13.50	12.50	4.76	0.80	5.30
		XCET 170508FN-27P		●				17.50	16.00	5.56	0.80	5.30
-27Q		XCET 050202FN-27Q	●					5.80	5.00	2.10	0.20	2.25
		XCET 050204FN-27Q	●					5.80	5.00	2.10	0.40	2.25
		XCET 060202FN-27Q	●					6.50	6.00	2.38	0.20	2.50
		XCET 060204FN-27Q	●					6.50	6.00	2.38	0.40	2.50
		XCET 070304FN-27Q	●					7.60	7.00	3.18	0.40	2.80
		XCET 080304FN-27Q	●					8.50	8.00	3.18	0.40	3.40
		XCET 09T304FN-27Q	●					9.60	9.00	3.97	0.40	3.40
		XCET 10T304FN-27Q	●					10.60	10.00	3.97	0.40	4.40
		XCET 10T308FN-27Q	●					10.60	10.00	3.97	0.80	4.40
		XCET 130404FN-27Q	●					13.50	12.50	4.76	0.40	5.30
		XCET 130408FN-27Q	●					13.50	12.50	4.76	0.80	5.30
		XCET 170508FN-27Q	●					17.50	16.00	5.56	0.80	5.30
EN		XCNT 050202EN			●	●	●	5.80	5.00	2.10	0.20	2.25
		XCNT 050204EN			●	●	●	5.80	5.00	2.10	0.40	2.25
		XCNT 060202EN			●	●	●	6.50	6.00	2.38	0.20	2.50
		XCNT 060204EN			●	●	●	6.50	6.00	2.38	0.40	2.50
		XCNT 070304EN			●	●	●	7.60	7.00	3.18	0.40	2.80
		XCNT 080304EN			●	●	●	8.50	8.00	3.18	0.40	3.40
		XCNT 09T304EN			●	●	●	9.60	9.00	3.97	0.40	3.40
		XCNT 10T304EN			●	●	●	10.60	10.00	3.97	0.40	4.40
		XCNT 10T308EN			●	●	●	10.60	10.00	3.97	0.80	4.40
		XCNT 130404EN			●	●	●	13.50	12.50	4.76	0.40	5.30
		XCNT 130408EN			●	●	●	13.50	12.50	4.76	0.80	5.30
		XCNT 170508EN			●	●	●	17.50	16.00	5.56	0.80	5.30
			H210T	H216T	CTC1425	CTC1435	CTP2440	d	l	s	r	d_1





A16-A33 A58-A59 A258-A259 A218-A222 A223

		H210T	H216T	CTC1425	CTC1435	CTP2440	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P				●	●	●					
M		O		O	O	●					
K		O	●	●	O						
N		●	●			O					
S		●				O					
H											
-M50Q		XCNT 050204EN-M50Q				●		5.80	5.00	2.10	0.40	2.25
		XCNT 060204EN-M50Q				●		6.50	6.00	2.38	0.40	2.50
		XCNT 070304EN-M50Q				●		7.60	7.00	3.18	0.40	2.80
		XCNT 080304EN-M50Q			●			8.50	8.00	3.18	0.40	3.40
		XCNT 09T304EN-M50Q			●			9.60	9.00	3.97	0.40	3.40
		XCNT 10T304EN-M50Q			●			10.60	10.00	3.97	0.40	4.40
		XCNT 10T308EN-M50Q			●			10.60	10.00	3.97	0.80	4.40
		XCNT 130404EN-M50Q			●			13.50	12.50	4.76	0.40	5.30
		XCNT 130408EN-M50Q			●			13.50	12.50	4.76	0.80	5.30
		XCNT 170508EN-M50Q			●			17.50	16.00	5.56	0.80	5.30
		H210T	H216T	CTC1425	CTC1435	CTP2440	d	l	s	r	d_1



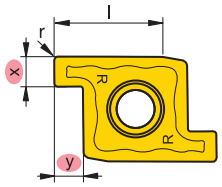
A16-A33
A58-A59
A258-A259
A218-A222
A223

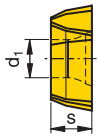
CERATIZIT hard material matters

ProfileMaster

PM..

			CTC1435	CTP2440	x [mm]	y [mm]	l [mm]	s [mm]	d_1 [mm]	
-M20		PM 10LG 201504-M20	●	●	2.00	1.50	5.00	2.10	2.10	0.40
		PM 10RG 201504-M20	●	●	2.00	1.50	5.00	2.10	2.10	0.40
		PM 12LG 201804-M20	●	●	2.00	1.80	6.00	2.30	2.50	0.40
		PM 12RG 201804-M20	●	●	2.00	1.80	6.00	2.30	2.50	0.40
		PM 16LG 252004-M20	●	●	2.50	2.00	8.00	2.80	3.40	0.40
		PM 16RG 252004-M20	●	●	2.50	2.00	8.00	2.80	3.40	0.40
		PM 20LG 302504-M20	●	●	3.00	2.50	10.00	3.80	4.10	0.40
		PM 20RG 302504-M20	●	●	3.00	2.50	10.00	3.80	4.10	0.40
		PM 25LG 353004-M20	●	●	3.50	3.00	12.50	4.50	4.40	0.40
		PM 25RG 353004-M20	●	●	3.50	3.00	12.50	4.50	4.40	0.40
		PM 32LG 404004-M20	●	●	4.00	4.00	16.00	5.50	6.00	0.40
		PM 32RG 404004-M20	●	●	4.00	4.00	16.00	5.50	6.00	0.40
			CTC1435	CTP2440	x	y	l	s	d_1	





Inserts
Tools and inserts for turning

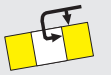
A16-A33 A58-A59 A258-A259 A224-A225

CERATIZIT

hard material matters

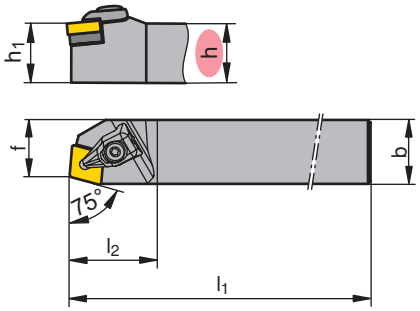


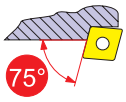

hard material matters
CERATIZIT

External machining	Innternal machining	EcoCut Mini	EcoCut	ProfileMaster
		Ø 4 - Ø 8	EC Ø 8-10	Ø 10 - 32
 Maxilock D	 Maxilock D			
A116-A127	A188-A191	A217	A218	A224-A225
 Maxilock N	 Maxilock N		EC Ø 12-14	
A128-A142	A192-A196		 A219	
 Maxilock S	 Maxilock S		EC Ø 16-18	
A143-A167	A197-A212		 A220	
 Maxilock P	 Maxilock P		EC Ø 20-25	
A168-A173	A213-A214		 A221	
 Simplex N	 Simplex N		EC Ø 32	
A174-A183	A215		 A222	
 Simplex P	 Simplex P		ECR Ø 40-60	
A184-A187	A216		 A223	

DCBN...







Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	DCBNR 2525 M12	R	25	25	150	32	22	CN.. 1204..
	DCBNL 2525 M12	L	25	25	150	32	22	

Ordering example: 1 piece DCBNR 2525 M12

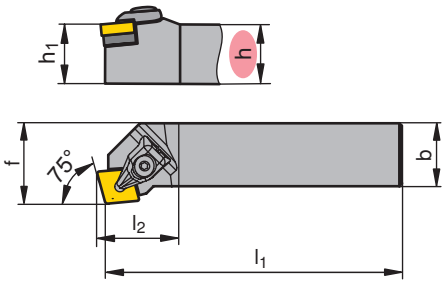
	h	1	2	3	4
CN.. 1204..	25	M4,5x12-15IP/10002887	U-CN12T3-D	S-15IP-T	SET-02-D



A58-A59 A72-A75 A86

DCKN...





Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	DCKNR 2525 M12	R	25	25	150	29.1	32	CN.. 1204..
	DCKNL 2525 M12	L	25	25	150	29.1	32	

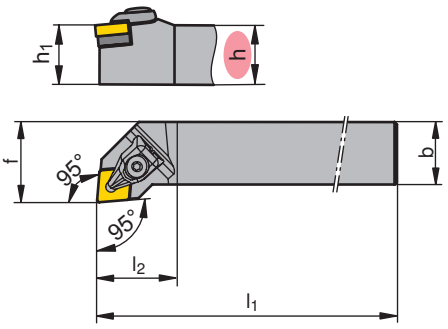
Ordering example: 1 piece DCKNR 2525 M12

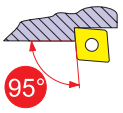
	h	1	2	3	4
CN.. 1204..	25	M4,5x12-15IP/10002887	U-CN12T3-D	S-15IP-T	SET-02-D

A58-A59 A72-A75 A86

DCLN...





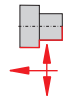


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	DCLNR 1616 H09	R	16	16	100	23	20	CN.. 0903..
20	DCLNR 2020 K09		20	20	125	24	25	CN.. 0903..
	DCLNR 2020 K12		20	20	125	32	25	CN.. 1204..
25	DCLNR 2525 M12		25	25	150	32	32	CN.. 1204..
	DCLNR 2525 M16		25	25	150	38	32	CN.. 1606..
32	DCLNR 3225 P12		32	25	170	32	32	CN.. 1204..
	DCLNR 3232 P16		32	32	170	37	40	CN.. 1606..
	DCLNR 3232 P19		32	32	170	42	40	CN.. 1906..
40	DCLNR 4040 S19		40	40	250	42	50	CN.. 1906..
	DCLNR 4040 S25		40	40	250	60	50	CN.. 2509..
16	DCLNL 1616 H09	L	16	16	100	23	20	CN.. 0903..
20	DCLNL 2020 K09		20	20	125	24	25	CN.. 0903..
	DCLNL 2020 K12		20	20	125	32	25	CN.. 1204..
25	DCLNL 2525 M12		25	25	150	32	32	CN.. 1204..
	DCLNL 2525 M16		25	25	150	38	32	CN.. 1606..
32	DCLNL 3225 P12		32	25	170	32	32	CN.. 1204..
	DCLNL 3232 P16		32	32	170	37	40	CN.. 1606..
	DCLNL 3232 P19		32	32	170	42	40	CN.. 1906..
40	DCLNL 4040 S19		40	40	250	42	50	CN.. 1906..
	DCLNL 4040 S25		40	40	250	60	50	CN.. 2509..

Ordering example: 1 piece DCLNR 1616 H09

	h	1	2	3	4
CN.. 0903..	16 - 20	M3x7-09IP/10003007	U-CN0903-D	S-09IP-T	SET-01-D
CN.. 1204..	20 - 32	M4,5x12-15IP/10002887	U-CN12T3-D	S-15IP-T	SET-02-D
CN.. 1606..	25 - 32	M5x14-20IP/10003023	U-CN1604-D	S-20IP-T	SET-03-D
CN.. 1906..	32 - 40	M5x14-20IP/10003023	U-CN1905-D	S-20IP-T	SET-04-D
CN.. 2509..	40	M6x16-25IP/10003048	U-CN2506-D	S-25IP-T	SET-05-D

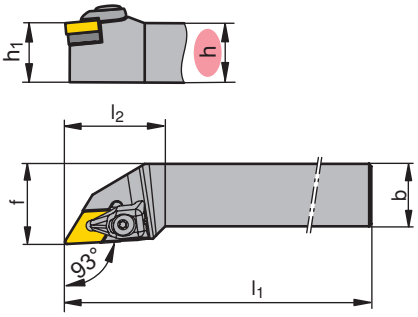

A58-A59

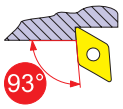

A72-A75


A86

DDJN...





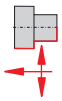


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	DDJNR 1616 H11	R	16	16	100	33	20	DN.. 1104..
20	DDJNR 2020 K11		20	20	125	40	25	DN.. 1104..
	DDJNR 2020 K15		20	20	125	40	25	DN.. 1506..
25	DDJNR 2525 M11		25	25	150	40	32	DN.. 1104..
	DDJNR 2525 M15		25	25	150	40	32	DN.. 1506..
32	DDJNR 3225 P15		32	25	170	40	32	DN.. 1506..
16	DDJNL 1616 H11	L	16	16	100	33	20	DN.. 1104..
20	DDJNL 2020 K11		20	20	125	40	25	DN.. 1104..
	DDJNL 2020 K15		20	20	125	40	25	DN.. 1506..
25	DDJNL 2525 M11		25	25	150	40	32	DN.. 1104..
	DDJNL 2525 M15		25	25	150	40	32	DN.. 1506..
32	DDJNL 3225 P15		32	25	170	40	32	DN.. 1506..

Ordering example: 1 piece DDJNR 1616 H11

	h	1	2	3	4
DN.. 1104..	16 - 25	M3x7-09IP/10003007	U-DN1103-D	S-09IP-T	SET-01L-D
DN.. 1506..	20 - 32	M4,5x12-15IP/10002887	U-DN15T3-D	S-15IP-T	SET-02-D


A58-A59

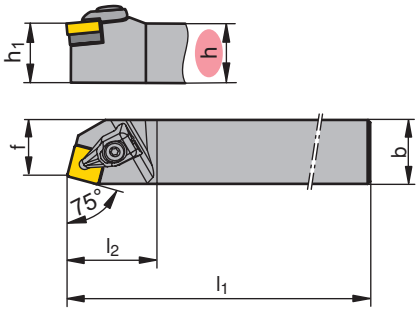

A76-A78

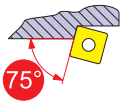

A86

DN 1504 (s = 4,76 mm) = U-DN1505-D

DSBN...





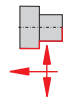


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
20	DSBNR 2020 K12	R	20	20	125	35	17	SN.. 1204..
25	DSBNR 2525 M12		25	25	150	35	22	SN.. 1204..
	DSBNR 2525 M15		25	25	150	43	22	SN.. 1506..
32	DSBNR 3232 P15		32	32	170	42	27	SN.. 1506..
	DSBNR 3232 P19		32	32	170	48	27	SN.. 1906..
40	DSBNR 4040 S19		40	40	250	48	35	SN.. 1906..
	DSBNR 4040 S25		40	40	250	57	35	SN.. 2507..
20	DSBNL 2020 K12	L	20	20	125	35	17	SN.. 1204..
25	DSBNL 2525 M12		25	25	150	35	22	SN.. 1204..
	DSBNL 2525 M15		25	25	150	43	22	SN.. 1506..
32	DSBNL 3232 P15		32	32	170	42	27	SN.. 1506..
	DSBNL 3232 P19		32	32	170	48	27	SN.. 1906..
40	DSBNL 4040 S19		40	40	250	48	35	SN.. 1906..
	DSBNL 4040 S25		40	40	250	57	35	SN.. 2507..

Ordering example: 1 piece DSBNR 2020 K12

	h	1	2	3	4
SN.. 1204..	20 - 25	M4,5x12-15IP/10002887	U-SN12T3-D	S-15IP-T	SET-02-D
SN.. 1506..	25 - 32	M5x14-20IP/10003023	U-SN1504-D	S-20IP-T	SET-03-D
SN.. 1906..	32 - 40	M5x14-20IP/10003023	U-SN1905-D	S-20IP-T	SET-04-D
SN.. 2507..	40	M6x16-25IP/10003048	U-SN2506-D	S-25IP-T	SET-05-D



A58-A59



A79-A80

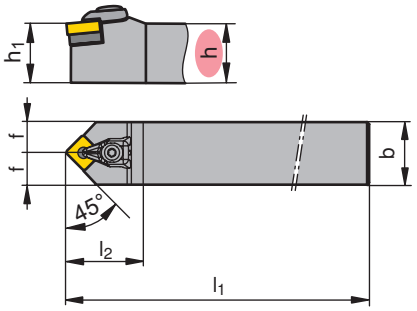


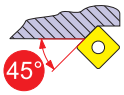
A87

SN 2509 (s = 9,52 mm) = U-SN2504-D

DSDN...







h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
20	DSDNN 2020 K12	N	20	20	125	38	10	SN.. 1204..
25	DSDNN 2525 M12		25	25	150	38	12.5	

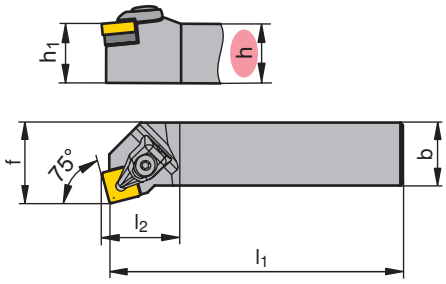
Ordering example: 1 piece DSDNN 2020 K12

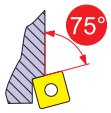
	h	1	2	3	4
SN.. 1204..	20 - 25	M4,5x12-15IP/10002887	U-SN12T3-D	S-15IP-T	SET-02-D

A58-A59 A79-A80 A87

DSKN...







Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	DSKNR 2525 M12	R	25	25	150	31.0	32	SN.. 1204..
	DSKNL 2525 M12	L	25	25	150	31.0	32	

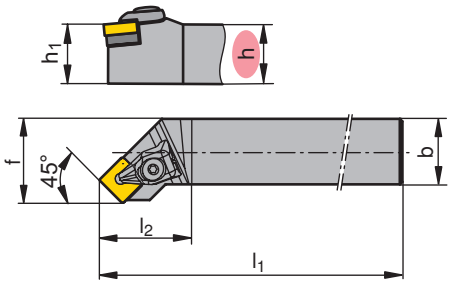
Ordering example: 1 piece DSKNR 2525 M12

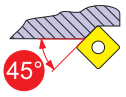
h	1	2	3	4	
SN.. 1204..	25	M4,5x12-15IP/10002887	U-SN12T3-D	S-15IP-T	SET-02-D

A58-A59 A79-A80 A87

DSSN...







Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
20	DSSNR 2020 K12	R	20	20	125	35	25	SN.. 1204..
25	DSSNR 2525 M12		25	25	150	35	32	
32	DSSNR 3225 P12		32	25	170	35	32	
20	DSSNL 2020 K12	L	20	20	125	35	25	
25	DSSNL 2525 M12		25	25	150	35	32	
32	DSSNL 3225 P12		32	25	170	35	32	

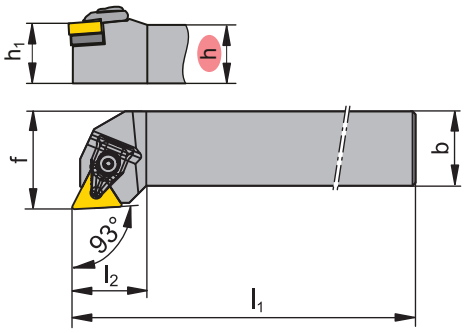
Ordering example: 1 piece DSSNR 2020 K12

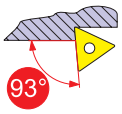
	h	1	2	3	4
SN.. 1204..	20 - 32	M4,5x12-15IP/10002887	U-SN12T3-D	S-15IP-T	SET-02-D

A58-A59 A79-A80 A87

DTJN...





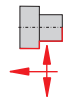


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
20	DTJNR 2020 K16	R	20	20	125	23	25	TN.. 1604..
25	DTJNR 2525 M16		25	25	150	24	32	
20	DTJNL 2020 K16	L	20	20	125	23	25	
25	DTJNL 2525 M16		25	25	150	24	32	

Ordering example: 1 piece DTJNR 2020 K16

	h	1	2	3	4
TN.. 1604..	20 - 25	M3x7-09IP/10003007	U-TN1603-D	S-09IP-T	SET-01-D

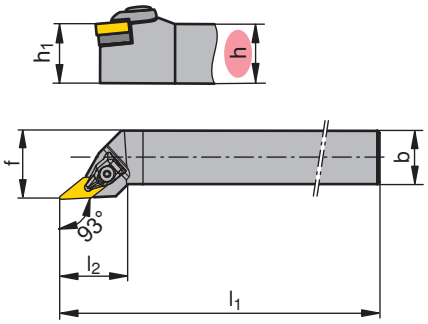

A58-A59


A81


A87

DVJN...





Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
20	DVJNR 2020 K16	R	20	20	125	39	25	VN.. 1604..
25	DVJNR 2525 M16	R	25	25	150	39	32	
20	DVJNL 2020 K16	L	20	20	125	39	25	
25	DVJNL 2525 M16	L	25	25	150	39	32	

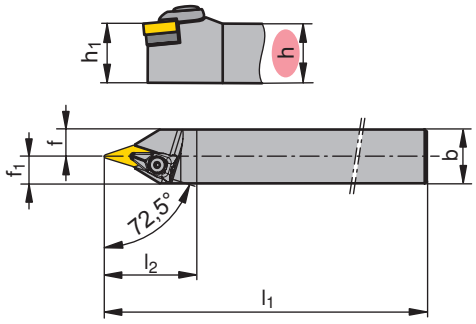
Ordering example: 1 piece DVJNR 2020 K16

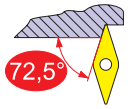
	h	1	2	3	4
VN.. 1604..	20 - 25	M3x7-09IP/10003007	U-VN1603-D	S-09IP-T	SET-01L-D

A58-A59
A83+A87

DVVN...





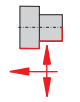


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	f_1 [mm]	
20	DVVNN 2020 K16	N	20	20	125	43	7.5	12.5	VN.. 1604..
25	DVVNN 2525 M16		25	25	150	43	12.5	12.5	

Ordering example: 1 piece DVVNN 2020 K16

	h	1	2	3	4
VN.. 1604..	20 - 25	M3x7-09IP/10003007	U-VN1603-D	S-09IP-T	SET-01L-D



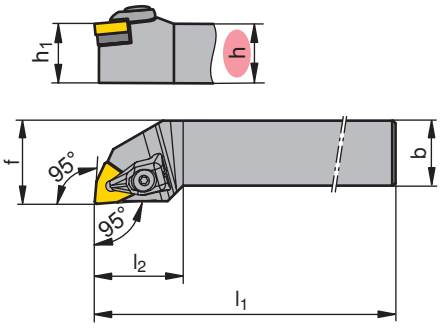
A58-A59

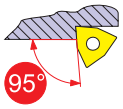


A83+A87

DWLN...







Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	DWLNR 1616 H06	R	16	16	100	25	20	WN.. 0604..
20	DWLNR 2020 K06		20	20	125	27	25	WN.. 0604..
	DWLNR 2020 K08		20	20	125	34	25	WN.. 0804..
25	DWLNR 2525 M06		25	25	150	27	32	WN.. 0604..
	DWLNR 2525 M08		25	25	150	34	32	WN.. 0804..
16	DWLNL 1616 H06	L	16	16	100	25	20	WN.. 0604..
20	DWLNL 2020 K06		20	20	125	27	25	WN.. 0604..
	DWLNL 2020 K08		20	20	125	34	25	WN.. 0804..
25	DWLNL 2525 M06		25	25	150	27	32	WN.. 0604..
	DWLNL 2525 M08		25	25	150	34	32	WN.. 0804..

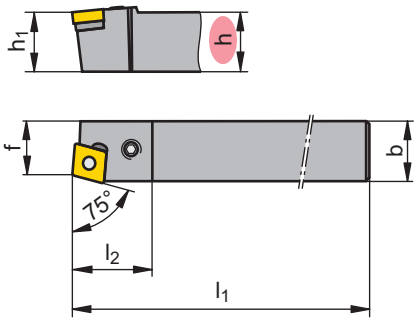
Ordering example: 1 piece DWLNR 1616 H06

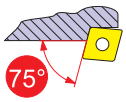
	h	1	2	3	4
WN.. 0604..	16 - 25	M3x7-09IP/10003007	U-WN0603-D	S-09IP-T	SET-01-D
WN.. 0804..	20 - 25	M4,5x12-15IP/10002887	U-WN08T3-D	S-15IP-T	SET-02-D

A58-A59
A84-A85

PCBN...





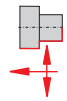


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	PCBNR 2525 M12-T	R	25	25	150	27.7	22	CN.. 1204..
25	PCBNR 2525 M16-T		25	25	150	31.8	22	CN.. 1606..
32	PCBNR 3232 P19-T		32	32	170	38.0	27	CN.. 1906..
25	PCBNL 2525 M12-T	L	25	25	150	27.7	22	CN.. 1204..
25	PCBNL 2525 M16-T		25	25	150	31.8	22	CN.. 1606..
32	PCBNL 3232 P19-T		32	32	170	38.0	27	CN.. 1906..

Ordering example: 1 piece PCBNR 2525 M12-T

	h	1	2	3	4	5	6	Set 1-4
CN.. 1204..	25	U 112150/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853401/SORT
CN.. 1606..	25	U 000152/HM-U	H 000840/H	S 000831/S ISK 3MM	R 025464/R	M 022473/MO	7882202/SW 3	7853402/SORT
CN.. 1906..	32	U 123151/HM-U	H 033442/H	S 033422/S ISK 4MM	R 033462/R	M 022472/MO	7480412/SW 4	7853403/SORT



A58-A59



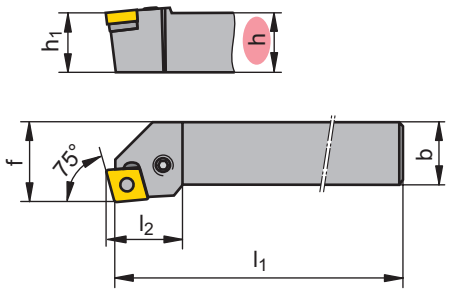
A72-A75

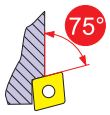


A86

PCKN...





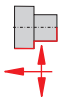


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	PCKNR 2525 M12-T	R	25	25	150	31.4	32	CN.. 1204..
	PCKNL 2525 M12-T	L	25	25	150	31.4	32	

Ordering example: 1 piece PCKNR 2525 M12-T

	h	1	2	3	4	5	6	Set 1-4
CN.. 1204..	25	U 112150/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853401/SORT

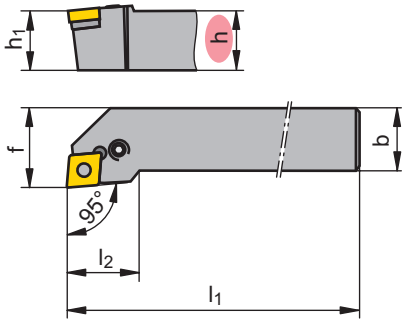

A58-A59

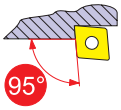

A72-A75


A86

PCLN...





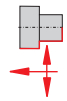


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	PCLNR 1616 H12-T	R	16	16	100	26.2	20	CN.. 1204..
20	PCLNR 2020 K12-T		20	20	125	27.4	25	CN.. 1204..
25	PCLNR 2525 M12-T		25	25	150	28	32	CN.. 1204..
	PCLNR 2525 M16-T		25	25	150	32.7	32	CN.. 1606..
32	PCLNR 3225 P12-T		32	25	170	32.6	32	CN.. 1204..
	PCLNR 3232 P16-T		32	32	170	32.6	40	CN.. 1606..
	PCLNR 3232 P19-T		32	32	170	38	40	CN.. 1906..
40	PCLNR 4040 S19-T		40	40	250	38	50	CN.. 1906..
	PCLNR 4040 S25		40	40	250	50	50	CN.. 2509..
16	PCLNL 1616 H12-T	L	16	16	100	26.2	20	CN.. 1204..
20	PCLNL 2020 K12-T		20	20	125	27.4	25	CN.. 1204..
25	PCLNL 2525 M12-T		25	25	150	28	32	CN.. 1204..
	PCLNL 2525 M16-T		25	25	150	32.7	32	CN.. 1606..
32	PCLNL 3225 P12-T		32	25	170	32.6	32	CN.. 1204..
	PCLNL 3232 P16-T		32	32	170	32.6	40	CN.. 1606..
	PCLNL 3232 P19-T		32	32	170	38	40	CN.. 1906..
40	PCLNL 4040 S19-T		40	40	250	38	50	CN.. 1906..
	PCLNL 4040 S25		40	40	250	50	50	CN.. 2509..

Ordering example: 1 piece PCLNR 1616 H12-T

	h	1	2	3	4	5	6	Set 1-4
CN.. 1204..	16	U 112150/HM-U	H 023441/H	S 000458/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853400/SORT
CN.. 1204..	20 - 32	U 112150/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853401/SORT
CN.. 1606..	25 - 32	U 000152/HM-U	H 000840/H	S 000831/S ISK 3MM	R 025464/R	M 022473/MO	7882202/SW 3	7853402/SORT
CN.. 1906..	32 - 40	U 123151/HM-U	H 033442/H	S 033422/S ISK 4MM	R 033462/R	M 022472/MO	7480412/SW 4	7853403/SORT
CN.. 2509..	40	U-CN2507	H 038444/H	S 038427/S ISK 5MM	R 038465/R	M 028474/MO	7812301/SW 5	



A58-A59



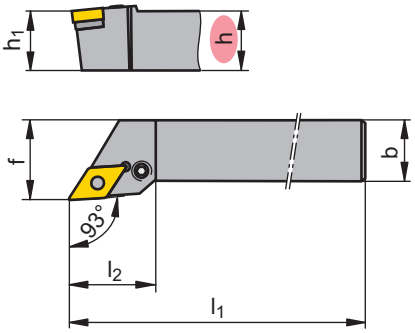
A72-A75

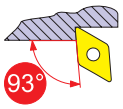


A86

PDJN...





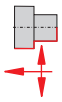


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	PDJNR 1616 H11	R	16	16	100	26	20	DN.. 1104..
20	PDJNR 2020 K11		20	20	125	30	25	DN.. 1104..
	PDJNR 2020 K15-T		20	20	125	34.9	25	DN.. 1506..
25	PDJNR 2525 M11		25	25	150	30	32	DN.. 1104..
	PDJNR 2525 M15-T		25	25	150	34.7	32	DN.. 1506..
32	PDJNR 3225 P15-T		32	25	170	34.7	32	DN.. 1506..
	PDJNR 3232 P15-T		32	32	170	34.7	40	DN.. 1506..
16	PDJNL 1616 H11	L	16	16	100	26	20	DN.. 1104..
20	PDJNL 2020 K11		20	20	125	30	25	DN.. 1104..
	PDJNL 2020 K15-T		20	20	125	34.9	25	DN.. 1506..
25	PDJNL 2525 M11		25	25	150	30	32	DN.. 1104..
	PDJNL 2525 M15-T		25	25	150	34.7	32	DN.. 1506..
32	PDJNL 3225 P15-T		32	25	170	34.7	32	DN.. 1506..
	PDJNL 3232 P15-T		32	32	170	34.7	40	DN.. 1506..

Ordering example: 1 piece PDJNR 1616 H11

	h	1	2	3	4	5	6	Set 1-4
DN.. 1104..	16 - 25	7853521/HM-U	7853610/H	S 018420/S ISK 2,5MM	7853806/R	M 018470/MO	7882201/SW 2,5	7853426/SORT
DN.. 1506..	20 - 32	U 153150/HM-U	H 024447/H	S 000831/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853404/SORT

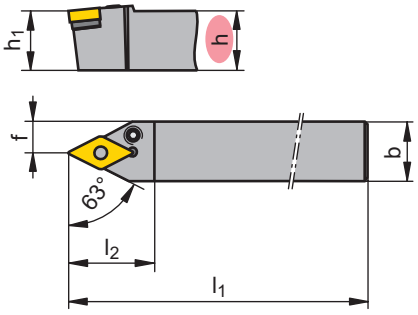

A58-A59

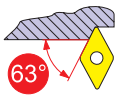

A76-A78


A86

PDNN...





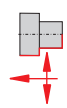


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	PDNNR 2525 M11	R	25	25	150	30	12.5	DN.. 1104..
	PDNNR 2525 M15-T		25	25	150	37.4	12.5	DN.. 1506..
	PDNNL 2525 M11	L	25	25	150	30	12.5	DN.. 1104..
	PDNNL 2525 M15-T		25	25	150	37.4	12.5	DN.. 1506..

Ordering example: 1 piece PDNNR 2525 M11

	h	1	2	3	4	5	6	Set 1-4
DN.. 1104..	25	7853521/HM-U	7853610/H	S 018420/S ISK 2,5MM	7853806/R	M 018470/MO	7882201/SW 2,5	7853426/SORT
DN.. 1506..	25	U 153150/HM-U	H 024447/H	S 000831/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853404/SORT

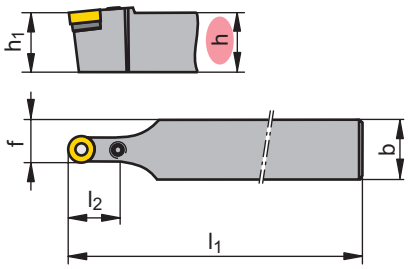

A58-A59

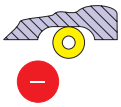

A76-A78


A86

PRDC...



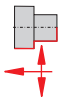




h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	RC.. 1204..
25	PRDCN 2525 M12-T	N	25	25	150	24	18.5	RC.. 1204..
32	PRDCN 3225 P12-T		32	25	170	24	18.5	RC.. 1204..
32	PRDCN 3225 P16-T		32	25	170	28	20.5	RC.. 1606..
32	PRDCN 3232 P20-T		32	32	170	32	26	RC.. 2006..
40	PRDCN 4040 S25-T		40	40	250	42	32.5	RC.. 2507..

Ordering example: 1 piece PRDCN 2525 M12-T

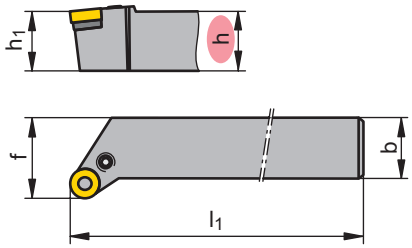
	h	1	2	3	4	5	6	Set 1-4
RC.. 1204..	25 - 32	U 000351/U	H 000341/H	S 018420/S ISK 2,5MM	R 018463/R	M 018470/MO	7882201/SW 2,5	7853416/SORT
RC.. 1606..	32	U 000352/U	H 000342/H	S 000433/S	R 000467/R	M 018471/MO	7882202/SW 3	7853417/SORT
RC.. 2006..	32	U 000353/U	H 000343/H	S 000425/S ISK 3MM	R 025464/R	M 022473/MO	7882301/SW 2	7853418/SORT
RC.. 2507..	40	U 000354/U	H 000344/H	S 000432/S	R 033462/R	M 022472/MO	7480412/SW 4	7853419/SORT

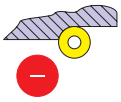

A58-A59


A92

PRGC...





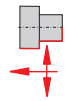


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	f [mm]	
25	PRGCR 2525 M12-T	R	25	25	150	32	RC.. 1204..
32	PRGCR 3225 P12-T		32	25	170	32	RC.. 1204..
	PRGCR 3225 P16-T		32	25	170	32	RC.. 1606..
	PRGCR 3232 P20-T		32	32	170	40	RC.. 2006..
40	PRGCR 4040 S25-T		40	40	250	50	RC.. 2507..
25	PRGCL 2525 M12-T	L	25	25	150	32	RC.. 1204..
32	PRGCL 3225 P12-T		32	25	170	32	RC.. 1204..
	PRGCL 3232 P20-T		32	32	170	40	RC.. 2006..
40	PRGCL 4040 S25-T		40	40	250	50	RC.. 2507..

Ordering example: 1 piece PRGCR 2525 M12-T

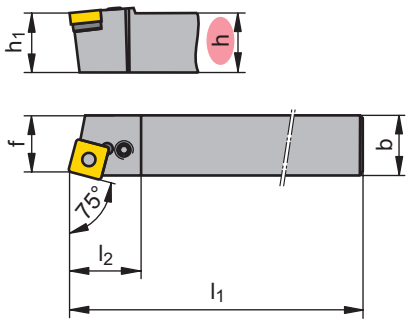
 	h	1 	2 	3 	4 	5 	6 	Set 1-4
RC.. 1204..	25 - 32	U 000351/U	H 000341/H	S 018420/S ISK 2,5MM	R 018463/R	M 018470/MO	7882201/SW 2,5	7853416/SORT
RC.. 1606..	32	U 000352/U	H 000342/H	S 000433/S	R 000467/R	M 018471/MO	7882202/SW 3	7853417/SORT
RC.. 2006..	32	U 000353/U	H 000343/H	S 000425/S ISK 3MM	R 025464/R	M 022473/MO	7882301/SW 2	7853418/SORT
RC.. 2507..	40	U 000354/U	H 000344/H	S 000432/S	R 033462/R	M 022472/MO	7480412/SW 4	7853419/SORT

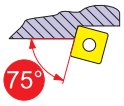

A58-A59


A92

PSBN...





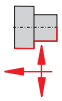


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
20	PSBNR 2020 K12-T	R	20	20	125	27.5	17	SN.. 1204..
25	PSBNR 2525 M12-T		25	25	150	27.5	22	SN.. 1204..
	PSBNR 2525 M15-T		25	25	150	32.5	22	SN.. 1506..
32	PSBNR 3225 P12-T		32	25	170	32	22	SN.. 1204..
	PSBNR 3232 P15-T		32	32	170	32	27	SN.. 1506..
	PSBNR 3232 P19-T		32	32	170	39.2	27	SN.. 1906..
40	PSBNR 4040 S19-T		40	40	250	38.5	35	SN.. 1906..
	PSBNR 4040 S25-T		40	40	250	48.0	35	SN.. 2507..
20	PSBNL 2020 K12-T	L	20	20	125	27.5	17	SN.. 1204..
25	PSBNL 2525 M12-T		25	25	150	27.5	22	SN.. 1204..
	PSBNL 2525 M15-T		25	25	150	32.5	22	SN.. 1506..
32	PSBNL 3225 P12-T		32	25	170	32	22	SN.. 1204..
	PSBNL 3232 P15-T		32	32	170	32	27	SN.. 1506..
	PSBNL 3232 P19-T		32	32	170	39.2	27	SN.. 1906..
40	PSBNL 4040 S19-T		40	40	250	38.5	35	SN.. 1906..
	PSBNL 4040 S25-T		40	40	250	48.0	35	SN.. 2507..

Ordering example: 1 piece PSBNR 2020 K12-T

	h	1	2	3	4	5	6	Set 1-4
SN.. 1204..	20 - 32	U 063451/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853408/SORT
SN.. 1506..	25 - 32	U 000457/HM-U	H 000840/H	S 000831/S ISK 3MM	R 025464/R	M 022473/MO	7882202/SW 3	7853409/SORT
SN.. 1906..	32 - 40	U 083452/HM-U	H 033442/H	S 033422/S ISK 4MM	R 033462/R	M 022472/MO	7480412/SW 4	7853410/SORT
SN.. 2507..	40	U 092453/HM-U	H 038444/H	S 038427/S ISK 5MM	R 038465/R	M 028474/MO	7812301/SW 5	7853411/SORT


A58-A59

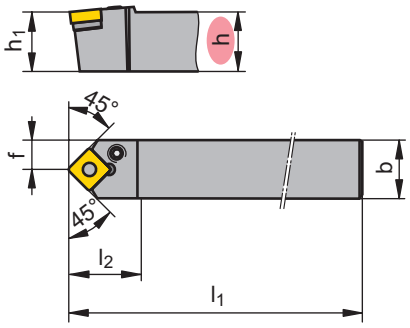

A79-A80

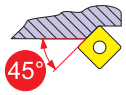

A87

SN1204 r ≥1,6 mm = U 000456/HM-U

PSDN...



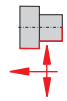




h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	PSDNN 1616 H09-T		16	16	100	21.5	8.0	SN.. 0903..
20	PSDNN 2020 K12-T		20	20	125	27.6	10.0	SN.. 1204..
25	PSDNN 2525 M12-T	N	25	25	150	27.6	12.5	SN.. 1204..
32	PSDNN 3225 P19-T		32	25	170	40.4	12.5	SN.. 1906..
40	PSDNN 4040 S25-T		40	40	250	48.8	20	SN.. 2507..

Ordering example: 1 piece PSDNN 1616 H09-T

	h	1	2	3	4	5	6	Set 1-4
SN.. 0903..	16	U 053450/HM-U	H 018440/H	S 018420/S ISK 2,5MM	R 018463/R	M 018470/MO	7882201/SW 2,5	7853421/SORT
SN.. 1204..	20 - 25	U 063451/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853408/SORT
SN.. 1906..	32	U 083452/HM-U	H 033442/H	S 033422/S ISK 4MM	R 033462/R	M 022472/MO	7480412/SW 4	7853410/SORT
SN.. 2507..	40	U 092453/HM-U	H 038444/H	S 038427/S ISK 5MM	R 038465/R	M 028474/MO	7812301/SW 5	7853411/SORT


A58-A59

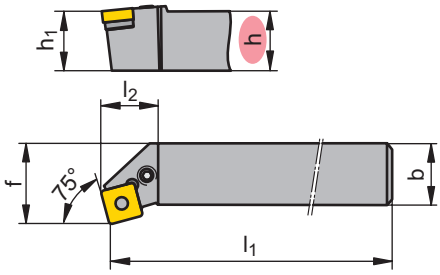

A79-A80

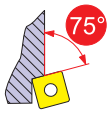

A87

SN1204 r ≥1,6 mm = U 000456/HM-U

PSKN...





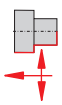


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	PSKNR 1616 H09-T	R	16	16	100	18.6	20	SN.. 0903..
20	PSKNR 2020 K12-T		20	20	125	24.1	25	SN.. 1204..
25	PSKNR 2525 M12-T		25	25	150	24.1	32	SN.. 1204..
32	PSKNR 3225 P12-T		32	25	170	24.1	32	SN.. 1204..
40	PSKNR 4040 S19-T		40	40	250	38.3	50	SN.. 1906..
16	PSKNL 1616 H09-T	L	16	16	100	18.6	20	SN.. 0903..
20	PSKNL 2020 K12-T		20	20	125	24.1	25	SN.. 1204..
25	PSKNL 2525 M12-T		25	25	150	24.1	32	SN.. 1204..
32	PSKNL 3225 P12-T		32	25	170	24.1	32	SN.. 1204..

Ordering example: 1 piece PSKNR 1616 H09-T

	h	1	2	3	4	5	6	Set 1-4
SN.. 0903..	16	U 053450/HM-U	H 018440/H	S 018420/S ISK 2,5MM	R 018463/R	M 018470/MO	7882201/SW 2,5	7853421/SORT
SN.. 1204..	20 - 32	U 063451/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853408/SORT
SN.. 1906..	40	U 083452/HM-U	H 033442/H	S 033422/S ISK 4MM	R 033462/R	M 022472/MO	7480412/SW 4	7853410/SORT


A58-A59

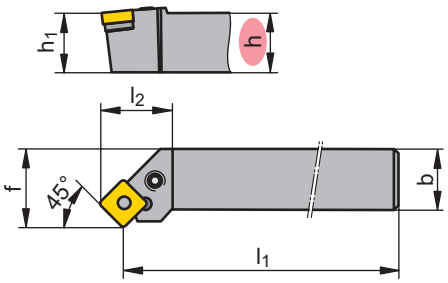

A79-A80

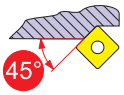

A87

SN1204 r ≥1,6 mm = U 000456/HM-U

PSSN...





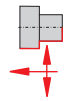


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	PSSNR 1616 H09-T	R	16	16	100	23.0	20	SN.. 0903..
20	PSSNR 2020 K12-T		20	20	125	27.3	25	SN.. 1204..
25	PSSNR 2525 M12-T		25	25	150	29.3	32	SN.. 1204..
	PSSNR 2525 M15-T		25	25	150	32.5	32	SN.. 1506..
32	PSSNR 3225 P12-T		32	25	170	29.3	32	SN.. 1204..
	PSSNR 3232 P15-T		32	32	170	37.5	40	SN.. 1506..
	PSSNR 3232 P19-T		32	32	170	40.2	40	SN.. 1906..
40	PSSNR 4040 S25-T		40	40	250	48.8	50	SN.. 2507..
16	PSSNL 1616 H09-T	L	16	16	100	23.0	20	SN.. 0903..
20	PSSNL 2020 K12-T		20	20	125	27.3	25	SN.. 1204..
25	PSSNL 2525 M12-T		25	25	150	29.3	32	SN.. 1204..
32	PSSNL 3225 P12-T		32	25	170	29.3	32	SN.. 1204..
	PSSNL 3232 P19-T		32	32	170	40.2	40	SN.. 1906..

Ordering example: 1 piece PSSNR 1616 H09-T

	h	1	2	3	4	5	6	Set 1-4
SN.. 0903..	16	U 053450/HM-U	H 018440/H	S 018420/S ISK 2,5MM	R 018463/R	M 018470/MO	7882201/SW 2,5	7853421/SORT
SN.. 1204..	20 - 32	U 063451/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853408/SORT
SN.. 1506..	25 - 32	U 000457/HM-U	H 000840/H	S 000831/S ISK 3MM	R 025464/R	M 022473/MO	7882202/SW 3	7853409/SORT
SN.. 1906..	32	U 083452/HM-U	H 033442/H	S 033422/S ISK 4MM	R 033462/R	M 022472/MO	7480412/SW 4	7853410/SORT
SN.. 2507..	40	U 092453/HM-U	H 038444/H	S 038427/S ISK 5MM	R 038465/R	M 028474/MO	7812301/SW 5	7853411/SORT



A58-A59



A79-A80

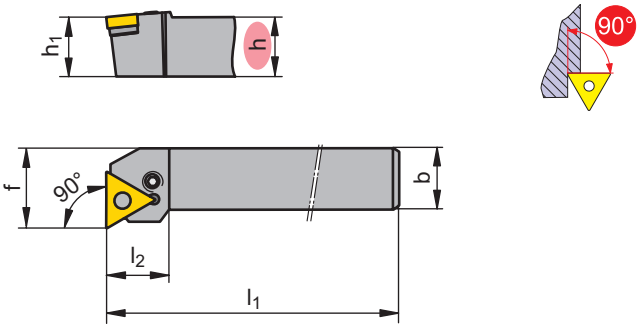


A87

SN1204 r ≥1,6 mm = U 000456/HM-U

PTFN...



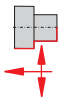


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	PTFNR 1616 H16-T	R	16	16	100	20.2	20	TN.. 1604..
20	PTFNR 2020 K16-T		20	20	125	20.5	25	TN.. 1604..
25	PTFNR 2525 M16-T		25	25	150	25	32	TN.. 1604..
	PTFNR 2525 M22-T		25	25	150	25.2	32	TN.. 2204..
32	PTFNR 3225 P22-T		32	25	170	25	32	TN.. 2204..
16	PTFNL 1616 H16-T	L	16	16	100	20.2	20	TN.. 1604..
20	PTFNL 2020 K16-T		20	20	125	20.5	25	TN.. 1604..
25	PTFNL 2525 M16-T		25	25	150	25	32	TN.. 1604..
	PTFNL 2525 M22-T		25	25	150	25.2	32	TN.. 2204..
32	PTFNL 3225 P22-T		32	25	170	25	32	TN.. 2204..

Ordering example: 1 piece PTFNR 1616 H16-T

	h	1	2	3	4	5	6	Set 1-4
TN.. 1604..	16 - 25	U 013950/HM-U	H 018440/H	S 018420/S ISK 2,5MM	R 018463/R	M 018470/MO	7882201/SW 2,5	7853413/SORT
TN.. 2204..	25 - 32	U 021953/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853414/SORT

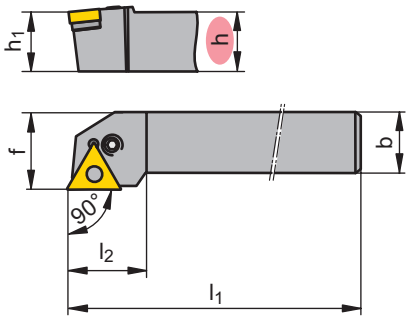

A58-A59

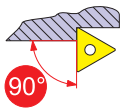

A81-A82


A87

PTGN...





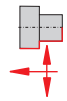


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	PTGNR 1616 H16-T	R	16	16	100	20	20	TN.. 1604..
20	PTGNR 2020 K16-T		20	20	125	20	25	TN.. 1604..
25	PTGNR 2525 M16-T		25	25	150	22.2	32	TN.. 1604..
	PTGNR 2525 M22-T		25	25	150	29	32	TN.. 2204..
32	PTGNR 3225 P16-T		32	25	170	22	32	TN.. 1604..
	PTGNR 3232 P22-T		32	32	170	29	40	TN.. 2204..
16	PTGNL 1616 H16-T	L	16	16	100	20	20	TN.. 1604..
20	PTGNL 2020 K16-T		20	20	125	20	25	TN.. 1604..
25	PTGNL 2525 M16-T		25	25	150	22.2	32	TN.. 1604..
	PTGNL 2525 M22-T		25	25	150	29	32	TN.. 2204..
32	PTGNL 3225 P16-T		32	25	170	22	32	TN.. 1604..
	PTGNL 3232 P22-T		32	32	170	29	40	TN.. 2204..

Ordering example: 1 piece PTGNR 1616 H16-T

	h	1	2	3	4	5	6	Set 1-4
TN.. 1604..	16 - 32	U 013950/HM-U	H 018440/H	S 018420/S ISK 2,5MM	R 018463/R	M 018470/MO	7882201/SW 2,5	7853413/SORT
TN.. 2204..	25 - 32	U 021953/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853414/SORT



A58-A59



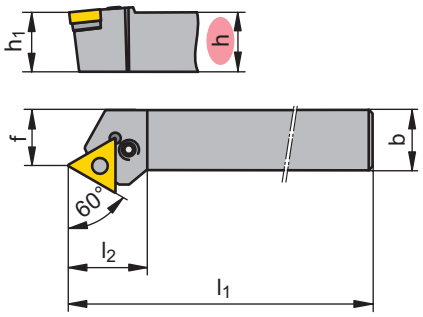
A81-A82

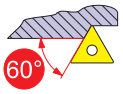


A87

PTTN...





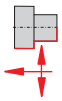


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
20	PTTNR 2020 K16-T	R	20	20	125	25.9	17	TN.. 1604..
25	PTTNR 2525 M22-T		25	25	150	32.7	22	TN.. 2204..
20	PTTNL 2020 K16-T	L	20	20	125	25.9	17	TN.. 1604..
25	PTTNL 2525 M22-T		25	25	150	32.7	22	TN.. 2204..

Ordering example: 1 piece PTTNR 2020 K16-T

	h	1	2	3	4	5	6	Set 1-4
TN.. 1604..	20	U 013950/HM-U	H 018440/H	S 018420/S ISK 2,5MM	R 018463/R	M 018470/MO	7882201/SW 2,5	7853413/SORT
TN.. 2204..	25	U 021953/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853414/SORT

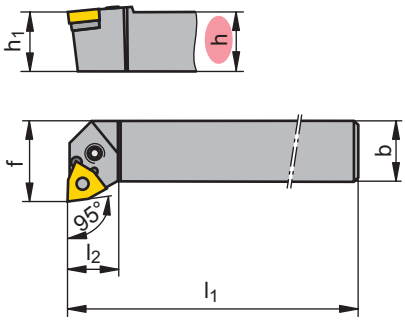

A58-A59

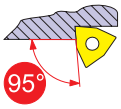

A81-A82


A87

PWLN...





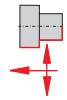


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	PWLNR 1616 H06	R	16	16	100	20	20	WN.. 0604..
20	PWLNR 2020 K06		20	20	125	25	25	WN.. 0604..
	PWLNR 2020 K08		20	20	125	22	25	WN.. 0804..
25	PWLNR 2525 M06		25	25	150	25	32	WN.. 0604..
	PWLNR 2525 M08		25	25	150	22	32	WN.. 0804..
32	PWLNR 3225 P08		32	25	170	22	32	WN.. 0804..
16	PWLNL 1616 H06	L	16	16	100	20	20	WN.. 0604..
20	PWLNL 2020 K06		20	20	125	25	25	WN.. 0604..
	PWLNL 2020 K08		20	20	125	22	25	WN.. 0804..
25	PWLNL 2525 M06		25	25	150	25	32	WN.. 0604..
	PWLNL 2525 M08		25	25	150	22	32	WN.. 0804..
32	PWLNL 3225 P08		32	25	170	22	32	WN.. 0804..

Ordering example: 1 piece PWLNR 1616 H06

	h	1	2	3	4	5	6	Set 1-4
WN.. 0604..	16 - 25	7853520/HM-U	H 018440/H	S 018420/S ISK 2,5MM	7853806/R	M 018470/MO	7882201/SW 2,5	7853423/SORT
WN.. 0804..	20 - 32	7853519/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853422/SORT



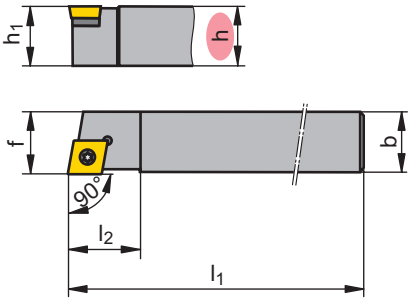
A58-A59

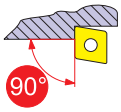


A84-A85

SCAC...





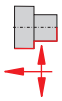


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
8	SCACR 0808 D06	R	8	8	60	9	8	CC.. 0602..
	SCACR 0808 K06		8	8	125	9	8	CC.. 0602..
10	SCACR 1010 E06		10	10	70	9	10	CC.. 0602..
	SCACR 1010 M06		10	10	150	9	10	CC.. 0602..
12	SCACR 1212 F09		12	12	80	13	12	CC.. 09T3..
	SCACR 1212 M09		12	12	150	13	12	CC.. 09T3..
14	SCACR 1414 M09		14	14	150	13	14	CC.. 09T3..
16	SCACR 1616 H09		16	16	100	13	16	CC.. 09T3..
20	SCACR 2020 K12		20	20	125	17	20	CC.. 1204..
8	SCACL 0808 D06	L	8	8	60	9	8	CC.. 0602..
	SCACL 0808 K06		8	8	125	9	8	CC.. 0602..
10	SCACL 1010 E06		10	10	70	9	10	CC.. 0602..
	SCACL 1010 M06		10	10	150	9	10	CC.. 0602..
12	SCACL 1212 F09		12	12	80	13	12	CC.. 09T3..
	SCACL 1212 M09		12	12	150	13	12	CC.. 09T3..
14	SCACL 1414 M09		14	14	150	13	14	CC.. 09T3..
16	SCACL 1616 H09		16	16	100	13	16	CC.. 09T3..
20	SCACL 2020 K12		20	20	125	17	20	CC.. 1204..

Ordering example: 1 piece SCACR 0808 D06

	h	1	2	2	3	4	Set 1-4
CC.. 0602..	8 - 10	7815101/M2,5X6,0/T08	7724106/TORX T08				7815902/SORT
CC.. 09T3..	12 - 14	7815102/M3,5X11,0/T15	7724103/TORX T15				7883906/SORT
CC.. 09T3..	16	7815102/M3,5X11,0/T15		7883301/KOMBI T15	7883001/HM-U	7883102/B M 3,5	7883903/SORT
CC.. 1204..	20	7883202/M4,5X12/T15		7883301/KOMBI T15	7883002/HM-U	7883101/B M 4,5	7883901/SORT

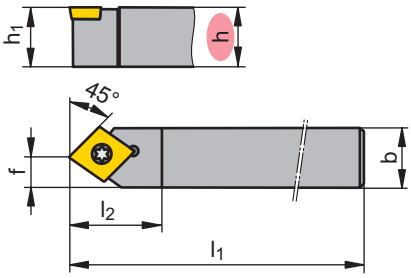

A58-A59

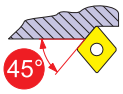

A88-A89


A97

SCDC...





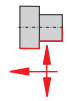


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
8	SCDCL 0808 K06	L	8	8	125	13	4	CC.. 0602..
10	SCDCL 1010 M06		10	10	150	13	5	
12	SCDCL 1212 M09		12	12	150	18	6	CC.. 09T3..
14	SCDCL 1414 M09		14	14	150	18	7	

Ordering example: 1 piece SCDCL 0808 K06

	h	1	2	Set 1-2
CC.. 0602..	8 - 10	7815101/M2,5X6,0/T08	7724106/TORX T08	7815902/SORT
CC.. 09T3..	12 - 14	7815102/M3,5X11,0/T15	7724103/TORX T15	7883906/SORT

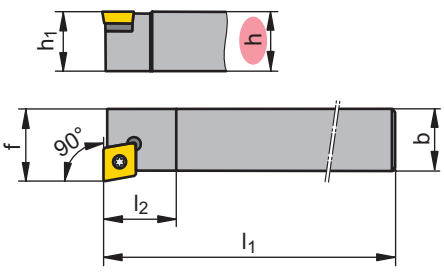

A58-A59

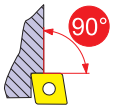

A88-A89


A97

SCFC...







Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
8	SCFCR 0808 D06	R	8	8	60	10	10	CC.. 0602..
10	SCFCR 1010 E06		10	10	70	10	12	CC.. 0602..
12	SCFCR 1212 F09		12	12	80	13	16	CC.. 09T3..
16	SCFCR 1616 H09		16	16	100	13	20	CC.. 09T3..
20	SCFCR 2020 K12		20	20	125	17	25	CC.. 1204..
8	SCFCL 0808 D06	L	8	8	60	10	10	CC.. 0602..
10	SCFCL 1010 E06		10	10	70	10	12	CC.. 0602..
12	SCFCL 1212 F09		12	12	80	13	16	CC.. 09T3..
16	SCFCL 1616 H09		16	16	100	13	20	CC.. 09T3..
20	SCFCL 2020 K12		20	20	125	17	25	CC.. 1204..

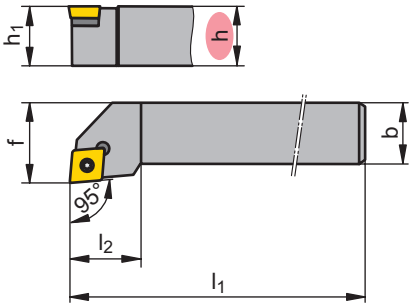
Ordering example: 1 piece SCFCR 0808 D06

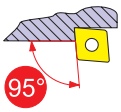
	h	1	2	2	3	4	Set 1-4
CC.. 0602..	8 - 10	7815101/M2,5X6,0/T08	7724106/TORX T08				7815902/SORT
CC.. 09T3..	12	7815102/M3,5X11,0/T15	7724103/TORX T15				7883906/SORT
CC.. 09T3..	16	7815102/M3,5X11,0/T15		7883301/KOMBI T15	7883001/HM-U	7883102/B M 3,5	7883903/SORT
CC.. 1204..	20	7883202/M4,5X12/T15		7883301/KOMBI T15	7883002/HM-U	7883101/B M 4,5	7883901/SORT

A58-A59 A88-A89 A97

SCLC...





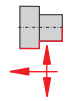


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
8	SCLCR 0808 D06	R	8	8	60	9	10	CC.. 0602..
10	SCLCR 1010 E06		10	10	70	9	12	CC.. 0602..
12	SCLCR 1212 F09		12	12	80	15	16	CC.. 09T3..
16	SCLCR 1616 H09		16	16	100	17	20	CC.. 09T3..
	SCLCR 1616 H12		16	16	100	20	20	CC.. 1204..
20	SCLCR 2020 K09		20	20	125	17	25	CC.. 09T3..
	SCLCR 2020 K12		20	20	125	20	25	CC.. 1204..
25	SCLCR 2525 M12		25	25	150	20	32	CC.. 1204..
32	SCLCR 3225 P12		32	25	170	20	32	CC.. 1204..
8	SCLCL 0808 D06	L	8	8	60	9	10	CC.. 0602..
10	SCLCL 1010 E06		10	10	70	9	12	CC.. 0602..
12	SCLCL 1212 F09		12	12	80	15	16	CC.. 09T3..
16	SCLCL 1616 H09		16	16	100	17	20	CC.. 09T3..
	SCLCL 1616 H12		16	16	100	20	20	CC.. 1204..
20	SCLCL 2020 K09		20	20	125	17	25	CC.. 09T3..
	SCLCL 2020 K12		20	20	125	20	25	CC.. 1204..
25	SCLCL 2525 M12		25	25	150	20	32	CC.. 1204..
32	SCLCL 3225 P12		32	25	170	20	32	CC.. 1204..

Ordering example: 1 piece SCLCR 0808 D06

	h	1	2	2	3	4	Set 1-4
CC.. 0602..	8 - 10	7815101/M2,5X6,0/T08	7724106/TORX T08				7815902/SORT
CC.. 09T3..	12	7815102/M3,5X11,0/T15	7724103/TORX T15				7883906/SORT
CC.. 09T3..	16 - 20	7815102/M3,5X11,0/T15		7883301/KOMBI T15	7883001/HM-U	7883102/B M 3,5	7883903/SORT
CC.. 1204..	16 - 32	7883202/M4,5X12/T15		7883301/KOMBI T15	7883002/HM-U	7883101/B M 4,5	7883901/SORT

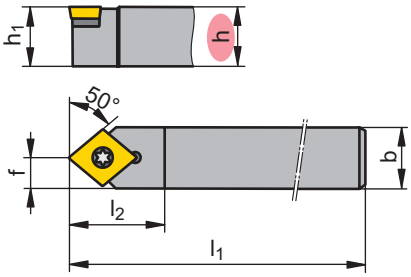

A58-A59

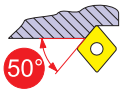

A88-A89


A97

SCMC...



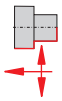




h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	SCMCN 1616 H12	N	16	16	100	25	8	CC.. 1204..
20	SCMCN 2020 K12		20	20	125	25	10	
25	SCMCN 2525 M12		25	25	150	25	12.5	
32	SCMCN 3225 P12		32	25	170	25	12.5	

Ordering example: 1 piece SCMCN 1616 H12

	h	1	2	3	4	Set 1-4
CC.. 1204..	16 - 32	7883202/M4,5X12/T15	7883301/KOMBI T15	7883002/HM-U	7883101/B M 4,5	7883901/SORT


A58-A59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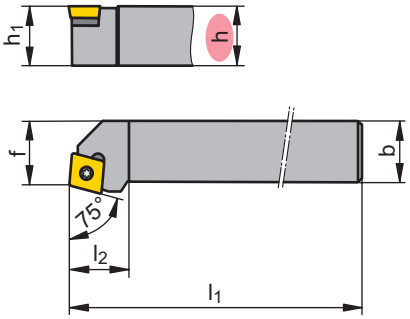
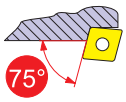
SCRC...





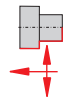


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
10	SCRCR 1010 E06	R	10	10	70	10	11	CC.. 0602..
12	SCRCR 1212 F09		12	12	80	16	13	CC.. 09T3..
16	SCRCR 1616 H09		16	16	100	17	17	CC.. 09T3..
	SCRCR 1616 H12		16	16	100	20	17	CC.. 1204..
20	SCRCR 2020 K09		20	20	125	17	22	CC.. 09T3..
	SCRCR 2020 K12		20	20	125	20	22	CC.. 1204..
25	SCRCR 2525 M12		25	25	150	20	27	CC.. 1204..
32	SCRCR 3225 P12		32	25	170	20	27	CC.. 1204..
12	SCRCL 1212 F09	L	12	12	80	16	13	CC.. 09T3..
16	SCRCL 1616 H09		16	16	100	17	17	CC.. 09T3..
20	SCRCL 2020 K09		20	20	125	17	22	CC.. 09T3..
	SCRCL 2020 K12		20	20	125	20	22	CC.. 1204..
25	SCRCL 2525 M12		25	25	150	20	27	CC.. 1204..
32	SCRCL 3225 P12		32	25	170	20	27	CC.. 1204..

Ordering example: 1 piece SCRCR 1010 E06

	h	1	2	2	3	4	Set 1-4
CC.. 0602..	10	7815101/M2,5X6,0/T08	7724106/TORX T08				7815902/SORT
CC.. 09T3..	12	7815102/M3,5X11,0/T15	7724103/TORX T15				7883906/SORT
CC.. 09T3..	16 - 20	7815102/M3,5X11,0/T15		7883301/KOMBI T15	7883001/HM-U	7883102/B M 3,5	7883903/SORT
CC.. 1204..	16 - 32	7883202/M4,5X12/T15		7883301/KOMBI T15	7883002/HM-U	7883101/B M 4,5	7883901/SORT



A58-A59



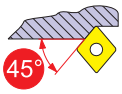
A88-A89

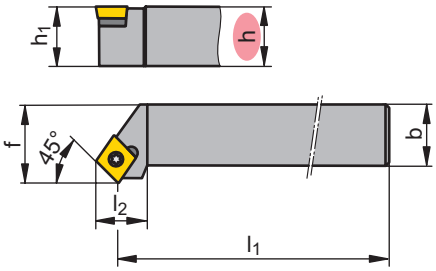


A97

SCSC...





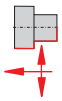


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	SCSCR 1616 H12	R	16	16	100	20	20	CC.. 1204..
20	SCSCR 2020 K12		20	20	125	20	25	
25	SCSCR 2525 M12		25	25	150	20	32	
20	SCSCL 2020 K12	L	20	20	125	20	25	
25	SCSCL 2525 M12		25	25	150	20	32	

Ordering example: 1 piece SCSCR 1616 H12

	h	1	2	3	4	Set 1-4
CC.. 1204..	16 - 25	7883202/M4,5X12/T15	7883301/KOMBI T15	7883002/HM-U	7883101/B M 4,5	7883901/SORT

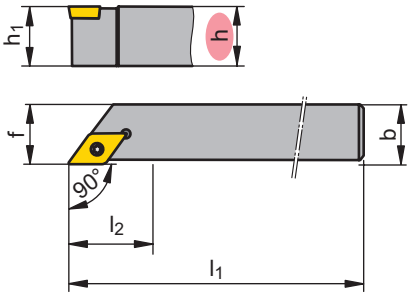

A58-A59

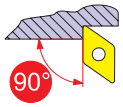

A88


A97

SDAC...





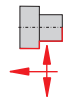


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
8	SDACR 0808 K07	R	8	8	125	14	8	DC.. 0702..
10	SDACR 1010 M07		10	10	150	14	10	DC.. 0702..
12	SDACR 1212 M07		12	12	150	14	12	DC.. 0702..
	SDACR 1212 M11		12	12	150	21	12	DC.. 11T3..
14	SDACR 1414 M11		14	14	150	21	14	DC.. 11T3..
8	SDACL 0808 K07	L	8	8	125	14	8	DC.. 0702..
10	SDACL 1010 M07		10	10	150	14	10	DC.. 0702..
12	SDACL 1212 M07		12	12	150	14	12	DC.. 0702..
	SDACL 1212 M11		12	12	150	21	12	DC.. 11T3..
14	SDACL 1414 M11		14	14	150	21	14	DC.. 11T3..

Ordering example: 1 piece SDACR 0808 K07

	h	1	2	Set 1-2
DC.. 0702..	8 - 12	7815101/M2,5X6,0/T08	7724106/TORX T08	7815902/SORT
DC.. 11T3..	12 - 14	7815102/M3,5X11,0/T15	7724103/TORX T15	7883906/SORT

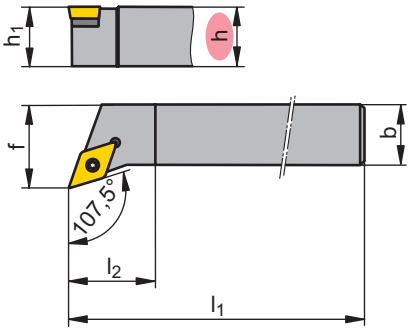

A58-A59

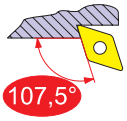

A90-A91


A97

SDHC...







Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
10	SDHCR 1010 E07	R	10	10	70	7.6	12	DC.. 0702..
12	SDHCR 1212 F07		12	12	80	12.2	16	DC.. 0702..
16	SDHCR 1616 H11		16	16	100	11.6	20	DC.. 11T3..
20	SDHCR 2020 K11		20	20	125	14.1	25	DC.. 11T3..
25	SDHCR 2525 M11		25	25	150	20.5	32	DC.. 11T3..
10	SDHCL 1010 E07	L	10	10	70	7.6	12	DC.. 0702..
12	SDHCL 1212 F07		12	12	80	12.2	16	DC.. 0702..
16	SDHCL 1616 H11		16	16	100	11.6	20	DC.. 11T3..
20	SDHCL 2020 K11		20	20	125	14.1	25	DC.. 11T3..
25	SDHCL 2525 M11		25	25	150	20.5	32	DC.. 11T3..

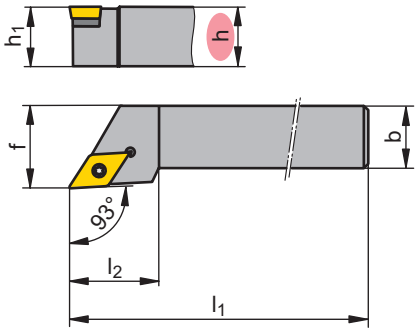
Ordering example: 1 piece SDHCR 1010 E07

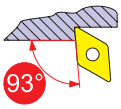
	h	1	2	2	3	4	Set 1-4
DC.. 0702..	10 - 12	7815101/M2,5X6,0/T08	7724106/TORX T08				7815902/SORT
DC.. 11T3..	16 - 25	7815102/M3,5X11,0/T15		7883301/KOMBI T15	7815000/HM-U	7883102/B M 3,5	7815900/SORT

A58-A59 A97 A90-A91

SDJC...





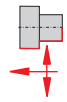


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
8	SDJCR 0808 D07		8	8	60	13	10	DC.. 0702..
10	SDJCR 1010 E07		10	10	70	13	12	DC.. 0702..
12	SDJCR 1212 F07		12	12	80	14.3	16	DC.. 0702..
16	SDJCR 1616 H11	R	16	16	100	19.3	20	DC.. 11T3..
20	SDJCR 2020 K11		20	20	125	19.9	25	DC.. 11T3..
25	SDJCR 2525 M11		25	25	150	21.2	32	DC.. 11T3..
32	SDJCR 3225 P11		32	25	170	21.2	32	DC.. 11T3..
8	SDJCL 0808 D07		8	8	60	13	10	DC.. 0702..
10	SDJCL 1010 E07		10	10	70	13	12	DC.. 0702..
12	SDJCL 1212 F07		12	12	80	14.3	16	DC.. 0702..
16	SDJCL 1616 H11	L	16	16	100	19.3	20	DC.. 11T3..
20	SDJCL 2020 K11		20	20	125	19.9	25	DC.. 11T3..
25	SDJCL 2525 M11		25	25	150	21.2	32	DC.. 11T3..
32	SDJCL 3225 P11		32	25	170	21.2	32	DC.. 11T3..

Ordering example: 1 piece SDJCR 0808 D07

	h	1	2	2	3	4	Set 1-4
DC.. 0702..	8 - 12	7815101/M2,5X6,0/T08	7724106/TORX T08				7815902/SORT
DC.. 11T3..	16 - 32	7815102/M3,5X11,0/T15		7883301/KOMBI T15	7815000/HM-U	7883102/B M 3,5	7815900/SORT



A58-A59



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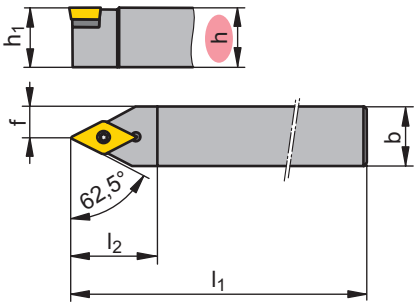
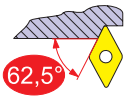
A90-A91

SDNC...



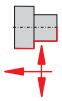




h [mm]	Type, description	LNR	h_1 [mm]	b [mm]	l_1 [mm]	f [mm]	
8	SDNCN 0808 D07		8	8	60	4	DC.. 0702..
	SDNCN 0808 K07		8	8	125	4	DC.. 0702..
10	SDNCN 1010 E07		10	10	70	5	DC.. 0702..
	SDNCN 1010 M07		10	10	150	5	DC.. 0702..
12	SDNCN 1212 F07		12	12	80	6	DC.. 0702..
	SDNCN 1212 M07	N	12	12	150	6	DC.. 0702..
	SDNCN 1212 M11		12	12	150	6	DC.. 11T3..
14	SDNCN 1414 M11		14	14	150	7	DC.. 11T3..
16	SDNCN 1616 H11		16	16	100	8	DC.. 11T3..
20	SDNCN 2020 K11		20	20	125	10	DC.. 11T3..
25	SDNCN 2525 M11		25	25	150	12.5	DC.. 11T3..

Ordering example: 1 piece SDNCN 0808 D07

	h	1	2	2	3	4	Set 1-4
DC.. 0702..	8 - 12	7815101/M2,5X6,0/T08	7724106/TORX T08				7815902/SORT
DC.. 11T3..	12 - 14	7815102/M3,5X11,0/T15	7724103/TORX T15				7883906/SORT
DC.. 11T3..	16 - 25	7815102/M3,5X11,0/T15		7883301/KOMBI T15	7815000/HM-U	7883102/B M 3,5	7815900/SORT

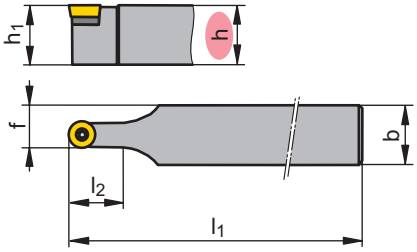

A58-A59

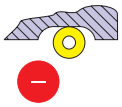

A97


A90-A91

SRDC...



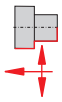




h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
12	SRDCN 1212 F06		12	12	80	12	9	RC.. 0602..
16	SRDCN 1616 H06		16	16	100	12	11	RC.. 0602..
	SRDCN 1616 H08		16	16	100	16	12	RC.. 0803..
	SRDCN 1616 H10		16	16	100	20.9	13	RC.. 1003..
20	SRDCN 2020 K06		20	20	125	12	13	RC.. 0602..
	SRDCN 2020 K08	N	20	20	125	16.5	14	RC.. 0803..
	SRDCN 2020 K10		20	20	125	20	15	RC.. 1003..
25	SRDCN 2525 M06		25	25	150	12.4	15.5	RC.. 0602..
	SRDCN 2525 M08		25	25	150	16.5	16.5	RC.. 0803..
	SRDCN 2525 M10		25	25	150	20.9	17.5	RC.. 1003..

Ordering example: 1 piece SRDCN 1212 F06

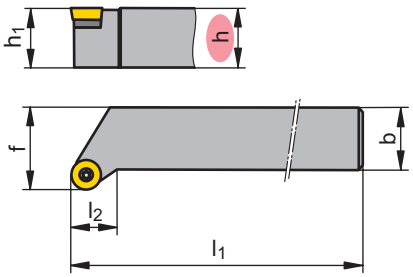
							
	h	1	2	2	3	4	Set 1-4
RC.. 0602..	12 - 25	7815101/M2,5X6,0/T08	7724106/TORX T08				7815902/SORT
RC.. 0803..	16 - 25	7883203/M3,0X7,3/T08	7724106/TORX T08				7883907/SORT
RC.. 1003..	16 - 25	7815102/M3,5X11,0/T15		7883301/KOMBI T15	7817002/HM-U	7883102/B M 3,5	7817902/SORT

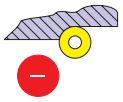

A58-A59


A92

SRGC...





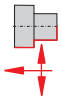


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
12	SRGCR 1212 F06	R	12	12	80	12.5	16	RC.. 0602..
16	SRGCR 1616 H06		16	16	100	12.5	20	RC.. 0602..
	SRGCR 1616 H08		16	16	100	13.6	20	RC.. 0803..
	SRGCR 1616 H10		16	16	100	13.6	20	RC.. 1003..
20	SRGCR 2020 K06		20	20	125	15.0	25	RC.. 0602..
	SRGCR 2020 K08		20	20	125	16.1	25	RC.. 0803..
	SRGCR 2020 K10		20	20	125	16.1	25	RC.. 1003..
25	SRGCR 2525 M06		25	25	150	18.5	32	RC.. 0602..
	SRGCR 2525 M08		25	25	150	19.6	32	RC.. 0803..
	SRGCR 2525 M10		25	25	150	19.6	32	RC.. 1003..
12	SRGCL 1212 F06	L	12	12	80	12.5	16	RC.. 0602..
16	SRGCL 1616 H08		16	16	100	13.6	20	RC.. 0803..
	SRGCL 1616 H10		16	16	100	13.6	20	RC.. 1003..
20	SRGCL 2020 K06		20	20	125	15.0	25	RC.. 0602..
	SRGCL 2020 K10		20	20	125	16.1	25	RC.. 1003..
25	SRGCL 2525 M06		25	25	150	18.5	32	RC.. 0602..
	SRGCL 2525 M08		25	25	150	19.6	32	RC.. 0803..
	SRGCL 2525 M10		25	25	150	19.6	32	RC.. 1003..

Ordering example: 1 piece SRGCR 1212 F06

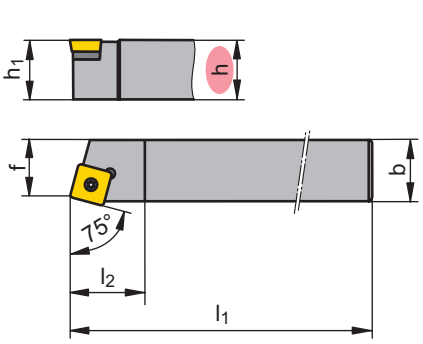
	h	1	2	2	3	4	Set 1-4
RC.. 0602..	12 - 25	7815101/M2,5X6,0/T08	7724106/TORX T08				7815902/SORT
RC.. 0803..	16 - 25	7883203/M3,0X7,3/T08	7724106/TORX T08				7883907/SORT
RC.. 1003..	16 - 25	7815102/M3,5X11,0/T15		7883301/KOMBI T15	7817002/HM-U	7883102/B M 3,5	7817902/SORT

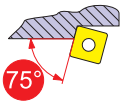

A58-A59


A92

SSBC...





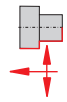


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	SSBCR 1616 H09	R	16	16	100	20	13	SC.. 09T3..
20	SSBCR 2020 K09		20	20	125	20	17	SC.. 09T3..
	SSBCR 2020 K12		20	20	125	20	17	SC.. 1204..
25	SSBCR 2525 M12		25	25	150	20	22	SC.. 1204..
16	SSBCL 1616 H09	L	16	16	100	20	13	SC.. 09T3..
20	SSBCL 2020 K09		20	20	125	20	17	SC.. 09T3..
	SSBCL 2020 K12		20	20	125	20	17	SC.. 1204..
25	SSBCL 2525 M12		25	25	150	20	22	SC.. 1204..

Ordering example: 1 piece SSBCR 1616 H09

	h	1	2	3	4	Set 1-4
SC.. 09T3..	16 - 20	7815102/M3,5X11,0/T15	7883301/KOMBI T15	7883003/HM-U	7883102/B M 3,5	7883904/SORT
SC.. 1204..	20 - 25	7883202/M4,5X12/T15	7883301/KOMBI T15	7883004/HM-U	7883101/B M 4,5	7883902/SORT



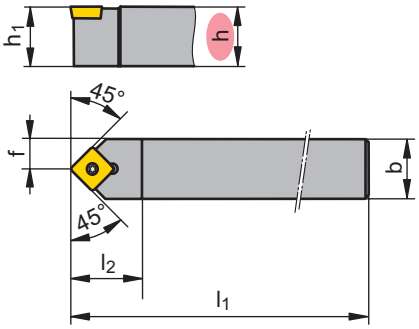
A58-A59

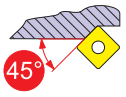


A93

SSDC...



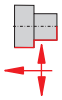




h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
12	SSDCN 1212 F09	N	12	12	80	16	6	SC.. 09T3..
16	SSDCN 1616 H09		16	16	100	20	8	SC.. 09T3..
	SSDCN 1616 H12		16	16	100	25	8	SC.. 1204..
20	SSDCN 2020 K09		20	20	125	20	10	SC.. 09T3..
	SSDCN 2020 K12		20	20	125	25	10	SC.. 1204..
25	SSDCN 2525 M12		25	25	150	25	12.5	SC.. 1204..

Ordering example: 1 piece SSDCN 1212 F09

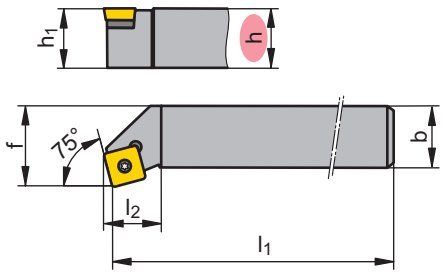
	h	1	2	2	3	4	Set 1-4
SC.. 09T3..	12	7815102/M3,5X11,0/T15	7724103/TORX T15				7883906/SORT
SC.. 09T3..	16 - 20	7815102/M3,5X11,0/T15		7883301/KOMBI T15	7883003/HM-U	7883102/B M 3,5	7883904/SORT
SC.. 1204..	16 - 25	7883202/M4,5X12/T15		7883301/KOMBI T15	7883004/HM-U	7883101/B M 4,5	7883902/SORT

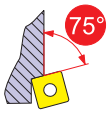

A58-A59


A93

SSKC...





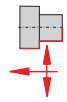


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	SSKCR 1616 H09	R	16	16	100	17.5	20	SC.. 09T3..
20	SSKCR 2020 K09		20	20	125	22.5	25	SC.. 09T3..
	SSKCR 2020 K12		20	20	125	23.5	25	SC.. 1204..
25	SSKCR 2525 M12		25	25	150	23.5	32	SC.. 1204..
16	SSKCL 1616 H09	L	16	16	100	17.5	20	SC.. 09T3..
20	SSKCL 2020 K09		20	20	125	22.5	25	SC.. 09T3..

Ordering example: 1 piece SSKCR 1616 H09

	h	1	2	3	4	Set 1-4
SC.. 09T3..	16 - 20	7815102/M3,5X11,0/T15	7883301/KOMBI T15	7883003/HM-U	7883102/B M 3,5	7883904/SORT
SC.. 1204..	20 - 25	7883202/M4,5X12/T15	7883301/KOMBI T15	7883004/HM-U	7883101/B M 4,5	7883902/SORT



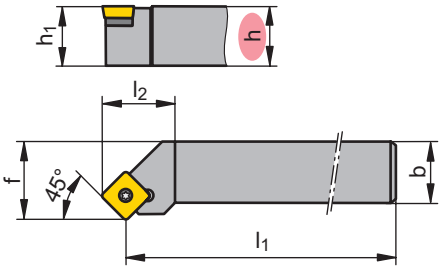
A58-A59

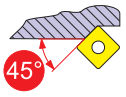


A93

SSSC...





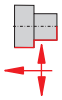


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
12	SSSCR 1212 F09	R	12	12	80	18	16	SC.. 09T3..
16	SSSCR 1616 H09		16	16	100	20	20	SC.. 09T3..
	SSSCR 1616 H12		16	16	100	25	20	SC.. 1204..
20	SSSCR 2020 K09		20	20	125	20	25	SC.. 09T3..
	SSSCR 2020 K12		20	20	125	25	25	SC.. 1204..
25	SSSCR 2525 M12		25	25	150	25	32	SC.. 1204..
32	SSSCR 3225 P12		32	25	170	25	32	SC.. 1204..
12	SSSCL 1212 F09	L	12	12	80	18	16	SC.. 09T3..
16	SSSCL 1616 H09		16	16	100	20	20	SC.. 09T3..
	SSSCL 1616 H12		16	16	100	25	20	SC.. 1204..
20	SSSCL 2020 K09		20	20	125	20	25	SC.. 09T3..
	SSSCL 2020 K12		20	20	125	25	25	SC.. 1204..
25	SSSCL 2525 M12		25	25	150	25	32	SC.. 1204..

Ordering example: 1 piece SSSCR 1212 F09

	h	1	2	2	3	4	Set 1-4
SC.. 09T3..	12	7815102/M3,5X11,0/T15	7724103/TORX T15				7883906/SORT
SC.. 09T3..	16 - 20	7815102/M3,5X11,0/T15		7883301/KOMBI T15	7883003/HM-U	7883102/B M 3,5	7883904/SORT
SC.. 1204..	16 - 32	7883202/M4,5X12/T15		7883301/KOMBI T15	7883004/HM-U	7883101/B M 4,5	7883902/SORT



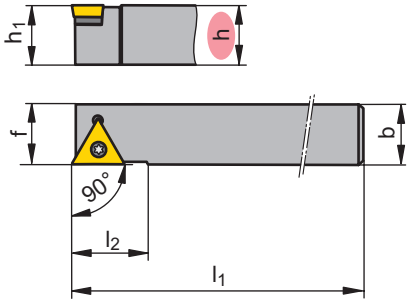
A58-A59

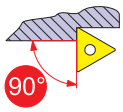


A93

STAC...





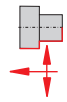


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
10	STACR 1010 K09	R	10	10	125	12	10	TC.. 0902..
12	STACR 1212 K11		12	12	125	15	12	TC.. 1102..
14	STACR 1414 K11		14	14	125	15	14	TC.. 1102..
10	STACL 1010 K09	L	10	10	125	12	10	TC.. 0902..
12	STACL 1212 K11		12	12	125	15	12	TC.. 1102..

Ordering example: 1 piece STACR 1010 K09

	h	1	2	Set 1-2
TC.. 0902..	10	7722113/M2,2X5/T07	7724105/TORX T07	7883908/SORT
TC.. 1102..	12 - 14	7815101/M2,5X6,0/T08	7724106/TORX T08	7815902/SORT



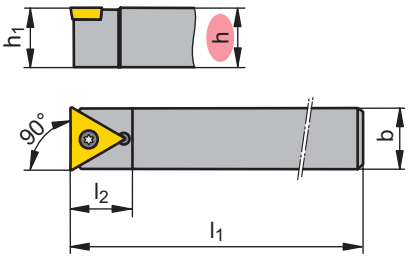
A58-A59

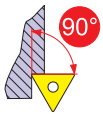


A94

STCC...



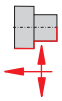




h [mm]	Type, description	LNR	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	
8	STCCN 0808 K09	N	8	8	125	11	TC.. 0902..
10	STCCN 1010 K11		10	10	125	15	TC.. 1102..
12	STCCN 1212 K11		12	12	125	15	TC.. 1102..
14	STCCN 1414 K11		14	14	125	21	TC.. 1102..
16	STCCN 1616 K11		16	16	125	24	TC.. 1102..

Ordering example: 1 piece STCCN 0808 K09

	h	1	2	Set 1-2
TC.. 0902..	8	7722113/M2,2X5/T07	7724105/TORX T07	7883908/SORT
TC.. 1102..	10 - 16	7815101/M2,5X6,0/T08	7724106/TORX T08	7815902/SORT



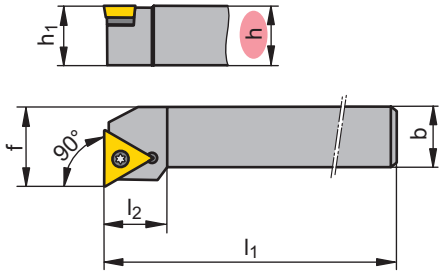
A58-A59

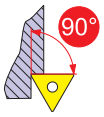


A94

STFC...





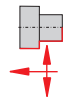


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
12	STFCR 1212 F11	R	12	12	80	15	16	TC.. 1102..
16	STFCR 1616 H16		16	16	100	20	20	TC.. 16T3..
20	STFCR 2020 K16		20	20	125	20	25	TC.. 16T3..
25	STFCR 2525 M16		25	25	150	20	32	TC.. 16T3..
12	STFCL 1212 F11	L	12	12	80	15	16	TC.. 1102..
16	STFCL 1616 H16		16	16	100	20	20	TC.. 16T3..
20	STFCL 2020 K16		20	20	125	20	25	TC.. 16T3..
25	STFCL 2525 M16		25	25	150	20	32	TC.. 16T3..

Ordering example: 1 piece STFCR 1212 F11

	h	1	2	2	3	4	Set 1-4
TC.. 1102..	12	7815101/M2,5X6,0/T08	7724106/TORX T08				7815902/SORT
TC.. 16T3..	16 - 25	7815102/M3,5X11,0/T15		7883301/KOMBI T15	7883005/HM-U	7883102/B M 3,5	7883905/SORT



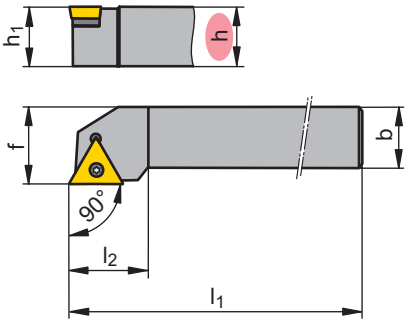
A58-A59

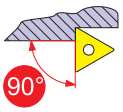


A94

STGC...





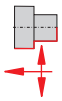


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
10	STGCR 1010 E09	R	10	10	70	12	12	TC.. 0902..
12	STGCR 1212 F11		12	12	80	15	16	TC.. 1102..
16	STGCR 1616 H16		16	16	100	22	20	TC.. 16T3..
20	STGCR 2020 K16		20	20	125	22	25	TC.. 16T3..
25	STGCR 2525 M16		25	25	150	22	32	TC.. 16T3..
10	STGCL 1010 E09	L	10	10	70	12	12	TC.. 0902..
12	STGCL 1212 F11		12	12	80	15	16	TC.. 1102..
16	STGCL 1616 H16		16	16	100	22	20	TC.. 16T3..
20	STGCL 2020 K16		20	20	125	22	25	TC.. 16T3..
25	STGCL 2525 M16		25	25	150	22	32	TC.. 16T3..

Ordering example: 1 piece STGCR 1010 E09

	h	1	2	2	3	4	Set 1-4
TC.. 0902..	10	7722113/M2,2X5/T07	7724105/TORX T07				7883908/SORT
TC.. 1102..	12	7815101/M2,5X6,0/T08	7724106/TORX T08				7815902/SORT
TC.. 16T3..	16 - 25	7815102/M3,5X11,0/T15		7883301/KOMBI T15	7883005/HM-U	7883102/B M 3,5	7883905/SORT



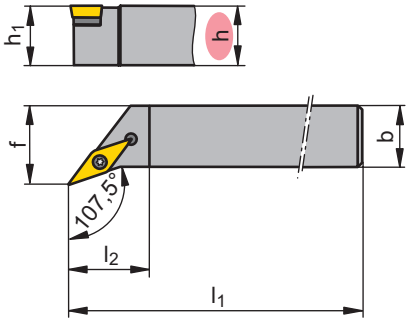
A58-A59

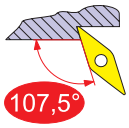


A94

SVHC...





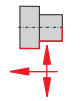


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
12	SVHCR 1212 F11	R	12	12	80	11.9	16	VC.. 1103..
16	SVHCR 1616 H11		16	16	100	11.9	20	VC.. 1103..
20	SVHCR 2020 K11		20	20	125	14.7	25	VC.. 1103..
	SVHCR 2020 K16		20	20	125	13.7	25	VC.. 1604..
25	SVHCR 2525 M11		25	25	150	20.1	32	VC.. 1103..
	SVHCR 2525 M16		25	25	150	20.0	32	VC.. 1604..
	SVHCR 2525 M22		25	25	150	21.9	32	VC.. 2205..
32	SVHCR 3225 P16		32	25	170	20.0	32	VC.. 1604..
	SVHCR 3225 P22		32	25	170	21.9	32	VC.. 2205..
12	SVHCL 1212 F11	L	12	12	80	11.9	16	VC.. 1103..
16	SVHCL 1616 H11		16	16	100	11.9	20	VC.. 1103..
20	SVHCL 2020 K11		20	20	125	14.7	25	VC.. 1103..
	SVHCL 2020 K16		20	20	125	13.7	25	VC.. 1604..
25	SVHCL 2525 M11		25	25	150	20.1	32	VC.. 1103..
	SVHCL 2525 M16		25	25	150	20.0	32	VC.. 1604..
	SVHCL 2525 M22		25	25	150	21.9	32	VC.. 2205..
32	SVHCL 3225 P16		32	25	170	20.0	32	VC.. 1604..
	SVHCL 3225 P22		32	25	170	21.9	32	VC.. 2205..

Ordering example: 1 piece SVHCR 1212 F11

	h	1	2	2	3	4	Set 1-4
VC.. 1103..	12 - 25	7815101/M2,5X6,0/T08	7724106/TORX T08				7815902/SORT
VC.. 1604..	20 - 32	7815102/M3,5X11,0/T15		7883301/KOMBI T15	7815002/HM-U	7883102/B M 3,5	7815901/SORT
VC.. 2205..	25 - 32	7883202/M4,5X12/T15		7883301/KOMBI T15	7815004/HM-U	7883101/B M 4,5	7883911/SORT



A58-A59



A95-A96



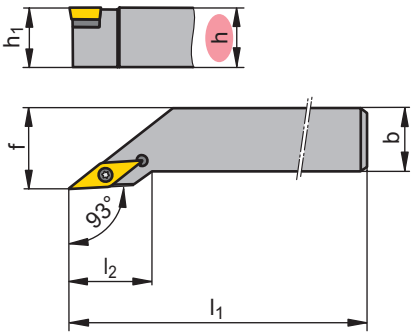
A97

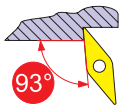


VC.. 1604 r ≥ .039 inch =  7815003/HM-U

SVJC...





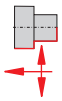


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
12	SVJCR 1212 F11	R	12	12	80	21.6	16	VC.. 1103..
16	SVJCR 1616 H11		16	16	100	21.6	20	VC.. 1103..
20	SVJCR 2020 K11		20	20	125	23	25	VC.. 1103..
	SVJCR 2020 K16		20	20	125	29.4	25	VC.. 1604..
25	SVJCR 2525 M11		25	25	150	25.5	32	VC.. 1103..
	SVJCR 2525 M16		25	25	150	32.5	32	VC.. 1604..
32	SVJCR 3225 P16		32	25	170	32.5	32	VC.. 1604..
12	SVJCL 1212 F11	L	12	12	80	21.6	16	VC.. 1103..
16	SVJCL 1616 H11		16	16	100	21.6	20	VC.. 1103..
20	SVJCL 2020 K11		20	20	125	23	25	VC.. 1103..
	SVJCL 2020 K16		20	20	125	29.4	25	VC.. 1604..
25	SVJCL 2525 M11		25	25	150	25.5	32	VC.. 1103..
	SVJCL 2525 M16		25	25	150	32.5	32	VC.. 1604..
32	SVJCL 3225 P16		32	25	170	32.5	32	VC.. 1604..

Ordering example: 1 piece SVJCR 1212 F11

	h	1	2	2	3	4	Set 1-4
VC.. 1103..	12 - 25	7815101/M2,5X6,0/T08	7724106/TORX T08				7815902/SORT
VC.. 1604..	20 - 32	7815102/M3,5X11,0/T15		7883301/KOMBI T15	7815002/HM-U	7883102/B M 3,5	7815901/SORT


A58-A59

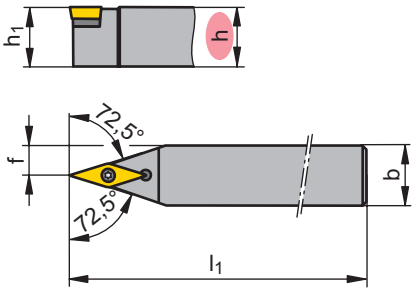

A95-A96

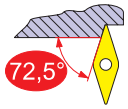

A97


VC.. 1604 r ≥ .039 inch = 
7815003/HM-U

SVVC...







h [mm]	Type, description	LNR	h_1 [mm]	b [mm]	l_1 [mm]	f [mm]	
12	SVVCN 1212 F11	N	12	12	80	6	VC.. 1103..
16	SVVCN 1616 H11		16	16	100	8	VC.. 1103..
20	SVVCN 2020 K11		20	20	125	10	VC.. 1103..
	SVVCN 2020 K16		20	20	125	10	VC.. 1604..
25	SVVCN 2525 M11		25	25	150	12.5	VC.. 1103..
	SVVCN 2525 M16		25	25	150	12.5	VC.. 1604..
32	SVVCN 3225 P16		32	25	170	12.5	VC.. 1604..

Ordering example: 1 piece SVVCN 1212 F11

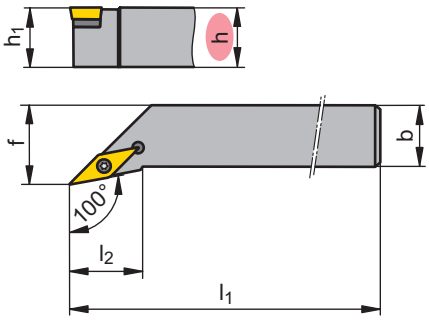
	h	1	2	2	3	4	Set 1-4
VC.. 1103..	12 - 25	7815101/M2,5X6,0/T08	7724106/TORX T08				7815902/SORT
VC.. 1604..	20 - 32	7815102/M3,5X11,0/T15		7883301/KOMBI T15	7815002/HM-U	7883102/B M 3,5	7815901/SORT

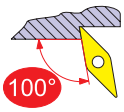
A58-A59 A95-A96 A97

VC.. 1604 r ≥ .039 inch = 7815003/HM-U

SVZC/SVZP...





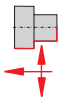


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	SVZCR 2525 M16	R	25	25	150	27.3	32	VC.. 1604..
	SVZPR 2525 M22-16		25	25	150	32.3	32	VP.. 2205..
	SVZCL 2525 M16	L	25	25	150	27.3	32	VC.. 1604..
	SVZPL 2525 M22-16		25	25	150	32.3	32	VP.. 2205..

Ordering example: 1 piece SVZCR 2525 M16

	h	1	2	3	4	Set 1-4
VC.. 1604..	25	7815102/M3,5X11,0/T15	7883301/KOMBI T15	7815002/HM-U	7883102/B M 3,5	7815901/SORT
VP.. 2205..	25	7883202/M4,5X12/T15	7883301/KOMBI T15	7815005/HM-U	7883101/B M 4,5	7883912/SORT


A58-A59

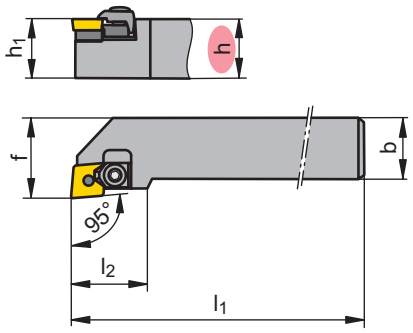

A95-A96

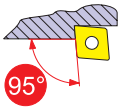

A97


VC.. 1604 r ≥ .039 inch = 
7815003/HM-U

MCLC...





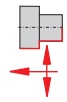


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
20	MCLCR 2020 K12	R	20	20	125	35	25	CC.. 1204..
25	MCLCR 2525 M12		25	25	150	35	32	
20	MCLCL 2020 K12	L	20	20	125	35	25	
25	MCLCL 2525 M12		25	25	150	35	32	

Ordering example: 1 piece MCLCR 2020 K12

	h	1	2	3	4	5	Set 1-4
CC.. 1204..	20 - 25	7880004/HM-U	7880402/PS	7880603/KE	7880103/K	7724104/TORX T20	7880904/SORT



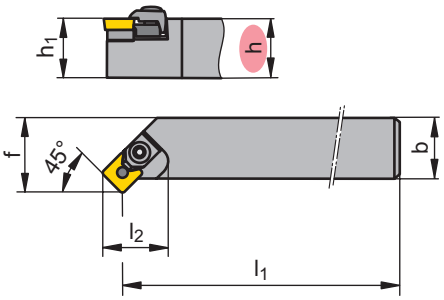
A58-A59

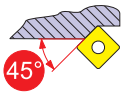


A98

MSSC...





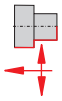


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
20	MSSCR 2020 K12	R	20	20	125	32	25	SC.. 1204..
25	MSSCR 2525 M12		25	25	150	28	32	
32	MSSCR 3225 P12		32	25	170	28	32	
20	MSSCL 2020 K12	L	20	20	125	32	25	
25	MSSCL 2525 M12		25	25	150	28	32	
32	MSSCL 3225 P12		32	25	170	28	32	

Ordering example: 1 piece MSSCR 2020 K12

	h	1	2	3	4	5	Set 1-4
SC.. 1204..	20 - 32	7880003/HM-U	7880402/PS	7880603/KE	7880103/K	7724104/TORX T20	7880903/SORT



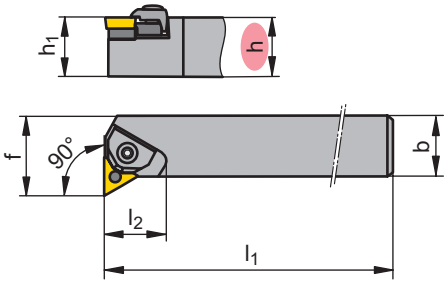
A58-A59

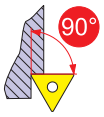


A98

MTFC...





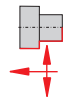


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
20	MTFCR 2020 K16	R	20	20	125	22	25	TC.. 1604..
25	MTFCR 2525 M16		25	25	150	25	32	

Ordering example: 1 piece MTFCR 2020 K16

	h	1	2	3	4	5	Set 1-4
TC.. 1604..	20 - 25	7880001/HM-U	7880401/PS	7880601/KE	7880101/K	7724104/TORX T20	7880901/SORT



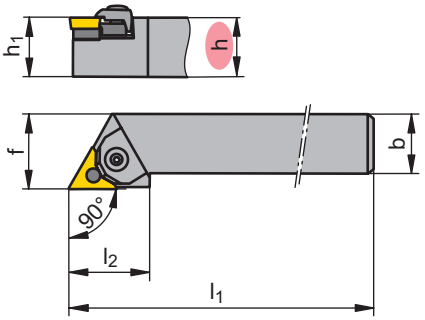
A58-A59

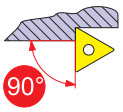


A98

MTGC...







Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
20	MTGCR 2020 K16	R	20	20	125	32	25	TC.. 1604..
25	MTGCR 2525 M16		25	25	150	32	32	TC.. 1604..
	MTGCR 2525 M22		25	25	150	35	32	TC.. 2204..
20	MTGCL 2020 K16	L	20	20	125	32	25	TC.. 1604..
25	MTGCL 2525 M16		25	25	150	32	32	TC.. 1604..

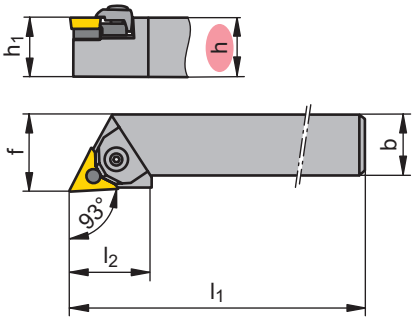
Ordering example: 1 piece MTGCR 2020 K16

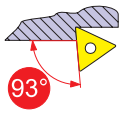
	h	1	2	3	4	5	Set 1-4
TC.. 1604..	20 - 25	7880001/HM-U	7880401/PS	7880601/KE	7880101/K	7724104/TORX T20	7880901/SORT
TC.. 2204..	25	7880002/HM-U	7880402/PS	7880602/KE	7880102/K	7724104/TORX T20	7880902/SORT

A58-A59
A98

MTJC...





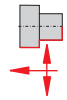


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
20	MTJCR 2020 K16	R	20	20	125	32	25	TC.. 1604..
25	MTJCR 2525 M16		25	25	150	32	32	TC.. 1604..
	MTJCR 2525 M22		25	25	150	35	32	TC.. 2204..
32	MTJCR 3225 P16		32	25	170	32	32	TC.. 1604..
20	MTJCL 2020 K16	L	20	20	125	32	25	TC.. 1604..
25	MTJCL 2525 M16		25	25	150	32	32	TC.. 1604..
32	MTJCL 3225 P16		32	25	170	32	32	TC.. 1604..

Ordering example: 1 piece MTJCR 2020 K16

	h	1	2	3	4	5	Set 1-4
TC.. 1604..	20 - 32	7880001/HM-U	7880401/PS	7880601/KE	7880101/K	7724104/TORX T20	7880901/SORT
TC.. 2204..	25	7880002/HM-U	7880402/PS	7880602/KE	7880102/K	7724104/TORX T20	7880902/SORT



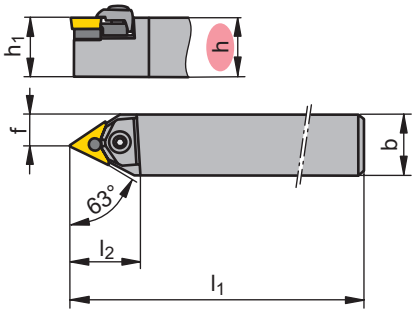
A58-A59

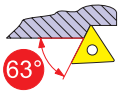


A98

MTNC...





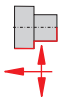


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
20	MTNCR 2020 K16	R	20	20	125	26	10	TC.. 1604..
25	MTNCR 2525 M16	R	25	25	150	26	12.5	
25	MTNCL 2525 M16	L	25	25	150	26	12.5	

Ordering example: 1 piece MTNCR 2020 K16

	h	1	2	3	4	5	Set 1-4
TC.. 1604..	20 - 25	7880001/HM-U	7880401/PS	7880601/KE	7880101/K	7724104/TORX T20	7880901/SORT



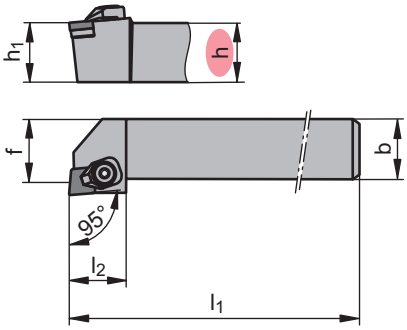
A58-A59

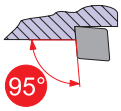


A98

CCLN...





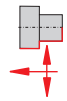


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	CCLNR 2525 M09	R	25	25	150	26	32	CN.. 0903..

Ordering example: 1 piece CCLNR 2525 M09

	h	1	2	3	4	5	Set 1-4
CN.. 0903..	25	7485865/SP	7830501/HM-U	7480902/KN 2,6x10	7485860/M6,0X16,2/T20	7724104/TORX T20	7830509/SORT



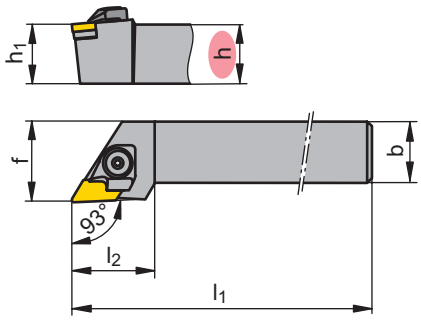
A58-A59

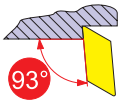


A99

CKJN...







Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	CKJNR 2525 M16	R	25	25	150	35	32	KN.. 1604R..
	CKJNL 2525 M16	L	25	25	150	35	32	KN.. 1604L..

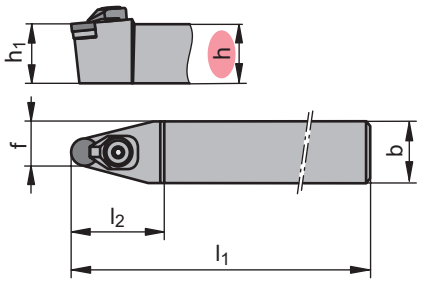
Ordering example: 1 piece CKJNR 2525 M16

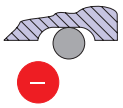
	h	1	2	3	4	5	6	7
KN.. 1604L..	25	70.5-825/SP	U 000051L/HM-U	7480901/KN 3x10	70.5-865/S	70.5-848/F	7480412/SW 4	70.5-841/F+S
KN.. 1604R..	25	70.5-824/SP	U 000051R/HM-U	7480901/KN 3x10	70.5-865/S	70.5-848/F	7480412/SW 4	70.5-841/F+S

A58-A59
A105

CRDN...



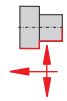




h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	●
25	CRDNN 2525 M09	N	25	25	150	35	12.5	RN.. 0903..
	CRDNN 2525 M12		25	25	150	35	12.5	RN.. 1203..
32	CRDNN 3232 P09		32	32	170	35	16	RN.. 0903..
	CRDNN 3232 P12		32	32	170	35	16	RN.. 1203..
40	CRDNN 4040 R12		40	40	200	35	20	RN.. 1203..

Ordering example: 1 piece CRDNN 2525 M09

●	h	1	2	3	4	5	Set 1-4
RN.. 0903..	25 - 32	7485865/SP	7817008/HM-U	7480902/KN 2,6x10	7485860/M6,0X16,2/T20	7724104/TORX T20	7817911/SORT
RN.. 1203..	25 - 40	7485865/SP	7817009/HM-U	7480901/KN 3x10	7485860/M6,0X16,2/T20	7724104/TORX T20	7817912/SORT



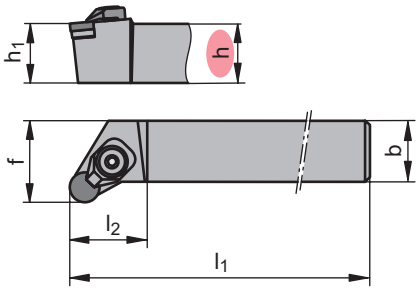
A58-A59

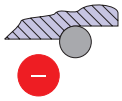


A101

CRGN...





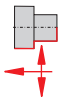


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	●
20	CRGNR 2020 K09	R	20	20	125	21	25	RN.. 0903..
25	CRGNR 2525 M09		25	25	150	21	32	RN.. 0903..
	CRGNR 2525 M12		25	25	150	21	32	RN.. 1203..
32	CRGNR 3232 P09		32	32	170	21	40	RN.. 0903..
	CRGNR 3232 P12		32	32	170	21	40	RN.. 1203..
40	CRGNR 4040 R12		40	40	200	21	50	RN.. 1203..
25	CRGNL 2525 M09	L	25	25	150	21	32	RN.. 0903..
	CRGNL 2525 M12		25	25	150	21	32	RN.. 1203..
32	CRGNL 3232 P09		32	32	170	21	40	RN.. 0903..
	CRGNL 3232 P12		32	32	170	21	40	RN.. 1203..
40	CRGNL 4040 R12		40	40	200	21	50	RN.. 1203..

Ordering example: 1 piece CRGNR 2020 K09

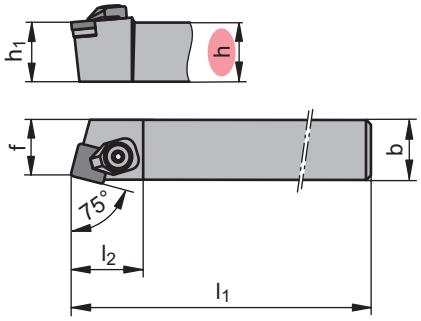
●	h	1	2	3	4	5	Set 1-4
RN.. 0903..	20 - 32	7485865/SP	7817008/HM-U	7480902/KN 2,6x10	7485860/M6,0X16,2/T20	7724104/TORX T20	7817911/SORT
RN.. 1203..	25 - 40	7485865/SP	7817009/HM-U	7480901/KN 3x10	7485860/M6,0X16,2/T20	7724104/TORX T20	7817912/SORT

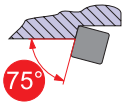

A58-A59


A101

CSBN...





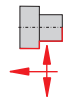


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	CSBNR 2525 M12	R	25	25	150	32	22	SN.. 1204..

Ordering example: 1 piece CSBNR 2525 M12

	h	1	2	3	4	5	6	Set 1-5
SN.. 1204..	25	7485869/SP	7480312/HM-U	7480901/KN 3x10	7480210/M8X20	7480910/FS	7480412/SW 4	7485901/SORT



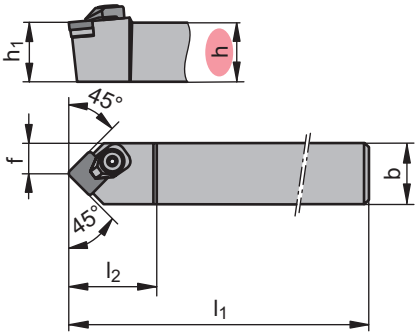
A58-A59

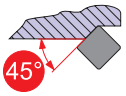


A102-A103

CSDN...





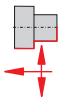


h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	CSDNN 2525 M09	N	25	25	150	25	12.5	SN.. 0903..
	CSDNN 2525 M12		25	25	150	34	12.5	SN.. 1204..
32	CSDNN 3232 P123		32	32	170	28	16	SN.. 1203..

Ordering example: 1 piece CSDNN 2525 M09

	h	1	2	3	4	
SN.. 0903..	25	7485865/SP	7485940/HM-U	7480902/KN 2,6x10	7485860/M6,0X16,2/T20	
SN.. 1204..	25	7485869/SP	7480312/HM-U	7480901/KN 3x10		
SN.. 1203..	32	7485865/SP	7480312/HM-U	7480901/KN 3x10	7485860/M6,0X16,2/T20	

5	6	7	8	Set 1-5
		7724104/TORX T20		7485926/SORT
7480910/FS	7480210/M8X20		7480412/SW 4	7485901/SORT
		7724104/TORX T20		

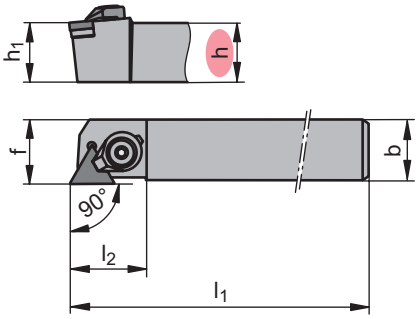

A58-A59

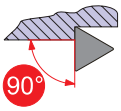

A102-A103


A102

CTAN...





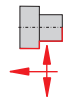


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	△
20	CTANR 2020 K16	R	20	20	125	30	20.5	TN.. 1604..
25	CTANR 2525 M16		25	25	150	30	25.5	

Ordering example: 1 piece CTANR 2020 K16

△	h	1	2	3	4	5	6	Set 1-5
TN.. 1604..	20 - 25	7485869/SP	7480313/HM-U	7480901/KN 3x10	7480210/M8X20	7480910/FS	7480412/SW 4	7485906/SORT



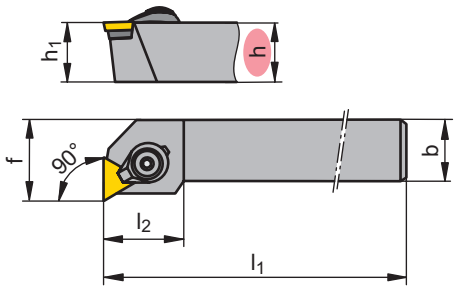
A58-A59

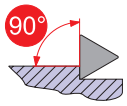


A104

CTFN...







Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
12	CTFNR 1212 F11	R	12	12	80	15	16	TN.. 1103..

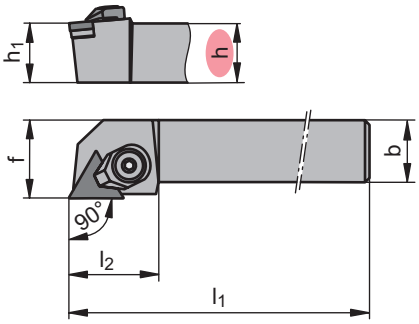
Ordering example: 1 piece CTFNR 1212 F11

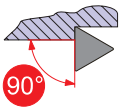
	h	1	2	3	
TN.. 1103..	12	7830001/SP	7830002/M4,0X10/T15	7724103/TORX T15	

A58-A59
A104

CTGN...





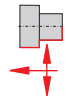


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
12	CTGNR 1212 F11	R	12	12	80	16	16	TN.. 1103..
25	CTGNR 2525 M11		25	25	150	25	32	
12	CTGNL 1212 F11	L	12	12	80	16	16	

Ordering example: 1 piece CTGNR 1212 F11

	h	1	2	3	4	5	Set 1-5
TN.. 1103..	12	7830001/SP			7830002/M4,0X10/T15	7724103/TORX T15	
TN.. 1103..	25	7485865/SP	7485941/HM-U	7480902/KN 2,6x10	7485860/M6,0X16,2/T20	7724104/TORX T20	7485907/SORT



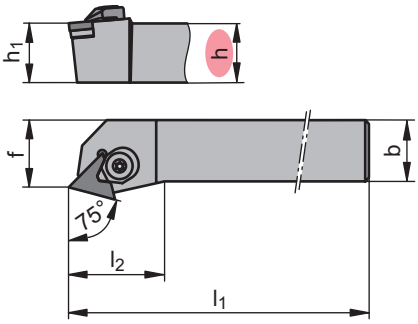
A58-A59

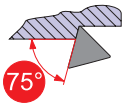


A104

CTRN...







Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
12	CTRNR 1212 F11	R	12	12	80	17.5	13	TN.. 1103..

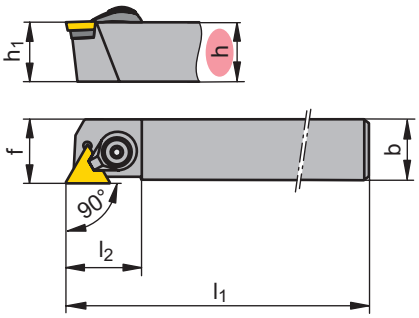
Ordering example: 1 piece CTRNR 1212 F11

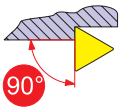
	h	1	2	3	
TN.. 1103..	12	7830001/SP	7830002/M4,0X10/T15	7724103/TORX T15	

A58-A59
A104

CTAP...





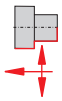


Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	△
20	CTAPR 2020 K16	R	20	20	125	30	20.5	TP.. 1603..
25	CTAPR 2525 M16		25	25	150	30	25.5	
20	CTAPL 2020 K16	L	20	20	125	30	20.5	
25	CTAPL 2525 M16		25	25	150	30	25.5	

Ordering example: 1 piece CTAPR 2020 K16

 △	h	 1	 2	 3	 4	 5	 6	Set 1-5
TP.. 1603..	20 - 25	7485869/SP	7480316/HM-U	7480901/KN 3x10	7480210/M8X20	7480910/FS	7480412/SW 4	7485911/SORT



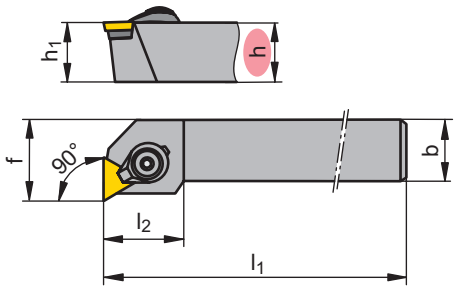
A58-A59

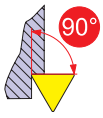


A108

CTFP...







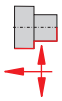
Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	△
12	CTFPR 1212 F11	R	12	12	80	14	16	TP.. 1103..
20	CTFPR 2020 K16		20	20	125	28	25	TP.. 1603..
25	CTFPR 2525 M16		25	25	150	32	32	TP.. 1603..
25	CTFPL 2525 M16	L	25	25	150	32	32	TP.. 1603..

Ordering example: 1 piece CTFPR 1212 F11

 △	h	 1	 2	 3	 4	
TP.. 1103..	12	7830001/SP				
TP.. 1603..	20 - 25	7485869/SP	7480316/HM-U	7480901/KN 3x10	7480210/M8X20	

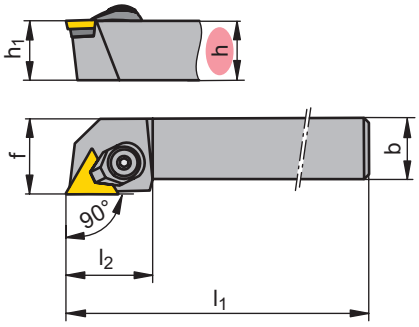
 5	 6	 7	 8	Set 1-5
		7724103/TORX T15	7830002/M4,0X10/T15	
7480910/FS	7480412/SW 4			7485911/SORT

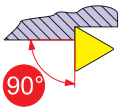

A58-A59


A108

CTGP...







Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
10	CTGPR 1010 E11	R	10	10	70	16.5	12	TP.. 1103..
12	CTGPR 1212 F11	R	12	12	80	16.5	16	
	CTGPL 1212 F11	L	12	12	80	16.5	16	

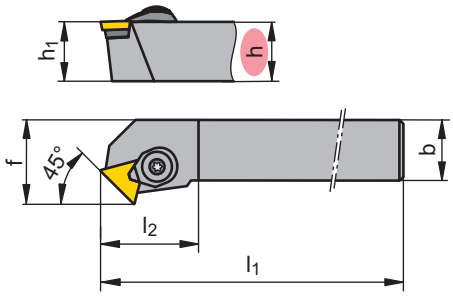
Ordering example: 1 piece CTGPR 1010 E11

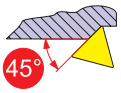
	h	1	2	3	
TP.. 1103..	10 - 12	7830001/SP	7724103/TORX T15	7830002/M4,0X10/T15	

A58-A59 A108

CTSP...







Picture shows right-hand version

h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
12	CTSPR 1212 F11	R	12	12	80	16	16	TP.. 1103..

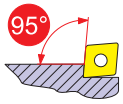
Ordering example: 1 piece CTSPR 1212 F11

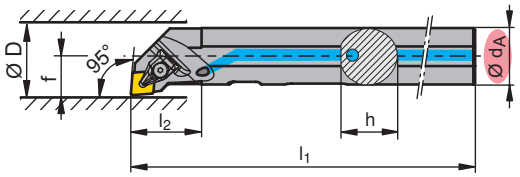
	h	1	2	3	
TP.. 1103..	12	7830002/M4,0X10/T15	7830001/SP	7724103/TORX T15	

A58-A59
A108

DCLN...





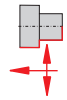


Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
20	A20Q DCLNR 09	R	19	180	35	13	25	CN.. 0903..
25	A25R DCLNR 12		24	200	36	17	32	CN.. 1204..
32	A32S DCLNR 12		31	250	40	22	40	CN.. 1204..
40	A40T DCLNR 12		39	300	45	27	50	CN.. 1204..
20	A20Q DCLNL 09	L	19	180	35	13	25	CN.. 0903..
25	A25R DCLNL 12		24	200	36	17	32	CN.. 1204..
32	A32S DCLNL 12		31	250	40	22	40	CN.. 1204..
40	A40T DCLNL 12		39	300	45	27	50	CN.. 1204..
50	A50U DCLNL 16		47	350	45	35	63	CN.. 1606..

Ordering example: 1 piece A20Q DCLNR 09

	d_A	1	2	3	4
CN.. 0903..	20	M3x7-09IP/10003007	U-CN0903-D	S-09IP-T	SET-01-D
CN.. 1204..	25	M4,5x12-15IP/10002887		S-15IP-T	SET-02-D
CN.. 1204..	32 - 40	M4,5x12-15IP/10002887	U-CN12T3-D	S-15IP-T	SET-02-D
CN.. 1606..	50	M5x14-20IP/10003023	U-CN1604-D	S-20IP-T	SET-03-D

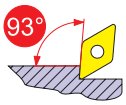

A58-A59

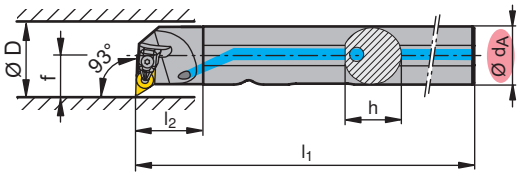

A72-A75


A86

DDUN...





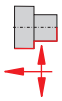


Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
25	A25R DDUNR 11	R	24	200	30	17	32	DN.. 1104..
32	A32S DDUNR 11		31	250	40	22	40	DN.. 1104..
40	A40T DDUNR 15		39	300	45	27	50	DN.. 1506..
25	A25R DDUNL 11	L	24	200	30	17	32	DN.. 1104..
32	A32S DDUNL 11		31	250	40	22	40	DN.. 1104..
40	A40T DDUNL 15		39	300	45	27	50	DN.. 1506..

Ordering example: 1 piece A25R DDUNR 11

	d_A	1	2	3	4
DN.. 1104..	25 - 32	M3x7-09IP/10003007	U-DN1103-D	S-09IP-T	SET-01L-D
DN.. 1506..	40	M4,5x12-15IP/10002887	U-DN15T3-D	S-15IP-T	SET-02-D


A58-A59

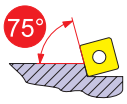

A76-A78

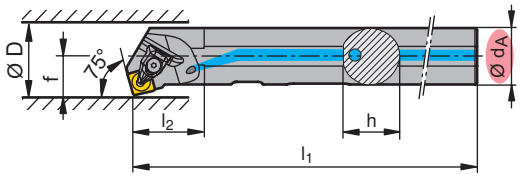

A86

DN 1504 (s = 4,76 mm) = U-DN1505-D

DSKN...





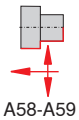


Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
32	A32S DSKNR 12	R	31	250	44.2	22	40	SN.. 1204..
	A32S DSKNL 12	L	31	250	44.2	22	40	

Ordering example: 1 piece A32S DSKNR 12

	d_A	1	2	3	4
SN.. 1204..	32	M4,5x12-15IP/10002887	U-SN12T3-D	S-15IP-T	SET-02-D

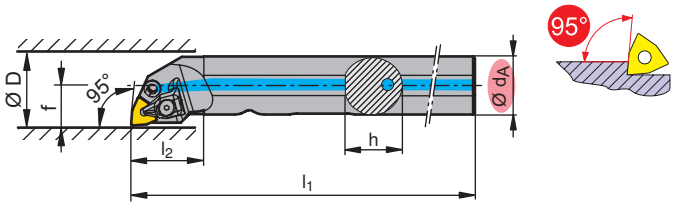

A58-A59


A79-A80


A87

DWLN...





Version A with coolant hole

Version S without coolant hole

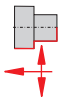
Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
25	A25R DWLNR 06	R	24	200	32	17	32	WN.. 0604..
	S25T DWLNR 08		23	300	40	17	32	WN.. 0804..
32	A32S DWLNR 08		31	250	40	22	40	WN.. 0804..
	S32U DWLNR 08		30	350	40	22	40	WN.. 0804..
40	A40T DWLNR 08		39	300	45	27	50	WN.. 0804..
	S40V DWLNR 08		38	400	45	27	50	WN.. 0804..
25	A25R DWLNL 06	L	24	200	32	17	32	WN.. 0604..
32	A32S DWLNL 08		31	250	40	22	40	WN.. 0804..
40	A40T DWLNL 08		39	300	45	27	50	WN.. 0804..

Ordering example: 1 piece A25R DWLNR 06

		Version A				
	d_A	1	2	3	4	5
WN.. 0604..	25	M3x7-09IP/10003007	U-WN0603-D	S-09IP-T	HY-M5	SET-01-D
WN.. 0804..	32 - 40	M4,5x12-15IP/10002887	U-WN08T3-D	S-15IP-T	HY-M5	SET-02-D

		Version S			
	d_A	1	2	3	4
WN.. 0804..	25			S-15IP-T	SET-02-D
WN.. 0804..	32 - 40	M4,5x12-15IP/10002887	U-WN08T3-D	S-15IP-T	SET-02-D



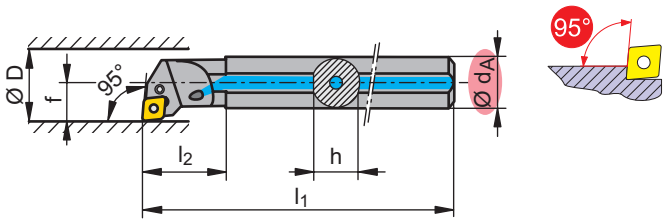
A58-A59



A84-A85

PCLN...





Version A with coolant hole

Version S without coolant hole

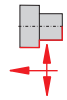
Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
25	A25R PCLNR 12	R	23	200	36	17	32	CN.. 1204..
	S25T PCLNR 12		23	300	22	17	32	CN.. 1204..
32	A32S PCLNR 12		30	250	50	22	40	CN.. 1204..
	S32U PCLNR 12		30	350	24.1	22	40	CN.. 1204..
40	A40T PCLNR 12		38	300	60	27	50	CN.. 1204..
	S40V PCLNR 12		38	400	24.1	27	50	CN.. 1204..
50	S50W PCLNR 16		47	450	31	35	63	CN.. 1606..
25	A25R PCLNL 12	L	23	200	36	17	32	CN.. 1204..
	S25T PCLNL 12		23	300	22	17	32	CN.. 1204..
32	A32S PCLNL 12		30	250	50	22	40	CN.. 1204..
	S32U PCLNL 12		30	350	24.1	22	40	CN.. 1204..
40	A40T PCLNL 12		38	300	60	27	50	CN.. 1204..
	S40V PCLNL 12		38	400	24.1	27	50	CN.. 1204..
50	S50W PCLNL 16		47	450	31	35	63	CN.. 1606..

Ordering example: 1 piece A25R PCLNR 12

		Version A						
	d_A	1	2	3	4	5	6	Set 1-4
CN.. 1204..	25 - 32	U 112150/HM-U	H 023441/H	S 000458/S ISK 3MM	R 023461/R	7882202/SW 3	M 018471/MO	7853400/SORT
CN.. 1204..	40	U 112150/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	7882202/SW 3	M 018471/MO	7853401/SORT

		Version S						
	d_A	1	2	3	4	5	6	Set 1-4
CN.. 1204..	25 - 32	U 112150/HM-U	H 023441/H	S 000458/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853400/SORT
CN.. 1204..	40	U 112150/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853401/SORT
CN.. 1606..	50	U 000152/HM-U	H 000840/H	S 000831/S ISK 3MM	R 025464/R	M 022473/MO	7882202/SW 3	7853402/SORT

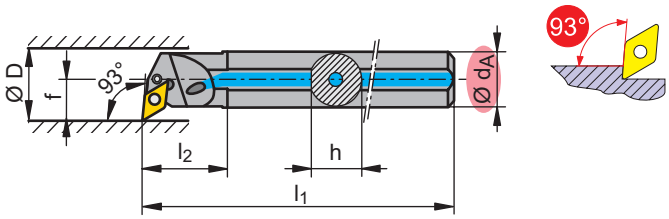

A58-A59


A72-A75


A86

PDUN...





Version A with coolant hole

Version S without coolant hole

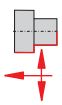
Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
20	A20Q PDUNR 11	R	18.5	180		16	25	DN.. 1104..
25	A25R PDUNR 11		23	200		18.5	32	DN.. 1104..
32	A32S PDUNR 11		30	250		22	40	DN.. 1104..
32	A32S PDUNR 15		30	250	50	22	40	DN.. 1506..
40	A40T PDUNR 15		38	300	60	27	50	DN.. 1506..
50	S50W PDUNR 15		47	450		35	63	DN.. 1506..
20	A20Q PDUNL 11	L	18.5	180		16	25	DN.. 1104..
25	A25R PDUNL 11		23	200		18.5	32	DN.. 1104..
32	A32S PDUNL 11		30	250		22	40	DN.. 1104..
32	A32S PDUNL 15		30	250	50	22	40	DN.. 1506..
40	A40T PDUNL 15		38	300	60	27	50	DN.. 1506..
50	S50W PDUNL 15		47	450		35	63	DN.. 1506..

Ordering example: 1 piece A20Q PDUNR 11

		Version A						
	d_A	1	2	3	4	5	6	Set 1-4
DN.. 1104..	20		7853611/H	7853711/S			7882201/SW 2,5	7853427/SORT
DN.. 1104..	25 - 32	7853521/HM-U	7853610/H	S 018420/S ISK 2,5MM	7853806/R	M 018470/MO	7882201/SW 2,5	7853426/SORT
DN.. 1506..	32 - 40	U 153150/HM-U	H 024447/H	S 000831/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853404/SORT

		Version S						
	d_A	1	2	3	4	5	6	Set 1-4
DN.. 1506..	50	7853404/SORT	H 024447/H	R 023461/R	S 000831/S ISK 3MM	U 153150/HM-U	7882202/SW 3	M 018471/MO

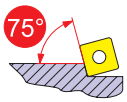

A58-A59

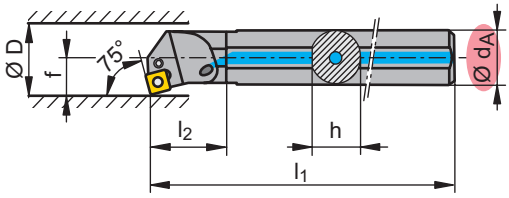

A76-A78


A86

PSKN...





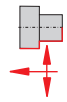


Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
25	A25R PSKNR 12	R	23	200	36	17	32	SN.. 1204..
32	A32S PSKNR 12		30	250	50	22	40	
40	A40T PSKNR 12		38	300	60	27	50	
25	A25R PSKNL 12	L	23	200	36	17	32	
32	A32S PSKNL 12		30	250	50	22	40	
40	A40T PSKNL 12		38	300	60	27	50	

Ordering example: 1 piece A25R PSKNR 12

	d_A	1	2	3	4	5	6	Set 1-4
SN.. 1204..	25 - 32	U 000456/HM-U	H 023441/H	S 000458/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853407/SORT
SN.. 1204..	40	U 000456/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853408/SORT

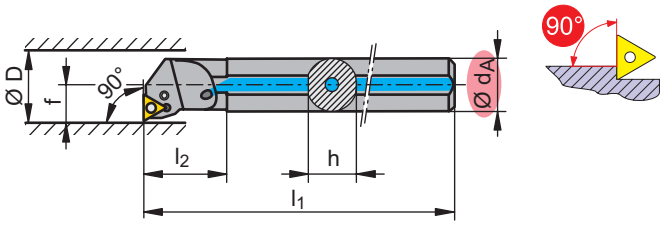

A58-A59


A79-A80


A87

PTFN...





Version A with coolant hole

Version S without coolant hole

Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
16	A16M PTFNR 11	R	15	150	29	11	20	TN.. 1103..
20	A20Q PTFNR 11		18.5	180	32	13	25	TN.. 1103..
25	A25R PTFNR 16		23	200	36	17	32	TN.. 1604..
25	S25T PTFNR 16		23	300	17.5	17	32	TN.. 1604..
32	A32S PTFNR 16		30	250	50	22	40	TN.. 1604..
40	A40T PTFNR 22		38	300	60	27	50	TN.. 2204..
50	S50W PTFNR 22		47	450	35	35	63	TN.. 2204..
16	A16M PTFNL 11	L	15	150	29	11	20	TN.. 1103..
20	A20Q PTFNL 11		18.5	180	32	13	25	TN.. 1103..
25	A25R PTFNL 16		23	200	36	17	32	TN.. 1604..
32	A32S PTFNL 16		30	250	50	22	40	TN.. 1604..
40	A40T PTFNL 22		38	300	60	27	50	TN.. 2204..

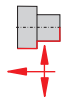
Ordering example: 1 piece A16M PTFNR 11

Version A

	d_A	1	2	3	4	5	6	Set 1-4
TN.. 1103..	16 - 20		H 011446/H	S 011429/S ISK 2MM			7882301/SW 2	7853412/SORT
TN.. 1604..	25 - 32	U 013950/HM-U	H 018440/H	S 018420/S ISK 2,5MM	R 018463/R	M 018470/MO	7882201/SW 2,5	7853413/SORT
TN.. 2204..	40	U 021953/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853414/SORT

Version S

	d_A	1	2	3	4	5	6	Set 1-4
TN.. 1604..	25	U 013950/HM-U	H 018440/H	S 018420/S ISK 2,5MM	R 018463/R	M 018470/MO	7853413/SORT	7882201/SW 2,5
TN.. 2204..	50	U 021953/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7853414/SORT	7882202/SW 3

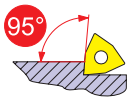

A58-A59

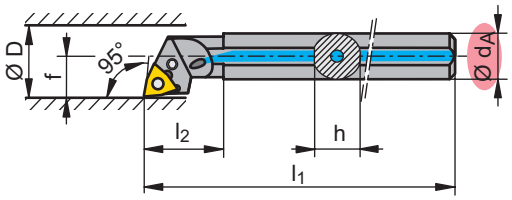

A81-A82


A87

PWLN...





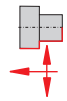


Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
16	A16M PWLNR 06	R	15	150		11	21	WN.. 0604..
20	A20Q PWLNR 06-1		19	180		13	25	WN.. 0604..
25	A25R PWLNR 06		23	200		17	32	WN.. 0604..
32	A32S PWLNR 06		30	250		22	40	WN.. 0604..
	A32S PWLNR 08		30	250	50	22	40	WN.. 0804..
40	A40T PWLNR 08		38	300	60	27	50	WN.. 0804..
16	A16M PWLNL 06	L	15	150		11	21	WN.. 0604..
20	A20Q PWLNL 06-1		19	180		13	25	WN.. 0604..
25	A25R PWLNL 06		23	200		17	32	WN.. 0604..
32	A32S PWLNL 06		30	250		22	40	WN.. 0604..
	A32S PWLNL 08		30	250	50	22	40	WN.. 0804..
40	A40T PWLNL 08		38	300	60	27	50	WN.. 0804..

Ordering example: 1 piece A16M PWLNR 06

	d_A	1	2	3	4	5	6	Set 1-4
WN.. 0604..	16 - 20		7853608/H	7853712/S			7882301/SW 2	7853425/SORT
WN.. 0604..	25 - 32	7853520/HM-U	H 018440/H	S 018420/S ISK 2,5MM	7853806/R	M 018470/MO	7882201/SW 2,5	7853423/SORT
WN.. 0804..	32 - 40	7853519/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853422/SORT



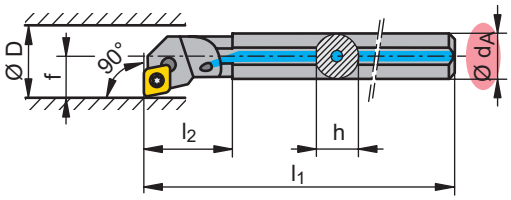
A58-A59

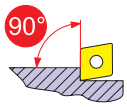


A84-A85

SCFC...





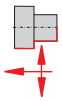


Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
8	A08F SCFCR 06	R	7.6	80	17	5	11	CC.. 0602..
10	A10H SCFCR 06		9.5	100	19	7	13	
12	A12K SCFCR 06		11.5	125	22	9	16	
8	A08F SCFCL 06	L	7.6	80	17	5	11	
10	A10H SCFCL 06		9.5	100	19	7	13	
12	A12K SCFCL 06		11.5	125	22	9	16	

Ordering example: 1 piece A08F SCFCR 06

	d_A	1	2	Set 1-2
CC.. 0602..	8 - 12	7883204/M2,5X5/T08	7724106/TORX T08	7883909/SORT

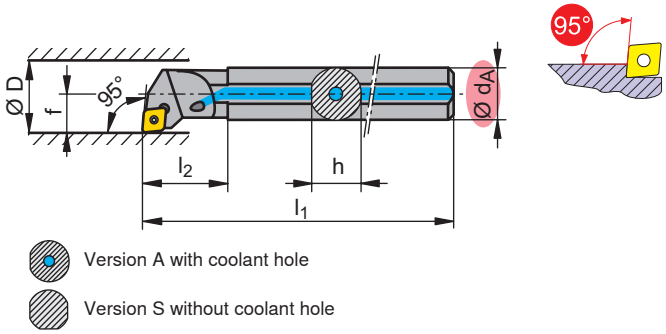

A58-A59


A88-A89


A97

SCLC...





Version A with coolant hole

Version S without coolant hole

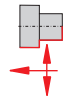
Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
8	A08F SCLCR 06	R	7.6	80	17	5	11	CC.. 0602..
	S08H SCLCR 06		7.2	100	8	5	11	CC.. 0602..
10	A10H SCLCR 06		9.5	100	19	7	13	CC.. 0602..
	S10K SCLCR 06		9	125	10	7	13	CC.. 0602..
12	A12K SCLCR 06		11.5	125	22	9	16	CC.. 0602..
	S12Q SCLCR 06		11	180	10	9	16	CC.. 0602..
16	A16M SCLCR 09		15	150	29	11	20	CC.. 09T3..
	S16R SCLCR 09		14.5	200	16	11	20	CC.. 09T3..
20	A20Q SCLCR 09		18.5	180	32	13	25	CC.. 09T3..
	S20S SCLCR 09		18	250	16	13	25	CC.. 09T3..
25	A25R SCLCR 09		23	200	36	17	32	CC.. 09T3..
	S25T SCLCR 09		23	300	16	17	32	CC.. 09T3..
32	A32S SCLCR 12		30	250	50	22	40	CC.. 1204..
40	A40T SCLCR 12		38	300	60	27	50	CC.. 1204..

Ordering example: 1 piece A08F SCLCR 06

		Version A					
	d_A	1	2	3	4	5	Set 1-2
CC.. 0602..	**8 - 12**	7883204/M2,5X5/T08			7724106/TORX T08		7883909/SORT
CC.. 09T3..	**16**	7722111/M3,5X7,2/T15			7724103/TORX T15		7883910/SORT
CC.. 09T3..	**25**	7883209/M3,5X8,6/T15			7724103/TORX T15		7883914/SORT
CC.. 1204..	**32 - 40**	7883202/M4,5X12/T15	7883002/HM-U	7883101/B M 4,5		7883301/KOMBI T15	7883901/SORT

		Version S		
	d_A	1	2	Set 1-2
CC.. 0602..	8 - 12	7883204/M2,5X5/T08	7724106/TORX T08	7883909/SORT
CC.. 09T3..	16 - 20	7722111/M3,5X7,2/T15	7724103/TORX T15	7883910/SORT
CC.. 09T3..	25	7815102/M3,5X11,0/T15	7724103/TORX T15	7883906/SORT

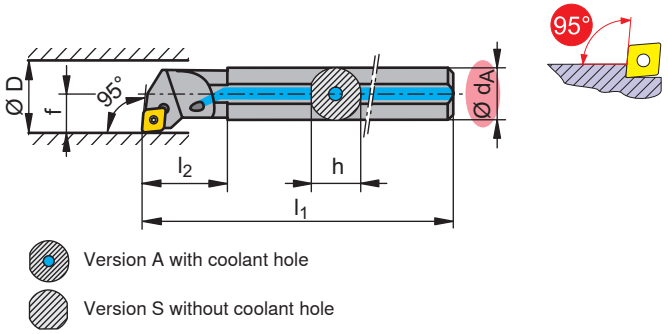

A58-A59


A88-A89


A97

SCLC...





Version A with coolant hole

Version S without coolant hole

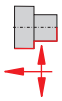
Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	CC.. 0602..
8	A08F SCLCL 06	L	7.6	80	17	5	11	CC.. 0602..
	S08H SCLCL 06		7.2	100	8	5	11	CC.. 0602..
10	A10H SCLCL 06		9.5	100	19	7	13	CC.. 0602..
	S10K SCLCL 06		9	125	10	7	13	CC.. 0602..
12	A12K SCLCL 06		11.5	125	22	9	16	CC.. 0602..
	S12Q SCLCL 06		11	180	10	9	16	CC.. 0602..
16	A16M SCLCL 09		15	150	29	11	20	CC.. 09T3..
	S16R SCLCL 09		14.5	200	16	11	20	CC.. 09T3..
20	A20Q SCLCL 09		18.5	180	32	13	25	CC.. 09T3..
	S20S SCLCL 09		18	250	16	13	25	CC.. 09T3..
25	A25R SCLCL 09		23	200	36	17	32	CC.. 09T3..
	S25T SCLCL 09		23	300	16	17	32	CC.. 09T3..
32	A32S SCLCL 12		30	250	50	22	40	CC.. 1204..
40	A40T SCLCL 12		38	300	60	27	50	CC.. 1204..

Ordering example: 1 piece A08F SCLCL 06

		Version A					
	d_A	1	2	3	4	5	Set 1-2
CC.. 0602..	**8 - 12**	7883204/M2,5X5/T08			7724106/TORX T08		7883909/SORT
CC.. 09T3..	**16**	7722111/M3,5X7,2/T15			7724103/TORX T15		7883910/SORT
CC.. 09T3..	**25**	7883209/M3,5X8,6/T15			7724103/TORX T15		7883914/SORT
CC.. 1204..	**32 - 40**	7883202/M4,5X12/T15	7883002/HM-U	7883101/B M 4,5		7883301/KOMBI T15	7883901/SORT

		Version S		
	d_A	1	2	Set 1-2
CC.. 0602..	8 - 12	7883204/M2,5X5/T08	7724106/TORX T08	7883909/SORT
CC.. 09T3..	16 - 20	7722111/M3,5X7,2/T15	7724103/TORX T15	7883910/SORT
CC.. 09T3..	25	7815102/M3,5X11,0/T15	7724103/TORX T15	7883906/SORT

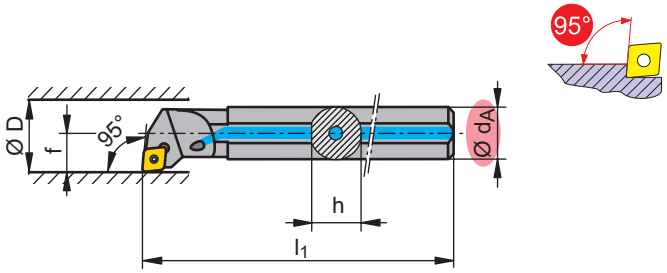

A58-A59


A88-A89


A97

SCLC...
with carbide shank



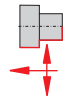


Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	f [mm]	D_{min} [mm]	
8	E08H SCLCR 06	R	7.6	100	6	11	CC.. 0602..
10	E10K SCLCR 06		9	125	7	13	CC.. 0602..
12	E12Q SCLCR 06		11.5	180	9	16	CC.. 0602..
16	E16R SCLCR 09		15	200	11	20	CC.. 09T3..
20	E20S SCLCR 09		18.5	250	13	25	CC.. 09T3..
25	E25T SCLCR 09		23	300	17	32	CC.. 09T3..
8	E08H SCLCL 06	L	7.6	100	6	11	CC.. 0602..
10	E10K SCLCL 06		9	125	7	13	CC.. 0602..
12	E12Q SCLCL 06		11.5	180	9	16	CC.. 0602..
16	E16R SCLCL 09		15	200	11	20	CC.. 09T3..
20	E20S SCLCL 09		18.5	250	13	25	CC.. 09T3..
25	E25T SCLCL 09		23	300	17	32	CC.. 09T3..

Ordering example: 1 piece E08H SCLCR 06

	d_A	1	2	Set 1-2
CC.. 0602..	8 - 12	7883204/M2,5X5/T08	7724106/TORX T08	7883909/SORT
CC.. 09T3..	16	7722111/M3,5X7,2/T15	7724103/TORX T15	7883910/SORT
CC.. 09T3..	20	7883209/M3,5X8,6/T15	7724103/TORX T15	7883914/SORT
CC.. 09T3..	25	7815102/M3,5X11,0/T15	7724103/TORX T15	7883906/SORT

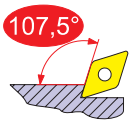

A58-A59

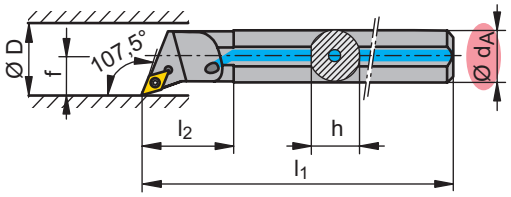

A88-A89


A97

SDQC...





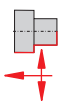


Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
12	A12K SDQCR 07	R	11.5	125	22	9	16	DC.. 0702..
16	A16M SDQCR 07		15	150	29	11	20	DC.. 0702..
20	A20Q SDQCR 07		18.5	180	32	13	25	DC.. 0702..
25	A25R SDQCR 11		23	200	36	17	32	DC.. 11T3..
32	A32S SDQCR 11		30	250	50	22	40	DC.. 11T3..
40	A40T SDQCR 11		38	300	60	27	50	DC.. 11T3..
12	A12K SDQCL 07	L	11.5	125	22	9	16	DC.. 0702..
16	A16M SDQCL 07		15	150	29	11	20	DC.. 0702..
20	A20Q SDQCL 07		18.5	180	32	13	25	DC.. 0702..
25	A25R SDQCL 11		23	200	36	17	32	DC.. 11T3..
32	A32S SDQCL 11		30	250	50	22	40	DC.. 11T3..
40	A40T SDQCL 11		38	300	60	27	50	DC.. 11T3..

Ordering example: 1 piece A12K SDQCR 07

	d_A	1	2	3	4	5	Set 1-5
DC.. 0702..	12 - 20	7815101/M2,5X6,0/T08			7724106/TORX T08		7815902/SORT
DC.. 11T3..	25	7883209/M3,5X8,6/T15			7724103/TORX T15		7883914/SORT
DC.. 11T3..	32 - 40	7815102/M3,5X11,0/T15	7815000/HM-U	7883102/B M 3,5		7883301/KOMBI T15	7815900/SORT

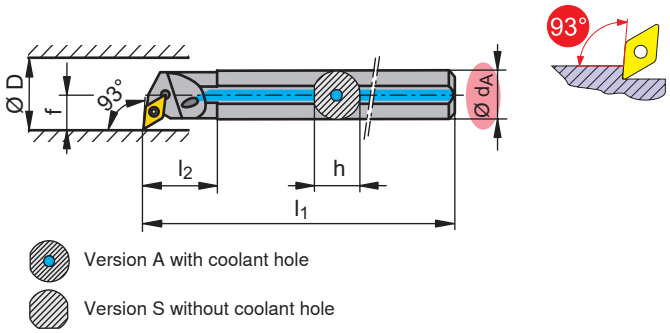

A58-A59


A90-A91


A97

SDUC...





Version A with coolant hole

Version S without coolant hole

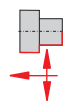
Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
12	A12K SDUCR 07		11.5	125	22	9	16	DC.. 0702..
	S12Q SDUCR 07		11	180	12.5	9	16	DC.. 0702..
16	A16M SDUCR 07		15	150	29	11	20	DC.. 0702..
	S16R SDUCR 07		14.5	200	16.5	11	20	DC.. 0702..
20	A20Q SDUCR 07		18.5	180	32	13	25	DC.. 0702..
	S20S SDUCR 07		18	250	20.5	13	25	DC.. 0702..
	A20Q SDUCR 11	R	18.5	180	32	13	25	DC.. 11T3..
	S20S SDUCR 11		18	250	16	13	25	DC.. 11T3..
25	A25R SDUCR 11		23	200	36	17	32	DC.. 11T3..
	S25T SDUCR 11		23	300	26	17	32	DC.. 11T3..
32	A32S SDUCR 11		30	250	50	22	40	DC.. 11T3..
	S32U SDUCR 11		30	350	33	22	40	DC.. 11T3..
40	A40T SDUCR 11		38	300	60	27	50	DC.. 11T3..

Ordering example: 1 piece A12K SDUCR 07

		Version A					
	d_A	1	2	3	4	5	Set 1-5
DC.. 0702..	**12 - 20**	7815101/M2,5X6,0/T08			7724106/TORX T08		7815902/SORT
DC.. 11T3..	**20**	7722111/M3,5X7,2/T15			7724103/TORX T15		7883914/SORT
DC.. 11T3..	**25**	7883209/M3,5X8,6/T15			7724103/TORX T15		7815900/SORT
DC.. 11T3..	**32 - 40**	7815102/M3,5X11,0/T15	7815000/HM-U	7883102/B M 3,5		7883301/KOMBI T15	7815900/SORT

		Version S					
	d_A	1	2	3	4	5	Set 1-5
DC.. 0702..	**12 - 16**	7815101/M2,5X6,0/T08			7724106/TORX T08		7815902/SORT
DC.. 11T3..	**25**	7815102/M3,5X11,0/T15	7815000/HM-U	7883102/B M 3,5		7883301/KOMBI T15	7815900/SORT

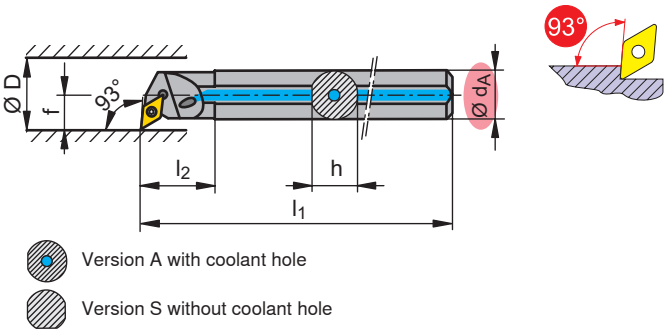

A58-A59


A90-A91


A97

SDUC...





Version A with coolant hole

Version S without coolant hole

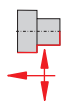
Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
12	A12K SDUCL 07	L	11.5	125	22	9	16	DC.. 0702..
	S12Q SDUCL 07		11	180	12.5	9	16	DC.. 0702..
16	A16M SDUCL 07		15	150	29	11	20	DC.. 0702..
	S16R SDUCL 07		14.5	200	16.5	11	20	DC.. 0702..
20	A20Q SDUCL 07		18.5	180	32	13	25	DC.. 0702..
	A20Q SDUCL 11		18.5	180	32	13	25	DC.. 11T3..
25	A25R SDUCL 11		23	200	36	17	32	DC.. 11T3..
	S25T SDUCL 11		23	300	26	17	32	DC.. 11T3..
32	A32S SDUCL 11		30	250	50	22	40	DC.. 11T3..
40	A40T SDUCL 11		38	300	60	27	50	DC.. 11T3..

Ordering example: 1 piece A12K SDUCL 07

		Version A					
	d_A	1	2	3	4	5	Set 1-5
DC.. 0702..	12 - 20	7815101/M2,5X6,0/T08			7724106/TORX T08		7815902/SORT
DC.. 11T3..	20	7722111/M3,5X7,2/T15			7724103/TORX T15		7883914/SORT
DC.. 11T3..	25	7883209/M3,5X8,6/T15			7724103/TORX T15		7815900/SORT
DC.. 11T3..	32 - 40	7815102/M3,5X11,0/T15	7815000/HM-U	7883102/B M 3,5		7883301/KOMBI T15	7815900/SORT

		Version S					
	d_A	1	2	3	4	5	Set 1-5
DC.. 0702..	12 - 16	7815101/M2,5X6,0/T08			7724106/TORX T08		7815902/SORT
DC.. 11T3..	25	7815102/M3,5X11,0/T15	7815000/HM-U	7883102/B M 3,5		7883301/KOMBI T15	7815900/SORT

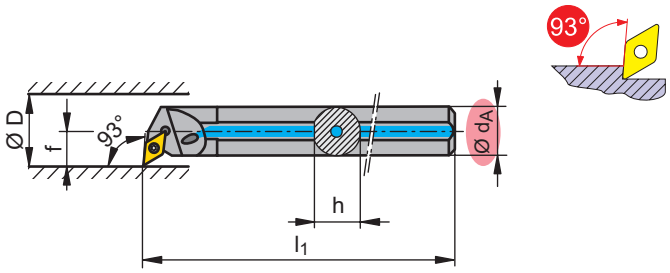

A58-A59


A90-A91


A97

SDUC...
with carbide shank



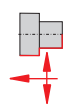


Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	f [mm]	D_{min} [mm]	
12	E12Q SDUCR 07	R	11.5	180	9	16	DC.. 0702..
16	E16R SDUCR 07		15	200	11	20	DC.. 0702..
20	E20S SDUCR 11		18.5	250	13	25	DC.. 11T3..
25	E25T SDUCR 11		23	300	17	32	DC.. 11T3..
12	E12Q SDUCL 07	L	11.5	180	9	16	DC.. 0702..
16	E16R SDUCL 07		15	200	11	20	DC.. 0702..
20	E20S SDUCL 11		18.5	250	13	25	DC.. 11T3..
25	E25T SDUCL 11		23	300	17	32	DC.. 11T3..

Ordering example: 1 piece E12Q SDUCR 07

	d_A	1	2	Set 1-2
DC.. 0702..	12 - 16	7815101/M2,5X6,0/T08	7724106/TORX T08	7815902/SORT
DC.. 11T3..	20	7883209/M3,5X8,6/T15	7724103/TORX T15	7883914/SORT
DC.. 11T3..	25	7815102/M3,5X11,0/T15	7724103/TORX T15	7883906/SORT

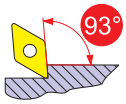

A58-A59

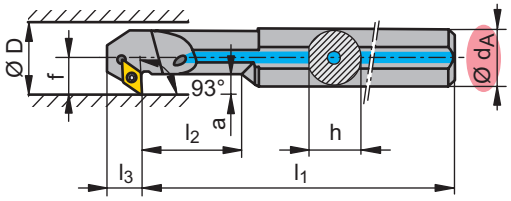

A90-A91


A97

SDXC...





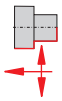


Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	D_{min} [mm]	a [mm]	
12	A12K SDXCR 07	R	11.5	125	24	12.0	9	16	4.00	DC.. 0702..
16	A16M SDXCR 07		15	150	36	12.0	11	20	4.00	DC.. 0702..
20	A20Q SDXCR 11		18.5	180	40	16.5	13	25	6.20	DC.. 11T3..
25	A25R SDXCR 11		23	200	50	16.8	17	32	9.20	DC.. 11T3..
12	A12K SDXCL 07	L	11.5	125	24	12.0	9	16	4.00	DC.. 0702..
16	A16M SDXCL 07		15	150	36	12.0	11	20	4.00	DC.. 0702..
20	A20Q SDXCL 11		18.5	180	40	16.5	13	25	6.20	DC.. 11T3..
25	A25R SDXCL 11		23	200	50	16.8	17	32	9.20	DC.. 11T3..

Ordering example: 1 piece A12K SDXCR 07

	d_A	1	2	Set 1-2
DC.. 0702..	12 - 16	7815101/M2,5X6,0/T08	7724106/TORX T08	7815902/SORT
DC.. 11T3..	20 - 25	7883209/M3,5X8,6/T15	7724103/TORX T15	7883914/SORT

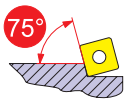

A58-A59

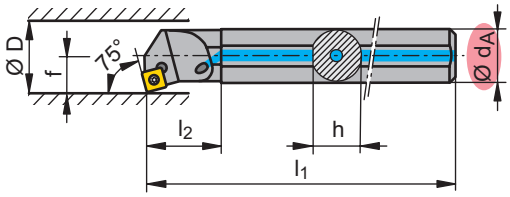

A90-A91


A97

SSKC...





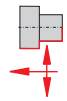


Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
16	A16M SSKCR 09	R	15	150	29	11	20	SC.. 09T3..
20	A20Q SSKCR 09		18.5	180	32	13	25	
25	A25R SSKCR 09		23	200	36	17	32	
16	A16M SSKCL 09	L	15	150	29	11	20	
20	A20Q SSKCL 09		18.5	180	32	13	25	
25	A25R SSKCL 09		23	200	36	17	32	

Ordering example: 1 piece A16M SSKCR 09

	d_A	1	2	Set 1-2
SC.. 09T3..	16	7722111/M3,5X7,2/T15	7724103/TORX T15	7883910/SORT
SC.. 09T3..	20 - 25	7883209/M3,5X8,6/T15	7724103/TORX T15	7883914/SORT



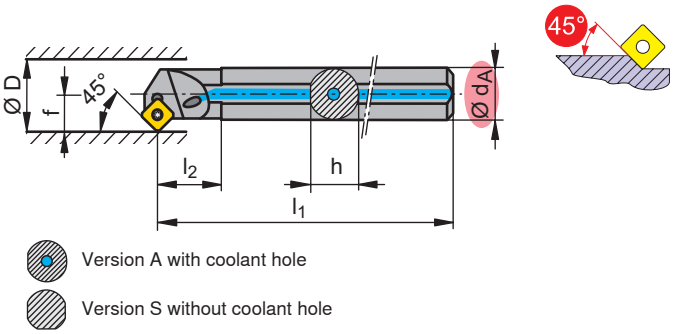
A58-A59



A93

SSSC...





Version A with coolant hole

Version S without coolant hole

Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
16	A16M SSSCR 09	R	15	150	29	11	20	SC.. 09T3..
	S16R SSSCR 09		14.5	200	8.4	11	20	SC.. 09T3..
20	A20Q SSSCR 09		18.5	180	32	13	25	SC.. 09T3..
25	A25R SSSCR 09		23	200	36	17	32	SC.. 09T3..
32	A32S SSSCR 12		30	250	50	22	40	SC.. 1204..
40	A40T SSSCR 12		38	300	60	27	50	SC.. 1204..
16	A16M SSSCL 09	L	15	150	29	11	20	SC.. 09T3..
20	A20Q SSSCL 09		18.5	180	32	13	25	SC.. 09T3..
25	A25R SSSCL 09		23	200	36	17	32	SC.. 09T3..
32	A32S SSSCL 12		30	250	50	22	40	SC.. 1204..
40	A40T SSSCL 12		38	300	60	27	50	SC.. 1204..

Ordering example: 1 piece A16M SSSCR 09

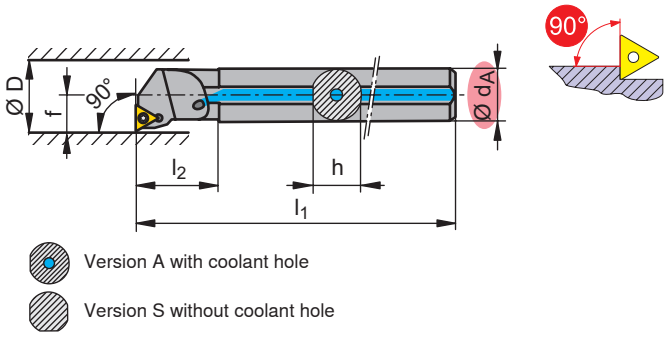
		Version A					
	d_A	1	2	3	4	5	Set 1-5
SC.. 09T3..	16	7722111/M3,5X7,2/T15			7724103/TORX T15		7883910/SORT
SC.. 09T3..	20 - 25	7883209/M3,5X8,6/T15			7724103/TORX T15		7883914/SORT
SC.. 1204..	32 - 40	7883202/M4,5X12/T15	7883004/HM-U	7883101/B M 4,5		7883301/KOMBI T15	7883902/SORT

		Version S		
	d_A	1	2	Set 1-5
SC.. 09T3..	16	7722111/M3,5X7,2/T15	7724103/TORX T15	7883910/SORT

A58-A59
A93

STFC...



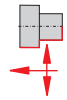


Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
10	A10H STFCR 09	R	9.5	100	19	7	13	TC.. 0902..
12	A12K STFCR 11		11.5	125	22	9	16	TC.. 1102..
16	A16M STFCR 11		15	150	29	11	20	TC.. 1102..
	S16R STFCR 11		14.5	200	13	11	20	TC.. 1102..
20	A20Q STFCR 11		18.5	180	32	13	25	TC.. 1102..
	S20S STFCR 11		18	250	13	13	25	TC.. 1102..
25	A25R STFCR 16		23	200	36	17	32	TC.. 16T3..
32	A32S STFCR 16		30	250	50	22	40	TC.. 16T3..
40	A40T STFCR 16		38	300	60	27	50	TC.. 16T3..
10	A10H STFCL 09	L	9.5	100	19	7	13	TC.. 0902..
12	A12K STFCL 11		11.5	125	22	9	16	TC.. 1102..
16	A16M STFCL 11		15	150	29	11	20	TC.. 1102..
20	A20Q STFCL 11		18.5	180	32	13	25	TC.. 1102..
25	A25R STFCL 16		23	200	36	17	32	TC.. 16T3..
32	A32S STFCL 16		30	250	50	22	40	TC.. 16T3..
40	A40T STFCL 16		38	300	60	27	50	TC.. 16T3..

Ordering example: 1 piece A10H STFCR 09

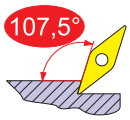
		Versions A + S					
	d_A	1	2	3	4	5	Set 1-5
TC.. 0902..	**10**	7722113/M2,2X5/T07			7724105/TORX T07		7883908/SORT
TC.. 1102..	**12 - 20**	7815101/M2,5X6,0/T08			7724106/TORX T08		7815902/SORT
TC.. 16T3..	**25 - 40**	7815102/M3,5X11,0/T15	7883005/HM-U	7883102/B M 3,5		7883301/KOMBI T15	7883905/SORT

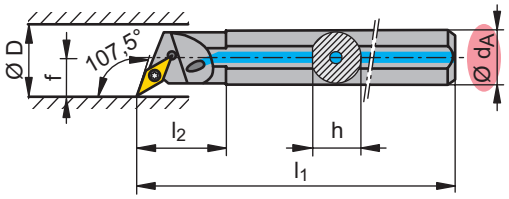

A58-A59


A94

SVQC...





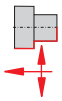


Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
16	A16M SVQCR 11	R	15	150	29	11	20	VC.. 1103..
20	A20Q SVQCR 11		18.5	180	32	13	25	VC.. 1103..
25	A25R SVQCR 11		23	200	36	17	32	VC.. 1103..
32	A32S SVQCR 16		30	250	50	22	40	VC.. 1604..
40	A40T SVQCR 16		38	300	60	27	50	VC.. 1604..
16	A16M SVQCL 11	L	15	150	29	11	20	VC.. 1103..
20	A20Q SVQCL 11		18.5	180	32	13	25	VC.. 1103..
25	A25R SVQCL 11		23	200	36	17	32	VC.. 1103..
32	A32S SVQCL 16		30	250	50	22	40	VC.. 1604..
40	A40T SVQCL 16		38	300	60	27	50	VC.. 1604..

Ordering example: 1 piece A16M SVQCR 11

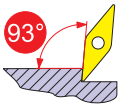
	d_A	1	2	3	4	5	Set 1-5
VC.. 1103..	**16 - 25**	7815101/M2,5X6,0/T08			7724106/TORX T08		7815902/SORT
VC.. 1604..	**32 - 40**	7815102/M3,5X11,0/T15	7815002/HM-U	7883102/B M 3,5		7883301/KOMBI T15	7815901/SORT

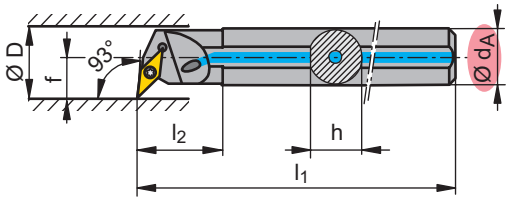

A58-A59


A95-A96

SVUC...





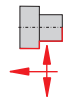


Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
16	A16M SVUCR 11		15	150	29	11	20	VC.. 1103..
20	A20Q SVUCR 11		18.5	180	32	13	25	VC.. 1103..
25	A25R SVUCR 11	R	23	200	36	17	32	VC.. 1103..
32	A32S SVUCR 16		30	250	50	22	40	VC.. 1604..
40	A40T SVUCR 16		38	300	60	27	50	VC.. 1604..
16	A16M SVUCL 11		15	150	29	11	20	VC.. 1103..
20	A20Q SVUCL 11		18.5	180	32	13	25	VC.. 1103..
25	A25R SVUCL 11	L	23	200	36	17	32	VC.. 1103..
32	A32S SVUCL 16		30	250	50	22	40	VC.. 1604..
40	A40T SVUCL 16		38	300	60	27	50	VC.. 1604..

Ordering example: 1 piece A16M SVUCR 11

	d_A	1	2	3	4	5	Set 1-5
VC.. 1103..	**16 - 25**	7815101/M2,5X6,0/T08			7724106/TORX T08		7815902/SORT
VC.. 1604..	**32 - 40**	7815102/M3,5X11,0/T15	7815002/HM-U	7883102/B M 3,5		7883301/KOMBI T15	7815901/SORT

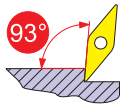

A58-A59

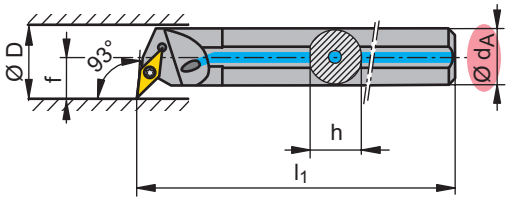

A95-A96


A97

SVUC
with carbide shank





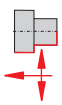


Picture shows right-hand version

d_A [mm]	Type, description	LNR	h [mm]	l_1 [mm]	f [mm]	D_{min} [mm]	
16	E16R SVUCR 11	R	15	200	11	20	VC.. 1103..
20	E20S SVUCR 11		18.5	250	13	25	
25	E25T SVUCR 11		23	300	17	32	
16	E16R SVUCL 11	L	15	200	11	20	
20	E20S SVUCL 11		18.5	250	13	25	
25	E25T SVUCL 11		23	300	17	32	

Ordering example: 1 piece E16R SVUCR 11

	d_A	1	2	Set 1-2
VC.. 1103..	16 - 25	7815101/M2,5X6,0/T08	7724106/TORX T08	7815902/SORT

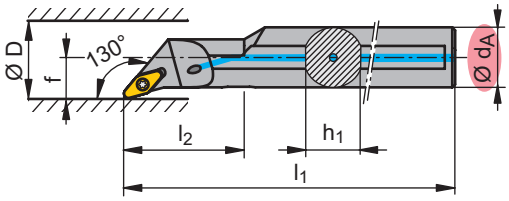

A58-A59


A95-A96


A97

SVXC/P





Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
40	A40S SVXCR 22	R	37	250	80	27	45	VC.. 2205..
	A40S SVXPR 22-16		37	250	80	27	45	VP.. 2205..
	A40S SVXCL 22	L	37	250	80	27	45	VC.. 2205..
	A40S SVXPL 22-16		37	250	80	27	45	VP.. 2205..

Ordering example: 1 piece A40S SVXCR 22

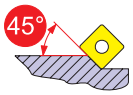
	d_A	1	2	3	
VC.. 2205..	40	7883202/M4,5X12/T15	7724103/TORX T15	7896900/O-RING 40	
VP.. 2205..	40	7883202/M4,5X12/T15	7724103/TORX T15	7896900/O-RING 40	

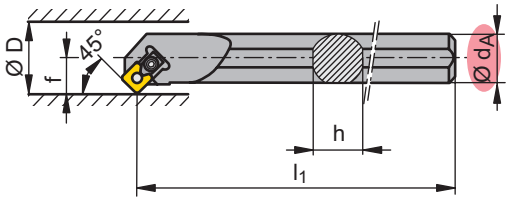


A58-A59 A95-A96 A97

MSSC...





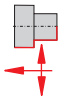


Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	f [mm]	D_{min} [mm]		
32	S32S MSSCR 12	R	30	250	22	40		SC.. 1204..
	S32S MSSCL 12	L	30	250	22	40		

Ordering example: 1 piece S32S MSSCR 12

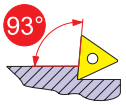
	d_A	1	2	3	4	5	Set 1-4
SC.. 1204..	32	7880010/HM-U	7880407/PS	7880608/KE	7880103/K	7724104/TORX T20	7880914/SORT

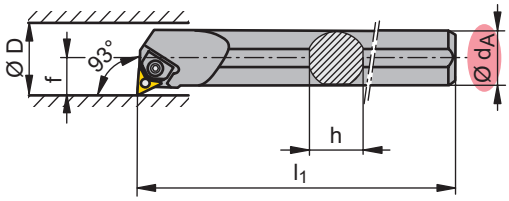

A58-A59


A98

MTUC...





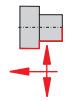


Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	f [mm]	D_{min} [mm]		
32	S32S MTUCR 16	R	30	250	22	40		TC.. 1604..
40	S40T MTUCR 16	R	38	300	27	50		
32	S32S MTUCL 16	L	30	250	22	40		

Ordering example: 1 piece S32S MTUCR 16

	d_A	1	2	3	4	5	Set 1-4
TC.. 1604..	32 - 40	7880008/HM-U	7880408/PS	7880606/KE	7880101/K	7724104/TORX T20	7880912/SORT



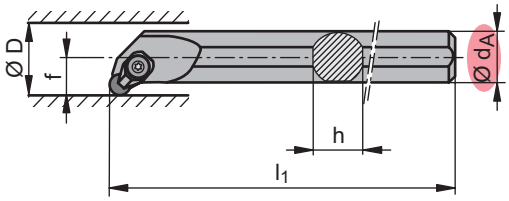
A58-A59



A98

CRSN...



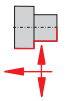


Picture shows right-hand version

d_A [mm]	Type, description	LNR	h [mm]	l_1 [mm]	f [mm]	D_{min} [mm]	
32	S32U CRSNR 09	R	30	350	22	40	RN.. 0903..

Ordering example: 1 piece S32U CRSNR 09

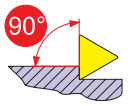
	d_A	1	2	3	4	5	Set 1-4
RN.. 09T3..	32	7485860/M6,0X16,2/T20	7485865/SP	7817008/HM-U	7480902/KN 2,6x10	7724104/TORX T20	7817911/SORT

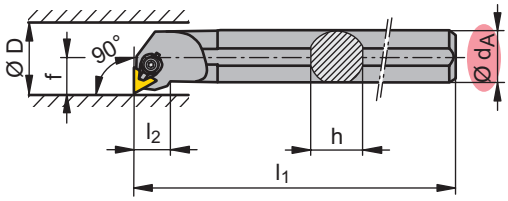

A58-A59


A101

CTFP...





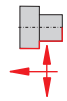


Picture shows right-hand version

d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
12	S12Q CTFPR 11	R	11	180	15	9	16	TP.. 1103..
16	S16R CTFPR 11		14.5	200	15	11	20	TP.. 1103..
20	S20S CTFPR 11		18	250	15	13	25	TP.. 1103..
25	S25T CTFPR 16		23	300	20	17	32	TP.. 1603..
32	S32U CTFPR 16		30	350	20	22	40	TP.. 1603..
12	S12Q CTFPL 11	L	11	180	15	9	16	TP.. 1103..
16	S16R CTFPL 11		14.5	200	15	11	20	TP.. 1103..
20	S20S CTFPL 11		18	250	15	13	25	TP.. 1103..
25	S25T CTFPL 16		23	300	20	17	32	TP.. 1603..
32	S32U CTFPL 16		30	350	20	22	40	TP.. 1603..

Ordering example: 1 piece S12Q CTFPR 11

	d_A	1	2	3	4	5	Set 1-4
TP.. 1103..	12 - 20	7830002/M4,0X10/T15	7830001/SP			7724103/TORX T15	7830005/SORT
TP.. 1603..	25 - 32	7485860/M6,0X16,2/T20	7485865/SP	7480316/HM-U	7480901/KN 3x10	7724104/TORX T20	7485915/SORT

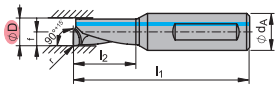


A58-A59



A108

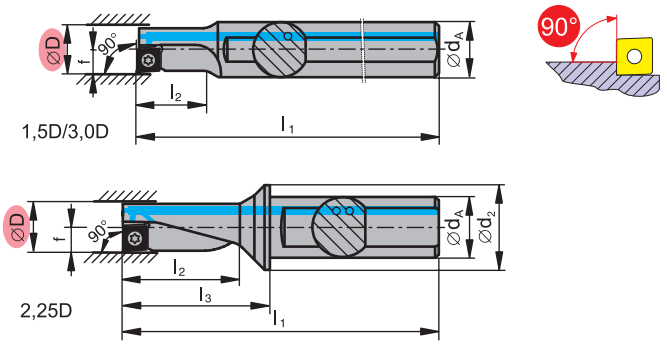
			TSM30	CM45	RL	D [mm]	d_A [mm]	l_1 [mm]	l_2 [mm]	r [mm]	f [mm]
-27		EC 04L-2.25D-27	●		L	4	6	35	9	0.2	2
		EC 04L-4.00D-27	●		L	4	6	41	16	0.2	2
		EC 04R-2.25D-27	●		R	4	6	35	9	0.2	2
		EC 04R-4.00D-27	●		R	4	6	41	16	0.2	2
		EC 05L-2.25D-27	●		L	5	6	37	11.25	0.2	2.5
		EC 05L-4.00D-27	●		L	5	6	45	20	0.2	2.5
		EC 05R-2.25D-27	●		R	5	6	37	11.25	0.2	2.5
		EC 05R-4.00D-27	●		R	5	6	45	20	0.2	2.5
		EC 06L-2.25D-27	●		L	6	8	38	13.5	0.2	3
		EC 06L-4.00D-27	●		L	6	8	49	24	0.2	3
		EC 06R-2.25D-27	●		R	6	8	38	13.5	0.2	3
		EC 06R-4.00D-27	●		R	6	8	49	24	0.2	3
		EC 07L-2.25D-27	●		L	7	8	42	15.75	0.2	3.5
		EC 07L-4.00D-27	●		L	7	8	53	28	0.2	3.5
		EC 07R-2.25D-27	●		R	7	8	42	15.75	0.2	3.5
		EC 07R-4.00D-27	●		R	7	8	53	28	0.2	3.5
		EC 08L-2.25D-27	●		L	8	8	45	18	0.2	4
		EC 08L-4.00D-27	●		L	8	8	57	32	0.2	4
		EC 08R-2.25D-27	●		R	8	8	45	18	0.2	4
		EC 08R-4.00D-27	●		R	8	8	57	32	0.2	4
EN		EC 04L-2.25D		●	L	4	6	35	9	0.2	2
		EC 04L-4.00D		●	L	4	6	41	16	0.2	2
		EC 04R-2.25D		●	R	4	6	35	9	0.2	2
		EC 04R-4.00D		●	R	4	6	41	16	0.2	2
		EC 05L-2.25D		●	L	5	6	37	11.25	0.2	2.5
		EC 05L-4.00D		●	L	5	6	45	20	0.2	2.5
		EC 05R-2.25D		●	R	5	6	37	11.25	0.2	2.5
		EC 05R-4.00D		●	R	5	6	45	20	0.2	2.5
		EC 06L-2.25D		●	L	6	8	38	13.5	0.2	3
		EC 06L-4.00D		●	L	6	8	49	24	0.2	3
		EC 06R-2.25D		●	R	6	8	38	13.5	0.2	3
		EC 06R-4.00D		●	R	6	8	49	24	0.2	3
		EC 07L-2.25D		●	L	7	8	42	15.75	0.2	3.5
		EC 07L-4.00D		●	L	7	8	53	28	0.2	3.5
		EC 07R-2.25D		●	R	7	8	42	15.75	0.2	3.5
		EC 07R-4.00D		●	R	7	8	53	28	0.2	3.5
		EC 08L-2.25D		●	L	8	8	45	18	0.2	4
		EC 08L-4.00D		●	L	8	8	57	32	0.2	4
		EC 08R-2.25D		●	R	8	8	45	18	0.2	4
		EC 08R-4.00D		●	R	8	8	57	32	0.2	4
			TSM30	CM45	RL	D	d_A	l_1	l_2	r	f



A16-A33
A58-A59
A258-A259

EC...





Picture shows right-hand version

D [mm]	Type, description	L R	d_A [mm]	d_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	
8	EC 08R-1.5D 04	R	12		80	12		4	XC.. 0401..
	EC 08R-2.25D 04		10	12	60	18	22.0	4	
	EC 08R-3.0D 04 H		12		80	24		4	
	EC 08L-1.5D 04	L	12		80	12		4	
	EC 08L-2.25D 04		10	12	60	18	22.0	4	
	EC 08L-3.0D 04 H		12		80	24		4	
10	EC 10R-1.5D 05	R	12		90	15		5	XC.. 0502..
	EC 10R-2.25D 05		12	16	69.5	22.5	27.5	5	
	EC 10R-3.0D 05 H		12		85	30		5	
	EC 10L-1.5D 05	L	12		90	15		5	
	EC 10L-2.25D 05		12	16	69.5	22.5	27.5	5	
	EC 10L-3.0D 05 H		12		85	30		5	

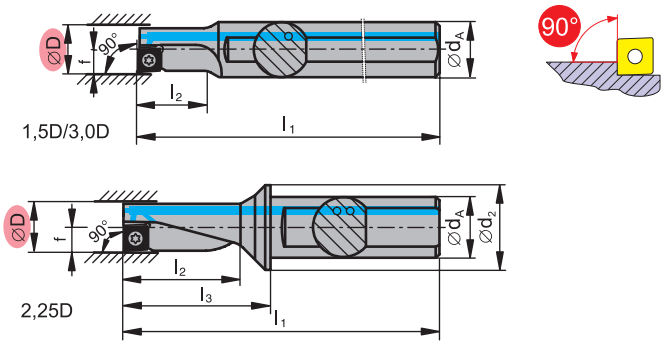
Ordering example: 1 piece EC 08R-1.5D 04

	D [mm]	10 pieces	1 piece	
XC.. 0401..	8	7815108/M1,8X3,4/T06	7883305/TORX T06	
XC.. 0502..	10	7815110/M2,0X4,0/T06	7883305/TORX T06	

A58-A59 A109+A111

EC...





Picture shows right-hand version

D [mm]	Type, description	L R	d_A [mm]	d_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	
12	EC 12R-1.5D 06	R	16		100	18		6	XC.. 0602..
	EC 12R-2.25D 06		16	20	78	27	33.0	6	
	EC 12R-3.0D 06 H		16		95	36		6	
	EC 12L-1.5D 06	L	16		100	18		6	
	EC 12L-2.25D 06		16	20	78	27	33.0	6	
	EC 12L-3.0D 06 H		16		95	36		6	
14	EC 14R-1.5D 07	R	16		110	21		7	XC.. 0703..
	EC 14R-2.25D 07		16	20	83.5	31.5	38.5	7	
	EC 14R-3.0D 07 H		16		100	42		7	
	EC 14L-1.5D 07	L	16		110	21		7	
	EC 14L-2.25D 07		16	20	83.5	31.5	38.5	7	
	EC 14L-3.0D 07 H		16		100	42		7	

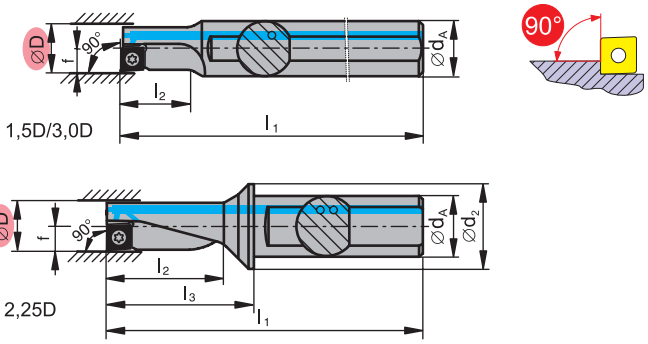
Ordering example: 1 piece EC 12R-1.5D 06

	D [mm]	10 pieces	1 piece	
XC.. 0602..	12	7722113/M2,2X5/T07	7724105/TORX T07	
XC.. 0703..	14	7815101/M2,5X6,0/T08	7724106/TORX T08	

A58-A59 A110-A111

EC...





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D [mm]	Type, description	L R	d_A [mm]	d_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	
16	EC 16R-1.5D 08	R	20		125	24		8	XC.. 0803..
	EC 16R-2.25D 08		20	25	94	36	44.0	8	
	EC 16R-3.0D 08 H		20		110	48		8	
	EC 16L-1.5D 08	L	20		125	24		8	
	EC 16L-2.25D 08		20	25	94	36	44.0	8	
	EC 16L-3.0D 08 H		20		110	48		8	
18	EC 18R-1.5D 09	R	25		135	27		9	XC.. 09T3..
	EC 18R-2.25D 09		25	32	109.5	40.5	53.5	9	
	EC 18R-3.0D 09 H		25		125	54		9	
	EC 18L-1.5D 09	L	25		135	27		9	
	EC 18L-2.25D 09		25	32	109.5	40.5	53.5	9	
	EC 18L-3.0D 09 H		25		125	54		9	

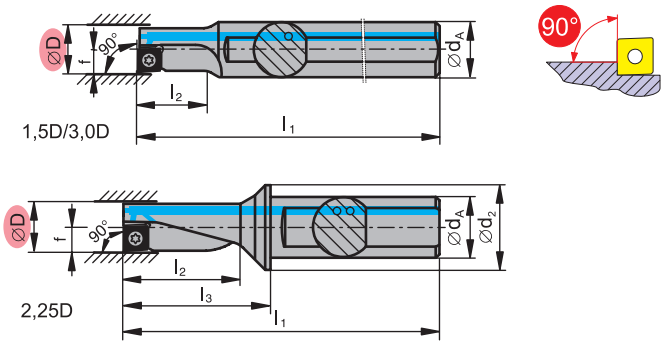
Ordering example: 1 piece EC 16R-1.5D 08

	D [mm]	10 pieces	1 piece	
XC.. 0803..	**16**	7883203/M3,0X7,3/T08	7724106/TORX T08	
XC.. 09T3..	**18**	7883203/M3,0X7,3/T08	7724106/TORX T08	

A58-A59 A110-A111

EC...





Picture shows right-hand version

D [mm]	Type, description	L R	d_A [mm]	d_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	
20	EC 20R-1.5D 10	R	25		150	30		10	XC.. 10T3..
	EC 20R-2.25D 10		25	32	111	45	55.0	10	
	EC 20R-3.0D 10 H		25		130	60		10	
	EC 20L-1.5D 10	L	25		150	30		10	
	EC 20L-2.25D 10		25	32	111	45	55.0	10	
	EC 20L-3.0D 10 H		25		130	60		10	
25	EC 25R-1.5D 13	R	32		180	37.5		12.5	XC.. 1304..
	EC 25R-2.25D 13		32	40	129	56.5	69.0	12.5	
	EC 25R-3.0D 13 H		32		150	75		12.5	
	EC 25L-1.5D 13	L	32		180	37.5		12.5	
	EC 25L-2.25D 13		32	40	129	56.5	69.0	12.5	
	EC 25L-3.0D 13 H		32		150	75		12.5	

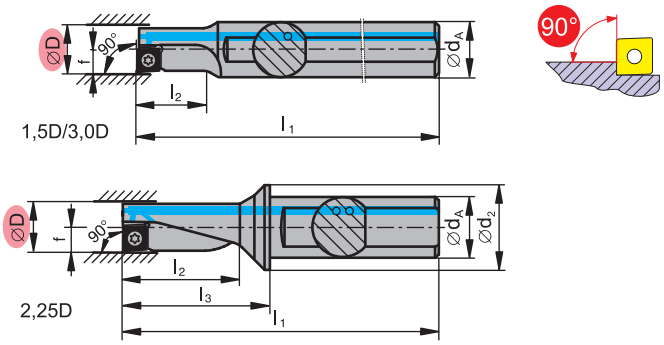
Ordering example: 1 piece EC 20R-1.5D 10

	D [mm]	10 pieces	1 piece	
XC.. 10T3..	**20**	7883209/M3,5X8,6/T15	7724103/TORX T15	
XC.. 1304..	**25**	7822114/M4,5X10,5/T20	7724104/TORX T20	

A58-A59 A110-A111

EC...





Picture shows right-hand version

D [mm]	Type, description	L R	d_A [mm]	d_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	
32	EC 32R-1.5D 17	R	40		200	48		16	XC.. 1705..
	EC 32R-2.25D 17		40	50	158	72	88.0	16	
	EC 32R-3.0D 17 H		40		185	96		16	
	EC 32L-1.5D 17	L	40		200	48		16	
	EC 32L-2.25D 17		40	50	158	72	88.0	16	
	EC 32L-3.0D 17 H		40		185	96		16	

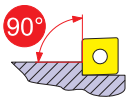
Ordering example: 1 piece EC 32R-1.5D 17

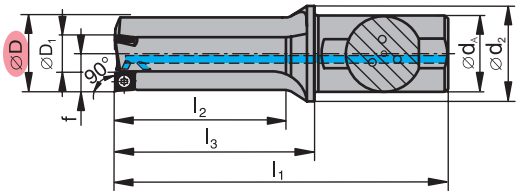
	D [mm]	10 pieces	1 piece	
XC.. 1705..	32	7822114/M4,5X10,5/T20	7724104/TORX T20	

A58-A59 A110-A111

ECR...





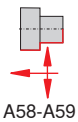


Picture shows right-hand version

D [mm]	Type, description	L R	D_1 [mm]	d_A [mm]	d_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	
40	ECR 4020R03-2.25D 10	R	20	40	50	175	90	105.0	20	XC.. 10T3..
	ECR 4020L03-2.25D 10	L	20	40	50	175	90	105.0	20	
60	ECR 6032R03-2.25D 17	R	32	40	70	232	135	162.0	30	XC.. 1705..
	ECR 6032L03-2.25D 17	L	32	40	70	232	135	162.0	30	

Ordering example: 1 piece ECR 4020R03-2.25D 10

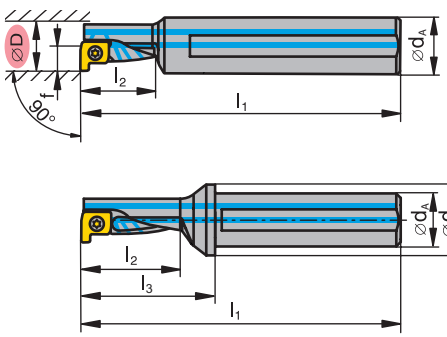
	D [mm]	10 pieces	1 piece	
XC.. 10T3..	**40**	7883209/M3,5X8,6/T15	7724103/TORX T15	
XC.. 1705..	**60**	7822114/M4,5X10,5/T20	7724104/TORX T20	

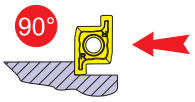

A58-A59


A110-A111

0° / 90°





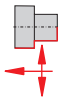


Picture shows right-hand version

D [mm]	Type, description	L NR	d_A [mm]	d_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	
10	PM 10R-1.5D	R	12		80	15		5	PM 10..
	PM 10R-2.25D		12	16	72.4	22.5	30.4	5	
	PM 10L-1.5D	L	12		80	15		5	
	PM 10L-2.25D		12	16	72.4	22.5	30.4	5	
12	PM 12R-1.5D	R	16		90	18		6	PM 12..
	PM 12R-2.25D		16	20	78	27	33.0	6	
	PM 12L-1.5D	L	16		90	18		6	
	PM 12L-2.25D		16	20	78	27	33.0	6	
16	PM 16R-1.5D	R	20		125	24		8	PM 16..
	PM 16R-2.25D		20	25	96.5	36	46.5	8	
	PM 16L-1.5D	L	20		125	24		8	
	PM 16L-2.25D		20	25	96.5	36	46.5	8	
20	PM 20R-1.5D	R	25		150	30		10	PM 20..
	PM 20R-2.25D		25	32	111	45	55.0	10	
	PM 20L-1.5D	L	25		150	30		10	
	PM 20L-2.25D		25	32	111	45	55.0	10	
25	PM 25R-1.5D	R	32		180	37.5		12.5	PM 25..
	PM 25R-2.25D		32	40	132.6	56.3	72.6	12.5	
	PM 25L-1.5D	L	32		180	37.5		12.5	
	PM 25L-2.25D		32	40	132.6	56.3	72.6	12.5	
32	PM 32R-1.5D	R	40		200	48		16	PM 32..
	PM 32R-2.25D		40	50	158	72	88.0	16	
	PM 32L-1.5D	L	40		200	48		16	
	PM 32L-2.25D		40	50	158	72	88.0	16	

Ordering example: 1 piece PM 10R-1.5D

	D [mm]	 1	 2	
PM 10..	**10**	10001230/M1,8X3,8/T06	7883305/TORX T06	
PM 12..	**12**	7883215/M2,2X4,0/T07	7724105/TORX T07	
PM 16..	**16**	7883214/M3,0X5,7/T08	7724106/TORX T08	
PM 20..	**20**	7722111/M3,5X7,2/T15	7724103/TORX T15	
PM 25..	**25**	7883209/M3,5X8,6/T15	7724103/TORX T15	
PM 32..	**32**	10001785/M5,0X10,8/T20	7724104/TORX T20	



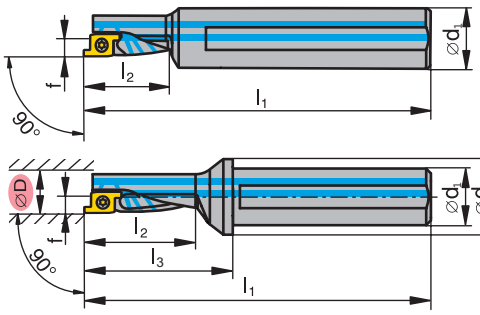
A58-A59



A112

0°





Picture shows right-hand version

D [mm]	Type, description	L N R	d_A [mm]	d_2 [mm]	l_1 [mm]	l_3 [mm]	l_2 [mm]	f [mm]	
16	PM 16R-1.5D	R	20		127.3		26.3	5.70	PM 16..
	PM 16R-2.25D		20	25	98.8	48.8	38.3	5.70	
	PM 16L-1.5D	L	20		127.3		26.3	5.70	
	PM 16L-2.25D		20	25	98.8	48.8	38.3	5.70	
20	PM 20R-1.5D	R	25		152.8		32.8	7.20	PM 20..
	PM 20R-2.25D		25	32	113.8	57.8	47.8	7.20	
	PM 20L-1.5D	L	25		152.8		32.8	7.20	
	PM 20L-2.25D		25	32	113.8	57.8	47.8	7.20	
25	PM 25R-1.5D	R	32		183.3		40.8	9.20	PM 25..
	PM 25R-2.25D		32	40	135.9	75.9	59.6	9.20	
	PM 25L-1.5D	L	32		183.3		40.8	9.20	
	PM 25L-2.25D		32	40	135.9	75.9	59.6	9.20	
32	PM 32R-1.5D	R	40		204.3		52.3	11.70	PM 32..
	PM 32R-2.25D		40	50	162.3	92.3	76.3	11.70	
	PM 32L-1.5D	L	40		204.3		52.3	11.70	
	PM 32L-2.25D		40	50	162.3	92.3	76.3	11.70	

Ordering example: 1 piece PM 16R-1.5D

	D [mm]	1	2	
PM 16..	**16**	7883214/M3,0X5,7/T08	7724106/TORX T08	
PM 20..	**20**	7722111/M3,5X7,2/T15	7724103/TORX T15	
PM 25..	**25**	7883209/M3,5X8,6/T15	7724103/TORX T15	
PM 32..	**32**	10001785/M5,0X10,8/T20	7724104/TORX T20	

A58-A59

A112

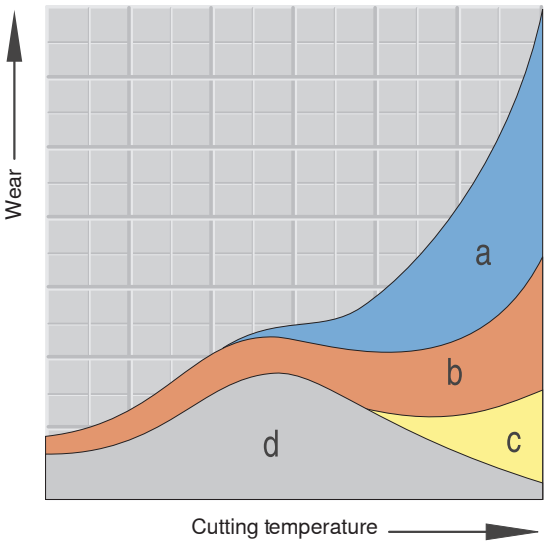
CERATIZIT

hard material matters



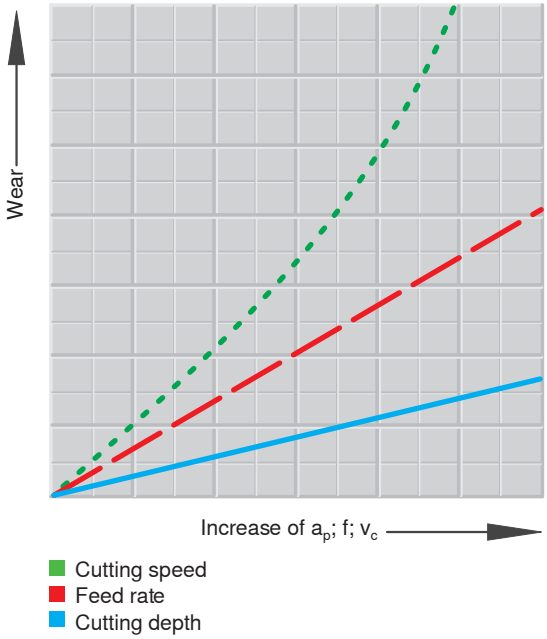
Wear is caused through simultaneous mechanical and thermal stress of the cutting edge.
The most common causes are:

> Mechanical abrasion
> Damage due to built-up edge (BUE)
> Oxidation processes
> Diffusion



a = diffusion
b = mechanical abrasion
c = oxidation
d = damage due to built-up edge (BUE)

With increasing cutting temperature the thermally caused wear types of oxidation and diffusion prevail.



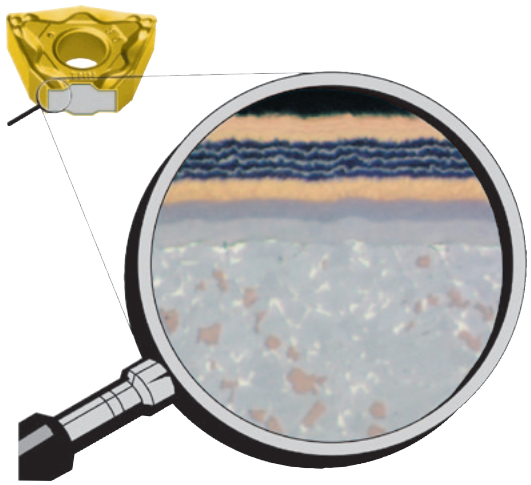
Cutting temperature and wear depend decisively upon the machining conditions.

Benefits of hard material coatings

Depositing hard material layers on carbide tools positively influences wear characteristics.

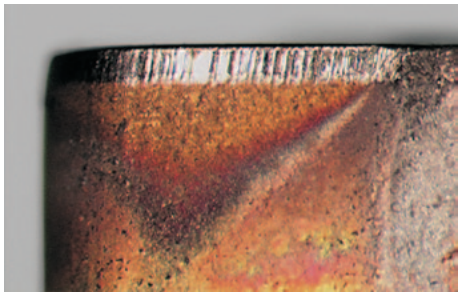
The advantages of hard material layers consist in the reduction of:

> Friction
> Temperature changes
> Oxidation
> Diffusion



Types of wear

Flank wear

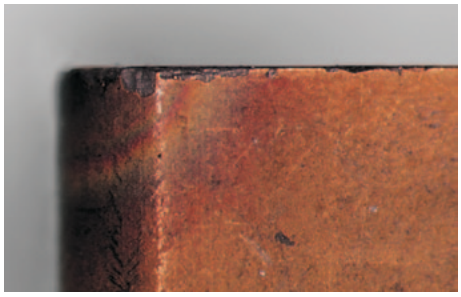


Abrasion on flank, normal wear after a certain machining time.

Reasons:
> Cutting speed too high
> Carbide grade with insufficient wear resistance
> Incorrect feed rate

Remedies:
> Reduce cutting speed
> Select more wear resistant carbide grade
> Adapt feed rate to cutting speed and cutting depth (increase feed rate)

Edge chipping



Through excessive mechanical stress at the cutting edge fracture and chipping can occur.

Reasons:
> Grade with too high wear resistance
> Vibration
> Feed rate too high or excessive cutting depth
> Interrupted cut
> Swarf damage

Remedies:
> Use tougher grade
> Use negative cutting edge geometry with chip groove
> Increase stability (tool, work piece)

Cratering

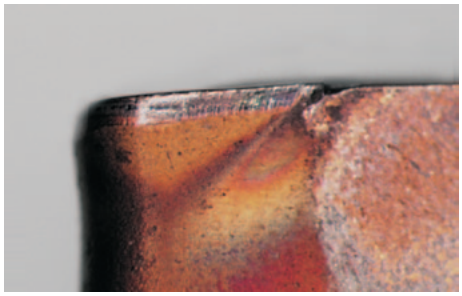


The hot chip which is being evacuated causes cratering at the rake face of the cutting edge.

Reasons:
> Cutting speed and / or feed rate too high
> Rake angle too shallow
> Grade with low wear resistance
> Insufficient coolant supply

Remedies:
> Reduce cutting speed and / or feed rate
> Increase coolant quantity and / or pressure, optimize coolant supply
> Use grade with higher resistance to cratering

Plastic deformation

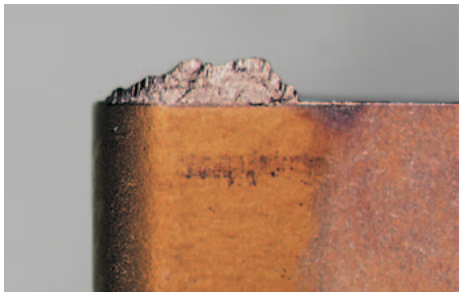


High machining temperature and simultaneous mechanical stress can lead to plastic deformation.

Reasons:
> Too high machining temperature, resulting in softening of substrate
> Damaged coatings

Remedies:
> Reduce cutting speed
> Choose carbide grade with higher wear resistance
> Provide cooling

Built-up edge

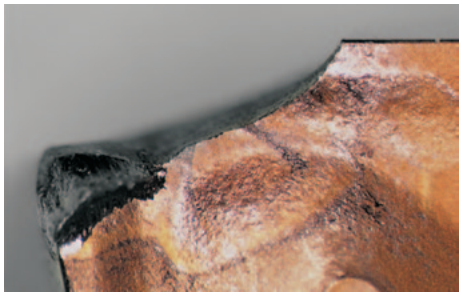


Built-up edge occurs when the chip is not evacuated properly due to insufficient cutting temperature.

Reasons:
> Too low cutting speed
> Too small rake angle
> Wrong cutting material
> Lack of cooling / lubrication

Remedies:
> Increase cutting speed
> Enlarge rake angle
> Apply TiN-coating
> Use emulsion with higher concentration

Insert breakage



Excessive stress of the insert causes breakage.

Reasons:
> Excessive stress of cutting material
> Lack of stability
> Corner angle too small
> Excessive notching

Remedies:
> Use tougher cutting material
> Use protective edge chamfer
> Increase honing of edge
> Use more stable geometry

Corrective measures for turning problems

Type of problem												Corrective measures	
Type of wear						Work piece problems				Swarf control			
Flank wear	Cratering	Edge chipping	Plastic deformation	Insert breakage	Built-up edge	Vibration	Formation of pips and burrs	Chattered surface	Surface quality	Chip too long (tangled swarf)	Chip too short (fragmented chip)		
↓	↓		↓		↑	↓			↑	↓		Cutting speed	Cutting values
~		↓	↓	↓		↑		↓	↓	↑	↓	Feed rate	
	↓	↓					↓	↓	↓			Feed - centre area	
		↑	~		↓	~	↓	↓	↓	↓	↑	Chip groove (↓ -R -M -F ↑)	Selection of inserts
↑		↑	↑			↓	↓	↓	↑			Corner radius (larger ↓ ↑ smaller)	
↑	↑	↓	↑	↓								Cutting material (wear resistance ↓ ↑ toughness)	
		~		~		~		~	~			Clamping of tool	General criteria
		~		~		~		~	~			Clamping of work piece	
		~		~		~			↓			Overhang	
~		~				~	~		~			Tip height	
●	~		●		●		●		●	●		Cooling lubricant	

↑ raise, increase, large influence

↑ raise, increase low influence

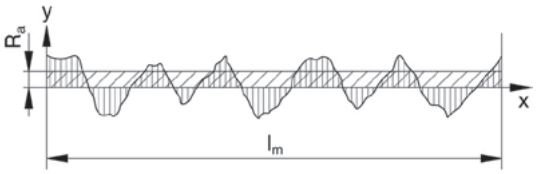
↓ avoid, reduce large influence

↓ avoid, reduce low influence

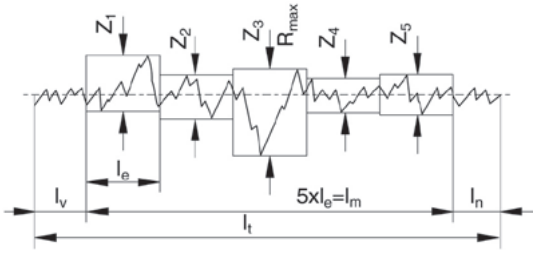
~ check, optimize

● use

ISO-DIN measured surface roughness

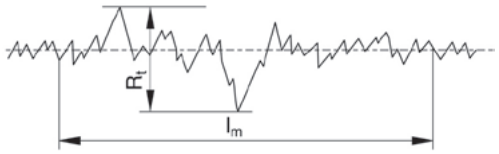


Average roughness value R_a (DIN 4768)
This is defined as the arithmetical mean of the absolute sums of the roughness profile R within the entire measured length l_m.



Average roughness depth R_z (DIN 4768)
This is defined as the average value resulting from the single roughness depths of five successive single measured lengths l_e.

Single surface roughness depth Z_1 ... Z_5
This is the vertical distance between the highest and the lowest point of the roughness profile R within a single measured length l_e.



Maximum surface roughness depth R_t (DIN 4768/1)
This is the distance between the elevation and depression of the line within the measured length (reference distance) of profile filtered according to DIN 4768 sheet 1.

Surface quality according to manufacturing method

Surface symbol according to ISO 1302	**new**	.025	.05	.1	.2	.4	.8	1.6	3.2	6.3	12.5	25	50
Surface symbol according to ISO 3141	**until now**	▽▽▽▽					▽▽▽		▽▽		▽		
Roughness index		N 1	N 2	N 3	N 4	N 5	N 6	N 7	N 8	N 9	N 10	N 11	N 12
Arithmetic mean value	R_a [µm]	.025	.05	.1	.2	.4	.8	1.6	3.2	6.3	12.5	25	50
Surface roughness depth	R_z [µm]	.25	.63	1	1.6	2.5	4-6.3	10	16-25	40	63	100	160
Longitudinal turning Face turning													
Longitudinal turning Face turning	MasterFinish												
Longitudinal grinding Surface grinding													

≙ Surface roughness (produced through special methods)

≙ Surface roughness (produced through normal workshop methods)

≙ Surface roughness (produced through rough machining methods)

Surface and roughness

Table for the comparison of the measuring systems (metric compared to inch) of surface roughness

R_{tmax} [µm]	CLA/R_a [µm]	CLA [µ"]	RMS [µm]	RMS [µ"]
.06	.02	.75	.02	.8
.1	.03	1.2	.04	13
.2	.06	2.5	.08	2.8
.3	.09	3.7	.1	4.2
.4	.13	5	.14	5.6
.5	.16	6.7	.18	6.9
.6	.19	7.5	.21	8.3
.7	.22	8.7	.25	9.7
.8	.25	10	.28	11.1
.9	.28	11.2	.32	12.5
1	.31	12.5	.35	14
1.2	.38	15.8	.42	16.7
1.5	.47	18.8	.53	20.9
1.8	.57	22.6	.64	25.5
2	.64	25.1	.78	27.9
2.4	.73	30.1	.85	33.4
2.8	.89	35.2	.99	39
3	.95	37.6	1.06	41.9
3.5	1.11	43.9	1.24	48.8
4	1.27	50.2	1.41	55.8
5	1.59	62.7	1.77	69.7
6	1.91	75.5	2.12	83.6
7	2.22	87.5	2.48	92.6
8	2.54	100	2.83	111.7
10	3.18	125.5	3.54	140
20	6.64	251.5	7.8	279
40	12.7	502	14.1	558
60	19.1	755	21.2	836
125	39.5	1560	43.5	1750
200	64	2510	78	2790

1 µm = .001 mm = 39.37 µ"

1 µ" = .000001" = .0000254 mm

CLA (centre line average)

RMS (root mean square)

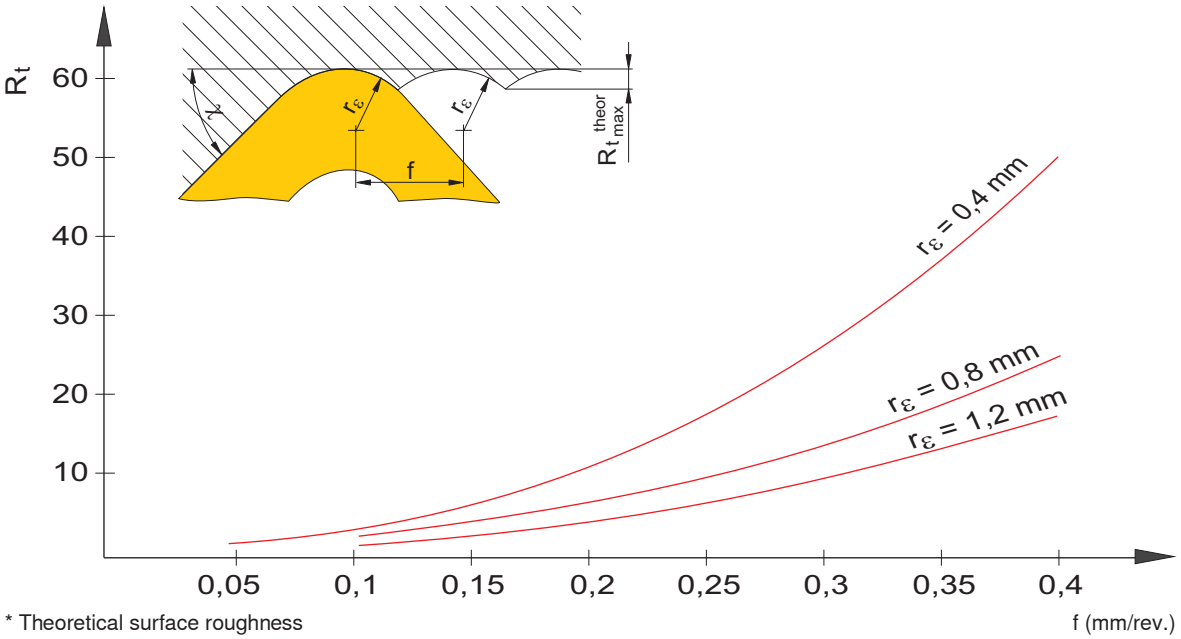
Theoretical surface finish

The maximum theoretical surface roughness with turning, $R_{t\,theor.}$ is the combination of feed rate and corner radius.

$$R_{t\,theor.} = \left(r_\varepsilon - \sqrt{r_\varepsilon^2 - \frac{f^2}{4}} \right) \cdot 1000$$

or approximately

$$R_{t\,theor.} = \frac{0.125 \cdot f^2}{r_\varepsilon}$$



* Theoretical surface roughness

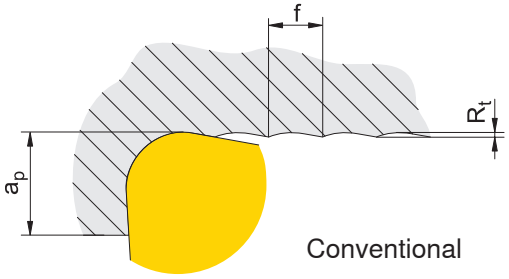
Cutting data for feed rate

Roughness range R_z in µm	$R_{t\,max}$	corresponds to R_a-value	Roughness index	ISO 1302	Corner radius r_ε (mm) and feed rate f (mm/rev.)			
					r_ε = 0,4	r_ε = 0,8	r_ε = 1,2	r_ε = 1,6
63 - 100	$\sqrt{R_t\ 100}$	12,5 - 25	N 11	25	–	0,51	0,69	0,18
40 - 63	$\sqrt{R_t\ 63}$	6,3 - 25	N 10	12,5	0,27	0,43	0,56	0,68
31,5 - 40	$\sqrt{R_t\ 40}$	4,9 - 6,3	N 9	6,3	0,25	0,37	0,49	0,57
25 - 31,5	$\sqrt{R_t\ 31,5}$	4,0 - 4,9			0,22	0,32	0,41	0,47
16 - 25	$\sqrt{R_t\ 25}$	2,5 - 4,0	N 8	3,2	0,20	0,28	0,36	0,39
10 - 16	$\sqrt{R_t\ 16}$	1,6 - 2,5			0,15	0,22	0,29	0,31
6,3 - 10	$\sqrt{R_t\ 10}$	1,0 - 1,6	N 7	1,6	0,10	0,13	0,18	0,20

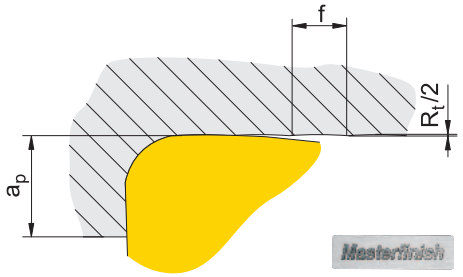
Operating principle / benefit

Improved surface finish

With the same feed rate an insert with ‘Masterfinish’ cutting edge reaches a roughness value R_a which is many times higher than the one of a conventional insert.

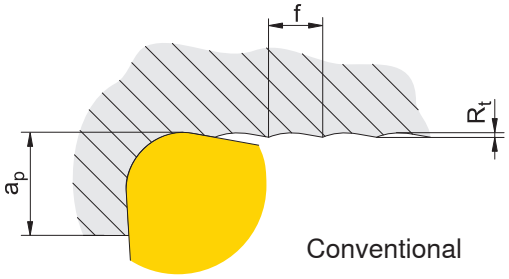


Conventional

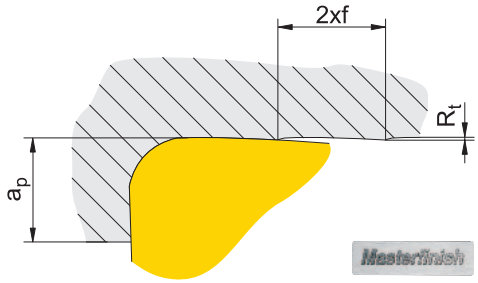


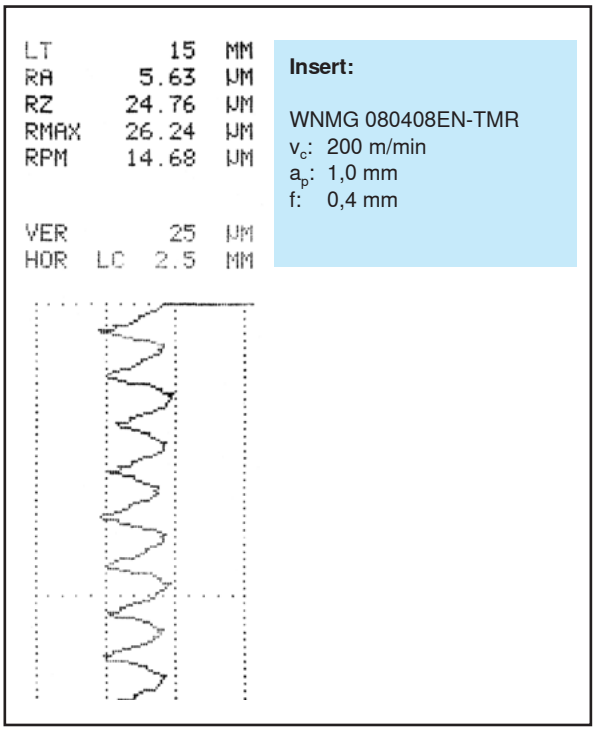
Shorter machining time

If you want to reach the same R_a-value as with a standard insert, a twice as high feed rate can be applied for the insert with ‘Masterfinish’ cutting edge (= shorter production time per component!).



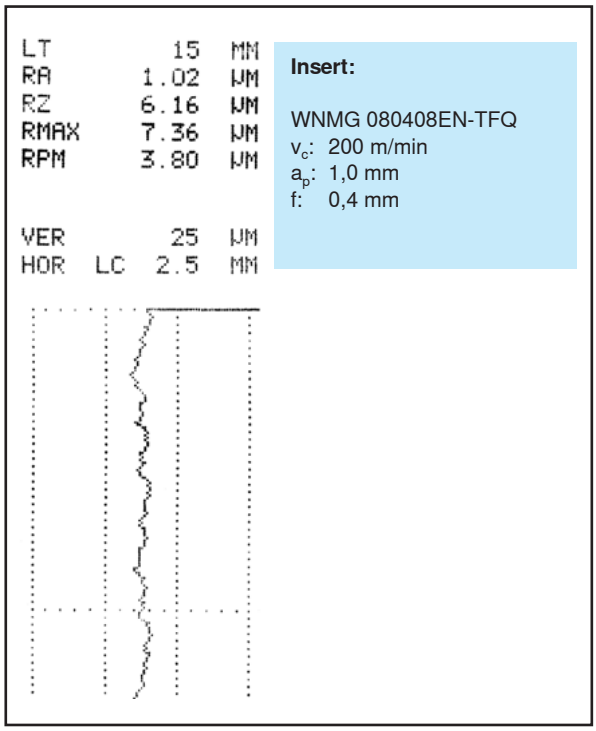
Conventional





Insert:

WNMG 080408EN-TMR
v_c: 200 m/min
a_p: 1,0 mm
f: 0,4 mm

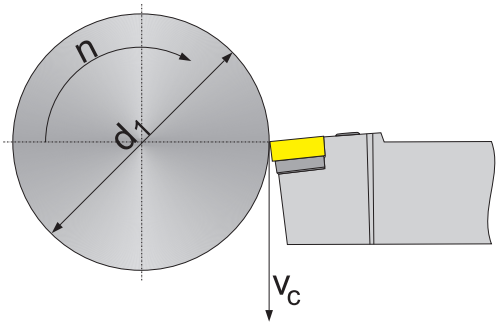


Insert:

WNMG 080408EN-TFQ
v_c: 200 m/min
a_p: 1,0 mm
f: 0,4 mm

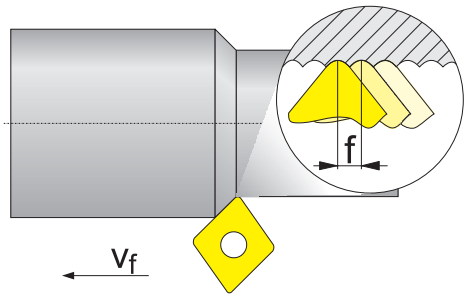
Cutting speed (v_c)

$$v_c = \frac{d_1 \cdot \pi \cdot n}{1000} \quad [m/min]$$



Revolutions per minute (n)

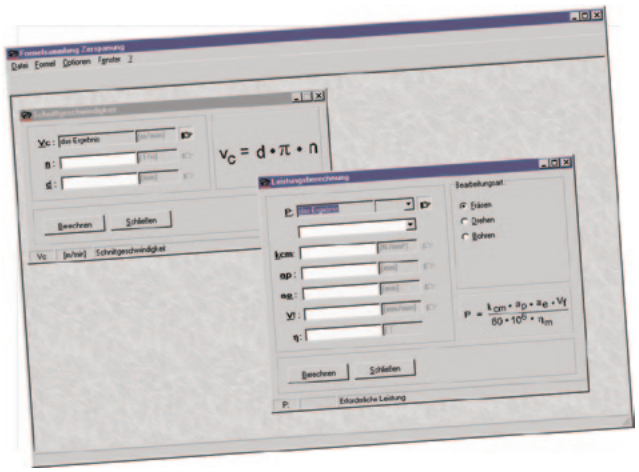
$$n = \frac{v_c \cdot 1000}{d_1 \cdot \pi} \quad [rev./min]$$



Feed rate (v_f)

$$v_f = f \cdot n \quad [mm/min]$$

The CERATIZIT formula collection CT-CALC



> PC - aided calculation of machining parameters:
  - cutting speed
  - chip removal rate
  - power consumption
  - medium chip thickness
> Languages: DE, EN, FR, IT, ES, DA, SE, FI
> Free of charge download from **www.ceratizit.com**

CERATIZIT hard material matters

Hardness values

Comparison table

Tensile strength N/mm²	Vickers HV	Brinell HB	Rockwell HRC	Shore C
575	180	171		
595	185	176		
610	190	181		
625	195	185		
640	200	190	12,0	
660	205	195	13,0	
675	210	199	14,0	
690	215	204	15,0	
705	220	209	15,5	28
720	225	214	16,0	
740	230	219	17,0	29
755	235	223	18,0	
770	240	228	20,3	30
785	245	233	21,3	
800	250	238	22,2	31
820	255	242	23,1	32
835	260	247	24,0	33
850	265	252	24,8	
865	270	257	25,6	
880	275	261	26,4	34
900	280	268	27,1	
915	285	271	27,8	35
930	290	276	28,5	
950	295	280	29,2	36
965	300	285	29,8	37
995	310	295	31,0	38
1030	320	304	32,2	39
1060	330	314	33,3	40
1095	340	323	34,3	41
1125	350	333	35,5	42
1155	360	342	36,6	43
1190	370	352	37,7	44
1220	380	361	38,8	45
1255	390	371	39,8	46
1290	400	380	40,8	47
1320	410	390	41,8	48
1350	420	399	42,7	
1385	430	409	43,6	49
1420	440	418	44,5	
1455	450	428	45,3	51
1485	460	437	46,1	52
1520	470	447	46,9	53
1555	480	465	47,7	54
1595	490	466	48,4	
1630	500	475	49,1	57
1665	510	485	49,8	58
1700	520	494	50,5	59
1740	530	504	51,1	60

Tensile strength N/mm²	Vickers HV	Brinell HB	Rockwell HRC	Shore C
1775	540	513	51,7	61
1810	550	523	52,3	62
1845	560	532	53,0	63
1880	570	542	53,6	64
1920	580	551	54,1	65
1955	590	561	54,7	66
1995	600	570	55,2	67
2030	610	580	55,7	68
2070	620	589	56,3	69
2105	630	599	56,8	70
2145	640	608	57,3	71
2180	650	618	57,8	72
2210	660	628	58,3	73
2240	665	633	58,8	74
2280	670	638	59,3	
2310	675	643	59,8	75
2350	680	648	60,3	76
2380	685	653	61,1	77
2410	690	658	61,3	78
2450	695	663	61,7	79
2480	710	668	62,2	80
2520	720	678	62,6	81
2550	730	683	63,1	82
2590	740	693	63,5	
2630	750	703	63,9	83
2660	760	708	64,3	84
2700	770	718	64,7	85
2730	780	723	65,1	
2770	790	733	65,5	86
2800	800	738	65,9	
2840	810	748	66,3	87
2870	820	753	66,7	88
2910	830	763	67,0	
2940	840	768	67,4	89
2980	850		67,7	
3010	860		68,1	90
3050	870		68,4	
3080	880		68,7	91
3120	890		69,0	
3150	900		69,3	92
3190	910		69,6	
3220	920		69,9	
3260	930		70,1	

Germany DIN	Mat. no.	United Kingdom BS	France AFNOR	Sweden SS	United States AISI	Japan JIS	$K_{c1.1}$ N/mm²	m_c	VDI 3323 group
10 SPb 20	1.0722		10 PbF 2		11 L 08		1350	.21	1
100 Cr 6	1.2067	BL 3	Y 100 C 6		L 3	SUJ2	1775	.24	6/9
105 WCr 6	1.2419		105 WC 13			SKS31	1775	.24	6/9
12 CrMo 9 10	1.7380	1501-622 Gr. 31; 45	10 CD 9.10	2218	A 182-F22	SPVA,SCMV4	1675	.24	6/7
12 Ni 19	1.5680		Z 18 N 5		2515		2450	.23	10/11
13 CrMo 4 4	1.7335	1501-620 Gr. 27	15 CD 3.5	2216	A 182-F11; F12	SPVAF12	1675	.24	6/7
14 MoV 6 3	1.7715	1503-660-440					1675	.24	6/7
14 Ni 6	1.5622		16 N 6		A 350-LF 5		1675	.24	6/7
14 NiCr 10	1.5732		14 NC 11		3415	SNC415(H)	1675	.24	6/7
14 NiCr 14	1.5752	655 M 13	12 NC 15		3310; 9314	SNC815(H)	1675	.24	6/7
14 NiCrMo 13 4	1.6657						1675	.24	6/7
15 Cr 3	1.7015	523 M 15	12 C 3		5015		1675	.24	6/7
15 CrMo 5	1.7262		12 CD 4			SCM415(H)	1675	.24	6/7
15 Mo 3	1.5415	1501-240	15 D 3	2912	A 204 Gr. A		1675	.24	6/7
16 MnCr 5	1.7131	527 M 17	16 MC 5	2511	5115	SCR415	1675	.24	6/7
16 Mo 5	1.5423	1503-245-420			4520	SB450M	1675	.24	6/7
17 CrNiMo 6	1.6587	820 A 16	18 NCD 6				1675	.24	6/7
21 NiCrMo 2	1.6523	805 M 20	20 NCD 2	2506	8620	SNCM220(H)	1725	.24	6/8
25 CrMo 4	1.7218	1717 CDS 110	25 CD 4 S	2225	4130	SM420;SCM430	1725	.24	6/8
28 Mn 6	1.1170	150 M 28	20 M 5		1330		1500	.22	2
32 CrMo 12	1.7361	722 M 24	30 CD 12	2240			1775	.24	6/9
34 Cr 4	1.7033	530 A 32	32 C 4		5132	SCR430(H)	1725	.24	6/8
34 CrMo 4	1.7220	708 A 37	35 CD 4	2234	4135; 4137	SCM432;SCCRM3	1775	.24	6/9
34 CrNiMo 6	1.6582	817 M 40	35 NCD 6	2541	4340	SNCM447	1775	.24	6/9
35 S 20	1.0726	212 M 36	35 MF 4	1957	1140		1525	.22	2/3
36 CrNiMo 4	1.6511	816 M 40	40 NCD 3		9840	SNCM447	1775	.24	6/9
36 Mn 5	1.1167						1525	.22	2/3
36 NiCr 6	1.5710	640 A 35	35 NC 6		3135	SNC236	1800	.24	3/9
38 MnSi 4	1.5120						1800	.24	3/9
39 CrMoV 13 9	1.8523	897 M 39					1775	.24	6/9
40 Mn 4	1.1157	150 M 36	35 M 5		1039		1525	.22	2/3
40 NiCrMo 2 2	1.6546	311-Type 7	40 NCD 2		8740	SNCM240	1775	.24	6/9
41 Cr 4	1.7035	530 M 40	42 C 4		5140	SCR440(H)	1775	.24	6/9
41 CrAlMo 7	1.8509	905 M 39	40 CAD 6.12	2940	A 355 Cl. A	SACM645	1775	.24	6/9
41 CrMo 4	1.7223	708 M 40	42 CD 4 TS	2244	4142; 4140	SCM440	1775	.24	6/9
42 Cr 4	1.7045	530 A 40	42 C 4 TS	2245	5140	SCr440	1775	.24	6/9
42 CrMo 4	1.7225	708 M 40	42 CD 4	2244	4142; 4140	SCM440(H)	1775	.24	6/9
45 WCrV 7	1.2542	BS 1		2710	S 1		1775	.24	6/9
50 CrV 4	1.8159	735 A 50	50 CV 4	2230	6150	SUP10	1775	.24	6/9
55 Cr 3	1.7176	527 A 60	55 C 3	2253	5155	SUP9(A)	1775	.24	6/9
55 NiCrMoV 6	1.2713		55 NCDV 7		L 6	SKH1;SKT4	1775	.24	6/9
55 Si 7	1.0904	250 A 53	55 S 7	2085; 2090	9255		1775	.24	6/9
58 CrV 4	1.8161						1775	.24	6/9
60 SiCr 7	1.0961		60 SC 7		9262		1775	.24	6/9
9 SMn 28	1.0715	230 M 07	S 250	1912	1213	SUM22	1350	.21	1
9 SMn 36	1.0736	240 M 07	S 300		1215		1350	.21	1
9 SMnPb 28	1.0718		S 250 Pb	1914	12 L 13	SUM22L	1350	.21	1
9 SMnPb 36	1.0737		S 300 Pb	1926	12 L 14		1350	.21	1
Al99	3.0205						700	.25	21
AlCuMg1	3.1325						700	.25	22

CERATIZIT hard material matters

Comparison of materials

Germany DIN	Mat. no.	United Kingdom BS	France AFNOR	Sweden SS	United States AISI	Japan JIS	$K_{c1.1}$ N/mm²	m_c	VDI 3323 group
AlMg1	3.3315						700	.25	21
AlMgSi1	3.2315						700	.25	22
C 105 W1	1.1545		Y1 105	1880	W 110	SK3	1675	.24	3
C 125 W	1.1663		Y2 120		W 112		1675	.24	3
C 15	1.0401	080 M 15	AF3 7 C 12; XC 18	1350	1015	S15C	1350	.21	1
C 22	1.0402	050 A 20	AF 42 C 20	1450	1020	S20C, S22C	1350	.21	1
C 35	1.0501	060 A 35	AF 55 C 35	1550	1035	S35C	1525	.22	2/3
C 45	1.0503	080 M 46	AF 65 C 45	1650	1045	S45C	1525	.22	2/3
C 55	1.0535	070 M 55		1655	1055	S55C	1675	.24	3
C 60	1.0601	080 A 62	CC 55		1060	S60C	1675	.24	3
Cf 35	1.1183					S35C	1525	.22	2/3
Cf 53	1.1213					S50C	1525	.22	2/3
Ck 101	1.1274	060 A 96		1870	1095		1675	.24	3
Ck 15	1.1141	080 M 15	XC 15; XC 18	1370	1015	S15C	1350	.21	1
Ck 55	1.1203	070 M 55	XC 55		1055	S55C	1675	.24	3
Ck 60	1.1221	080 A 62	XC 60	1665; 1678	1060	S58C	1675	.24	3
CoCr20W15Ni	2.4764						3300	.24	35
CuZn15	2.0240						700	.27	27
CuZn36Pb3	2.0375						700	.27	26
E-Cu57	2.0060						700	.27	28
G-AlSi10Mg	3.2381						700	.25	24
G-AlSi12	3.2581						700	.25	23
G-AlSi9Cu3	3.2163						700	.25	23
G-CuSn5ZnPb	2.1096						700	.27	26
G-CuZn40Fe	2.0590						700	.27	28
G-X 120 Mn 12	1.3401	Z 120 M 12	Z 120 M 12		A 128 (A)		3300	.24	35
G-X 20 Cr 14	1.4027	420 C 29	Z 20 C 13 M			SCS2	1875	.21	12/13
G-X 40 NiCrSi 38 18	1.4865	330 C 40					2600	.24	31
G-X 45 CrSi 9 3	1.4718	401 S 45	Z 45 CS 9		HNV 3		2450	.23	10/11
G-X 5 CrNi 13 4	1.4313	425 C 11	Z 5 CN 13.4	2385	CA 6-NM		1875	.21	12/13
G-X 5 CrNiMoNb 18 10	1.4581	318 C 17	Z 4 CNDNb 18.12 M				2150	.2	14
G-X 6 CrNi 18 9	1.4308	304 C 15	Z 6 CN 18.10 M	2333	CF-8		2150	.2	14
G-X 6 CrNiMo 18 10	1.4408						2150	.2	14
G-X 7 Cr 13	1.4001						1875	.21	12/13
GG-10	.6010		Ft 10 D	01 10-00	A48-20 B	FC100	1150	.2	15
GG-15	.6015	Grade 150	Ft 15 D	01 15-00	A48-25 B	FC150	1150	.2	15
GG-20	.6020	Grade 220	Ft 20 D	01 20-00	A48-30 B	FC200	1150	.2	15
GG-25	.6025	Grade 260	Ft 25 D	01 25-00	A48-40 B	FC250	1250	.24	15/16
GG-30	.6030	Grade 300	Ft 30 D	01 30-00	A48-45 B	FC300	1350	.28	16
GG-35	.6035	Grade 350	Ft 35 D	01 35-00	A48-50 B	FC350	1350	.28	16
GG-40	.6040	Grade 400	Ft 40 D	01 40-00	A48-60 B	FC400	1350	.28	16
GGG-35.3	.7033					FCD350	1225	.25	17
GGG-40	.7040	SNG 420/12	FGS 400-12	0717-02	60-40-18	FCD400	1225	.25	17
GGG-40.3	.7043	SNG 370/17	FGS 370-17	0717-15		FCD400	1225	.25	17
GGG-50	.7050	SNG 500/7	FGS 500-7	0727-02	65-45-12	FCD500	1350	.28	18
GGG-60	.7060	SNG 600/3	FGS 600-3	0732-03	80-55-06	FCD600	1350	.28	18
GGG-70	.7070	SNG 700/2	FGS 700-2	0737-01	100-70-03	FCD700	1350	.28	18
GGG-NiCr 20 2	.7660	S-NiCr 20 2	S-NC 20 2		A 439 Type D-2		1350	.28	18
GGG-NiMn 13 7	.7652	S-NiMn 13 7	S-NM 13 7				1350	.28	18
GS-Ck 45	1.1191	080 M 46	XC 42	1672	1045	S45C	1525	.22	2/3

Germany DIN	Mat. no.	United Kingdom BS	France AFNOR	Sweden SS	United States AISI	Japan JIS	$K_{c1.1}$ N/mm²	m_c	VDI 3323 group
GTS-35-10	.8135	B 340/12	MN 35-10				1225	.25	19
GTS-45-06	.8145	P 440/7					1420	.3	20
GTS-55-04	.8155	P 510/4	MP 50-5				1420	.3	20
GTS-65-02	.8165	P 570/3	MP 60-3				1420	.3	20
GTS-70-02	.8170	P 690/2	IP 70-2				1420	.3	20
NiCr20TiAl	2.4631	HR 401; 601	Nimonic 80 A				3300	.24	33
NiCr22Mo9Nb	2.4856		Inconel 625				3300	.24	33
NiCu30Al	2.4375		Monel K 500				3300	.24	34
NiFe25Cr20NbTi	2.4955						3300	.24	34
S 18-0-1	1.3355	BT 1	Z 80 WCV 18-04-01		T 1		2450	.23	10/11
S 18-1-2-5	1.3255	BT 4	Z 80 WKCV 18-05-04-0		T 4		2450	.23	10/11
S 2-9-2	1.3348		Z 100 DCWV 09-04-02-	2782	M 7		2450	.23	10/11
S 6-5-2	1.3343	BM 2	Z 85 WDCV 06-05-04-0	2722	M 2	SKH9; SKH51	2450	.23	10/11
S 6-5-2-5	1.3243		Z 85 WDKCV 06-05-05-	2723		SKH55	2450	.23	10/11
TiAl6V4	3.7165	TA 10 bis TA 13	T-A 6 V				2110	.22	37
X 10 Cr 13	1.4006	410 S 21	Z 12 C 13	2302	410; CA-15	SUS410	1875	.21	12/13
X 10 CrNiMoNb 18 12	1.4583				318		2150	.2	14
X 10 CrNiS 18 9	1.4305	303 S 21	Z 10 CNF 18.09	2346	303		2150	.2	14
X 100 CrMoV 5 1	1.2363	BA 2	Z 100 CDV 5	2260	A 2		2450	.23	10/11
X 12 CrMoS 17	1.4104		Z 10 CF 17	2383	430 F	SUS430F	1875	.21	12/13
X 12 CrNi 17 7	1.4310	301 S 21	Z 12 CN 17.07		301		2150	.2	14
X 12 CrNi 22 12	1.4829					SUS301	1350	.28	16
X 12 CrNi 25 21	1.4845	310 S24	Z 12 CN 25.20	2361	310 S	SUH310; SUS310S	2150	.2	14
X 12 CrNiTi 18 9	1.4878	321 S 20	Z 6 CNT 18.12 (B)	2337	321		2150	.2	14
X 12 NiCrSi 36 16	1.4864	NA 17	Z 12 NCS 37.18		330	SUH330	2600	.24	31
X 15 CrNiSi 20 12	1.4828	309 S 24	Z 15 CNS 20.12		309	SUH309	1350	.28	16
X 165 CrMoV 12	1.2601			2310			2450	.23	10/11
X 2 CrNiMo 18 13	1.4440						2150	.2	14
X 2 CrNiMoN 17 13 3	1.4429	316 S 62	Z 2 CND 17.13 Az	2375	316 LN	SUS316LN	2150	.2	14
X 2 CrNiN 18 10	1.4311	304 S 62	Z 2 CN 18 .10	2371	304 LN	SUS304LN	2150	.2	14
X 20 CrNi 17 2	1.4057	431 S 29	Z 15 CN 16.02	2321	431	SUS431	1875	.21	12/13
X 210 Cr 12	1.2080	BD 3	Z 200 C 12		D 3		2450	.23	10/11
X 210 CrW 12	1.2436			2312			2450	.23	10/11
X 30 WCrV 9 3	1.2581	BH 21	Z 30 WCV 9		H 21	SKD5	2450	.23	10/11
X 40 CrMoV 5 1	1.2344	BH 13	Z 40 CDV 5	2242	H 13	SKD61	2450	.23	10/11
X 46 Cr 13	1.4034	420 S 45	Z 40 C 14				1875	.21	12/13
X 5 CrNi 18 9	1.4301	304 S 15	Z 6 CN 18.09	2332; 2333	304; 304 H	SUS304	2150	.2	14
X 5 CrNiMo 17 13 3	1.4436	316 S 16	Z 6 CND 17.12	2343	316	SUS316	2150	.2	14
X 5 CrNiMo 18 10	1.4401	316 S 16	Z 6 CND 17.11	2347	316	SUS316	2150	.2	14
X 53 CrMnNiN 21 9	1.4871	349 S 54	Z 52 CMN 21.09		EV 8		1875	.21	12/13
X 6 Cr 13	1.4000	403 S 17	Z 6 C 13	2301	403	SUS403	1875	.21	12/13
X 6 Cr 17	1.4016	430 S 15	Z 8 C 17	2320	430	SUS430	1875	.21	12/13
X 6 CrMo 17	1.4113	434 S 17	Z 8 CD 17.01	2325	434	SUS434	1875	.21	12/13
X 6 CrNiMoTi 17 12 2	1.4571	320 S 31	Z 6 CNT 17.12	2350	316 Ti		2150	.2	14
X 6 CrNiNb 18 10	1.4550	347 S 17	Z 6 CNNb 18.10	2338	347		2150	.2	14
X 6 CrNiTi 18 10	1.4541	321 S 12	Z 6 CNT 18.10	2337	321		2150	.2	14
X2 CrNi 18-8	1.4317						2150	.2	14

CERATIZIT hard material matters

Designation

ISO - ANSI

ISO	ANSI
CCGT CCGT 060200FN-F23	CCGT 21.5X0FN-F23
CCGT 060201FN	CCGT 21.50FN
CCGT 060201FN-F23	CCGT 21.50FN-F23
CCGT 060202EN-SF	CCGT 21.5.5EN-SF
CCGT 060202EN-SM	CCGT 21.5.5EN-SM
CCGT 060202FN	CCGT 21.5.5FN
CCGT 060202FN-23P	CCGT 21.5.5FN-23P
CCGT 060202FN-25P	CCGT 21.5.5FN-25P
CCGT 060202FN-27	CCGT 21.5.5FN-27
CCGT 060204EN-SF	CCGT 21.51EN-SF
CCGT 060204FN	CCGT 21.51FN
CCGT 060204FN-23P	CCGT 21.51FN-23P
CCGT 060204FN-25P	CCGT 21.51FN-25P
CCGT 060204FN-25Q	CCGT 21.51FN-25Q
CCGT 060204FN-27	CCGT 21.51FN-27
CCGT 09T300FN-F23	CCGT 32.5X0FN-F23
CCGT 09T301FN	CCGT 32.50FN
CCGT 09T301FN-F23	CCGT 32.50FN-F23
CCGT 09T302EN-SF	CCGT 32.5.5EN-SF
CCGT 09T302FN	CCGT 32.5.5FN
CCGT 09T302FN-25P	CCGT 32.50.5FN-25P
CCGT 09T302FN-27	CCGT 32.5.5FN-27
CCGT 09T304EN-SF	CCGT 32.51EN-SF
CCGT 09T304FN	CCGT 32.51FN
CCGT 09T304FN-23P	CCGT 32.51FN-23P
CCGT 09T304FN-25P	CCGT 32.51FN-25P
CCGT 09T304FN-25Q	CCGT 32.51FN-25Q
CCGT 09T304FN-27	CCGT 32.51FN-27
CCGT 09T308EN-SF	CCGT 32.52EN-SF
CCGT 09T308FN	CCGT 32.52FN
CCGT 09T308FN-23P	CCGT 32.52FN-23P
CCGT 09T308FN-25P	CCGT 32.52FN-25P
CCGT 09T308FN-25Q	CCGT 32.52FN-25Q
CCGT 09T308FN-27	CCGT 32.52FN-27
CCGT 120402FN-25P	CCGT 43.5FN-25P
CCGT 120402FN-27	CCGT 43.5FN-27
CCGT 120404EN-SF	CCGT 431EN-SF
CCGT 120404FN	CCGT 431FN
CCGT 120404FN-25P	CCGT 431FN-25P
CCGT 120404FN-25Q	CCGT 431FN-25Q
CCGT 120404FN-27	CCGT 431FN-27
CCGT 120408FN	CCGT 432FN
CCGT 120408FN-25P	CCGT 432FN-25P
CCGT 120408FN-25Q	CCGT 432FN-25Q
CCGT 120408FN-27	CCGT 432FN-27
CCGWCCGW 060202FN	CCGW 21.5.5FN
CCGW 060204FN	CCGW 21.51FN
CCGW 09T301FN	CCGW 32.50FN
CCGW 09T302FN	CCGW 32.5.5FN
CCGW 09T304FN	CCGW 32.51FN
CCGW 09T308FN	CCGW 32.52FN
CCMT CCMT 060204EN-29	CCMT 21.51EN-29

ISO	ANSI
CCMT 060204EN-SF	CCMT 21.51EN-SF
CCMT 060204EN-SM	CCMT 21.51EN-SM
CCMT 060204EN-SMF	CCMT 21.51EN-SMF
CCMT 060208EN-SM	CCMT 21.52EN-SM
CCMT 060208EN-SMF	CCMT 21.52EN-SMF
CCMT 09T304EN-29	CCMT 32.51EN-29
CCMT 09T304EN-F43	CCMT 32.51EN-F43
CCMT 09T304EN-SF	CCMT 32.51EN-SF
CCMT 09T304EN-SM	CCMT 32.51EN-SM
CCMT 09T304EN-SMF	CCMT 32.51EN-SMF
CCMT 09T304EN-SMQ	CCMT 32.51EN-SMQ
CCMT 09T308EN-29	CCMT 32.52EN-29
CCMT 09T308EN-F43	CCMT 32.52EN-F43
CCMT 09T308EN-SF	CCMT 32.52EN-SF
CCMT 09T308EN-SM	CCMT 32.52EN-SM
CCMT 09T308EN-SMF	CCMT 32.52EN-SMF
CCMT 09T308EN-SMQ	CCMT 32.52EN-SMQ
CCMT 120404EN-SF	CCMT 431EN-SF
CCMT 120404EN-SM	CCMT 431EN-SM
CCMT 120404EN-SMF	CCMT 431EN-SMF
CCMT 120404EN-SMQ	CCMT 431EN-SMQ
CCMT 120408EN-SF	CCMT 432EN-SF
CCMT 120408EN-SM	CCMT 432EN-SM
CCMT 120408EN-SMF	CCMT 432EN-SMF
CCMT 120408EN-SMQ	CCMT 432EN-SMQ
CCMT 120412EN-SM	CCMT 433EN-SM
CCMX CCMX 09T304SN	CCMX 32.51SN
CCMX 09T308SN	CCMX 32.52SN
CCMX 120408EN	CCMX 432EN
CNGA CNGA 120408SN-025C	CNGA 432SN-025C
CNGA 120408TN-020D	CNGA 432TN-020D
CNGA 120412SN-020D	CNGA 433SN-020D
CNGA 120412SN-025C	CNGA 433SN-025C
CNGA 160608SN-028C	CNGA 542SN-028C
CNGA 160616SN-028C	CNGA 544SN-028C
CNGA 160616TN-020D	CNGA 544TN-020D
CNGG CNGG 120404EN-CF	CNGG 431EN-CF
CNGM CNGM 190612FN-27	CNGM 643FN-27
CNGN CNGN 120404TN-020D	CNGN 431TN-020D
CNGN 120408TN-020D	CNGN 432TN-020D
CNGN 120416SN-020D	CNGN 434SN-020D
CNGN 120712PN-100CF	CNGN 453PN-100CF
CNGN 120712SN-025C	CNGN 453SN-025C
CNGN 120716PN-100CF	CNGN 454PN-100CF
CNGN 120716PN-150CF	CNGN 454PN-150CF
CNGN 120716SN-025C	CNGN 454SN-025C
CNGN 160716SN-025C	CNGN 554SN-025C
CNGN 160716SN-200C	CNGN 554SN-200C
CNGP CNGP 120402FN-F32	CNGP 43.5FN-F32
CNGP 120408FN-F32	CNGP 432FN-F32

ISO	ANSI
CNMA CNMA 120404EN	CNMA 431EN
CNMA 120408EN	CNMA 432EN
CNMA 120412EN	CNMA 433EN
CNMA 120412FN	CNMA 433FN
CNMA 120412TN-020D	CNMA 433TN-020D
CNMA 120416EN	CNMA 434EN
CNMA 120416FN	CNMA 434FN
CNMA 120416TN-020D	CNMA 434TN-020D
CNMA 160608EN	CNMA 542EN
CNMA 160612EN	CNMA 543EN
CNMA 160616EN	CNMA 544EN
CNMA 190612EN	CNMA 643EN
CNMA 190616EN	CNMA 644EN
CNMG CNMG 090304EN-TF	CNMG 321EN-TF
CNMG 090308EN-TM	CNMG 322EN-TM
CNMG 120404EN-42	CNMG 431EN-42
CNMG 120404EN-CF	CNMG 431EN-CF
CNMG 120404EN-M42	CNMG 431EN-M42
CNMG 120404EN-M52	CNMG 431EN-M52
CNMG 120404EN-TF	CNMG 431EN-TF
CNMG 120404EN-TFQ	CNMG 431EN-TFQ
CNMG 120404EN-TMF	CNMG 431EN-TMF
CNMG 120408EN-42	CNMG 432EN-42
CNMG 120408EN-CF	CNMG 432EN-CF
CNMG 120408EN-M42	CNMG 432EN-M42
CNMG 120408EN-M52	CNMG 432EN-M52
CNMG 120408EN-TF	CNMG 432EN-TF
CNMG 120408EN-TFQ	CNMG 432EN-TFQ
CNMG 120408EN-TM	CNMG 432EN-TM
CNMG 120408EN-TMF	CNMG 432EN-TMF
CNMG 120408EN-TMM	CNMG 432EN-TMM
CNMG 120408EN-TMQ	CNMG 432EN-TMQ
CNMG 120408EN-TMR	CNMG 432EN-TMR
CNMG 120412EN-CF	CNMG 433EN-CF
CNMG 120412EN-M42	CNMG 433EN-M42
CNMG 120412EN-M52	CNMG 433EN-M52
CNMG 120412EN-TF	CNMG 433EN-TF
CNMG 120412EN-TFQ	CNMG 433EN-TFQ
CNMG 120412EN-TM	CNMG 433EN-TM
CNMG 120412EN-TMF	CNMG 433EN-TMF
CNMG 120412EN-TMM	CNMG 433EN-TMM
CNMG 120412EN-TMQ	CNMG 433EN-TMQ
CNMG 120412EN-TRM	CNMG 433EN-TRM
CNMG 120416EN-TM	CNMG 434EN-TM
CNMG 120416EN-TRM	CNMG 434EN-TRM
CNMG 160608EN-TM	CNMG 542EN-TM
CNMG 160612EN-TM	CNMG 543EN-TM
CNMG 160612EN-TMR	CNMG 543EN-TMR
CNMG 160616EN-TRM	CNMG 544EN-TRM
CNMG 190612EN-TM	CNMG 643EN-TM
CNMG 190612EN-TMR	CNMG 643EN-TMR
CNMG 190616EN-TMR	CNMG 644EN-TMR

ISO	ANSI
CNMM CNMM 120408EN-TR	CNMM 432EN-TR
CNMM 120408SN-TRR	CNMM 432SN-TRR
CNMM 120412EN-TR	CNMM 433EN-TR
CNMM 120412SN-TRR	CNMM 433SN-TRR
CNMM 160612EN-TR	CNMM 543EN-TR
CNMM 160612SN-TRR	CNMM 543SN-TRR
CNMM 160616EN-TR	CNMM 544EN-TR
CNMM 160616SN-TRR	CNMM 544SN-TRR
CNMM 190612EN-TR	CNMM 643EN-TR
CNMM 190612SN-TRR	CNMM 643SN-TRR
CNMM 190616EN-TR	CNMM 644EN-TR
CNMM 190616SN-R80	CNMM 644SN-R80
CNMM 190616SN-TRR	CNMM 644SN-TRR
CNMM 190624SN-R80	CNMM 646SN-R80
CNMN CNMN 090308FN	CNMN 322FN
CNMN 090308TN-020D	CNMN 322TN-020D
CNMN 090312TN-020D	CNMN 323TN-020D
CNMN 090316TN-020D	CNMN 324TN-020D
CNMN 120412FN	CNMN 433FN
CNMN 120412TN-020D	CNMN 433TN-020D
CNMN 120416FN	CNMN 434FN
CNMN 120416TN-020D	CNMN 434TN-020D
CNMX CNMX 120404SN	CNMX 431SN
CNMX 120408EN	CNMX 432EN
CNMX 120408SN	CNMX 432SN
CNMX 120412SN	CNMX 433SN
CNMX 120712SN-020D	CNMX 453SN-020D
CNMX 120716SN-020D	CNMX 454SN-020D
CNMX 190740SN	CNMX 65XSN-020D
DCGT DCGT 070200FN-F23	DCGT 21.5X0FN-F23
DCGT 070201EN-SF	DCGT 21.50EN-SF
DCGT 070201FN	DCGT 21.50FN
DCGT 070201FN-F23	DCGT 21.50FN-F23
DCGT 070202EN-SF	DCGT 21.5.5EN-SF
DCGT 070202EN-SM	DCGT 21.5.5EN-SM
DCGT 070202FN	DCGT 21.5.5FN
DCGT 070202FN-25P	DCGT 21.5.5FN-25P
DCGT 070202FN-27	DCGT 21.5.5FN-27
DCGT 070204EN-SF	DCGT 21.51EN-SF
DCGT 070204FN	DCGT 21.51FN
DCGT 070204FN-23P	DCGT 21.51FN-23P
DCGT 070204FN-25P	DCGT 21.51FN-25P
DCGT 070204FN-27	DCGT 21.51FN-27
DCGT 11T300FN-F23	DCGT 32.5X0FN-F23
DCGT 11T302EN-SF	DCGT 32.5.5EN-SF
DCGT 11T302FN	DCGT 32.5.5FN
DCGT 11T302FN-25P	DCGT 32.5.5FN-25P
DCGT 11T302FN-27	DCGT 32.5.5FN-27
DCGT 11T304EN-SF	DCGT 32.51EN-SF
DCGT 11T304FL-25Q	DCGT 32.51FL-25Q
DCGT 11T304FN	DCGT 32.51FN

Designation

ISO - ANSI

	ISO	ANSI
	DCGT 11T304FN-23P	DCGT 32.51FN-23P
	DCGT 11T304FN-25P	DCGT 32.51FN-25P
	DCGT 11T304FN-25Q	DCGT 32.51FN-25Q
	DCGT 11T304FN-27	DCGT 32.51FN-27
	DCGT 11T304FR-25Q	DCGT 32.51FR-25Q
	DCGT 11T308EN-SF	DCGT 32.52EN-SF
	DCGT 11T308FL-25Q	DCGT 32.52FL-25Q
	DCGT 11T308FN	DCGT 32.52FN
	DCGT 11T308FN-23P	DCGT 32.52FN-23P
	DCGT 11T308FN-25P	DCGT 32.52FN-25P
	DCGT 11T308FN-25Q	DCGT 32.52FN-25Q
	DCGT 11T308FN-27	DCGT 32.52FN-27
	DCGT 11T308FR-25Q	DCGT 32.52FR-25Q
DCGW	DCGW 070201FN	DCGW 21.50FN
	DCGW 070202FN	DCGW 21.5.5FN
	DCGW 070204FN	DCGW 21.51FN
	DCGW 11T301FN	DCGW 32.50FN
	DCGW 11T302FN	DCGW 32.5.5FN
	DCGW 11T304FN	DCGW 32.51FN
	DCGW 11T308FN	DCGW 32.52FN
DCMT	DCMT 070202EN-F43	DCMT 21.5.5EN-F43
	DCMT 070202EN-SMF	DCMT 21.5.5EN-SMF
	DCMT 070204EN-29	DCMT 21.51EN-29
	DCMT 070204EN-F43	DCMT 21.51EN-F43
	DCMT 070204EN-SF	DCMT 21.51EN-SF
	DCMT 070204EN-SM	DCMT 21.51EN-SM
	DCMT 070204EN-SMF	DCMT 21.51EN-SMF
	DCMT 070204EN-SMQ	DCMT 21.51EN-SMQ
	DCMT 070208EN-SM	DCMT 21.52EN-SM
	DCMT 070208EN-SMF	DCMT 21.52EN-SMF
	DCMT 11T302EN-F43	DCMT 32.5.5EN-F43
	DCMT 11T304EL-29	DCMT 32.51EL-29
	DCMT 11T304EL-SMQ	DCMT 32.51EL-SMQ
	DCMT 11T304EL-SMQ	DCMT 32.51EL-SMQ
	DCMT 11T304EN-F43	DCMT 32.51EN-F43
	DCMT 11T304EN-SF	DCMT 32.51EN-SF
	DCMT 11T304EN-SF	DCMT 32.51EN-SF
	DCMT 11T304EN-SM	DCMT 32.51EN-SM
	DCMT 11T304EN-SMF	DCMT 32.51EN-SMF
	DCMT 11T304EN-SMQ	DCMT 32.51EN-SMQ
	DCMT 11T308EN-29	DCMT 32.52EN-29
	DCMT 11T308EN-F43	DCMT 32.52EN-F43
	DCMT 11T308EN-SF	DCMT 32.52EN-SF
	DCMT 11T308EN-SM	DCMT 32.52EN-SM
	DCMT 11T308EN-SMF	DCMT 32.52EN-SMF
	DCMT 11T308EN-SMQ	DCMT 32.52EN-SMQ
	DCMT 11T312EN-SM	DCMT 32.53EN-SM
DCMX	DCMX 11T304SN	DCMX 32.51SN
	DCMX 11T308SN	DCMX 32.52SN
DE-	DE-TNMG 160408Q-RM	
	DE-TNMG 160408-RM	
	DE-TNMG 220412Q-RM	
	DE-TNMG 220412-RM	
	DE-TNMG 270616Q-RM	
DNGA	DNGA 150604TN-020D	DNGA 441TN-020D
	DNGA 150608TN-020D	DNGA 442TN-020D
	DNGA 150612TN-020D	DNGA 443TN-020D
	DNGA 150616TN-020D	DNGA 444TN-020D
DNGN	DNGN 150704TN-020D	DNGN 451TN-020D
	DNGN 150708TN-020D	DNGN 452TN-020D
	DNGN 150712SN-200C	DNGN 453SN-200C
	DNGN 150712TN-020D	DNGN 453TN-020D
	DNGN 150716PN-100CF	DNGN 454PN-100CF
	DNGN 150716SN-200C	DNGN 454SN-200C
	DNGN 150716TN-020D	DNGN 454TN-020D
DNGP	DNGP 150402FN-F32	DNGP 43.5FN-F32
	DNGP 150404FN-F32	DNGP 431FN-F32
	DNGP 150408FN-F32	DNGP 432FN-F32
	DNGP 150602FN-F32	DNGP 44.5FN-F32
	DNGP 150604FN-F32	DNGP 441FN-F32
	DNGP 150608FN-F32	DNGP 442FN-F32
DNMA	DNMA 150608EN	DNMA 442EN
	DNMA 150612EN	DNMA 443EN
DNMG	DNMG 110404EN-CF	DNMG 331EN-CF
	DNMG 110404EN-M42	DNMG 331EN-M42
	DNMG 110404EN-TF	DNMG 331EN-TF
	DNMG 110404EN-TMF	DNMG 331EN-TMF
	DNMG 110408EN-CF	DNMG 332EN-CF
	DNMG 110408EN-M42	DNMG 332EN-M42
	DNMG 110408EN-TF	DNMG 332EN-TF
	DNMG 110408EN-TM	DNMG 332EN-TM
	DNMG 110408EN-TMF	DNMG 332EN-TMF
	DNMG 110408EN-TRM	DNMG 332EN-TRM
	DNMG 110412EN-CF	DNMG 333EN-CF
	DNMG 110412EN-TMF	DNMG 333EN-TMF
	DNMG 110412EN-TMR	DNMG 333EN-TMR
	DNMG 150404EN-M42	DNMG 431EN-M42
	DNMG 150404EN-M52	DNMG 431EN-M52
	DNMG 150408EN-M42	DNMG 432EN-M42
	DNMG 150408EN-M52	DNMG 432EN-M52
	DNMG 150412EN-TRM	DNMG 433EN-TRM
	DNMG 150604EN-CF	DNMG 441EN-CF
	DNMG 150604EN-M42	DNMG 441EN-M42
	DNMG 150604EN-M52	DNMG 441EN-M52
	DNMG 150604EN-TF	DNMG 441EN-TF
	DNMG 150604EN-TFQ	DNMG 441EN-TFQ
	DNMG 150604EN-TMF	DNMG 441EN-TMF
	DNMG 150608EN-CF	DNMG 442EN-CF
	DNMG 150608EN-M42	DNMG 442EN-M42
	DNMG 150608EN-M52	DNMG 442EN-M52
	DNMG 150608EN-TF	DNMG 442EN-TF
	DNMG 150608EN-TFQ	DNMG 442EN-TFQ
	DNMG 150608EN-TM	DNMG 442EN-TM

	ISO	ANSI
	DNMG 150608EN-TMF	DNMG 442EN-TMF
	DNMG 150608EN-TMR	DNMG 442EN-TMR
	DNMG 150612EN-CF	DNMG 443EN-CF
	DNMG 150612EN-TF	DNMG 443EN-TF
	DNMG 150612EN-TFQ	DNMG 443EN-TFQ
	DNMG 150612EN-TM	DNMG 443EN-TM
	DNMG 150612EN-TM	DNMG 443EN-TM
	DNMG 150612EN-TMM	DNMG 443EN-TMM
	DNMG 150612EN-TMQ	DNMG 443EN-TMQ
	DNMG 150612EN-TMR	DNMG 443EN-TMR
	DNMG 150616EN-TM	DNMG 444EN-TM
	DNMG 150616EN-TMM	DNMG 444EN-TMM
	DNMG 150616EN-TMR	DNMG 444EN-TMR
	DNMG 150616EN-TRM	DNMG 444EN-TRM
DNMM	DNMM 150608EN-TR	DNMM 442EN-TR
	DNMM 150612EN-TR	DNMM 443EN-TR
DNMX	DNMX 150608SN	DNMX 442SN
	DNMX 150708SN-020D	DNMX 452SN-020D
	DNMX 150712SN-020D	DNMX 453SN-020D
	DNMX 150716SN-020D	DNMX 454SN-020D
ENGN	ENGN 130704TN-020D	ENGN 451TN-020D
	ENGN 130708TN-020D	ENGN 452TN-020D
	ENGN 130712SN-025E	ENGN 453TN-025D
	ENGN 130712TN-020D	ENGN 453TN-020D
	ENGN 130716SN-025E	ENGN 454TN-025E
	ENGN 130716SN-200C	ENGN 454TN-200C
	ENGN 130732TN-020D	ENGN 458TN-020D
KNUX	KNUX 160405EL-11	
	KNUX 160405EL-12	
	KNUX 160405ER-11	
	KNUX 160405ER-12	
	KNUX 160410EL-11	
	KNUX 160410EL-12	
	KNUX 160410ER-11	
	KNUX 160410ER-12	
LNMN	LNMN 6688PN-150CE	
RCGT	RCGT 0602MOEN-SM	
	RCGT 0602MOFN-27	
	RCGT 0803MOEN-SM	
	RCGT 0803MOFN-25P	
	RCGT 0803MOFN-27	
	RCGT 1003MOFN-27	
RCGX	RCGX 070400SN-050C	RCGX 2.53SN-050C
	RCGX 090700PN-075CF	RCGX 35PN-075CF
	RCGX 090700PN-100CF	RCGX 35PN-100CF
	RCGX 090700SN-200C	RCGX 35SN-200C
	RCGX 090700TN-020D	RCGX 35TN-020D
	RCGX 120700PN-100CF	RCGX 45PN-100CF
	RCGX 120700PN-150CF	RCGX 45PN-150CF
	RCGX 120700SN-200C	RCGX 45SN-200C
	RCGX 120700TN-020D	RCGX 45TN-020D
	RCGX 151000PN-100CF	RCGX 5(6.3)PN-100CF

	ISO	ANSI
	RCGX 151000PN-150CF	RCGX 5(6.3)PN-150CF
	RCGX 151000SN-200C	RCGX 5(6.3)SN-200C
	RCGX 191000PN-100CF	RCGX 6(6.3)PN-100CF
	RCGX 191000PN-200CF	RCGX 6(6.3)PN-200CF
	RCGX 191000SN-200C	RCGX 6(6.3)SN-200C
	RCGX 251200PN-100CF	RCGX 88PN-100CF
	RCGX 251200PN-200CF	RCGX 88PN-200CF
	RCGX 251200SN-200C	RCGX 88SN-200C
RCMT	RCMT 0803MOEN-25	
	RCMT 1003MOSN-SM	
	RCMT 1204MOSN-SM	
	RCMT 1606MOSN-SM	
	RCMT 2006MOSN-SM	
	RCMT 2507MOSN-SM	
	RCMT 3209MOSN-SM	
RNGN	RNGN 060400TN-020D	RNGN 23TN-020D
	RNGN 120400PN-150CF	RNGN 43PN-150CF
	RNGN 120700PN-150CF	RNGN 45PN-150CF
	RNGN 120700SN-020D	RNGN 45SN-020D
	RNGN 120700SN-200C	RNGN 45SN-200C
	RNGN 120700TN-020D	RNGN 45TN-020D
	RNGN 150700PN-150CE	RNGN 55PN-150CE
	RNGN 150700SN-200C	RNGN 55SN-200C
	RNGN 190700PN-100CF	RNGN 65PN-100CF
	RNGN 190700PN-150CE	RNGN 65PN-150CE
	RNGN 190700SN-200C	RNGN 65SN-200C
	RNGN 190700TN-020D	RNGN 65TN-020D
	RNGN 250700PN-100CF	RNGN 85PN-100CF
	RNGN 250700PN-200CE	RNGN 85PN-200CE
	RNGN 250700TN-020D	RNGN 85TN-020D
	RNGN 310900PN-100CF	RNGN 106PN-100CF
	RNGN 310900PN-215CF	RNGN 106PN-215CF
RNMN	RNMN 090300FN	RNMN 32FN
	RNMN 090300TN-020D	RNMN 32TN-020D
	RNMN 120300TN-020D	RNMN 42TN-020D
	RNMN 120400FN	RNMN 43FN
	RNMN 120400TN-020D	RNMN 43TN-020D
	RNMN 250400TN-050D	RNMN 83TN-050D
	RNMN 250600TN-050D	RNMN 84TN-050D
SCGT	SCGT 09T304EN-SF	SCGT 32.51EN-SF
	SCGT 09T308FN-27P	SCGT 32.52FN-27P
	SCGT 120408FN-25P	SCGT 432FN-25P
	SCGT 120408FN-27	SCGT 432FN-27
SCMT	SCMT 09T304EN-SF	SCMT 32.51EN-SF
	SCMT 09T304EN-SM	SCMT 32.51EN-SM
	SCMT 09T304EN-SMF	SCMT 32.51EN-SMF
	SCMT 09T308EN-SF	SCMT 32.52EN-SF
	SCMT 09T308EN-SM	SCMT 32.52EN-SM
	SCMT 09T308EN-SMF	SCMT 32.52EN-SMF
	SCMT 120408EN-SF	SCMT 432EN-SF
	SCMT 120408EN-SM	SCMT 432EN-SM

CERATIZIT hard material matters

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	ISO	ANSI
	SCMT 120408EN-SMF	SCMT 432EN-SMF
	SCMT 120412EN-SM	SCMT 433EN-SM
SCMX	SCMX 120408EN	SCMX 432EN
	SCMX 120412EN	SCMX 433EN
	SCMX 190612EN	SCMX 643EN
	SCMX 190616EN	SCMX 644EN
SNGA	SNGA 120408SN-025C	SNGA 432SN-025C
	SNGA 120412SN-025C	SNGA 433SN-025C
SNGN	SNGN 090308SN-025C	SNGN 322SN-025C
	SNGN 120408SN-015D	SNGN 432SN-015D
	SNGN 120408TN-020D	SNGN 432TN-020D
	SNGN 120412PN-150CF	SNGN 433PN-150CF
	SNGN 120412SN-015D	SNGN 433SN-015D
	SNGN 120412TN-020D	SNGN 433TN-020D
	SNGN 120716PN-100CF	SNGN 454PN-100CF
	SNGN 120716PN-150CF	SNGN 454PN-150CF
	SNGN 120716SN-025C	SNGN 454SN-025C
	SNGN 120716SN-200C	SNGN 454SN-200C
	SNGN 120720PN-100CF	SNGN 455PN-100CF
	SNGN 120720PN-150CF	SNGN 455PN-150CF
	SNGN 120720SN-200C	SNGN 455SN-200C
	SNGN 120730PN-028C	SNGN 457.5PN-028C
	SNGN 150712TN-020D	SNGN 553TN-020D
	SNGN 150716PN-150CF	SNGN 554PN-150CF
	SNGN 150720SN-200C	SNGN 555SN-200C
	SNGN 190716PN-150CF	SNGN 654PN-150CF
	SNGN 190716SN-025E	SNGN 654SN-025E
	SNGN 190716TN-020D	SNGN 654TN-020D
	SNGN 190720PN-100CF	SNGN 655PN-100CF
	SNGN 190720SN-200C	SNGN 655SN-200C
	SNGN 190720TN-020D	SNGN 655TN-020D
	SNGN 250724PN-100CF	SNGN 856PN-100CF
	SNGN 250724PN-150CE	SNGN 856PN-150CE
	SNGN 250724SN-050C	SNGN 856SN-050C
	SNGN 250724SN-200C	SNGN 856SN-200C
	SNGN 250924PN-100CF	SNGN 866PN-100CF
	SNGN 250924PN-150CE	SNGN 866PN-150CE
	SNGN 250924SN-030E	SNGN 866SN-030E
	SNGN 250924SN-200C	SNGN 866SN-200C
	SNGN 250924TN-020D	SNGN 866TN-020D
SNMA	SNMA 120408EN	SNMA 432EN
	SNMA 120412TN-020D	SNMA 433TN-020D
	SNMA 120416EN	SNMA 434EN
	SNMA 150616EN	SNMA 544EN
	SNMA 190616EN	SNMA 644EN
SNMG	SNMG 090308EN	SNMG 322EN
	SNMG 120404EN-TF	SNMG 431EN-TF
	SNMG 120408EN-M42	SNMG 432EN-M42
	SNMG 120408EN-M52	SNMG 432EN-M52
	SNMG 120408EN-TM	SNMG 432EN-TM
	SNMG 120408EN-TMF	SNMG 432EN-TMF
	SNMG 120412EN-M42	SNMG 433EN-M42

	ISO	ANSI
	SNMG 120412EN-TM	SNMG 433EN-TM
	SNMG 120412EN-TMF	SNMG 433EN-TMF
	SNMG 120412EN-TMR	SNMG 433EN-TMR
	SNMG 120412EN-TRM	SNMG 433EN-TRM
	SNMG 120416EN-TM	SNMG 434EN-TM
	SNMG 120416EN-TMR	SNMG 434EN-TMR
	SNMG 150612EN-TMR	SNMG 543EN-TMR
	SNMG 150616EN-TMR	SNMG 544EN-TMR
	SNMG 190612EN-TMR	SNMG 643EN-TMR
	SNMG 190616EN-TMR	SNMG 644EN-TMR
SNMM	SNMM 120408EN-TR	SNMM 432EN-TR
	SNMM 120408EN-TUB	SNMM 432EN-TUB
	SNMM 120412EN-TR	SNMM 433EN-TR
	SNMM 150612EN-TR	SNMM 543EN-TR
	SNMM 190612EN-TUB	SNMM 643EN-TUB
	SNMM 190616EN-TR	SNMM 644EN-TR
	SNMM 190616SN-TRR	SNMM 644SN-TRR
	SNMM 250724EN-TR	SNMM 856EN-TR
	SNMM 250724SN-TRR	SNMM 856SN-TRR
SNMN	SNMN 090308FN	SNMN 322FN
	SNMN 090308TN-020D	SNMN 322TN-020D
	SNMN 090312FN	SNMN 323FN
	SNMN 090312TN-020D	SNMN 323TN-020D
	SNMN 090316FN	SNMN 324FN
	SNMN 090316TN-020D	SNMN 324TN-020D
	SNMN 120312FN	SNMN 423FN
	SNMN 120312TN-020D	SNMN 423TN-020D
	SNMN 120316FN	SNMN 424FN
	SNMN 120316TN-020D	SNMN 424TN-020D
	SNMN 120412FN	SNMN 433FN
	SNMN 120412TN-020D	SNMN 433TN-020D
	SNMN 120416FN	SNMN 434FN
	SNMN 120416TN-020D	SNMN 434TN-020D
SNMX	SNMX 120712SN-020D	SNMX 453SN-020D
	SNMX 120716SN-020D	SNMX 454SN-020D
SNUN	SNUN 120412EN	SNUN 433EN
	SNUN 120416EN	SNUN 434EN
SPMR	SPMR 090304EN	SPMR 321EN
	SPMR 090308EN-57	SPMR 322EN-57
	SPMR 120304EN	SPMR 421EN
	SPMR 120308EN	SPMR 422EN
	SPMR 120308ER	SPMR 422ER
SPUN	SPUN 120308EN	SPUN 422EN
	SPUN 120312EN	SPUN 423EN
TCGT	TCGT 090202FN	TCGT 1.81.5.5FN
	TCGT 090204FN	TCGT 1.81.51FN
	TCGT 110202EN-SF	TCGT 21.5.5EN-SF
	TCGT 110202EN-SM	TCGT 21.5.5EN-SM
	TCGT 110202FN-27	TCGT 21.5.5FN-27
	TCGT 110204EN-SF	TCGT 21.51EN-SF
	TCGT 110204FN	TCGT 21.51FN

	ISO	ANSI
	TCGT 110204FN-27	TCGT 21.51FN-27
	TCGT 110208EN-SF	TCGT 21.52EN-SF
	TCGT 110208FN	TCGT 21.52FN
	TCGT 16T302FN-27	TCGT 32.5.5FN-27
	TCGT 16T304EN-SF	TCGT 32.51EN-SF
	TCGT 16T304FN	TCGT 32.51FN
	TCGT 16T304FN-27	TCGT 32.51FN-27
	TCGT 16T308EN-SF	TCGT 32.52EN-SF
	TCGT 16T308FN	TCGT 32.52FN
	TCGT 16T308FN-27	TCGT 32.52FN-27
TCMT	TCMT 090204EN-SM	TCMT 1.81.51EN-SM
	TCMT 110204EN-F43	TCMT 21.51EN-F43
	TCMT 110204EN-SF	TCMT 21.51EN-SF
	TCMT 110204EN-SM	TCMT 21.51EN-SM
	TCMT 110204EN-SMF	TCMT 21.51EN-SMF
	TCMT 110208EN-SF	TCMT 21.52EN-SF
	TCMT 110208EN-SM	TCMT 21.52EN-SM
	TCMT 110208EN-SMF	TCMT 21.52EN-SMF
	TCMT 16T304EN-F43	TCMT 32.51EN-F43
	TCMT 16T304EN-SF	TCMT 32.51EN-SF
	TCMT 16T304EN-SM	TCMT 32.51EN-SM
	TCMT 16T304EN-SMF	TCMT 32.51EN-SMF
	TCMT 16T308EN-F43	TCMT 32.52EN-F43
	TCMT 16T308EN-SF	TCMT 32.52EN-SF
	TCMT 16T308EN-SM	TCMT 32.52EN-SM
	TCMT 16T308EN-SMF	TCMT 32.52EN-SMF
	TCMT 220408EN-SM	TCMT 432EN-SM
TCMW	TCMW 16T304FN	TCMW 32.51FN
TCMX	TCMX 160404EN	TCMX 331EN
	TCMX 160408EN	TCMX 332EN
	TCMX 160412EN	TCMX 333EN
	TCMX 220404EN	TCMX 431EN
	TCMX 220408EN	TCMX 432EN
	TCMX 220412EN	TCMX 433EN
TNGA	TNGA 160408TN-020D	TNGA 332TN-020D
TNGN	TNGN 110308TN-020D	TNGN 222TN-020D
	TNGN 160408TN-020D	TNGN 332TN-020D
	TNGN 220408TN-020D	TNGN 432TN-020D
TNMA	TNMA 160408EN	TNMA 332EN
	TNMA 160412EN	TNMA 333EN
	TNMA 220408EN	TNMA 432EN
	TNMA 220412EN	TNMA 433EN
	TNMA 220416EN	TNMA 434EN
TNMG	TNMG 110302EN	TNMG 22.5EN
	TNMG 110304EN-TF	TNMG 221EN-TF
	TNMG 160404EN-CF	TNMG 331EN-CF
	TNMG 160404EN-M42	TNMG 331EN-M42
	TNMG 160404EN-M52	TNMG 331EN-M52
	TNMG 160404EN-TF	TNMG 331EN-TF
	TNMG 160404EN-TMF	TNMG 331EN-TMF
	TNMG 160404ER	TNMG 331ER
	TNMG 160408EL	TNMG 332EL

	ISO	ANSI
	TNMG 160408EN-CF	TNMG 332EN-CF
	TNMG 160408EN-M42	TNMG 332EN-M42
	TNMG 160408EN-M52	TNMG 332EN-M52
	TNMG 160408EN-TF	TNMG 332EN-TF
	TNMG 160408EN-TM	TNMG 332EN-TM
	TNMG 160408EN-TMF	TNMG 332EN-TMF
	TNMG 160408EN-TMR	TNMG 332EN-TMR
	TNMG 160408ER	TNMG 332ER
	TNMG 160412EN-CF	TNMG 333EN-CF
	TNMG 160412EN-TF	TNMG 333EN-TF
	TNMG 160412EN-TM	TNMG 333EN-TM
	TNMG 160412EN-TMF	TNMG 333EN-TMF
	TNMG 160412EN-TMR	TNMG 333EN-TMR
	TNMG 160412EN-TRM	TNMG 333EN-TRM
	TNMG 220408EN-TM	TNMG 432EN-TM
	TNMG 220408EN-TMR	TNMG 432EN-TMR
	TNMG 220408EN-TRM	TNMG 432EN-TRM
	TNMG 220412EN-TM	TNMG 433EN-TM
	TNMG 220412EN-TMR	TNMG 433EN-TMR
	TNMG 220412EN-TRM	TNMG 433EN-TRM
	TNMG 220416EN-TM	TNMG 434EN-TM
	TNMG 220416EN-TMR	TNMG 434EN-TMR
	TNMG 220416EN-TRM	TNMG 434EN-TRM
TNMM	TNMM 160408EN-TR	TNMM 332EN-TR
	TNMM 160408SN-TRR	TNMM 332SN-TRR
	TNMM 160412EN-TR	TNMM 333EN-TR
	TNMM 220408EN-TR	TNMM 432EN-TR
	TNMM 220412EN-TR	TNMM 433EN-TR
	TNMM 220412SN-TRR	TNMM 433SN-TRR
	TNMM 220416EN-TR	TNMM 434EN-TR
	TNMM 270612EN-TUB	TNMM 543EN-TUB
	TNMM 270616EN-TR	TNMM 544EN-TR
TNMN	TNMN 110304FN	TNMN 221FN
	TNMN 110304TN-020D	TNMN 221TN-020D
	TNMN 110308FN	TNMN 222FN
	TNMN 110308TN-020D	TNMN 222TN-020D
	TNMN 110312TN-020D	TNMN 223TN-020D
TNMX	TNMX 160408SN	TNMX 332SN
TNUN	TNUN 160308EN	TNUN 322EN
	TNUN 160412EN	TNUN 333EN
	TNUN 160416EN	TNUN 334EN
TPGN	TPGN 160304TN-020D	TPGN 321TN-020D
TPMR	TPMR 110304EL	TPMR 221EL
	TPMR 110304EN	TPMR 221EN
	TPMR 110304ER	TPMR 221ER
	TPMR 110308EN	TPMR 222EN
	TPMR 160304EL	TPMR 321EL
	TPMR 160304EN	TPMR 321EN
	TPMR 160304ER	TPMR 321ER
	TPMR 160308EL	TPMR 322EL
	TPMR 160308EN	TPMR 322EN

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	ISO	ANSI
	TPMR 160308EN-57	TPMR 322EN-57
	TPMR 160308ER	TPMR 322ER
TPUN	TPUN 110304EN	TPUN 221EN
	TPUN 110308EN	TPUN 222EN
	TPUN 160304EN	TPUN 321EN
	TPUN 160304FN	TPUN 321FN
	TPUN 160308EN	TPUN 322EN
	TPUN 160308FN	TPUN 322FN
	TPUN 160312EN	TPUN 323EN
	TPUN 220408EN	TPUN 432EN
	TPUN 220412EN	TPUN 433EN
VCGT	VCGT 110300FN-F23	VCGT 22X0FN-F23
	VCGT 110301EN-SF	VCGT 220EN-SF
	VCGT 110301FN-F23	VCGT 220FN-F23
	VCGT 110302EN-SF	VCGT 220.5EN-SF
	VCGT 110302EN-SMF	VCGT 22.5EN-SMF
	VCGT 110302FN-25P	VCGT 220.5FN-25P
	VCGT 110302FN-27	VCGT 22.5FN-27
	VCGT 110304EN-SF	VCGT 221EN-SF
	VCGT 110304FL-25Q	VCGT 221FL-25Q
	VCGT 110304FN-25P	VCGT 221FN-25P
	VCGT 110304FN-27	VCGT 221FN-27
	VCGT 110304FR-25Q	VCGT 221FR-25Q
	VCGT 110308EN-SF	VCGT 222EN-SF
	VCGT 110308FN-27	VCGT 222FN-27
	VCGT 160400FN-F23	VCGT 33X0FN-F23
	VCGT 160401FN-F23	VCGT 330FN-F23
	VCGT 160404EN-SF	VCGT 331EN-SF
	VCGT 160404FN-25P	VCGT 331FN-25P
	VCGT 160404FN-27	VCGT 331FN-27
	VCGT 160408EN-SF	VCGT 332EN-SF
	VCGT 160408FN-25P	VCGT 332FN-25P
	VCGT 160408FN-27	VCGT 332FN-27
	VCGT 160412FN-25P	VCGT 333FN-25P
	VCGT 160412FN-27	VCGT 333FN-27
	VCGT 220530FN-25P	VCGT 43.57.5FN-25P
	VCGT 220530FN-27	VCGT 43.57.5FN-27
VCMT	VCMT 110304EN-SMF	VCMT 221EN-SMF
	VCMT 160404EN-29	VCMT 331EN-29
	VCMT 160404EN-SF	VCMT 331EN-SF
	VCMT 160404EN-SM	VCMT 331EN-SM
	VCMT 160404EN-SMF	VCMT 331EN-SMF
	VCMT 160406EN-SM	
	VCMT 160408EN-29	VCMT 332EN-29
	VCMT 160408EN-SF	VCMT 332EN-SF
	VCMT 160408EN-SM	VCMT 332EN-SM
	VCMT 160408EN-SMF	VCMT 332EN-SMF
	VCMT 160412EN-25	VCMT 333EN-25
	VCMT 160412EN-29	VCMT 333EN-29
	VCMT 160412EN-SM	VCMT 333EN-SM
	VCMT 220530EN-25	VCMT 447EN-25
VCMW	VCMW 160404FN	VCMW 331FN

	ISO	ANSI
VCUW	VCUW 160404FL	VCUW 331FL
	VCUW 160404FN	VCUW 331FN
	VCUW 160404FR	VCUW 331FR
	VCUW 160408FL	VCUW 332FL
	VCUW 160408FN	VCUW 332FN
	VCUW 160408FN-F3	VCUW 332FN-F3
	VCUW 160408FN-M4	VCUW 332FN-M4
	VCUW 160408FR	VCUW 332FR
	VCUW 160412FN	VCUW 333FN
	VCUW 160412FN-F3	VCUW 333FN-F3
	VCUW 160412FN-M4	VCUW 333FN-M4
	VCUW 160412TN-M4	VCUW 333TN-M4
	VCUW 160416FN	VCUW 334FN
	VCUW 220530FN	VCUW 43.57.5FN
	VCUW 220530FN-M4	VCUW 43.57.5FN-M4
VNGA	VNGA 160408TN-020D	VNGA 332TN-020D
	VNGA 160412TN-020D	VNGA 333TN-020D
VNGP	VNGP 160402FN-F32	VNGP 33.5FN-F32
	VNGP 160404FN-F32	VNGP 331FN-F32
VNMG	VNMG 160404EN-F40	VNMG 331EN-F40
	VNMG 160404EN-M40	VNMG 331EN-M40
	VNMG 160408EN-F40	VNMG 332EN-F40
	VNMG 160408EN-M40	VNMG 332EN-M40
VPGT	VPGT 220516FN-25P	VPGT 444FN-25P
	VPGT 220516FN-27	VPGT 43.54FN-27
VPMT	VPMT 220516EN-25	VPMT 43.54EN-25
VPUW	VPUW 220516FN-F3	VPUW 43.54FN-F3
	VPUW 220516FN-M4	VPUW 43.54FN-M4
	VPUW 220612FN-F3	VPUW443FN-F3
	WNMG 060404EN-CF	WNMG 231EN-CF
	WNMG 060404EN-M42	WNMG 231EN-M42
	WNMG 060404EN-M52	WNMG 231EN-M52
	WNMG 060404EN-TF	WNMG 231EN-TF
	WNMG 060404EN-TFQ	WNMG 331EN-TFQ
	WNMG 060404EN-TMF	WNMG 231EN-TMF
	WNMG 060408EN-CF	WNMG 232EN-CF
	WNMG 060408EN-M42	WNMG 232EN-M42
	WNMG 060408EN-M52	WNMG 232EN-M52
	WNMG 060408EN-TFQ	WNMG 332EN-TFQ
	WNMG 060408EN-TM	WNMG 232EN-TM
	WNMG 060408EN-TMF	WNMG 232EN-TMF
	WNMG 060408EN-TMM	WNMG 232EN-TMM
	WNMG 060408EN-TRM	WNMG 232EN-TRM
	WNMG 060412EN-TMF	WNMG 233EN-TMF
	WNMG 060412EN-TRM	WNMG 233EN-TRM
	WNMG 080404EN-M42	WNMG 431EN-M42
	WNMG 080404EN-M52	WNMG 431EN-M52
	WNMG 080404EN-TF	WNMG 431EN-TF
	WNMG 080404EN-TFQ	WNMG 431EN-TFQ
	WNMG 080404EN-TMF	WNMG 431EN-TMF
	WNMG 080408EN-CF	WNMG 432EN-CF

	ISO	ANSI
	WNMG 080408EN-M42	WNMG 432EN-M42
	WNMG 080408EN-M52	WNMG 432EN-M52
	WNMG 080408EN-TF	WNMG 432EN-TF
	WNMG 080408EN-TFQ	WNMG 432EN-TFQ
	WNMG 080408EN-TM	WNMG 432EN-TM
	WNMG 080408EN-TMF	WNMG 432EN-TMF
	WNMG 080408EN-TMM	WNMG 432EN-TMM
	WNMG 080408EN-TMQ	WNMG 432EN-TMQ
	WNMG 080408EN-TMR	WNMG 432EN-TMR
	WNMG 080408EN-TMR	WNMG 432EN-TMR
	WNMG 080412EN-CF	WNMG 433EN-CF
	WNMG 080412EN-M42	WNMG 433EN-M42
	WNMG 080412EN-TFQ	WNMG 433EN-TFQ
	WNMG 080412EN-TM	WNMG 433EN-TM
	WNMG 080412EN-TMF	WNMG 433EN-TMF
	WNMG 080412EN-TMM	WNMG 433EN-TMM
	WNMG 080412EN-TMQ	WNMG 433EN-TMQ
	WNMG 080412EN-TMR	WNMG 433EN-TMR
	WNMG 080412EN-TRM	WNMG 433EN-TRM
	WNMG 080416EN-TMR	WNMG 434EN-TMR
	WNMG 080416EN-TRM	WNMG 434EN-TRM
XCET	XCET 040102FL-27P	
	XCET 040102FL-27Q	
	XCET 040102FR-27P	
	XCET 040102FR-27Q	
	XCET 040104FL-27P	
	XCET 040104FL-27Q	
	XCET 040104FR-27P	
	XCET 040104FR-27Q	
	XCET 050202FN-27P	
	XCET 050202FN-27Q	
	XCET 050204FN-27P	
	XCET 050204FN-27Q	
	XCET 060202FN-27P	
	XCET 060202FN-27Q	
	XCET 060204FN-27P	
	XCET 060204FN-27Q	
	XCET 070304FN-27P	
	XCET 070304FN-27Q	
	XCET 080304FN-27P	
	XCET 080304FN-27Q	
	XCET 09T304FN-27P	
	XCET 09T304FN-27Q	
	XCET 10T304FN-27P	
	XCET 10T304FN-27Q	
	XCET 10T308FN-27P	
	XCET 10T308FN-27Q	
	XCET 130404FN-27P	
	XCET 130404FN-27Q	
	XCET 130408FN-27P	
	XCET 130408FN-27Q	
	XCET 170508FN-27P	

	ISO	ANSI
	XCET 170508FN-27Q	
XCGT	XCGT 400632FN-25	
XCNT	XCNT 040102EL	
	XCNT 040102ER	
	XCNT 040104EL	
	XCNT 040104ER	
	XCNT 050202EN	
	XCNT 050204EN	
	XCNT 060202EN	
	XCNT 060204EN	
	XCNT 070304EN	
	XCNT 080304EN	
	XCNT 080304EN-M50Q	
	XCNT 09T304EN	
	XCNT 09T304EN-M50Q	
	XCNT 10T304EN	
	XCNT 10T304EN-M50Q	
	XCNT 10T308EN	
	XCNT 10T308EN-M50Q	
	XCNT 130404EN	
	XCNT 130404EN-M50Q	
	XCNT 130408EN	
	XCNT 130408EN-M50Q	
	XCNT 170508EN	
	XCNT 170508EN-M50Q	

CERATIZIT hard material matters

Cutting data

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ .15% C	1	125
		annealed	.15% - .45% C	2	150 - 250
		tempered	≥ .45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% Si	23	80
		hardened	< 12% Si	24	90
		non hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	–
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	–
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

Uncoated carbide			
H10T v_c [m/min]	**H210T** v_c [m/min]	**H216T** v_c [m/min]	**CTW7120** v_c [m/min]
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–
120 - 160	140 - 200	120 - 160	–
90 - 140	100 - 160	90 - 140	–
130 - 170	160 - 200	130 - 170	–
90 - 130	110 - 150	90 - 130	–
140 - 200	160 - 220	140 - 200	–
120 - 160	140 - 180	120 - 160	–
300 - 2500	300 - 3000	300 - 2500	100 - 500
200 - 2000	200 - 2500	200 - 2000	100 - 300
400 - 1500	400 - 2000	400 - 1500	100 - 500
400 - 1500	400 - 1800	400 - 1500	100 - 300
200 - 800	200 - 1000	200 - 800	100 - 300
250 - 600	250 - 800	250 - 600	100 - 500
200 - 600	200 - 800	200 - 600	100 - 500
150 - 400	150 - 600	150 - 400	100 - 300
150 - 300	150 - 400	150 - 300	100 - 300
80 - 180	100 - 220	80 - 180	80 - 180
60 - 150	80 - 200	60 - 150	60 - 150
100 - 250	100 - 300	100 - 250	100 - 250
–	35 - 50	–	–
–	25 - 40	–	–
–	25 - 40	–	–
–	20 - 30	–	–
–	15 - 25	–	–
–	80 - 140	–	50 - 120
–	40 - 100	–	30 - 50
–	–	–	–
–	–	–	–
–	–	–	–
–	–	–	–

Cutting data

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ .15% C	1	125
		annealed	.15% - .45% C	2	150 - 250
		tempered	≥ .45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% Si	23	80
		hardened	< 12% Si	24	90
		non hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	–
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	–
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

Coated carbide						
AMZ v_c [m/min]	**CTP4115** v_c [m/min]	**CTP5110** v_c [m/min]	**CTC3110** v_c [m/min]	**CTCK120** v_c [m/min]	**CTP5115** v_c [m/min]	**CTCP115** v_c [m/min]
110 - 160	–	–	–	230 - 450	–	250 - 500
90 - 140	–	–	–	200 - 340	–	220 - 400
80 - 120	–	–	–	160 - 270	–	180 - 300
90 - 130	–	–	–	200 - 360	–	250 - 400
80 - 120	–	–	–	150 - 290	–	200 - 320
70 - 90	–	–	–	130 - 260	–	150 - 280
90 - 110	–	–	–	150 - 290	–	180 - 320
70 - 90	–	–	–	100 - 260	–	120 - 280
160 - 220	–	–	–	160 - 290	–	200 - 320
70 - 110	–	–	–	130 - 250	–	150 - 280
–	–	150 - 230	–	–	130 - 220	220 - 300
90 - 140	–	140 - 190	–	–	120 - 180	–
–	–	60 - 100	–	–	50 - 90	–
–	–	–	–	–	–	–
180 - 220	–	–	250 - 450	150 - 400	–	140 - 370
140 - 180	–	–	220 - 350	180 - 350	–	140 - 330
160 - 220	–	–	220 - 380	200 - 450	–	190 - 430
120 - 180	–	–	200 - 350	160 - 300	–	140 - 270
180 - 240	–	–	200 - 400	200 - 550	–	180 - 520
160 - 200	–	–	180 - 320	160 - 350	–	150 - 330
300 - 3200	300 - 3500	–	–	–	–	–
200 - 2800	200 - 2800	–	–	–	–	–
400 - 2000	400 - 3000	–	–	–	–	–
400 - 2000	400 - 3000	–	–	–	–	–
200 - 1200	200 - 2000	–	–	–	–	–
250 - 1000	250 - 1000	–	–	–	–	–
200 - 1000	200 - 1000	–	–	–	–	–
150 - 800	150 - 800	–	–	–	–	–
150 - 500	150 - 500	–	–	–	–	–
80 - 200	80 - 200	–	–	–	–	–
80 - 220	80 - 220	–	–	–	–	–
100 - 320	100 - 320	–	–	–	–	–
30 - 50	–	80 - 120	–	–	80 - 120	–
20 - 40	–	60 - 100	–	–	60 - 100	–
20 - 40	–	35 - 90	–	–	35 - 90	–
18 - 30	–	30 - 50	–	–	30 - 50	–
15 - 25	–	30 - 45	–	–	30 - 45	–
80 - 140	–	70 - 120	–	–	70 - 120	–
40 - 100	–	40 - 70	–	–	40 - 70	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–

Cutting data

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ .15% C	1	125
		annealed	.15% - .45% C	2	150 - 250
		tempered	≥ .45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% Si	23	80
		hardened	< 12% Si	24	90
		non hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	–
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	–
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

Coated carbide				
CTP2120 v_c [m/min]	**CTCP125** v_c [m/min]	**CTPM125** v_c [m/min]	**CTC1135** v_c [m/min]	**CTC2135** v_c [m/min]
–	190 - 290	120 - 280	180 - 230	180 - 230
–	170 - 240	130 - 250	170 - 190	170 - 190
–	130 - 200	100 - 180	130 - 150	130 - 150
–	170 - 250	130 - 200	170 - 190	170 - 190
–	100 - 190	60 - 180	90 - 150	90 - 150
–	80 - 170	50 - 150	70 - 130	70 - 130
–	130 - 210	80 - 200	120 - 200	120 - 200
–	80 - 160	40 - 140	50 - 100	50 - 100
–	130 - 220	100 - 200	140 - 180	140 - 180
–	110 - 190	80 - 150	110 - 160	110 - 160
150 - 200	140 - 210	120 - 250	140 - 200	140 - 200
120 - 200	100 - 210	100 - 220	110 - 190	110 - 190
90 - 160	–	60 - 160	80 - 150	80 - 150
60 - 80	70 - 100	40 - 100	55 - 75	55 - 75
120 - 160	130 - 210	–	–	–
90 - 130	120 - 200	–	–	–
120 - 160	120 - 240	–	–	–
120 - 180	120 - 200	–	–	–
140 - 220	150 - 250	–	–	–
110 - 160	120 - 200	–	–	–
100 - 600	–	–	–	–
100 - 400	–	–	–	–
100 - 600	–	–	–	–
100 - 400	–	–	–	–
100 - 400	–	–	–	–
100 - 600	–	–	–	–
100 - 600	–	–	–	–
100 - 400	–	–	–	–
100 - 400	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
20 - 50	–	–	–	20 - 40
20 - 50	–	–	–	15 - 35
15 - 40	–	–	–	8 - 25
20 - 35	–	–	–	4 - 15
10 - 25	–	–	–	4 - 15
80 - 140	–	–	–	80 - 130
25 - 45	–	–	–	15 - 35
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–

CERATIZIT hard material matters

Cutting data

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ .15% C	1	125
		annealed	.15% - .45% C	2	150 - 250
		tempered	≥ .45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% Si	23	80
		hardened	< 12% Si	24	90
		non hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	–
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	–
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

Cermet			CBN			PCD	
TCC410 v_c [m/min]	TCM407 v_c [m/min]	TCM10 v_c [m/min]	TA100 v_c [m/min]	TA120 v_c [m/min]	TA201 v_c [m/min]	CTD4110 v_c [m/min]	CTD4125 v_c [m/min]
400 - 520	340 - 430	280 - 350	–	–	–	–	–
350 - 400	290 - 340	230 - 270	–	–	–	–	–
300 - 350	240 - 290	190 - 240	–	–	–	–	–
400 - 440	320 - 360	260 - 300	–	–	–	–	–
300 - 360	230 - 280	180 - 230	–	–	–	–	–
250 - 300	200 - 250	140 - 220	–	–	–	–	–
310 - 380	250 - 310	160 - 200	–	–	–	–	–
280 - 400	230 - 330	160 - 200	–	–	–	–	–
350 - 400	280 - 340	230 - 270	–	–	–	–	–
260 - 310	210 - 250	170 - 250	–	–	–	–	–
250 - 320	200 - 260	170 - 240	–	–	–	–	–
300 - 350	250 - 280	200 - 240	–	–	–	–	–
–	–	–	–	–	–	–	–
210 - 250	160 - 200	130 - 160	–	–	–	–	–
340 - 480	–	–	–	–	–	–	–
260 - 360	–	–	500 - 1500	500 - 1500	–	–	–
360 - 520	280 - 430	220 - 300	–	–	–	–	–
300 - 400	250 - 380	180 - 250	**200 - 700	**200 - 700	**200 - 700	–	–
330 - 500	250 - 400	250 - 350	–	–	–	–	–
180 - 320	180 - 320	160 - 250	–	–	–	–	–
–	–	–	–	–	–	300 - 4000	300 - 4000
–	–	–	–	–	–	300 - 1500	300 - 1500
–	–	–	–	–	–	300 - 4000	300 - 4000
–	–	–	–	–	–	300 - 2000	300 - 2000
–	–	–	–	–	–	200 - 700	200 - 700
–	–	–	–	–	–	–	–
–	–	–	–	–	–	100 - 700	100 - 700
–	–	–	–	–	–	100 - 1500	100 - 1500
–	–	–	–	–	–	300 - 3000	300 - 3000
–	–	–	–	–	–	80 - 300	80 - 300
–	–	–	–	–	–	80 - 300	80 - 300
–	–	–	–	–	–	50 - 200	50 - 200
–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–
–	–	–	–	–	100 - 250	–	–
–	–	–	–	–	100 - 250	–	–
–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–
–	–	–	–	–	70 - 250	–	–
–	–	–	–	–	70 - 150	–	–
–	–	–	–	–	–	–	–
–	–	–	40 - 120	40 - 120	–	–	–

** From cast iron GGG60 onwards

CERATIZIT hard material matters

Cutting data

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ .15% C	1	125
		annealed	.15% - .45% C	2	150 - 250
		tempered	≥ .45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% Si	23	80
		hardened	< 12% Si	24	90
		non hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	–
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	–
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

Si_3N_4			Sialon	Ceramic
CTN3105 v_c [m/min]	**CTN3110** v_c [m/min]	**CTM3110** v_c [m/min]	**CTI3105** v_c [m/min]	**CTS3105** v_c [m/min]
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
300 - 1500	500 - 1100	500 - 1100	600 - 1200	***400 -1200
200 - 800	300 - 800	300 - 800	600 - 1200	***150 - 500
200 - 700	200 - 600	200 - 600	300 - 700	***250 - 600
200 - 700	250 - 450	250 - 450	–	–
300 - 1000	300 - 800	300 - 800	–	–
250 - 700	250 - 600	250 - 600	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
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–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	40 - 200
–	–	–	–	30 - 180
–	–	–	–	70 - 200
–	–	–	–	60 - 70

*** Only for finishing

CERATIZIT hard material matters

Cutting data

EcoCut / ProfileMaster

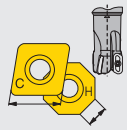
Work piece material		Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ .15% C	1	125
		annealed	.15% - .45% C	2	150 - 250
		tempered	≥ .45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% Si	23	80
		hardened	< 12% Si	24	90
		non hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	–
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	–
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

Uncoated carbide			Coated carbide			
H210T v_c [m/min]	H216T v_c [m/min]	TSM30 v_c [m/min]	CTC1425 v_c [m/min]	CTC1435 v_c [m/min]	CTP2440 v_c [m/min]	CM45 v_c [m/min]
–	–	–	150 - 300	140 - 280	120 - 250	60 - 230
–	–	–	120 - 220	100 - 200	80 - 180	60 - 160
–	–	–	100 - 200	80 - 180	60 - 150	50 - 130
–	–	–	120 - 220	100 - 200	80 - 180	60 - 160
–	–	–	100 - 180	80 - 160	60 - 150	50 - 130
–	–	–	80 - 150	70 - 140	60 - 120	50 - 100
–	–	–	110 - 190	100 - 180	80 - 160	60 - 140
–	–	–	70 - 150	60 - 140	50 - 120	40 - 100
–	–	–	110 - 220	100 - 200	50 - 200	40 - 200
–	–	–	100 - 180	80 - 150	50 - 150	40 - 150
–	–		120 - 220	100 - 200	50 - 200	40 - 200
–	–		100 - 200	100 - 180	50 - 180	40 - 180
–	–		–	–	50 - 100	40 - 100
–	–		–	–	50 - 80	40 - 80
140 - 200	120 - 160	80 - 140	130 - 280	120 - 250	–	100 - 180
100 - 160	90 - 140	60 - 120	130 - 280	120 - 250	–	80 - 160
160 - 200	130 - 170	90 - 150	120 - 280	110 - 250	–	100 - 180
110 - 150	90 - 130	60 - 110	120 - 280	110 - 250	–	80 - 160
160 - 220	140 - 200	100 - 180	110 - 280	100 - 250	–	100 - 200
140 - 180	120 - 160	80 - 140	110 - 280	100 - 250	–	90 - 160
120 - 3000	100 - 2500	80 - 2000	–	–	80 - 2000	80 - 2000
120 - 2500	100 - 2000	80 - 1500	–	–	80 - 1500	80 - 1500
120 - 2000	100 - 1500	80 - 1500	–	–	80 - 1500	80 - 1500
120 - 1800	100 - 1500	80 - 1300	–	–	80 - 1300	80 - 1300
120 - 1000	100 - 800	80 - 600	–	–	80 - 600	80 - 600
120 - 800	100 - 600	80 - 400	–	–	80 - 400	80 - 400
120 - 800	100 - 600	80 - 400	–	–	80 - 400	80 - 400
120 - 600	100 - 400	80 - 300	–	–	80 - 300	80 - 300
120 - 400	100 - 300	80 - 200	–	–	80 - 200	80 - 200
90 - 220	80 - 180	60 - 160	–	–	60 - 160	60 - 160
80 - 200	60 - 150	50 - 140	–	–	50 - 140	50 - 140
120 - 300	100 - 250	80 - 200	–	–	80 - 200	80 - 200
35 - 50	30 - 45	25 - 40	–	–	20 - 50	20 - 50
25 - 40	20 - 35	20 - 30	–	–	20 - 40	20 - 40
25 - 40	20 - 35	20 - 30	–	–	15 - 20	15 - 20
20 - 30	18 - 30	15 - 25	–	–	10 - 20	10 - 20
15 - 25	15 - 25	15 - 25	–	–	10 - 20	10 - 20
80 - 140	60 - 120	30 - 100	–	–	50 - 120	50 - 120
40 - 100	30 - 80	25 - 60	–	–	30 - 50	30 - 50
–	–	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–


hard material matters
CERATIZIT
CERATIZIT

Introduction



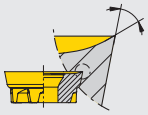
B2-B5



B6-B7



B8-B22



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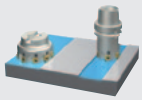
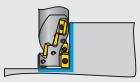


B25

Application



B36-B37



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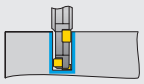

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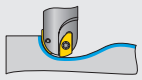
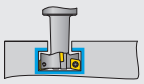


B40-B41



B42

Inserts

A



B46

C



B47-B48

L



B49-B55

O



B56-B57

R



B58-B61

S



B62-B66

T



B67-B68

V



B69

W



B70

X



B71-B75

Z



B76



B77-B78

Other systems



B79

Tools



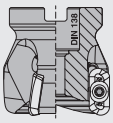
B86-B113



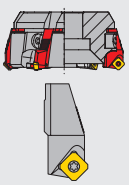
B114-B123



B124-B127

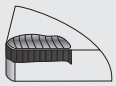


B128-B156



B157-B169

Technical information



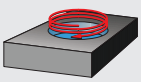
B170-B176



B177-B189



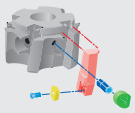
B190-B203



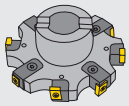
B204-B227



B228-B236



B237-B239



B240-B241



B242-B246

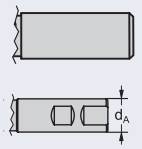


B247-B252

CERATIZIT designation system

Milling tools

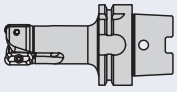
C



G



M



A



Connection/ interface

shoulder/slot cutters



face milling cutters



button insert cutters



cassette cutters



Diameter

R



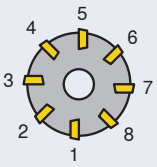
L



N



Cutting direction



Effective number of cutting edges

* only when a distinction is necessary

A = with adjustable inserts

(B* = irregular pitch)

C490 . 25 . R . 02K4A31

System

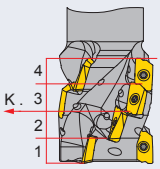
270 = face milling cutters
273 = face milling cutters
274 = face milling cutters
272 = chamfering cutters
251 = button insert cutters

260 = cassette cutters
211 = shoulder/slot cutters
210 = shoulder/slot cutters
141 = shoulder/slot cutters
241 = shoulder/slot cutters
490 = shoulder/slot cutters
BF = drill and slot cutters
212 = drill and slot cutters
244 = long edge cutters
HDM = heavy duty milling cutters
HSC = high-speed cutters
HPC = high-performance cutters
HEC = high-efficiency cutters

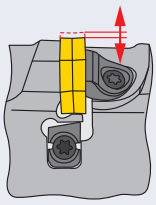
HFC = high-feed cutters

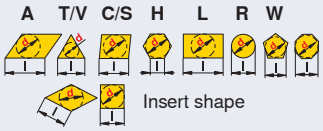
KF = ball nose cutters
NF = T-slot cutters
ZF = circlip groove cutters

Heavy duty milling cutters



Number of adjustable inserts

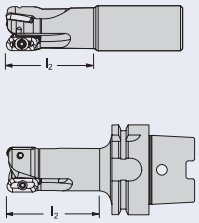




d[mm]	A	T/V	C/S	H	L	R	W	O
5,00	-	-	-	-	-	05	-	-
5,56	-	09	05	-	08	-	03	-
6,00	-	-	-	-	-	06	-	-
6,35	-	11	06	03	10	-	04	02
6,65	10	-	-	-	-	-	-	-
7,94	-	-	07	-	-	-	-	-
8,00	-	-	-	-	-	08	-	-
9,00	-	-	-	-	12	-	-	-
9,52	-	16	09	05	15	-	06	04
9,57	15	-	-	-	-	-	-	-
10,00	-	-	-	-	-	10	-	-
12,00	-	-	-	-	-	12	-	-
12,70		22	12	07	20		08	05
15,87		27	15	09			10	06
16,00						16		
16,74			16					
19,05		33	19	11			13	07
20,00						20		

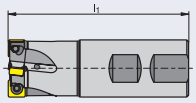
Cutting edge length

l_2 [mm]



Working length

l_1 [mm]

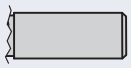


Overall length

09 - A20 - 40 - 165

Details connection, shank

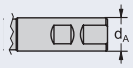
A
$d_A = d_1$



A20
d_A = 20 mm



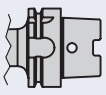
B
$d_A = d_1$



B25
d_A = 25 mm



H63A



CERATIZIT designation system

Inserts

Insert shape

A	85°	
B	82°	
K	55°	
H	120°	
L	90°	
O	135°	
P	108°	
C	80°	
D	55°	
E	75°	
M	86°	
V	35°	
R	-	
S	90°	
T	60°	
W	80°	
X	Special shapes	

Tolerances



	d [±mm]	m [±mm]	s [±mm]	d=6,35/9,52	d=12,7	d=15,8/19,05
A	0,025	0,005	0,025	●	●	●
C	0,025	0,013	0,025	●	●	●
E	0,025	0,025	0,025	●	●	●
F	0,013	0,005	0,025	●	●	●
G	0,025	0,025	0,13	●	●	●
H	0,013	0,013	0,025	●	●	●
J	0,05	0,005	0,025	●		
	0,08	0,005	0,025		●	
	0,10	0,005	0,025			●
K	0,05	0,013	0,025	●		
	0,08	0,013	0,025		●	
	0,10	0,013	0,025			●



	d [±mm]	m [±mm]	s [±mm]	d=6,35/9,52	d=12,7	d=15,8/19,05
M	0,05	0,08	0,13	●		
	0,08	0,13	0,13		●	
	0,10	0,15	0,13			●
N	0,05	0,08	0,025	●		
	0,08	0,13	0,025		●	
	0,10	0,15	0,025			●
U	0,08	0,13	0,13	●		
	0,13	0,20	0,13		●	
	0,18	0,27	0,13			●

Form of top surface

A	
F	
G	
M	
N	
Q	
R	
T	
U	
W	
X	Special shapes

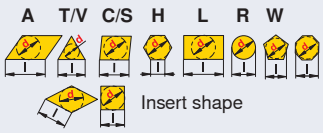
S D N T 09

Clearance angle

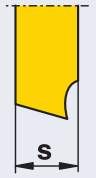


	α
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
O	Special version

Cutting edge length

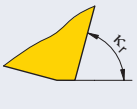


d[mm]	A	T/V	C/S	H	L	R	W	O
5,00	-	-	-	-	-	05	-	-
5,56	-	09	05	-	08	-	03	-
6,00	-	-	-	-	-	06	-	-
6,35	-	11	06	03	10	-	04	02
6,65	10	-	-	-	-	-	-	-
7,94	-	-	07	-	-	-	-	-
8,00	-	-	-	-	-	08	-	-
9,00	-	-	-	-	12	-	-	-
9,52	-	16	09	05	15	-	06	04
9,57	15	-	-	-	-	-	-	-
10,00	-	-	-	-	-	10	-	-
12,00	-	-	-	-	-	12	-	-
12,70		22	12	07	20		08	05
15,87		27	15	09			10	06
16,00						16		
16,74			16					
19,05		33	19	11			13	07
20,00						20		



	s [mm]
01	1,59
T1	1,98
02	2,38
03	3,18
T3	3,97
04	4,76
05	5,56
06	6,35
07	7,94
09	9,52

Insert thickness



1st sign

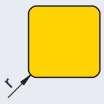
	κ_r
A	45°
D	60°
E	75°
F	85°
P	90°
Z	Others

2nd sign

	α'_n
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
Z	Others

Radius

	r (mm)
M0*	
02	0,2
04	0,4
08	0,8
12	1,2

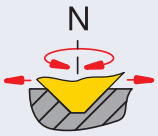


* Shape R only

Facet corner radius







Cutting direction

Manufacturer specific detail

particularly for:

-27	Non ferrous metals
-29	Steel
-31	Cast iron
-33	Stainless steels
F50	Fine
M50	Medium
R50	Rough

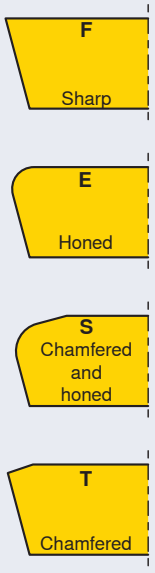
additional characteristic:

P	Polished (Microfinish)
R	Rough
M	Medium
F	Fine

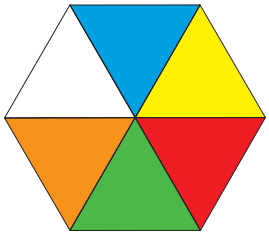
Chip groove

03 AE SN -29

Cutting edge



Material



Based on VDI 3323 CERATIZIT's MasterGuide divides materials into six main groups (P, M, K, N, S, H).
Each is given a colour, according to the system partly adopted in ISO 513.

Blue: steel
Machining, cementation, tempered and constructional steels

Yellow: stainless steel
Ferritic Cr-steels, austenitic CrNi-steels, martensitic Cr-steels, duplex steels

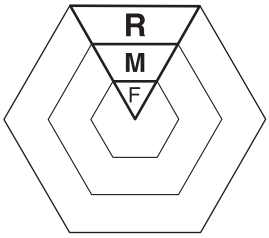
Red: cast iron
Cast iron, grey cast iron, tempered iron, spheroidal cast iron, CGI, sintered iron

Green: non ferrous metals and non metals
Al wrought and Al cast alloys, copper, copper alloys, non metal materials

Orange: heat resistant alloys / titanium
Ni/Co-base alloys, Ti alloys

White: hard materials
Hardened steels (≥ 45 HRC), chilled castings, hard cast irons

Machining application type



Each coloured segment is divided into three sections, and each section indicates the relevant machining application type:

R = rough machining



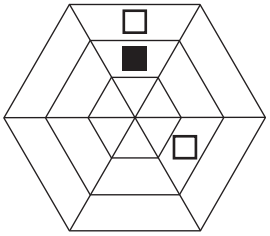
M = medium machining



F = fine machining



Application

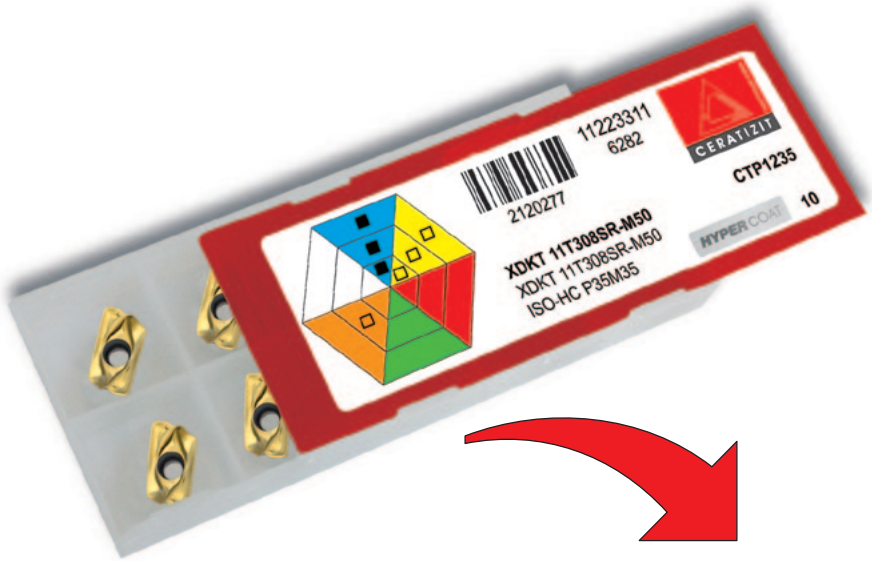


The ideal application area for each insert is indicated by a black square. Extended applications are indicated by an open square. The CERATIZIT MasterGuide provides you with an easily understandable structure for choosing a product and enables youto reduce grade and geometry inventory.

■ **Main application**

□ **Extended application**

The right indexable insert at a glance



Main application:
Medium, finish and rough machining of steel.

Extended application:
Medium machining of heat resistant alloys.
Medium, fine and rough machining of stainless steels.

The CERATIZIT designation system

for new cutting materials

CTC 3215

Manufacturer: CERATIZIT

Cutting material

W Uncoated carbide
C CVD coated carbide
P PVD coated carbide
T Uncoated cermet
E Coated cermet
N Uncoated silicon nitride
M Coated silicon nitride
S Mixed ceramic
I Sialon
D PCD
B CBN
L CBN coated
H Sintered HSS

ISO 513 Application range

For example:
05 ISO K05/P05
10
15
25-

Main application (material) Variant 1: number

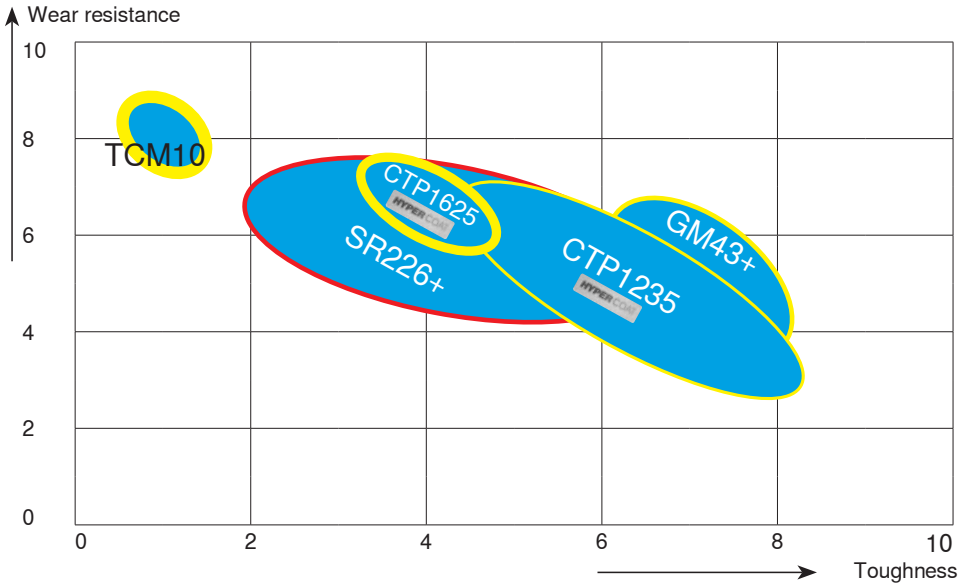
1 Steel
2 Stainless steel
3 Cast iron
4 Light and non ferrous metals, non metals
5 Heat resistant alloys, titanium
6 Hard materials
7 Universal grade for a variety of applications

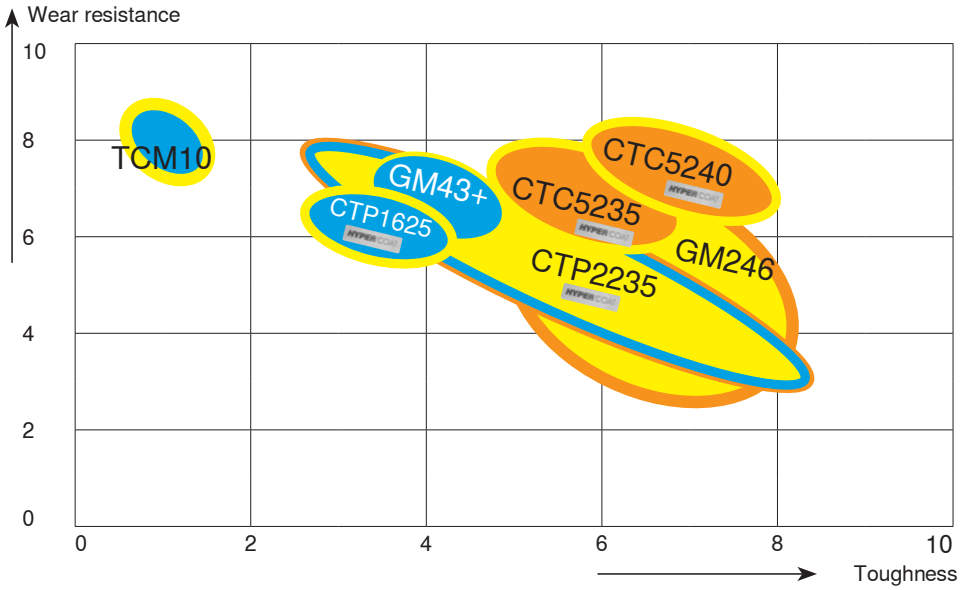
Main application (machining method)

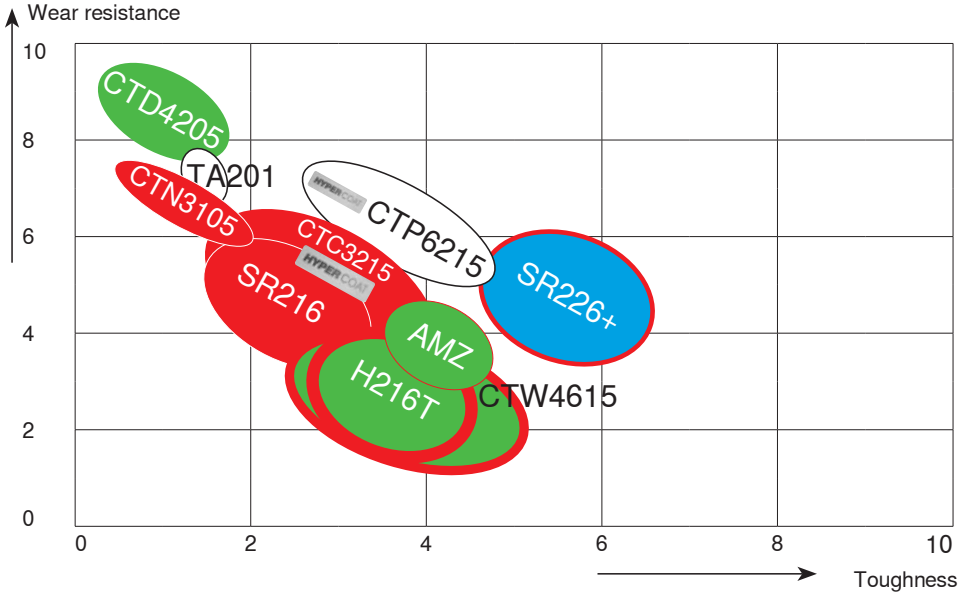
1 Turning
2 Milling
3 Parting and grooving
4 Drilling
5 Threading
6 Others
7 Universal grade for a variety of applications

Main application (material) Variant 2: ISO letter

P Steel
M Stainless steel
K Cast iron
N Light and non ferrous metals, non metals
S Heat resistant alloys, titanium
H Hard materials
X Universal grade for a variety of applications


Wear resistance
10
8
6
4
2
0
TCM10
CTP1625
SR226+
CTP1235
GM43+
0
2
4
6
8
10
Toughness


Wear resistance
10
8
6
4
2
0
TCM10
GM43+
CTP1625
CTC5240
CTC5235
GM246
CTP2235
0
2
4
6
8
10
Toughness


Wear resistance
10
8
6
4
2
0
CTD4205
TA201
CTN3105
CTP6215
CTC3215
SR216
SR226+
AMZ
H216T
CTW4615
0
2
4
6
8
10
Toughness

Grade overview

Grade designation	Standard designation	*Cutting material	Application range	P Steel	M Stainless	K Cast iron	N Non ferrous metals	S Heat resistant	H Hard materials
AMZ	HC-K10	P		○	○	○	●	○	
CTC3215	HC-K15	C				●			
CTC5235	HC-M35	C		○	●	○		●	
CTC5240	HC-M40	C						●	
CTP1235	HC-P35	P		●					
	HC-M30	P			○			○	
CTP1625	HC-P25	P		●					
	HC-M25	P			●			○	
	HC-K20	P				○			
CTP2235	HC-P40	P		○					
	HC-M40	P			●			○	
CTP3220	HC-K20	P				●			
CTP6215	HC-K15	P				●			●
CTW4615	HW-K15	W				●	●		
GM246	HC-P40	C		○					
	HC-M40	C			●			●	
GM43+	HC-P35	C		●					
	HC-M35	C			○			○	
H216T	HW-K15	W				●	●		
S26T	HW-P20	W		●	○				
SR216	HC-K10	C				●			
SR226+	HC-P25	C		●					
	HC-M25	C			○				
	HC-K20	C				●			

Application range: 01 05 10 15 20 25 30 35 40 45 50

● Main application

○ Extended application

*Type of cutting material

B8

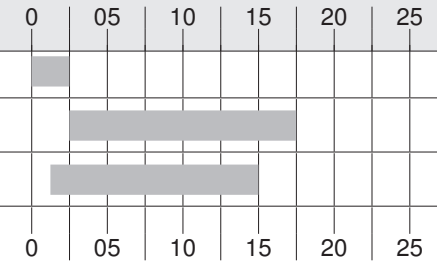
Grade designation	Standard designation	*Cutting material	Application range	P Steel	M Stainless	K Cast iron	N Non ferrous metals	S Heat resistant	H Hard materials
TCC410	HC-P10	E		●					
	HC-M10	E			○				
	HC-K05	E				●			
TCM10	HT-P15	T		●					
	HT-M10	T			●				
	HT-K10	T				○			



● Main application

○ Extended application

Grade designation	Standard designation	*Cutting material	Application range	P Steel	M Stainless	K Cast iron	N Non ferrous metals	S Heat resistant	H Hard materials
CTD4205	DP-K01	D					●		
CTL3215	BN-K10	L				●			○
CTN3105	CN-K05	N				●			



● Main application

○ Extended application

***Type of cutting material**

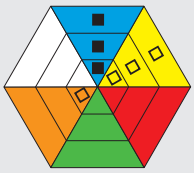
B8

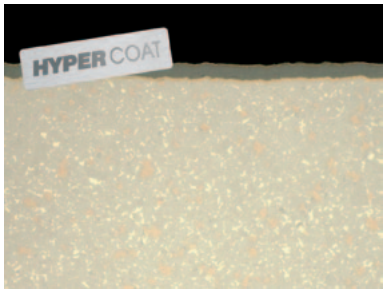
Grade description

Steel

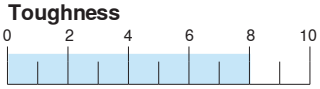
CTP1235

HC-P35
HC-M30

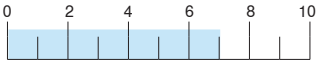




Toughness



Wear resistance



Composition:
Co 9.0%; mixed carbides 4.0%; WC balance

Grain size:
1-1.5 µm

Hardness:
HV 1510

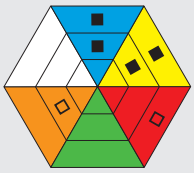
Coating specification:
PVD
(Ti,Al)N + TiN; 4 µm

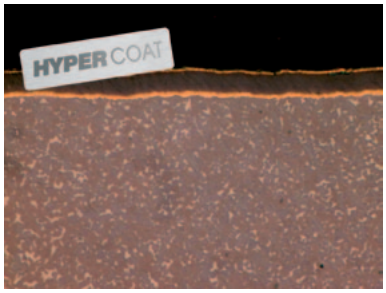
Wet / dry:



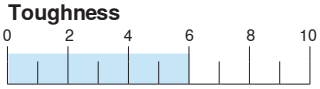
CTP1625

HC-P25
HC-M25
HC-K20

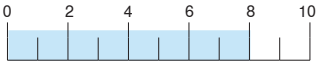




Toughness



Wear resistance



Carbide grade for milling with side and face milling cutters

Composition:
Co 9.5%; mixed carbides 20.6%; WC balance

Grain size:
1.5 µm

Hardness:
HV 1550

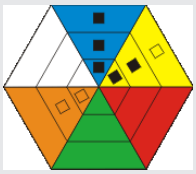
Coating specification:
PVD
TiN + TiAlN + TiN; 3-4 µm

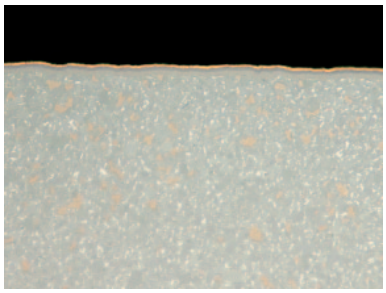
Wet / dry:



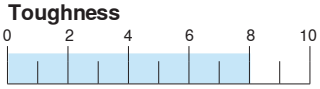
GM43+

HC-P35
HC-M35

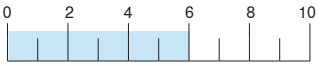




Toughness



Wear resistance



Composition:
Co 9.0%; mixed carbides 4.0%; WC balance

Grain size:
1 - 1.5 µm

Hardness:
HV 1510

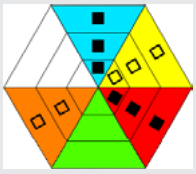
Coating specification:
CVD
TiN + Ti(C,N) + TiC; 3 µm

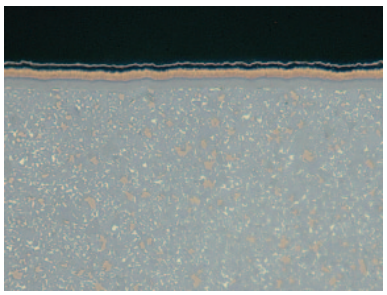
Wet / dry:



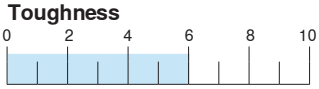
SR226+

HC-P25
HC-M25
HC-K20

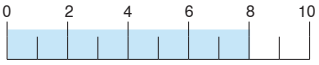




Toughness



Wear resistance



Composition:
Co 9.0%; mixed carbides 4.0%; WC balance

Grain size:
1 - 1.5 μm

Hardness:
HV 1510

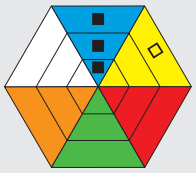
Coating specification:
CVD
Al_2O_3 + TiN + Ti (C,N); 5.5 μm

Wet / dry:



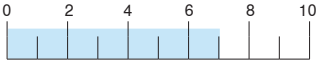
S26T

HW-P20

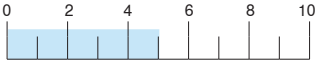




Toughness



Wear resistance



Composition:
Co 9.5%; mixed carbides 20.6%; WC balance

Grain size:
1.5 μm

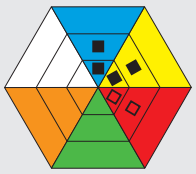
Hardness:
HV 1550

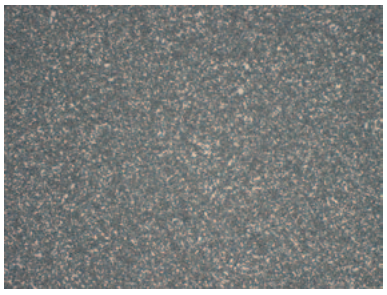
Wet / dry:



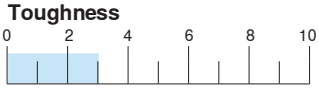
TCM10

HT-P15
HT-M10
HT-K10

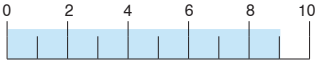




Toughness



Wear resistance



Composition: cermet
Co/Ni 12.2%; WC 15.0%; TaNbC 10.0%; TiCN balance

Hardness:
HV 1620

Wet / dry:

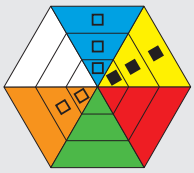


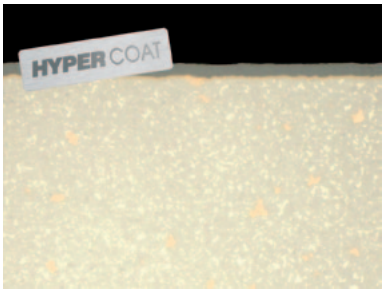
Grade description

Stainless steel

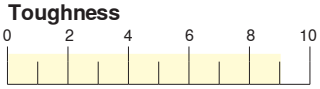
CTP2235

HC-P40
HC-M40

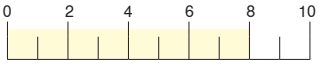




Toughness



Wear resistance



Composition:
Co 12.5%; mixed carbides 2.0%; WC balance

Grain size:
1 μm

Hardness:
HV 1380

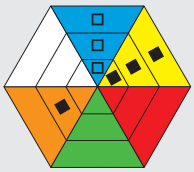
Coating specification:
PVD
(TiAl)N; 4 μm

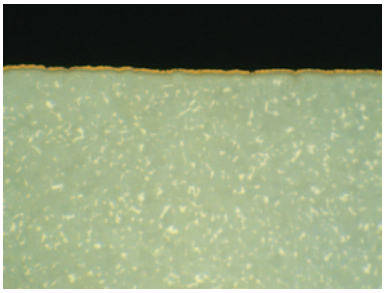
Wet / dry:



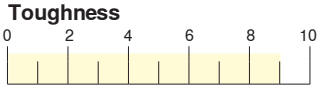
GM246

HC-P40
HC-M40

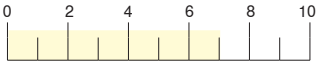




Toughness



Wear resistance



Composition:
Co 8.0%; WC balance

Grain size:
2 μm

Hardness:
HV 1280

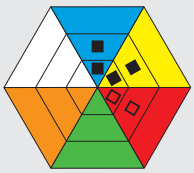
Coating specification:
CVD
TiN + Ti(C,N) + TiC; 3 μm

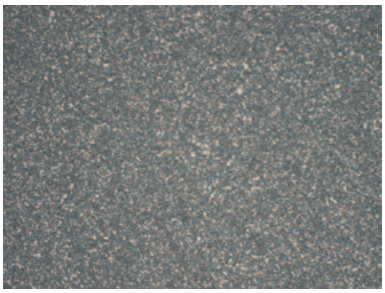
Wet / dry:



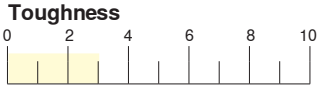
TCM10

HT-P15
HT-M10
HT-K10

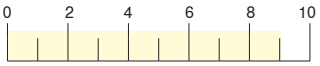




Toughness



Wear resistance



Composition: cermet
Co/Ni 12.2%; WC 15.0%; TaNbC 10.0%;
TiCN balance

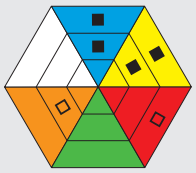
Hardness:
HV 1620

Wet / dry:

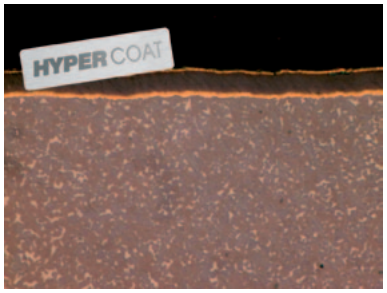


CTP1625

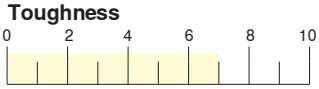
HC-P25
HC-M25
HC-K20



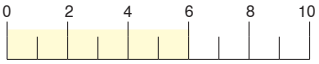
Carbide grade for milling with side and face milling cutters



Toughness



Wear resistance



Composition:
Co 9.5%; mixed carbides 20.6%; WC balance

Grain size:
1.5 μm

Hardness:
HV 1550

Coating specification:
PVD
TiN + TiAlN + TiN; 3-4 μm

Wet / dry:

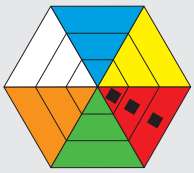


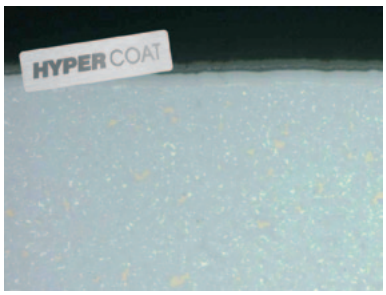
Grade description

Cast iron

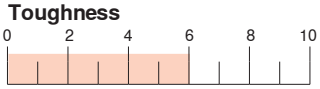
CTC3215

HC-K15

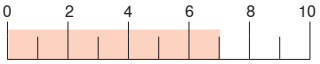




Toughness



Wear resistance



Special grade for the machining of cast iron

Composition:
Co 6.0%; mixed carbides 2.0%; WC balance

Grain size:
1 μm

Hardness:
HV 1630

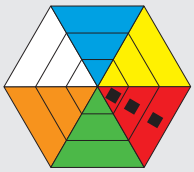
Coating specification:
CVD
Ti(C,N) + Al_2O_3; 5 μm

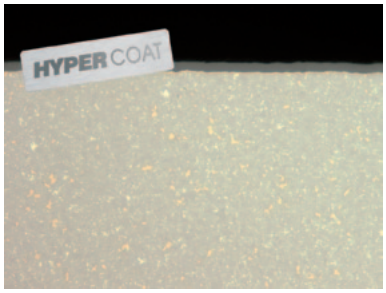
Wet / dry:



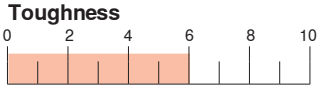
CTP3220

HC-K20

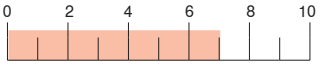




Toughness



Wear resistance



Special grade for the machining of cast iron

Composition:
Co 6.0%; TaC 2.0%; WC balance

Grain size:
1 μm

Hardness:
HV_{30} 1630

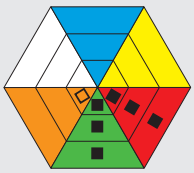
Coating specification:
PVD
TiAlN; 3 μm

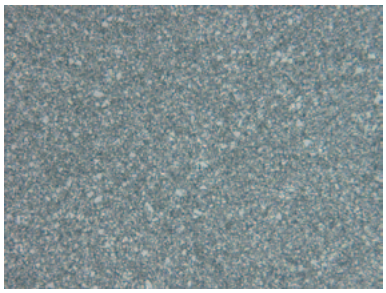
Wet / dry:



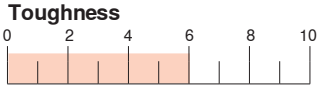
CTW4615

HW-K15

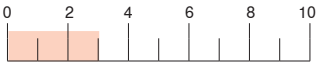




Toughness



Wear resistance



Precision manufactured

Composition:
Co 6.0%; WC balance

Grain size:
1 μm

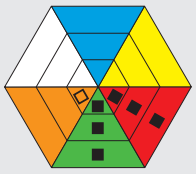
Hardness:
HV 1630

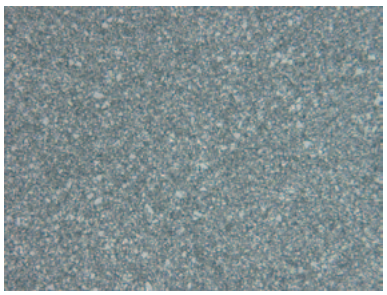
Wet / dry:



H216T

HW-K15



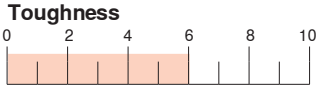


Composition:
Co 6.0%; WC balance

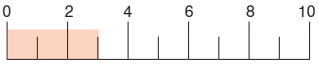
Grain size:
1 µm

Hardness:
HV_{30} 1630

Toughness



Wear resistance



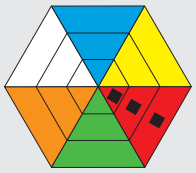
Wet / dry:

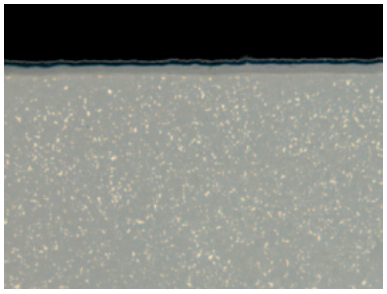


Microfinish

SR216

HC-K10





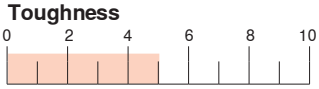
Composition:
Co 6.0%; WC balance

Grain size:
1 µm

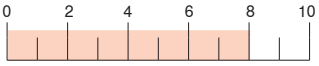
Hardness:
HV 1630

Coating specification:
CVD
Al_2O_3 + Ti(C,N) + Ti(C,N); 5.5 µm

Toughness



Wear resistance



Wet / dry:



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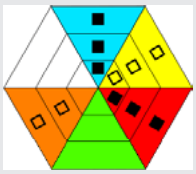
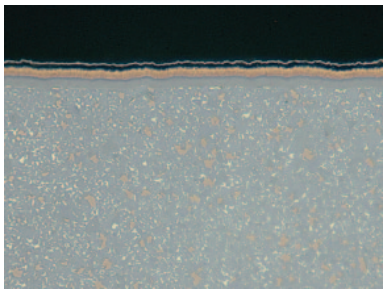
SR226+

HC-P25
HC-M25
HC-K20





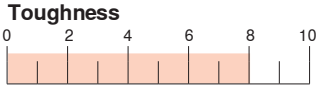
Composition:
Co 9.0%; mixed carbides 4.0%; WC balance

Grain size:
1 - 1.5 µm

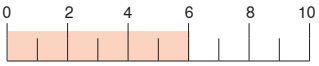
Hardness:
HV 1510

Coating specification:
CVD
Al_2O_3 + TiN + Ti (C,N); 5.5 µm

Toughness



Wear resistance



Wet / dry:



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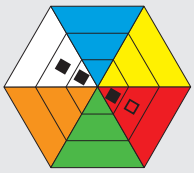
Grade description

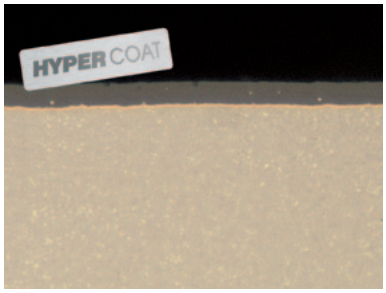
Cast iron

CTP6215

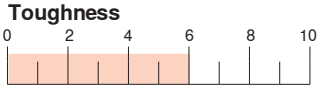
HC-K15



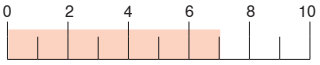
Carbide grade for hard material machining.



Toughness



Wear resistance



Composition:
Co 12.0%; WC balance

Grain size:
.4 µm

Hardness:
HV 1730

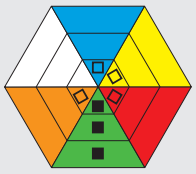
Coating specification:
PVD
(TiAl)N; 4 µm

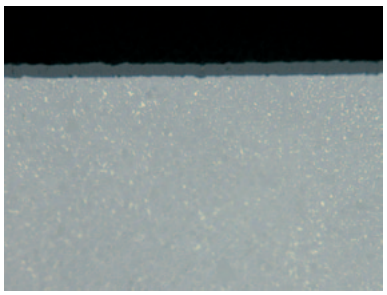
Wet / dry:



AMZ

HC-K10





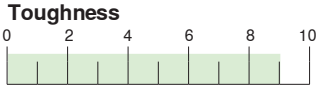
Composition:
Co 6.0%; WC balance

Grain size:
1 µm

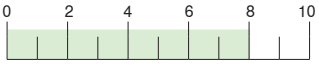
Hardness:
HV 1630

Coating specification:
PVD
TiAlN; 2 - 4 µm

Toughness



Wear resistance



Wet / dry:



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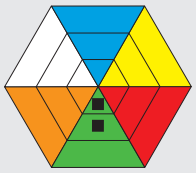
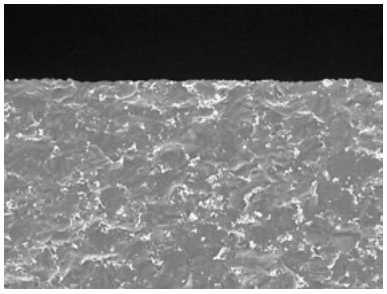
CTD4205

DP-K01

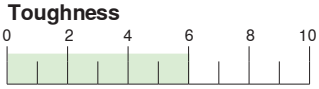




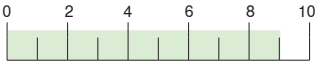
Composition:
Polycrystalline diamond (PCD)

Grain size:
~ 25 µm

Toughness



Wear resistance



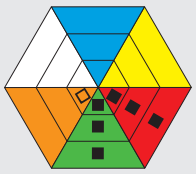
Wet / dry:

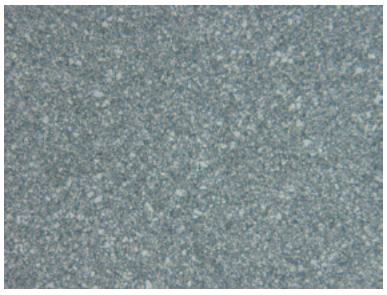


PCD for milling non ferrous metals, plastics and graphite

CTW4615

HW-K15



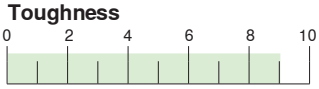


Composition:
Co 6.0%; WC balance

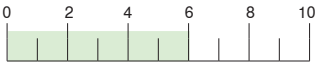
Grain size:
1 µm

Hardness:
HV 1630

Toughness



Wear resistance



Wet / dry:



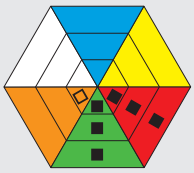
Precision manufactured

Grade description

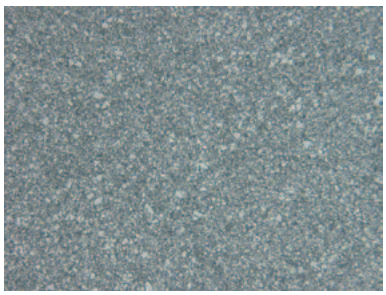
Non ferrous metals and non metals

H216T

HW-K15



Microfinish

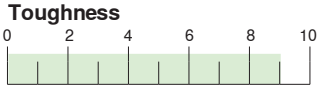


Composition:
Co 6.0%; WC balance

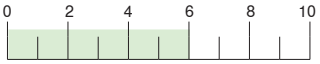
Grain size:
1 μm

Hardness:
HV_{30} 1630

Toughness



Wear resistance

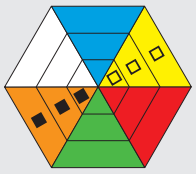


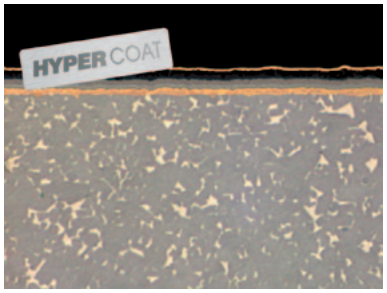
Wet / dry:



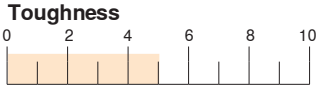
CTC5235

HC-M35

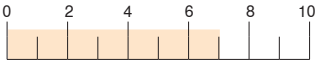




Toughness



Wear resistance



Composition:
10.0% binder; WC balance

Grain size:
2 µm

Hardness:
HV 1330

Coating specification:
CVD
TiN-Ti (C,N); Al_2O_3; Ti (N,B); 6 µm

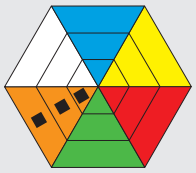
Wet / dry:

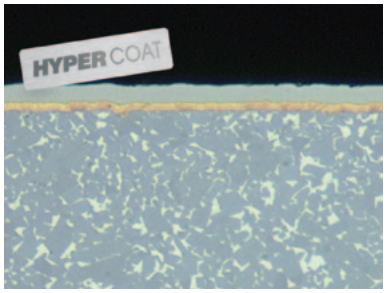


Carbide grade for milling heat-resistant alloys (e.g. turbine blades etc.)

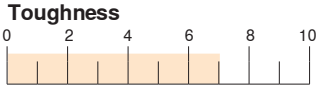
CTC5240

HC-M40

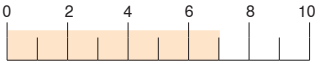




Toughness



Wear resistance



Composition:
10.0% binder; WC balance

Grain size:
2 µm

Hardness:
HV 1330

Coating specification:
CVD
TiN + TiB_2; 4 µm

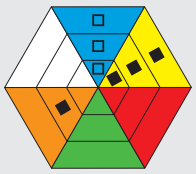
Wet / dry:

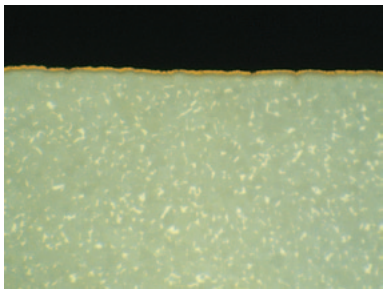


Carbide grade for milling titanium alloys

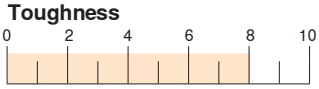
GM246

HC-P40
HC-M40

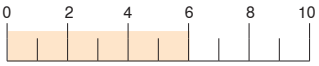




Toughness



Wear resistance



Composition:
Co 8.0%; WC balance

Grain size:
2 µm

Hardness:
HV 1280

Coating specification:
CVD
TiN + Ti(C,N) + TiC; 3 µm

Wet / dry:

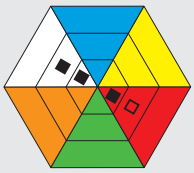


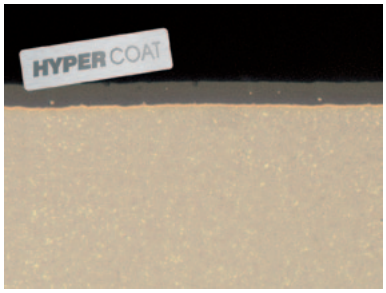
Grade description

Hard materials

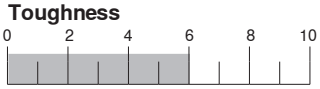
CTP6215

HC-K15

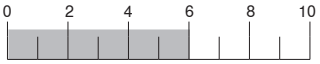




Toughness



Wear resistance



Carbide grade for hard material machining.

Composition:
Co 12.0%; WC balance

Grain size:
.4 µm

Hardness:
HV 1730

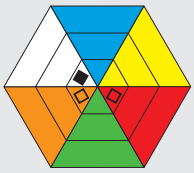
Coating specification:
PVD
(TiAl)N; 4 µm

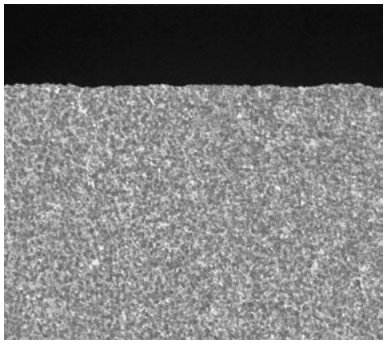
Wet / dry:



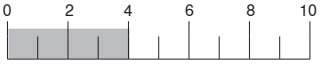
TA201

BN-K10

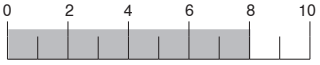




Toughness



Wear resistance



Particularly suitable for hard materials.

Composition:
Cubic boron nitride (CBN), 65 vol.% + binder (TiN)

Grain size:
~ 2 µm

Insert type:
Brazed segment

Wet / dry:



	Chip groove	Chip groove code	Material	Machining situation and stability				Machining type
				◯	◯	◔	⬡	F / M / R
	27P F10 F20			×	×	×		
	F40		Ti	×	×			F
γ = 12-30°	F50 33 29M			×	×	×		
	M31 M32		Ti	×	×			
γ = 10-18°	M50 29 31				×	×		M
γ = 0-12°	R50 R60					×	×	R

MasterGuide:

- Steel
- Stainless
- Cast iron
- Non ferrous metals
- Heat resistant
- Heat resistant materials
- Hard materials

- Main application
- Extended application

Machining situation and stability:

- ◯ excellent
- ◯ good
- ◔ acceptable
- ⬡ difficult

Machining type:

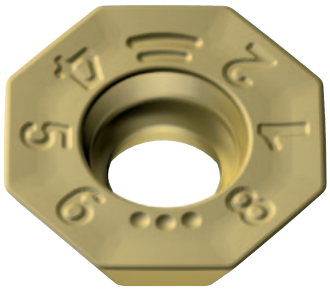
F Fine machining
M Medium machining
R Rough machining

Chip grooves



Chip groove code

				Cutting edge		
				sharp 10-20	medium 30-40	stable 50-60
Level of machining	easy	F		●	●●	●●●
	universal	M		●	●●	●●●
	difficult	R		●	●●	●●●

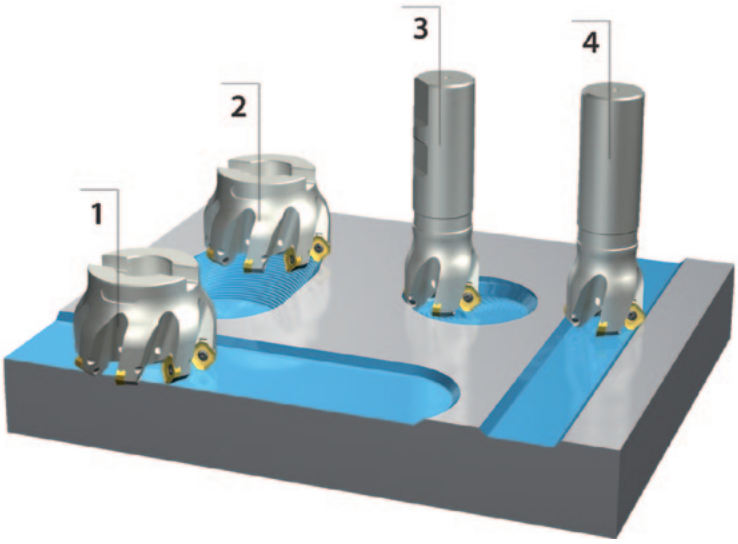


Chip groove M50

= M
= 50

MaxiMill 270

- Maximal chip volume
- 45° approach angle
- Soft cutting action

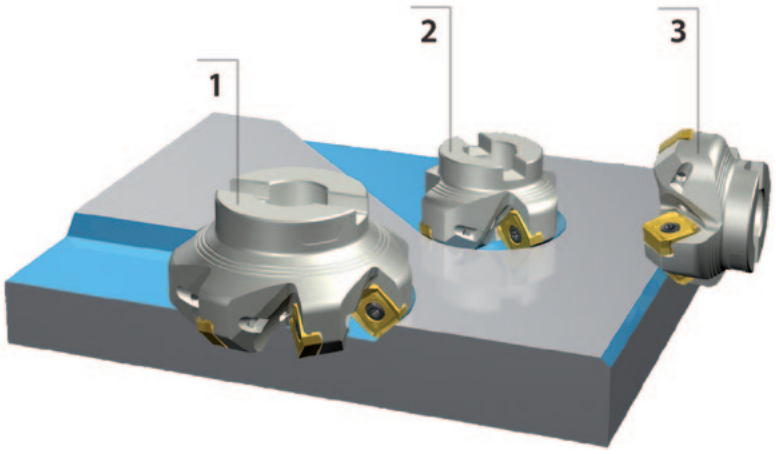


1 Face milling
2 Angled ramping
3 Helical plunge milling
4 Slot milling

	Ø 6 – 160 mm	09 12 15

MaxiMill 271

- 8 effective cutting edges
- Maximum depth of cut 8.4 mm



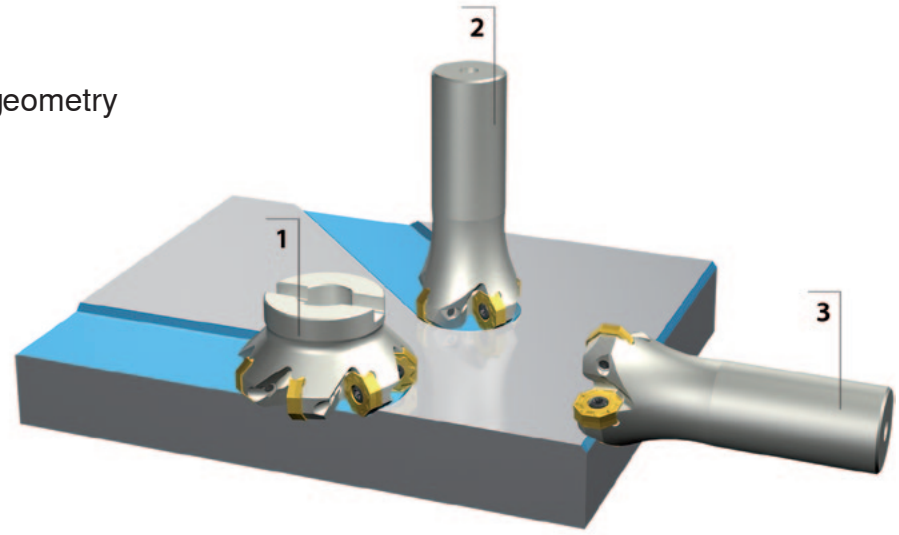
1 Face milling
2 Slot milling
3 Chamfering

4 – 15	Ø 50 – 250 mm	17

MaxiMill 273

- 16 cutting edges
- Approach angle 44.6°
- Positive cutting edge geometry

1 Face milling
2 Slot milling
3 Chamfering

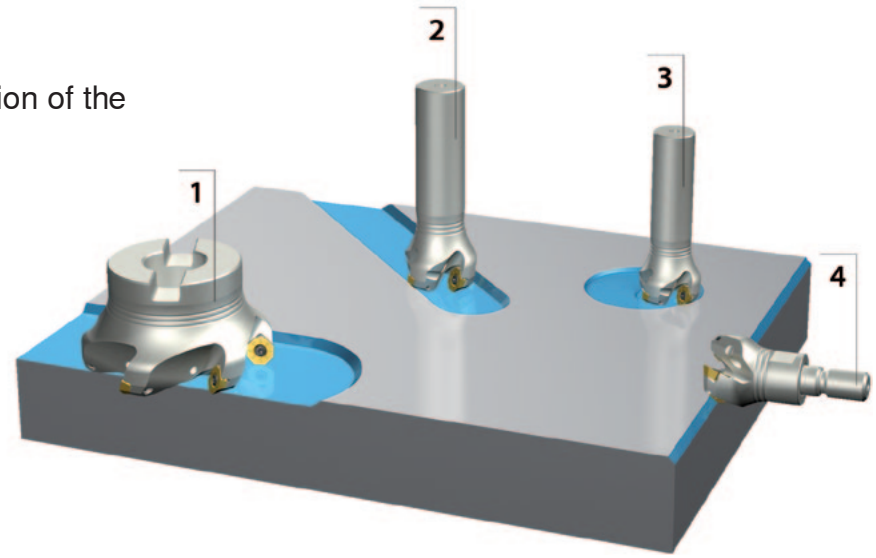


		
	Ø 32 – 315 mm (400)	 06

MaxiMill 274

- 8 cutting edges
- Approach angle 43°
- Extremely positive position of the insert when mounted

1 Face milling
2 Slot milling
3 Helical plunge milling
4 Chamfering

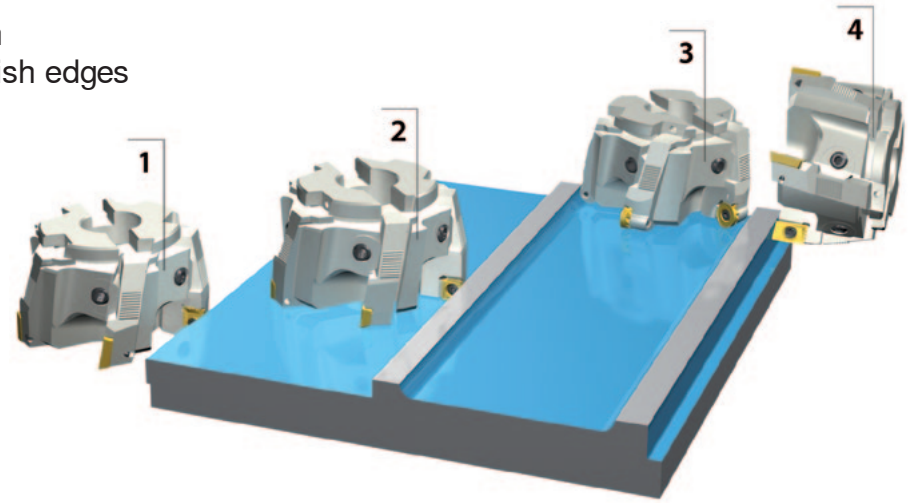


		
	Ø 20 – 125 mm	 OF.. 04..  SF.. 09..

MaxiMill 260

- Universal application
- Adjustable Masterfinish edges
- Long tool life

1 Peripheral milling
2 Face milling
3 Slot milling
4 Shoulder milling

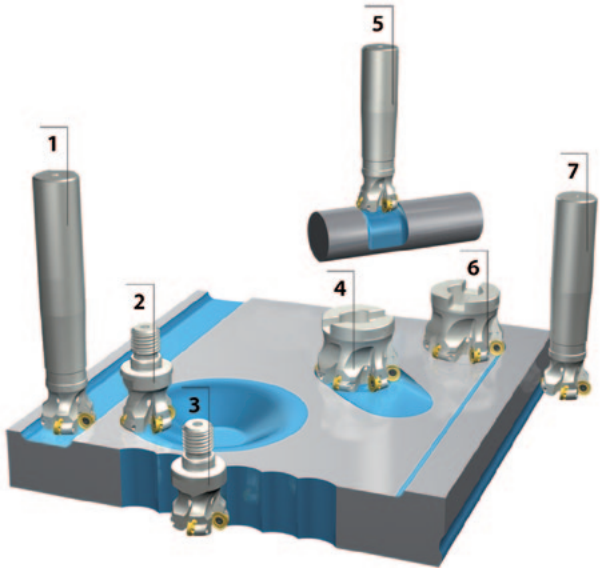


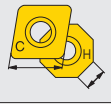
	
Ø 80 – 400 mm	

MaxiMill 251/251RS

- Very high feed rates
- Maximum stability
- 8 indexes

1 Slot milling
2 Profile milling
3 Plunging
4 Angled ramping
5 Turn milling
6 Face milling
7 Reverse copy milling

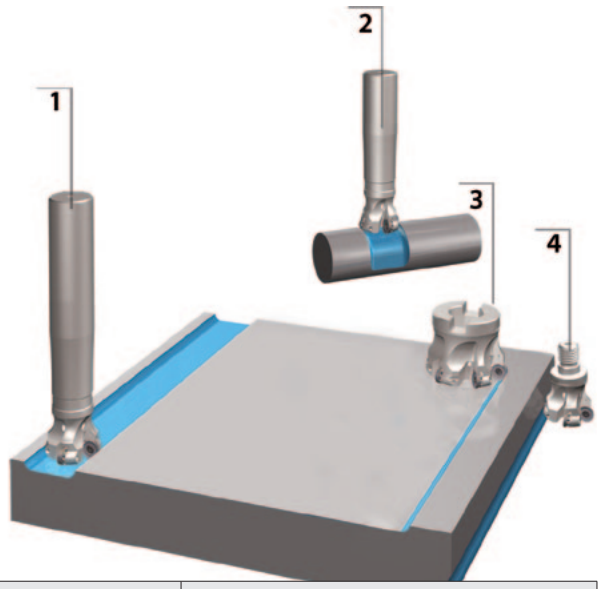


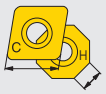
		
	Ø 10 – 125 mm	05 08 10 12 16 20

MaxiMill 252

- Double the number of cutting edges combined with optimum depth of cut
- Optimized chip geometry

1 Slot milling
2 Turn milling
3 Face milling
4 Reverse copy milling

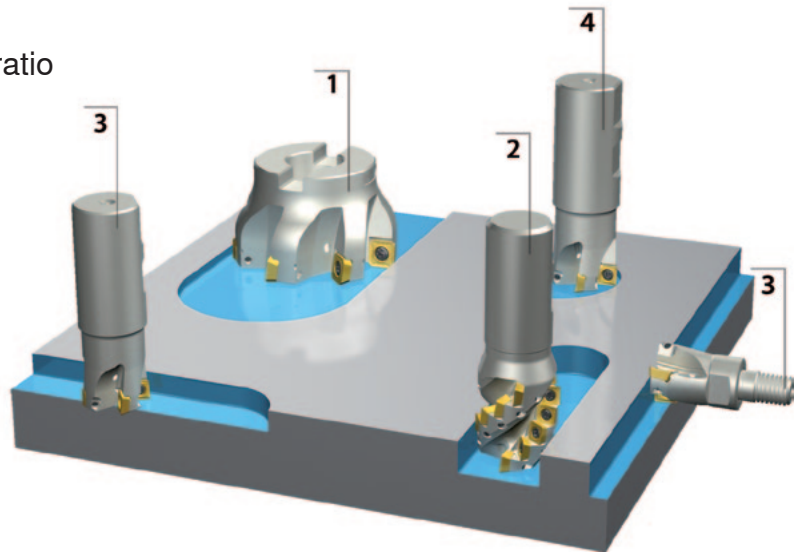


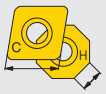
		
4 – 8	Ø 32 – 80 mm	 10  12

MaxiMill 490

- 4 cutting edges
- Optimum price-performance ratio
- 90° approach angle

1 Face milling
2 Slot milling
3 Shoulder milling
4 Angled ramping

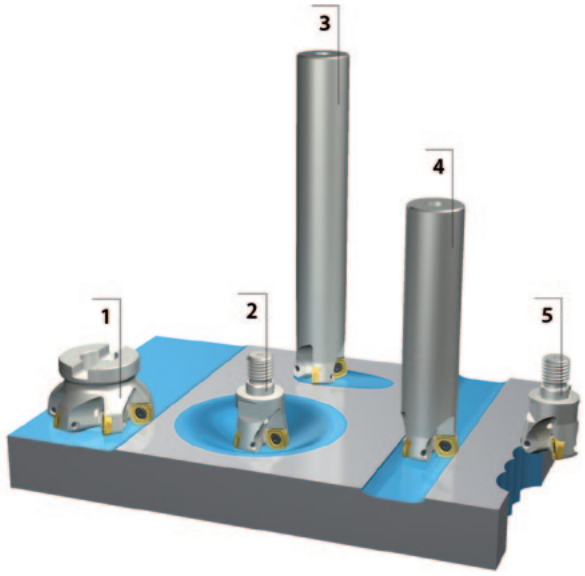


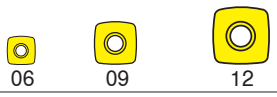
		
	Ø 25 – 125 mm	 09  12

MaxiMill HFC

- Extremely high feed rates
- Maximum chip removal rates

1 Face milling
2 Helical plunge milling
3 Angled ramping
4 Slot milling
5 Plunge milling

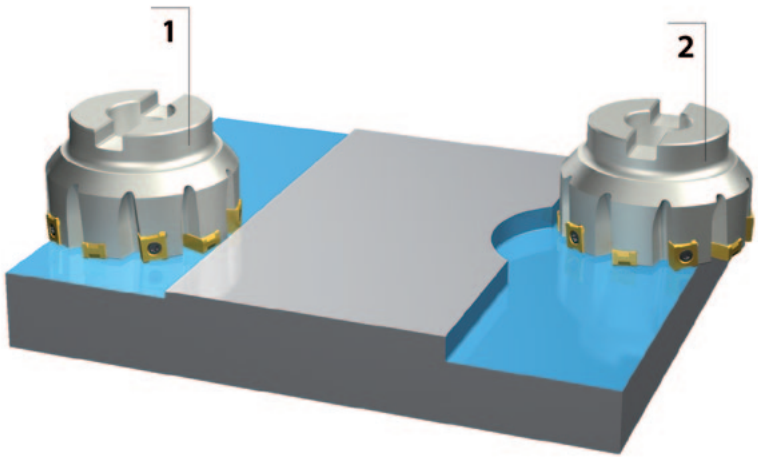


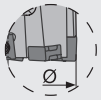
 ..... 	Ø 16 – 100 mm	 06 09 12

MaxiMill HEC-11

- 8 usable cutting edges
- Low cutting forces
- High process security
- Optimal solution for cast iron

1 Face milling
2 Shoulder milling

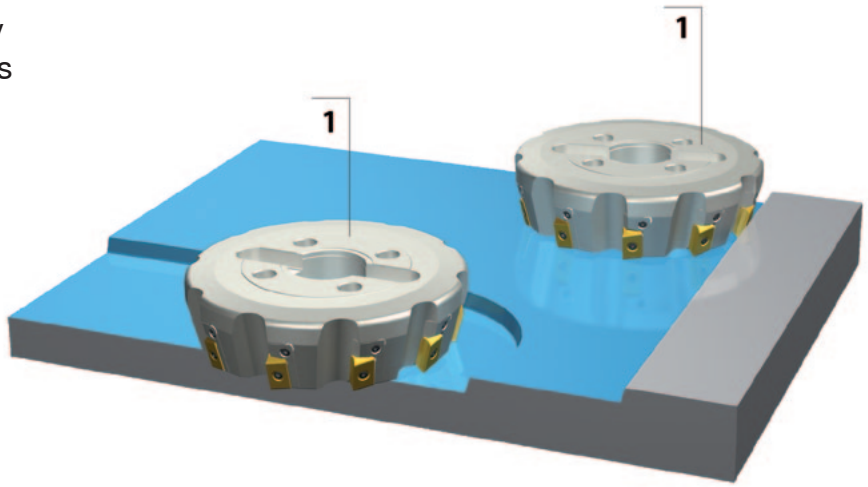


		
Ø 50 – 160 mm	 11	One insert with three cutting materials: ceramic, CBN, hard materials

MaxiMill AHDM

- High application security
- Wide field of applications
- Outstanding tool life

1 Face milling

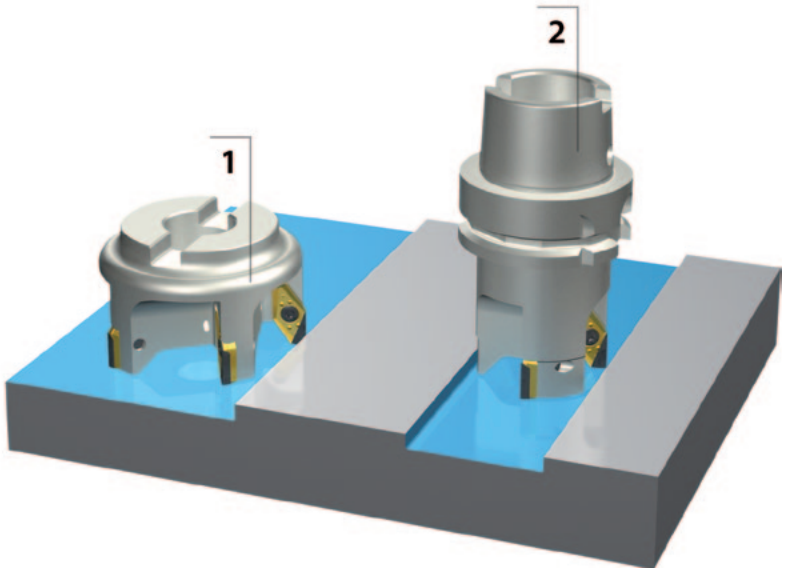


Ø		φ
Ø 160 – 315 mm	22	75°

MaxiMill HSV-22

- Stable and secure
- Robust insert

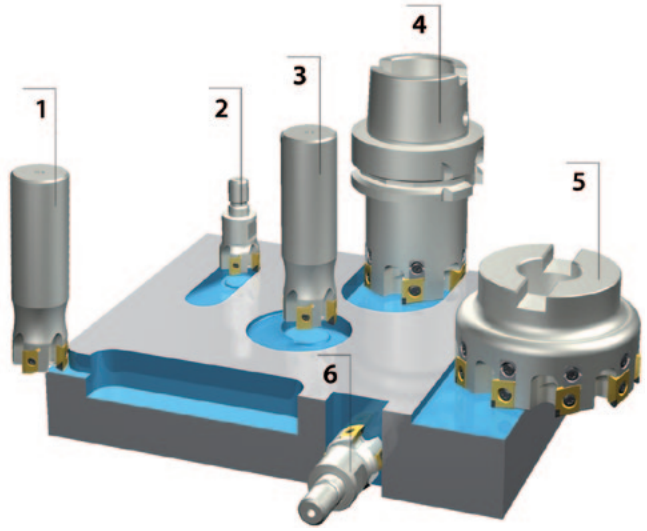
1 Face milling
2 Slot milling



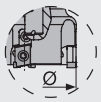
Ø		
Ø 50 – 125 mm	22	Monobloc shell milling cutters HSK63A

MaxiMill HPC-12 / HPC-04

- High productivity matters
- Low cutting forces
- Easy radial precision adjustment

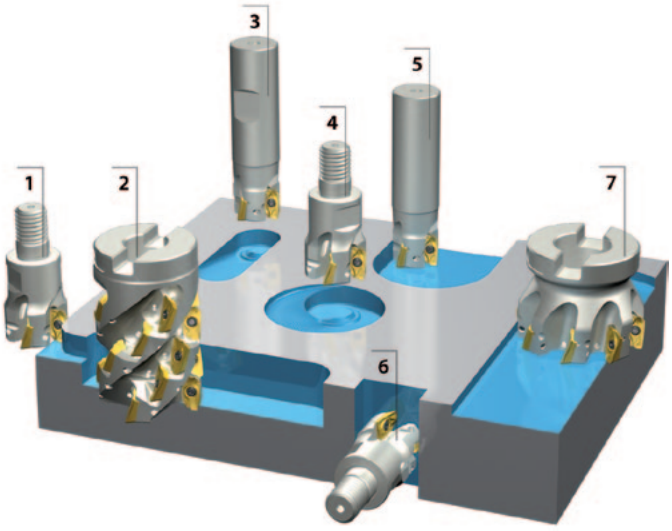


1 Peripheral milling
2 Angled ramping & pocket milling
3 Axial plunging & helical plunging
4 Trochoidal slot milling
5 Shoulder & face milling
6 Slot milling

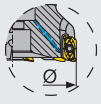
		
Ø 20 – 315 mm	 12	Semi-finishing and finishing of aluminium components, finishing of cast iron components

MaxiMill 211

- Milling with radial force compensation
- Minimum vibration
- Maximum chip removal rates

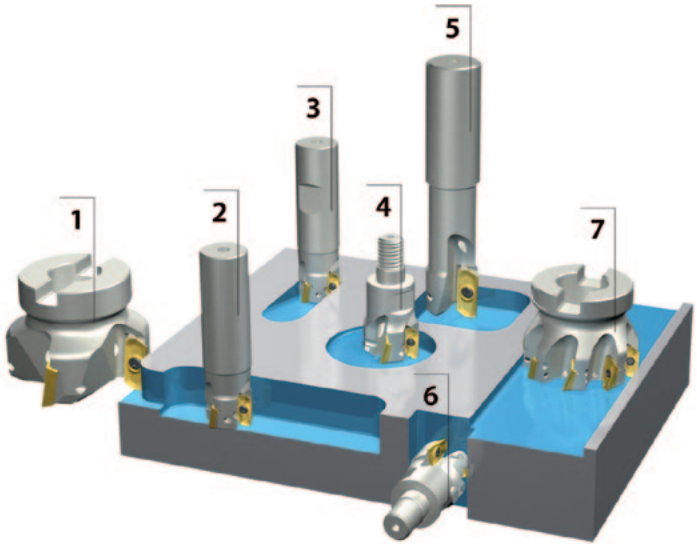


1 Peripheral milling
2 Shoulder milling
3 Angled ramping & pocket milling
4 Axial plunging & helical plunging
5 Trochoidal slot milling
6 Slot milling
7 Shoulder & face milling

		
	Ø 10 – 160 mm	 07 11 15 20

MaxiMill HSC/HPC

- Aluminium milling at high speed
- Maximum chip removal rates

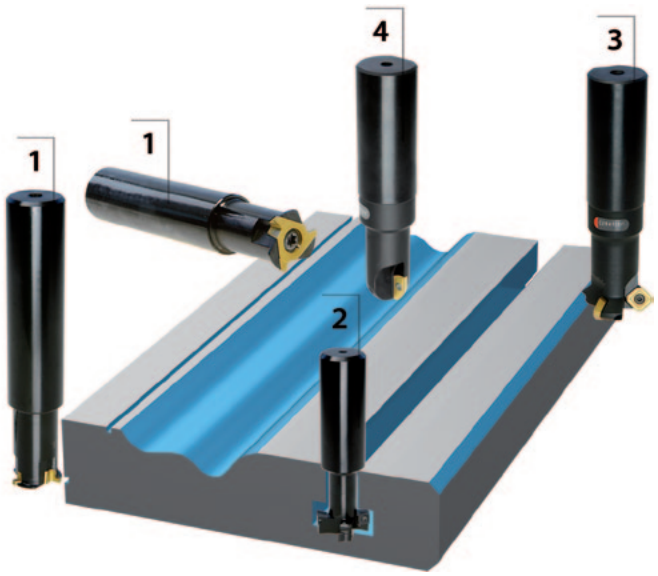


1 Peripheral milling
2 Shoulder milling
3 Angled ramping
4 Axial plunging & helical plunge milling
5 Pocket milling
6 Slot milling
7 Shoulder & face milling

		
	Ø 10 – 160 mm	 XDHT-11 XDHT-19 XDHX-19

Profile milling cutters

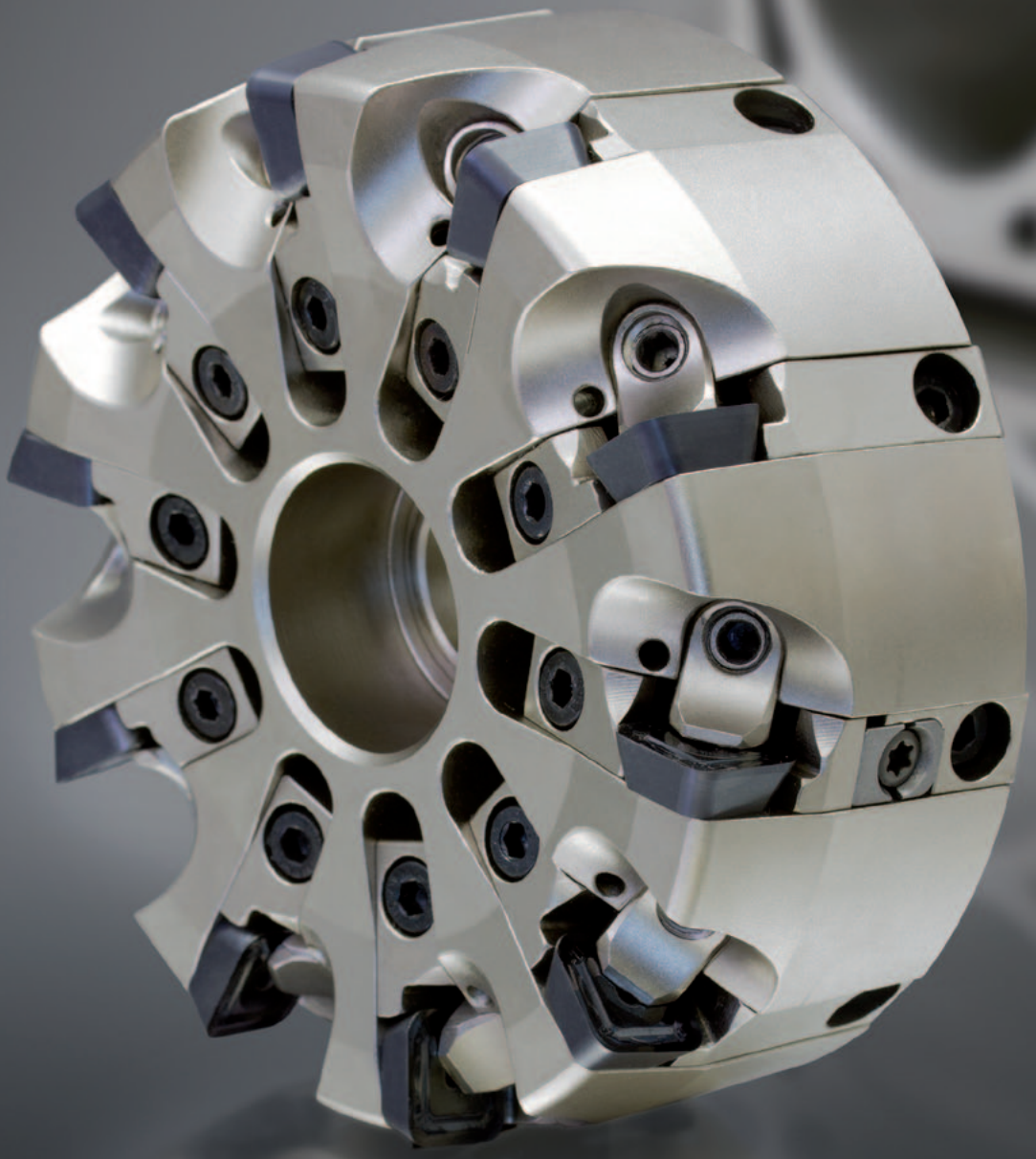
- Always a solution for specific machining tasks



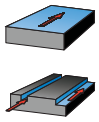
1 Slot milling (circlip)
2 T-slot milling
3 Chamfering
4 Profile milling

CERATIZIT

hard material matters



Overview of machining operations

A..					
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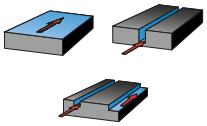
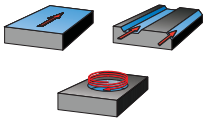
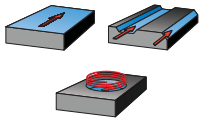
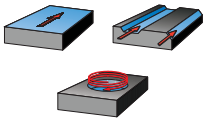
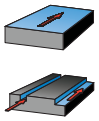
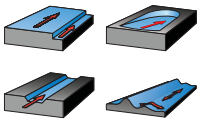
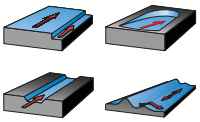
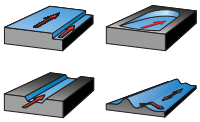
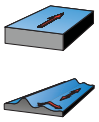
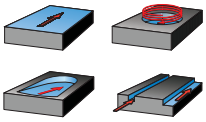
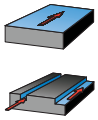
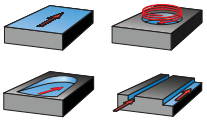
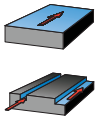
L..					
O..					
R..					
S..					
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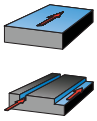
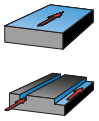
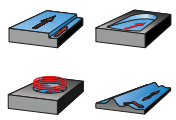
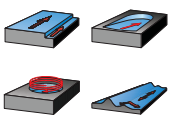
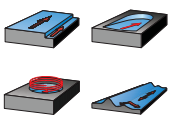
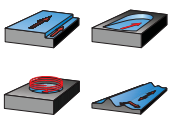
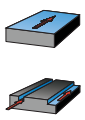
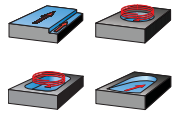
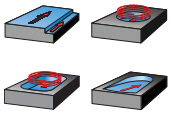
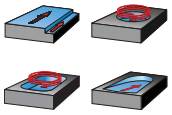
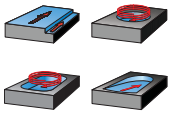
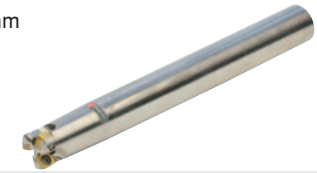
V..					

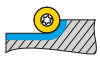
X..					
Z..					
XA/XD. SP. OD.					

Application

Face milling

C270 45° $a_p \leq 4$ mm  Ø = 6 - 32 mm B86	**C251** $a_p \leq 6$ mm  Ø = 10 - 32 mm B88-B89	**C252** $a_p \leq 2,5$ mm  Ø = 32 mm B90
C273 45° $a_p \leq 3,5$ mm  Ø = 32 - 40 mm B91	**C274** 45° $a_p \leq 3,8$ mm  Ø = 20 - 32 mm B92-B93	**C490** 90° $a_p \leq 11$ mm  Ø = 25 - 40 mm B95
CHFC 90° $a_p \leq 2$ mm  Ø = 16 - 35 mm B94	**G251** $a_p \leq 6$ mm  Ø = 20 - 35 mm B114	**G252** $a_p \leq 2,5$ mm  Ø = 32 mm B115
G490 90° $a_p \leq 11$ mm  Ø = 25 - 40 mm B117	**G274** 45° $a_p \leq 3,8$ mm  Ø = 20 - 32 mm B120-B121	**GHFC** 90° $a_p \leq 2$ mm  Ø = 16 - 35 mm B116
GHPC-04 90° $a_p \leq 4$ mm  Ø = 20 - 40 mm B122	**MHPC-12** 90° $a_p \leq 11$ mm  Ø = 40 - 160 mm B125	**A270** 45° $a_p \leq 9$ mm  Ø = 32 - 160 mm B128-B130
AHPC-12 90° $a_p \leq 11$ mm  Ø = 40 - 315 mm B153	**AHEC-11** 90° $a_p \leq 4$ mm  Ø = 50 - 160 mm B141-B142	**A490** 90° $a_p \leq 12$ mm  Ø = 40 - 125 mm B143

A251



$a_p \leq 10$ mm



Ø = 40 - 125 mm B131-B132

A252

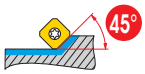


$a_p \leq 3$ mm



Ø = 40 - 80 mm B133

A271

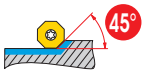


$a_p \leq 8{,}4$ mm



Ø = 50 - 250 mm B134

A273

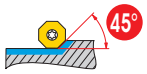


$a_p \leq 3{,}5$ mm



Ø = 40 - 315 mm B135-B137

A274

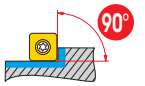


$a_p \leq 3{,}8$ mm



Ø = 32 - 125 mm B138-B139

AHFC

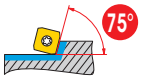


$a_p \leq 2$ mm



Ø = 32 - 100 mm B140

AHDM

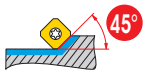


$a_p \leq 20$ mm



Ø = 160 - 315 mm B150

A260/041
A260/031



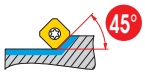
$a_p \leq 6$ mm





Ø = 80 - 398 mm B157

A260/029



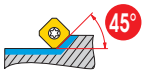
$a_p \leq 6$ mm





Ø = 80 - 398 mm B158

A260/032



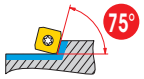
$a_p \leq 9$ mm





Ø = 80 - 393 mm B158

A260/018



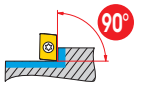
$a_p \leq 9$ mm





Ø = 82 - 400 mm B160

A260/039
A260/055



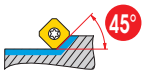
$a_p \leq 12$ mm





Ø = 89 - 407 mm B165

A260/058



$a_p \leq 8{,}4$ mm





Ø = 77 - 395 mm B159

A260/052



$a_p \leq 6$ mm





Ø = 80 - 398 mm B162

A260/053



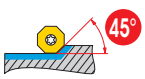
$a_p \leq 8$ mm





Ø = 80 - 398 mm B162

A260/057



$a_p \leq 3{,}5$ mm

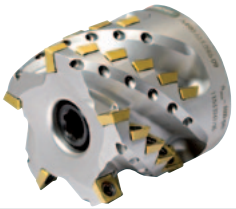


Ø = 82 - 400 mm B161

Application

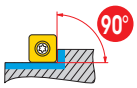
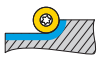
Shoulder and slot milling

C211 $a_p \leq 14$ mm  Ø = 10 - 40 mm B97-B100	**C211K** $a_p \leq 50{,}5$ mm  Ø = 25 - 50 mm B101	**C210** $a_p \leq 8$ mm  Ø = 16 - 32 mm B102
C BF $a_p \leq 8$ mm  Ø = 10 - 20 mm B104	**C212** $a_p \leq 19$ mm  Ø = 20 - 25 mm B103	**CHPC-04** $a_p \leq 4$ mm  Ø = 20 - 40 mm B110
CHSC/CHPC $a_p \leq 18$ mm  Ø = 16 - 32 mm B106-B108	**C490** $a_p \leq 11$ mm  Ø = 25 - 40 mm B95	**C490K** $a_p \leq 41$ mm  Ø = 32 - 40 mm B96
G211 $a_p \leq 14$ mm  Ø = 16 - 40 mm B118	**G210** $a_p \leq 8$ mm  Ø = 16 - 32 mm B119	**GHPC-04** $a_p \leq 4$ mm  Ø = 20 - 40 mm B122
GHSC-11 $a_p \leq 10$ mm  Ø = 16 - 40 mm B123	**GHSC-19** $a_p \leq 18$ mm  Ø = 25 - 40 mm B123	**G490** $a_p \leq 11$ mm  Ø = 25 - 40 mm B117
MHSC-11 **MHSC-19** $a_p \leq 18$ mm  Ø = 25 - 50 mm B124	**MHSC-19** $a_p \leq 18$ mm  Ø = 25 - 50 mm B126	**MHSV-22** $a_p \leq 15$ mm  Ø = 50 - 125 mm B127

MHPC-12 90° $a_p \leq 11$ mm  Ø = 40 - 160 mm B125	**A211** 90° $a_p \leq 19$ mm  Ø = 32 - 160 mm B145-B146	**A211K** 90° $a_p \leq 75{,}5$ mm  Ø = 40 - 80 mm B147
A210 90° $a_p \leq 8$ mm  Ø = 40 - 125 mm B148	**A490** 90° $a_p \leq 12$ mm  Ø = 40 - 125 mm B143	**A490K** 90° $a_p \leq 41$ mm  Ø = 40 - 63 mm B144
AHSC-11 **AHSC-19** 90° $a_p \leq 18$ mm HSC High Speed Cutting  Ø = 40 - 125 mm B151	**AHPC-19** 90° $a_p \leq 18$ mm HSC High Speed Cutting  Ø = 40 - 63 mm B152	**AHSV-22** 90° $a_p \leq 15$ mm  Ø = 50 - 125 mm B154
A260/054 90° $a_p \leq 10$ mm   Ø = 89 - 407 mm B163	**A260/056** 90° $a_p \leq 14$ mm   Ø = 89 - 407 mm B163	**A260/039** **A260/055** 90° $a_p \leq 12$ mm   Ø = 89 - 407 mm B165
A260/051 **A260/042** 90° $a_p \leq 14$ mm   Ø = 89 - 407 mm B164	**A260/025** 90° $a_p \leq 18$ mm   Ø = 89 - 407 mm B166	**A260/026** 90° $a_p \leq 18$ mm   Ø = 89 - 407 mm B167
b = 6-9 mm **90LN**  Ø = 80 - 125 mm B155	b = 14-22 mm **90CN**  Ø = 125 - 200 mm B156	

Application
Form milling

CHSC/CHPC $a_p \leq 18$ mm  Ø = 16 - 32 mm B106-B109	**C251** $a_p \leq 6$ mm  Ø = 10 - 32 mm B88-B89	**C252** $a_p \leq 2{,}5$ mm  Ø = 32 mm B90
C KF $a_p \leq 16$ mm  Ø = 12 - 32 mm B111	**C211** $a_p \leq 14$ mm  Ø = 10 - 40 mm B97-B100	**CHFC** $a_p \leq 2$ mm  Ø = 16 - 35 mm B94
GHSC-11 $a_p \leq 10$ mm  Ø = 16 - 40 mm B123	**GHSC-19** $a_p \leq 18$ mm  Ø = 25 - 40 mm B123	**G251** $a_p \leq 6$ mm  Ø = 20 - 35 mm B114
G252 $a_p \leq 2{,}5$ mm  Ø = 32 mm B115	**G211** $a_p \leq 14$ mm  Ø = 16 - 40 mm B118	**GHFC** $a_p \leq 2$ mm  Ø = 16 - 35 mm B116
MHSC-11 **MHSC-19** $a_p \leq 18$ mm  Ø = 25 - 50 mm B124	**MHSC-19** $a_p \leq 18$ mm  Ø = 25 - 50 mm B126	**A251** $a_p \leq 10$ mm  Ø = 40 - 125 mm B131-B132
AHSC-11 **AHSC-19** $a_p \leq 18$ mm  Ø = 40 - 125 mm B151	**AHPC-19** $a_p \leq 18$ mm  Ø = 40 - 63 mm B152	**A211** $a_p \leq 19$ mm  Ø = 32 - 160 mm B145-B146

AHFC	A260/052	A260/053
 $a_p \leq 2$ mm	 $a_p \leq 6$ mm	 $a_p \leq 8$ mm
		
Ø = 32 - 100 mm B140	Ø = 80 - 398 mm B162	Ø = 80 - 398 mm B162

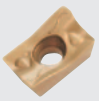
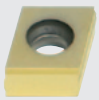
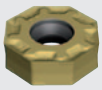
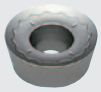
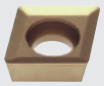
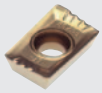
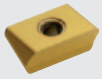
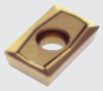
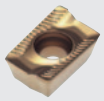
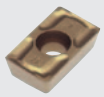
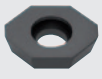
Application

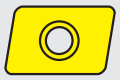
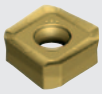
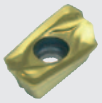
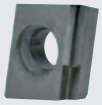
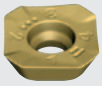
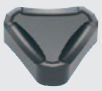
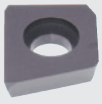
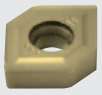
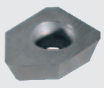
Profile milling

a = 8 - 20 mm **C NF**	a = 1,1 - 2,65 mm **C ZF**	**C272-09**
		
Ø = 17,5 - 48 mm B112	Ø = 16 - 25 mm B113	Ø = 6 - 25 mm B87


hard material matters
CERATIZIT
CERATIZIT

Overview

	A	C	L	O	R
CERATIZIT systems	AP..  B46	CN..  B47	LD../LE..  B49	OA..  B56	RD..  B58-B59
		CP..  B48	LD..  B50+B51	OF..  B57	RP..  B58-B59
			LN..  B52-B54		RN..  B60
			LP..  B55		R..  B61
Other systems	AD..  B79		LD..  B79	OF..  B80	
	AP..  B79				
Finishing				OD..  B77	

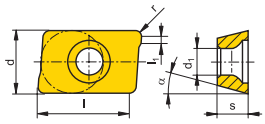
S	T	V	W	X	Z
					
SA..  B62	**TC..**  B67	**VC..**  B69	**WP..**  B70	**XD..**  B71-B74	**ZN..**  B76
SD..  B63-B64	**TP..**  B68			**XD../XO../XP..**  B74-B75	
SF..  B57					
SE.. / SP..  B65-B66					
SE..  B80-B82	**TN..**  B81				
SP..  B80-B82	**TP..**  B81				
SP..  B77				**XA..**  B78	
				XD..  B78	

CERATIZIT hard material matters

System 210, 212

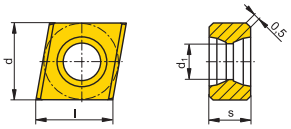
AP..

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1
			P			●	O				●	●	●	●	●	O		O	O	●	●											
			M			O	O				O	●	O	O	O	●		●	●	O	●											
			K	●	●		O	●	●	●	●	●	O				O				●	O		●	●							
			N	●	●		●																●									
			S				O					O	O	O	O	●	●	O	●													
			H							●															O							
-27P		APHT 100302FR-27P		●		●																					6.65	9.80	3.50	1.7	0.20	2.80
		APHT 100304FR-27P		●		●																					6.65	9.80	3.50	1.7	0.40	2.80
		APHT 100308FR-27P		●		●																					6.65	9.80	3.50	1.7	0.80	2.80
-29		APKT 1003PDSR-29			●						●		●	●													6.65	9.80	3.50	1.0	0.50	2.80
-29M		APKT 1003PDSR-29M									●		●	●													6.65	9.94	3.80	1.6	0.50	2.80
-31		APKT 1003PDSR-31					●																				6.65	9.80	3.50	1.0	0.50	2.80
-33		APHT 100308SR-33P																	●								6.65	9.80	3.50	1.7	0.80	2.80
		APHT 100308SR-33																	●								6.65	9.80	3.50	1.7	0.80	2.80
		APHT 100312SR-33																	●								6.65	9.80	3.50	2.0	1.20	2.80
		APHT 100320SR-33																	●								6.65	9.80	3.50	1.0	2.00	2.80
		APHT 100332SR-33																	●								6.65	9.80	3.50		3.20	2.80
APHW		APHW 100308SR																			●						6.65	10.10	3.50	1.4	0.80	2.80
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1



B10-B11 B23-B24 B34-B35 B194-B203 B102-B103 B119 B148 B164

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	r	d_1
			P			●	○					●	●	●	●	●	○		○	○	●	●									
			M			○	○					○	●	○	○	○	●		●	●	○	●									
			K	●	●		○	●	●	●	●	●	○				○				●	○		●	●						
			N	●	●		●																●								
			S				○						○	○	○	○	●	●	○	●											
			H							●															○						
CNHT		CNHT 1005		●								●															10.00	10.15	5.40	0.50	4.70
		CNHT 1205		●								●															10.00	12.90	5.40	0.50	4.70
CNHW		CNHW 1005		●								●															10.00	10.15	5.40	0.50	4.70
		CNHW 1205		●								●															10.00	12.90	5.40	0.50	4.70
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	r	d_1

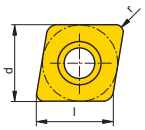


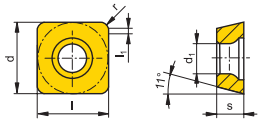
B10-B11 B34-B35 B194-B203 B156

System CNF

CP.. SP..

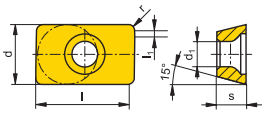
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P					●	○					●	●	●	●	●	○		○	○	●	●										
M					○	○					○	●	○	○	○	●		●	●	○	●										
K		●	●			○	●	●	●	●	●	○				○				●	○		●	●							
N		●	●			●																●									
S						○						○	○	○	○	●	●	○	●												
H									●															○							
CPMT		CPMT 060304EN												●													6.35	6.40	3.18	0.40	2.80
		CPMT 09T308SN			●									●													9.52	9.70	3.97	0.80	4.40
CPMW		CPMW 060304EN						●																			6.35	6.40	3.18	0.40	2.80
		CPMW 09T308EN		●				●																			9.52	9.70	3.97	0.80	4.40
SP..W		SPGW 050204EN			●																						5.56	5.56	2.38	0.40	2.80
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	r	d_1

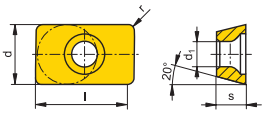




B10-B11 B34-B35 B194-B203 B112

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P					●	○					●	●	●	●	●	○		○	○	●	●										
M					○	○					○	●	○	○	○	●		●	●	○	●										
K	●	●			○	●	●	●	●	●	○					○				●	○		●	●							
N	●	●			●																	●									
S					○							○	○	○	○	●	●	○	●												
H									●															○							
-29		LDHT 100204ER-29												●														6.35	10.00	2.58	0.40	2.80
LE..-29		LEHT 08T104ER-29												●														5.56	8.00	1.98	0.40	2.50
LEHW		LEHW 08T104ER												●														5.56	8.00	1.98	0.40	2.50
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	r	d_1



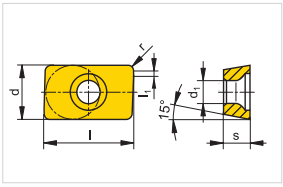


B10-B11 B23-B24 B34-B35 B194-B203 B104

System HSC

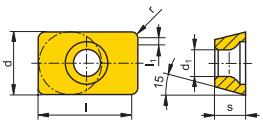
LD..

		CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	r	d_1
		P			●	○					●	●	●	●	●	○		○	○	●	●									
		M			○	○					○	●	○	○	○	●		●	●	○	●									
		K	●	●		○	●	●	●	●	●	○				○				●	○		●	●							
		N	●	●		●																●								
		S				○						○	○	○	○	●	●	○	●												
		H							●																○						
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	r	d_1
																										[mm]	[mm]	[mm]	[mm]	[mm]
-27P		LDHT 120404FR-27P		●																						9.00	12.00	4.00	0.40	3.40
		LDHT 120408FR-27P		●																						9.00	12.00	4.00	0.80	3.40
		LDHT 120425FR-27P		●																						9.00	12.00	4.00	2.50	3.40



B10-B11 B23-B24 B34-B35 B194-B203

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215		d [mm]	l [mm]	s [mm]	l_1 [mm]	r [mm]	d_1 [mm]
-27P		LDFT 150405FR-27P				●																				9.52	15.00	4.76	1.2	0.50	4.40
		LDFT 150408FR-27P		●																						9.52	15.00	4.76	1.2	0.80	4.40
-29		LDFT 1504PDSR-29									●		●	●												9.52	15.00	4.76	1.2	0.80	4.40
		LDMT 1504PDSR-29									●			●												9.52	15.00	4.76	1.2	0.80	4.40
-33		LDFT 1504PDSR-33																●	●							9.52	15.00	4.76	0.8	1.20	4.40
		LDFT 150416SR-33																	●							9.52	15.00	4.76	0.9	1.60	4.40
		LDFT 150420SR-33																	●							9.52	15.00	4.76	0.9	2.00	4.40
		LDFT 150432SR-33																	●							9.52	15.00	4.76	1.0	3.20	4.40
		LDFT 150440SR-33																	●							9.52	15.00	4.76		4.00	4.40
LDFT		LDFT 150408ER															●									9.52	15.00	4.76		0.80	4.40
LDFT-P		LDFT 150408FR-P		●																						9.52	15.00	4.76	1.2	0.80	4.40
LDFW		LDFW 1504PDSR					●	●			●															9.52	15.00	4.76	1.2	0.80	4.40

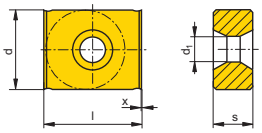


B10-B11 B23-B24 B34-B35 B194-B203 B105 B149 B164

System S90

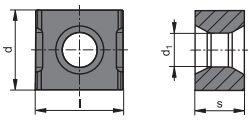
LN..

		CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	d_1	x
		P			●	○					●	●	●	●	●	○		○	○	●	●									
		M			○	○					○	●	○	○	○	●		●	●	○	●									
		K	●	●		○	●	●	●	●	●	○				○				●	○		●	●							
		N	●	●		●																●									
		S				○						○	○	○	○	●	●	○	●												
		H							●																○						
LNET		LNET 1235										●															9.52	12.70	3.50	4.40	0.3
		LNET 1240		●								●															9.52	12.70	4.00	4.40	0.3
		LNET 1245		●								●															9.52	12.70	4.50	4.40	0.4
		LNET 1250		●								●															9.52	12.70	5.00	4.40	0.4
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	d_1	x



B10-B11 B34-B35 B194-B203 B155

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d [mm]	l [mm]	s [mm]	d_1 [mm]
-R50		LNHX 1106PNER-R50					●			●																	10.00	11.00	6.35	4.27
		LNHX 110608EN-R50								●																	10.00	11.00	6.35	4.27
LNHX		LNHX 1106PNER					●			●										●							10.00	11.00	6.35	4.27
		LNHX 1106PNSR																					●	●			10.00	11.00	6.35	4.27
		LNHX 1106ZZER-Q					●																	●			10.00	11.00	6.35	4.27
		LNHX 110608SN																					●				10.00	11.00	6.35	4.27
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	d_1

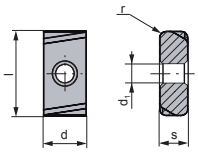


B10-B11 B23-B24 B34-B35 B194-B203 B141-B142

System HDM

LN..

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P					●	○					●	●	●	●	●	○		○	○	●	●										
M					○	○					○	●	○	○	○	●		●	●	○	●										
K	●	●			○	●	●	●	●	●	○					○				●	○		●	●							
N	●	●			●																	●									
S					○							○	○	○	○	●	●	○	●												
H									●															○							
LNUC		LNUC 220920ER					●																				14.28	28.57	9.52	2.00	5.90
LNUJ		LNUJ 220920SR					●																				15.81	27.85	9.52	2.00	5.90

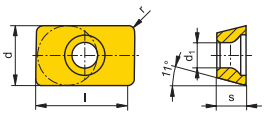


Inserts

Tools and inserts for milling

B10-B11 B34-B35 B194-B203 B150

		CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P				●	○					●	●	●	●	●	○		○	○	●	●										
M				○	○					○	●	○	○	○	●		●	●	○	●										
K		●	●		○	●	●	●	●	●	○				○				●	○		●	●							
N		●	●		●																●									
S					○						○	○	○	○	●	●	○	●												
H								●															○							
-29																														
	LPHT 200408ER-29												●													12.70	20.00	4.76	0.80	5.50
LPHW																														
	LPHW 200408ER		●																							12.70	20.00	4.76	0.80	5.50
	LPHW 200408SR												●													12.70	20.00	4.76	0.80	5.50
		CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	r	d_1

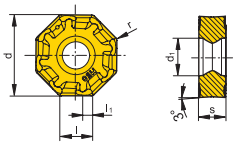


B10-B11 B23-B24 B34-B35 B194-B203 B167

System A273

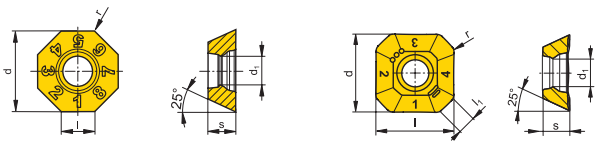
OA..

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1
			P			●	○				●	●	●	●	●	○		○	○	●	●											
			M			○	○				○	●	○	○	○	●		●	●	○	●											
			K	●	●		○	●	●	●	●	●	○				○				●	○		●	●								
			N	●	●		●																●									
			S				○					○	○	○	○	●	●	○	●													
			H							●															○							
				CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1
																											[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
-F40		OAKU 060508ER-F40														●	●										17.18	6.00	5.56	2.0	0.80	5.80
-F50		OAKU 060508SR-F50									●		●					●									17.18	6.00	5.56	2.0	0.80	5.80
-M50		OAKU 060508SL-M50					●			●																	17.18	6.00	5.56	2.0	0.80	5.80
		OAKU 060508SR-M50					●			●	●		●					●									17.18	6.00	5.56	2.0	0.80	5.80
-R50		OAKU 060508SR-R50					●			●																	17.18	6.00	5.56	2.0	0.80	5.80
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1



B10-B11 B23-B24 B34-B35 B194-B203 B91 B135-B137 B161

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
		P			●	○					●	●	●	●	●	○		○	○	●	●									
		M			○	○					○	●	○	○	○	●		●	●	○	●									
		K	●	●		○	●	●	●	●	●	○				○				●	○		●	●							
		N	●	●		●																●									
		S				○						○	○	○	○	●	●	○	●												
		H							●															○							
OF..-F10		OFHT 040305FN-F10	●																								9.52	3.94	3.18	0.50	3.35
SF..-F10		SFHT 0903AFFR-F10	●																								9.52	9.52	3.18	1.00	3.35
SF..-F40		SFHT 0903AFER-F40															●										9.52	9.52	3.18	1.00	3.35
OF..-F50		OFHT 040305SN-F50									●		●			●		●									9.52	3.94	3.18	0.50	3.35
-F50		SFHT 0903AFSR-F50									●		●			●		●									9.52	9.52	3.18	1.00	3.35
OF..-M50		OFHT 040305SN-M50					●				●		●					●									9.52	3.94	3.18	0.50	3.35
SF..-M50		SFKT 0903AFSR-M50									●		●														9.52	9.52	3.18	1.00	3.35
SF..-R50		SFKT 0903AFSR-R50					●			●																	9.52	9.52	3.18	1.00	3.35
OFHW		OFHW 040302EN														●	●										9.52	3.94	3.18	0.20	3.35
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	r	d_1



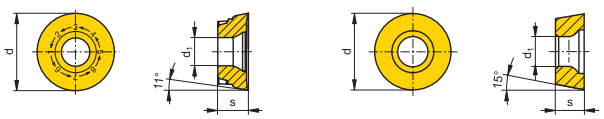
B10-B11 B23-B24 B34-B35 B194-B203 B92-B93 B120-B121 B138-B139

CERATIZIT hard material matters

System 251 / 251-RS

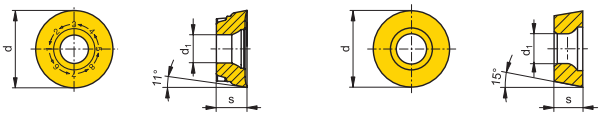
RD.. RP..

			P			●	O				●	●	●	●	●	O		O	O	●	●					
			M			O	O				O	●	O	O	O	●		●	●	O	●					
			K	●	●		O	●	●	●	●	O				O				●	O		●	●		
			N	●	●		●															●				
			S				O					O	O	O	O	●	●	O	●							
			H							●															O		
				CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d [mm]	s [mm]	d_1 [mm]
-27P			RPHX 10T3MOFN-27P		●																						10.00	3.97	3.40
			RPHX 1204MOFN-27P		●																						12.00	4.76	4.40
			RPHX 1605MOFN-27P		●																						16.00	5.56	5.50
-29			RPNX 10T3MOSN-29									●			●												10.00	3.97	3.40
			RPNX 1204MOSN-29									●			●												12.00	4.76	4.40
			RPNX 1605MOSN-29									●			●												16.00	5.56	5.50
RDHX -33			RDHX 0802MOEN-33																●	●							8.00	2.38	2.80
-33			RPHX 10T3MOEN-33																●	●							10.00	3.97	3.40
			RPHX 1204MOEN-33																●	●							12.00	4.76	4.40
			RPHX 1605MOEN-33																●	●							16.00	5.56	5.50
-33M			RPHX 2006MOSN-33M																●	●							20.00	6.35	6.00
-33R			RPNX 2006MOSN-33R																	●							20.00	6.35	6.00
RDHX -M31			RDHX 0501MOEN-M31														●										5.00	1.59	2.50
			RDHX 0802MOEN-M31														●	●									8.00	2.38	2.80
-M31			RDHX 0802M4EN-M31														●										8.00	2.38	2.80
			RPHX 10T3M4EN-M31														●	●									10.00	3.97	3.40
			RPHX 10T3M8EN-M31														●	●									10.00	3.97	3.40
			RPHX 1204M4EN-M31														●	●									12.00	4.76	4.40
			RPHX 1204M6EN-M31														●	●									12.00	4.76	4.40
			RPHX 1204M8EN-M31														●	●									12.00	4.76	4.40
			RPHX 1605M8EN-M31														●	●									16.00	5.56	5.50
			RPHX 2006M4EN-M31														●										20.00	6.35	6.00
			RPNX 10T3M4EN-M31														●										10.00	3.97	3.40
			RPNX 10T3M8EN-M31														●										10.00	3.97	3.40
			RPNX 1204M4EN-M31														●										12.00	4.76	4.40
			RPNX 1204M8EN-M31														●										12.00	4.76	4.40
			RPNX 2006M8EN-M31														●	●									20.00	6.35	6.00
				CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	s	d_1



B10-B11 B23-B24 B34-B35 B194-B203 B88-B89 B114 B131-B132 B162

			P	M	K	N	S	H	CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215	d [mm]	s [mm]	d_1 [mm]
-M32		RPHX 10T3M4EN-M32			●	○											●	●	●	●	●	○		○	○	●	●				10.00	3.97	3.40
		RPHX 1204M4EN-M32			○	○											○	●	○	○	○	●		●	●	○	●				12.00	4.76	4.40
-R60		RPNX 1204M8EN-R60						●							●																12.00	4.76	4.40
RDHX		RDHX 0501MOFN								●																					5.00	1.59	2.50
		RDHX 0501MOSN															●			●											5.00	1.59	2.50
		RDHX 0802MOEN											●																		8.00	2.38	2.80
		RDHX 0802MOFN								●																					8.00	2.38	2.80
		RDHX 0802MOSN															●		●	●											8.00	2.38	2.80
RPHX		RPHX 10T3MOEN											●																		10.00	3.97	3.40
		RPHX 10T3MOSN															●		●	●							●				10.00	3.97	3.40
		RPHX 1204MOSN											●				●		●	●							●				12.00	4.76	4.40
		RPHX 1204M4EN																				●									12.00	4.76	4.40
		RPHX 1605MOSN											●				●		●	●											16.00	5.56	5.50
		RPNX 1204MOSN															●			●											12.00	4.76	4.40
		RPNX 1605MOSN															●														16.00	5.56	5.50
									CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215	d	s	d_1

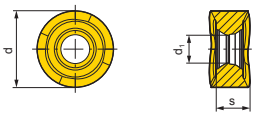


B10-B11 B23-B24 B34-B35 B194-B203 B88-B89 B114 B131-B132 B162

System 252

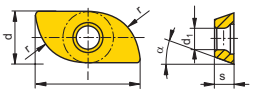
RN..

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d [mm]	s [mm]	d_1 [mm]
P					●	○					●	●	●	●	●	○		○	○	●	●							
M					○	○					○	●	○	○	○	●		●	●	○	●							
K	●	●			○	●	●	●	●	●	○					○				●	○		●	●				
N	●	●			●																	●						
S					○							○	○	○	○	●	●	○	●									
H									●															○				
-M31		RNHU 1004M4ER-M31														●	●										10.00	5.28	3.40
		RNHU 1205M4ER-M31														●	●										12.00	6.34	4.40
-M32		RNHU 1004M4ER-M32														●											10.00	5.28	3.40
		RNHU 1205M4ER-M32														●											12.00	6.34	4.40



B10-B11 B23-B24 B34-B35 B194-B203 B90 B115 B133

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P					●	○					●	●	●	●	●	○		○	○	●	●										
M					○	○					○	●	○	○	○	●		●	●	○	●										
K	●	●			○	●	●	●	●	●	○					○				●	○		●	●							
N	●	●			●																	●									
S					○							○	○	○	○	●	●	○	●												
H									●															○							
R..E		R06E 0602ZZER											●														6.35	13.00	2.38	6.00	2.80
		R08E 0803ZZSR											●														8.33	14.93	3.18	8.00	3.40
R..D		R10D 0602ZZER											●														6.35	13.40	2.38	10.00	2.80
		R12D 0803ZZSR											●														8.00	17.00	3.18	12.50	3.40
		R16D 10T3ZZER											●	●													10.00	17.00	3.97	16.00	4.40
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	r	d_1

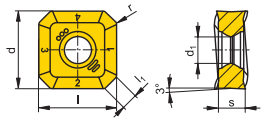


B10-B11 B34-B35 B194-B203 B111

System 271

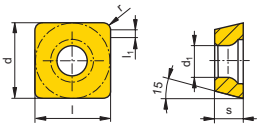
SA..

		CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d [mm]	l [mm]	s [mm]	l_1 [mm]	r [mm]	d_1 [mm]
		P			●	○				●	●	●	●	●	○		○	○	●	●											
		M			○	○				○	●	○	○	○	●		●	●	○	●											
		K	●	●		○	●	●	●	●	●	○				○				●	○		●	●								
		N	●	●		●																●									
		S				○					○	○	○	○	●	●	○	●													
		H							●															○							
-F50		SAKU 1706ABSR-F50								●		●			●											17.00	17.00	6.35	3.70	0.80	5.80
-M50		SAKU 1706ABSR-M50				●			●	●		●														17.00	17.00	6.35	3.70	0.80	5.80
-R50		SAKU 1706ABSR-R50				●			●																	17.00	17.00	6.35	3.70	0.80	5.80
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1



B10-B11 B23-B24 B34-B35 B194-B203 B134 B159

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215	d [mm]	l [mm]	s [mm]	l_1 [mm]	r [mm]	d_1 [mm]
		P			●	○					●	●	●	●	●	○		○	○	●	●									
		M			○	○					○	●	○	○	○	●		●	●	○	●									
		K	●	●		○	●	●	●	●	●	○				○				●	○		●	●							
		N	●	●		●																●								
		S				○						○	○	○	○	●	●	○	●											
		H							●															○						
-27P		SDHT 09T308ER-27															●								9.52	9.52	3.97	2.5	0.80	4.40
		SDHT 09T308FR-27P		●		●																			9.52	9.52	3.97	2.5	0.80	4.40
		SDHT 120508FR-27P		●		●																			12.70	12.70	5.00	2.2	0.80	5.00
		SDHT 120525FR-27P		●		●																			12.70	12.70	5.00	2.2	2.50	5.00
-29		SDMT 1205ZZSN-29									●		●	●					●						12.70	12.70	5.00	0.9	0.80	5.00
		SDNT 09T308SR-29									●		●	●											9.52	9.52	3.97	2.5	0.80	4.40
-31		SDMT 1205ZZSN-31					●																		12.70	12.70	5.00	0.9	0.80	5.00
		SDNT 09T308SR-31					●	●																	9.52	9.52	3.97	2.5	0.80	4.40
-33		SDHT 120512SR-33																●	●						12.70	12.70	5.00	1.8	1.20	5.00
		SDHT 120520SR-33																	●						12.70	12.70	5.00	1.0	2.00	5.00
		SDNT 09T308SR-33																●	●						9.52	9.52	3.97	2.5	0.80	4.40
-M31		SDMT 120508ER-M31														●	●								12.70	12.70	5.00		0.80	5.50
		SDNT 09T308ER-M31														●	●								9.52	9.52	3.97	2.5	0.80	4.40
SD..T		SDHT 09T308SR																			●				9.52	9.52	3.97	2.5	0.80	4.40
		SDNT 09T308ER											●												9.52	9.52	3.97	2.5	0.80	4.40
SD..W		SDHW 120508SR																			●				12.70	12.70	5.00	2.2	0.80	5.00
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215	d	l	s	l_1	r	d_1

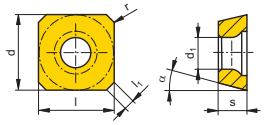


B10-B11 B23-B24 B34-B35 B194-B203 B95-B96 B117 B143-B144 B165

System 270, 272

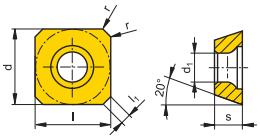
SD..

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1
			P			●	○					●	●	●	●	●	○		○	○	●	●											
			M			○	○					○	●	○	○	○	●		●	●	○	●											
			K	●	●		○	●	●	●	●	●	○				○					●	○		●	●							
			N	●	●		●																	●									
			S				○						○	○	○	○	●	●	○	●													
			H							●																○							
				CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1
																											[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
-27P		SDHT 0903AEFN-27P		●		●																					9.52	9.52	3.18	1.68	1.00	3.40
		SDHT 1204AEFN-27		●																							12.70	12.70	4.76	1.74	0.20	5.50
		SDHT 1204AEFN-27P		●																							12.70	12.70	4.76	1.74	0.20	5.50
		SDHT 1504AEFN-27		●																							15.88	15.88	4.76	1.74	0.20	5.50
-29		SDMT 1204AESN-29R									●		●	●													12.70	12.70	4.76	1.74	1.00	5.50
		SDNT 0903AESN-29									●		●	●													9.52	9.52	3.18	1.68	1.00	3.40
-31		SDMT 1204AEEN-31					●	●																			12.70	12.70	4.76	1.74	1.00	5.50
		SDNT 0903AESN-31					●																				9.52	9.52	3.18	1.61	1.00	3.40
-33		SDHT 0903AESN-33P																	●								9.52	9.52	3.18	1.68	1.00	3.40
		SDHT 0903AESN-33																●	●								9.52	9.52	3.18	1.68	1.00	3.40
		SDHT 1204AESN-33																●	●								12.70	12.70	4.76	1.74	1.00	5.50
-M31		SDHT 0903AESN-M31														●	●										9.52	9.52	3.18	1.68	1.00	3.40
		SDHT 1204AESN-M31														●	●										12.70	12.70	4.76	1.74	1.00	5.50
SD..T		SDHT 1204AESN			●																●						12.70	12.70	4.76	1.74	0.20	5.50
		SDHT 1204AESN-R									●			●													12.70	12.70	4.76	1.74	1.00	5.50
		SDHT 1504AESN												●													15.88	15.88	4.76	1.74	0.20	5.50
SD..W		SDHW 0903AESN																			●						9.52	9.52	3.18	1.68	1.00	3.40
		SDHW 1204AEEN		●																							12.70	12.70	4.76	1.74	0.20	5.50
		SDHW 1204AEEN-R					●	●																			12.70	12.70	4.76	1.74	1.00	5.50
		SDHW 1204AESN-R									●			●							●						12.70	12.70	4.76	1.74	1.00	5.50
		SDHW 1504AEEN		●																							15.88	15.88	4.76	1.74	0.20	5.50
		SDHW 1504AESN									●		●														15.88	15.88	4.76	1.74	0.20	5.50
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1



B10-B11 B23-B24 B34-B35 B194-B203 B86-B87 B128-B130 B157-B158

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215		d [mm]	l [mm]	s [mm]	l_1 [mm]	r [mm]	d_1 [mm]
P				●	○						●	●	●	●	●	○		○	○	●	●										
M				○	○						○	●	○	○	○	●		●	●	○	●										
K	●	●		○	●	●	●	●	●	●	○					○				●	○		●	●							
N	●	●		●																		●									
S				○								○	○	○	○	●	●	○	●												
H									●															○							
-27P		SEHT 1204AEFN-27P		●																						12.70	12.70	4.76	1.60	0.20	5.50
		SEHT 1204AEFN-27		●																						12.70	12.70	4.76	1.60	0.20	5.50
-33		SEHT 1204AFSN-33																	●							12.70	12.70	4.76	1.63	1.20	5.50
SE..T		SEHT 1204AFSN												●												12.70	12.70	4.76	2.40	0.20	5.50
SE..W		SEHW 1204AFSN					●							●												12.70	12.70	4.76	2.30	0.30	5.50
		SEKW 1204AFSN					●				●			●												12.70	12.70	4.76	2.20	2.40	5.50
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215		d	l	s	l_1	r	d_1

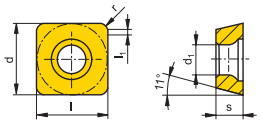


B10-B11 B23-B24 B34-B35 B194-B203 B158

System A260-018

SP..

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d [mm]	l [mm]	s [mm]	l_1 [mm]	r [mm]	d_1 [mm]
		P			●	○					●	●	●	●	●	○		○	○	●	●										
		M			○	○					○	●	○	○	○	●		●	●	○	●										
		K	●	●		○	●	●	●	●	●	○				○				●	○		●	●								
		N	●	●		●																●									
		S				○						○	○	○	○	●	●	○	●												
		H							●															○							
-29		SPKT 1204EDSR-29									●																12.70	12.70	4.76	1.4	0.25	5.50
SP..W		SPKW 1204EDER					●																				12.70	12.70	4.76	1.8	0.25	5.50
		SPKW 1204EDSR												●													12.70	12.70	4.76	1.8	0.25	5.50
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1

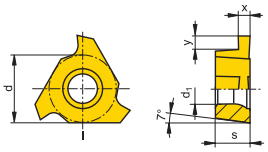


Inserts

Tools and inserts for milling

B10-B11 B23-B24 B34-B35 B194-B203 B160

		CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215		d [mm]	s [mm]	d_1 [mm]	y [mm]	x [mm]
P				●	○					●	●	●	●	●	○		○	○	●	●										
M				○	○					○	●	○	○	○	●		●	●	○	●										
K		●	●		○	●	●	●	●	●	○				○				●	○		●	●							
N		●	●		●																●									
S					○						○	○	○	○	●	●	○	●												
H								●															○							
TC..																														
	TC 1103ER160													●											6.35	3.18	2.80	1.40	1.60
	TC 1103ER185													●											6.35	3.18	2.80	1.70	1.85
	TC 1103ER215													●											6.35	3.18	2.80	2.00	2.15
	TC 1103ER265													●											6.35	3.18	2.80	2.20	2.65
	TC 16T3ER110													●											9.53	3.97	4.20	0.90	1.10
	TC 16T3ER130													●											9.53	3.97	4.20	1.30	1.30
	TC 16T3ER160													●											9.53	3.97	4.20	1.40	1.60
		CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215		d	s	d_1	y	x

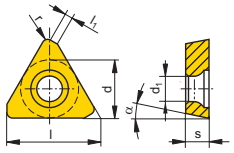


B10-B11 B23-B24 B34-B35 B194-B203 B113

System A260-025

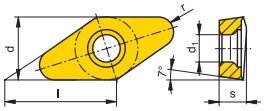
TP..

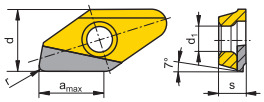
	CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1
																									[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
TPKW		TPKW 2204PDER		●																					12.70	20.80	4.76	1.60	1.20	5.50
		TPKW 2204PDSR										●													12.70	20.80	4.76	1.60	1.20	5.50
	CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1



B10-B11 B34-B35 B194-B203 B166

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	r	d_1	a_{max}
			P			●	O					●	●	●	●	●	O		O	O	●	●											
			M			O	O					O	●	O	O	●	O		●	●	O	●											
			K	●	●		O	●	●	●	●	●	O				O				●	O		●	●								
			N	●	●		●																●										
			S				O						O	O	O	O	●	●	O	●													
			H							●															O								
				CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	r	d_1	a_{max}
																											[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
-27MP		VCGT 220530FN-27MP		●																							12.70	22.10	5.56	3.00	5.50	
		VCGX 220530FN-27MP		●																							12.70	22.10	5.56	3.00	5.50	
VC..W		VCGW 2205PCER-R																				●					12.70	22.10	5.56	0.80	5.50	8.5
		VCGW 2205PCSR-M																				●					12.70	22.10	5.56	0.80	5.50	5.0
				CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	r	d_1	a_{max}



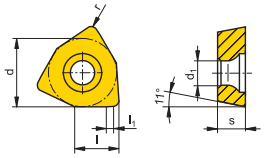


B10-B11 B23-B24 B34-B35 B194-B203 B127 B154

System 280

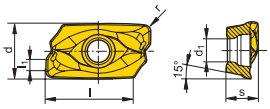
WP..

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d [mm]	l [mm]	s [mm]	l_1 [mm]	r [mm]	d_1 [mm]
P					●	○					●	●	●	●	●	○		○	○	●	●											
M					○	○					○	●	○	○	○	●		●	●	○	●											
K	●	●			○	●	●	●	●	●	●	○				○				●	○		●	●								
N	●	●			●																	●										
S					○							○	○	○	○	●	●	○	●													
H									●															○								
-29		WPHT 0603PDSR-29									●			●							●						9.52	6.00	3.18	1.2	0.80	3.40
		WPMT 0603PDSR-29									●																9.52	6.00	3.18	1.2	0.80	3.40
-31		WPHT 0603PDSR-31					●																				9.52	6.00	3.18	1.2	0.80	3.40
-33		WPHT 0603PDSR-33																	●								9.52	6.00	3.18	1.2	0.80	3.40
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1



B10-B11 B23-B24 B34-B35 B194-B203

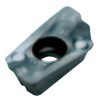
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215		d [mm]	l [mm]	s [mm]	l_1 [mm]	r [mm]	d_1 [mm]
		P			●	○					●	●	●	●	●	○		○	○	●	●									
		M			○	○					○	●	○	○	○	●		●	●	○	●									
		K	●	●		○	●	●	●	●	●	○				○				●	○		●	●							
		N	●	●		●																●								
		S				○						○	○	○	○	●	●	○	●											
		H							●															○						
-F20		XDKT 070304FR-F20	●																							4.90	7.80	3.18	1.5	0.40	2.50
		XDKT 070308FR-F20	●																							4.90	7.80	3.18	1.1	0.80	2.50
		XDKT 11T302FR-F20	●																							6.80	10.60	3.80	2.0	0.20	2.80
		XDKT 11T304FR-F20	●																							6.80	10.60	3.80	1.8	0.40	2.80
		XDKT 11T308FR-F20	●																							6.80	10.60	3.80	1.4	0.80	2.80
		XDKT 11T320FR-F20	●																							6.80	10.60	3.80	1.7	2.00	2.80
		XDKT 11T325FR-F20	●																							6.80	10.60	3.80	1.2	2.50	2.80
		XDKT 150508FR-F20	●																							9.30	14.80	5.56	1.6	0.80	4.50
-F40		XDKT 070304ER-F40														●	●									4.90	7.80	3.18	1.2	0.40	2.50
		XDKT 070308ER-F40														●	●									4.90	7.80	3.18	0.8	0.80	2.50
		XDKT 11T304ER-F40														●	●									6.80	10.60	3.80	1.7	0.40	2.80
		XDKT 11T308ER-F40														●	●									6.80	10.60	3.80	1.4	0.80	2.80
		XDKT 11T312ER-F40														●	●									6.80	10.60	3.80	1.1	1.20	2.80
		XDKT 11T316ER-F40														●	●									6.80	10.60	3.80	0.8	1.60	2.80
		XDKT 11T320ER-F40														●										6.80	10.60	3.80	0.3	2.00	2.80
		XDKT 11T325ER-F40														●	●									6.80	10.60	3.80	1.6	2.50	2.80
		XDKT 11T332ER-F40														●	●									6.80	10.60	3.80	1.5	3.20	2.80
		XDKT 11T340ER-F40														●	●									6.80	10.60	3.80		4.00	2.80
		XDKT 150508ER-F40														●	●									9.30	14.80	5.56	1.6	0.80	4.50
		XDKT 150532ER-F40														●	●									9.30	14.80	5.56	1.9	3.20	4.50
		XDKT 150540ER-F40														●	●									9.30	14.80	5.56	1.2	4.00	4.50
		XDKT 200708ER-F40														●	●									12.50	18.80	6.93	2.8	0.80	5.50
		XDKT 200732ER-F40														●	●									12.50	18.80	6.82	0.9	3.20	5.50
-F50		XDKT 070304SR-F50									●		●					●								4.90	7.80	3.18	1.2	0.40	2.50
		XDKT 070308SR-F50									●		●					●								4.90	7.80	3.18	1.0	0.80	2.50
		XDKT 11T304SR-F50									●		●	●												6.80	10.60	3.80	1.8	0.40	2.80
		XDKT 11T308SR-F50									●		●	●				●	●							6.80	10.60	3.80	1.4	0.80	2.80
		XDKT 11T312SR-F50																●	●							6.80	10.60	3.80	1.0	1.20	2.80
		XDKT 11T320SR-F50									●		●	●				●	●							6.80	10.60	3.80	2.1	2.00	2.80
		XDKT 11T325SR-F50									●		●	●												6.80	10.60	3.80	1.6	2.50	2.80
		XDKT 11T332SR-F50																●	●							6.80	10.60	3.80	1.5	3.20	2.80
		XDKT 150508SR-F50									●		●					●								9.30	14.80	5.56	1.6	0.80	4.50
-M50		XDKT 070304SR-M50									●		●					●								4.90	7.80	3.18	1.0	0.40	2.50
		XDKT 070308SR-M50									●		●					●								4.90	7.80	3.18	1.0	0.80	2.50
		XDKT 11T304SR-M50					●				●		●	●												6.80	10.60	3.80	1.8	0.40	2.80
		XDKT 11T308SR-M50					●				●		●	●				●								6.80	10.60	3.80	1.4	0.80	2.80
		XDKT 11T312SR-M50																●								6.80	10.60	3.80	1.0	1.20	2.80
		XDKT 11T320SR-M50									●		●	●				●								6.80	10.60	3.80	2.1	2.00	2.80
		XDKT 11T325SR-M50									●		●	●												6.80	10.60	3.80	1.6	2.50	2.80
		XDKT 11T332SR-M50																●								6.80	10.60	3.80	1.5	3.20	2.80
		XDKT 150508SR-M50					●			●	●		●					●								9.30	14.80	5.56	1.6	0.80	4.50
		XDKT 150520SR-M50									●															9.30	14.80	5.56	1.6	2.00	4.50
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215		d	l	s	l_1	r	d_1

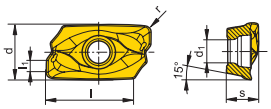


B10-B11 B23-B24 B34-B35 B194-B203 B97-B101 B118 B145-B147 B163

System 211

XD..

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1
			P			●	○				●	●	●	●	●	○		○	○	●	●											
			M			○	○				○	●	○	○	○	●		●	●	○	●											
			K	●	●		○	●	●	●	●	○				○				●	○		●	●								
			N	●	●		●															●										
			S				○					○	○	○	○	●	●	○	●													
			H						●															○								
				CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1
																											[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
-R50		XDKT 11T304SR-R50									●		●	●													6.80	10.60	3.80	1.8	0.40	2.80
		XDKT 11T308SR-R50					●				●		●	●				●	●								6.80	10.60	3.80	1.4	0.80	2.80
		XDKT 11T312SR-R50																●	●								6.80	10.60	3.80	1.0	1.20	2.80
		XDKT 11T320SR-R50									●		●	●				●	●								6.80	10.60	3.80	2.1	2.00	2.80
		XDKT 11T325SR-R50									●		●	●													6.80	10.60	3.80	1.6	2.50	2.80
		XDKT 11T332SR-R50																●	●								6.80	10.60	3.80	1.5	3.20	2.80
		XDKT 150508SR-R50					●			●	●		●														9.30	14.80	5.56	1.6	0.80	4.50
		XDKT 150520SR-R50									●																9.30	14.80	5.56	1.6	2.00	4.50
-R60		XDKT 11T308SR-R60							●																		6.80	10.60	3.80	1.4	0.80	2.80
		XDKT 150508SR-R60							●																		9.30	14.80	5.56	1.6	0.80	4.50
				CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1



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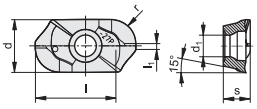
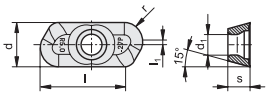
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215		d [mm]	l [mm]	s [mm]	l_1 [mm]	r [mm]	d_1 [mm]
-27P		XDHT 11T302FR-27P		●																						6.80	10.60	3.50	2.0	0.20	2.80
		XDHT 11T304FR-27P		●																						6.80	10.60	3.50	1.8	0.40	2.80
		XDHT 11T308FR-27P		●																						6.80	10.60	3.50	1.4	0.80	2.80
		XDHT 11T312FR-27P		●																						6.80	10.60	3.50	1.4	1.20	2.80
		XDHT 11T316FR-27P		●																						6.80	10.60	3.50	1.4	1.60	2.80
		XDHT 11T320FR-27P		●																						6.80	10.60	3.50	1.4	2.00	2.80
		XDHT 11T325FR-27P		●																						6.80	10.60	3.50	1.4	2.50	2.80
		XDHT 11T332FR-27P		●																						6.80	10.60	3.50	0.8	3.20	2.80
		XDHT 11T340FR-27P		●																						6.80	10.60	3.50		4.00	2.80
		XDHT 11T350FR-27P		●																						6.80	10.60	3.50		5.00	2.80
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215		d	l	s	l_1	r	d_1

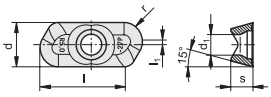


System HSC

XD..19..

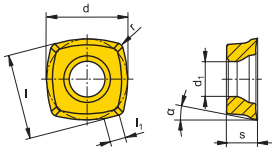
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1
			P			●	○				●	●	●	●	●	○		○	○	●	●											
			M			○	○				○	●	○	○	○	●		●	●	○	●											
			K	●	●		○	●	●	●	●	●	○				○				●	○		●	●								
			N	●	●		●																●									
			S				○					○	○	○	○	●	●	○	●													
			H							●															○							
				CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1
																											[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
XDHT		XDHT 190402FR-27P		●																							9.52	19.00	4.76	2.0	0.20	4.65
		XDHT 190404FR-27P		●																							9.52	19.00	4.76	2.0	0.40	4.65
		XDHT 190408FR-27P		●																							9.52	19.00	4.76	2.0	0.80	4.65
		XDHT 190412FR-27P		●																							9.52	19.00	4.76	2.0	1.20	4.65
		XDHT 190416FR-27P		●																							9.52	19.00	4.76	2.0	1.60	4.65
		XDHT 190420FR-27P		●																							9.52	19.00	4.76	2.0	2.00	4.65
		XDHT 190425FR-27P		●																							9.52	19.00	4.76	1.4	2.50	4.65
		XDHT 190432FR-27P		●																							9.52	19.00	4.76	1.0	3.20	4.65
		XDHT 190440FR-27P		●																							9.52	19.00	4.76	1.0	4.00	4.65
		XDHT 190450FR-27P		●																							9.52	19.00	4.76		5.00	4.65
XDHX		XDHX 190402FR-27P		●																							9.52	19.00	4.76	2.0	0.20	4.65
		XDHX 190404FR-27P		●																							9.52	19.00	4.76	2.0	0.40	4.65
		XDHX 190408FR-27P		●																							9.52	19.00	4.76	2.0	0.80	4.65
		XDHX 190412FR-27P		●																							9.52	19.00	4.76	2.0	1.20	4.65
		XDHX 190416FR-27P		●																							9.52	19.00	4.76	2.0	1.60	4.65
		XDHX 190420FR-27P		●																							9.52	19.00	4.76	2.0	2.00	4.65
		XDHX 190425FR-27P		●																							9.52	19.00	4.76	1.4	2.50	4.65
		XDHX 190432FR-27P		●																							9.52	19.00	4.76	1.0	3.20	4.65
		XDHX 190440FR-27P		●																							9.52	19.00	4.76	1.0	4.00	4.65
		XDHX 190450FR-27P		●																							9.52	19.00	4.76		5.00	4.65
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1





B10-B11 B23-B24 B34-B35 B194-B203 B108-B109 B123 B151-B152 B124+B126

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215		d [mm]	l [mm]	s [mm]	l_1 [mm]	r [mm]	d_1 [mm]
		P			●	O					●	●	●	●	●	O		O	O	●	●									
		M			O	O					O	●	O	O	O	●		●	●	O	●									
		K	●	●		O	●	●	●	●	●	O				O				●	O		●	●							
		N	●	●		●																●									
		S				O						O	O	O	O	●	●	O	●												
		H							●															O							
-F40		XDLX 09T308ER-F40														●	●									9.60	9.00	3.97	2.4	0.80	4.40
		XOLX 120410ER-F40														●	●									12.70	12.00	4.76	2.2	1.00	5.50
		XPLX 060305ER-F40														●	●									6.35	6.00	2.75	1.0	0.50	2.80
-M50		XDLX 09T308SR-M50					●				●		●					●								9.60	9.00	3.97	1.5	0.80	4.40
		XOLX 120410SR-M50									●		●					●								12.70	12.00	4.76	2.2	1.00	5.50
		XPLX 060305SR-M50					●						●					●								6.35	6.00	2.75	1.0	0.50	2.80
-R50		XOLX 120410SR-R50											●													12.70	12.00	4.76	2.2	1.00	5.50
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215		d [mm]	l [mm]	s [mm]	l_1 [mm]	r [mm]	d_1 [mm]



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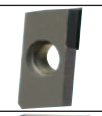
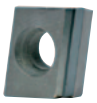
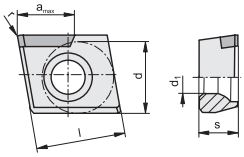
CERATIZIT hard material matters

System HPC

ZN..

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]	a_{max} [mm]
			P			●	○					●	●	●	●	●	○		○	○	●	●										
			M			○	○					○	●	○	○	○	●		●	●	○	●										
			K	●	●		○	●	●	●	●	●	○				○				●	○		●	●							
			N	●	●		●																●									
			S				○						○	○	○	○	●	●	○	●												
			H							●															○							
0003		ZNHW 120508SR-0003																				●					10.00	12.40	5.40	0.80	4.85	3.0
0007		ZNHW 120504FR-0007																				●					10.00	12.40	5.40	0.40	4.85	7.0
1002		ZNHW 1205EOER-1002																						●			10.00	12.40	5.40		4.85	2.0
		ZNHW 1205EOSR-1002																						●			10.00	12.40	5.40		4.85	2.0
1204		ZNHW 04T3POER-1204																				●					7.00	11.00	3.97		2.80	4.0
		ZNHW 04T305ER-1204																						●			7.00	11.00	3.97	0.50	2.80	4.0
1503		ZNHW 1205POSR-1503																				●					10.00	12.40	5.40		4.85	3.0
		ZNHW 120504ER-1503																				●					10.00	12.40	5.40	0.40	4.85	3.0
		ZNHW 120508ER-1503																				●					10.00	12.40	5.40	0.80	4.85	3.0
1506		ZNHW 1205POSR-1506																				●					10.00	12.40	5.40		4.85	6.0
		ZNHW 1205POSR-1506-R																				●					10.00	12.40	5.40		4.85	6.0
1511		ZNHW 1205POER-1511																				●					10.00	12.40	5.40		4.85	11.0
3003		ZNHW 1205POSR-3003																				●					10.00	12.40	5.40		4.85	3.0
5003		ZNHW 1205ZZSR-5003-Q																				●					10.00	12.40	5.40		4.85	3.0
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	r	d_1	a_{max}



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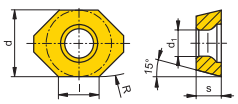
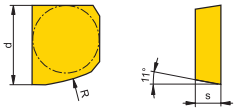
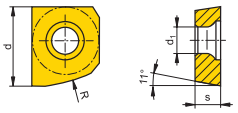
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d [mm]	l [mm]	s [mm]	d_1 [mm]	R [mm]
	P				●	○					●	●	●	●	●	○		○	○	●	●										
	M				○	○					○	●	○	○	○	●		●	●	○	●										
	K		●	●		○	●	●	●	●	●	○				○				●	○		●	●							
	N		●	●		●																●									
	S					○						○	○	○	○	●	●	○	●												
	H								●															○							
ODGX		ODGX 1204ADSN									●																	12.70	7.17	4.76	5.50	400
SPEX-1		SPEX 1203EDER-1						●																				12.70	12.00	3.18		500
SPEX		SPEX 1204EETR		●																								12.70	12.00	4.76	5.50	400
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	d_1	R







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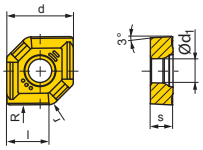
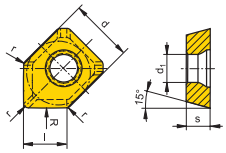
System 270, 273

XA.. XD..

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	r	d_1	R
			P			●	○				●	●	●	●	●	○		○	○	●	●											
			M			○	○				○	●	○	○	○	●		●	●	○	●											
			K	●	●		○	●	●	●	●	○				○				●	○		●	●								
			N	●	●		●															●										
			S				○					○	○	○	○	●	●	○	●													
			H						●															○								
				CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	r	d_1	R
																											[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
-M50		XAHT 060525SL-M50					●																				17.08	10.00	5.56	2.50	6.00	640
		XAHT 060525SR-M50					●			●	●		●					●									17.08	10.00	5.56	2.50	6.00	640
XDHW		XDHW 0903AEEN					●																				9.52	5.50	3.18	1.00	3.40	125
		XDHW 0903AEFN		●																							9.52	5.50	3.18	1.00	3.40	125
		XDHW 0903AESN									●			●							●						9.52	5.50	3.18	1.00	3.40	125
		XDHW 1204AEEN					●																				12.70	7.50	4.76	1.00	5.50	150
		XDHW 1204AEFN		●																							12.70	7.50	4.76	1.00	5.50	150
		XDHW 1204AESN									●			●							●						12.70	7.50	4.76	1.00	5.50	150
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	r	d_1	R





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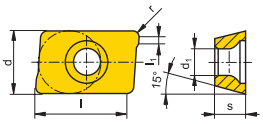
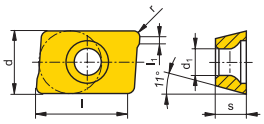
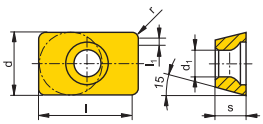
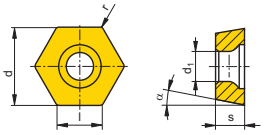
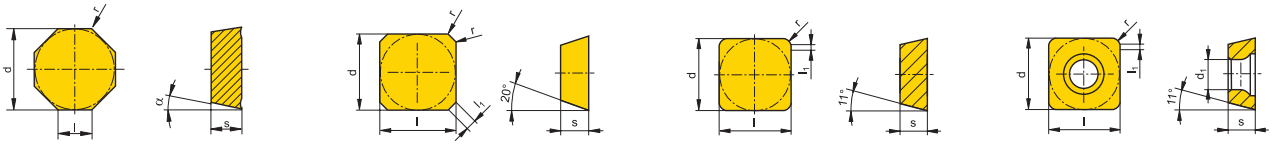
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215		d [mm]	l [mm]	s [mm]	l_1 [mm]	r [mm]	d_1 [mm]
P					●	○					●	●	●	●	●	○		○	○	●	●									
M					○	○					○	●	○	○	○	●		●	●	○	●									
K	●	●			○	●	●	●	●	●	○					○				●	○		●	●							
N	●	●			●																	●								
S					○							○	○	○	○	●	●	○	●												
H									●														○							
-29		ADKT 1505PDSR-29									●		●	●				●								9.57	15.20	5.65	1.2	0.80	4.40
APFT...-29		APFT 1604PDSR-29									●			●												9.52	16.00	4.76	1.2	0.80	4.40
APKT...-29		APKT 1604PDSR-29									●			●		●										9.52	16.39	5.26	1.4	0.80	4.40
LDHT...-29		LDHT 15T3PDSR-29												●												9.52	15.00	3.97	1.2	0.80	4.40
		LDHT 15T308FR-29		●																						9.52	15.00	3.97		0.80	4.40
HNGX..-31Q		HNGX 090530EN-31Q					●																			16.20	9.35	5.56		3.00	3.81
LDHT		LDHT 15T308FR		●																						9.52	15.00	3.97		0.80	4.40
LDHW		LDHW 15T308ER		●			●																			9.52	15.00	3.97		0.80	4.40
		LDHW 15T308SR									●			●							●					9.52	15.00	3.97		0.80	4.40
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215		d	l	s	l_1	r	d_1

Other systems

O.. S.. T..

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1
			P			●	○				●	●	●	●	●	○		○	○	●	●											
			M			○	○				○	●	○	○	○	●		●	●	○	●											
			K	●	●		○	●	●	●	●	●	○				○				●	○		●	●								
			N	●	●		●																●									
			S				○					○	○	○	○	●	●	○	●													
			H							●															○							
				CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d [mm]	l [mm]	s [mm]	l_1 [mm]	r [mm]	d_1 [mm]
OFHR..-27P		OFHR 070410FN-27P		●																							18.18	7.00	4.97	1.5	1.00	
SEKR..-29		SEKR 1203AFSN-29									●			●													12.70	12.70	3.18		2.40	
SPKR..-29		SPKR 1203EDSR-29									●			●													12.70	12.70	3.18		0.30	
-29		SPKT 1204EDSR-29									●																12.70	12.70	4.76	1.4	0.25	5.50
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1



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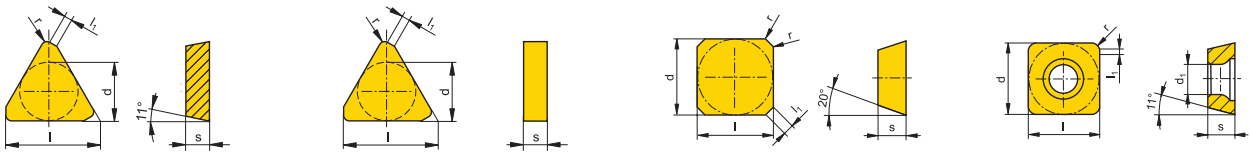
		CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215		d [mm]	l [mm]	s [mm]	l_1 [mm]	r [mm]	d_1 [mm]
P				●	○					●	●	●	●	●	○		○	○	●	●										
M				○	○					○	●	○	○	○	●		●	●	○	●										
K		●	●		○	●	●	●	●	●	○				○				●	○		●	●								
N		●	●		●																●									
S					○						○	○	○	○	●	●	○	●													
H								●															○							
TPKR...-29		TPKR 1603PPSR-29									●			●												9.52	15.50	3.18	1.2		
		TPKR 2204PDSR-29									●			●												12.70	20.70	4.76	1.4		
TNHF...-31		TNHF 1204ANEN-31M					●																			12.70	18.90	4.76	2.6		
		TNHF 1204ANEN-31					●																			12.70	18.90	4.76	2.6		
		TNHF 1204ANSN-31Q				●																				12.70	18.90	4.76	2.6		
		TNHF 1204ANSN-31					●																			12.70	18.90	4.76	2.6		
SEHR...-33		SEHR 1203AFSN-33																	●							12.70	12.70	3.18		1.20	
SPMT...-33		SPMT 070308SN-33																	●							7.94	7.94	3.18		0.80	2.80
		SPMT 120408SN-33																	●							12.70	12.70	4.76		0.80	5.50
SEKN		SEKN 1203AFEN		●															●							12.70	12.70	3.18		2.40	
		SEKN 1203AFSN			●		●	●			●			●							●					12.70	12.70	3.18		2.40	
		SEKN 1504AFSN					●				●							●								15.88	15.88	4.76		2.40	
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215		d	l	s	l_1	r	d_1

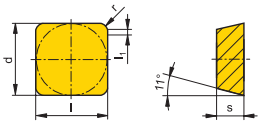


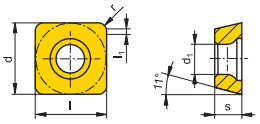
CERATIZIT hard material matters

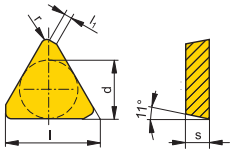
Other systems

O.. S.. T..

			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d [mm]	l [mm]	s [mm]	l_1 [mm]	r [mm]	d_1 [mm]
		P			●	○					●	●	●	●	●	○		○	○	●	●										
		M			○	○					○	●	○	○	○	●		●	●	○	●										
		K	●	●		○	●	●	●	●	●	○				○				●	○		●	●								
		N	●	●		●																●									
		S				○						○	○	○	○	●	●	○	●												
		H							●															○							
SPKN		SPKN 1203EDER		●			●	●																			12.70	12.70	3.18			
		SPKN 1203EDSR			●						●			●													12.70	12.70	3.18			
		SPKN 1504EDSR			●						●			●													15.88	15.88	4.76			
SPKR		SPKR 1203EDFR		●																							12.70	12.70	3.18			
SP..W		SPKW 1204EDER					●																				12.70	12.70	4.76	1.8	0.25	5.50
		SPKW 1204EDSR												●													12.70	12.70	4.76	1.8	0.25	5.50
SPMT		SPMT 090308SN												●													9.52	9.52	3.18		0.80	3.40
		SPMT 120408EN		●				●																			12.70	12.70	4.76		0.80	5.50
		SPMT 120408SN												●													12.70	12.70	4.76		0.80	5.50
TPKN		TPKN 1603PPER						●																			9.52	15.50	3.18	1.4		
		TPKN 1603PPSR			●						●			●													9.52	15.50	3.18	1.4		
		TPKN 2204PDER						●																			12.70	22.00	4.76	1.4		
		TPKN 2204PDSR			●						●			●													12.70	22.00	4.76	1.4		
TPKW		TPKW 16T3PPSR												●													9.52	15.50	3.97	1.4	1.10	4.40
			CTW4615	H216T	S26T	AMZ	CTC3215	SR216	CTP6215	CTP3220	SR226+	CTP1625	CTP1235	GM43+	GM43	CTC5235	CTC5240	CTP2235	GM246	TCC410	TCM10	CTD4205	CTN3105	CTL3215			d	l	s	l_1	r	d_1







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hard material matters
CERATIZIT
CERATIZIT

Overview

MaxiMill end mills



Face milling cutters C270



B86

Chamfering cutters C272



B87

Button insert cutters C251 / C252



B88-B90

Face milling cutters C273



B91

Face milling cutters C274



B92-B93

Face milling cutters CHFC



B94

Shoulder & slot milling cutters C490



B95-B96

Shoulder & slot milling cutters C211



B97-B101

MaxiMill end mills



Shoulder & slot milling cutters C210



B102

Drill and slot milling cutters C212



B103

Drill and slot milling cutters C BF



B104

Shoulder & slot milling cutters CHSC



B106-B108

Shoulder & slot milling cutters CHPC



B109

Ball nose milling cutters C KF



B111

T-slot milling cutters C NF



B112

Circlip groove milling cutters C ZF



B113

MaxiMill threaded shank milling cutters



Button insert milling cutters G251 / G252



B114-B115

Face milling cutters GHFC



B116

Shoulder & slot milling cutters G490



B117

Shoulder & slot milling cutters G211



B118

Shoulder & slot milling cutters G210



B119

Face milling cutters G274



B120-B121

Shoulder & slot milling cutters GHPC



B122

Shoulder & slot milling cutters GHSC



B123

MaxiMill monobloc milling cutters



HSC milling cutters MHSC



B124+B126

HSC milling cutters MHPC



B125

HSC milling cutters MHSV



B127

MaxiMill shell milling cutters



Face milling cutters A270



B128-B130

Button insert cutters A251 / A252



B131-B133

Face milling cutters A271



B134

Face milling cutters A273



B135-B137

Face milling cutters A274



B138-B139

Face milling cutters AHFC



B140

Shoulder & face milling cutters AHEC-11



B141-B142

Shoulder & slot milling cutters A490



B143-B144

MaxiMill shell milling cutters



Shoulder & slot milling cutters A211



B145-B147

Shoulder & slot milling cutters A210



B148

Face milling cutters AHDM



B150

Shoulder & slot milling cutters AHSC



B151

Shoulder & slot milling cutters AHPC-19



B152

Face milling cutters AHPC-12



B153

Shoulder & slot milling cutters AHSV



B154

Side & face milling cutters 90LN / 90CN



B155-B156

MaxiMill cassette cutters



Face milling cutters A260



B157-B161

Button insert cutters A260



B162

Shoulder & slot milling cutters A260



B163-B167

Cutter body A260



B168

Cassettes A260

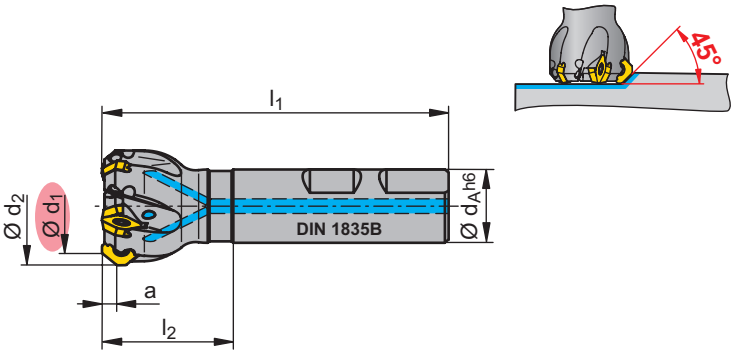


B169

Face milling cutters

C270-09





d1 [mm]	Type, description	d2 [mm]	l1 [mm]	l2 [mm]	dA [mm]	a [mm]	z	
6	C270.06.R.01-09	14.4	80	32	16	4	1	SD/XD.. 0903..
12	C270.12.R.01-09	20.4	80	32	16	4	1	
16	C270.16.R.02-09	24.4	90	40	20	4	2	
20	C270.20.R.03-09	28.4	90	40	20	4	3	
25	C270.25.R.04-09	33.4	100	44	25	4	4	
32	C270.32.R.05-09	40.4	95	36	25	4	5	

Ordering example: 1 piece C270.06.R.01-09

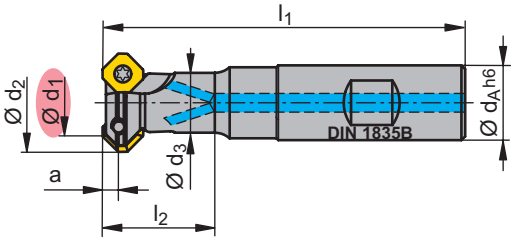
Supply details: cutter body and insert clamping screws

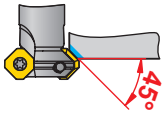
	d1 [mm]			
SD/XD.. 0903..	**6 - 12**	7883214/M3,0X5,7/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08
SD/XD.. 0903..	**16 - 32**	7883203/M3,0X7,3/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08

B190-B193 B204-B218 B242-B246 B64









d_1 [mm]	Type, description	d_2 [mm]	l_1 [mm]	l_2 [mm]	d_A [mm]	a [mm]	z	
6	C272.06.R.01-09	14.4	91	24	16	4	1	SD.. 0903..
8	C272.08.R.01-09	16.4	91	25.5	16	4	1	
12	C272.12.R.01-09	20.4	91	26	16	4	1	
16	C272.16.R.02-09	24.4	97	30	20	4	2	
18	C272.18.R.02-09	26.4	97	30	20	4	2	
25	C272.25.R.03-09	33.4	109	35	25	4	3	

Ordering example: 1 piece C272.06.R.01-09

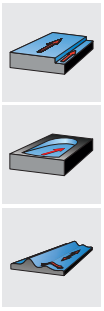
Supply details: cutter body and insert clamping screws

	d_1 [mm]			
SD.. 0903..	**6 - 12**	7883214/M3,0X5,7/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08
SD.. 0903..	**16 - 25**	7883203/M3,0X7,3/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08

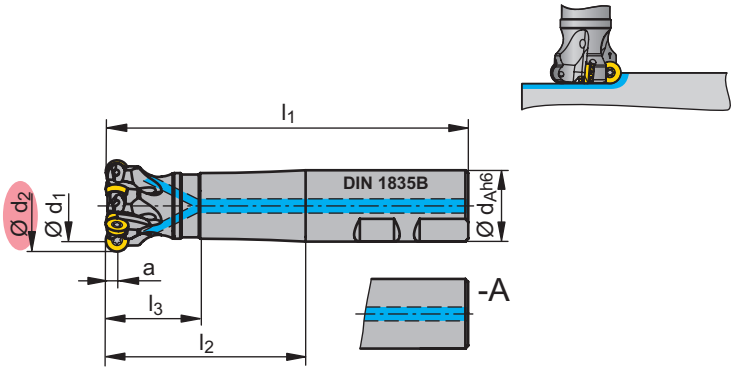
B190-B193 B242-B246 B64

Button insert cutters

C251







to be discontinued

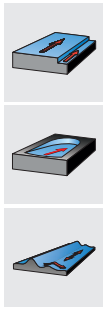
d_2 [mm]	Type, description	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
10	C251.10.R.02-05-A-45-165	5	165	45	27	12	2.5	12000	2	RD.. 0501..
16	C251.16.R.04-05	11	88	40	28	16	2.5	40000	4	
	C251.16.R.04-05-A	11	88	40	28	16	2.5	40000	4	
20	C251.20.R.03-08	12	100	50	35	20	4	31800	3	RD.. 0802..
25	C251.25.R.04-08	17	116	60	38	25	4	25450	4	
	C251.25.R.03-10-B-60	15	116	60	38	25	5	25450	3	RP.. 10T3..
	C251.25.R.03-10-AR-60	15	116	60		25	5	25450	3	

Ordering example: 1 piece C251.10.R.02-05-A-45-165

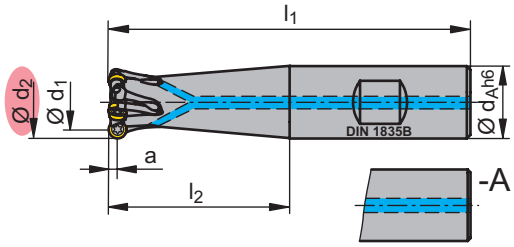
Supply details: cutter body and insert clamping screws

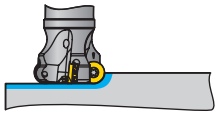
	d_2 [mm]			
RD.. 0501..	**10 - 16**	7801175/M2,0X3,3/T06	7883305/TORX T06	DMSD 0,7Nm/SORT T06
RD.. 0802..	**20 - 25**	7883204/M2,5X5/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08
RP.. 10T3..	**25**	10007085/M3,0X7,3/T10	7883306/TORX T10	DMSD 2,0Nm/SORT T10

B190-B193 B204-B218 B242-B246 B247-B252 B60









d_2 [mm]	Type, description	d_1 [mm]	l_1 [mm]	l_2 [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
10	C251.10.R.02-05-A-25-165-RS	5	165	25	10	2.5	12000	2	RD.. 0501..
	C251.10.R.02-05-B12-20-RS	5	67	20	12	2.5	40000	2	
12	C251.12.R.03-05-A-32-165-RS	7	165	32	12	2.5	16000	3	
	C251.12.R.03-05-B16-25-RS	7	75	25	16	2.5	40000	3	
16	C251.16.R.04-05-A-40-165-RS	11	165	40	16	2.5	18000	4	
	C251.16.R.04-05-B-32-RS	11	81	32	16	2.5	40000	4	
20	C251.20.R.05-05-A-50-165-RS	15	165	50	20	2.5	18000	5	
	C251.20.R.05-05-B-40-RS	15	91	40	20	2.5	31800	5	
16	C251.16.R.02-08-A-40-165-RS	8	165	40	16	4	18000	2	RD.. 0802..
	C251.16.R.02-08-B-32-RS	8	81	32	16	4	40000	2	
20	C251.20.R.03-08-A-50-200-RS	12	200	50	20	4	25000	3	
	C251.20.R.03-08-A-60-RS	12	110	60	20	4	27300	3	
	C251.20.R.03-08-B-40-RS	12	91	40	20	4	31800	3	
25	C251.25.R.04-08-A-60-225-RS	17	225	60	25	4	18000	4	
	C251.25.R.04-08-A-60-RS	17	116	60	25	4	20000	4	
	C251.25.R.04-08-B-50-RS	17	107	50	25	4	25500	4	
20	C251.20.R.02-10-A-50-RS	10	102	50	20	5	31800	2	RP.. 10T3..
	C251.20.R.02-10-A-50-200-RS	10	200	50	20	5	25000	2	
25	C251.25.R.03-10-A-60-RS	15	116	60	25	5	20000	3	
	C251.25.R.03-10-A-60-225-RS	15	225	60	25	5	18000	3	
	C251.25.R.03-10-B-60-RS	15	116	60	25	5	20000	3	
32	C251.32.R.04-10-A-70-RS	22	130	70	32	5	19000	4	
25	C251.25.R.02-12-B-30-RS	13	86	30	25	6	25000	2	RP.. 1204..
32	C251.32.R.03-12-A-40-RS	20	100	40	32	6	19000	3	
	C251.32.R.03-12-B-40-RS	20	100	40	32	6	19000	3	

Ordering example: 1 piece C251.10.R.02-05-A-25-165-RS

Supply details: cutter body and insert clamping screws

	d_2 [mm]			
RD.. 0501..	**12 - 20**	7801175/M2,0X3,3/T06	7883305/TORX T06	DMSD 0,7Nm/SORT T06
RD.. 0802..	**20 - 25**	7883204/M2,5X5/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08
RP.. 10T3..	**20 - 32**	10007085/M3,0X7,3/T10	7883306/TORX T10	DMSD 2,0Nm/SORT T10
RP.. 1204..	**25 - 32**	7883209/M3,5X8,6/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15

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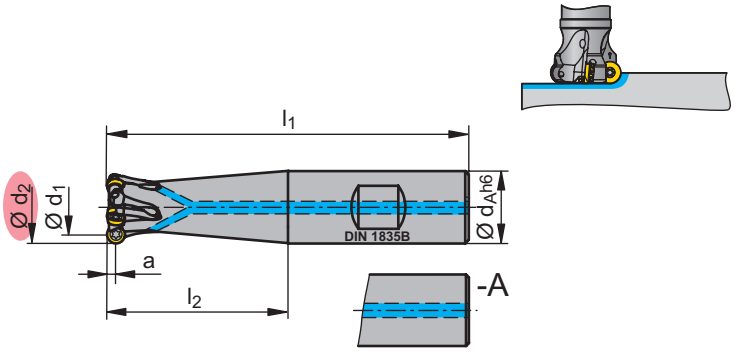
Button insert cutters

C252





d_2 [mm]	Type, description	d_1 [mm]	l_1 [mm]	l_2 [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
32	C252.32.R.04-10-A-70	22	131	70	32	2.5	19850	4	RN.. 1004..

Ordering example: 1 piece C252.32.R.04-10-A-70

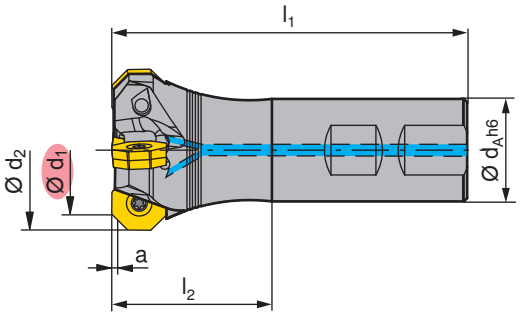
Supply details: cutter body and insert clamping screws

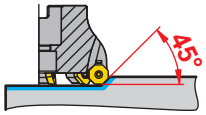
	d_2 [mm]		
RN.. 1004..	**32**	10009229/M3X7,5/10IP	DMSD 2,0Nm/SORT 10IP

B190-B193 B204-B218 B242-B246 B247-B252 B60









d_1 [mm]	Type, description	d_2 [mm]	l_1 [mm]	l_2 [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
32	C273.32.R.03-06-B-40	42.2	101	40	32	3.5	19600	3	OAKU 06..
40	C273.40.R.04-06-B32-50	50.2	111	50	32	3.5	17000	4	

Ordering example: 1 piece C273.32.R.03-06-B-40

Supply details: cutter body and insert clamping screws

	d_1 [mm]			
OAKU 06..	**32 - 40**	10000155/M5,0X14/T20	7724104/TORX T20	DMSD 5,0Nm/SORT T20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B242-B246


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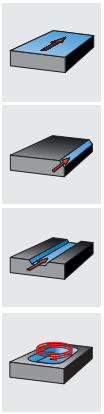
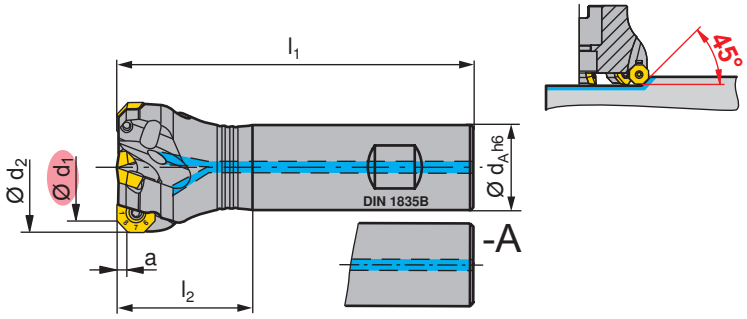
Face milling cutters

C274-09 OF..







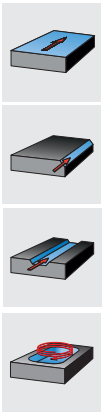
d1 [mm]	Type, description	d2 [mm]	l1 [mm]	l2 [mm]	a [mm]	dA [mm]	nmax [min-1]	z	
20	C274.20.R.03-09-A-25	25.6	77	25	2.5	20	42600	3	OF.. 0403..
	C274.20.R.03-09-B-25	25.6	77	25	2.5	20	42600	3	
25	C274.25.R.04-09-A20-32	30.7	84	32	2.5	20	37200	4	
	C274.25.R.04-09-B20-32	30.7	84	32	2.5	20	37200	4	
32	C274.32.R.05-09-A25-40	37.7	98	40	2.5	25	32200	5	
	C274.32.R.05-09-B25-40	37.7	98	40	2.5	25	32200	5	

Ordering example: 1 piece C274.20.R.03-09-A-25

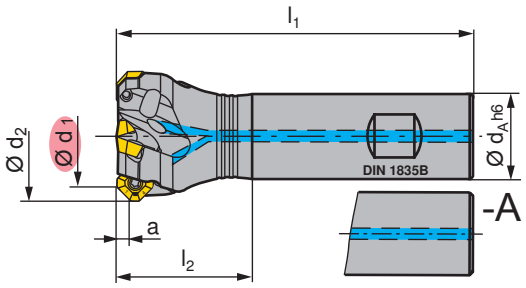
Supply details: cutter body and insert clamping screws

	d1 [mm]			
OF.. 0403..	**20 - 32**	10007562/M2,5X7,6/08TP	10000276/TORX 08IP	DMSD 1,6Nm/SORT 08IP

B190-B193 B242-B246 B57







d1 [mm]	Type, description	d2 [mm]	l1 [mm]	l2 [mm]	a [mm]	dA [mm]	nmax [min-1]	z	
18.9	C274.20.R.03-09-A-25	27.4	77.7	25.7	3.8	20	42600	3	SF.. 0903..
	C274.20.R.03-09-B-25	27.4	77.7	25.7	3.8	20	42600	3	
23.8	C274.25.R.04-09-A20-32	32.5	84.7	32.7	3.8	20	37200	4	
	C274.25.R.04-09-B20-32	32.5	84.7	32.7	3.8	20	37200	4	
30.7	C274.32.R.05-09-A25-40	39.5	98.7	40.7	3.8	25	32200	5	
	C274.32.R.05-09-B25-40	39.5	98.7	40.7	3.8	25	32200	5	

Ordering example: 1 piece C274.20.R.03-09-A-25

Supply details: cutter body and insert clamping screws

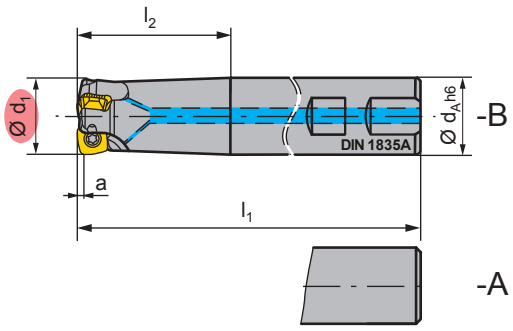
	d1 [mm]			
SF.. 0903..	**18.9 - 30.7**	10007562/M2,5X7,6/08TP	10000276/TORX 08IP	DMSD 1,6Nm/SORT 08IP

B190-B193 B242-B246 B57

Face milling cutters

CHFC-06/-09/-12





HFC high feed cutting

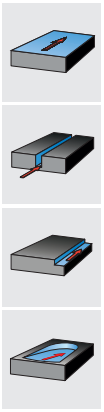
d_1 [mm]	Type, description	l_1 [mm]	l_2 [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
16	CHFC.16.R.02-06-A-40-200	200	40	16	0.8	4600	2	XP.. 06
	CHFC.16.R.02-06-B-40	89	40	16	0.8	17300	2	
20	CHFC.20.R.03-06-A-50-225	225	50	20	0.8	4200	3	
	CHFC.20.R.03-06-B-50	101	50	20	0.8	14500	3	
25	CHFC.25.R.04-06-A-50-225	225	50	25	0.8	4600	4	
	CHFC.25.R.04-06-B-50	107	50	25	0.8	15600	4	
32	CHFC.32.R.05-06-A25-60-225	225	60	25	0.8	3900	5	
	CHFC.32.R.05-06-B25-60	117	60	25	0.8	11000	5	
25	CHFC.25.R.02-09-A-50-225	225	50	25	1	9000	2	XD.. 09..
	CHFC.25.R.03-09-A-50-225	225	50	25	1	9000	3	
32	CHFC.32.R.03-09-A-63-250	250	63	32	1	8100	3	
	CHFC.32.R.02-12-A-63-250	250	63	32	2	6480	2	XO.. 12..
35	CHFC.35.R.03-12-A-63-250	250	63	32	2	6480	3	

Ordering example: 1 piece CHFC.16.R.02-06-A-40-200

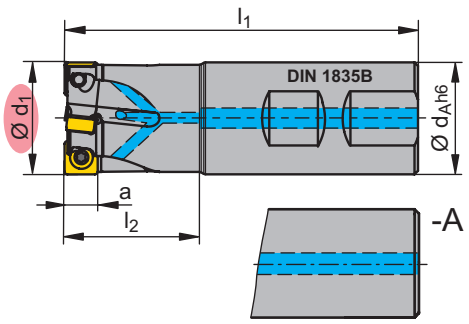
Supply details: cutter body and insert clamping screws

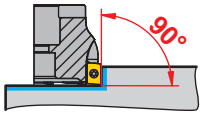
	d_1 [mm]			
XP.. 06	**16 - 32**	7883204/M2,5X5/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08
XD.. 09..	**25**	7722111/M3,5X7,2/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15
XD.. 09..	**32**	7883209/M3,5X8,6/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15
XO.. 12..	**32 - 35**	7822114/M4,5X10,5/T20	7724104/TORX T20	DMSD 5,0Nm/SORT T20

B190-B193 B204-B218 B242-B246 B247-B252 B75









d_1 [mm]	Type, description	l_1 [mm]	l_2 [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
25	C490.25.R.02-09-A20-40-165	165	40	20	8	17700	2	SD.. 09T3..
	C490.25.R.02-09-A-40-165	165	40	25	8	17700	2	
	C490.25.R.03-09-B-32	88	32	25	8	23700	3	
32	C490.32.R.04-09-B25-40	96	40	25	8	19700	4	
	C490.32.R.04-09-B-40	100	40	32	8	19700	4	
	C490.32.R.03-12-B-40	101	40	32	11	16300	3	SD.. 1205..
40	C490.40.R.04-12-B32-50	112	50	32	11	13600	4	

Ordering example: 1 piece C490.25.R.02-09-A20-40-165
Supply details: cutter body and insert clamping screws

	d_1 [mm]			
SD.. 09T3..	**25 - 32**	7722111/M3,5X7,2/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15
SD.. 1205..	**32 - 40**	7822114/M4,5X10,5/T20	7724104/TORX T20	DMSD 5,0Nm/SORT T20

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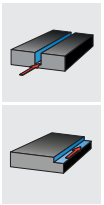
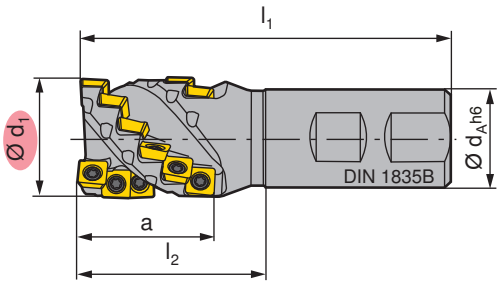
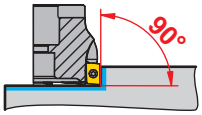
Shoulder & slot milling cutters

C490-09K









d_1 [mm]	Type, description	l_1 [mm]	l_2 [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	n		z	
32	C490.32.R.02K3-09-B-40	100	40	32	21	9700	6		2	SD.. 09T3..
40	C490.40.R.03K6-09-B32-60	120	60	32	41	8000	18		3	

Ordering example: 1 piece C490.32.R.02K3-09-B-40

Supply details: cutter body and insert clamping screws

n = number of inserts

	d_1 [mm]			
SD.. 09T3..	**32 - 40**	7722111/M3,5X7,2/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15

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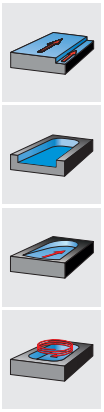
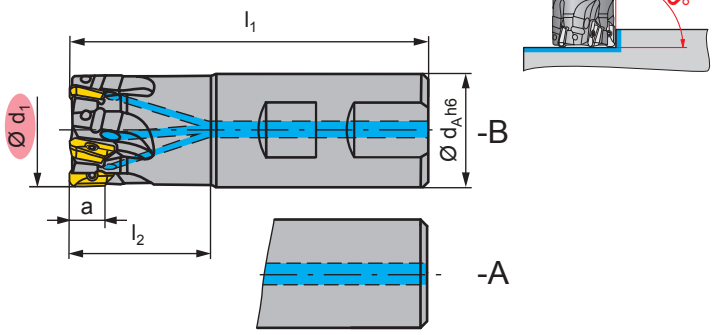






d_1 [mm]	Type, description	l_1 [mm]	l_2 [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
10	C211.10.R.01-07-A-20	61	20	10	6	72000	1	XD.. 07..
12	C211.12.R.02-07-A-20	66.5	20	12	6	66600	2	
16	C211.16.R.03-07-A-32-165	165	32	16	6	17760	3	
	C211.16.R.04-07-A-25	74.5	25	16	6	50400	4	
	C211.16.R.04-07-B-25	74.5	25	16	6	50400	4	
20	C211.20.R.04-07-A-40-200	200	40	20	6	12600	4	
	C211.20.R.05-07-A-25	77	25	20	6	44280	5	
	C211.20.R.05-07-B-25	77	25	20	6	44280	5	
25	C211.25.R.05-07-A20-50-225	225	50	20	6	11280	5	
	C211.25.R.06-07-A20-32	84	32	20	6	39840	6	
	C211.25.R.06-07-B20-32	84	32	20	6	39840	6	
32	C211.32.R.08-07-A25-40	98	40	25	6	36240	8	
	C211.32.R.08-07-B25-40	98	40	25	6	36240	8	

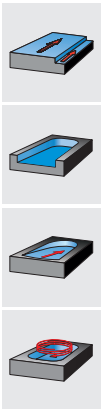
Ordering example: 1 piece C211.10.R.01-07-A-20
Supply details: cutter body and insert clamping screws

	d_1 [mm]			
XD.. 07..	**10 - 32**	10006888/M2,2X4,2/07IP	10006918/TORX 07IP	DMSD 1,0Nm/SORT 07IP

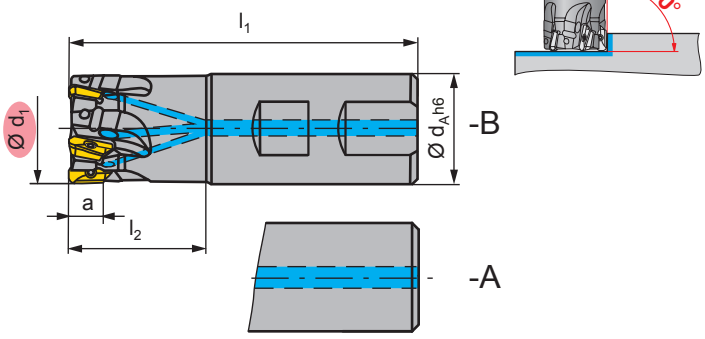
B190-B193 B204-B218 B236 B242-B246 B247-B252 B71

Shoulder & slot milling cutters

C211-11







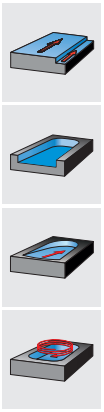
d_1 [mm]	Type, description	l_1 [mm]	l_2 [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
12	C211.12.R.01-11-B-20	75	20	16	10	55500	1	XD.. 11..
15.7	C211.15.7.R.02-11-B-25	75	25	16	10	42000	2	
16	C211.16.R.02-11-A-25	75	25	16	10	42000	2	
	C211.16.R.02-11-A-32-165	165	32	16	10	14800	2	
	C211.16.R.02-11-A15-32-165	165	32	15	10	14800	2	
	C211.16.R.02-11-B-25	75	25	16	10	42000	2	
19.7	C211.19.7.R.03-11-B-25	77	25	20	10	36900	3	
20	C211.20.R.02-11-A19-40-200	200	40	19	10	10500	2	
	C211.20.R.02-11-A-25	77	25	20	10	36900	2	
	C211.20.R.02-11-A-40-200	200	40	20	10	10500	2	
	C211.20.R.03-11-A-25	77	25	20	10	36900	3	
	C211.20.R.03-11-A-32-165	165	32	20	10	15800	3	
	C211.20.R.02-11-B-25	77	25	20	10	36900	2	
	C211.20.R.03-11-B-25	77	25	20	10	36900	3	
24.7	C211.24.7.R.04-11-B-32	90	32	25	10	33200	4	
25	C211.25.R.02-11-A-50-225	225	50	25	10	9400	2	
	C211.25.R.03-11-A24-50-225	225	50	24	10	9400	3	
	C211.25.R.03-11-A-32	90	32	25	10	33200	3	
	C211.25.R.03-11-A-50-225	225	50	25	10	9400	3	
	C211.25.R.04-11-A-32	90	32	25	10	33200	4	
	C211.25.R.04-11-A-40-165	165	40	25	10	19900	4	
	C211.25.R.03-11-B-32	90	32	25	10	33200	3	
	C211.25.R.04-11-B-32	90	32	25	10	33200	4	

Ordering example: 1 piece C211.12.R.01-11-B-20

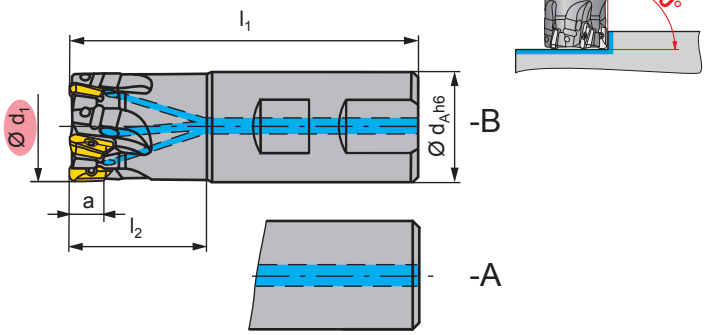
Supply details: cutter body and insert clamping screws

	d_1 [mm]			
XD.. 11..	**12**	10005892/M2,5X5,0/08TP	10000276/TORX 08IP	DMSD 1,6Nm/SORT 08IP
XD.. 11..	**15.7 - 25**	10000126/M2,5X5,6/08TP	10000276/TORX 08IP	DMSD 1,6Nm/SORT 08IP

B190-B193 B204-B218 B236 B242-B246 B247-B252 B71-B73







d1 [mm]	Type, description	l1 [mm]	l2 [mm]	dA [mm]	a [mm]	nmax [min-1]	z	
31.7	C211.31.7.R.05-11-B-40	102	40	32	10	30200	5	XD.. 11..
32	C211.32.R.02-11-A-64-250	250	64	32	10	8500	2	
	C211.32.R.04-11-A25-40	102	40	25	10	30200	4	
	C211.32.R.04-11-A-40	102	40	32	10	30200	4	
	C211.32.R.04-11-A-64-250	250	64	32	10	8500	4	
	C211.32.R.05-11-A25-40	102	40	25	10	30200	5	
	C211.32.R.05-11-A-40	102	40	32	10	30200	5	
	C211.32.R.05-11-A-50-165	165	50	32	10	20900	5	
	C211.32.R.04-11-B-40	102	40	32	10	30200	4	
	C211.32.R.05-11-B25-40	102	40	25	10	30200	5	
	C211.32.R.05-11-B-40	102	40	32	10	30200	5	
40	C211.40.R.06-11-B32-50	110	50	32	10	27700	6	
	C211.40.R.06-11-B-50	122	50	40	10	27700	6	

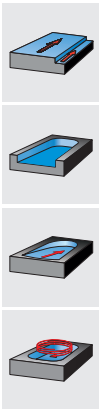
Ordering example: 1 piece C211.31.7.R.05-11-B-40
Supply details: cutter body and insert clamping screws

	d1 [mm]			
XD.. 11..	**31.7 - 32**	10000126/M2,5X5,6/08TP	10000276/TORX 08IP	DMSD 1,6Nm/SORT 08IP
XD.. 11..	**40**	10000125/M2,5X7,3/08TP	10000276/TORX 08IP	DMSD 1,6Nm/SORT 08IP

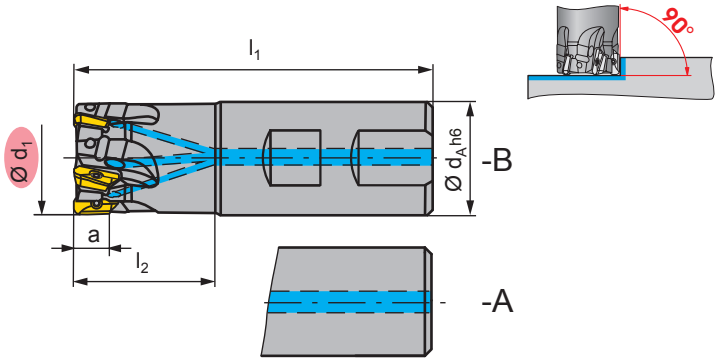
B190-B193 B204-B218 B236 B242-B246 B247-B252 B71-B73

Shoulder & slot milling cutters

C211-15







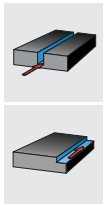
d_1 [mm]	Type, description	l_1 [mm]	l_2 [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
25	C211.25.R.02-15-A-32	90	32	25	14	26560	2	XD.. 15..
	C211.25.R.02-15-A-50-225	225	50	25	14	7520	2	
	C211.25.R.02-15-B-32	90	32	25	14	26560	2	
	C211.25.R.02-15-B20-32	83	32	20	14	26560	2	
32	C211.32.R.03-15-A-40	103	40	32	14	24160	3	
	C211.32.R.03-15-A-63-250	250	63	32	14	6800	3	
	C211.32.R.03-15-B-40	103	40	32	14	24160	3	
	C211.32.R.03-15-B25-40	96	40	25	14	24160	3	
40	C211.40.R.04-15-A32-50	110	50	32	14	22160	4	
	C211.40.R.03-15-A32-50-275	275	50	32	14	6120	3	
	C211.40.R.04-15-B32-50	110	50	32	14	22160	4	

Ordering example: 1 piece C211.25.R.02-15-A-32

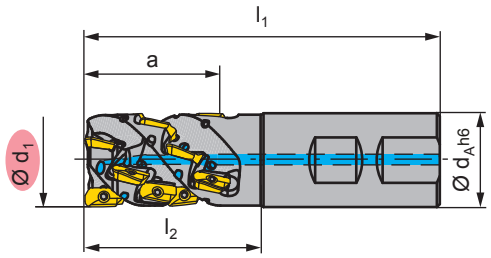
Supply details: cutter body and insert clamping screws

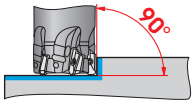
	d_1 [mm]			
XD.. 15..	**25 - 40**	10006887/M3,5X8,6/15IP	10006919/TORX 15IP	DMSD 3,2Nm/SORT 15IP

B190-B193 B204-B218 B236 B242-B246 B247-B252 B71-B73









d_1 [mm]	Type, description	l_1 [mm]	l_2 [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	n	
25	C211.25.R.02K3-11-B-40	97	40	25	27	22200	2	6	XD.. 11..
	C211.25.R.02K4-11-B-50	107	50	25	37	19400	2	8	
	C211.25.R.02K5-11-B-60	117	60	25	45.5	19400	2	10	
32	C211.32.R.02K4-11-B-50	111	50	32	37	20200	2	8	
	C211.32.R.03K5-11-B-60	121	60	32	45.5	20200	3	15	
40	C211.40.R.03K4-11-B32-50	110	50	32	37	18500	3	12	
	C211.40.R.04K5-11-B32-60	120	60	32	45.5	18500	4	20	
	C211.40.R.02K3-15-B32-60	120	60	32	38	14800	2	6	XD.. 15..
50	C211.50.R.03K4-15-B40-64	134	64	40	50.5	13600	3	12	

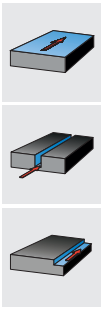
Ordering example: 1 piece C211.25.R.02K3-11-B-40
Supply details: cutter body and insert clamping screws
n = number of inserts

	d_1 [mm]			
XD.. 11..	**25**	10000126/M2,5X5,6/08TP	10000276/TORX 08IP	DMSD 1,6Nm/SORT 08IP
XD.. 11..	**32 - 40**	10000125/M2,5X7,3/08TP	10000276/TORX 08IP	DMSD 1,6Nm/SORT 08IP
XD.. 15..	**40 - 50**	10006887/M3,5X8,6/15IP	10006919/TORX 15IP	DMSD 3,2Nm/SORT 15IP

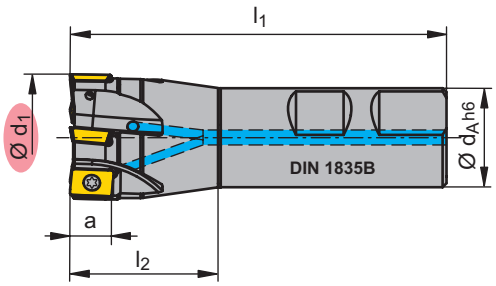
B190-B193 B204-B218 B236 B242-B246 B247-B252 B71

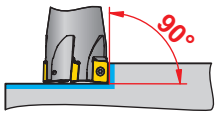
Shoulder & slot milling cutters

C210









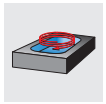
d_1 [mm]	Type, description	l_1 [mm]	l_2 [mm]	d_A [mm]	a [mm]		z	
16	C210.16.R.02	80	32	16	8		2	AP.. 1003..
20	C210.20.R.03	90	40	20	8		3	
25	C210.25.R.04	100	44	25	8		4	
32	C210.32.R.05	95	38	25	8		5	

Ordering example: 1 piece C210.16.R.02

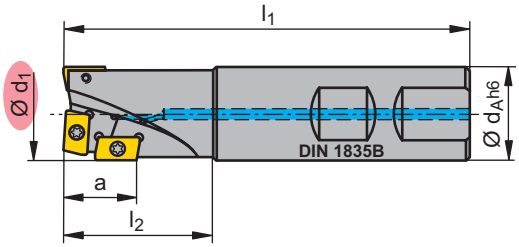
Supply details: cutter body and insert clamping screws

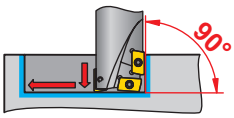
	d_1 [mm]			
AP.. 1003..	**16 - 20**	7883204/M2,5X5/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08
AP.. 1003..	**25 - 32**	7815101/M2,5X6,0/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08

B190-B193 B204-B218 B236 B242-B246 B247-B252 B46









d_1 [mm]	Type, description	l_1 [mm]	l_2 [mm]	d_A [mm]	a [mm]	z	k	n	
20	C212.20.R.01	90	35	20	19	1	2	3	AP.. 1003..
25	C212.25.R.01	110	50	25	19	1	2	3	

Ordering example: 1 piece C212.20.R.01

Supply details: cutter body and insert clamping screws

k = number of rows
n = number of inserts

! = second row inserts corner radius ≤ 1.0 mm!

	d_1 [mm]			
AP.. 1003..	**20 - 25**	7815101/M2,5X6,0/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08

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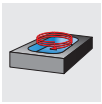
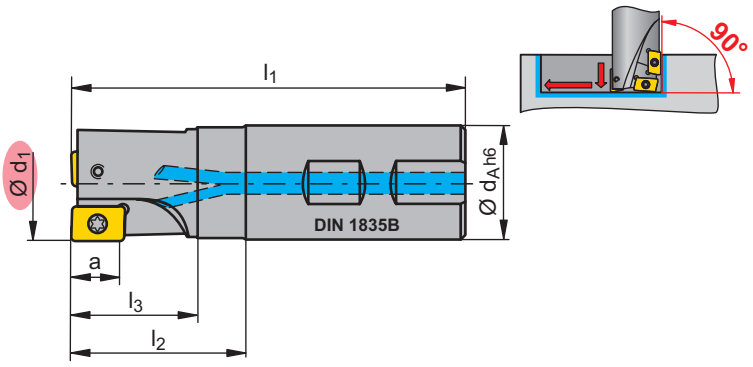
Drill & slot milling cutters

C BF







d1 [mm]	Type, description	l1 [mm]	l2 [mm]	l3 [mm]	dA [mm]	a [mm]	z	n	
10	C BF.10.R.01	82	35	21	16	6	1	1	LE.. 08T1..
16	C BF.16.R.01	88	38	25	20	6	1	2	
18	C BF.18.R.01	91	41	28	20	6	1	2	
12	C BF.12.R.01	85	37	24	16	8	1	1	LD.. 1002..
20	C BF.20.R.01	99	43	30	25	8	1	2	

Ordering example: 1 piece C BF.10.R.01

Supply details: cutter body and insert clamping screws

z = effective number of teeth for the calculation of the feed rate
n = number of inserts

	d1 [mm]			
LE.. 08T1..	**10**	7883215/M2,2X4,0/T07	7724105/TORX T07	DMSD 1,0Nm/SORT T07
LE.. 08T1..	**16 - 18**	7722113/M2,2X5/T07	7724105/TORX T07	DMSD 1,0Nm/SORT T07
LD.. 1002..	**12**	7883212/M2,5X4,2/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08
LD.. 1002..	**20**	7883204/M2,5X5/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08

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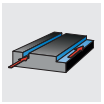
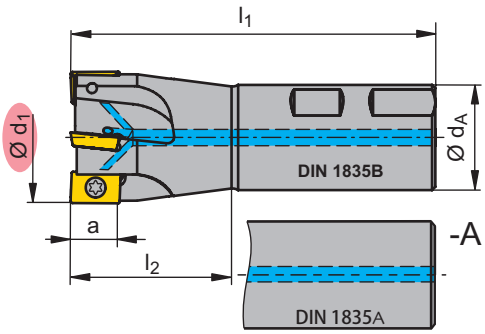






d_1 [mm]	Type, description	l_1 [mm]	l_2 [mm]	d_A [mm]	a [mm]		z	
16	C141.16.R.01	75	27	16	14		1	LD.. 1504..
20	C141.20.R.01.A	95	39	25	14		1	
	C141.20.R.01	95	39	25	14		1	
25	C141.25.R.02	100	44	25	14		2	
32	C141.32.R.03	108	48	32	14		3	
40	C141.40.R.04	111	51	32	14		4	

Ordering example: 1 piece C141.16.R.01

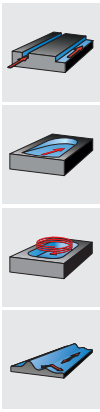
Supply details: cutter body and insert clamping screws

	d_1 [mm]			
LD.. 1504..	**16**	7801177/M3,5X6,7/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15
LD.. 1504..	**20 - 40**	7722111/M3,5X7,2/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15

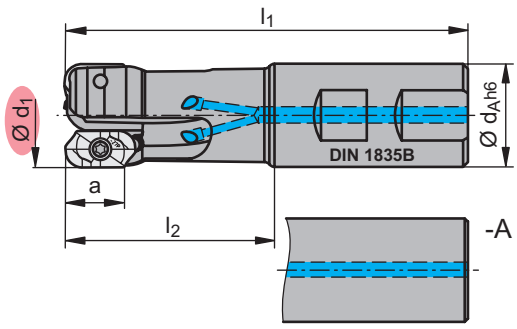
B190-B193 B204-B218 B242-B246 B51

Shoulder & slot milling cutters

CHSC-11







d_1 [mm]	Type, description	l_1 [mm]	l_2 [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
16	CHSC.16.R.02-11-A-25	75	25	16	10	56200	2	XD.. 11..
	CHSC.16.R.02-11-A-32	165	32	16	10	18800	2	
	CHSC.16.R.02-11-B-25	75	25	16	10	56200	2	
18	CHSC.18.R.02-11-A-25	77.7	25	20	10	53000	2	
	CHSC.18.R.02-11-A-32	165	32	20	10	23900	2	
19	CHSC.19.R.02-11-A-25	77.7	25	20	10	51600	2	
	CHSC.19.R.02-11-A-32	165	32	20	10	25400	2	
20	CHSC.20.R.02-11-A-32	84	32	20	10	50300	2	
	CHSC.20.R.02-11-A-40	165	40	20	10	26700	2	
	CHSC.20.R.03-11-B-32	84	32	20	10	50300	3	
22	CHSC.22.R.02-11-A-32	91	32	25	10	47900	2	
	CHSC.22.R.02-11-A-40	165	40	25	10	30200	2	
25	CHSC.25.R.02-11-A-40	98	40	25	10	45000	2	
	CHSC.25.R.02-11-A-50	165	50	25	10	31700	2	
	CHSC.25.R.03-11-A-50	165	50	25	10	31700	3	
	CHSC.25.R.03-11-A-40	98	40	25	10	45000	3	
	CHSC.25.R.04-11-B-40	98	40	25	10	45000	4	
32	CHSC.32.R.03-11-A-50	112	50	32	10	39700	3	
	CHSC.32.R.03-11-A-63	165	63	32	10	33400	3	
	CHSC.32.R.05-11-B-50	112	50	32	10	39300	5	

Ordering example: 1 piece CHSC.16.R.02-11-A-25

Supply details: cutter body and insert clamping screws

	d_1 [mm]			
XD.. 11..	**16 - 25**	10000126/M2,5X5,6/08TP	10000276/TORX 08IP	DMSD 1,8Nm/SORT 08IP
XD.. 11..	**32**	10000125/M2,5X7,3/08TP	10000276/TORX 08IP	DMSD 1,8Nm/SORT 08IP

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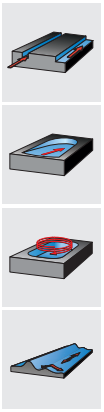
CERATIZIT

hard material matters

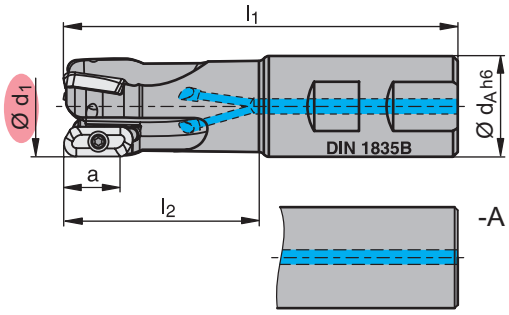


Shoulder & slot milling cutters

CHSC-19







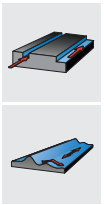
d_1 [mm]	Type, description	l_1 [mm]	l_2 [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
25	CHSC.25.R.02-19-A-50	121	50	25	18	32400	2	XD.T 19..
	CHSC.25.R.02-19-A-63	165	63	25	18	24700	2	
	CHSC.25.R.02-19	121	65	25	18	32400	2	
32	CHSC.32.R.02-19-A-63	125	63	32	18	28900	2	
	CHSC.32.R.02-19-A-80	165	80	32	18	24400	2	
	CHSC.32.R.03-19-A-63	125	63	32	18	28900	3	
	CHSC.32.R.03-19-A-80	165	80	32	18	24400	3	
	CHSC.32.R.02-19	125	65	32	18	28900	2	
	CHSC.32.R.03-19	125	65	32	18	28900	3	

Ordering example: 1 piece CHSC.25.R.02-19-A-50

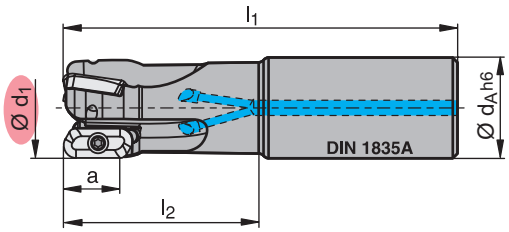
Supply details: cutter body and insert clamping screws

	d_1 [mm]			
XD.T 19..	**25**	7818430/M4,0X7,0/T15	7724103/TORX T15	DMSD 6,0Nm/SORT T15
XD.T 19..	**32**	7818428/M4,0X8,5/T15	7724103/TORX T15	DMSD 6,0Nm/SORT T15

B190-B193 B204-B218 B236 B242-B246 B227-B234 B74







HSC-HP
High Speed Cutting
High Performance

d_1 [mm]	Type, description	l_1 [mm]	l_2 [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
22	CHPC.22.R.02-19-A-40	165	40	22	18	31900	2	XD.X 19..
25	CHPC.25.R.02-19-A-50	121	65	25	18	41800	2	
	CHPC.25.R.02-19-A-63	165	63	25	18	31900	2	
32	CHPC.32.R.02-19-A-63	125	63	32	18	39800	2	
	CHPC.32.R.02-19-A-80	165	65	32	18	33500	2	
	CHPC.32.R.03-19-A-63	125	63	32	18	39800	3	
	CHPC.32.R.03-19-A-80	165	80	32	18	33500	3	

Ordering example: 1 piece CHPC.22.R.02-19-A-40

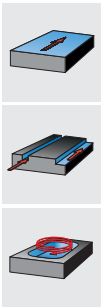
Supply details: cutter body and insert clamping screws

	d_1 [mm]			
XD.X 19..	**22 - 25**	7818430/M4,0X7,0/T15	7724103/TORX T15	DMSD 5,0Nm/SORT T15
XD.X 19..	**32**	7818428/M4,0X8,5/T15	7724103/TORX T15	DMSD 5,0Nm/SORT T15

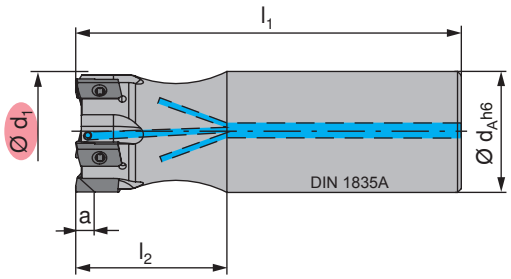
B190-B193 B204-B218 B236 B242-B246 B227-B234 B74

Shoulder & slot milling cutters

CHPC-04







HSC-HP
High Speed Cutting
High Performance

d_1 [mm]	Type, description	l_1 [mm]	l_2 [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
20	CHPC.20.R.03-04-A-25	77	25	20	4	52000	3	ZNHW 04T3..
25	CHPC.25.R.04-04-A-32	90	32	25	4	45000	4	
32	CHPC.32.R.05-04-A-40	102	40	32	4	39000	5	
40	CHPC.40.R.06-04-A32-50	122	50	32	4	34000	6	

Ordering example: 1 piece CHPC.20.R.03-04-A-25

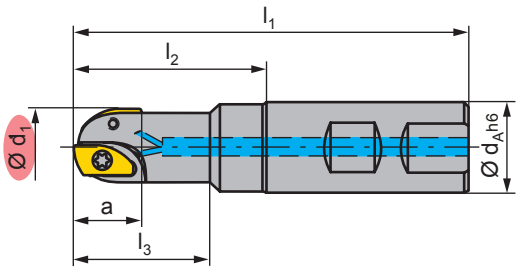
Supply details: cutter body and insert clamping screws

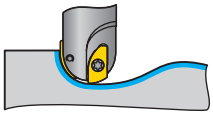
	d_1 [mm]		
ZNHW 04T3..	**20 - 40**	10000125/M2,5X7,3/08TP	DMSD 1,6Nm/SORT 08IP

B190-B193 B242-B246 B76









d1 [mm]	Type, description	l1 [mm]	l2 [mm]	l3 [mm]	dA [mm]	a [mm]	z	n	
12	C KF.12.R.01	87	39	24	16	10	1	1	R06E 0602..
16	C KF.16.R.01	96	46	31	20	12	1	1	R08E 0803..
20	C KF.20.R.01	109	53	37	25	12	1	2	R10D 0602..
25	C KF.25.R.01	112	56	56	25	14	1	2	R12D 0803..
32	C KF.32.R.01	120	60	60	32	16	1	2	R16D 10T3..

Ordering example: 1 piece C KF.12.R.01

Supply details: cutter body and insert clamping screws

z = effective number of teeth for the calculation of the feed rate
n = number of inserts

	d1 [mm]			
R06E 0602..	**12**	7883212/M2,5X4,2/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08
R08E 0803..	**16**	7883213/M3,0X5,0/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08
R10D 0602..	**20**	7883204/M2,5X5/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08
R12D 0803..	**25**	7883203/M3,0X7,3/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08
R16D 10T3..	**32**	7722111/M3,5X7,2/T15	7724103/TORX T15	DMSD 1,2Nm/SORT T08

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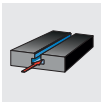
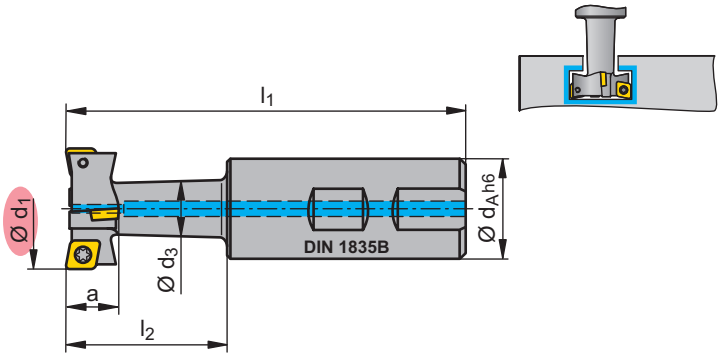
T-slot milling cutters

C NF







d_1 [mm]	Type, description	l_1 [mm]	l_2 [mm]	d_3 [mm]	d_A [mm]	a [mm]	z	n	
17.5	C NF.17.R.01	80	25	8.5	16	8	1	2	SP.. 0502..
20.5	C NF.20.R.01	85	30	10.5	16	9	1	2	CP.. 0603..
24.0	C NF.23.R.01	95	32	12.5	25	10	1	2	
31.0	C NF.30.R.02	105	40	16	25	12	2	4	
38.5	C NF.37.R.02	115	50	20	32	16	2	4	CP.. 09T3..
48.0	C NF.47.R.02	125	60	26	32	20	2	4	

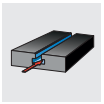
Ordering example: 1 piece C NF.17.R.01

Supply details: cutter body and insert clamping screws

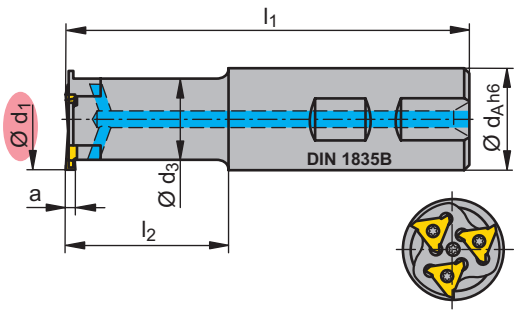
z = effective number of teeth for the calculation of the feed rate
n = number of inserts

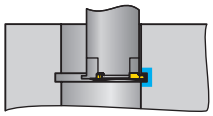
	d_1 [mm]			
SP.. 0502..	**17.5**	7883204/M2,5X5/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08
CP.. 0603..	**20.5 - 31.0**	7815101/M2,5X6,0/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08
CP.. 09T3..	**38.5 - 48.0**	7722111/M3,5X7,2/T15	7724103/TORX T15	DMSD 1,2Nm/SORT T08

B190-B193 B242-B246 B247-B252 B48









d_1 [mm]	Type, description	l_1 [mm]	l_2 [mm]	d_3 [mm]	d_A [mm]	a [mm]	z	n	
16	C ZF.16.R.03	84	24	13	16	1,1-1,6	3	1	TC 16T3..
25	C ZF.25.R.03	100	40	20.5	25	1,6-2,65	3	3	TC 1103..

Ordering example: 1 piece C ZF.16.R.03

Supply details: cutter body and insert clamping screws

z = effective number of teeth for the calculation of the feed rate
n = number of inserts

	d_1 [mm]			
TC 16T3..	**16**	7883209/M3,5X8,6/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15
TC 1103..	**25**	7815101/M2,5X6,0/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08

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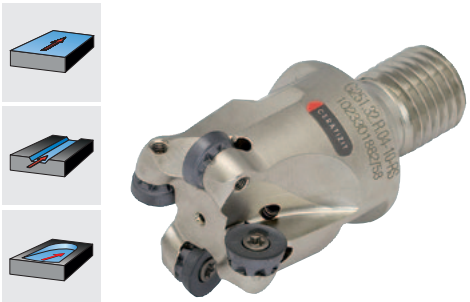
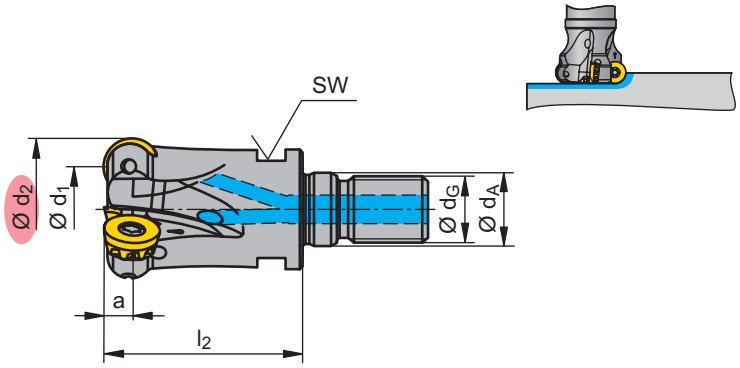
Button insert cutters

G251-05/-08/-10/-12 RS





d_2 [mm]	Type, description	d_1 [mm]	l_2 [mm]	d_A [mm]	d_G [mm]	a [mm]	n_{max} [min^{-1}]	z	
20	G251.20.R.05-05-RS	15	33	10.5	10	2.5	31800	5	RD.. 0501..
25	G251.25.R.06-05-RS	20	35	12.5	12	2.5	25450	6	
32	G251.32.R.07-05-RS	27	35	17.0	16	2.5	19850	7	
20	G251.20.R.03-08-RS	12	33	10.5	10	4	31800	3	RD.. 0802..
25	G251.25.R.04-08-RS	17	35	12.5	12	4	25450	4	
32	G251.32.R.05-08-RS	24	35	17.0	16	4	19850	5	
20	G251.20.R.02-10-RS	10	33	10.5	10	5	31800	2	RP.. 10T3..
25	G251.25.R.03-10-RS	15	35	12.5	12	5	25450	3	
32	G251.32.R.04-10-RS	22	35	17.0	16	5	19850	4	
25	G251.25.R.02-12-35-RS	13	35	12.5	12	6	25000	2	RP.. 1204..
42	G251.42.R.04-12-42-RS	30	42	17.0	16	6	15000	4	
32	G251.32.R.03-12-35-RS	20	35	17.0	16	6	19000	3	
35	G251.35.R.03-12-35-RS	23	35	17.0	16	6	15900	3	

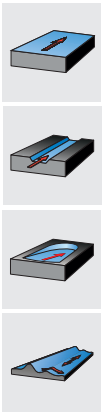
Ordering example: 1 piece G251.20.R.05-05-RS

Supply details: cutter body and insert clamping screws

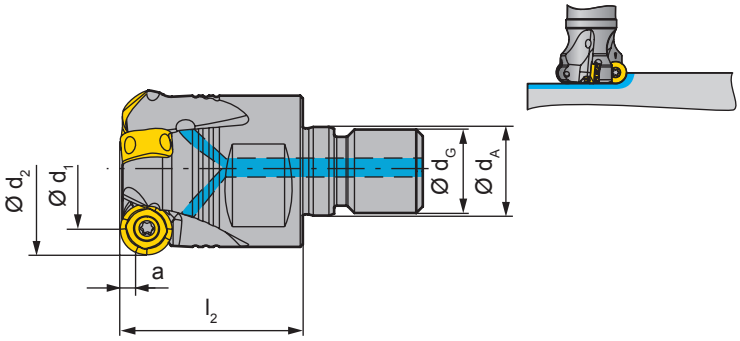
n_{max} = depends on the overhang and number of interfaces in the complete tool

	d_2 [mm]			
RD.. 0501..	**20 - 32**	7801175/M2,0X3,3/T06	7883305/TORX T06	DMSD 0,7Nm/SORT T06
RD.. 0802..	**20 - 32**	7883204/M2,5X5/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08
RP.. 10T3..	**20 - 32**	10007085/M3,0X7,3/T10	7883306/TORX T10	DMSD 2,0Nm/SORT T10
RP.. 1204..	**25 - 42**	7883209/M3,5X8,6/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15

B190-B193 B204-B218 B242-B246 B247-B252 B58







d2 [mm]	Type, description	d1 [mm]	l2 [mm]	dA [mm]	dG [mm]	a [mm]	nmax [min-1]	z	
32	G252.32.R.04-10	22	35	17.0	16	2.5	19850	4	RN.. 1004..

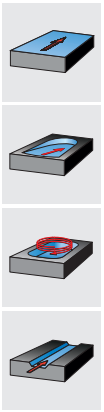
Ordering example: 1 piece G252.32.R.04-10
Supply details: cutter body and insert clamping screws

	d2 [mm]		
RN.. 1004..	**32**	10009229/M3X7,5/10IP	DMSD 2,0Nm/SORT 10IP

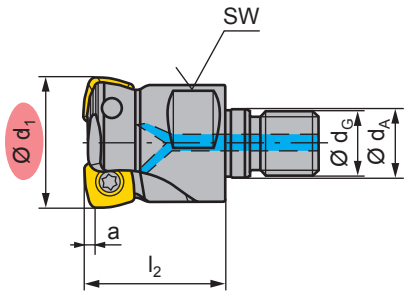
B190-B193 B204-B218 B242-B246 B247-B252 B60

Face milling cutters

GHFC-06/-09/-12







HFC high feed cutting

d_1 [mm]	Type, description	l_2 [mm]	d_A [mm]	d_G [mm]	a [mm]	n_{max} [min^{-1}]	z	
16	GHFC.16.R.02-06-27	27	8.5	8	0.8	20800	2	XP.. 06
20	GHFC.20.R.03-06-33	33	10.5	10	0.8	19800	3	
25	GHFC.25.R.04-06-35	35	12.5	12	0.8	18700	4	
32	GHFC.32.R.05-06-35	35	17.0	16	0.8	22000	5	
25	GHFC.25.R.02-09	35	12.5	12	1	30000	2	XD.. 09..
25	GHFC.25.R.03-09	35	12.5	12	1	30000	3	
32	GHFC.32.R.03-09	35	17.0	16	1	27000	3	
32	GHFC.32.R.02-12	35	17.0	16	2	21600	2	XO.. 12..
35	GHFC.35.R.03-12	35	17.0	16	2	21360	3	

Ordering example: 1 piece GHFC.16.R.02-06-27

Supply details: cutter body and insert clamping screws

n_{max} = depends on the overhang and number of interfaces in the complete tool

	d_1 [mm]			
XP.. 06	**16 - 32**	7883204/M2,5X5/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08
XD.. 09..	**25**	7722111/M3,5X7,2/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15
XD.. 09..	**32**	7883209/M3,5X8,6/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15
XO.. 12..	**32 - 35**	7822114/M4,5X10,5/T20	7724104/TORX T20	DMSD 5,0Nm/SORT T20

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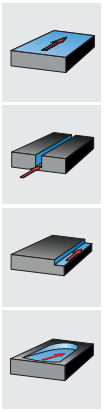
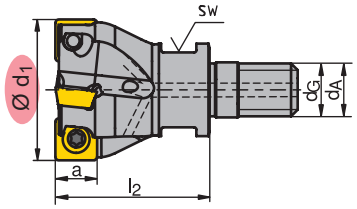
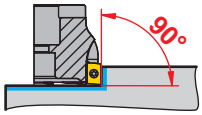








d_1 [mm]	Type, description	l_2 [mm]	d_A [mm]	d_G [mm]	a [mm]	n_{max} [min^{-1}]	z	
25	G490.25.R.03-09	35	12.5	12	8	23700	3	SD.. 09T3..
32	G490.32.R.04-09	35	17.0	16	8	19700	4	
	G490.32.R.03-12	35	17.0	16	11	16300	3	SD.. 1205..
40	G490.40.R.04-12	40	17.0	16	11	13600	4	

Ordering example: 1 piece G490.25.R.03-09

Supply details: cutter body and insert clamping screws

n_{max} = depends on the overhang and number of interfaces in the complete tool

	d_1 [mm]			
SD.. 09T3..	**25 - 32**	7722111/M3,5X7,2/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15
SD.. 1205..	**32 - 40**	7822114/M4,5X10,5/T20	7724104/TORX T20	DMSD 5,0Nm/SORT T20

B190-B193 B242-B246 B247-B252 B63

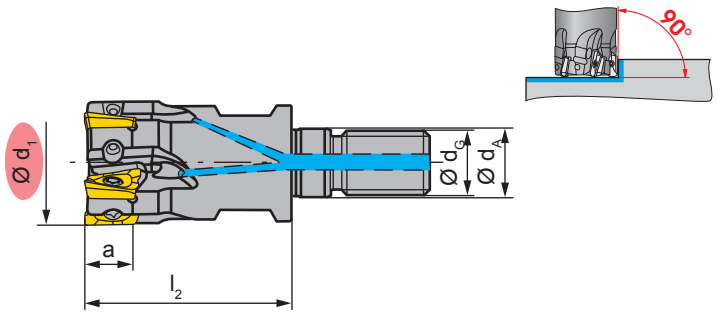
Tools

Tools and inserts for milling

Shoulder & slot milling cutters

G211-07/-11/-15





d_1 [mm]	Type, description	l_2 [mm]	d_A [mm]	d_G [mm]	a [mm]	n_{max} [min^{-1}]	z	
16	G211.16.R.04-07	27	8.5	8	6	50400	4	XD.. 07..
20	G211.20.R.05-07	33	10.5	10	6	44280	5	
25	G211.25.R.06-07	35	12.5	12	6	39480	6	
32	G211.32.R.08-07	35	17.0	16	6	36240	8	
16	G211.16.R.02-11	27	8.5	8	10	42000	2	XD.. 11..
20	G211.20.R.02-11	33	10.5	10	10	36900	2	
	G211.20.R.03-11	33	10.5	10	10	36900	3	
25	G211.25.R.03-11	35	12.5	12	10	33200	3	
	G211.25.R.04-11	35	12.5	12	10	33200	4	
32	G211.32.R.04-11	35	17.0	16	10	30200	4	
	G211.32.R.05-11	35	17.0	16	10	30200	5	
40	G211.40.R.06-11	35	17.0	16	10	27700	6	
25	G211.25.R.02-15	35	12.5	12	14	26560	2	XD.. 15..
32	G211.32.R.03-15	35	17.0	16	14	30200	3	
40	G211.40.R.04-15	35	17.0	16	14	27700	4	

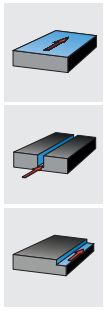
Ordering example: 1 piece G211.16.R.04-07

Supply details: cutter body and insert clamping screws

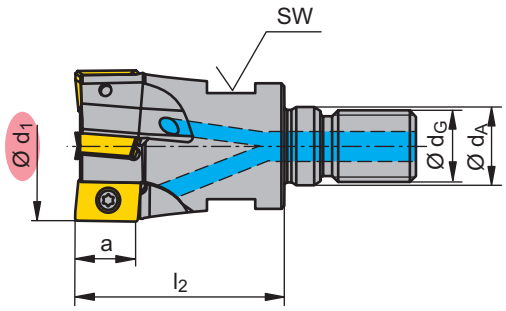
n_{max} = depends on the overhang and number of interfaces in the complete tool

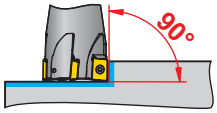
	d_1 [mm]			
XD.. 07..	**16 - 32**	10006888/M2,2X4,2/07IP	10006918/TORX 07IP	DMSD 1,0Nm/SORT 07IP
XD.. 11..	**16 - 32**	10000126/M2,5X5,6/08TP	10000276/TORX 08IP	DMSD 1,6Nm/SORT 08IP
XD.. 11..	**40**	10000125/M2,5X7,3/08TP	10000276/TORX 08IP	DMSD 1,6Nm/SORT 08IP
XD.. 15..	**25 - 40**	10006887/M3,5X8,6/15IP	10006919/TORX 15IP	DMSD 3,2Nm/SORT 15IP

B190-B193 B204-B218 B236 B242-B246 B247-B252 B71-B73









d_1 [mm]	Type, description	l_2 [mm]	d_A [mm]	d_G [mm]	a [mm]		z	
16	G210.16.R.02	27	8.5	8	8		2	AP.. 1003..
20	G210.20.R.03	33	10.5	10	8		3	
25	G210.25.R.04	35	12.5	12	8		4	
32	G210.32.R.05	35	17	16	8		5	

Ordering example: 1 piece G210.16.R.02

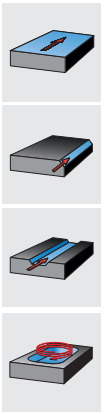
Supply details: cutter body and insert clamping screws

	d_1 [mm]			
AP.. 1003..	**16 - 20**	7883204/M2,5X5/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08
AP.. 1003..	**25 - 32**	7815101/M2,5X6,0/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08

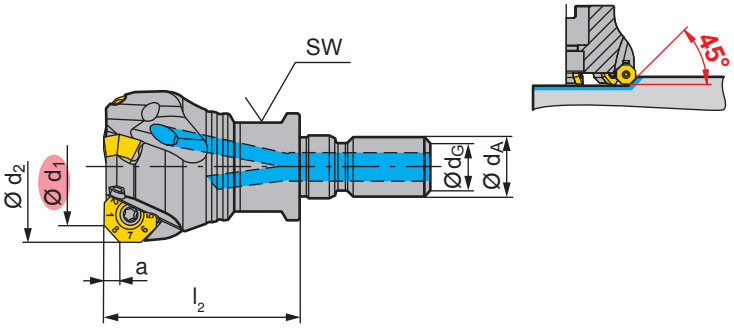
B190-B193 B204-B218 B236 B242-B246 B46

Face milling cutters

G274-09 OF..







d_1 [mm]	Type, description	d_2 [mm]	l_2 [mm]	a [mm]	d_A [mm]	d_G [mm]	n_{max} [min^{-1}]	z	
20	G274.20.R.03-09	25.6	35	2.5	12.5	12	42600	3	OF.. 0403..
25	G274.25.R.04-09	30.6	35	2.5	12.5	12	37200	4	
32	G274.32.R.05-09	37.7	35	2.5	17.0	16	32200	5	

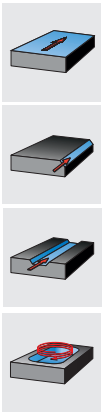
Ordering example: 1 piece G274.20.R.03-09

Supply details: cutter body and insert clamping screws

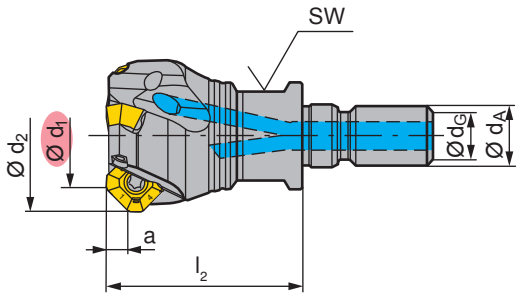
n_{max} = depends on the overhang and number of interfaces in the complete tool

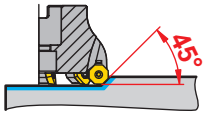
	d_1 [mm]			
OF.. 0403..	**20 - 32**	10007562/M2,5X7,6/08TP	10000276/TORX 08IP	DMSD 1,6Nm/SORT 08IP

B190-B193 B204-B218 B242-B246 B57









d_1 [mm]	Type, description	d_2 [mm]	l_2 [mm]	a [mm]	d_A [mm]	d_G [mm]	n_{max} [min^{-1}]	z	
18.9	G274.20.R.03-09	27.4	35.7	3.8	12.5	12	42600	3	SF.. 0903..
23.8	G274.25.R.04-09	32.5	35.7	3.8	12.5	12	37200	4	
30.7	G274.32.R.05-09	39.5	35.7	3.8	17.0	16	32200	5	

Ordering example: 1 piece G274.20.R.03-09

Supply details: cutter body and insert clamping screws

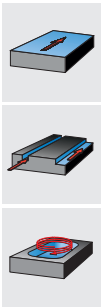
n_{max} = depends on the overhang and number of interfaces in the complete tool

	d_1 [mm]			
OF.. 0403..	**20 - 32**	10007562/M2,5X7,6/08TP	10000276/TORX 08IP	DMSD 1,6Nm/SORT 08IP

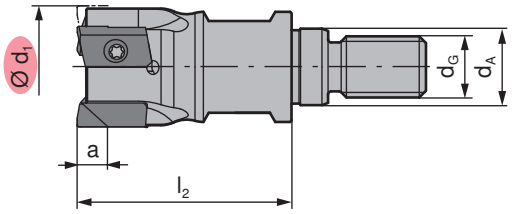
B190-B193 B204-B218 B242-B246 B57

Shoulder & slot milling cutters

GHPC-04







HSC-HP
High Speed Cutting
High Performance

d_1 [mm]	Type, description	l_2 [mm]	d_A [mm]	d_G [mm]	a [mm]	n_{max} [min^{-1}]	z	
20	GHPC.20.R.03-04	35	10.5	10	4	52000	3	ZNHW 04T3..
25	GHPC.25.R.04-04	35	12.5	12	4	45000	4	
32	GHPC.32.R.05-04	35	17	16	4	38000	5	
40	GHPC.40.R.06-04	35	17	16	4	34000	6	

Ordering example: 1 piece GHPC.20.R.03-04

Supply details: cutter body and insert clamping screws

n_{max} = depends on the overhang and number of interfaces in the complete tool

	d_1 [mm]		
ZNHW 04T3..	**20 - 40**	10000125/M2,5X7,3/08TP	DMSD 1,6Nm/SORT 08IP

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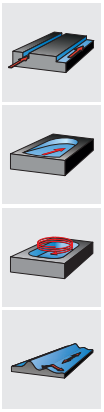



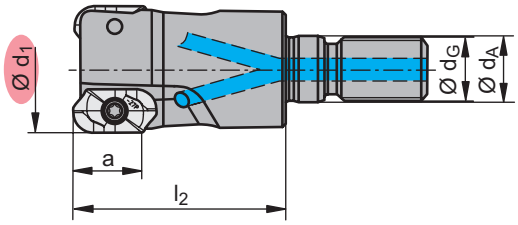

d_1 [mm]	Type, description	l_2 [mm]	d_A [mm]	d_G [mm]	a [mm]	n_{max} [min^{-1}]	z	
16	GHSC.16.R.02-11	27	8.5	8	10	56200	2	XD.. 11..
18	GHSC.18.R.02-11	27	8.5	8	10	53000	2	
20	GHSC.20.R.02-11	33	10.5	10	10	50300	2	
25	GHSC.25.R.03-11	35	12.5	12	10	45000	3	
32	GHSC.32.R.03-11	35	17	16	10	39800	3	
40	GHSC.40.R.03-11	35	17	16	10	35500	3	
25	GHSC.25.R.02-19	45	12.5	12	18	34400	2	XD.T 19..
32	GHSC.32.R.03-19	52	17	16	18	29100	3	
40	GHSC.40.R.03-19	52	17	16	18	24900	3	

Ordering example: 1 piece GHSC.16.R.02-11

Supply details: cutter body and insert clamping screws

n_{max} = depends on the overhang and number of interfaces in the complete tool

	d_1 [mm]			
XD.. 11..	**16 - 25**	10000126/M2,5X5,6/08TP	10000276/TORX 08IP	DMSD 1,8Nm/SORT 08IP
XD.. 11..	**32 - 40**	10000125/M2,5X7,3/08TP	10000276/TORX 08IP	DMSD 1,8Nm/SORT 08IP
XD.T 19..	**25**	7818430/M4,0X7,0/T15	7724103/TORX T15	DMSD 6,0Nm/SORT T15
XD.T 19..	**32 - 40**	7818428/M4,0X8,5/T15	7724103/TORX T15	DMSD 6,0Nm/SORT T15

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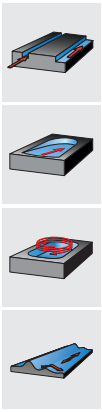
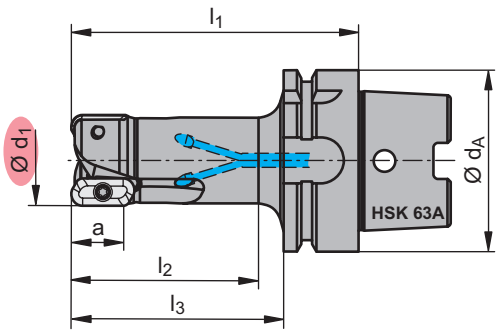
Shoulder & slot milling cutters

MHSC-11/-19







d_1 [mm]	Type, description	l_1 [mm]	l_2 [mm]	l_3 [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
25	MHSC.25.R.03-11-H63A-50	90	50	64	63	10	45000	3	XD.. 11..
	MHSC.25.R.03-11-H63A-63	100	63	74	63	10	42000	3	
32	MHSC.32.R.03-11-H63A-63	100	63	74	63	10	39700	3	
	MHSC.32.R.03-11-H63A-80	120	80	94	63	10	37200	3	
40	MHSC.40.R.04-11-H63A-63	100	63	74	63	10	35500	4	
	MHSC.40.R.04-11-H63A-80	120	80	94	63	10	35500	4	
50	MHSC.50.R.04-11-H63A-63	100	63	74	63	10	31800	4	
	MHSC.50.R.04-11-H63A-100	140	100	114	63	10	31800	4	
25	MHSC.25.R.02-19-H63A-50	90	50	64	63	18	35000	2	XD.T 19..
	MHSC.25.R.02-19-H63A-63	100	63	74	63	18	32700	2	
32	MHSC.32.R.02-19-H63A-63	100	63	74	63	18	29100	2	
	MHSC.32.R.02-19-H63A-80	120	80	94	63	18	27200	2	
	MHSC.32.R.03-19-H63A-63	100	63	74	63	18	29100	3	
	MHSC.32.R.03-19-H63A-80	120	80	94	63	18	27200	3	
40	MHSC.40.R.03-19-H63A-63	100	63	74	63	18	24900	3	
	MHSC.40.R.03-19-H63A-80	120	80	94	63	18	24900	3	
50	MHSC.50.R.03-19-H63A-100	140	100	114	63	18	21600	3	

Ordering example: 1 piece MHSC.25.R.03-11-H63A-50

Supply details: cutter body and insert clamping screws

	d_1 [mm]			
XD.. 11..	**25**	10000126/M2,5X5,6/08TP	10000276/TORX 08IP	DMSD 1,8Nm/SORT 08IP
XD.. 11..	**32 - 50**	10000125/M2,5X7,3/08TP	10000276/TORX 08IP	DMSD 1,8Nm/SORT 08IP
XD.T 19..	**25**	7818430/M4,0X7,0/T15	7724103/TORX T15	DMSD 6,0Nm/SORT T15
XD.T 19..	**32 - 40**	7818428/M4,0X8,5/T15	7724103/TORX T15	DMSD 6,0Nm/SORT T15
XD.T 19..	**50**	7818429/M4,0X11/T15	7724103/TORX T15	DMSD 6,0Nm/SORT T15

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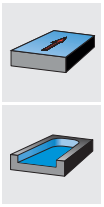



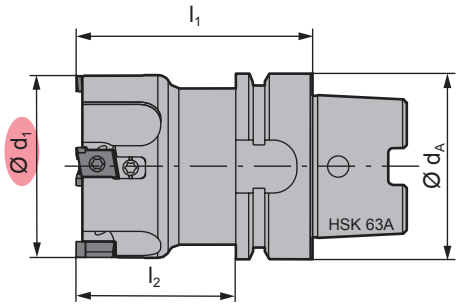

d_1 [mm]	Type, description	l_1 [mm]	l_2 [mm]	d_A [mm]	n_{max} [min^{-1}]	z	
40	MHPC.40.R.04-12-H63A-70	70	44	63	32000	4	
50	MHPC.50.R.04-12-H63A-80	80	54	63	32000	4	
50	MHPC.50.R.05-12-H63A-80	80	54	63	32000	5	
63	MHPC.63.R.04-12-H63A-80	80	54	63	29000	4	
63	MHPC.63.R.07-12-H63A-80	80	54	63	29000	7	
80	MHPC.80.R.05-12-H63A-90	90		63	26000	5	ZNHW 1205..
80	MHPC.80.R.09-12-H63A-90	90		63	26000	9	
100	MHPC.100.R.06-12-H63A-90	90		63	24000	6	
100	MHPC.100.R.12-12-H63A-90	90		63	24000	12	
125	MHPC.125.R.08-12-H63A-123	123		63	22000	8	
160	MHPC.160.R.10-12-H63A-123	123		63	18000	10	

Ordering example: 1 piece MHPC.40.R.04-12-H63A-70

Supply details: cutter body, insert clamping screws, wedges, clamping key, edge protecting ring
Ø 125 - 160: assembled version, adapter + shell mill

	d_1 [mm]				
ZNHW 1205..	**40 - 160**	7818429/M4,0X11/T15	DMSD 5,0Nm/SORT T15	10002113-0/AW-RH	10002362-0/WS-L T15

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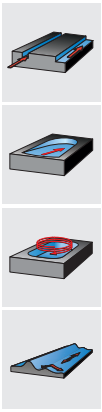
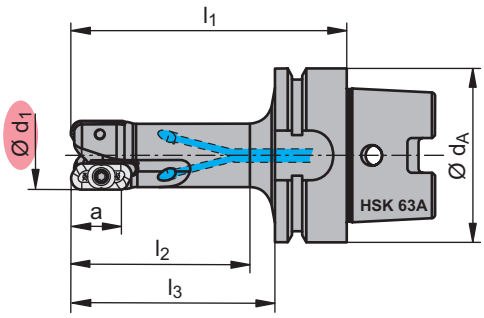
Shoulder & slot milling cutters

MHPC-19







d_1 [mm]	Type, description	l_1 [mm]	l_2 [mm]	l_3 [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
25	MHPC.25.R.02-19-H63A-50	90	50	64	63	18	45200	2	
25	MHPC.25.R.02-19-H63A-63	100	63	74	63	18	42300	2	
25	MHPC.25.R.02-19-H63A-80	120	80	94	63	18	38400	2	
25	MHPC.25.R.02-19-H63A-100	140	100	114	63	18	33900	2	
32	MHPC.32.R.02-19-H63A-63	100	63	74	63	18	40000	2	
32	MHPC.32.R.02-19-H63A-80	120	80	94	63	18	37500	2	
32	MHPC.32.R.02-19-H63A-100	140	100	114	63	18	34300	2	
32	MHPC.32.R.03-19-H63A-63	100	63	74	63	18	40000	3	XD.X 19..
32	MHPC.32.R.03-19-H63A-80	120	80	94	63	18	37500	3	
40	MHPC.40.R.03-19-H63A-63	100	63	74	63	18	35700	3	
40	MHPC.40.R.03-19-H63A-80	120	80	94	63	18	35700	3	
40	MHPC.40.R.03-19-H63A-100	140	100	114	63	18	33500	3	
50	MHPC.50.R.03-19-H63A-63	100	63	74	63	18	31900	3	
50	MHPC.50.R.03-19-H63A-80	120	80	94	63	18	31900	3	
50	MHPC.50.R.03-19-H63A-100	140	100	114	63	18	31900	3	

Ordering example: 1 piece MHPC.25.R.02-19-H63A-50

Supply details: cutter body and insert clamping screws

	d_1 [mm]			
XD.X 19..	**25**	7818430/M4,0X7,0/T15	7724103/TORX T15	DMSD 5,0Nm/SORT T15
XD.X 19..	**32 - 40**	7818428/M4,0X8,5/T15	7724103/TORX T15	DMSD 5,0Nm/SORT T15
XD.X 19..	**50**	7818429/M4,0X11/T15	7724103/TORX T15	DMSD 5,0Nm/SORT T15

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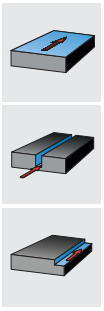



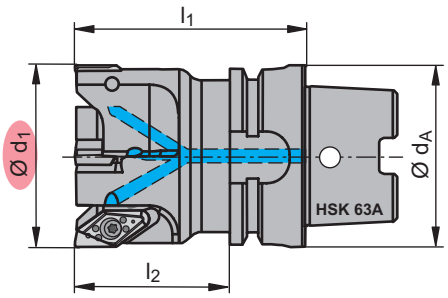

d_1 [mm]	Type, description	l_1 [mm]	l_2 [mm]	d_A [mm]	n_{max} [min^{-1}]	z	
50	MHSV.50.R.03-22-H63A-80	80	54	63	24000	3	VC.. 2205..
63	MHSV.63.R.04-22-H63A-80	80	54	63	21000	4	
80	MHSV.80.R.05-22-H63A-90	90		63	18000	5	
100	MHSV.100.R.06-22-H63A-90	90		63	15000	6	
125	MHSV.125.R.07-22-H63A-123	123		63	12000	7	

Ordering example: 1 piece MHSV.50.R.03-22-H63A-80
Supply details: cutter body and insert clamping screws

	d_1 [mm]		
VC.. 2205..	**50 - 125**	7822114/M4,5X10,5/T20	DMSD 5,0Nm/SORT T20

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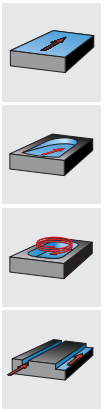
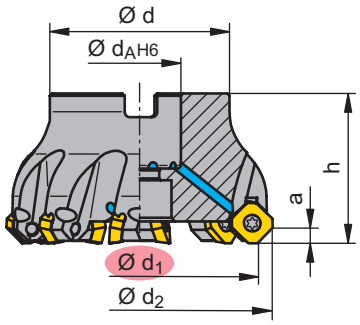
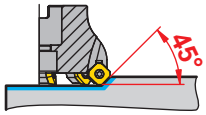
Face milling cutters

A270-09









d_1 [mm]	Type, description	d_2 [mm]	h [mm]	d [mm]	d_A [mm]	a [mm]	z	
32	A270.32.R.03-09	40.4	40	34	16	4	3	SD/XD.. 0903..
	A270.32.R.05-09	40.4	40	34	16	4	5	
40	A270.40.R.04-09	48.4	40	38	16	4	4	
	A270.40.R.06-09	48.4	40	38	16	4	6	
50	A270.50.R.06-09	58.4	40	43	22	4	6	
	A270.50.R.08-09	58.4	40	43	22	4	8	
63	A270.63.R.05-09	71.4	40	48	22	4	5	
	A270.63.R.08-09	71.4	40	48	22	4	8	
	A270.63.R.10-09	71.4	40	48	22	4	10	
80	A270.80.R.06-09	88.4	50	58	27	4	6	
	A270.80.R.10-09	88.4	50	58	27	4	10	
	A270.80.R.12-09	88.4	50	58	27	4	12	
100	A270.100.R.07-09	108.4	50	78	32	4	7	
	A270.100.R.12-09	108.4	50	78	32	4	12	
	A270.100.R.14-09	108.4	50	78	32	4	14	
125	A270.125.R.10-09	133.4	63	88	40	4	10	
	A270.125.R.12-09	133.4	63	88	40	4	12	
160	A270.160.R.12-09	168.4	63	93.4	40	4	12	

Ordering example: 1 piece A270.32.R.03-09

Supply details: cutter body and insert clamping screws

	d_1 [mm]			
SD/XD.. 0903..	**32 - 160**	7883203/M3,0X7,3/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08

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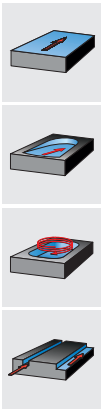



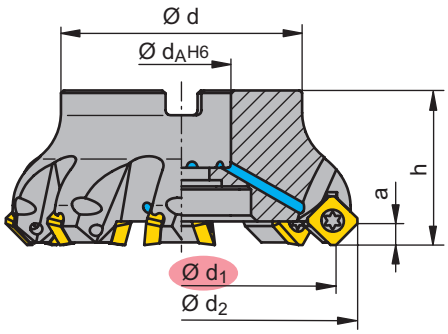

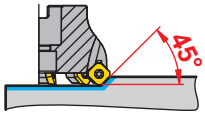

d_1 [mm]	Type, description	d_2 [mm]	h [mm]	d [mm]	d_A [mm]	a [mm]	z	
32	A270.32.R.03-12	46	40	32	16	6	3	SD/XD.. 1204..
40	A270.40.R.03-12	54	40	38	16	6	3	
	A270.40.R.04-12	54	40	38	16	6	4	
50	A270.50.R.04-12	64	40	43	22	6	4	
	A270.50.R.05-12	64	40	43	22	6	5	
63	A270.63.R.04-12	77	40	48	22	6	4	
	A270.63.R.06-12	77	40	48	22	6	6	
80	A270.80.R.05-12	94	50	58	27	6	5	
	A270.80.R.08-12	94	50	58	27	6	8	
100	A270.100.R.06-12	114	50	78	32	6	6	
	A270.100.R.10-12	114	50	78	32	6	10	
125	A270.125.R.07-12	139	63	88	40	6	7	
	A270.125.R.12-12	139	63	88	40	6	12	
160	A270.160.R.08-12	174	63	93.4	40	6	8	

Ordering example: 1 piece A270.32.R.03-12

Supply details: cutter body and insert clamping screws

	d_1 [mm]				
SD/XD.. 1204..	**32 - 40**	7822114/M4,5X10,5/T20	DMSD 5,0Nm/SORT T20	7818267/M8,0x30,0	S4/SW4
SD/XD.. 1204..	**40 - 160**	7822114/M4,5X10,5/T20	DMSD 5,0Nm/SORT T20		

7724104/TORX T20		
7724104/TORX T20		

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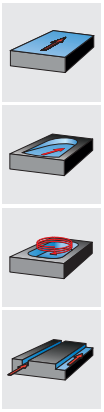
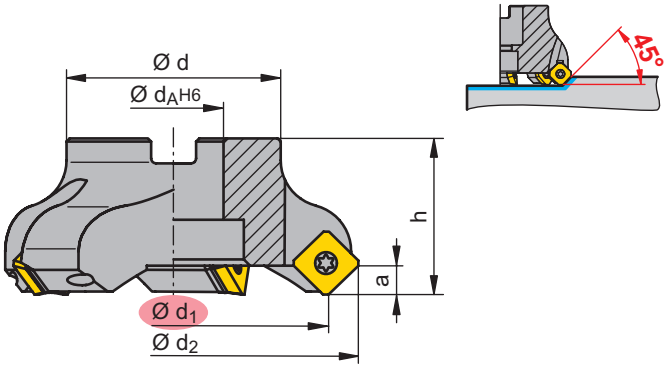
Face milling cutters

A270-15







d1 [mm]	Type, description	d2 [mm]	h [mm]	d [mm]	dA [mm]	a [mm]	z	
80	A270.80.R.04-15	98.4	50	58.8	27	9	4	SD.. 1504..
100	A270.100.R.05-15	118.4	50	68.6	32	9	5	
125	A270.125.R.06-15	143.4	63	81.35	40	9	6	
160	A270.160.R.07-15	178.5	63	104	40	9	7	

Ordering example: 1 piece A270.80.R.04-15

Supply details: cutter body and insert clamping screws

	d1 [mm]				
SD.. 1504..	**80 - 125**	7883216/M4,5X13/T20	7818121/KOMBI T20/SW4,5	DMSD 5,0Nm/SORT T20	7818120/HM-U
SD.. 1504..	**160**	7822114/M4,5X10,5/T20	7818121/KOMBI T20/SW4,5	DMSD 5,0Nm/SORT T20	7818120/HM-U

7883101/B M 4,5		
7883101/B M 4,5		

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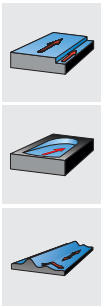



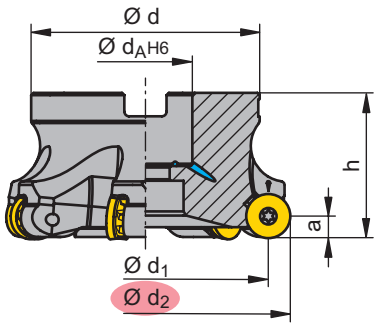

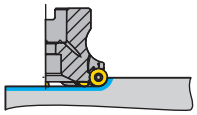

to be discontinued

d_2 [mm]	Type, description	d_1 [mm]	h [mm]	d [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
42	A251.42.R.06-10	32	40	38	16	5	15150	6	RP.. 10T3..
50	A251.50.R.06-10	40	40	43	22	5	12700	6	
40	A251.40.R.04-12-R	28	40	38	16	6	15900	4	RP.. 1204..
100	A251.100.R.07-16	84	50	78	32	8	6350	7	RP.. 1605..
100	A251.100.R.06-20	80	63	78	32	10	6350	6	RP.. 2006..

Ordering example: 1 piece A251.42.R.06-10

Supply details: cutter body and insert clamping screws

	d_2 [mm]				
RP.. 10T3..	**42**	10007085/M3,0X7,3/T10	DMSD 2,0Nm/SORT T10	7883306/TORX T10	7818267/M8,0x30,0
RP.. 10T3..	**50**	10007085/M3,0X7,3/T10	DMSD 2,0Nm/SORT T10	7883306/TORX T10	
RP.. 1204..	**40**	7883209/M3,5X8,6/T15	DMSD 3,2Nm/SORT T15	7724103/TORX T15	7818267/M8,0x30,0
RP.. 1605..	**100**	7822114/M4,5X10,5/T20	DMSD 5,0Nm/SORT T20	7724104/TORX T20	
RP.. 2006..	**100**	10000155/M5,0X14/T20	DMSD 5,0Nm/SORT T20	7724104/TORX T20	

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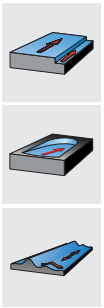
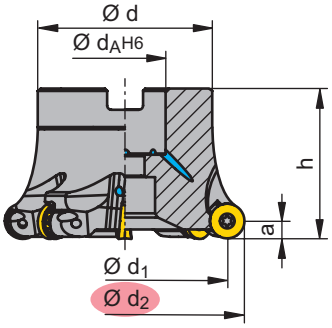
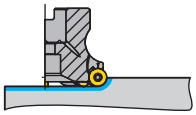
Button insert cutters

A251-RS









d_2 [mm]	Type, description	d_1 [mm]	h [mm]	d [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
40	A251.40.R.05-10-RS	30	40	38	16	5	15900	5	RP.. 10T3..
	A251.40.R.03-10-RS	30	40	38	16	5	15900	3	
42	A251.42.R.06-10-RS	32	40	38	16	5	15150	6	
50	A251.50.R.04-10-RS	40	40	43	22	5	12700	4	
	A251.50.R.06-10-RS	40	40	43	22	5	12700	6	
52	A251.52.R.06-10-RS	42	40	43	22	5	12200	6	
40	A251.40.R.04-12-RS	28	40	38	16	6	15900	4	RP.. 1204..
50	A251.50.R.04-12-RS	38	40	43	22	6	12700	4	
	A251.50.R.05-12-RS	38	40	43	22	6	12700	5	
52	A251.52.R.05-12-RS	40	40	43	22	6	12200	5	
63	A251.63.R.06-12-RS	51	40	48	22	6	10100	6	
66	A251.66.R.07-12-RS	54	40	48	22	6	9650	7	
80	A251.80.R.05-12-RS	68	50	58	27	6	7950	5	
	A251.80.R.07-12-RS	68	50	58	27	6	7950	7	
100	A251.100.R.06-12-RS	88	50	78	32	6	6350	6	
	A251.100.R.10-12-RS	88	50	78	32	6	6350	10	
50	A251.50.R.04-16-RS	34	40	48	22	8	12700	4	RP.. 1605..
63	A251.63.R.05-16-RS	47	40	48	22	8	10100	5	
80	A251.80.R.06-16-RS	64	50	58	27	8	7950	6	
100	A251.100.R.07-16-RS	84	50	78	32	8	6350	7	
80	A251.80.R.05-20-RS	60	50	58	27	10	7950	5	RP.. 2006..
100	A251.100.R.06-20-RS	80	50	78	32	10	6350	6	
125	A251.125.R.06-20-RS	105	63	88	40	10	5050	6	

Ordering example: 1 piece A251.40.R.05-10-RS

Supply details: cutter body and insert clamping screws

	d_2 [mm]					
RP.. 10T3..	**40**	10007085/M3,0X7,3/T10	DMSD 2,0Nm/SORT T10	7883306/TORX T10	7818267/M8,0x30,0
RP.. 10T3..	**40 - 52**	10007085/M3,0X7,3/T10	DMSD 2,0Nm/SORT T10	7883306/TORX T10	
RP.. 1204..	**40 - 100**	7883209/M3,5X8,6/T15	DMSD 3,2Nm/SORT T15	7724103/TORX T15	
RP.. 1605..	**50**	7822114/M4,5X10,5/T20	DMSD 5,0Nm/SORT T20	7724103/TORX T15	7818268/M10,0X31,0
RP.. 1605..	**63 - 100**	7822114/M4,5X10,5/T20	DMSD 5,0Nm/SORT T20	7724104/TORX T20	
RP.. 2006..	**80**	10000155/M5,0X14/T20	DMSD 5,0Nm/SORT T20	7724104/TORX T20	
RP.. 2006..	**100 - 125**	10000155/M5,0X14/T20		7724104/TORX T20	

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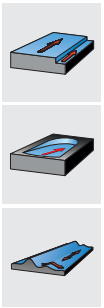



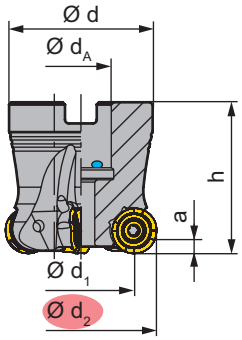

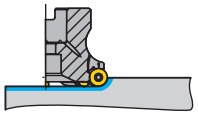

d_2 [mm]	Type, description	d_1 [mm]	h [mm]	d [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
40	A252.40.R.05-10	30	40	38	16	2.5	15900	5	RN.. 1004..
42	A252.42.R.05-10	32	40	38	16	2.5	15150	5	
50	A252.50.R.06-10	40	40	43	22	2.5	12700	6	
52	A252.52.R.07-10	42	40	43	22	2.5	12200	7	
40	A252.40.R.04-12	28	40	38	16	3.0	15900	4	RN.. 1205..
50	A252.50.R.05-12	38	40	43	22	3.0	12700	5	
52	A252.52.R.05-12	40	40	43	22	3.0	12200	5	
63	A252.63.R.06-12	51	40	48	22	3.0	10100	6	
66	A252.66.R.07-12	54	40	48	22	3.0	9650	7	
80	A252.80.R.08-12	68	50	58	27	3.0	7950	8	

Ordering example: 1 piece A252.40.R.05-10

Supply details: cutter body and insert clamping screws

	d_2 [mm]			
RN.. 1004..	**40 - 52**	10009229/M3X7,5/10IP	DMSD 2,0Nm/SORT 10IP	
RN.. 1205..	**40**	M3,5X8,6-15IP/10008749	DMSD 3,2Nm/SORT 15IP	7818267/M8,0x30,0
RN.. 1205..	**50 - 80**	M3,5X8,6-15IP/10008749	DMSD 3,2Nm/SORT 15IP	

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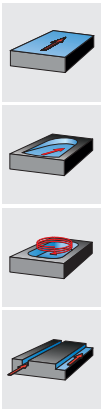
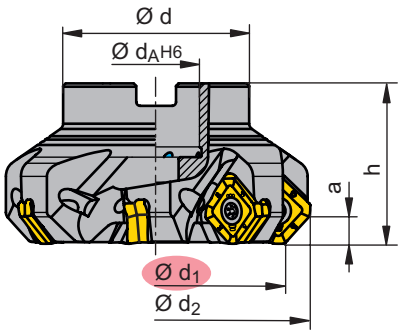
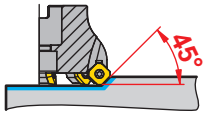
Face milling cutters

A271









d_1 [mm]	Type, description	d_2 [mm]	h [mm]	d [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
50	A271.50.R.04-17	66.1	40	43	22	8.4	14500	4	SAKU 1706..
63	A271.63.R.06-17	79.1	40	48	22	8.4	13000	6	
80	A271.80.R.07-17	96.1	50	58	27	8.4	11200	7	
100	A271.100.R.08-17	116.1	50	78	32	8.4	9900	8	
125	A271.125.R.10-17	141.1	63	88	40	8.4	8800	10	
160	A271.160.R.12-17	176.1	63	104	40	8.4	7700	12	
200	A271.200.R.13-17	216.1	63	134	60	8.4	6900	13	
250	A271.250.R.15-17	266.1	63	134	60	8.4	6100	15	

Ordering example: 1 piece A271.50.R.04-17

Supply details: cutter body and insert clamping screws

	d_1 [mm]			
SAKU 1706..	**50**	10000155/M5,0X14/T20	DMSD 5,0Nm/SORT T20	7818268/M10,0X31,0
SAKU 1706..	**63 - 250**	10000155/M5,0X14/T20	DMSD 5,0Nm/SORT T20	

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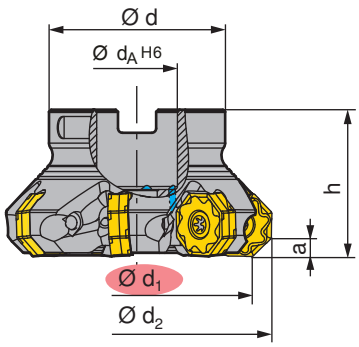

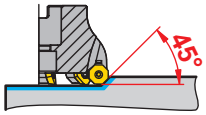

d_1 [mm]	Type, description	d_2 [mm]	h [mm]	d [mm]	d_A [mm]	a [mm]		z	
40	A273.40.R.03-06	50.2	40	38	16	3.5		3	
	A273.40.R.04-06	50.2	40	38	16	3.5		4	
50	A273.50.R.05-06	60.2	40	48	22	3.5		5	
63	A273.63.R.07-06	73.2	40	48	22	3.5		7	
80	A273.80.R.08-06	90.2	50	58	27	3.5		8	
100	A273.100.R.10-06	110.2	50	78	32	3.5		10	
125	A273.125.L.12-06	135.2	63	88	40	3.5		12	
	A273.125.R.12-06	135.2	63	88	40	3.5		12	
160	A273.160.L.14-06	170.2	63	100	40	3.5		14	
	A273.160.R.14-06	170.2	63	100	40	3.5		14	

OAKU 06..

Ordering example: 1 piece A273.40.R.03-06

Supply details: cutter body and insert clamping screws

	d_1 [mm]				
OAKU 06..	**40**	10000155/M5,0X14/T20	7724104/TORX T20	7818267/M8,0x30,0	S4/SW4
OAKU 06..	**50**	10000155/M5,0X14/T20	7724104/TORX T20	7818268/M10,0X31,0	7812301/SW 5
OAKU 06..	**63 - 160**	10000155/M5,0X14/T20	7724104/TORX T20		

DMSD 5,0Nm/SORT T20		
DMSD 5,0Nm/SORT T20		
DMSD 5,0Nm/SORT T20		

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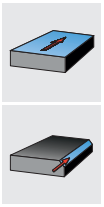
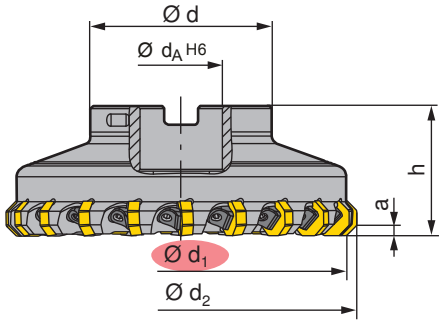
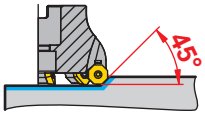
Face milling cutters

A273-06









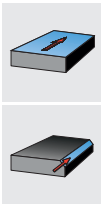
d1 [mm]	Type, description	d2 [mm]	h [mm]	d [mm]	dA [mm]	a [mm]		z	
80	A273.80.R.10-06	90.2	50	58	27	3.5		10	
100	A273.100.R.14-06	110.3	50	78	32	3.5		14	
125	A273.125.R.17-06	135.2	63	88	40	3.5		17	
160	A273.160.R.20-06	170.2	63	100	40	3.5		20	OAKU 06..
200	A273.200.R.25-06	210.2	63	153	60	3.5		25	
250	A273.250.R.31-06	260.2	63	153	60	3.5		31	
315	A273.315.R.40-06	325.2	63	226	60	3.5		40	

Ordering example: 1 piece A273.80.R.10-06

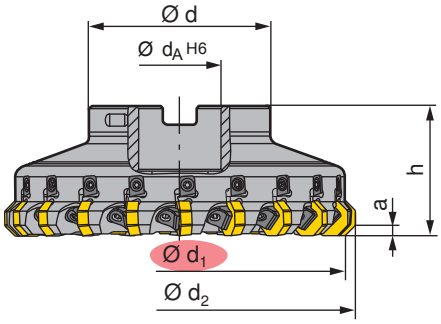
Supply details: cutter body, insert clamping screws

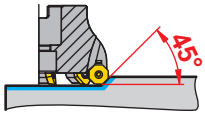
	d1 [mm]				
OAKU 06..	**80 - 315**	7724103/TORX T15	DMSD 4,0Nm/SORT T15	S-10007860/M6,0X21,0/T15	K-10007861/11,8X12,5

B190-B193 B242-B246 B56 B78









d_1 [mm]	Type, description	d_2 [mm]	h [mm]	d [mm]	d_A [mm]	a [mm]		z	
80	A273.80.R.10A10-06	90.2	50	58	27	3.5		10	
100	A273.100.R.14A14-06	110.3	50	78	32	3.5		14	
125	A273.125.R.17A17-06	135.2	63	88	40	3.5		17	
160	A273.160.R.20A20-06	170.2	63	88	40	3.5		20	OAKU 06..
200	A273.200.R.25A25-06	210.2	63	132	60	3.5		25	
250	A273.250.R.31A31-06	260.2	63	132	60	3.5		31	
315	A273.315.R.40A40-06	325.2	63	226	60	3.5		40	

Ordering example: 1 piece A273.80.R.10A10-06

Supply details: cutter body, insert clamping screws, adjustment wedge set, Torx key

	d_1 [mm]				
OAKU 06..	**80 - 315**	7724103/TORX T15	DMSD 1,0Nm/SORT T15	DMSD 4,0Nm/SORT T15	S-10007860/M6,0X21,0/T15

K-10007861/11,8X12,5	10002113-0/AW-RH	10002362-0/WS-L T15

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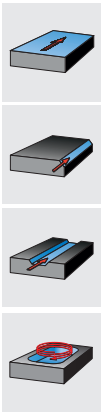
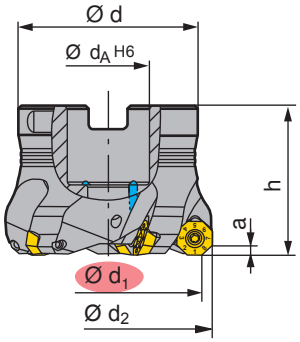
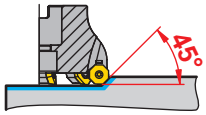
Face milling cutters

A274-09 OF..









d_1 [mm]	Type, description	d_2 [mm]	h [mm]	a [mm]	d [mm]	d_A [mm]	n_{max} [min^{-1}]	z	
32	A274.32.R.05-09	37.7	40	2.5	38	16	32200	5	OF.. 0403..
40	A274.40.R.04-09	45.7	40	2.5	38	16	28400	4	
	A274.40.R.06-09	45.7	40	2.5	38	16	28400	6	
50	A274.50.R.05-09	55.7	40	2.5	48	22	25200	5	
	A274.50.R.07-09	55.7	40	2.5	48	22	25200	7	
63	A274.63.R.06-09	68.7	40	2.5	48	22	22300	6	
	A274.63.R.09-09	68.7	40	2.5	48	22	22300	9	
80	A274.80.R.07-09	85.7	50	2.5	58	27	19600	7	
	A274.80.R.11-09	85.7	50	2.5	58	27	19600	11	
100	A274.100.R.09-09	105.7	50	2.5	78	32	17500	9	
	A274.100.R.13-09	105.7	50	2.5	78	32	17500	13	
125	A274.125.R.12-09	130.7	63	2.5	88	40	15600	12	

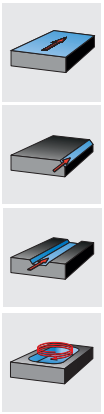
Ordering example: 1 piece A274.32.R.05-09

Supply details: cutter body and insert clamping screws

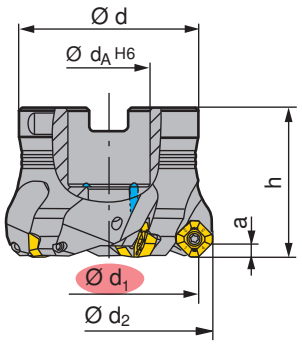
	d_1 [mm]				
OF.. 0403..	**32 - 40**	10007562/M2,5X7,6/08TP	10000276/TORX 08IP	7818267/M8,0x30,0	S4/SW4
OF.. 0403..	**50 - 125**	10007562/M2,5X7,6/08TP	10000276/TORX 08IP		

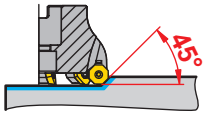
DMSD 1,6Nm/SORT 08IP		
DMSD 1,6Nm/SORT 08IP		

B190-B193 B235 B242-B246 B57









d_1 [mm]	Type, description	d_2 [mm]	h [mm]	a [mm]	d [mm]	d_A [mm]	n_{max} [min^{-1}]	z	
30.7	A274.32.R.05-09	39.2	40.7	3.8	38	16	32200	5	SF.. 0903..
38.7	A274.40.R.04-09	47.6	40.7	3.8	38	16	28400	4	
	A274.40.R.06-09	47.6	40.7	3.8	38	16	28400	6	
48.7	A274.50.R.05-09	57.6	40.7	3.8	48	22	25200	5	
	A274.50.R.07-09	57.6	40.7	3.8	48	22	25200	7	
61.7	A274.63.R.06-09	70.5	40.7	3.8	48	22	22300	6	
	A274.63.R.09-09	70.5	40.7	3.8	48	22	22300	9	
78.7	A274.80.R.07-09	87.5	50.7	3.8	58	27	19600	7	
	A274.80.R.11-09	87.5	50.7	3.8	58	27	19600	11	
98.7	A274.100.R.09-09	107.5	50.7	3.8	78	32	17500	9	
	A274.100.R.13-09	107.5	50.7	3.8	78	32	17500	13	
123.7	A274.125.R.12-09	132.5	63.7	3.8	88	40	15600	12	

Ordering example: 1 piece A274.32.R.05-09

Supply details: cutter body and insert clamping screws

	d_1 [mm]				
SF.. 0903..	**30.7 - 38.7**	10007562/M2,5X7,6/08TP	10000276/TORX 08IP	7818267/M8,0x30,0	S4/SW4
SF.. 0903..	**48.7 - 123.7**	10007562/M2,5X7,6/08TP	10000276/TORX 08IP		

DMSD 1,6Nm/SORT 08IP		
DMSD 1,6Nm/SORT 08IP		

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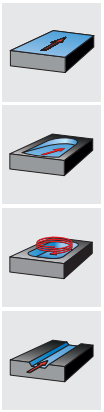
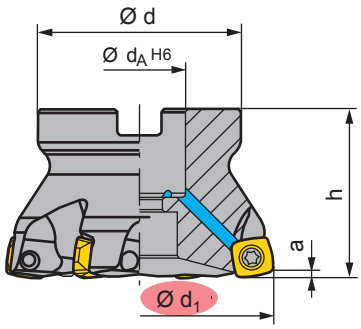
Face milling cutters

AHFC-09/-12







HFC high feed cutting

d_1 [mm]	Type, description	h [mm]	d [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
32	AHFC.32.R.03-09	40	38	16	1	27000	3	XD.. 09..
35	AHFC.35.R.04-09	40	38	16	1	26700	4	
40	AHFC.40.R.04-09	40	38	16	1	26400	4	
42	AHFC.42.R.05-09	40	38	16	1	26100	5	
50	AHFC.50.R.05-09	40	43	22	1	23500	5	
52	AHFC.52.R.06-09	40	43	22	1	23000	6	
63	AHFC.63.R.06-09	40	48	22	1	20500	6	
66	AHFC.66.R.07-09	40	48	22	1	20000	7	
40	AHFC.40.R.03-12	40	38	16	2	21120	3	XO.. 12..
42	AHFC.42.R.04-12	40	38	16	2	20880	4	
50	AHFC.50.R.04-12	40	43	22	2	18800	4	
52	AHFC.52.R.05-12	40	43	22	2	18400	5	
63	AHFC.63.R.05-12	40	48	22	2	16400	5	
66	AHFC.66.R.06-12	40	48	22	2	16000	6	
80	AHFC.80.R.07-12	50	58	27	2	14000	7	
100	AHFC.100.R.08-12	50	78	32	2	12000	8	

Ordering example: 1 piece AHFC.32.R.03-09

Supply details: cutter body and insert clamping screws

	d_1 [mm]				
XD.. 09..	**32 - 42**	7883209/M3,5X8,6/T15	7724103/TORX T15	7818267/M8,0x30,0	S4/SW4
XD.. 09..	**50 - 63**	7883209/M3,5X8,6/T15	7724103/TORX T15		
XO.. 12..	**40 - 42**	7822114/M4,5X10,5/T20	7724104/TORX T20	7818267/M8,0x30,0	S4/SW4
XO.. 12..	**50 - 100**	7822114/M4,5X10,5/T20	7724104/TORX T20		

DMSD 3,2Nm/SORT T15		
DMSD 3,2Nm/SORT T15		
DMSD 5,0Nm/SORT T20		
DMSD 5,0Nm/SORT T20		

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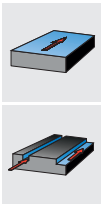



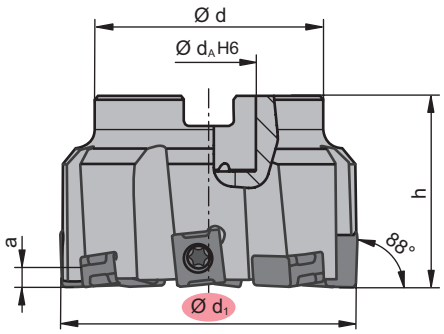

d_1 [mm]	Type, description	h [mm]	d [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
50	AHEC.50.R.06-11	40	48	22	4	12700	6	
	AHEC.50.R.04B-11	40	48	22	4	12700	4	
63	AHEC.63.R.08-11	40	48	22	4	10100	8	
	AHEC.63.R.06B-11	40	48	22	4	10100	6	
80	AHEC.80.R.10-11	50	58	27	4	8000	10	
	AHEC.80.R.08B-11	50	58	27	4	8000	8	
100	AHEC.100.R.12-11	50	78	32	4	6400	12	LN.X 1106
	AHEC.100.R.10B-11	50	78	32	4	6400	10	
125	AHEC.125.R.12-11	63	88	40	4	5100	12	
	AHEC.125.R.12B-11	63	88	40	4	5100	12	
	AHEC.125.R.16-11	63	88	40	4	5100	16	
160	AHEC.160.R.20-11	63	100	40	4	4000	20	
	AHEC.160.R.14B-11	63	100	40	4	4000	14	

Ordering example: 1 piece AHEC.50.R.06-11

Supply details: cutter body and insert clamping screws

	d_1 [mm]				
LN.X 1106	**50 - 63**	7815102/M3,5X11,0/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15	10006791/KMR22
LN.X 1106	**80**	7815102/M3,5X11,0/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15	10006792/KMR27
LN.X 1106	**100**	7815102/M3,5X11,0/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15	10006793/KMR32
LN.X 1106	**125**	7815102/M3,5X11,0/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15	10006794/KMR40
LN.X 1106	**160**	7815102/M3,5X11,0/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15	

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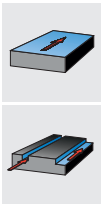
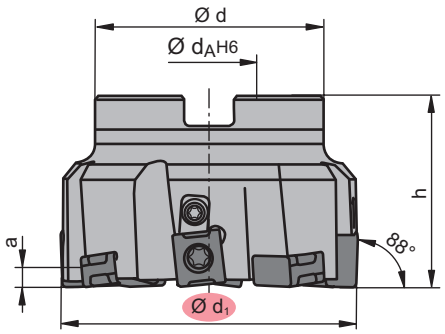
Shoulder & face milling cutters

AHEC-11 adjustable (A)







d1 [mm]	Type, description	h [mm]	d [mm]	dA [mm]	a [mm]	nmax [min-1]	z	
50	AHEC.50.R.06A03-11	40	48	22	4	12700	6	LN.X 1106
63	AHEC.63.R.08A04-11	40	48	22	4	10100	8	
80	AHEC.80.R.10A05-11	50	58	27	4	8000	10	
100	AHEC.100.R.12A06-11	50	78	32	4	6400	12	
125	AHEC.125.R.16A08-11	63	88	40	4	5100	16	
160	AHEC.160.R.20A10-11	63	100	40	4	4000	20	

Ordering example: 1 piece AHEC.50.R.06A03-11

Supply details: cutter body, insert clamping screws, adjustment wedge set

	d1 [mm]				
LN.X 1106	**50 - 63**	7815102/M3,5X11,0/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15	
LN.X 1106	**80**	7815102/M3,5X11,0/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15	
LN.X 1106	**100**	7815102/M3,5X11,0/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15	
LN.X 1106	**125**	7815102/M3,5X11,0/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15	
LN.X 1106	**160**	7815102/M3,5X11,0/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15	

10002113-0/AW-RH	10002362-0/WS-L T15	10006791/KMR22
10002113-0/AW-RH	10002362-0/WS-L T15	10006792/KMR27
10002113-0/AW-RH	10002362-0/WS-L T15	10006793/KMR32
10002113-0/AW-RH	10002362-0/WS-L T15	10006794/KMR40
10002113-0/AW-RH	10002362-0/WS-L T15	

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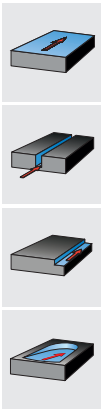
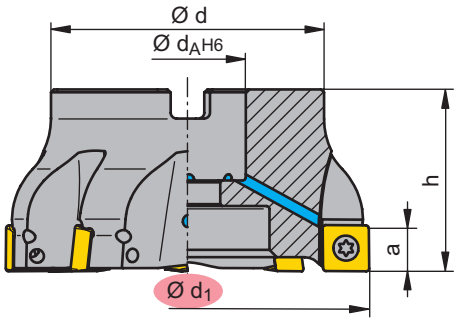
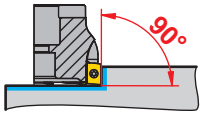








d_1 [mm]	Type, description	h [mm]	d [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
40	A490.40.R.05-09	40	38	16	8	17000	5	SD.. 09T3..
42	A490.42.R.06-09	40	38	16	8	16500	6	
50	A490.50.R.06-09	40	43	22	8	14800	6	
52	A490.52.R.07-09	40	43	22	8	14450	7	
63	A490.63.R.07-09	40	48	22	8	12850	7	
66	A490.66.R.08-09	40	48	22	8	12550	8	
80	A490.80.R.09-09	50	58	27	8	11250	9	
100	A490.100.R.10-09	50	78	32	8	9900	10	
40	A490.40.R.04-12	40	38	16	12	17000	4	SD.. 1205..
50	A490.50.R.05-12	40	43	22	12	14800	5	
63	A490.63.R.06-12	40	48	22	12	12850	6	
80	A490.80.R.07-12	50	58	27	12	11250	7	
100	A490.100.R.08-12	50	78	32	12	9900	8	
125	A490.125.R.10-12	63	88	40	12	5500	10	

Ordering example: 1 piece A490.40.R.05-09
Supply details: cutter body and insert clamping screws

	d_1 [mm]				
SD.. 09T3..	**40 - 42**	7722111/M3,5X7,2/T15	DMSD 3,2Nm/SORT T15	7818267/M8,0x30,0	S4/SW4
SD.. 09T3..	**50 - 100**	7722111/M3,5X7,2/T15	DMSD 3,2Nm/SORT T15		
SD.. 1205..	**40**	7822114/M4,5X10,5/T20	DMSD 5,0Nm/SORT T20	7818267/M8,0x30,0	S4/SW4
SD.. 1205..	**50**	7822114/M4,5X10,5/T20	DMSD 5,0Nm/SORT T20	7818268/M10,0X31,0	7812301/SW 5
SD.. 1205..	**63 - 125**	7822114/M4,5X10,5/T20	DMSD 5,0Nm/SORT T20		

7724103/TORX T15		
7724103/TORX T15		
7724104/TORX T20		
7724104/TORX T20		
7724104/TORX T20		


B190-B193


B204-B218


B235


B242-B246

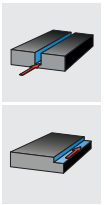


B247-B252

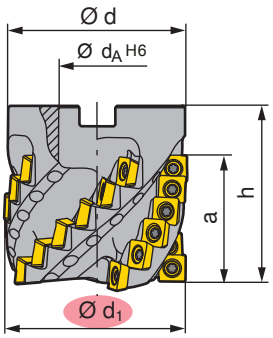

B63

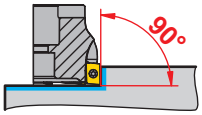
Shoulder & slot milling cutters

A490-09K









d_1 [mm]	Type, description	h [mm]	d [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	n	
40	A490.40.R.03K6-09	55	38.2	16	41	8000	3	18	SD.. 09T3..
50	A490.50.R.04K6-09	55	48	22	41	7500	4	24	
63	A490.63.R.05K6-09	60	61	27	41	6500	5	30	

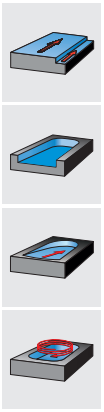
Ordering example: 1 piece A490.40.R.03K6-09

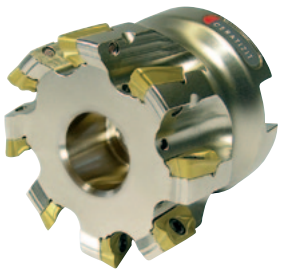
Supply details: cutter body, insert clamping screws, screw for cutter body

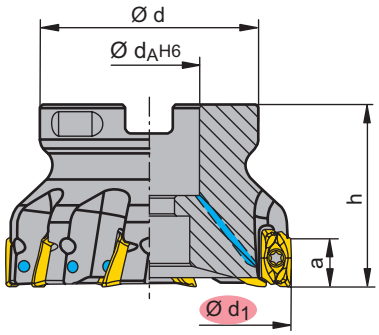
n = number of inserts

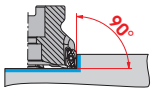
	d_1 [mm]			
SD.. 09T3..	**40 - 63**	7722111/M3,5X7,2/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15

B190-B193 B204-B218 B242-B246 B247-B252 B63









d_1 [mm]	Type, description	h [mm]	d [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
32	A211.32.R.06-07	40	38	16	6	36240	6	
	A211.32.R.08-07	40	38	16	6	36240	8	
40	A211.40.R.10-07	40	38	16	6	33240	10	XD.. 07..
	A211.40.R.08-07	40	38	16	6	33240	8	
50	A211.50.R.10-07	40	43	22	6	30480	10	
	A211.50.R.12-07	40	43	22	6	30480	12	
40	A211.40.R.04-11	40	38	16	10	27700	4	
	A211.40.R.06-11	40	38	16	10	27700	6	
50	A211.50.R.05-11	40	43	22	10	25400	5	
	A211.50.R.08-11	40	43	22	10	25400	8	
63	A211.63.R.06-11	40	48	22	10	23300	6	
	A211.63.R.10-11	40	48	22	10	23300	10	
80	A211.80.R.07-11	50	58	27	10	21300	7	XD.. 11..
	A211.80.R.10-11	50	58	27	10	21300	10	
	A211.80.R.12-11	50	58	27	10	21300	12	
100	A211.100.R.08-11	50	78	32	10	19600	8	
	A211.100.R.14-11	50	78	32	10	19600	14	
125	A211.125.R.10-11	63	88	40	10	17900	10	
160	A211.160.R.13-11	63	98	40	10	16500	13	

Ordering example: 1 piece A211.32.R.06-07

Supply details: cutter body and insert clamping screws

	d_1 [mm]				
XD.. 07..	**32**	10006888/M2,2X4,2/07IP	DMSD 1,0Nm/SORT 07IP	7818267/M8,0x30,0	S4/SW4
XD.. 07..	**40 - 50**	10006888/M2,2X4,2/07IP	DMSD 1,0Nm/SORT 07IP		
XD.. 11..	**40**	10000125/M2,5X7,3/08TP	DMSD 1,6Nm/SORT 08IP	7818267/M8,0x30,0	S4/SW4
XD.. 11..	**50**	10000125/M2,5X7,3/08TP	DMSD 1,6Nm/SORT 08IP	7818268/M10,0X31,0	7812301/SW 5
XD.. 11..	**63 - 160**	10000125/M2,5X7,3/08TP	DMSD 1,6Nm/SORT 08IP		

10006918/TORX 07IP		
10006918/TORX 07IP		
10000276/TORX 08IP		
10000276/TORX 08IP		
10000276/TORX 08IP		


B190-B193


B204-B218


B235


B236


B242-B246

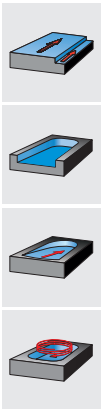


B247-B252

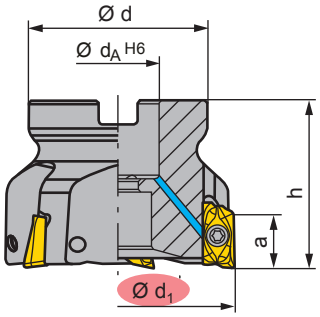

B71-B73

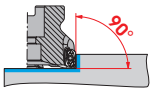
Shoulder & slot milling cutters

A211-15/-20









d_1 [mm]	Type, description	h [mm]	d [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
40	A211.40.R.03-15	40	38	16	14	22160	3	XD.. 15..
	A211.40.R.04-15	40	38	16	14	22160	4	
50	A211.50.R.03-15	40	43	22	14	20320	3	
	A211.50.R.05-15	40	43	22	14	20320	5	
63	A211.63.R.04-15	45	48	22	14	18640	4	
	A211.63.R.06-15	45	48	22	14	18640	6	
80	A211.80.R.05-15	50	58	27	14	17040	5	
	A211.80.R.08-15	50	58	27	14	17040	8	
100	A211.100.R.06-15	50	78	32	14	15680	6	
	A211.100.R.10-15	50	78	32	14	15680	10	
125	A211.125.R.07-15	63	88	40	14	14320	7	
	A211.125.R.11-15	63	88	40	14	14320	11	
160	A211.160.R.08-15	63	93	40	14	13200	8	
	A211.160.R.12-15	63	93	40	14	13200	12	
63	A211.63.R.05-20	45	48	22	19	14400	5	XD.. 20..
80	A211.80.R.06-20	50	58	27	19	12400	6	
100	A211.100.R.07-20	50	78	32	19	10900	7	

Ordering example: 1 piece A211.40.R.03-15

Supply details: cutter body and insert clamping screws

	d_1 [mm]				
XD.. 15..	**40**	10006887/M3,5X8,6/15IP	10006919/TORX 15IP	7818267/M8,0x30,0	S4/SW4
XD.. 15..	**50**	10006887/M3,5X8,6/15IP	10006919/TORX 15IP	7818268/M10,0X31,0	7812301/SW 5
XD.. 15..	**63 - 160**	10006887/M3,5X8,6/15IP	10006919/TORX 15IP		
XD.. 20..	**63 - 100**	7822114/M4,5X10,5/T20	7724104/TORX T20		

DMSD 3,2Nm/SORT 15IP		
DMSD 3,2Nm/SORT 15IP		
DMSD 3,2Nm/SORT 15IP		
DMSD 5,0Nm/SORT T20		


B190-B193


B204-B218


B235

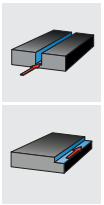

B236


B242-B246

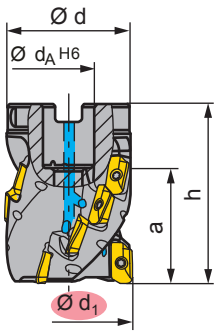


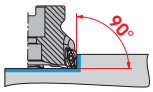
B247-B252


B71+B73









d_1 [mm]	Type, description	h [mm]	d [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	n	
40	A211.40.R.03K4-11	56	38	16	37	18500	3	12	
	A211.40.R.04K4-11	55	38	16	37	18500	4	16	
	A211.40.R.04K5-11	65	38	16	45.5	18500	4	20	
50	A211.50.R.04K5-11	65	43	22	45.5	17000	4	20	XD.. 11..
	A211.50.R.05K5-11	65	43	22	45.5	17000	5	25	
	A211.50.R.05K6-11	74	43	22	54.5	17000	5	30	
	A211.50.R.03K5-15	88	43	22	63.0	13600	3	15	
	A211.50.R.03K4-15	74	43	22	50.5	13600	3	12	
80	A211.80.R.04K5-15	88	78	32	63.0	11360	4	20	XD.. 15..
	A211.80.R.05K6-15	102	78	32	75.5	11360	5	30	
63	A211.63.R.03K4-15	74	58	27	51	12500	3	12	
	A211.63.R.04K6-15	102	58	27	75.5	12500	4	24	
	A211.63.R.04K4-20	92	58	27	68	14400	4	16	XD.. 20..
80	A211.80.R.05K4-20	92	76	32	68	12400	5	20	

Ordering example: 1 piece A211.40.R.03K4-11

Supply details: cutter body, insert clamping screws, screw for cutter body

n = number of inserts

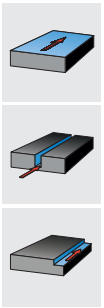
For the second and subsequent rows of teeth, use corner radius ≤ 0.8 mm to ensure adequate overlap of inserts.

	d_1 [mm]				
XD.. 11..	**40**	10000125/M2,5X7,3/08TP	10000276/TORX 08IP	DMSD 1,6Nm/SORT 08IP	S-10007790/M16,0X6,0/SW06
XD.. 11..	**50**	10000125/M2,5X7,3/08TP	10000276/TORX 08IP	DMSD 1,6Nm/SORT 08IP	S-10007791/M20,0X7,0/SW08
XD.. 15..	**50**	10006887/M3,5X8,6/15IP	10006919/TORX 15IP	DMSD 3,2Nm/SORT 15IP	S-10007791/M20,0X7,0/SW08
XD.. 15..	**63**	10006887/M3,5X8,6/15IP	10006919/TORX 15IP	DMSD 3,2Nm/SORT 15IP	S-10007821/M24,0X9,0/SW10
XD.. 15..	**80**	10006887/M3,5X8,6/15IP	10006919/TORX 15IP	DMSD 3,2Nm/SORT 15IP	S-10007822/M30,0X9,0/SW14
XD.. 20..	**63**	7822114/M4,5X10,5/T20	7724104/TORX T20	DMSD 5,0Nm/SORT T20	S-10007821/M24,0X9,0/SW10
XD.. 20..	**80**	7822114/M4,5X10,5/T20	7724104/TORX T20	DMSD 5,0Nm/SORT T20	S-10007822/M30,0X9,0/SW14

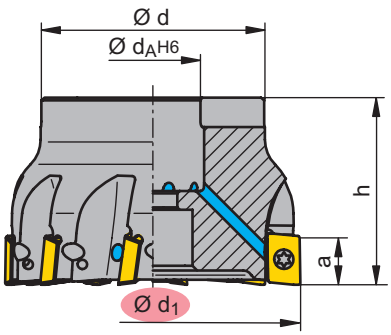
B190-B193 B204-B218 B235 B236 B242-B246 B247-B252 B71-B73

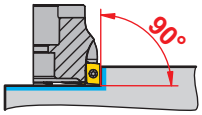
Shoulder & slot milling cutters

A210









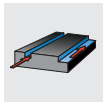
d_1 [mm]	Type, description	h [mm]	d [mm]	d_A [mm]	a [mm]	z	
40	A210.40.R.06	40	38	22	8	6	AP.. 1003..
50	A210.50.R.05	40	43	22	8	5	
	A210.50.R.08	40	43	22	8	8	
63	A210.63.R.06	40	48	22	8	6	
	A210.63.R.10	40	48	22	8	10	
80	A210.80.R.12	40	58	27	8	12	
100	A210.100.R.14	50	78	32	8	14	
125	A210.125.R.15	63	88	40	8	15	

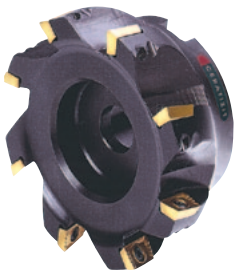
Ordering example: 1 piece A210.40.R.06

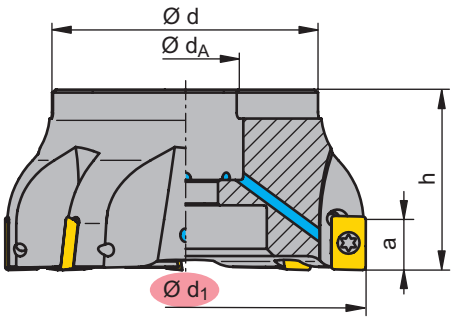
Supply details: cutter body and insert clamping screws

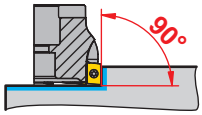
	d_1 [mm]			
AP.. 1003..	**40 - 125**	7815101/M2,5X6,0/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08

B190-B193 B204-B218 B236 B242-B246 B46









to be discontinued

d_1 [mm]	Type, description	h [mm]	d [mm]	d_A [mm]	a [mm]	z	
40	A241.40.R.04	40	33	16	13	4	LD.. 1504..
50	A241.50.R.05	40	33	22	13	5	
63	A241.63.R.06	40	48	22	13	6	
80	A241.80.R.07	50	78	27	13	7	
100	A241.100.R.08	50	75	32	13	8	
125	A241.125.R.10	63	88	40	13	10	

Ordering example: 1 piece A241.40.R.04

Supply details: cutter body and insert clamping screws

	d_1 [mm]			
LD.. 1504..	**40 - 125**	7883209/M3,5X8,6/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15


B190-B193

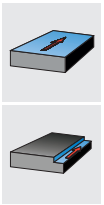

B204-B218

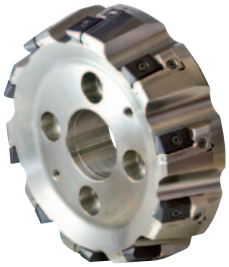

B242-B246

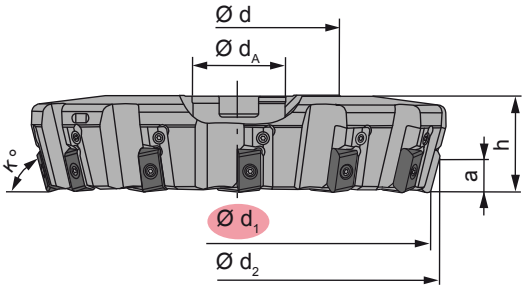

B51

Face milling cutters

AHDM







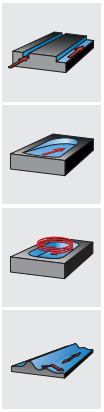
d1 [mm]	Type, description	d2 [mm]	h [mm]	d [mm]	dA [mm]	a [mm]	K [°]	z	
160	AHDM.160.R.08-75-22	160.2	63	110	40	20	75	8	LNUC 22..
200	AHDM.200.R.10-75-22	200.2	63	131	60	20	75	10	
250	AHDM.250.R.12-75-22	250.2	63	174	60	20	75	12	
315	AHDM.315.R.14-75-22	315.2	80	226	60	20	75	14	

Ordering example: 1 piece AHDM.160.R.08-75-22

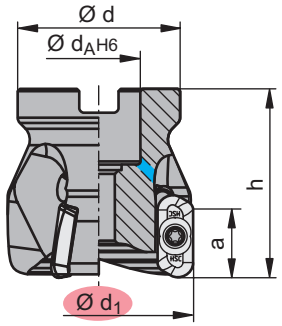
Supply details: cutter body and insert clamping screws

	d1 [mm]			
LNUC 22..	**160 - 315**	10006216/M5,0X18/T15	7724103/TORX T15	CA HDM-22-R

B190-B193 B204-B218 B242-B246 B54







d_1 [mm]	Type, description	h [mm]	d [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
40	AHSC.40.R.04-11	50	38	16	10	35500	4	XD.. 11..
50	AHSC.50.R.04-11	50	43	22	10	31800	4	
63	AHSC.63.R.05-11	50	48	22	10	28300	5	
80	AHSC.80.R.05-11	50	58	27	10	25100	5	
100	AHSC.100.R.05-11	50	78	32	10	22500	5	
40	AHSC.40.R.03-19	50	38	16	18	24900	3	XD.T 19..
50	AHSC.50.R.04-19	50	43	22	18	21600	4	
63	AHSC.63.R.04-19	50	48	22	18	18800	4	
	AHSC.63.R.05-19	50	48	22	18	18800	5	
80	AHSC.80.R.04-19	50	58	27	18	16400	4	
	AHSC.80.R.05-19	50	58	27	18	16400	5	
100	AHSC.100.R.04-19	50	78	32	18	14500	4	
	AHSC.100.R.05-19	50	78	32	18	14500	5	
125	AHSC.125.R.05-19	63	88	40	18	12800	5	
	AHSC.125.R.06-19	63	88	40	18	12800	6	

Ordering example: 1 piece AHSC.40.R.04-11

Supply details: cutter body and insert clamping screws

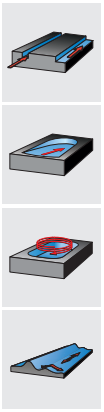
	d_1 [mm]				
XD.. 11..	**40**	10000125/M2,5X7,3/08TP	DMSD 1,8Nm/SORT 08IP	7818267/M8,0x30,0	S4/SW4
XD.. 11..	**50 - 63**	10000125/M2,5X7,3/08TP	DMSD 1,8Nm/SORT 08IP	7818268/M10,0X31,0	7812301/SW 5
XD.. 11..	**80 - 100**	10000125/M2,5X7,3/08TP	DMSD 1,8Nm/SORT 08IP		
XD.T 19..	**40**	7818428/M4,0X8,5/T15	DMSD 6,0Nm/SORT T15	7818267/M8,0x30,0	S4/SW4
XD.T 19..	**50 - 63**	7818429/M4,0X11/T15	DMSD 6,0Nm/SORT T15	7818268/M10,0X31,0	7812301/SW 5
XD.T 19..	**80 - 125**	7818429/M4,0X11/T15	DMSD 6,0Nm/SORT T15		

10000276/TORX 08IP		
10000276/TORX 08IP		
10000276/TORX 08IP		
7724103/TORX T15		
7724103/TORX T15		
7724103/TORX T15		

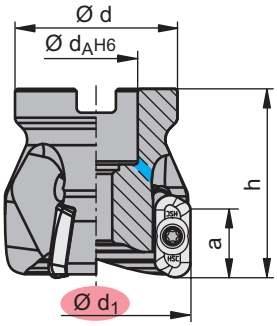
B190-B193 B204-B218 B227-B234 B235 B236 B242-B246 B73-B74

Shoulder & slot milling cutters

AHPC-19







d1 [mm]	Type, description	h [mm]	d [mm]	dA [mm]	a [mm]	nmax [min-1]	z	
40	AHPC.40.R.03-19	50	38	16	18	35700	3	XD.X 19..
50	AHPC.50.R.03-19	50	43	22	18	31900	3	
63	AHPC.63.R.03-19	50	48	22	18	28500	3	
	AHPC.63.R.04-19	50	48	22	18	28500	4	

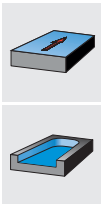
Ordering example: 1 piece AHPC.40.R.03-19

Supply details: cutter body and insert clamping screws

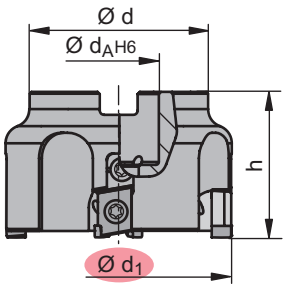
	d1 [mm]				
XD.X 19..	**40**	7818428/M4,0X8,5/T15	7724103/TORX T15	DMSD 5,0Nm/SORT T15	7818267/M8,0x30,0
XD.X 19..	**50 - 63**	7818429/M4,0X11/T15	7724103/TORX T15	DMSD 5,0Nm/SORT T15	7818268/M10,0X31,0

S4/SW4		
7812301/SW 5		

B190-B193 B204-B218 B227-B234 B235 B236 B242-B246 B74







HSC-HP
High Speed Cutting
High Performance

d_1 [mm]	Type, description	h [mm]	d [mm]	d_A [mm]	n_{max} [min^{-1}]		z	
40	AHPC.40.R.04-12	40	34	16	32000		4	
50	AHPC.50.R.04-12	40	49	22	32000		4	
	AHPC.50.R.05-12	40	49	22	32000		5	
63	AHPC.63.R.04-12	40	49	22	29000		4	
	AHPC.63.R.07-12	40	49	22	29000		7	
80	AHPC.80.R.05-12	50	60	27	26000		5	
	AHPC.80.R.09-12	50	60	27	26000		9	
100	AHPC.100.R.06-12	50	70	32	24000		6	ZNHW 1205..
	AHPC.100.R.12-12	50	70	32	24000		12	
125	AHPC.125.R.08-12	63	72	40	22000		8	
	AHPC.125.R.14-12	63	72	40	22000		14	
160	AHPC.160.R.10-12	63	72	40	18000		10	
	AHPC.160.R.16-12	63	118	40	18000		16	
200	AHPC.200.R.12-12	63	153	60	16000		12	
250	AHPC.250.R.14-12	63	200	60	14000		14	
315	AHPC.315.R.18-12	80	265	60	12000		18	

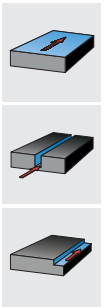
Ordering example: 1 piece AHPC.40.R.04-12
Supply details: cutter body, insert clamping screws, wedges, clamping key, edge protecting ring

	d_1 [mm]				
ZNHW 1205..	**40 - 63**	7818429/M4,0X11/T15	DMSD 5,0Nm/SORT T15	10002113-0/AW-RH	10002362-0/WS-L T15
ZNHW 1205..	**80 - 315**	7883216/M4,5X13/T20	DMSD 5,0Nm/SORT T15	10002113-0/AW-RH	10002362-0/WS-L T15

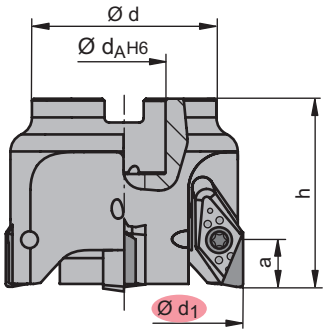
B190-B193 B227-B234 B237 B242-B246 B76

Shoulder & slot milling cutters

AHSV-22







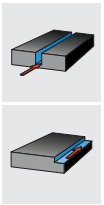
d_1 [mm]	Type, description	h [mm]	d [mm]	d_A [mm]	a [mm]	n_{max} [min^{-1}]	z	
50	AHSV.50.R.03-22	50	49	22	15	24000	3	VC.. 2205..
63	AHSV.63.R.04-22	50	49	22	15	21000	4	
80	AHSV.80.R.05-22	50	60	27	15	18000	5	
100	AHSV.100.R.06-22	63	70	32	15	15000	6	
125	AHSV.125.R.07-22	63	72	40	15	12000	7	

Ordering example: 1 piece AHSV.50.R.03-22

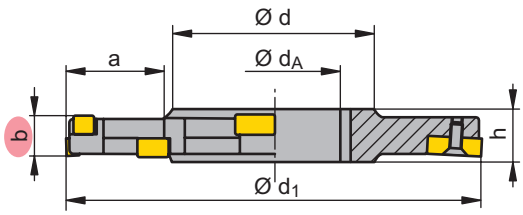
Supply details: cutter body and insert clamping screws

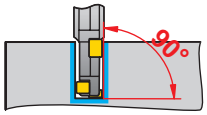
	d_1 [mm]		
VC.. 2205..	**50 - 125**	7822114/M4,5X10,5/T20	DMSD 5,0Nm/SORT T20

B190-B193 B227-B234 B242-B246 B69









to be discontinued

b [mm]	Type, description	d_1 [mm]	h [mm]	d [mm]	d_A [mm]	a [mm]	z	n	
6-7	80F08N-S90LN12N06	80	12	44	27	18	4	8	LNE. 1235.. / 1240..
	80Y08R-S90LN12N06		50	42	22	19	4	8	
	100G10N-S90LN12N06	100	12	52	32	24	5	10	
	100Y10R-S90LN12N06		50	50	27	25	5	10	
	125H12N-S90LN12N06	125	12	63	40	31	6	12	
	125Y12R-S90LN12N06		50	70	40	27.5	6	12	
8-9	80F08N-S90LN12N08	80	12	44	27	18	4	8	LNE. 1245.. / 1250..
	80Y08R-S90LN12N08		50	42	22	19	4	8	
	100G10N-S90LN12N08	100	12	52	32	24	5	10	
	100Y10R-S90LN12N08		50	50	27	25	5	10	
	125Y12R-S90LN12N08	125	50	70	40	27.5	6	12	

Ordering example: 1 piece 80F08N-S90LN12N06

Supply details: cutter body and insert clamping screws

z = effective number of teeth for the calculation of the feed rate
n = number of inserts

	d_1 [mm]		
LNE. 1235.. / 1240..	**80 - 125**	MS 1280/M4X5	
LNE. 1245.. / 1250..	**80 - 125**	MS 1282/M4X6,8	



B190-B193

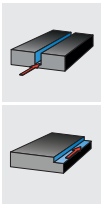

B240


B241

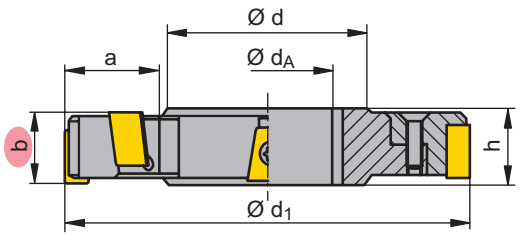

B52

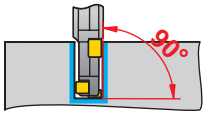
Side and face milling cutters

90CN









to be discontinued

b [mm]	Type, description	d_1 [mm]	h [mm]	d [mm]	d_A [mm]	a [mm]	z	n	
14-18	125H08N-S90CN10N14	125	18	60	40	32.5	4	8	CN.. 1005..
	125Y08R-S90CN10N14		50	60	32	32.5	4	8	
	160H10N-S90CN10N14	160	18	63	40	48.5	5	10	
	160Y10R-S90CN10N14		50	70	40	45	5	10	
	200Y12R-S90CN10N14	200	50	90	40	55	6	12	
18-22	125H08N-S90CN12N18	125	22	60	40	32.5	4	8	CN.. 1205..
	125Y08R-S90CN12N18		50	60	32	32.5	4	8	
	160H10N-S90CN12N18	160	22	63	40	48.5	5	10	
	160Y10R-S90CN12N18		50	70	40	45	5	10	
	200J12N-S90CN12N18	200	22	75	50	62.5	6	12	
	200Y12R-S90CN12N18		50	90	40	55	6	12	

Ordering example: 1 piece 125H08N-S90CN10N14

Supply details: cutter body and insert clamping screws

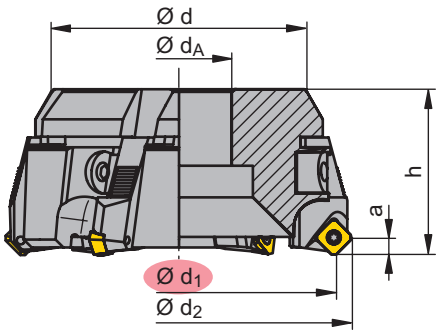
z = effective number of teeth for the calculation of the feed rate
n = number of inserts

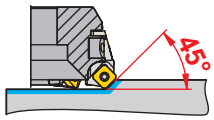
	d_1 [mm]			
CN.. 1005..	**125 - 200**	MS 1273/M4X11,5	MS 1308/M5X11,7	K-CN1014-L/K
CN.. 1205..	**125 - 200**	MS 1273/M4X11,5	MS 1309/M5X15,8	K-CN1218-L/K

B190-B193 B240 B241 B47









d_1 [mm]	Type, description	d_2 [mm]	h [mm]	d [mm]	d_A [mm]	a [mm]	[kg]	z	
80	A260.08.R.05/041	88.4	52	66	27	4	1.33	5	SD/XD.. 0903..
100	A260.10.R.06/041	108.4	52	86	32	4	1.94	6	
123	A260.12.R.07/041	131.4	63	95	40	4	3.49	7	
158	A260.16.R.10/041	166.4	63	130	40	4	6.04	10	
198	A260.20.R.12/041	206.4	63	172	60	4	9.91	12	
248	A260.25.R.14/041	256.4	63	222	60	4	16.74	14	
313	A260.31.R.18/041	321.4	80	280	60	4	31.51	18	
398	A260.40.R.22/041	406.4	80	365	60	4	67.57	22	
80	A260.08.R.05/031	94.5	52	66	27	6	1.31	5	SD/XD.. 1204..
100	A260.10.R.06/031	114.5	52	86	32	6	1.93	6	
123	A260.12.R.07/031	137.5	63	95	40	6	3.47	7	
158	A260.16.R.10/031	172.5	63	130	40	6	6.02	10	
198	A260.20.R.12/031	212.5	63	172	60	6	9.88	12	
248	A260.25.R.14/031	262.5	63	222	60	6	16.71	14	
313	A260.31.R.18/031	327.5	80	280	60	6	31.45	18	
398	A260.40.R.22/031	412.5	80	365	60	6	67.51	22	

Ordering example: 1 piece A260.08.R.05/041

Supply details: cutter body, cassettes, clamping screws, wedges, insert clamping screws, S4 clamping key, eccentric key

	d_1 [mm]				
SD/XD.. 0903..	**80 - 398**	7883203/M3,0X7,3/T08	7818044/M8X21/R-L	7818043/K	DMSD 1,2Nm/SORT T08
SD/XD.. 1204..	**80 - 398**	7822114/M4,5X10,5/T20	7818044/M8X21/R-L	7818043/K	DMSD 4,0Nm/SORT T20

7724106/TORX T08	S4/SW4	7818048/EXZS
7724104/TORX T20	S4/SW4	7818048/EXZS

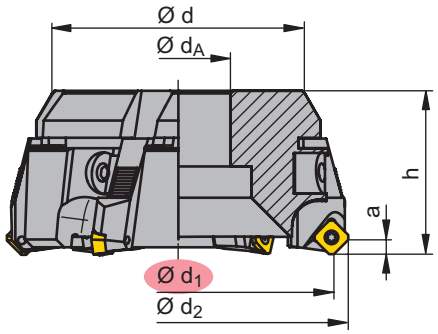
B190-B193 B238 B242-B246 B64 B78 **7818.../KA** B169

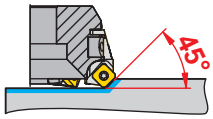
Face milling cutters

A260-029/-032









d1 [mm]	Type, description	d2 [mm]	h [mm]	d [mm]	dA [mm]	a [mm]	[kg]	z	
80	A260.08.R.05/029	93	52	66	27	6	1.30	5	SE.. 1204..
100	A260.10.R.06/029	113	52	86	32	6	1.91	6	
123	A260.12.R.07/029	136	63	95	40	6	3.46	7	
158	A260.16.R.10/029	171	63	130	40	6	5.99	10	
198	A260.20.R.12/029	211	63	172	60	6	9.85	12	
248	A260.25.R.14/029	261	63	222	60	6	16.67	14	
313	A260.31.R.18/029	326	80	280	60	6	31.41	18	
398	A260.40.R.22/029	411	80	365	60	6	67.45	22	
75	A260.08.R.05/032	94	52	66	27	9	1.31	5	SD.. 1504..
95	A260.10.R.06/032	114	52	86	32	9	1.77	6	
118	A260.12.R.07/032	137	63	95	40	9	3.37	7	
153	A260.16.R.10/032	172	63	130	40	9	5.83	10	
193	A260.20.R.12/032	212	63	172	60	9	12.67	12	
243	A260.25.R.14/032	262	63	222	60	9	16.35	14	
308	A260.31.R.18/032	327	80	280	60	9	32.15	18	
393	A260.40.R.22/032	412	80	365	60	9	52.07	22	

Ordering example: 1 piece A260.08.R.05/029

Supply details: cutter body, cassettes, clamping screws, wedges, insert clamping screws, S4 clamping key, eccentric key

	d1 [mm]				
SE.. 1204..	**80 - 398**	7822114/M4,5X10,5/T20	7724104/TORX T20	DMSD 4,0Nm/SORT T20	7818044/M8X21/R-L
SD.. 1504..	**75 - 393**	7822114/M4,5X10,5/T20	7724104/TORX T20	DMSD 4,0Nm/SORT T20	7818044/M8X21/R-L

S4/SW4	7818043/K	7818048/EXZS
S4/SW4	7818043/K	7818048/EXZS


B190-B193


B238


B242-B246

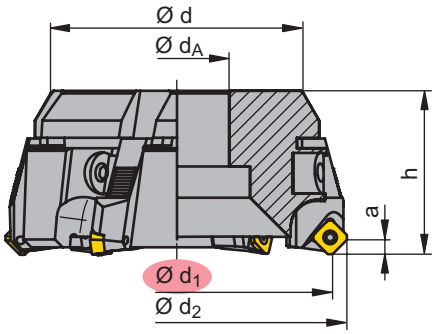

B62

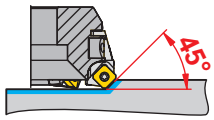
7818.../KA


B169









d_1 [mm]	Type, description	d_2 [mm]	h [mm]	d [mm]	d_A [mm]	a [mm]	[kg]	z	
77	A260.08.R.05/058	93	56	66	27	8.4	1.39	5	SAKU 1706..
97	A260.10.R.06/058	113	56	86	32	8.4	2.01	6	
120	A260.12.R.07/058	136	67	95	40	8.4	3.55	7	
155	A260.16.R.10/058	171	67	130	40	8.4	6.09	10	
195	A260.20.R.12/058	211	67	172	60	8.4	9.96	12	
245	A260.25.R.14/058	261	67	222	60	8.4	16.79	14	
310	A260.31.R.18/058	326	84	280	60	8.4	31.53	18	
395	A260.40.R.22/058	411	84	365	60	8.4	67.98	22	

Ordering example: 1 piece A260.08.R.05/058

Supply details: cutter body, cassettes, clamping screws, wedges, insert clamping screws, S4 clamping key, eccentric key

	d_1 [mm]				
SAKU 1706..	**77 - 395**	10000155/M5,0X14/T20	7724104/TORX T20	DMSD 5,0Nm/SORT T20	S4/SW4

7818048/EXZS	7818043/K	7818044/M8X21/R-L

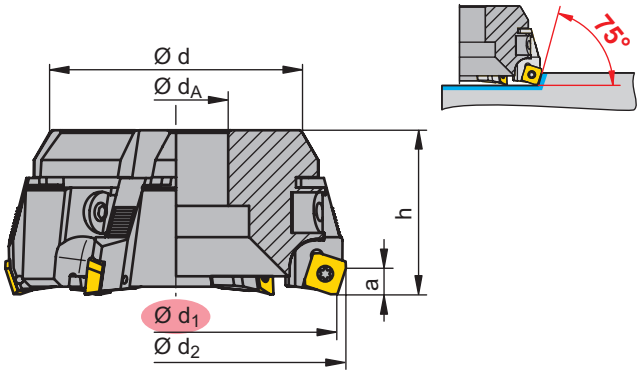
B190-B193 B238 B242-B246 B62 **7818.../KA** B169

Face milling cutters

A260-018







d1 [mm]	Type, description	d2 [mm]	h [mm]	d [mm]	dA [mm]	a [mm]	[kg]	z	
82	A260.08.R.05/018	88	52	66	27	9	1.31	5	SP.. 1204..
102	A260.10.R.06/018	108	52	86	32	9	1.92	6	
125	A260.12.R.07/018	131	63	95	40	9	3.47	7	
160	A260.16.R.10/018	166	63	130	40	9	6.01	10	
200	A260.20.R.12/018	206	63	172	60	9	9.87	12	
250	A260.25.R.14/018	256	63	222	60	9	16.69	14	
315	A260.31.R.18/018	321	80	280	60	9	31.44	18	
400	A260.40.R.22/018	406	80	365	60	9	67.49	22	

Ordering example: 1 piece A260.08.R.05/018

Supply details: cutter body, cassettes, clamping screws, wedges, insert clamping screws, S4 clamping key, eccentric key

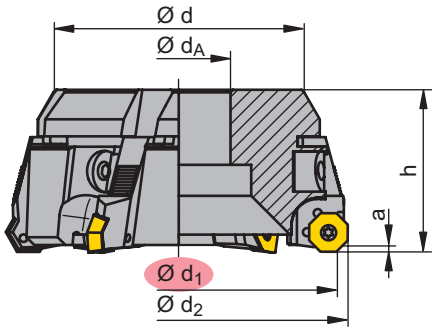
	d1 [mm]				
SP.. 1204..	**82 - 400**	7822114/M4,5X10,5/T20	7724104/TORX T20	DMSD 4,0Nm/SORT T20	7818044/M8X21/R-L

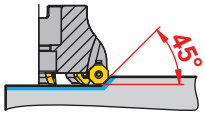
S4/SW4	7818043/K	7818048/EXZS

B190-B193 B238 B242-B246 B66 B78 7818.../KA B169









d_1 [mm]	Type, description	d_2 [mm]	h [mm]	d [mm]	d_A [mm]	a [mm]	[kg]	z	
82	A260.08.R.05/057	92.2	54	66	27	3.5	1.52	5	OAKU 06..
102	A260.10.R.06/057	112.2	54	86	32	3.5	1.90	6	
125	A260.12.R.07/057	135.2	65	95	40	3.5	3.48	7	
160	A260.16.R.10/057	170.2	65	130	40	3.5	5.98	10	
200	A260.20.R.12/057	210.2	65	172	60	3.5	9.75	12	
250	A260.25.R.14/057	260.2	65	222	60	3.5	15.69	14	
315	A260.31.R.18/057	325.2	82	280	60	3.5	31.38	18	
400	A260.40.R.22/057	410.2	82	365	60	3.5	67.33	22	

Ordering example: 1 piece A260.08.R.05/057

Supply details: cutter body, cassettes, clamping screws, wedges, insert clamping screws, S4 clamping key, eccentric key

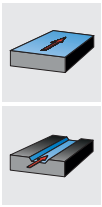
	d_1 [mm]				
OAKU 06..	**82 - 400**	10000155/M5,0X14/T20	7724104/TORX T20	DMSD 5,0Nm/SORT T20	S4/SW4

7818044/M8X21/R-L	7818043/K	7818048/EXZS

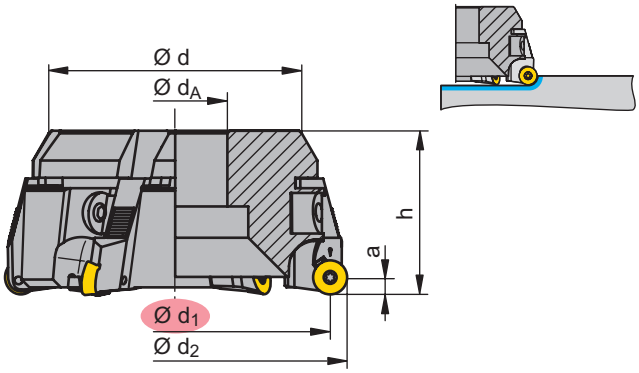
B190-B193 B238 B242-B246 B56 B78 **7818.../KA** B169

Button insert cutters

A260-052/-053







d_1 [mm]	Type, description	d_2 [mm]	h [mm]	d [mm]	d_A [mm]	a [mm]	[kg]	z	
80	A260.08.R.05/052	92	52	66	27	6	1.33	5	RP.. 1204..
100	A260.10.R.06/052	112	52	86	32	6	1.94	6	
123	A260.12.R.07/052	134	63	95	40	6	3.49	7	
158	A260.16.R.10/052	170	63	130	40	6	6.04	10	
198	A260.20.R.12/052	210	63	172	60	6	9.91	12	
248	A260.25.R.14/052	260	63	222	60	6	16.74	14	
313	A260.31.R.18/052	325	80	280	60	6	31.51	18	
398	A260.40.R.22/052	410	80	365	60	6	67.56	22	
80	A260.08.R.05/053	96	52	66	27	8	1.30	5	RP.. 1605..
100	A260.10.R.06/053	116	52	86	32	8	1.92	6	
123	A260.12.R.07/053	139	63	95	40	8	3.46	7	
158	A260.16.R.10/053	174	63	130	40	8	6.00	10	
198	A260.20.R.12/053	214	63	172	60	8	9.86	12	
248	A260.25.R.14/053	264	63	222	60	8	16.68	14	
313	A260.31.R.18/053	329	80	280	60	8	31.43	18	
398	A260.40.R.22/053	414	80	365	60	8	67.47	22	

Ordering example: 1 piece A260.08.R.05/052

Supply details: cutter body, cassettes, clamping screws, wedges, insert clamping screws, S4 clamping key, eccentric key

	d_1 [mm]				
RP.. 1204..	**80 - 398**	7883209/M3,5X8,6/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15	7818044/M8X21/R-L
RP.. 1605..	**80 - 398**	7822114/M4,5X10,5/T20	7724104/TORX T20	DMSD 4,0Nm/SORT T20	7818044/M8X21/R-L

S4/SW4	7818043/K	7818048/EXZS
S4/SW4	7818043/K	7818048/EXZS


B190-B193


B238


B242-B246

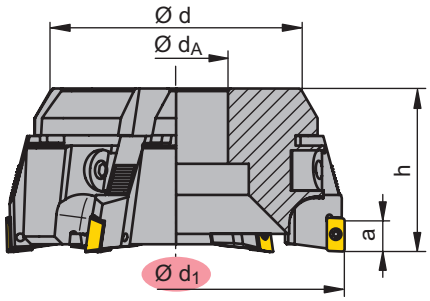

B58

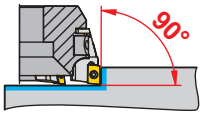
7818.../KA


B169









d_1 [mm]	Type, description	h [mm]	d [mm]	d_A [mm]	a [mm]		[kg]	z	
89	A260.08.R.05/054	52	66	27	10		1.33	5	
109	A260.10.R.06/054	52	89	32	10		1.95	6	
132	A260.12.R.07/054	63	95	40	10		3.50	7	
167	A260.16.R.10/054	63	130	40	10		6.05	10	XD.. 11..
207	A260.20.R.12/054	63	172	60	10		9.92	12	
257	A260.25.R.14/054	63	222	60	10		16.76	14	
322	A260.31.R.18/054	80	280	60	10		31.53	18	
407	A260.40.R.22/054	80	365	60	10		67.59	22	
89	A260.08.R.05/056	52	66	27	14		1.33	5	
109	A260.10.R.06/056	52	89	32	14		1.95	6	
132	A260.12.R.07/056	63	95	40	14		3.50	7	
167	A260.16.R.10/056	63	130	40	14		6.05	10	XD.. 15..
207	A260.20.R.12/056	63	172	60	14		9.92	12	
257	A260.25.R.14/056	63	222	60	14		16.76	14	
322	A260.31.R.18/056	80	280	60	14		31.53	18	
407	A260.40.R.22/056	80	365	60	14		67.59	22	

Ordering example: 1 piece A260.08.R.05/054

Supply details: cutter body, cassettes, clamping screws, wedges, insert clamping screws, S4 clamping key, eccentric key

	d_1 [mm]				
XD.. 11..	**89 - 407**	10000125/M2,5X7,3/08TP	10000276/TORX 08IP	DMSD 1,6Nm/SORT 08IP	7818044/M8X21/R-L
XD.. 15..	**89 - 407**	10006887/M3,5X8,6/15IP	10006919/TORX 15IP	DMSD 3,2Nm/SORT 15IP	7818044/M8X21/R-L

S4/SW4	7818043/K	7818048/EXZS
S4/SW4	7818043/K	7818048/EXZS


B190-B193


B236


B238


B242-B246


B71-B73

7818.../KA

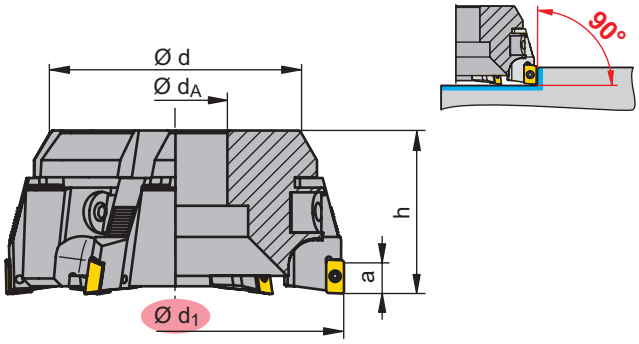

B169

Shoulder & slot milling cutters

A260-042/-051







d1 [mm]	Type, description	h [mm]	d [mm]	dA [mm]	a [mm]		[kg]	z	
89	A260.08.R.05/042	52	66	27	8		1.33	5	AP.. 1003..
109	A260.10.R.06/042	52	86	32	8		1.94	6	
132	A260.12.R.07/042	63	95	40	8		3.49	7	
167	A260.16.R.10/042	63	130	40	8		6.04	10	
207	A260.20.R.12/042	63	172	60	8		9.91	12	
257	A260.25.R.14/042	63	222	60	8		16.74	14	
322	A260.31.R.18/042	80	280	60	8		31.50	18	
407	A260.40.R.22/042	80	365	60	8		67.56	22	
89	A260.08.R.05/051	52	66	27	14		1.32	5	LD.. 1504..
109	A260.10.R.06/051	52	86	32	14		1.94	6	
132	A260.12.R.07/051	63	95	40	14		3.49	7	
167	A260.16.R.10/051	63	130	40	14		6.04	10	
207	A260.20.R.12/051	63	172	60	14		9.90	12	
257	A260.25.R.14/051	63	222	60	14		16.74	14	
322	A260.31.R.18/051	80	280	60	14		31.50	18	
407	A260.40.R.22/051	80	365	60	14		67.56	22	

Ordering example: 1 piece A260.08.R.05/042

Supply details: cutter body, cassettes, clamping screws, wedges, insert clamping screws, S4 clamping key, eccentric key

	d1 [mm]				
AP.. 1003..	**89 - 407**	7815101/M2,5X6,0/T08	7724106/TORX T08	DMSD 1,2Nm/SORT T08	7818044/M8X21/R-L
LD.. 1504..	**89 - 407**	7883209/M3,5X8,6/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15	7818044/M8X21/R-L

S4/SW4	7818043/K	7818048/EXZS
S4/SW4	7818043/K	7818048/EXZS


B190-B193


B236

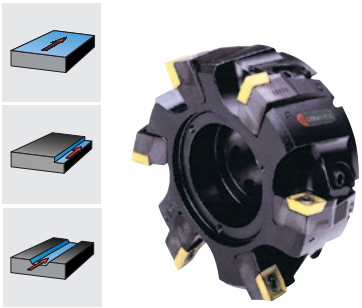

B238

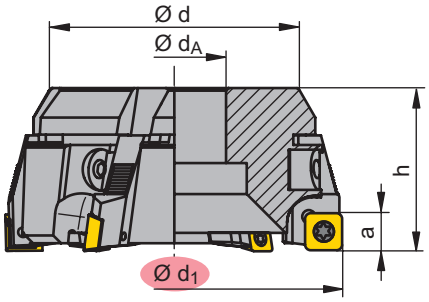

B242-B246

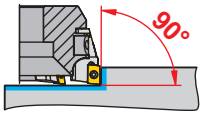

B46+B51

7818.../KA


B169







d_1 [mm]	Type, description	h [mm]	d [mm]	d_A [mm]	a [mm]		[kg]	z	
89	A260.08.R.05/055	52	66	27	8		1.34	5	SD.. 09T3..
109	A260.10.R.06/055	52	86	32	8		1.96	6	
132	A260.12.R.07/055	63	95	40	8		3.51	7	
167	A260.16.R.10/055	63	130	40	8		6.07	10	
207	A260.20.R.12/055	63	172	60	8		9.94	12	
257	A260.25.R.14/055	63	222	60	8		16.78	14	
322	A260.31.R.18/055	80	280	60	8		31.55	18	
407	A260.40.R.22/055	80	365	60	8		67.62	22	
89	A260.08.R.05/039	52	66	27	12		1.32	5	SD.. 1205..
109	A260.10.R.06/039	52	86	32	12		1.94	6	
132	A260.12.R.07/039	63	95	40	12		3.48	7	
167	A260.16.R.10/039	63	130	40	12		6.03	10	
207	A260.20.R.12/039	63	172	60	12		9.89	12	
257	A260.25.R.14/039	63	222	60	12		16.73	14	
322	A260.31.R.18/039	80	280	60	12		31.49	18	
407	A260.40.R.22/039	80	365	60	12		67.54	22	

Ordering example: 1 piece A260.08.R.05/055

Supply details: cutter body, cassettes, clamping screws, wedges, insert clamping screws, S4 clamping key, eccentric key

	d_1 [mm]				
SD.. 09T3..	**89 - 407**	7722111/M3,5X7,2/T15	7724103/TORX T15	DMSD 3,2Nm/SORT T15	7818044/M8X21/R-L
SD.. 1205..	**89 - 407**	7822114/M4,5X10,5/T20	7724104/TORX T20	DMSD 4,0Nm/SORT T20	7818044/M8X21/R-L

S4/SW4	7818043/K	7818048/EXZS
S4/SW4	7818043/K	7818048/EXZS

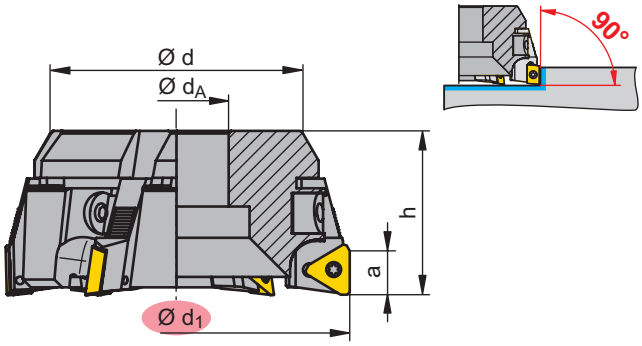
B190-B193 B238 B242-B246 B63 **7818.../KA** B169

Shoulder & slot milling cutters

A260-025







d_1 [mm]	Type, description	h [mm]	d [mm]	d_A [mm]	a [mm]		[kg]	z	
89	A260.08.R.05/025	52	66	27	18		1.31	5	
109	A260.10.R.06/025	52	86	32	18		1.93	6	
132	A260.12.R.07/025	63	95	40	18		3.47	7	
167	A260.16.R.10/025	63	130	40	18		6.02	10	TP.. 2204..
207	A260.20.R.12/025	63	172	60	18		9.88	12	
257	A260.25.R.14/025	63	222	60	18		16.71	14	
322	A260.31.R.18/025	80	280	60	18		31.46	18	
407	A260.40.R.22/025	80	365	60	18		67.51	22	

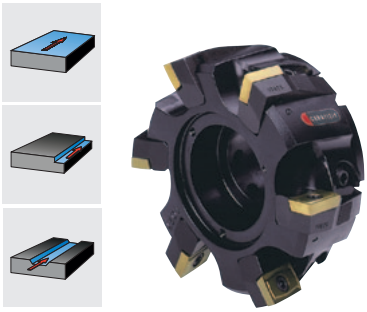
Ordering example: 1 piece A260.08.R.05/025

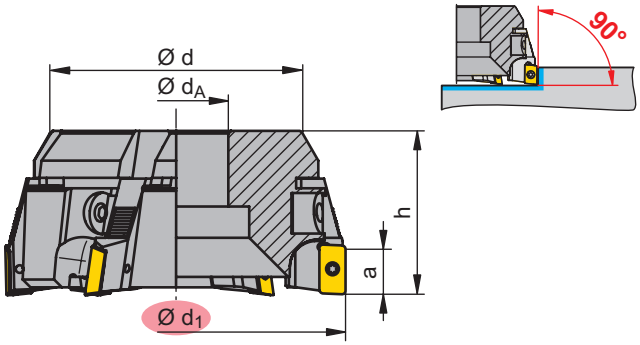
Supply details: cutter body, cassettes, clamping screws, wedges, insert clamping screws, S4 clamping key, eccentric key

	d_1 [mm]				
TP.. 2204..	**89 - 407**	7822114/M4,5X10,5/T20	7724104/TORX T20	DMSD 4,0Nm/SORT T20	7818044/M8X21/R-L

S4/SW4	7818043/K	7818048/EXZS

B190-B193 B238 B242-B246 B68 **7818.../KA** B169





d_1 [mm]	Type, description	h [mm]	d [mm]	d_A [mm]	a [mm]		[kg]	z	
89	A260.08.R.05/026	52	66	27	18		1.31	5	
109	A260.10.R.06/026	52	86	32	18		1.93	6	
132	A260.12.R.07/026	63	95	40	18		3.47	7	
167	A260.16.R.10/026	63	130	40	18		6.02	10	LP.. 2004..
207	A260.20.R.12/026	63	172	60	18		9.88	12	
257	A260.25.R.14/026	63	222	60	18		16.71	14	
322	A260.31.R.18/026	80	280	60	18		31.46	18	
407	A260.40.R.22/026	80	365	60	18		67.51	22	

Ordering example: 1 piece A260.08.R.05/026

Supply details: cutter body, cassettes, clamping screws, wedges, insert clamping screws, S4 clamping key, eccentric key

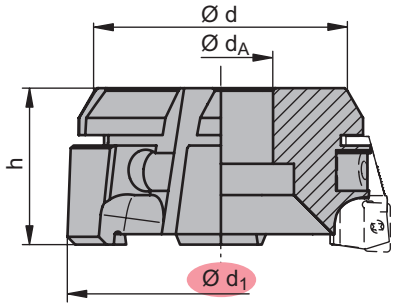
	d_1 [mm]				
LP.. 2004..	**89 - 407**	7822114/M4,5X10,5/T20	7724104/TORX T20	DMSD 4,0Nm/SORT T20	7818044/M8X21/R-L

S4/SW4	7818043/K	7818048/EXZS

B190-B193 B238 B242-B246 B55 **7818.../KA** B169

Cutter bodies





d_1 [mm]	Type, description	d [mm]	h [mm]	d_A [mm]			[kg]		
80	A260.08.R.05	66	49	27			0.97		
98	A260.10.R.06	86	49	32			1.52		
119	A260.12.R.07	95	60	40			2.99		
154	A260.16.R.10	130	60	40			5.33		
194	A260.20.R.12	172	60	60			9.05		
244	A260.25.R.14	222	60	60			15.75		
309	A260.31.R.18	280	77	60			30.23		
394	A260.40.R.22	365	77	60			66.00		

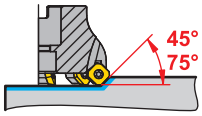
Ordering example: 1 piece A260.08.R.05

Supply details: cutter body, clamping screws, wedges, S4 clamping key, eccentric key.
Without inserts and cassettes.

	d_1 [mm]				
78180..	**80 - 394**	7818044/M8X21/R-L	7818043/K	7818048/EXZS	S4/SW4

Cassettes for system 260

Cassettes for face milling

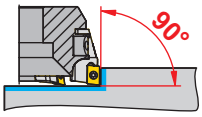


7818...



041 031 029 032 018 052 053 057 058

Cassettes for shoulder milling



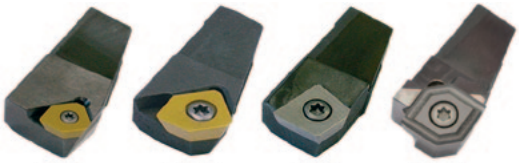
7818...



054 056 055 039 051 025 026

Cassettes for finishing

7818...



041 031 018 057

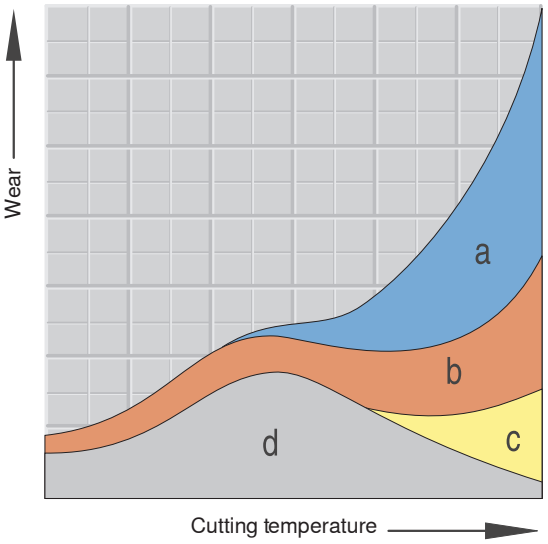
B177

Type, description	Assembled cutter	Diameter range		
7818041/KA	270-09	80-398	SD.. 0903..	B157
7818031/KA	270-12	80-398	SD.. 1204..	B157
7818029/KA	x	80-398	SE.. 1204..	B158
7818032/KA	270-15	75-393	SD.. 1504..	B158
7818018/KA	x	82-400	SP.. 1204..	B160
7818052/KA	251-12	82-398	RP.. 1204..	B162
7818053/KA	251-16	76-394	RP.. 1605..	B162
7818054/KA	211-11/HSC-11	89-407	XD_T 11T3	B163
7818039/KA	490-12	89-407	SD.. 1205..	B165
7818055/KA	490-09	89-407	SD.. 09T3..	B165
7818051/KA	241-15	89-407	LD.. 1504..	B164
7818025/KA	x	89-407	TPKW 2204..	B166
7818026/KA	x	89-407	LPH.. 2004..	B167
7818056/KA	211-15	89-407	XD_T 1505	B163
7818057/KA	273-06	80-398	OAKU 06..	B161
7818058/KA	271-17	77-395	SAKU 17..	B159

Causes of wear

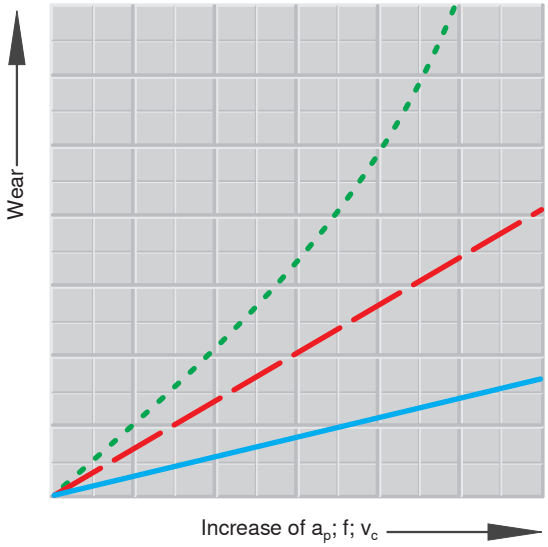
Wear is caused through simultaneous mechanical and thermal stress of the cutting edge.
The most common causes are:

> Mechanical abrasion
> Damage due to built-up edge (BUE)
> Oxidation processes
> Diffusion



a = diffusion
b = mechanical abrasion
c = oxidation
d = damage due to built-up edge (BUE)

With increasing cutting temperature the thermally caused wear types of oxidation and diffusion prevail.



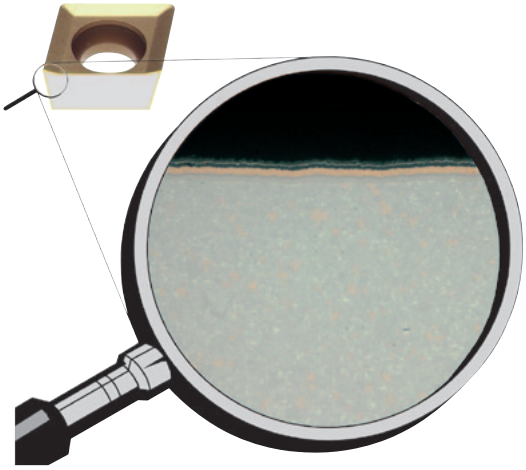
Cutting temperature and wear depend decisively upon the machining conditions.

Benefits of hard material coatings

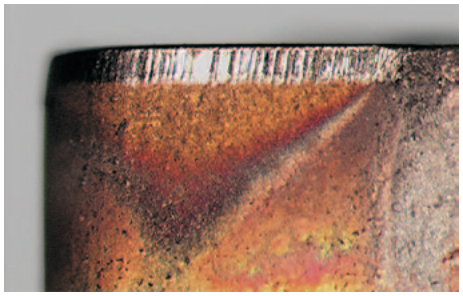
Depositing hard material layers on carbide tools positively influences wear characteristics.

The advantages of hard material layers consist in the reduction of:

> Friction
> Temperature changes
> Oxidation
> Diffusion



Flank wear



Abrasion on flank, normal wear after a certain machining time.

Reasons:
> Cutting speed too high
> Carbide grade with insufficient wear resistance
> Incorrect feed rate

Remedies:
> Reduce cutting speed
> Select more wear resistant carbide grade
> Adapt feed rate to cutting speed and cutting depth (increase feed rate)

Edge chipping

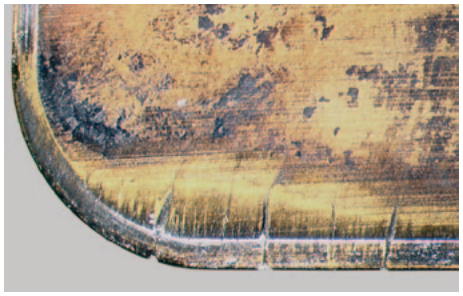


Through excessive mechanical stress at the cutting edge fracture and chipping can occur.

Reasons:
> Grade with too high wear resistance
> Vibration
> Feed rate too high or too large cutting depth
> Built-up edge, chip clogging
> Cutting edge geometry too positive

Remedies:
> Use tougher grade
> Use negative cutting edge geometry with chip groove
> Improve stability (tool, work piece)
> Increase cutting speed
> Reduce feed rate

Thermal cracking



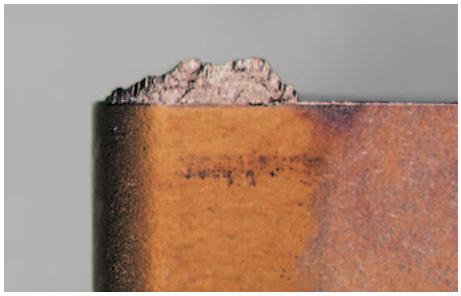
Small cracks at 90° to cutting edge.

Reasons:
> Varying temperature of cutting edge, thermal shock
> Incorrect cooling
> High tensile materials
> Cutting speed too high

Remedies:
> Use grade that is resistant to thermal cracking
> Apply cooling lubricant abundantly or use dry milling
> Reduce cutting speed
> Decrease feed rate

Types of wear

Built-up edge



Built-up edge occurs when the chip is not evacuated properly due to insufficient cutting temperature.

Reasons:
> Too low cutting speed
> Too small rake angle
> Wrong cutting material
> Lack of cooling / lubrication

Remedies:
> Increase cutting speed
> Enlarge rake angle
> Apply TiN-coating
> Use emulsion with higher concentration

Notching

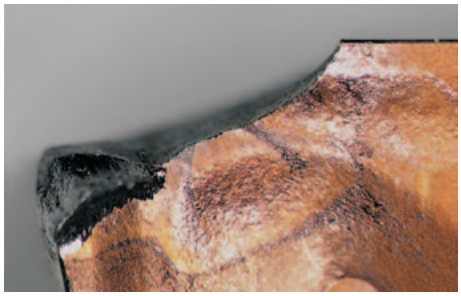


Notch at the maximum cutting depth.

Reasons:
> Cold work hardening materials (e.g. super alloys)
> Cast and forging skin
> Formation of burrs

Remedies:
> Decrease cutting speed
> Climb milling
> Change working orientation of the milling cutter
> Reduce approach angle

Insert breakage



Excessive stress of the insert causes breakage.

Reasons:
> Excessive stress of the carbide grade
> Lack of stability
> Corner angle too small
> Excessive notching
> Sudden changes of cutting forces

Remedies:
> Use tougher cutting material
> Use protective edge chamfer
> Increase edge hone
> Use more stable geometry
> Reduce feed rate

Cratering

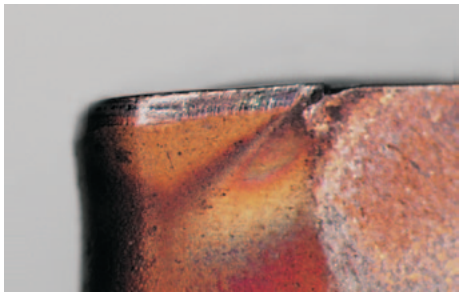


The hot chip which is being evacuated causes cratering at the rake face of the cutting edge.

Reasons:
> Cutting speed and / or feed rate too high
> Rake angle too shallow
> Grade with low wear resistance
> Insufficient coolant supply

Remedies:
> Reduce cutting speed and / or feed rate
> Increase coolant quantity and / or pressure, optimize coolant supply
> Use grade with higher resistance to cratering

Plastic deformation



High machining temperature and simultaneous mechanical stress can lead to plastic deformation.

Reasons:
> Too high machining temperature, resulting in softening of substrate
> Damaged coatings

Remedies:
> Reduce cutting speed
> Choose carbide grade with higher wear resistance
> Provide cooling

Measures for milling problems

Type of problem												Corrective measures
Flank wear	Edge chipping	Thermal cracks	Built-up edge	Notching	Insert breakage, edge chipping	Cratering	Deformation of cutting edge	Bad work piece surface	Chattering, vibration	Chip formation, chip jamming	Edge chipping on the work piece	Overstress of the machine	
↓	↑	↓	↑	↓		↓	↓	↑	~			↓	Cutting speed
↑	↓	↓	↑	↓	↓	↓	↓	↓	~		↓	↓	Feed rate per tooth
	↑	~		↑	↑								Toughness of cutting material
↑				~		↑	↑~						Wear resistance of cutting material
		↓	~	↓					↓	~	↓	↓	Approach angle
	~		↑~	~	~		↑~		↑	~			Rake angle
	↑		~	↑				↓			↓		Cutting edge facet
	↑				↑			↑	↑				Stability
								↑	↑		~		Precision of axial & radial run-out
~	~				~		~	~			~		Wear of cutting edge
					~			~	~		~		Positioning of the milling tool
		↑	↑	↑		↑	~	~		~			Cooling, chip removal
					~			~	~				Insert, cassette clamping
	~			~	~			~	~		↓	↓	Depth of cut

↑ raise, increase

↓ lower, decrease

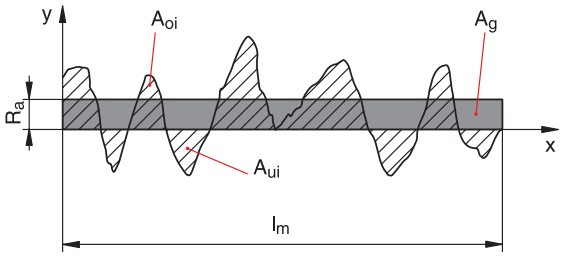
~ check, optimize

Definition of measured variables for surface quality

The surface quality of milled work pieces is influenced through
> the machine tool (condition, stability)
> the milling tool (cutting edge geometry, construction)
> the application data (v_f, v_c, f_z)
> the work piece (geometry, material, clamping)

The *average roughness value* R_a is the arithmetical mean of the roughness profile within the entire measured length l_m.

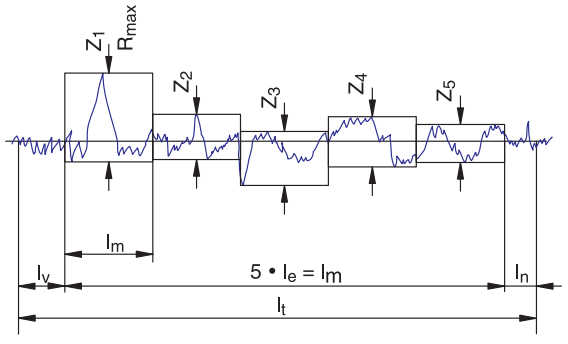
$$R_a = \frac{1}{l_m} \int_{x=0}^{x=l_m} |y| \, dx$$



Average roughness value R_a

Average roughness depth R_z is the arithmetic mean resulting from the single roughness depths Z_i of five successive single measured lengths.

$$R_z = \frac{\sum_{i=1}^{5} Z_i}{5}$$



Determination of the average roughness depth R_z from the roughness profile

Maximum roughness depth R_{max} is the largest single roughness depth Z_i on the measured length l_m.

In order to produce an excellent surface finish with insert milling cutters, inserts with wiper facets are employed.

Maximum profile depth P_t

f [mm]	l_1 [mm]				
	1,0	1,4	1,6	2,5	9,0
0,3	0,5	0,5	0,5	0,5	0,5
0,45	0,8	0,8	0,8	0,8	0,8
0,6	1,0	1,0	1,0	1,0	1,0
0,75	1,3	1,3	1,3	1,3	1,3
1,0	1,7	1,7	1,7	1,7	1,7
1,5	20,0	5,0	2,7	2,7	2,7
2,0	30,0	19,0	13,0	4,0	4,0
2,5	37,0	27,0	23,0	6,4	4,4
3,0	40,0	33,0	29,0	12,0	5,0

f [mm]	l_1 [mm]				
	1,0	1,4	1,6	2,5	9,0
3,5	44,0	37,0	34,0	19,0	6,0
5,0	49,0	44,0	42,0	32,0	8,7
7,5	53,0	50,0	48,0	42,0	13,0
12,0	56,0	54,0	53,0	50,0	23,0
20,0	58,0	57,0	56,0	55,0	41,0
30,0	59,0	58,0	58,0	57,0	50,0
40,0	59,0	59,0	59,0	58,0	54,0
50,0	59,0	59,0	59,0	59,0	57,0
60,0	60,0	60,0	60,0	59,0	60,0

Calculation example:

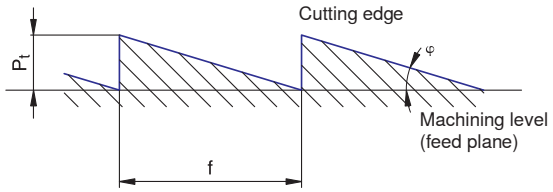
Type of cutter: A260.12.R.07
Insert: SPKW 1504AE
Cutter diameter d_1: 125 mm
Number of teeth z: 7
Feed per tooth f_z: .125 mm
Feed per revolution f: .875 mm
Facet length l_1: ≈ 2.5 mm

$f = f_z \cdot z = 0{,}125 \cdot 7 = 0.875$ mm

Maximum profile depth Pt ≈ 1.6 µm

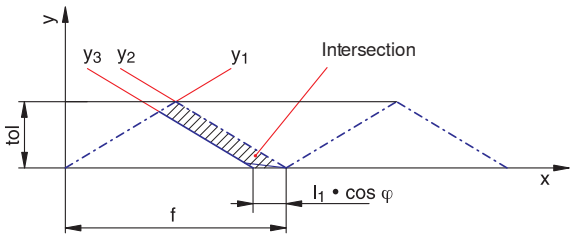
$f < l_1$:
Profile is produced by the deepest cutting edge axially.

$$P_t = f \bullet \tan(\varphi)$$



$f > l_1$:
Several cutting edges produce the surface

$$P_t = tol + l_1\left(\frac{\sin\varphi}{z} - \frac{\cos\varphi \bullet tol}{f}\right)$$



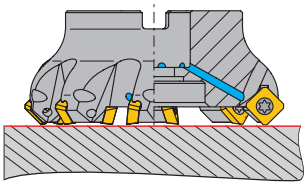
E.g.:
tol ≈ axial run-out of cutter (.04 mm) + adapter run-out (.02 mm) = .06 mm (φ ≈ 6' or .1°)

E.g.:
P_t [µm] tol* = .04 mm + .02 mm
Tool clamping
Tool clamping

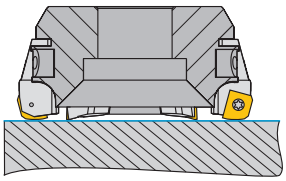
*) In most cases considerably more accurate axial run-out values will result. With .06 mm an excessive tolerance condition is assumed. If the cutting edges are precisely adjusted, the axial run-out will be negligible.

Conventional

1) Roughing

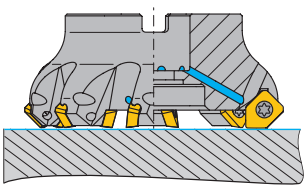


2) Finishing

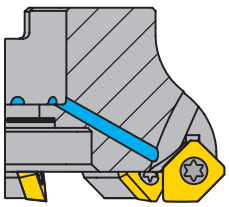
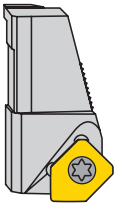
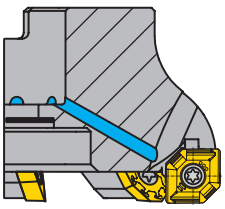
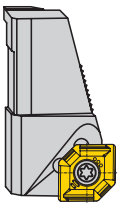
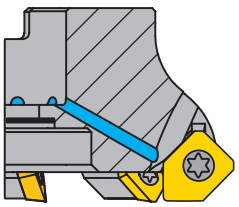
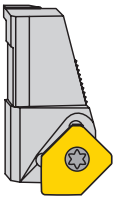


CERATIZIT MasterFinish

Roughing and finishing in a single operation

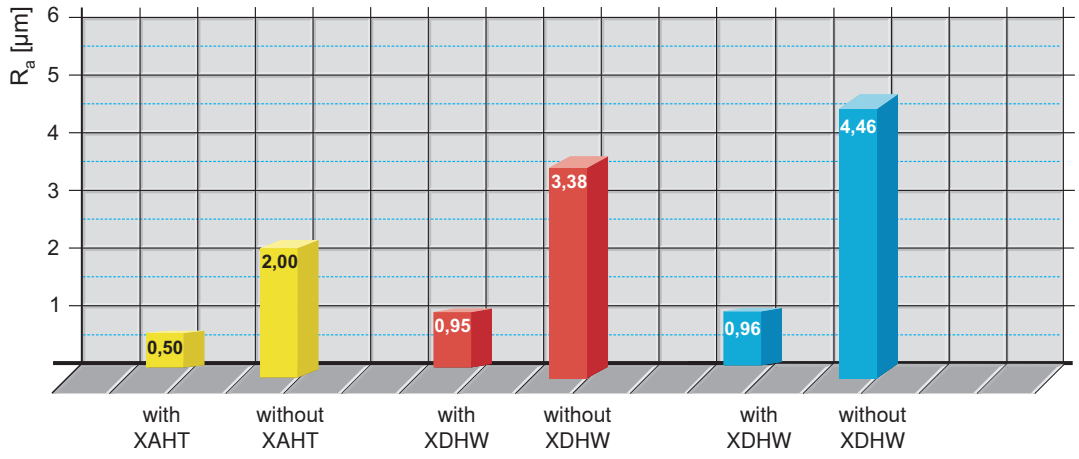


Application in the following CERATIZIT milling systems:

270-09	260-41	273-06	260-57	270-12	260-31
					
Ø 32 - 160	Ø 80 - 400	Ø 40 - 315	Ø 80 - 398	Ø 32 - 160	Ø 80 - 400
B128	B157	B135-B137	B161	B129	B157

Examples for economic application:

Finish milling with XDHW



A273.125.R.17-06
OAKU 060508SR-M50 CTP2235
XAHT 060508SR-F50 CTP2235
1.4571 (stainless, tempered steel)
X6CrNiMoTi 17 12 2
a_e = 80 mm
a_p = .5 mm
f_z = .25 mm
v_c = 200 m/min

A270.125.R.12-12
SDHT 1204AESN-R SR226+
XDHW 1204AESN SR226+
1.7225 (non alloyed, tempered steel)
42CrMo4
a_e = 96 mm
a_p = .5 mm
f_z = .25 mm
v_c = 350 m/min

A270.125.R.12-12
SDHT 1204AESN-R SR226+
XDHW 1204AESN SR226+
1.7225 (non alloyed tempered steel)
42CrMo4
a_e = 96 mm
a_p = .5 mm
f_z = .25 mm
v_c = 400 m/min

Formulas

Formulas, material designation & dimensions

www.ceratizit.com

The CERATIZIT formula collection

Cutting speed [m/min]

$$v_c = \frac{d_1 \bullet \pi \bullet n}{1000}$$

Revolutions of spindle [min^{-1}]

$$n = \frac{v_c \bullet 1000}{d_1 \bullet \pi}$$

Feed per tooth [mm]

$$f_z = \frac{v_f}{n \bullet z}$$

Feed rate [mm/min]

$$v_f = f_z \bullet n \bullet z$$

Feed per revolution [mm]

$$f = f_z \bullet z$$

Metal removal rate [cm^3/min]

$$Q = \frac{a_p \bullet a_e \bullet v_f}{1000}$$

Perpendicular rake angle [°]

$$\gamma_0 = \arctan[\cos(\kappa_r) \bullet \tan(\gamma_p) + \sin(\kappa_r) \bullet \tan(\gamma_f)]$$

Medium chip thickness [mm]:

$$h_m = \frac{\sin(\kappa) \bullet 180 \bullet a_e \bullet f_z}{\pi \bullet d_1 \bullet \arcsin\left(\frac{a_e}{d_1}\right)}$$

Specific cutting force:

$$k_c = h_m^{-mc} \bullet k_{c1.1}$$

Power consumption [kW]:

$$P_{mot} = \frac{a_p \bullet a_e \bullet v_f}{60 \bullet 10^6 \bullet \eta_m} \bullet k_c$$

Material designations & dimensions

a_e Cutting width [mm]

a_p Depth of cut [mm]

d_1 Cutter diameter [mm]

D_w Work piece diameter [mm]

f_z Feed per tooth [mm]

h_m Medium chip thickness [mm]

k Number of insert rows

k_c Specific cutting force [N/mm^2]

$k_{c1.1}$ Specific cutting force for 1 mm^2 chip cross section [N/mm^2]

l_1 Length of wiper facet [mm]

m_c Increase of specific cutting force

n Revolutions of spindle [min^{-1}]

P_{mot} Power consumption [kW]

Q Metal removal rate [cm^3]

v_c Cutting speed [m/min]

v_f Feed rate [mm/min]

z Effective numer of edges [pcs.]

η_m Mechanical efficiency [%]

γ_0 Perpendicular rake angle (effective rake angle) [°]

γ_f Lateral rake angle (radial rake anglel) [°]

γ_p Tool back clearance (axial rake angle) [°]

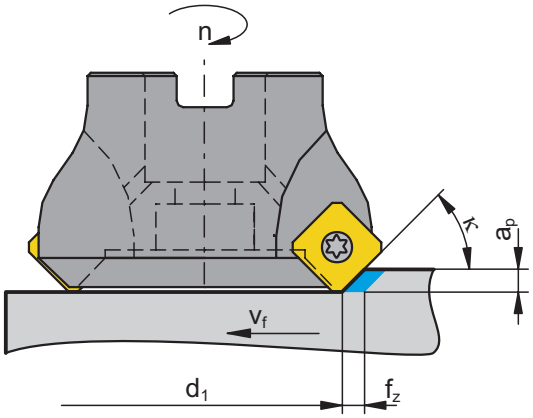
γ_w Rake angle of the insert [°]

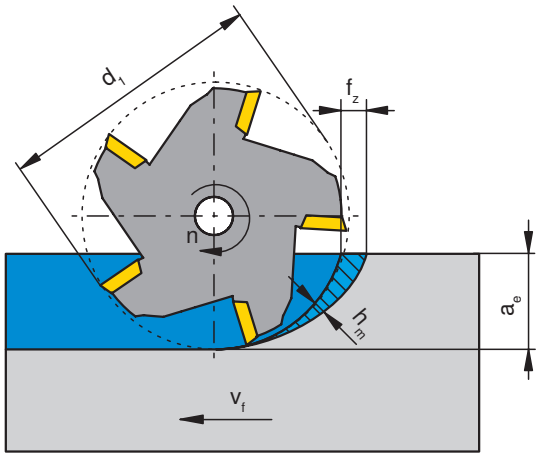
κ Cutting edge angle (approach angle) [°]

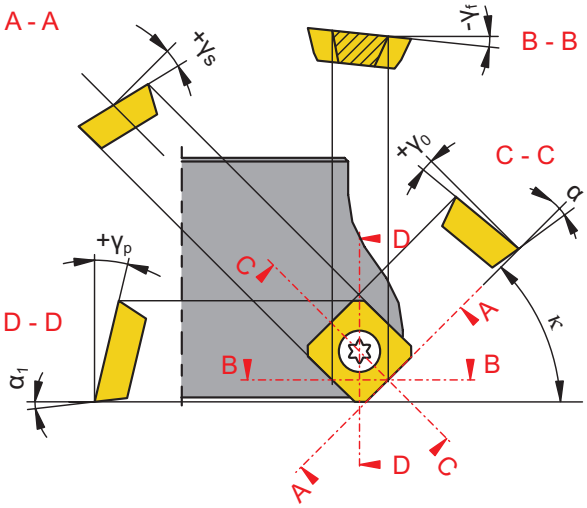
λ_s Inclination angle [°]

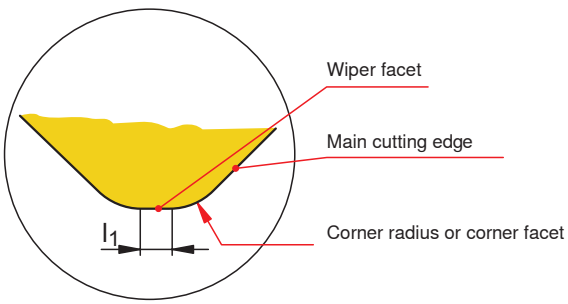
a Clearance angle [°]

a_1 Clearance angle of the corner facet [°]









Calculation example:

Cutter type: ... A270.40.R.04
Insert: ... SDMT 1204AESN-29R
Cutter diameter: ... 40 mm
Effective number of teeth: ... 4
Depth of cut a_p: ... 2 mm
Cutting width a_e: ... 28 mm
Approach angle κ: ... 45°
Axial rake angle γ_p: ... +13°
Radial rake angle γ_f: ... -6°

Selected cutting speed
v_c: ... 225 m/min

Calculation of rev number:

$$n = \frac{225 \cdot 1000}{40 \cdot \pi} = 1790 \text{ min}^{-1}$$

Selected feed per tooth ... 0.15 mm

Calculation of feed rate:

$$v_f = 0{,}15 \cdot 1790 \cdot 4 = 1074 \text{ mm/min}$$

Calculation of chip removal rate:

$$Q = \frac{2 \cdot 28 \cdot 1074}{1000} = 60 \text{ cm}^3\text{/min}$$

Calculation of the perpendicular rake angle:

$$\gamma_0 = \arctan \begin{bmatrix} \cos(90°) \cdot \tan(13°) \\ + \sin(90°) \cdot \tan(-6°) \end{bmatrix} = -6°$$

Medium chip thickness [mm]:

$$h_m = \frac{\sin(90°) \cdot 180 \cdot 28 \cdot 0{,}15}{\pi \cdot 40 \cdot \arcsin\left(\frac{28}{40}\right)} = 0{,}13 \text{ mm}$$

Specific cutting force:

$$k_c = 0{,}13^{-0{,}24} \cdot 1700 = 2774 \text{ N/mm}^2$$

Power consumption [kW]:

$$P_{mot} = \frac{2 \cdot 28 \cdot 1074}{60 \cdot 10^6 \cdot 0{,}80} \cdot 1700 = 2{,}13 \text{ kW}$$

Formulas

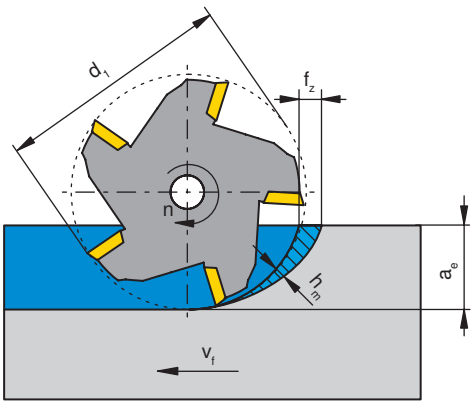
Formulas - medium chip thickness

The following equations give approximate figures in the proportion of a_e/d_1 (a_p/d_1)!

Peripheral milling cutters, side and face milling cutters

$$f_z \approx h_m \bullet \sqrt{\frac{d_1}{a_e}}$$

$$h_m \approx f_z \bullet \sqrt{\frac{a_e}{d_1}}$$



Calculation example:

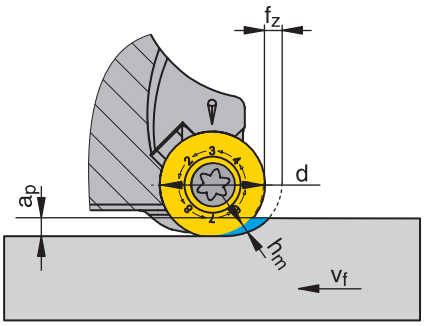
Cutter type: ... C244.25.R.02
Cutter diameter d_1: ... 25 mm
Width of cut a_e: ... 10 mm
Medium chip thickness h_m ... 0.15 mm

$$f_z \approx 0{,}15 \bullet \sqrt{\frac{25}{10}} \approx 0{,}24 \text{ mm}$$

Button insert cutters

$$f_z \approx h_m \bullet \sqrt{\frac{d}{a_p}}$$

$$h_m \approx f_z \bullet \sqrt{\frac{a_p}{d}}$$



Calculation example:

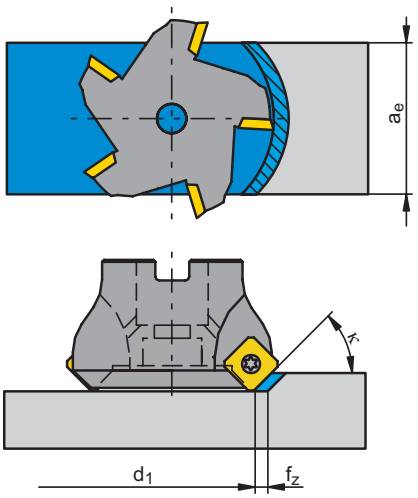
Cutter type: ... A251.63.R.06
Insert: ... RPHX 1204M0SN CTP1235
Insert diameter d: ... 12 mm
Depth of cut a_p: ... 2 mm
Requested medium chip thickness
h_m ... 0.15 mm

$$f_z \approx 0{,}15 \bullet \sqrt{\frac{12}{2}} \approx 0{,}37 \text{ mm}$$

Face milling cutter on centre above work piece

$$h_m = \frac{\sin(\kappa) \bullet 180 \bullet a_e \bullet f_z}{\pi \bullet d_1 \bullet \arcsin\left(\frac{a_e}{d_1}\right)}$$

$$f_z = \frac{h_m \bullet \pi \bullet d_1 \cdot \arcsin\left(\frac{a_e}{d_1}\right)}{\sin(\kappa) \bullet 180 \bullet a_e}$$



Calculation example:

Cutter type: ... A260.08.R.05/018
Cutter diameter d_1: ... 82 mm
Approach angle κ: ... 75°
Cutting width a_e: ... 70 mm
Medium chip thickness h_m ... 0.2 mm

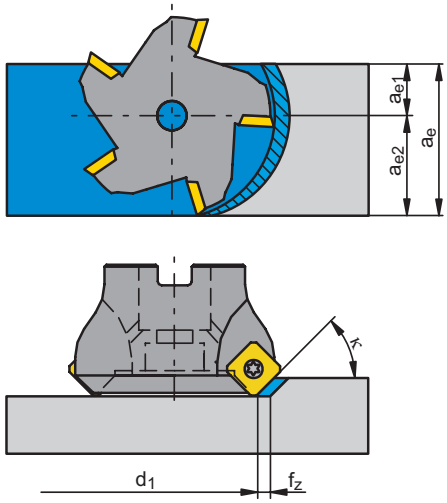
$$f_z = \frac{0{,}2 \bullet \pi \bullet 82 \bullet \arcsin\left(\frac{70}{82}\right)}{\sin(75) \cdot 180 \cdot 70}$$

f_z = 0,25 mm

Face milling cutter - off-centre above work piece

$$h_m = \frac{\sin(\kappa) \bullet 360 \bullet a_e \bullet f_z}{\pi \bullet d_1 \bullet \left[\arcsin\left(\frac{2 \bullet a_{e1}}{d_1}\right) + \arcsin\left(\frac{2 \bullet a_{e2}}{d_1}\right)\right]}$$

$$f_z = \frac{h_m \bullet \pi \bullet d_1 \bullet \left[\arcsin\left(\frac{2 \bullet a_{e1}}{d_1}\right) + \arcsin\left(\frac{2 \bullet a_{e2}}{d_1}\right)\right]}{\sin(\kappa) \bullet 360 \bullet a_e}$$



Calculation example:

Cutter type: ... A270.10.R.06/018
Cutter diameter d_1: ... 102 mm
Approach angle κ: ... 75°
Width of cut a_e: ... 70 mm
Width of cut a_{e1}: ... 20 mm
Width of cut a_{e2}: ... 50 mm
Medium chip thickness h_m ... 0.2 mm

$$f_z = \frac{0{,}2 \bullet \pi \bullet 102 \bullet \left[\arcsin\left(\frac{2 \bullet 20}{102}\right) + \arcsin\left(\frac{2 \bullet 50}{102}\right)\right]}{\sin(75°) \cdot 360 \cdot 70}$$

f_z = 0,27 mm

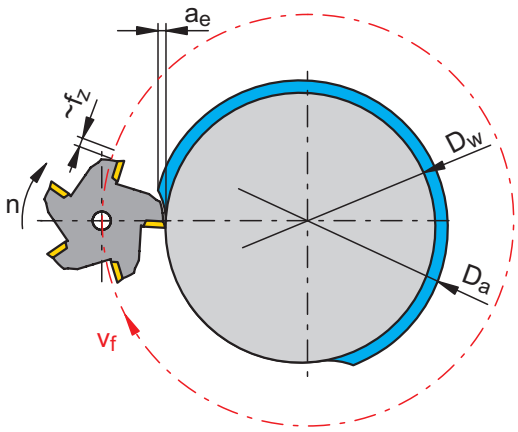
Helical milling - external

Feed rate (speed at centre of milling cutter)

$$v_f = (1+\frac{d_1}{D_w})\, n \cdot f_z \cdot z$$

Actual depth of cut

$$a_e = \frac{D_a^2 - D_w^2}{4 \bullet (D_w + d_1)}$$



Calculation example:

Cutter type: ... C210.25.R.04
Cutter diameter d_1: ... 25 mm
Number of teeth z: ... 4
Machined diameter D_w: ... 45 mm
Blank diameter D_a: ... 50 mm
Rev number n: ... 2500 rpm
Feed per tooth f_z: ... 0.05 mm

Feed rate:

$$v_f = (1+\frac{25}{45})\, 2500 \bullet 0{,}05 \bullet 4 = 777 \text{ mm/min}$$

Radial depth of cut:

(50 - 45)/2 = 2,5 mm

Effective radial depth of cut:

$$a_e = \frac{50^2 - 45^2}{4 \bullet (45 + 25)} = 1{,}7 \text{ mm}$$

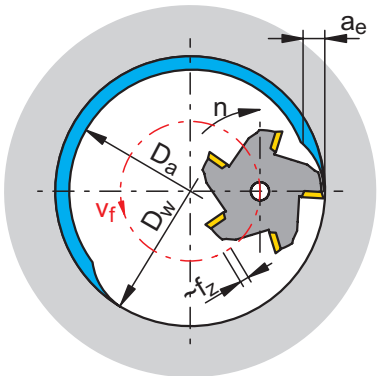
Helical milling - internal

Feed rate (speed at centre of milling cutter)

$$v_f = (1-\frac{d_1}{D_w})\, n \cdot f_z \cdot z$$

Actual depth of cut

$$a_e = \frac{D_w^2 - D_a^2}{4 \bullet (D_w + d_1)}$$



Calculation example:

Cutter type: ... C210.25.R.04
Milling cutter diameter d_1: ... 25 mm
Number of teeth z: ... 4
Machined diameter D_w: ... 50 mm
Blank diameter D_a: ... 45 mm
Rev number n: ... 2500 rpm
Feed per tooth f_z: ... 0.05 mm

Feed rate:

$$v_f = (1-\frac{25}{50})\, 2500 \bullet 0{,}05 \bullet 4 = 250 \text{ mm/min}$$

Radial depth of cut:

(50 - 45)/2 = 2,5 mm

Effective radial depth of cut:

$$a_e = \frac{50^2 - 45^2}{4 \bullet (50 - 25)} = 4{,}75 \text{ mm}$$

Tensile strength N/mm²	Vickers HV	Brinell HB	Rockwell HRC	Shore C
575	180	171		
595	185	176		
610	190	181		
625	195	185		
640	200	190	12,0	
660	205	195	13,0	
675	210	199	14,0	
690	215	204	15,0	
705	220	209	15,5	28
720	225	214	16,0	
740	230	219	17,0	29
755	235	223	18,0	
770	240	228	20,3	30
785	245	233	21,3	
800	250	238	22,2	31
820	255	242	23,1	32
835	260	247	24,0	33
850	265	252	24,8	
865	270	257	25,6	
880	275	261	26,4	34
900	280	268	27,1	
915	285	271	27,8	35
930	290	276	28,5	
950	295	280	29,2	36
965	300	285	29,8	37
995	310	295	31,0	38
1030	320	304	32,2	39
1060	330	314	33,3	40
1095	340	323	34,3	41
1125	350	333	35,5	42
1155	360	342	36,6	43
1190	370	352	37,7	44
1220	380	361	38,8	45
1255	390	371	39,8	46
1290	400	380	40,8	47
1320	410	390	41,8	48
1350	420	399	42,7	
1385	430	409	43,6	49
1420	440	418	44,5	
1455	450	428	45,3	51
1485	460	437	46,1	52
1520	470	447	46,9	53
1555	480	465	47,7	54
1595	490	466	48,4	
1630	500	475	49,1	57
1665	510	485	49,8	58
1700	520	494	50,5	59
1740	530	504	51,1	60

Tensile strength N/mm²	Vickers HV	Brinell HB	Rockwell HRC	Shore C
1775	540	513	51,7	61
1810	550	523	52,3	62
1845	560	532	53,0	63
1880	570	542	53,6	64
1920	580	551	54,1	65
1955	590	561	54,7	66
1995	600	570	55,2	67
2030	610	580	55,7	68
2070	620	589	56,3	69
2105	630	599	56,8	70
2145	640	608	57,3	71
2180	650	618	57,8	72
2210	660	628	58,3	73
2240	665	633	58,8	74
2280	670	638	59,3	
2310	675	643	59,8	75
2350	680	648	60,3	76
2380	685	653	61,1	77
2410	690	658	61,3	78
2450	695	663	61,7	79
2480	710	668	62,2	80
2520	720	678	62,6	81
2550	730	683	63,1	82
2590	740	693	63,5	
2630	750	703	63,9	83
2660	760	708	64,3	84
2700	770	718	64,7	85
2730	780	723	65,1	
2770	790	733	65,5	86
2800	800	738	65,9	
2840	810	748	66,3	87
2870	820	753	66,7	88
2910	830	763	67,0	
2940	840	768	67,4	89
2980	850		67,7	
3010	860		68,1	90
3050	870		68,4	
3080	880		68,7	91
3120	890		69,0	
3150	900		69,3	92
3190	910		69,6	
3220	920		69,9	
3260	930		70,1	

The figures given are approximate according to DIN EN ISO18265 (02-2004)

CERATIZIT hard material matters

Comparison of materials

Germany DIN	Mat. no.	United Kingdom BS	France AFNOR	Sweden SS	United States AISI	Japan JIS	$K_{c1.1}$ N/mm²	m_c	VDI 3323 group
10 SPb 20	1.0722		10 PbF 2		11 L 08		1350	.21	1
100 Cr 6	1.2067	BL 3	Y 100 C 6		L 3	SUJ2	1775	.24	6/9
105 WCr 6	1.2419		105 WC 13			SKS31	1775	.24	6/9
12 CrMo 9 10	1.7380	1501-622 Gr. 31; 45	10 CD 9.10	2218	A 182-F22	SPVA,SCMV4	1675	.24	6/7
12 Ni 19	1.5680		Z 18 N 5		2515		2450	.23	10/11
13 CrMo 4 4	1.7335	1501-620 Gr. 27	15 CD 3.5	2216	A 182-F11; F12	SPVAF12	1675	.24	6/7
14 MoV 6 3	1.7715	1503-660-440					1675	.24	6/7
14 Ni 6	1.5622		16 N 6		A 350-LF 5		1675	.24	6/7
14 NiCr 10	1.5732		14 NC 11		3415	SNC415(H)	1675	.24	6/7
14 NiCr 14	1.5752	655 M 13	12 NC 15		3310; 9314	SNC815(H)	1675	.24	6/7
14 NiCrMo 13 4	1.6657						1675	.24	6/7
15 Cr 3	1.7015	523 M 15	12 C 3		5015		1675	.24	6/7
15 CrMo 5	1.7262		12 CD 4			SCM415(H)	1675	.24	6/7
15 Mo 3	1.5415	1501-240	15 D 3	2912	A 204 Gr. A		1675	.24	6/7
16 MnCr 5	1.7131	527 M 17	16 MC 5	2511	5115	SCR415	1675	.24	6/7
16 Mo 5	1.5423	1503-245-420			4520	SB450M	1675	.24	6/7
17 CrNiMo 6	1.6587	820 A 16	18 NCD 6				1675	.24	6/7
21 NiCrMo 2	1.6523	805 M 20	20 NCD 2	2506	8620	SNCM220(H)	1725	.24	6/8
25 CrMo 4	1.7218	1717 CDS 110	25 CD 4 S	2225	4130	SM420;SCM430	1725	.24	6/8
28 Mn 6	1.1170	150 M 28	20 M 5		1330		1500	.22	2
32 CrMo 12	1.7361	722 M 24	30 CD 12	2240			1775	.24	6/9
34 Cr 4	1.7033	530 A 32	32 C 4		5132	SCR430(H)	1725	.24	6/8
34 CrMo 4	1.7220	708 A 37	35 CD 4	2234	4135; 4137	SCM432;SCCRM3	1775	.24	6/9
34 CrNiMo 6	1.6582	817 M 40	35 NCD 6	2541	4340	SNCM447	1775	.24	6/9
35 S 20	1.0726	212 M 36	35 MF 4	1957	1140		1525	.22	2/3
36 CrNiMo 4	1.6511	816 M 40	40 NCD 3		9840	SNCM447	1775	.24	6/9
36 Mn 5	1.1167						1525	.22	2/3
36 NiCr 6	1.5710	640 A 35	35 NC 6		3135	SNC236	1800	.24	3/9
38 MnSi 4	1.5120						1800	.24	3/9
39 CrMoV 13 9	1.8523	897 M 39					1775	.24	6/9
40 Mn 4	1.1157	150 M 36	35 M 5		1039		1525	.22	2/3
40 NiCrMo 2 2	1.6546	311-Type 7	40 NCD 2		8740	SNCM240	1775	.24	6/9
41 Cr 4	1.7035	530 M 40	42 C 4		5140	SCR440(H)	1775	.24	6/9
41 CrAlMo 7	1.8509	905 M 39	40 CAD 6.12	2940	A 355 Cl. A	SACM645	1775	.24	6/9
41 CrMo 4	1.7223	708 M 40	42 CD 4 TS	2244	4142; 4140	SCM440	1775	.24	6/9
42 Cr 4	1.7045	530 A 40	42 C 4 TS	2245	5140	SCr440	1775	.24	6/9
42 CrMo 4	1.7225	708 M 40	42 CD 4	2244	4142; 4140	SCM440(H)	1775	.24	6/9
45 WCrV 7	1.2542	BS 1		2710	S 1		1775	.24	6/9
50 CrV 4	1.8159	735 A 50	50 CV 4	2230	6150	SUP10	1775	.24	6/9
55 Cr 3	1.7176	527 A 60	55 C 3	2253	5155	SUP9(A)	1775	.24	6/9
55 NiCrMoV 6	1.2713		55 NCDV 7		L 6	SKH1;SKT4	1775	.24	6/9
55 Si 7	1.0904	250 A 53	55 S 7	2085; 2090	9255		1775	.24	6/9
58 CrV 4	1.8161						1775	.24	6/9
60 SiCr 7	1.0961		60 SC 7		9262		1775	.24	6/9
9 SMn 28	1.0715	230 M 07	S 250	1912	1213	SUM22	1350	.21	1
9 SMn 36	1.0736	240 M 07	S 300		1215		1350	.21	1
9 SMnPb 28	1.0718		S 250 Pb	1914	12 L 13	SUM22L	1350	.21	1
9 SMnPb 36	1.0737		S 300 Pb	1926	12 L 14		1350	.21	1
Al99	3.0205						700	.25	21
AlCuMg1	3.1325						700	.25	22

Germany DIN	Mat. no.	United Kingdom BS	France AFNOR	Sweden SS	United States AISI	Japan JIS	$K_{c1.1}$ N/mm²	m_c	VDI 3323 group
AlMg1	3.3315						700	.25	21
AlMgSi1	3.2315						700	.25	22
C 105 W1	1.1545		Y1 105	1880	W 110	SK3	1675	.24	3
C 125 W	1.1663		Y2 120		W 112		1675	.24	3
C 15	1.0401	080 M 15	AF3 7 C 12; XC 18	1350	1015	S15C	1350	.21	1
C 22	1.0402	050 A 20	AF 42 C 20	1450	1020	S20C, S22C	1350	.21	1
C 35	1.0501	060 A 35	AF 55 C 35	1550	1035	S35C	1525	.22	2/3
C 45	1.0503	080 M 46	AF 65 C 45	1650	1045	S45C	1525	.22	2/3
C 55	1.0535	070 M 55		1655	1055	S55C	1675	.24	3
C 60	1.0601	080 A 62	CC 55		1060	S60C	1675	.24	3
Cf 35	1.1183					S35C	1525	.22	2/3
Cf 53	1.1213					S50C	1525	.22	2/3
Ck 101	1.1274	060 A 96		1870	1095		1675	.24	3
Ck 15	1.1141	080 M 15	XC 15; XC 18	1370	1015	S15C	1350	.21	1
Ck 55	1.1203	070 M 55	XC 55		1055	S55C	1675	.24	3
Ck 60	1.1221	080 A 62	XC 60	1665; 1678	1060	S58C	1675	.24	3
CoCr20W15Ni	2.4764						3300	.24	35
CuZn15	2.0240						700	.27	27
CuZn36Pb3	2.0375						700	.27	26
E-Cu57	2.0060						700	.27	28
G-AlSi10Mg	3.2381						700	.25	24
G-AlSi12	3.2581						700	.25	23
G-AlSi9Cu3	3.2163						700	.25	23
G-CuSn5ZnPb	2.1096						700	.27	26
G-CuZn40Fe	2.0590						700	.27	28
G-X 120 Mn 12	1.3401	Z 120 M 12	Z 120 M 12		A 128 (A)		3300	.24	35
G-X 20 Cr 14	1.4027	420 C 29	Z 20 C 13 M			SCS2	1875	.21	12/13
G-X 40 NiCrSi 38 18	1.4865	330 C 40					2600	.24	31
G-X 45 CrSi 9 3	1.4718	401 S 45	Z 45 CS 9		HNV 3		2450	.23	10/11
G-X 5 CrNi 13 4	1.4313	425 C 11	Z 5 CN 13.4	2385	CA 6-NM		1875	.21	12/13
G-X 5 CrNiMoNb 18 10	1.4581	318 C 17	Z 4 CNDNb 18.12 M				2150	.2	14
G-X 6 CrNi 18 9	1.4308	304 C 15	Z 6 CN 18.10 M	2333	CF-8		2150	.2	14
G-X 6 CrNiMo 18 10	1.4408						2150	.2	14
G-X 7 Cr 13	1.4001						1875	.21	12/13
GG-10	.6010		Ft 10 D	01 10-00	A48-20 B	FC100	1150	.2	15
GG-15	.6015	Grade 150	Ft 15 D	01 15-00	A48-25 B	FC150	1150	.2	15
GG-20	.6020	Grade 220	Ft 20 D	01 20-00	A48-30 B	FC200	1150	.2	15
GG-25	.6025	Grade 260	Ft 25 D	01 25-00	A48-40 B	FC250	1250	.24	15/16
GG-30	.6030	Grade 300	Ft 30 D	01 30-00	A48-45 B	FC300	1350	.28	16
GG-35	.6035	Grade 350	Ft 35 D	01 35-00	A48-50 B	FC350	1350	.28	16
GG-40	.6040	Grade 400	Ft 40 D	01 40-00	A48-60 B	FC400	1350	.28	16
GGG-35.3	.7033					FCD350	1225	.25	17
GGG-40	.7040	SNG 420/12	FGS 400-12	0717-02	60-40-18	FCD400	1225	.25	17
GGG-40.3	.7043	SNG 370/17	FGS 370-17	0717-15		FCD400	1225	.25	17
GGG-50	.7050	SNG 500/7	FGS 500-7	0727-02	65-45-12	FCD500	1350	.28	18
GGG-60	.7060	SNG 600/3	FGS 600-3	0732-03	80-55-06	FCD600	1350	.28	18
GGG-70	.7070	SNG 700/2	FGS 700-2	0737-01	100-70-03	FCD700	1350	.28	18
GGG-NiCr 20 2	.7660	S-NiCr 20 2	S-NC 20 2		A 439 Type D-2		1350	.28	18
GGG-NiMn 13 7	.7652	S-NiMn 13 7	S-NM 13 7				1350	.28	18
GS-Ck 45	1.1191	080 M 46	XC 42	1672	1045	S45C	1525	.22	2/3

CERATIZIT hard material matters

Comparison of materials

Germany DIN	Mat. no.	United Kingdom BS	France AFNOR	Sweden SS	United States AISI	Japan JIS	$K_{c1.1}$ N/mm²	m_c	VDI 3323 group
GTS-35-10	.8135	B 340/12	MN 35-10				1225	.25	19
GTS-45-06	.8145	P 440/7					1420	.3	20
GTS-55-04	.8155	P 510/4	MP 50-5				1420	.3	20
GTS-65-02	.8165	P 570/3	MP 60-3				1420	.3	20
GTS-70-02	.8170	P 690/2	IP 70-2				1420	.3	20
NiCr20TiAl	2.4631	HR 401; 601	Nimonic 80 A				3300	.24	33
NiCr22Mo9Nb	2.4856		Inconel 625				3300	.24	33
NiCu30Al	2.4375		Monel K 500				3300	.24	34
NiFe25Cr20NbTi	2.4955						3300	.24	34
S 18-0-1	1.3355	BT 1	Z 80 WCV 18-04-01		T 1		2450	.23	10/11
S 18-1-2-5	1.3255	BT 4	Z 80 WKCV 18-05-04-0		T 4		2450	.23	10/11
S 2-9-2	1.3348		Z 100 DCWV 09-04-02-	2782	M 7		2450	.23	10/11
S 6-5-2	1.3343	BM 2	Z 85 WDCV 06-05-04-0	2722	M 2	SKH9; SKH51	2450	.23	10/11
S 6-5-2-5	1.3243		Z 85 WDKCV 06-05-05-	2723		SKH55	2450	.23	10/11
TiAl6V4	3.7165	TA 10 bis TA 13	T-A 6 V				2110	.22	37
X 10 Cr 13	1.4006	410 S 21	Z 12 C 13	2302	410; CA-15	SUS410	1875	.21	12/13
X 10 CrNiMoNb 18 12	1.4583				318		2150	.2	14
X 10 CrNiS 18 9	1.4305	303 S 21	Z 10 CNF 18.09	2346	303		2150	.2	14
X 100 CrMoV 5 1	1.2363	BA 2	Z 100 CDV 5	2260	A 2		2450	.23	10/11
X 12 CrMoS 17	1.4104		Z 10 CF 17	2383	430 F	SUS430F	1875	.21	12/13
X 12 CrNi 17 7	1.4310	301 S 21	Z 12 CN 17.07		301		2150	.2	14
X 12 CrNi 22 12	1.4829					SUS301	1350	.28	16
X 12 CrNi 25 21	1.4845	310 S24	Z 12 CN 25.20	2361	310 S	SUH310; SUS310S	2150	.2	14
X 12 CrNiTi 18 9	1.4878	321 S 20	Z 6 CNT 18.12 (B)	2337	321		2150	.2	14
X 12 NiCrSi 36 16	1.4864	NA 17	Z 12 NCS 37.18		330	SUH330	2600	.24	31
X 15 CrNiSi 20 12	1.4828	309 S 24	Z 15 CNS 20.12		309	SUH309	1350	.28	16
X 165 CrMoV 12	1.2601			2310			2450	.23	10/11
X 2 CrNiMo 18 13	1.4440						2150	.2	14
X 2 CrNiMoN 17 13 3	1.4429	316 S 62	Z 2 CND 17.13 Az	2375	316 LN	SUS316LN	2150	.2	14
X 2 CrNiN 18 10	1.4311	304 S 62	Z 2 CN 18 .10	2371	304 LN	SUS304LN	2150	.2	14
X 20 CrNi 17 2	1.4057	431 S 29	Z 15 CN 16.02	2321	431	SUS431	1875	.21	12/13
X 210 Cr 12	1.2080	BD 3	Z 200 C 12		D 3		2450	.23	10/11
X 210 CrW 12	1.2436			2312			2450	.23	10/11
X 30 WCrV 9 3	1.2581	BH 21	Z 30 WCV 9		H 21	SKD5	2450	.23	10/11
X 40 CrMoV 5 1	1.2344	BH 13	Z 40 CDV 5	2242	H 13	SKD61	2450	.23	10/11
X 46 Cr 13	1.4034	420 S 45	Z 40 C 14				1875	.21	12/13
X 5 CrNi 18 9	1.4301	304 S 15	Z 6 CN 18.09	2332; 2333	304; 304 H	SUS304	2150	.2	14
X 5 CrNiMo 17 13 3	1.4436	316 S 16	Z 6 CND 17.12	2343	316	SUS316	2150	.2	14
X 5 CrNiMo 18 10	1.4401	316 S 16	Z 6 CND 17.11	2347	316	SUS316	2150	.2	14
X 53 CrMnNiN 21 9	1.4871	349 S 54	Z 52 CMN 21.09		EV 8		1875	.21	12/13
X 6 Cr 13	1.4000	403 S 17	Z 6 C 13	2301	403	SUS403	1875	.21	12/13
X 6 Cr 17	1.4016	430 S 15	Z 8 C 17	2320	430	SUS430	1875	.21	12/13
X 6 CrMo 17	1.4113	434 S 17	Z 8 CD 17.01	2325	434	SUS434	1875	.21	12/13
X 6 CrNiMoTi 17 12 2	1.4571	320 S 31	Z 6 CNT 17.12	2350	316 Ti		2150	.2	14
X 6 CrNiNb 18 10	1.4550	347 S 17	Z 6 CNNb 18.10	2338	347		2150	.2	14
X 6 CrNiTi 18 10	1.4541	321 S 12	Z 6 CNT 18.10	2337	321		2150	.2	14
X2 CrNi 18-8	1.4317						2150	.2	14

$k_{c1.1}$ value = specific cutting force at a cutting rake angle of 0 degrees. For positive rake angles the $k_{c1.1}$ value has to be reduced (increased for negative rake angles) by 1% per degree of rake angle. The m_c value is the exponent for the conversion of the $k_{c1.1}$ value.

Aluminium cast alloys

Alloy group	DIN 1725-2		DIN EN 1706	
	Material		Alloy designation	
	Short designation	Number	Numeric	Chem. symbol
AlCu	G-AlCu4TiMg	3.1371	EN AC-21000	EN AC-Al Cu4MgTi
	G-AlCu4Ti	3.1841	EN AC-21100	EN AC-Al Cu4Ti
AlSiMgTi	–	–	EN AC-4100	EN AC-Al Si2MgTi
AlSi7Mg	–	–	EN AC-42000	EN AC-Al Si7Mg
	G-AlSi7Mg	3.2371	EN AC-42100	EN AC-Al Si7Mg0,3
	–	–	EN AC-42200	EN AC-Al Si7Mg0,6
AlSi10Mg	G-AlSi10Mg	3.2381	EN AC-43000	EN AC-Al Si10Mg/a)
	–	–	EN AC-43100	EN AC-Al Si10Mg(b)
	G-AlSi10Mg(Cu)	3.2383	EN AC-43200	EN AC-Al Si10Mg(Cu)
	G-AlSi9Mg	3.2373	EN AC-43300	EN AC-Al Si9Mg
	GD-AlSi10Mg	3.2382	EN AC-43400	EN AC-Al Si10Mg(Fe)
AlSi	G-AlSi11	3.2211	EN AC-44000	EN AC-Al Si11
	–	–	EN AC-44100	EN AC-Al Si12(b)
	G-AlSi12	3.2581	EN AC-44200	EN AC-Al Si12(a)
	GD-AlSi12	3.2582	EN AC-44300	EN AC-Al Si12(Fe)
	–	–	EN AC-44400	EN AC-Al Si9
AlSi5Cu	G-AlSi6Cu4	3.2151	EN AC-45000	EN AC-Al Si6Cu4
	–	–	EN AC-45100	EN AC-Al Si5Cu3Mg
	–	–	EN AC-45200	EN AC-Al Si5Cu3Mn
	–	–	EN AC-45300	EN AC-Al Si5Cu1Mg
	–	–	EN AC-45400	EN AC-Al Si5Cu3
AlSi9Cu	GD-AlSi9Cu3	3.2163	EN AC-46000	EN AC-Al Si9Cu3(Fe)
	–	–	EN AC-46100	EN AC-Al Si11Cu2(Fe)
	G-AlSi9Cu3	3.2163	EN AC-46200	EN AC-Al Si8Cu3
	–	–	EN AC-46300	EN AC-Al Si7Cu3Mg
	–	–	EN AC-46400	EN AC-Al Si9Cu1Mg
	–	–	EN AC-46500	EN AC-Al Si9Cu3(Fe)(Zn)
	–	–	EN AC-46600	EN AC-Al Si7Cu2
AlSi(Cu)	G-AlSi12(Cu)	3.2583	EN AC-47000	EN AC-Al Si12(Cu)
	GD-AlSi12(Cu)	3.2982	EN AC-47100	EN AC-AlSi12Cu1(Fe)
AlSiCuNiMg	–	–	EN AC-48000	EN AC-Al Si12CuNiMg
AlMg	–	–	EN AC-51000	EN AC-Al Mg3(b)
	G-AlMg3	3.3541	EN AC-51100	EN AC-AlMg3(a)
	GD-AlMg9	3.3292	EN AC-51200	EN AC-Al Mg9
	G-AlMg5	3.3561	EN AC-51300	EN AC-Al Mg5
	G-AlMg5Si	3.3261	EN AC-51400	EN AC-Al Mg5 (Si)
AlZnMg	–	–	EN AC-7100	EN AC-Al Zn5Mg

Aluminuim wrought alloys - bar

DIN 1725-1/DIN 1712-3		DIN EN 573-3	
Material		Alloy designation	
Short designation	Number	Numeric	Chem. symbol
AlCuMgPb	3.1645	EN AW-2007	EN AW-Al Cu4PbMgM
AlCuBiPb	3.1655	EN AW-2011	EN AW-Al Cu6BiPb
–	–	EN AW-2030	EN AW-Al Cu4PbMg
AlMgSiPb	3.0615	EN AW-6012	EN AW-Al MgSiPb
–	–	EN AW-6262	EN AW-Al Mg1SiPb
AlMgSi0,5	3.3206	EN AW-6060	EN AW-Al MgSi
–	–	EN AW-6063	EN AW-Al Mg0,7Si
AlMgSi1	3.2315	EN AW-6082	EN AW-Al Si1MgMn
AlCuSiMn	3.1255	EN AW-2014	EN AW-Al Cu4SiMg
AlCuMg1	3.1325	EN AW-2017A	EN AW-Al Cu4MgSi(A)
AlCuMg2	3.1355	EN AW-2024	EN AW-Al Cu4Mg1
AlZn4,5Mg1	3.4335	EN AW-7020	EN AW-Al Zn4,5Mg1
AlZnMgCu0,5	3.4345	EN AW-7022	EN AW-Al Zn5Mg3Cu
AlZnMgCu1,5	3.4365	EN AW-7075	EN AW-Al Zn5,5MgCu
Al99,5	3.0255	EN AW-1050A	EN AW-Al 99,5
E-Al	3.0257	EN AW-1350	EN AW-Eal 99,5
AlMg3	3.3535	EN AW-5754	EN AW-Al Mg3
AlMg5	3.3555	EN AW-5019	EN AW-Al Mg5
AlMg4,5Mn	3.3547	EN AW-5083	EN AW-Al Mg4,5Mn0,7

Aluminium wrought alloys - sheet

DIN 1725-1/DIN 1712-3		DIN EN 573-3	
Material		Alloy designation	
Short designation	Number	Numeric	Chem. symbol
Al99,5	3.0255	EN AW-1050A	EN AW-Al 99,5
AlMg3	3.3535	EN AW-5754	EN AW-Al Mg3
AlMg4,5Mn	3.3547	EN AW-5083	EN AW-Al Mg4,5Mn0,7
AlMg1SiCu	3.3211	EN AW-6061	EN AW-Al Mg1SiCu
AlMgSi1	3.2315	EN AW-6082	EN AW-Al Si1MgMn
AlCuMg1	3.1325	EN AW-2017A	EN AW-Al Cu4MgSi(A)
AlCuMg2	3.1355	EN AW-2024	EN AW-Al Cu4Mg1
AlZn4,5Mg1	3.4335	EN AW-7020	EN AW-Al Zn4,5Mg1
AlZnMgCu0,5	3.4345	EN AW-7022	EN AW-Al Zn5Mg3Cu
AlZnMgCu1,5	3.4365	EN AW-7075	EN AW-Al Zn5,5MgCu

= hardened materials

= naturally hard materials

Relative machinability of aluminium alloys

It depends on the type of alloy whether aluminium materials are easy to machine or not.
From the easily machined aluminium alloy to the problematic pure aluminium all levels of machinability can be found.

Group		Alloy type	Relative machinability
Pure Al		Al 99,9	5
Wrought alloys	**non hardened**	Al Mn	4 - 5
		Al Mg	3 - 5
		Al Mg Mn	3 - 4
	hardened	Al Mg Si	3 - 4
		Machining alloy stock	1 - 2
		Al Cu Mg	2 - 3
		Al Cu Si Mg	3
		Al Zn Mg Cu	2
Cast alloys		G - Al Si	3
		G - Al Si Mg	2 - 3
		G - Al Si Cu	2
		G - Al Mg	2
		G - Al Mg Si	2
		G - Al Cu Ti	2
		G - Al Si Cu Mg Ni	2 - 3

1 = very good machinability

5 = bad machinability

Machinability can be defined as the degree of difficulty that a material creates when being machined. In order to assess the machinability of a material basically four parameters have to be taken into consideration:

> Cutting force
> Tool life
> Surface quality
> Chip formation

Cutting data

Tool, material

	v_c (m/min)	f_z (mm)	a_p (mm)	v_c (m/min)	f_z (mm)	a_p (mm)	v_c (m/min)	f_z (mm)	a_p (mm)
MaxiMill 211-07				**211-11 / 260-054**			**211-11K**		
▽	300 - 60	0,03 - 0,10	0,20 - 6,0	350 - 60	0,05 - 0,20	0,20 - 10	300 - 100	0,05 - 0,20	≤ a
▽	220 - 40	0,03 - 0,10	0,20 - 6,0	250 - 40	0,05 - 0,20	0,20 - 10	200 - 80	0,05 - 0,20	≤ a
▽	3000 - 70	0,03 - 0,10	0,20 - 6,0	350 - 70	0,05 - 0,20	0,20 - 10	300 - 110	0,05 - 0,20	≤ a
▽	–	–	–	3000 - 200	0,10 - 0,25	0,20 - 10	2000 - 300	0,10 - 0,25	≤ a
▽	100 - 30	0,03 - 0,08	0,20 - 4,0	100 - 20	0,05 - 0,15	2,0 - 4,0	80 - 40	0,05 - 0,15	≤ a
▽	–	–	–	60 - 30	0,05 - 0,10	0,5 - 4,0	50 - 30	0,05 - 0,10	≤ a
MaxiMill 211-15 / 260-056				**MaxiMill 211-15K**			**MaxiMill 211-20**		
▽	350 - 100	0,08 - 0,35	1,0 - 14,0	300 - 120	0,08 - 0,35	≤ a	300 - 150	0,12 - 0,4	≤ a
▽	250 - 150	0,08 - 0,35	1,0 - 14,0	200 - 150	0,08 - 0,35	≤ a	250 - 150	0,12 - 0,35	≤ a
▽	350 - 110	0,08 - 0,35	1,0 - 14,0	300 - 130	0,08 - 0,35	≤ a	–	–	–
▽	3000 - 300	0,12 - 0,40	1,0 - 14,0	2500 - 400	0,12 - 0,40	≤ a	–	–	–
▽	90 - 25	0,08 - 0,20	1,0 - 8,0	80 - 25	0,08 - 0,20	≤ a	80 - 25	0,12 - 0,3	≤ a
MaxiMill 210 / 260-042				**244**			**212**		
▽	350 - 100	0,05 - 0,20	0,1 - 8,0	180 - 60	0,08 - 0,20	< a	180 - 60	0,08 - 0,25	< 19
▽	250 - 170	0,05 - 0,20	0,1 - 8,0	180 - 60	0,08 - 0,20	< a	180 - 60	0,08 - 0,25	< 19
▽	300 - 100	0,05 - 0,20	0,1 - 8,0	180 - 60	0,10 - 0,20	< a	180 - 60	0,08 - 0,25	< 19
▽	< 2000	0,05 - 0,20	0,1 - 8,0	< 2000	0,10 - 0,20	< a	< 2000	0,10 - 0,25	< 19
▽	75 - 25	0,08 - 0,15	0,2 - 4,0	–	–	–	–	–	–
▽	500 - 150	0,04 - 0,09	0,2 - 0,6	–	–	–	–	–	–
MaxiMill 141 / 241 / 260-051				**MaxiMill 274 (SF..)**			**MaxiMill 274 (OF..)**		
▽	350 - 80	0,05 - 0,35	0,05 - 14	350 - 80	0,1 - 0,4	0,1 - 3,8	350 - 80	0,1 - 0,35	0,1 - 2,5
▽	250 - 80	0,05 - 0,35	0,05 - 14	200 - 80	0,05 - 0,35	0,05 - 3,8	200 - 80	0,05 - 0,25	0,05 - 2,5
▽	350 - 80	0,05 - 0,35	0,05 - 14	350 - 80	0,15 - 0,3	0,15 - 3,8	–	–	–
▽	< 2000	0,05 - 0,35	0,05 - 14	< 2000	0,05 - 0,4	0,05 - 3,8	< 2000	0,05 - 0,4	0,05 - 2,5
▽	–	–	–	80 - 25	0,05 - 0,25	0,05 - 3,8	80 - 25	0,05 - 0,2	0,05 - 2,5
MaxiMill 490-09 / 260-055				**490-09K**			**490-12 / 260-039**		
▽	350 - 80	0,05 - 0,25	0,1 - 4,0	300 - 120	0,05 - 0,25	≤ a	350 - 90	0,10 - 0,40	1,0 - 6,0
▽	280 - 80	0,05 - 0,25	0,1 - 4,0	220 - 120	0,05 - 0,25	≤ a	250 - 90	0,10 - 0,40	1,0 - 6,0
▽	280 - 120	0,05 - 0,25	0,1 - 4,0	230 - 150	0,05 - 0,25	≤ a	280 - 90	0,10 - 0,40	1,0 - 6,0
▽	< 2000	0,05 - 0,30	0,1 - 4,0	< 2000	0,05 - 0,30	≤ a	< 2000	0,10 - 0,40	1,0 - 6,0
▽	110 - 15	0,05 - 0,15	0,1 - 4,0	80 - 35	0,05 - 0,15	≤ a	180 - 25	0,10 - 0,40	1,0 - 6,0
HSC-11 / 260-54				**HSC-19**			**HPC-19**		
▽	3000 - 300	0,05 - 0,25	0,05 - 10,0	2000-300	0,05 - 0,25	0,3 - 18	5000-300	0,05 - 0,4	0,3 - 18

	v_c (m/min)	f_z (mm)	a_p (mm)	v_c (m/min)	f_z (mm)	a_p (mm)	v_c (m/min)	f_z (mm)	a_p (mm)
MaxiMill 280 / 260-037									
▼	350 - 80	0,08 - 0,2	0,1 - 5,0						
▼	270 - 80	0,08 - 0,20	0,1 - 5,0						
▼	350 - 80	0,05 - 0,20	0,1 - 5,0						
▼	< 2000	0,05 - 0,20	0,1 - 5,0						
▼	75 - 25	0,1 - 0,2	2 - 5						
MaxiMill HPC-04				**HPC-12**			**HSV-22**		
▼	–	–	–	–	–	–	–	–	–
▼	–	–	–	–	–	–	–	–	–
▼	< 1000	0,05 - 0,15	0,1 - 2,0	< 1000	0,05 - 0,15	0,1 - 2,0	–	–	–
▼	< 5000	0,05 - 0,20	0,1 - 4,0	< 5000	0,05 - 0,40	0,1 - 11,0	< 3500	0,05 - 0,30	0,1 - 15
▼	–	–	–	–	–	–	–	–	–
▽	360 - 110	0,05 - 0,15	0,1 - 0,3	360 - 110	0,05 - 0,15	0,1 - 0,3	–	–	–
MaxiMill 251-05				**251-08**			**251-10**		
▼	350 - 180	0,10 - 0,35	0,25 - 1,0	350 - 180	0,15 - 0,40	0,5 - 1,5	350 - 180	0,15 - 0,50	0,5 - 2,5
▼	250 - 80	0,05 - 0,15	0,25 - 1,0	250 - 80	0,08 - 0,20	0,5 - 1,5	250 - 80	0,10 - 0,30	0,5 - 2,5
▼	350 - 100	0,05 - 0,20	0,25 - 1,0	350 - 100	0,08 - 0,25	0,5 - 1,5	350 - 100	0,10 - 0,30	0,5 - 2,5
▼	< 2000	0,10 - 0,20	0,25 - 1,0	< 2000	0,10 - 0,30	0,5 - 1,5	< 2000	0,10 - 0,40	0,5 - 2,5
▼	75 - 25	0,05 - 0,15	0,25 - 1,0	75 - 25	0,05 - 0,15	0,5 - 1,5	75 - 25	0,08 - 0,25	0,5 - 2,5
MaxiMill 251-12 / 260-052				**251-16 / 260-053**			**251-20**		
▼	350 - 180	0,2 - 0,80	0,5 - 3,0	350 - 180	0,25 - 0,80	1,5 - 4,0	350 - 180	0,25 - 0,80	1,5 - 4,0
▼	250 - 80	0,1 - 0,45	0,5 - 3,0	250 - 80	0,20 - 0,60	1,5 - 4,0	250 - 80	0,20 - 0,60	1,5 - 4,0
▼	350 - 100	0,1 - 0,45	0,5 - 3,0	350 - 100	0,20 - 0,60	1,5 - 4,0	350 - 100	0,20 - 0,60	1,5 - 4,0
▼	< 2000	0,1 - 0,45	0,5 - 3,0	< 2000	0,20 - 0,60	1,5 - 4,0	75 - 25	0,15 - 0,35	1,5 - 4,0
▼	75 - 25	0,1 - 0,3	0,5 - 3,0	75 - 25	0,15 - 0,35	1,5 - 4,0	75 - 25	0,1 - 0,3	0,5 - 3,0
MaxiMill 270-09 / 260-041				+			**272-09**		
▼	350 - 80	0,05 - 0,25	0,1 - 4,0	305 - 150	0,05 - 0,25	0,1 - 2,0	200 - 80	0,05 - 0,15	0,1 - 4
▼	200 - 80	0,05 - 0,25	0,1 - 4,0	200 - 110	0,05 - 0,25	0,1 - 2,0	180 - 80	0,05 - 0,15	0,1 - 4
▼	280 - 80	0,05 - 0,25	0,1 - 4,0	280 - 150	0,05 - 0,25	0,1 - 2,0	200 - 80	0,05 - 0,15	0,1 - 4
▼	< 2000	0,05 - 0,25	0,1 - 4,0	< 2000	0,05 - 0,25	0,1 - 2,0	< 2000	0,05 - 0,20	0,1 - 4
▼	75 - 25	0,05 - 0,25	0,1 - 4,0	–	–	–	60 - 25	0,10 - 0,10	0,1 - 4
MaxiMill 270-12 / 260-031				+			**MaxiMill 260-029**		
▼	350 - 60	0,05 - 0,35	0,1 - 6,0	350 - 80	0,1 - 0,45	0,1 - 4,0	350 - 60	0,05 - 0,35	0,1 - 6,0
▼	280 - 60	0,05 - 0,35	0,1 - 6,0	280 - 40	0,1 - 0,45	0,1 - 4,0	280 - 60	0,05 - 0,35	0,1 - 6,0
▼	280 - 180	0,05 - 0,35	0,1 - 6,0	280 - 80	0,1 - 0,45	0,1 - 4,0	280 - 180	0,05 - 0,35	0,1 - 6,0
▼	< 2000	0,05 - 0,35	0,1 - 6,0	< 2000	0,1 - 0,45	0,1 - 4,0	< 2000	0,05 - 0,35	0,1 - 6,0
▼	75 - 25	0,1 - 0,25	0,1 - 6,0	–	–	–	75 - 25	0,1 - 0,25	0,1 - 6,0

Cutting data

Tool, material

	v_c (m/min)	f_z (mm)	a_p (mm)	v_c (m/min)	f_z (mm)	a_p (mm)	v_c (m/min)	f_z (mm)	a_p (mm)
MaxiMill 252-10				**252-12**					
▽	250 - 80	0,05 - 0,2	0,5 - 1,5	250 - 80	0,1 - 0,45	0,5 - 3			
▽	75 - 25	0,1 - 0,15	0,5 - 1,5	75 - 25	0,1 - 0,3	0,5 - 3			
MaxiMill 270-12 / 260-031				**MaxiMill 271-17**					
▽	350 - 60	0,1 - 0,5	0,1 - 6,0	350 - 60	0,1 - 0,5	0,1 - 6,0			
▽	200 - 60	0,1 - 0,35	0,1 - 6,0	200 - 60	0,1 - 0,35	0,1 - 6,0			
▽	300 - 60	0,1 - 0,4	0,1 - 6,0	300 - 60	0,1 - 0,4	0,1 - 6,0			
▽	75 - 25	0,1 - 0,25	0,1 - 6,0	75 - 25	0,1 - 0,25	0,1 - 6,0			
MaxiMill 270-15 / 260-032				**273-06 / 260-057**					
▽	200 - 60	0,10 - 0,4	1 - 9	350 - 60	0,05 - 0,6	0,2 - 3,5	350 - 100	0,05 - 0,6	0,2 - 3,5
▽	200 - 60	0,10 - 0,4	1 - 9	250 - 40	0,05 - 0,4	0,2 - 3,5	250 - 60	0,05 - 0,4	0,2 - 3,5
▽	200 - 60	0,10 - 0,4	1 - 9	280 - 70	0,05 - 0,4	0,2 - 3,5	280 - 100	0,05 - 0,4	0,2 - 3,5
▽	< 2000	0,10 - 0,4	1 - 9	–	–	–	–	–	–
▽	75 - 25	0,10 - 0,25	1 - 9	100 - 10	0,05 - 0,15	0,2 - 3,5	100 - 40	0,05 - 0,15	0,2 - 3,5
MaxiMill HFC-06				**HFC-09**			**HFC-12**		
▽	280 - 100	0,1 - 1,5	0,1 - 0,8	280 - 100	0,1 - 2,5	0,1 - 1,0	280 - 100	0,1 - 3,0	0,1 - 2,0
▽	260 - 140	0,1 - 1,5	0,1 - 0,8	260 - 140	0,1 - 2,5	0,1 - 1,0	260 - 140	0,1 - 3,0	0,1 - 2,0
▽				230 - 110	0,1 - 2,5	0,1 - 1,0	230 - 110	0,1 - 3,0	0,1 - 2,0
▽	75 - 25	0,1 - 0,5	0,1 - 0,8	75 - 25	0,1 - 0,8	0,1 - 0,8	75 - 25	0,1 - 1,0	0,1 - 1,0
HEC-11									
▽ CTC3215	500 - 150	0,05 - 0,30	0,1 - 4,0						
▽ CTP3220	350 - 100	0,05 - 0,30	0,1 - 4,0						
▽ CTN3105	1500 - 300	0,05 - 0,30	0,1 - 4,0						
▽ CTL3215	1000 - 350	0,05 - 0,20	0,1 - 1,0						
▽ CTL3215	360 - 110	0,05 - 0,15	0,1 - 0,3						
▽ TCC410	300 - 100	0,05 - 0,25	0,1 - 4,0						
▽ TCC410	500 - 150	0,05 - 0,30	0,1 - 4,0						
MaxiMill AHDM									
▽	200 - 60	0,2 - 0,90	- 20						
▽	140 - 40	0,15 - 0,50	- 20						
▽	320 - 100	0,2 - 0,85	- 20						
MaxiMill C KF				**C NF**			**C ZF**		
▽	180 - 80	–	< a	160 - 80	0,10 - 0,25	–	120 - 60	0,03 - 0,08	–
▽	180 - 80	–	< a	140 - 70	0,10 - 0,25	–	120 - 60	0,03 - 0,08	–
▽	–	–	–	150 - 80	0,15 - 0,25	–	120 - 60	0,03 - 0,08	–
▽	–	–	–	< 350	0,15 - 0,25	–	< 300	0,03 - 0,08	–

	v_c (m/min)	f_z (mm)	a_p (mm)	v_c (m/min)	f_z (mm)	a_p (mm)	v_c (m/min)	f_z (mm)	a_p (mm)
MaxiMill 260-018				**260-040**					
▼	220 - 80	0,08 - 0,35	0,1 - 9,0	200 - 80	0,1 - 0,4	1 - 14			
▼	200 - 90	0,08 - 0,35	0,1 - 9,0	200 - 80	0,1 - 0,4	< 12			
▼	280 - 120	0,08 - 0,35	0,1 - 9,0	–	–	–			
▼	< 2000	0,05 - 0,1	0,1 - 2,0	–	–	–			
MaxiMill 260-023				**260-026**			**260-025**		
▼	–	–	–	180 - 60	0,1 - 0,35	2 - 18	180 - 60	0,1 - 0,35	2 - 18
▼	–	–	–	180 - 60	0,1 - 0,35	2 - 18	180 - 60	0,1 - 0,35	2 - 18
▼	350 - 80	0,08 - 0,4	0,1 - 7,0	250 - 80	0,1 - 0,35	2 - 18	180 - 80	0,1 - 0,35	2 - 18

Cutting data

Grades, material

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ .15% C	1	125
		annealed	.15% - .45% C	2	150 - 250
		tempered	≥ .45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% Si	23	80
		hardened	< 12% Si	24	90
		non hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	–
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	–
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

Uncoated carbide					
CTW4615		H216T		S26T	
v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]
–	–	–	–	160 - 220	100 - 160
–	–	–	–	140 - 100	90 - 150
–	–	–	–	120 - 180	80 - 140
–	–	–	–	120 - 180	80 - 140
–	–	–	–	110 - 170	80 - 140
–	–	–	–	100 - 160	70 - 110
–	–	–	–	100 - 160	60 - 100
–	–	–	–	90 - 150	60 - 100
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
90 - 160	90 - 160	90 - 160	90 - 160	–	–
80 - 130	80 - 130	80 - 130	80 - 130	–	–
100 - 160	100 - 160	100 - 160	100 - 160	–	–
90 - 150	90 - 150	90 - 150	90 - 150	–	–
100 - 160	100 - 160	100 - 160	100 - 160	–	–
70 - 150	90 - 150	70 - 150	90 - 150	–	–
–	200 - 5800	–	200 - 5800	–	–
–	200 - 2000	–	200 - 2000	–	–
–	200 - 2000	–	200 - 2000	–	–
–	200 - 1800	–	200 - 1800	–	–
–	200 - 1000	–	200 - 1000	–	–
–	200 - 600	–	200 - 600	–	–
250 - 1000	250 - 1000	250 - 1000	250 - 1000	–	–
–	150 - 400	–	150 - 400	–	–
–	300 - 800	–	300 - 800	–	–
80 - 1000	80 - 1000	80 - 1000	80 - 1000	–	–
70 - 500	70 - 500	70 - 500	70 - 500	–	–
80 - 300	80 - 300	80 - 300	80 - 300	–	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–

Recommended application

Possible application

CERATIZIT hard material matters

Cutting data

Grades, material

Work piece material		Type of treatment / alloy		VDI 3323 group	Hardness HB
A	Non alloyed steel	annealed	≤ .15% C	1	125
		annealed	.15% - .45% C	2	150 - 250
		tempered	≥ .45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% Si	23	80
		hardened	< 12% Si	24	90
		non hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	–
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	–
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

Coated carbide									
AMZ		CTC3215		CTP3220		SR216		CTP6215	
v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]
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–	–	–	–	–	–	–	–	–	–
180 - 220	–	180 - 350	180 - 350	120 - 300	120 - 300	180 - 350	180 - 350	180 - 350	180 - 350
140 - 180	–	140 - 280	140 - 280	130 - 280	130 - 280	140 - 280	140 - 280	140 - 280	140 - 280
150 - 220	–	130 - 250	130 - 250	120 - 210	120 - 210	130 - 250	130 - 250	130 - 250	130 - 250
120 - 180	–	100 - 200	100 - 200	110 - 200	110 - 200	100 - 200	100 - 200	100 - 200	100 - 200
180 - 220	–	150 - 320	150 - 320	200 - 340	200 - 340	150 - 320	150 - 320	150 - 320	150 - 320
150 - 200	–	120 - 250	120 - 250	160 - 280	160 - 280	120 - 250	120 - 250	120 - 250	120 - 250
–	300 - 3200	–	–	–	–	–	–	–	–
–	200 - 2800	–	–	–	–	–	–	–	–
–	400 - 2000	–	–	–	–	–	–	–	–
–	400 - 2000	–	–	–	–	–	–	–	–
–	200 - 1200	–	–	–	–	–	–	–	–
–	250 - 1000	–	–	–	–	–	–	–	–
200 - 1000	200 - 1000	–	–	–	–	–	–	–	–
–	150 - 800	–	–	–	–	–	–	–	–
–	150 - 500	–	–	–	–	–	–	–	–
–	80 - 200	–	–	–	–	–	–	–	–
–	80 - 220	–	–	–	–	–	–	–	–
–	100 - 320	–	–	–	–	–	–	–	–
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–	–	–	–	–	–	–	–	40 - 60	–
–	–	–	–	–	–	–	–	30 - 50	–
–	–	–	–	–	–	–	–	80 - 100	–
–	–	–	–	–	–	–	–	30 - 60	–

Recommended application

Possible application

Cutting data

Grades, material

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ .15% C	1	125
		annealed	.15% - .45% C	2	150 - 250
		tempered	≥ .45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% Si	23	80
		hardened	< 12% Si	24	90
		non hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	–
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	–
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

Coated carbide							
SR226+		CTP1625		CTP1235		GM43+	
v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]
210 - 350	130 - 200	90 - 130	170 - 200	100-220	70-180	200 - 280	130 - 210
170 - 320	110 - 180	90 - 130	140 - 160	100-220	70-180	170 - 250	110 - 180
150 - 280	90 - 150	90 - 130	130 - 150	100-220	70-180	150 - 220	90 - 150
150 - 250	80 - 140	90 - 130	150 - 180	80-220	70-170	140 - 200	80 - 140
140 - 210	60 - 120	90 - 130	130 - 160	80-220	70-170	130 - 180	60 - 130
100 - 180	60 - 110	90 - 130	120 - 150	80-220	70-170	100 - 160	60 - 110
140 - 210	60 - 110	70 - 90	100 - 120	80-180	60-140	100 - 160	60 - 110
100 - 170	60 - 100	70 - 90	90 - 110	80-180	60-140	90 - 140	60 - 100
140 - 190	80 - 140	90 - 130	130 - 160	70-180	60-140	130 - 180	80 - 140
100 - 170	70 - 120	90 - 130	110 - 150	70-180	60-140	90 - 150	70 - 130
110 - 200	–	90 - 130	140 - 180	60-200	40-140	–	70 - 140
120 - 210	–	90 - 130	110 - 130	60-200	40-140	–	70 - 130
–	–	–	–	60-200	40-140	–	60 - 110
80 - 140	–	70 - 90	90 - 110	60-200	40-140	–	70 - 130
160 - 220	120 - 180	160 - 220	120 - 180	–	–	–	–
100 - 170	80 - 150	100 - 170	80 - 150	–	–	–	–
100 - 200	80 - 170	100 - 200	80 - 170	–	–	–	–
90 - 180	70 - 140	90 - 180	70 - 140	–	–	–	–
90 - 180	70 - 140	90 - 180	70 - 140	–	–	–	–
80 - 160	70 - 130	80 - 160	70 - 130	–	–	–	–
–	–	–	–	–	–	–	–
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–	–	–	–	–	–	–	–
–	60 - 90	–	–	–	–	–	60 - 100
–	60 - 90	–	–	–	–	–	60 - 100
–	–	–	–	–	–	–	50 - 80
–	–	–	–	–	–	–	40 - 75
–	–	50 - 90	–	–	–	–	45 - 75
–	–	35 - 50	–	–	–	–	20 - 40
–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–
70 - 130	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–

☒ Recommended application ☐ Possible application

Cutting data

Grades, material

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ .15% C	1	125
		annealed	.15% - .45% C	2	150 - 250
		tempered	≥ .45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% Si	23	80
		hardened	< 12% Si	24	90
		non hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	–
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	–
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

Coated carbide								Cermet	
CTC5235		CTC5240		CTP2235		GM246		TCM10	
v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]
150 - 260	90 - 180	–	–	150-260	90-180	160 - 260	140 - 180	150 - 400	–
150 - 260	90 - 180	–	–	150-260	90-180	130 - 220	110 - 150	150 - 350	–
150 - 260	90 - 180	–	–	150-260	90-180	90 - 160	70 - 130	150 - 320	–
80 - 220	70 - 160	–	–	80-220	70-160	150 - 220	110 - 170	120 - 380	–
80 - 220	70 - 160	–	–	80-220	70-160	110 - 190	80 - 150	120 - 360	–
80 - 220	70 - 160	–	–	80-220	70-160	90 - 160	70 - 130	120 - 340	–
90 - 180	70 - 140	–	–	90-180	70-140	120 - 200	100 - 150	120 - 380	–
90 - 180	70 - 140	–	–	90-180	70-140	90 - 140	70 - 110	120 - 320	–
70 - 180	60 - 140	–	–	70-180	60-140	110 - 220	90 - 140	120 - 340	–
70 - 180	60 - 140	–	–	70-180	60-140	90 - 180	80 - 110	120 - 300	–
220 - 350	–	–	–	60-200	60-140	90 - 250	60 - 140	120-300	–
150 - 240	–	–	–	60-200	60-140	100 - 160	60 - 120	120 - 360	–
80 - 160	60 - 140	–	–	60-200	60-140	50 - 100	50 - 90	100 - 280	–
80 - 200	60 - 180	–	–	60-200	60-140	60 - 180	50 - 140	–	–
–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	100 - 480	–
–	–	–	–	–	–	–	–	100 - 420	–
–	–	–	–	–	–	–	–	100 - 600	–
–	–	–	–	–	–	–	–	100 - 500	–
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–	–	–	–	–	–	–	–	–	–
–	30 - 250	–	30 - 250	–	20-60	20 - 50	20 - 50	–	–
–	10 - 60	–	10 - 60	–	20-60	20 - 40	20 - 40	–	–
–	20 - 60	–	20 - 60	–	20-60	25 - 40	25 - 40	–	–
–	10 - 50	–	10 - 50	–	20-30	15 - 35	15 - 35	–	–
–	10 - 40	–	10 - 40	–	20-30	20 - 35	20 - 35	–	–
–	–	–	60 - 120	–	40-70	50 - 110	50 - 110	–	–
–	–	–	40 - 80	–	20-40	30 - 50	30 - 50	–	–
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Recommended application

Possible application

Cutting data

Grades, material

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ .15% C	1	125
		annealed	.15% - .45% C	2	150 - 250
		tempered	≥ .45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% Si	23	80
		hardened	< 12% Si	24	90
		non hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	–
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	–
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

PCD		CBN				Si_3N_4	
CTD4205		CTL3215		TA201		CTN3105	
☒ ☐	☐ ☒	☒ ☐	☐ ☒	☒ ☐	☐ ☒	☒ ☐	☐ ☒
v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]
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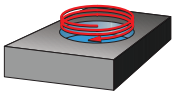
–	–	–	–	–	–	–	–
–	–	500 - 1000	–	–	–	400 - 1500	–
–	–	500 - 1000	–	–	–	300 - 800	–
–	–	–	–	–	–	–	–
–	–	350 - 650	–	200 - 700**	–	–	–
–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–
–	300 - 4000	–	–	–	–	–	–
–	300 - 1500	–	–	–	–	–	–
–	300 - 5000	–	–	–	–	–	–
–	300 - 3000	–	–	–	–	–	–
–	300 - 1000	–	–	–	–	–	–
–	–	–	–	–	–	–	–
–	100 - 700	–	–	–	–	–	–
–	100 - 1500	–	–	–	–	–	–
–	300 - 3000	–	–	–	–	–	–
–	80 - 300	–	–	–	–	–	–
–	80 - 300	–	–	–	–	–	–
–	80 - 300	–	–	–	–	–	–
–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–
–	–	–	–	100 - 250	–	–	–
–	–	–	–	100 - 250	–	–	–
–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–
–	–	–	–	70 - 250	–	–	–
–	–	110 - 190	–	70 - 150	–	–	–
–	–	210 - 360	–	–	–	–	–
–	–	–	–	–	–	–	–

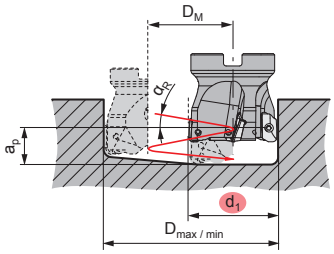
☒ ☐ Recommended application ☐ ☒ Possible application ** From spheroidal cast iron (GGG 60) on

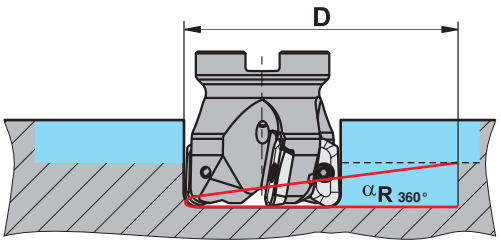
Application data

HSC-11

Helical plunge milling







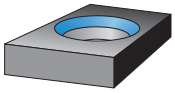
D_{max} [mm] = maximum diameter for flat bottom ground
D_{min} [mm] = minimum hole diameter
$D_M = D_{max} - d_1$ or $D_{min} - d_1$

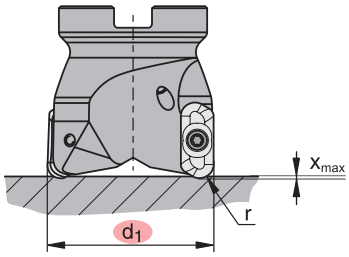
d_1 [mm]	D_{max} [mm]	D_{min} [mm]	α_{Rmax} [°]
16	30	20	10,0
18	34	24	9,1
19	36	26	8,6
20	38	28	8,2
22	42	32	7,4
25	48	38	6,5
32	62	53	4,7
40	78	69	3,3
50	98	89	2,4
63	124	115	1,7
80	158	150	1,1
100	198	189	0,9

a_p [mm] = $D_M \times \pi \times \tan \alpha_R$

d_1 [mm]	D [mm]	$\alpha_{R\ max}$ 360° [°]
16	20	10,0
18	24	9,1
19	26	8,6
20	28	8,2
22	32	7,4
25	38	6,5
32	53	4,7
40	69	3,3
50	89	2,4
63	115	1,7
80	150	1,1
100	189	0,9

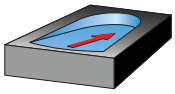
Axial plunging

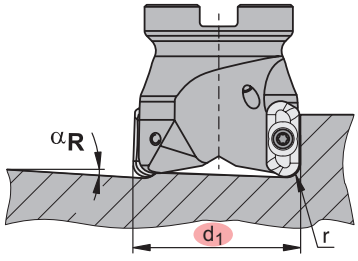




d_1 [mm]	r 0,2 - 4,0 X_{max} [mm]
16	1,7
18	2,11
19	2,24
20	2,39
22	2,70
25	2,55
32	2,40
40	2,28
50	2,26
63	2,10
80	1,75
100	1,79

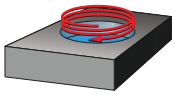
Angled ramping

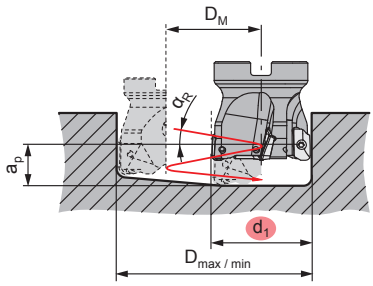


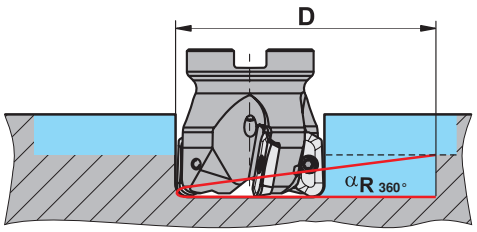


d_1 [mm]	r 0,2 - 4,0 α_R [°]
16	18,8°
18	16,3°
19	15,3°
20	14,8°
22	13,8°
25	10,3°
32	6,8°
40	4,8°
50	3,5°
63	2,5°
80	1,8°
100	1,3°

Helical plunge milling







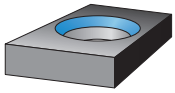
D_{max} [mm] = maximum diameter for flat bottom ground
D_{min} [mm] = minimum hole diameter
$D_M = D_{max} - d_1$ or $D_{min} - d_1$

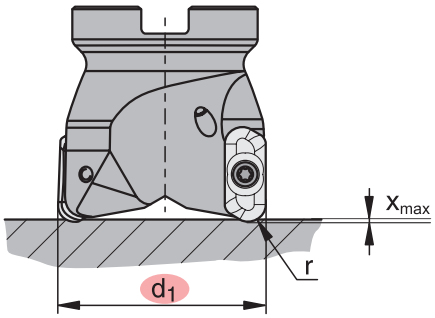
d_1 [mm]	D_{max} [mm]	D_{min} [mm]	$\alpha_{R\ max}$ 360° [°]
22	33	32	1,4
25	39	32	6,8
32	53	46	3,9
40	69	62	3,3
50	89	81	2,2
63	115	107	1,8

a_p [mm] = D_M x π x tan α_R

d_1 [mm]	D [mm]	$\alpha_{R\ max}$ 360° [°]
22	32	1,4
25	32	6,8
32	46	3,9
40	62	3,3
50	81	2,2
63	107	1,8

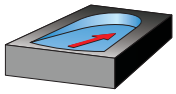
Axial plunging

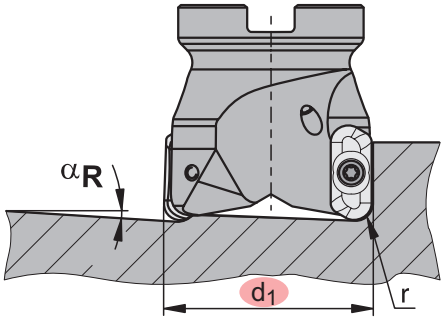




d_1 [mm]	r 0,2 - 4,0 X_{max} [mm]	r 5,0 X_{max} [mm]
22	0,70	0,28
25	2,23	1,45
32	2,12	1,39
40	2,38	1,53
50	2,54	1,57
63	2,61	1,86

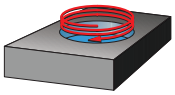
Angled ramping

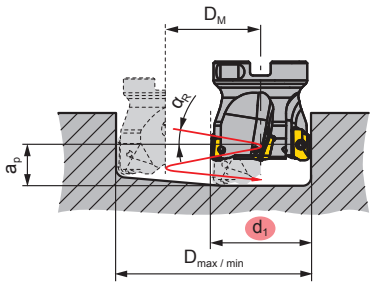


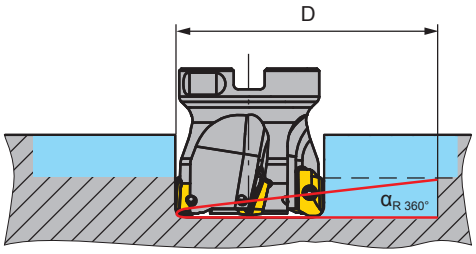


d_1 [mmh]	r 0,2 - 4,0 α_R [°]	r 5,0 α_R [°]
22	3,5	1,8
25	11,0	7,5
32	6,8	4,5
40	5,3	3,5
50	4,0	2,8
63	3,0	2,3

Helical plunge milling







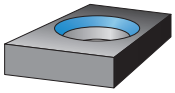
D_{max} [mm] = maximum diameter for flat bottom ground
D_{min} [mm] = minimum hole diameter
$D_M = D_{max} - d_1$ or $D_{min} - d_1$

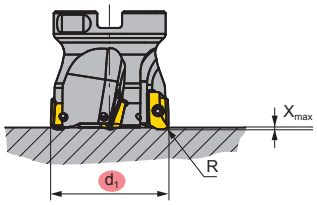
d_1 [mm]	D_{max} / r 0,4 [mm]	D_{min} [mm]	$\alpha_{R\ max}$ [°]
10	19	13	5,5
12	23	17	6,0
16	31	25	3,0
20	39	33	2,0
25	49	43	1,5
32	63	57	1,2
40	79	73	0,8
50	99	93	0,7

a_p [mm] = D_M x π x tan α_R

d_1 [mm]	D [mm]	$\alpha_{R\ max\ 360°}$ [°]
10	13	5,5
12	17	6,0
16	25	3,0
20	33	2,0
25	43	1,5
32	57	1,2
40	73	0,8
50	93	0,7

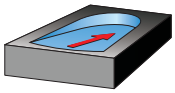
Axial plunging

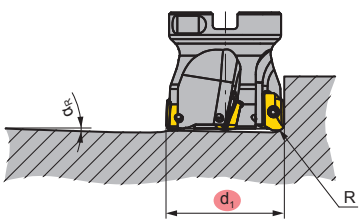




d_1 [mm]	X_{max} [mm]
10	0,8
12	0,8
16	0,8
20	0,8
25	0,8
32	0,8
40	0,8
50	0,8

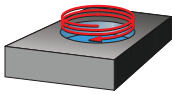
Angled ramping

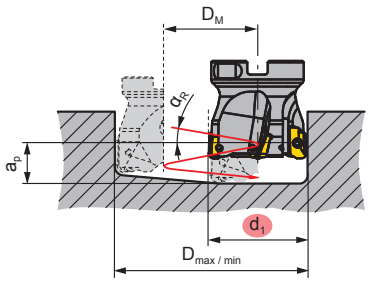


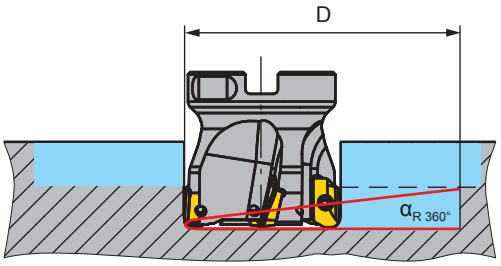


d_1 [mm]	αR [°]
10	11,0
12	7,9
16	4,3
20	3,0
25	2,5
32	1,6
40	1,2
50	1,0

Helical plunge milling







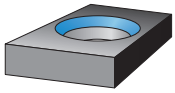
D_{max} [mm] = maximum diameter for flat bottom ground
D_{min} [mm] = minimum hole diameter
$D_M = D_{max} - d_1$ or $D_{min} - d_1$

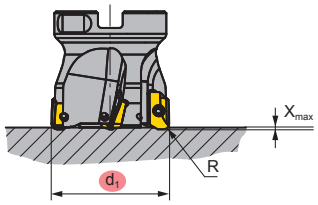
d_1 [mm]	D_{max} / r 0,8 [mm]	D_{min} [mm]	$\alpha_{R\ max}$ [°]
12	21	14	16,0
16	29	18	9,5
20	37	30	7,0
25	47	40	4,5
32	61	53	3,2
40	77	72	2,2
50	98	93	1,7
63	123	118	1,5
80	157	152	1,0
100	197	191	0,8
125	247	242	0,6
160	317	312	0,4

a_p [mm] = $D_M \times \pi \times \tan \alpha_R$

d_1 [mm]	D [mm]	$\alpha_{R\ max\ 360°}$ [°]
12	14	16,0
16	18	9,5
20	30	7,0
25	40	4,5
32	53	3,2
40	72	2,2
50	93	1,7
63	118	1,5
80	152	1,0
100	191	0,8
125	242	0,6
160	312	0,4

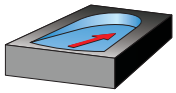
Axial plunging

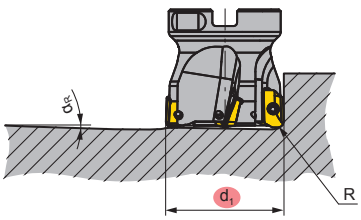




d_1 [mm]	X_{max} [mm]
12	1,3
16	1,5
20	2,0
25	2,0
32	1,8
40	1,6
50	1,6
63	1,6
80	1,6
100	1,6
125	1,6
160	1,6

Angled ramping



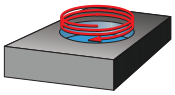


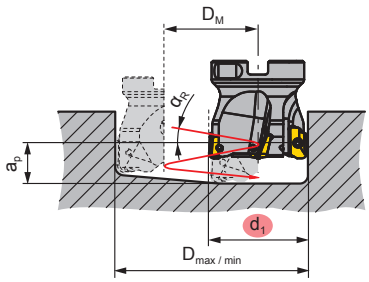
d_1 [mm]	α_R [°]
12	18,0
16	10,8
20	9,8
25	7,5
32	4,8
40	2,9
50	2,2
63	1,8
80	1,4
100	1,1
125	0,8
160	0,65

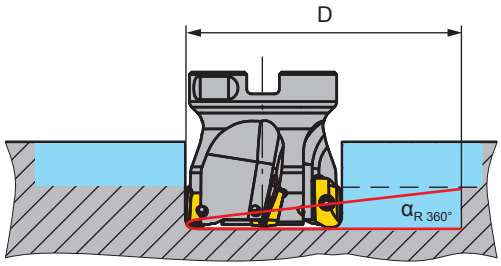
Application data

MaxiMill 211-15 / -15K

Helical plunge milling







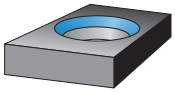
D_{max} [mm] = maximum diameter for flat bottom ground
D_{min} [mm] = minimum hole diameter
$D_M = D_{max} - d_1$ or $D_{min} - d_1$

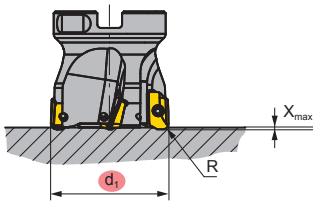
d_1 [mm]	D_{max} / r 0,8 [mm]	D_{min} [mm]	$\alpha_{R\ max}$ [°]
25	48	37	7,5
32	62	47	5,0
40	78	63	3,2
50	98	86	2,5
63	124	111	1,5
80	158	147	1,3
100	198	190	1,1
125	248	240	0,9
160	318	310	0,6

a_p [mm] = $D_M \times \pi \times \tan \alpha_R$

d_1 [mm]	D [mm]	$\alpha_{R\ max\ 360°}$ [°]
25	37	7,5
32	47	5,0
40	63	3,2
50	86	2,5
63	111	1,5
80	147	1,3
100	190	1,1
125	240	0,9
160	310	0,6

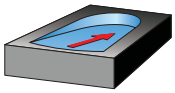
Axial plunging

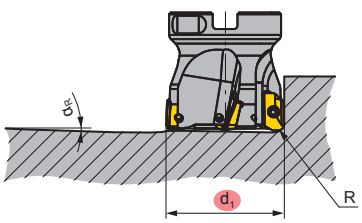




d_1 [mm]	X_{max} [mm]
25	2,7
32	2,5
40	2,5
50	2,5
63	2,5
80	2,5
100	2,5
125	2,5
160	2,5

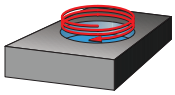
Angled ramping

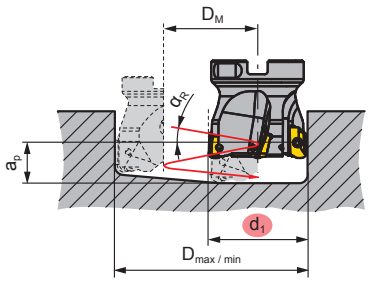




d_1 [mm]	α_R [°]
25	9,5
32	6,8
40	5,1
50	2,5
63	2,5
80	2,0
100	1,5
125	0,9
160	0,7

Helical plunge milling



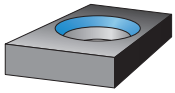


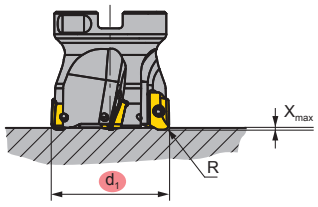
D_{max} [mm] = maximum diameter for flat bottom ground
D_{min} [mm] = minimum hole diameter
$D_M = D_{max} - d_1$ or $D_{min} - d_1$

d_1 [mm]	D_{max} / r 0,8 [mm]	D_{min} [mm]	$\alpha_{R\ max}$ [°]
63	124	107	2,2
80	158	143	1,7
100	198	183	1,3

a_p [mm] = D_M x π x tan α_R

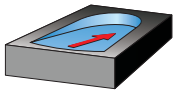
Axial plunging

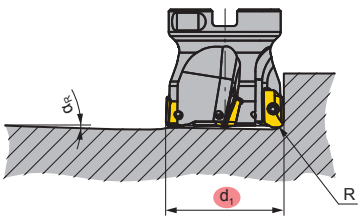




d_1 [mm]	X_{max} [mm]
63	2,0
80	2,0
100	2,0

Angled ramping



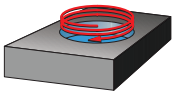


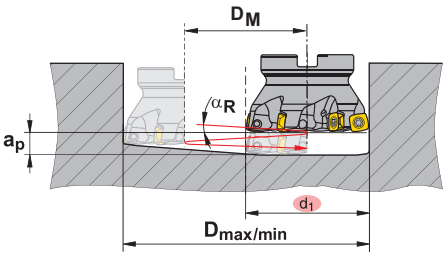
d_1 [mm]	α_R [°]
63	2,2
80	1,7
100	1,3

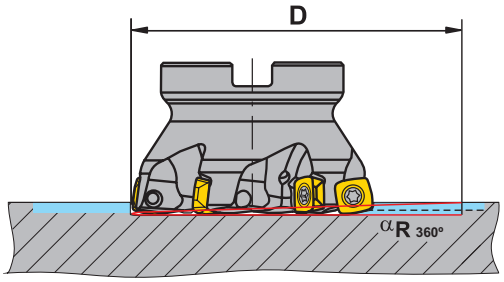
Application data

HFC-06

Helical plunge milling





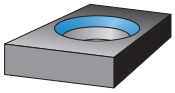


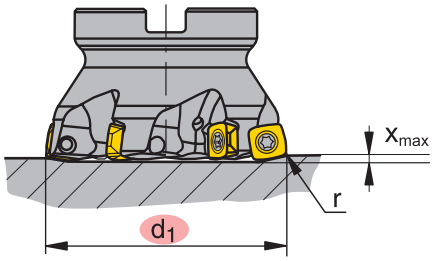
D_{max} [mm] = maximum diameter for flat bottom ground
D_{min} [mm] = minimum hole diameter
$D_M = D_{max} - d_1$ or $D_{min} - d_1$

d_1 [mm]	D_{max} [mm]	D_{min} [mm]	$\alpha_{R\ max}$ [°]
16	31	22	4,5
20	39	30	2,3
25	49	40	1,3
32	63	54	0,9

a_p [mm] = $D_M \times \pi \times \tan \alpha_R$

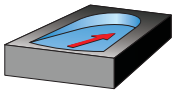
Axial plunging

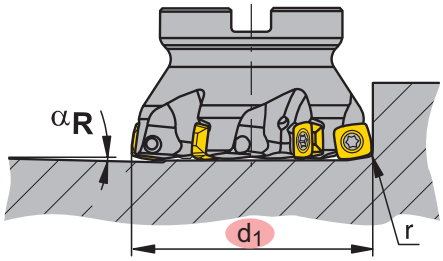




d_1 [mm]	X_{max} [mm]
16 - 32	0,5

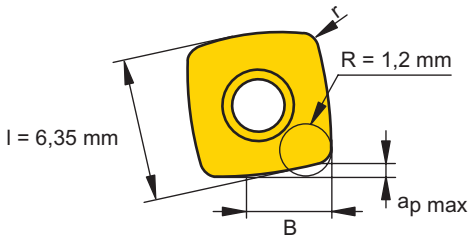
Angled ramping





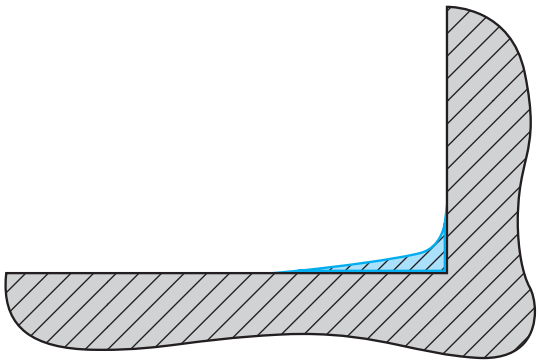
d_1 [mm]	$\alpha_{R\ max}$ [°]
16	5,9
20	3,2
25	2,0
32	1,3

Helical plunge milling



l [mm]	B [mm]	r [mm]	$a_{p\ max}$ [mm]
6,35	4,3	0,5	0,8

D_{max} [mm] = maximum diameter for flat bottom ground
D_{min} [mm] = minimum hole diameter
$D_M = D_{max} - d_1$ or $D_{min} - d_1$

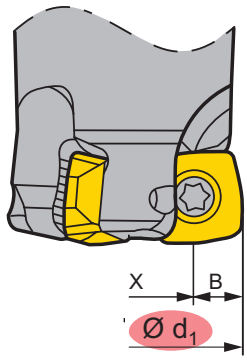


$f_z \geq 0.5$ / tooth



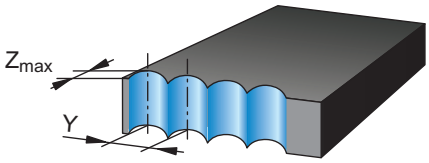
recommended

Axial plunging

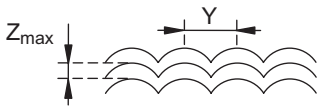


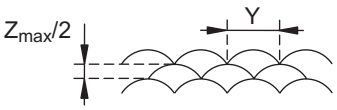
d_1 [mm]	X [mm]	B [mm]
16 - 32	d_1-(2 x B)	4,3

Angled ramping

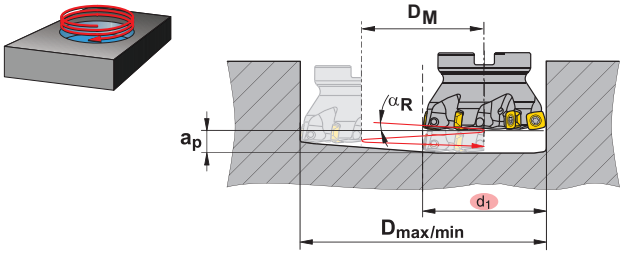


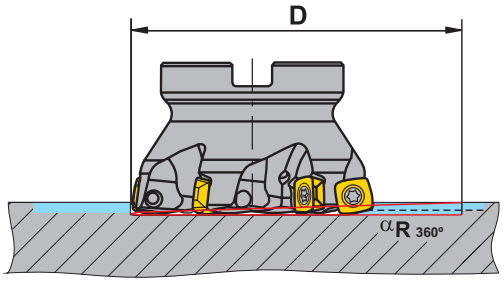
Z_{max} [mm]	f_z initial [mm]	f_z min [mm]	f_z max [mm]	Y_{max} [mm]
5,3	0,10	0,08	0,15	< 0,7 x d_1





Helical plunge milling





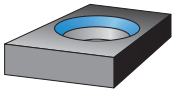
D_{max} [mm] = maximum diameter for flat bottom ground
D_{min} [mm] = minimum hole diameter
$D_M = D_{max} - d_1$ or $D_{min} - d_1$

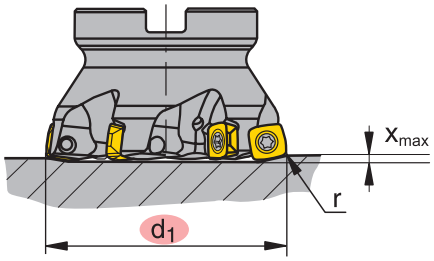
d_1 [mm]	D_{max} [mm]	D_{min} [mm]	$\alpha_{R\,max}$ [°]
25	48	35	3,1
32	62	49	1,7
35	68	55	1,4
40	78	65	1,0
42	82	69	0,9
50	98	85	0,8
52	102	89	0,7
63	124	111	0,7
66	130	117	0,6

a_p [mm] = D_M x π x tan α_R

d_1 [mm]	D [mm]	$\alpha_{R\,max}$ 360° [°]
25	35	3,1
32	49	1,7
35	55	1,4
40	65	1,0
42	69	0,9
50	85	0,8
52	89	0,7
63	111	0,7
66	117	0,6

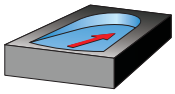
Axial plunging

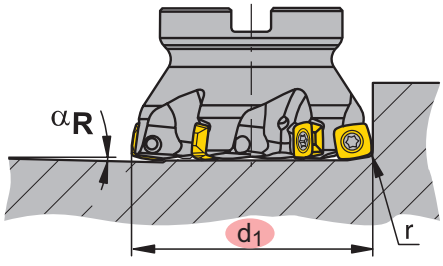




d_1 [mm]	X_{max} [mm]
25 - 66	0,75

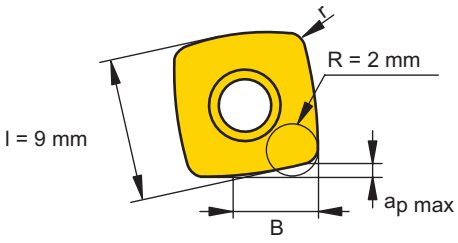
Angled ramping





d_1 [mm]	$\alpha_{R\,max}$ [°]
25	3,6
32	2,0
35	1,6
40	1,2
42	1,1
50	0,9
52	0,8
63	0,8
66	0,7

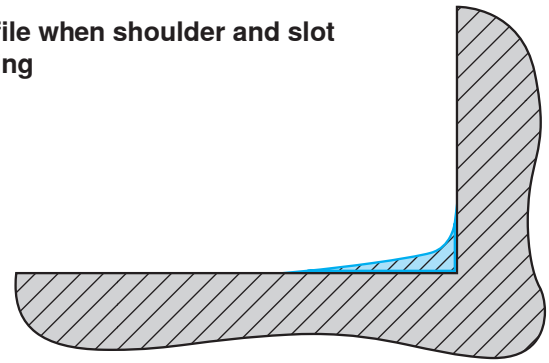
Depth of cut and remaining material



l [mm]	B [mm]	r [mm]	$a_{p\,max}$ [mm]
9	5,9	0,8	1

R = programmed radius

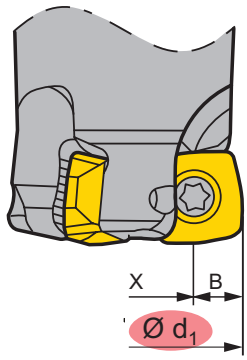
Profile when shoulder and slot milling



$f_z \geq 0.5$ / tooth

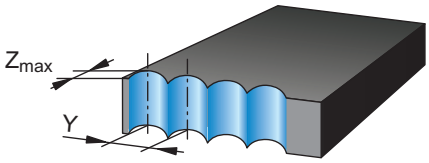
recommended

Width of cut for flat surfaces



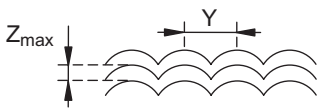
d_1 [mm]	X [mm]	B [mm]
25-66	d_1-(2 x B)	5,9

Engagement data when plunge milling

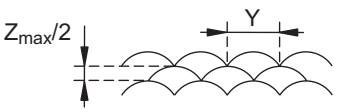


Z_{max} [mm]	f_z initial [mm]	f_z min [mm]	f_z max [mm]	Y_{max} [mm]
7,5	0,10	0,08	0,15	< 0,7 x d_1

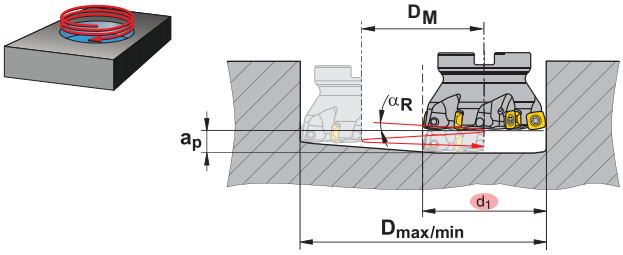
Tool offset with optimum overlap

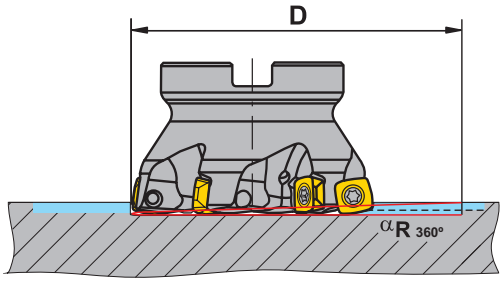


Tool offset for unstable conditions



Helical plunge milling





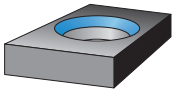
D_{max} [mm] = maximum diameter for flat bottom ground
D_{min} [mm] = minimum hole diameter
$D_M = D_{max} - d_1$ or $D_{min} - d_1$

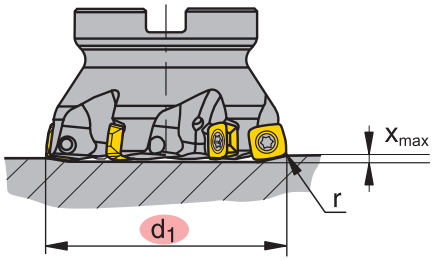
d_1 [mm]	D_{max} [mm]	D_{min} [mm]	$\alpha_{R\ max}$ [°]
32	62	44	6,1
35	68	50	3,7
40	78	60	2,5
42	82	64	2,3
50	98	80	1,3
52	102	84	1,3
63	124	106	0,9
66	130	112	0,9
80	158	140	1,1
100	198	180	0,6

a_p [mm] = $D_M \times \pi \times \tan \alpha_R$

d_1 [mm]	D [mm]	$\alpha_{R\ max}$ 360° [°]
32	44	6,1
35	50	3,7
40	60	2,5
42	64	2,3
50	80	1,3
52	84	1,3
63	106	0,9
66	112	0,9
80	140	1,1
100	180	0,6

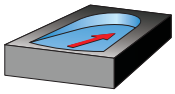
Axial plunging

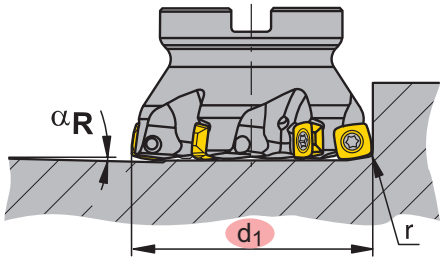




d_1 [mm]	X_{max} [mm]
32 - 100	1,15

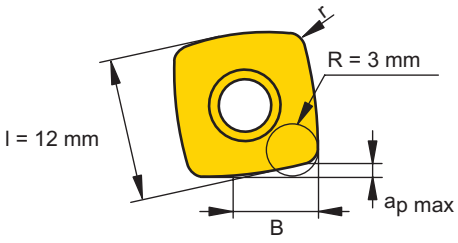
Angled ramping





d_1 [mm]	$\alpha_{R\ max}$ [°]
32	7,2
35	4,4
40	2,9
42	2,7
50	1,5
52	1,5
63	1,1
66	1,1
80	1,3
100	0,7

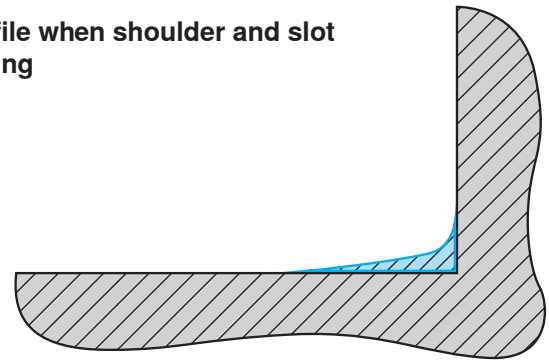
Depth of cut and remaining material



l [mm]	B [mm]	r [mm]	$a_{p\,max}$ [mm]
12	8,3	1,0	2

R = programmed radius

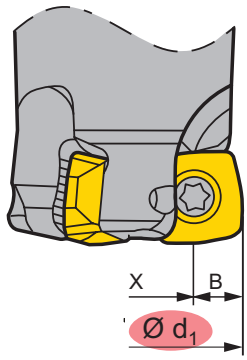
Profile when shoulder and slot milling



$f_z \geq 0.5$ / tooth

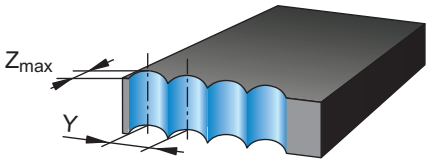
recommended

Width of cut for flat surfaces



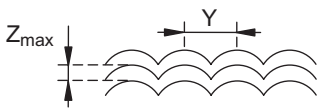
d_1 [mm]	X [mm]	B [mm]
32 - 100	d_1-(2 x B)	8,3

Engagement data when plunge milling

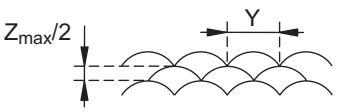


Z_{max} [mm]	f_z initial [mm]	f_z min [mm]	f_z max [mm]	Y_{max} [mm]
10	0,15	0,10	0,20	< 0,7 x d_1

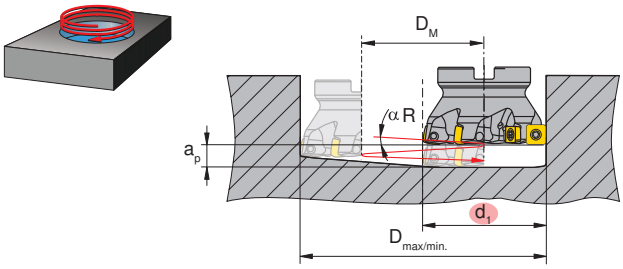
Tool offset with optimum overlap



Tool offset for unstable conditions



Helical plunge milling



D_{max} [mm] = maximum diameter for flat bottom ground
D_{min} [mm] = minimum hole diameter
$D_M = D_{max} - d_1$ or $D_{min} - d_1$

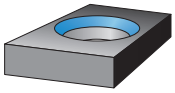
MaxiMill 490-09

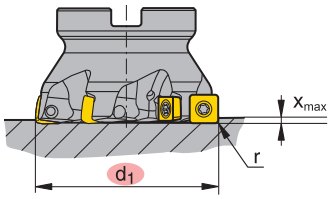
d_1 [mm]	D_{max} [mm]	D_{min} [mm]	$\alpha_{R\ max}$ [°]
25	48	37	4,4
32	62	47	2,2
40	78	63	0,75
50	98	83	0,5
63	124	109	0,35
80	158	143	0,25
100	198	183	0,2

MaxiMill 490-12

d_1 [mm]	D_{max} [mm]	D_{min} [mm]	$\alpha_{R\ max\ 360°}$ [°]
32	62	41	2,0
40	78	57	2,0
50	98	77	1,2
63	124	103	0,7
80	158	137	0,6
100	198	177	0,4
125	248	227	0,3

Axial plunging





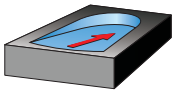
MaxiMill 490-09

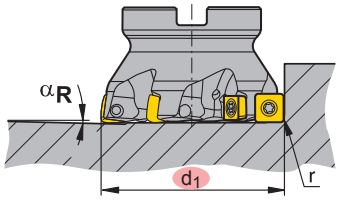
d_1 [mm]	X_{max} [mm]
25	0,5
32	0,5
40	0,3
50	0,3
63	0,3
80	0,3
100	0,3

MaxiMill 490-12

d_1 [mm]	X_{max} [mm]
32	0,3
40	0,5
50	0,5
63	0,5
80	0,5
100	0,5
125	0,5

Angled ramping





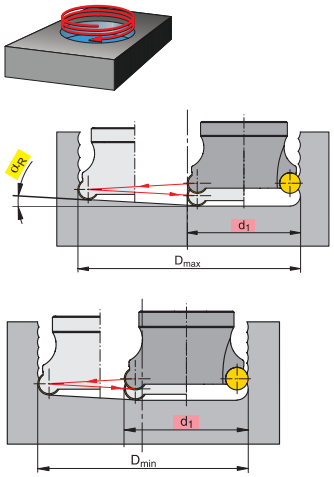
MaxiMill 490-09

d_1 [mm]	α_R [°]
25	4,4
32	2,2
40	0,75
50	0,5
63	0,35
80	0,25
100	0,2

MaxiMill 490-12

d_1 [mm]	α_R [°]
32	2,0
40	2,0
50	1,2
63	0,7
80	0,6
100	0,4
125	0,3

Helical plunge milling

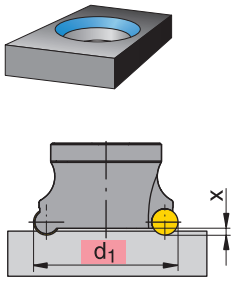


d_1 [mm]	D [mm]	⊙ 5 [mm]	⊙ 5 α_R [°]	⊙ 8 [mm]	⊙ 8 α_R [°]	⊙ 10 [mm]	⊙ 10 α_R [°]	⊙ 12 [mm]	⊙ 12 α_R [°]	⊙ 16 [mm]	⊙ 16 α_R [°]	⊙ 20 [mm]	⊙ 20 α_R [°]
10	D_{min} D_{max}	12 15	2,5	– –		– –		– –		– –		– –	
12	D_{min} D_{max}	16 19	2,1	– –		– –		– –		– –		– –	
16	D_{min} D_{max}	24 27	1,5	21 24	2,4	– –		– –		– –		– –	
20	D_{min} D_{max}	32 35	1,2	27 32	1,9	26 30	1,3	– –		– –		– –	
25	D_{min} D_{max}	42 45	1,0	37 42	1,5	37 40	1,8	31 38	2,2	– –		– –	
32	D_{min} D_{max}	56 59	0,7	51 56	1,2	50 54	1,5	46 52	1,7	– –		– –	
40	D_{min} D_{max}	– –		– –		64 70	1,1	62 68	1,4	– –		– –	
42	D_{min} D_{max}	– –		– –		68 74	1,1	– –		– –		– –	
50	D_{min} D_{max}	– –		– –		84 90	0,9	81 88	1,1	75 84	1,5	– –	
52	D_{min} D_{max}	– –		– –		88 94	0,9	86 92	1,0	– –		– –	
63	D_{min} D_{max}	– –		– –		– –		107 114	0,9	101 110	1,1	– –	
66	D_{min} D_{max}	– –		– –		– –		113 120	0,8	– –		– –	
80	D_{min} D_{max}	– –		– –		– –		142 148	0,7	135 144	0,9	128 140	1,1
100	D_{min} D_{max}	– –		– –		– –		181 188	0,5	175 184	0,7	168 180	0,9
125	D_{min} D_{max}	– –		– –		– –		– –		– –		218 230	0,7

D_{max} [mm] = maximum diameter for flat bottom ground
D_{min} [mm] = minimum hole diameter
$D_M = D_{max} - d_1$ or $D_{min} - d_1$

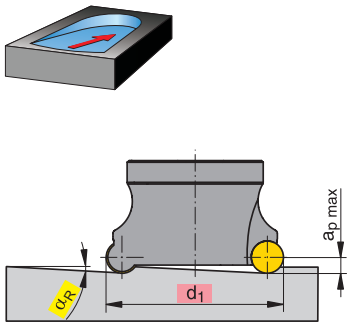
⚠ Maximum possible hole diameter
$r = 2 \times d_1 - 1$ mm

Axial plunging



Ø ⊙ [mm]	d_1 [mm]	X_{max} [mm]
05	10	0,5
	12-32	1,3
08	16	0,5
	20-32	2,7
10	20	0,2
	25	0,4
	32	0,8
	40_52	1,5
12	25	1,0
	32	1,1
	40	1,2
	50-100	1,5
16	50-100	2,0
20	80-125	3,0

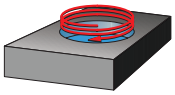
Angled ramping

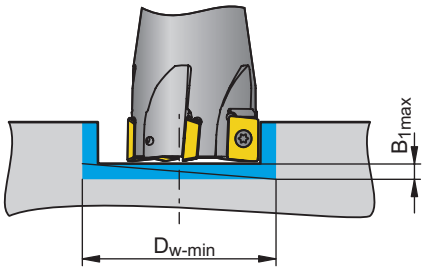


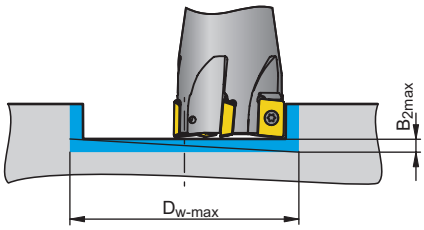
d_1 [mm]	⊙ 5 α_R [°]	⊙ 8 α_R [°]	⊙ 10 α_R [°]	⊙ 12 α_R [°]	⊙ 16 α_R [°]	⊙ 20 α_R [°]
10	3,4					
12	16,0	–	–	–	–	–
16	8,0	5,0	–	–	–	–
20	5,5	20,0	1,3	–	–	–
25	4,0	13,0	2,0	6,0	–	–
32	3,0	8,0	3,0	4,0	–	–
40	–	–	3,3	2,8	–	–
42	–	–	3,1	–	–	–
50	–	–	2,4	2,6	4,0	–
52	–	–	2,2	2,3	–	–
63	–	–	–	1,9	2,8	–
66	–	–	–	1,6	–	–
80	–	–	–	1,3	2,0	3,2
100	–	–	–	1,0	1,5	2,3
125	–	–	–	–	–	1,7

Application data

MaxiMill HSV / 210 / 270 / 141







α
Ramp angle

B
Calculated pitch / $D_w > D_{w\text{-}min}$ and $D_w < D_{w\text{-}max}$

B_{1max}
Max. pitch when plunging with minimum hole diameter

B_{2max}
Max. when plunging with maximum diameter

d_1
Milling cutter diameter

D_w
Diameter of hole

$D_{w\text{-}max}$
Largest hole diameter (without formation of pip)

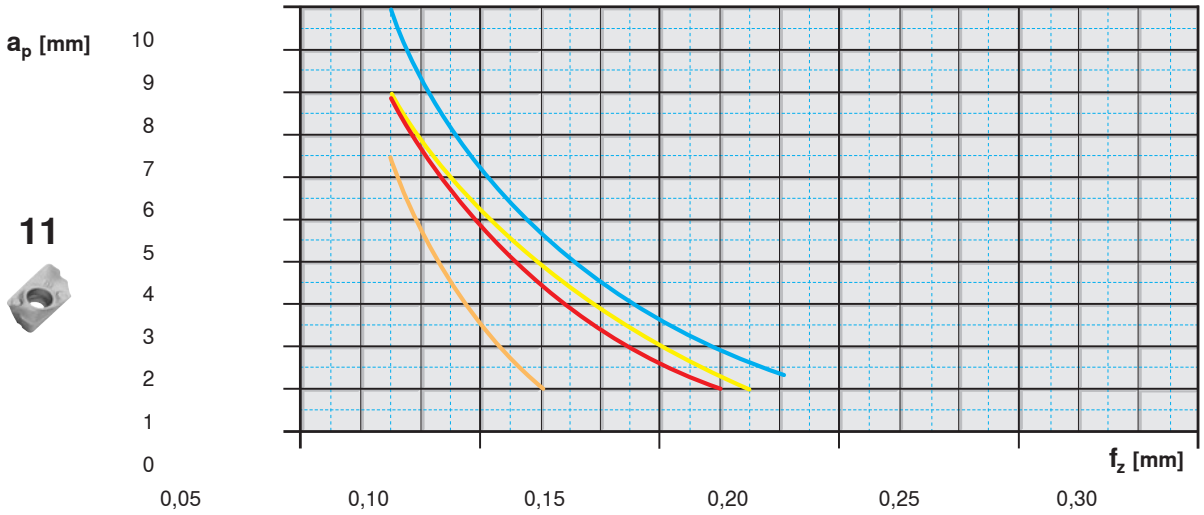
$D_{w\text{-}min}$
Minimum hole diameter

$$B = (D_w - d_1) \cdot \pi \cdot \tan \alpha$$

D [mm]	[mm] $D_{w\text{-}min}$	$B_{1\text{-}max}$	$D_{w\text{-}max}$	$B_{2\text{-}max}$	α
HSV					
Ø 40	58,0	8,0	74,0	15,0	8°
Ø 50	78,2	9,0	94,0	15,0	6°
Ø 63	104,0	10,5	120,0	15,0	4,8°
Ø 80	138,0	11,8	154,0	15,0	3,7°
210					
Ø 16	22,0	1,4	30,0	2,9	4,3°
Ø 20	30,0	1,5	38,0	2,6	2,7°
Ø 25	40,0	1,6	48,0	2,3	1,9°
Ø 32	54,0	1,6	62,0	2,2	1,3°
Ø 40	70,0	1,7	78,0	2,1	1,0°
Ø 50	90,0	1,6	98,0	1,9	0,7°
Ø 63	116,0	1,6	124,0	1,8	0,5°
Ø 80	150,0	1,5	158,0	1,7	0,4°
Ø 100	190,0	1,5	198,0	1,7	0,32°
Ø 125	240,0	1,5	248,0	1,7	0,25°
270-09					
Ø 06	14,4	1,5	19,0	1,5	–
Ø 12	28,5	1,5	31,0	1,5	–
Ø 16	36,5	1,5	39,0	1,5	–
Ø 20	44,5	1,5	47,0	1,5	–
Ø 25	54,5	1,5	57,0	1,5	–
Ø 32	68,5	1,5	71,0	1,5	–
Ø 40	84,5	1,5	87,0	1,5	–
Ø 50	104,5	1,5	107,0	1,5	–
Ø 63	130,5	1,5	133,0	1,5	–
Ø 80	164,5	1,5	167,0	1,5	–
Ø 100	204,5	1,5	207,0	1,5	–
Ø 125	254,5	1,5	257,0	1,5	–
Ø 160	324,5	1,5	327,0	1,5	–
270-12					
Ø 32	74,5	1,5	78,0	1,5	14,9
Ø 40	90,5	1,5	94,0	1,5	11,1
Ø 50	110,5	1,5	114,0	1,5	8,4
Ø 63	136,5	1,5	140,0	1,5	6,4
Ø 80	170,5	1,5	174,0	1,5	4,9
Ø 100	210,5	1,5	214,0	1,5	3,8
Ø 125	260,5	1,5	264,0	1,5	3,0
Ø 160	330,5	1,5	334,0	1,5	2,3
141					
Ø 16	20,0	0,4	30,0	1,5	2,0°
Ø 20	24,0	0,4	38,0	1,9	2,0°
Ø 25	34,0	0,9	48,0	2,5	2,0°
Ø 32	48,0	1,7	62,0	3,2	2,0°
Ø 40	64,0	1,9	78,0	3,1	1,5°
241					
Ø 40	64,0	1,9	78,0	3,1	1,5°
Ø 50	84,0	1,8	98,0	2,6	1,0°
Ø 63	110,0	1,2	124,0	1,6	0,5°
Ø 80	144,0	1,4	158,0	1,7	0,4°
Ø 100	184,0	1,3	198,0	1,6	0,3°
Ø 125	234,0	1,2	248,0	1,3	0,2°

	Example materials			
▼	High alloyed steel	1.000 N/mm^2	1.2312	40CrMnMoS 8-6
▼	Stainless steel, austenitic	600 N/mm^2	1.4571	X6CrNiMoTi 1712 2
▼	Grey cast iron pearlitic, ferritic	HB 180	EN-JL-1040	EN-GJL-250 (GG25)
▼	Super alloys, Ni-base, hardened	1.450 N/mm^2	2.4856	Inconel 625

If a_e < 50% use correction list **B222**



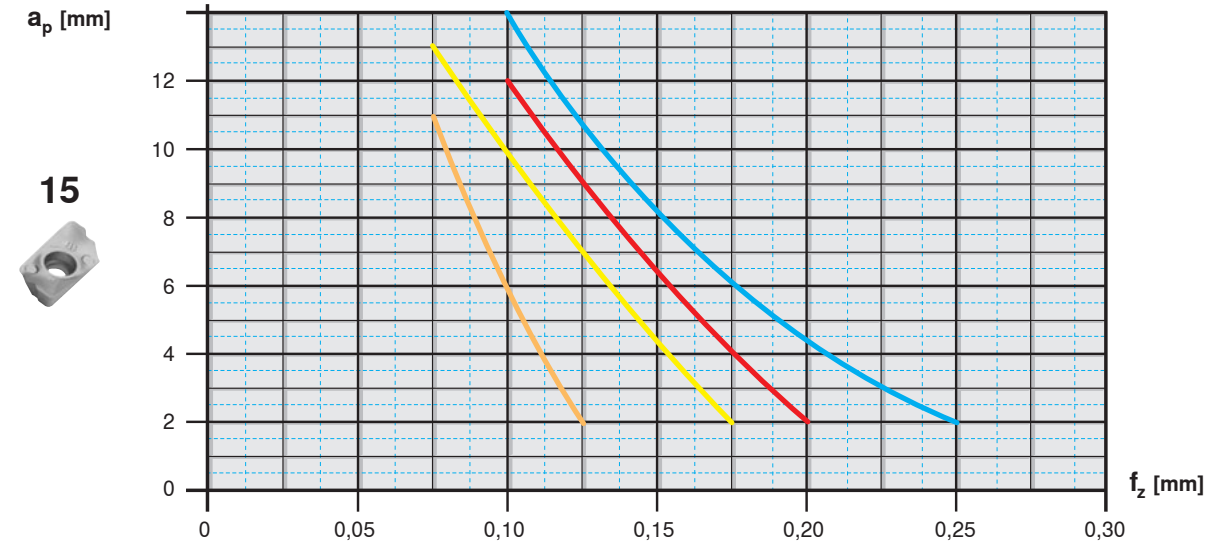
MaxiMill 211 - starting parameters

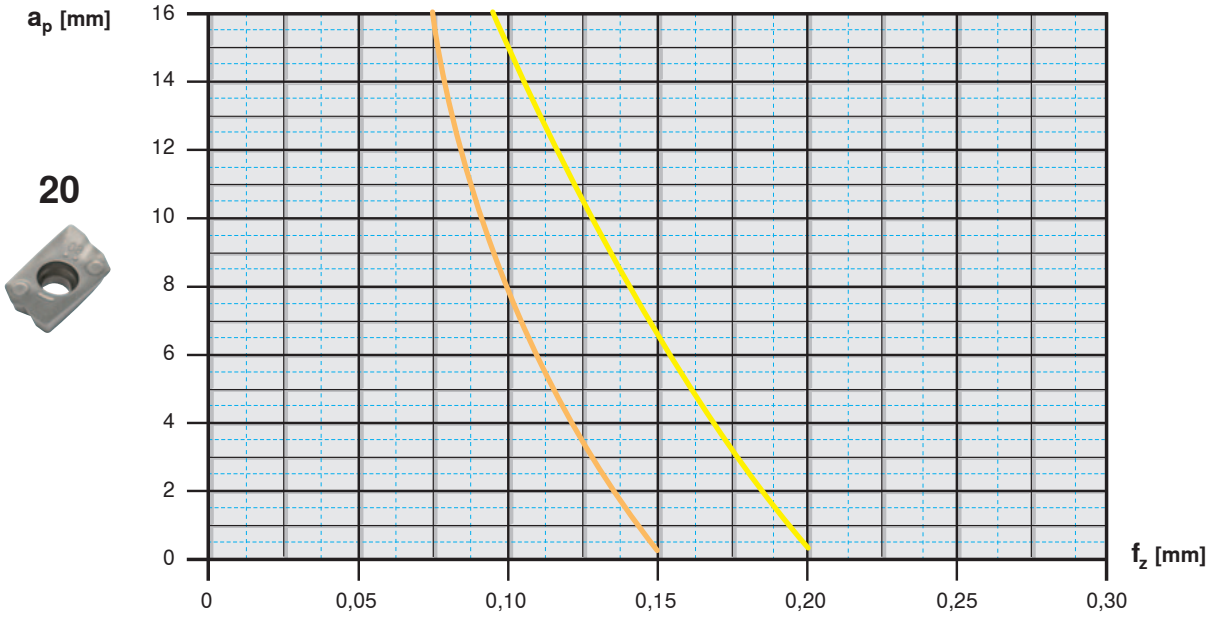
for example materials

	Example materials			
▼	High alloyed steel	1.000 N/mm²	1.2312	40CrMnMoS 8-6
▼	Stainless steel, austenitic	600 N/mm²	1.4571	X6CrNiMoTi 1712 2
▼	Grey cast iron pearlitic, ferritic	HB 180	EN-JL-1040	EN-GJL-250 (GG25)
▼	Super alloys, Ni-base, hardened	1.450 N/mm²	2.4856	Inconel 625

If a_e < 50% use correction list

B222





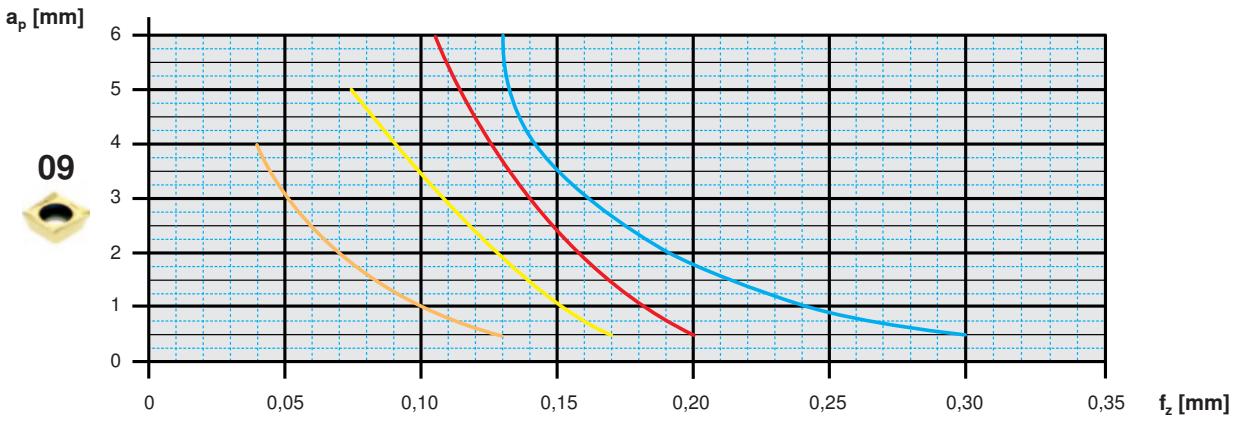
	Example materials			
▼	High alloyed steel	1.000 N/mm²	1.2312	40CrMnMoS 8-6
▼	Stainless steel, austenitic	600 N/mm²	1.4571	X6CrNiMoTi 1712 2
▼	Grey cast iron, pearlitic, ferritic	HB 180	EN-JL-1040	EN-GJL-250 (GG25)
▼	Super alloys, Ni-base, hardened	1.450 N/mm²	2.4856	Inconel 625

If a_e < 50% use correction list

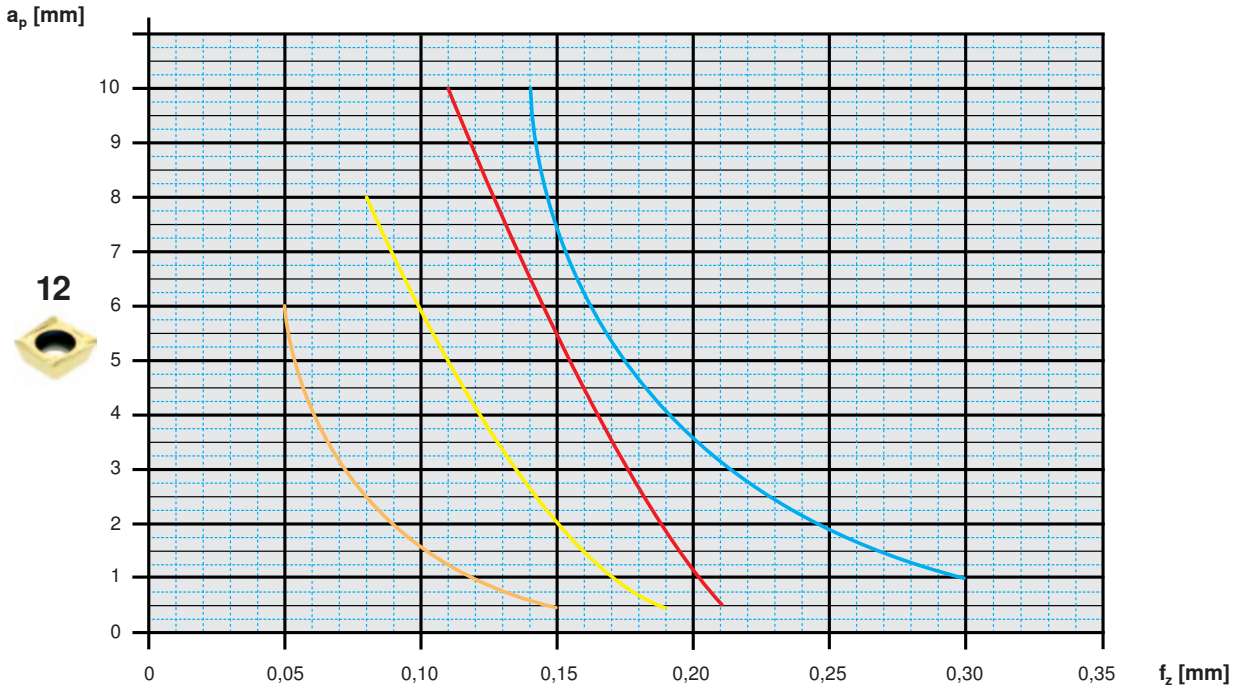
B222

490-09/-12

09



12

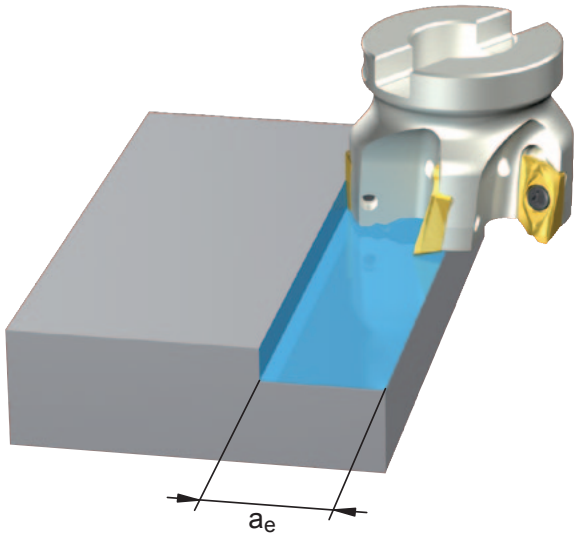


Application data for shoulder milling

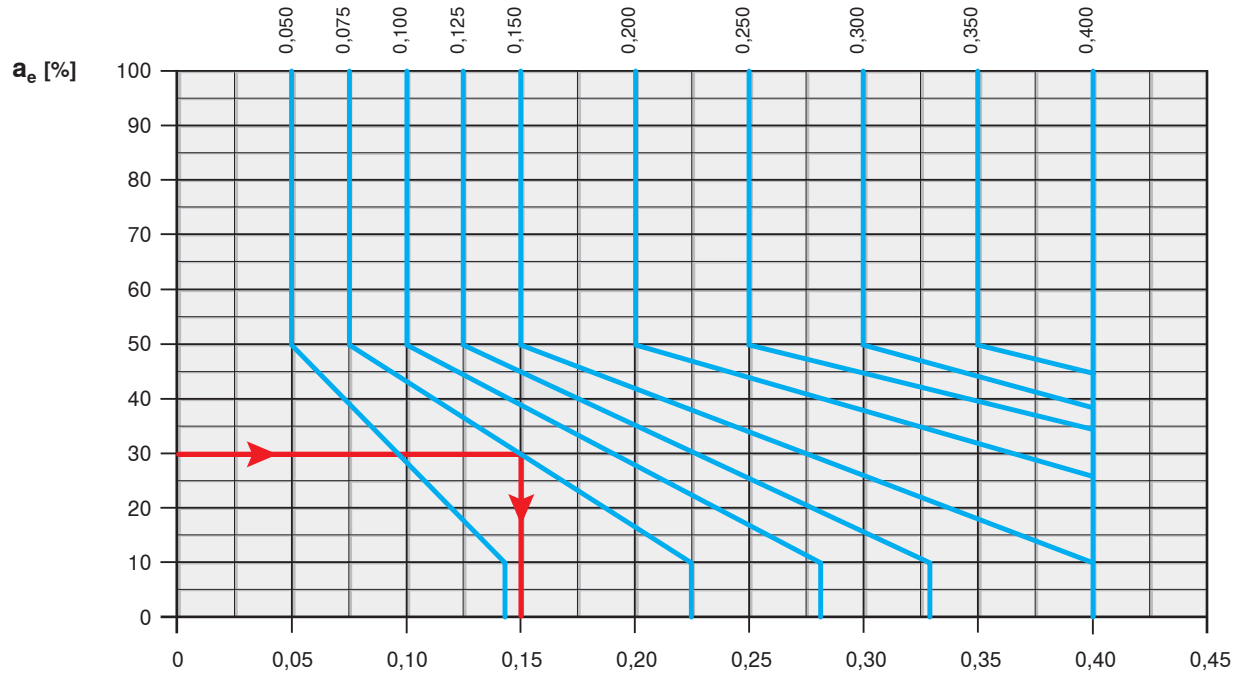
Correction of feed rate f_z

MaxiMill 211 / MaxiMill 490

These parameters apply for cutting width (a_e) below 50%



Starting values f_z [mm] from starting parameter diagram



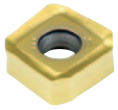
Corrected values f_z [mm]

Example:
Starting value [f_z] = 0,075 mm
a_e = 30%
Corrected value [f_z] = 0,15 mm

	Example materials			
▼	High alloyed steel	1.000 N/mm^2	1.2312	40CrMnMoS 8-6
▼	Stainless steel, austenitic	600 N/mm^2	1.4571	X6CrNiMoTi 1712 2
▼	Grey cast iron pearlitic, ferritic	HB 180	EN-JL-1040	EN-GJL-250 (GG25)
▼	Super alloys, Ni-base, hardened	1.450 N/mm^2	2.4856	Inconel 625

MaxiMill 271

SAKU



MaxiMill 273

OAKU



MaxiMill 273 / -274 - starting parameters

for example material

	Example materials			
▼	High alloyed steel	1.000 N/mm²	1.2312	40CrMnMoS 8-6
▼	Stainless steel, austenitic	600 N/mm²	1.4571	X6CrNiMoTi 1712 2
▼	Grey cast iron pearlitic, ferritic	HB 180	EN-JL-1040	EN-GJL-250 (GG25)
▼	Super alloys, Ni-base, hardened	1.450 N/mm²	2.4856	Inconel 625

MaxiMill 274



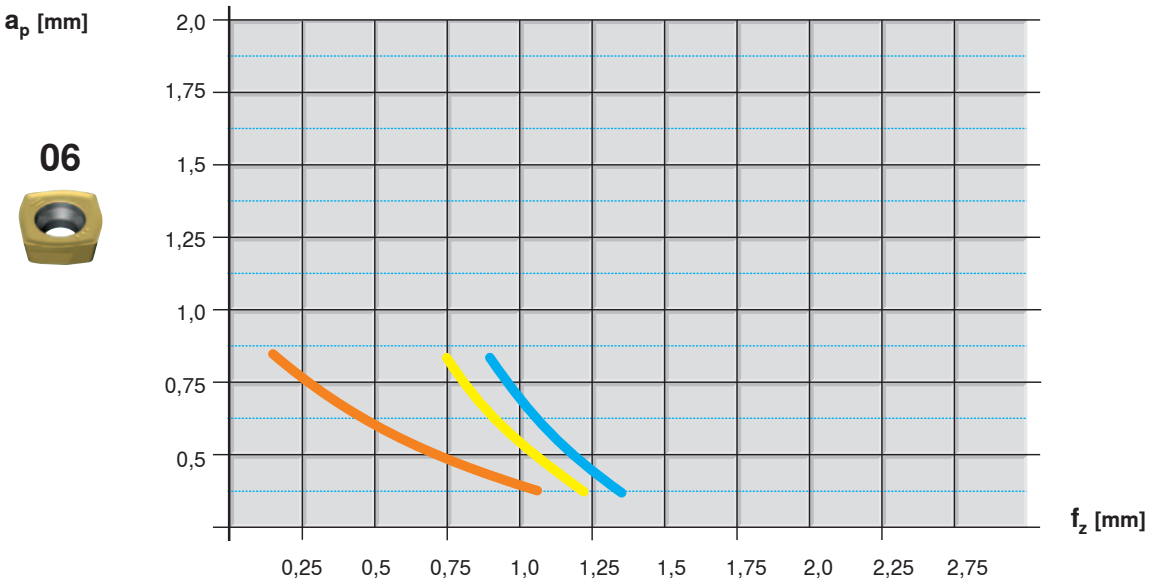
MaxiMill 274

SF..09

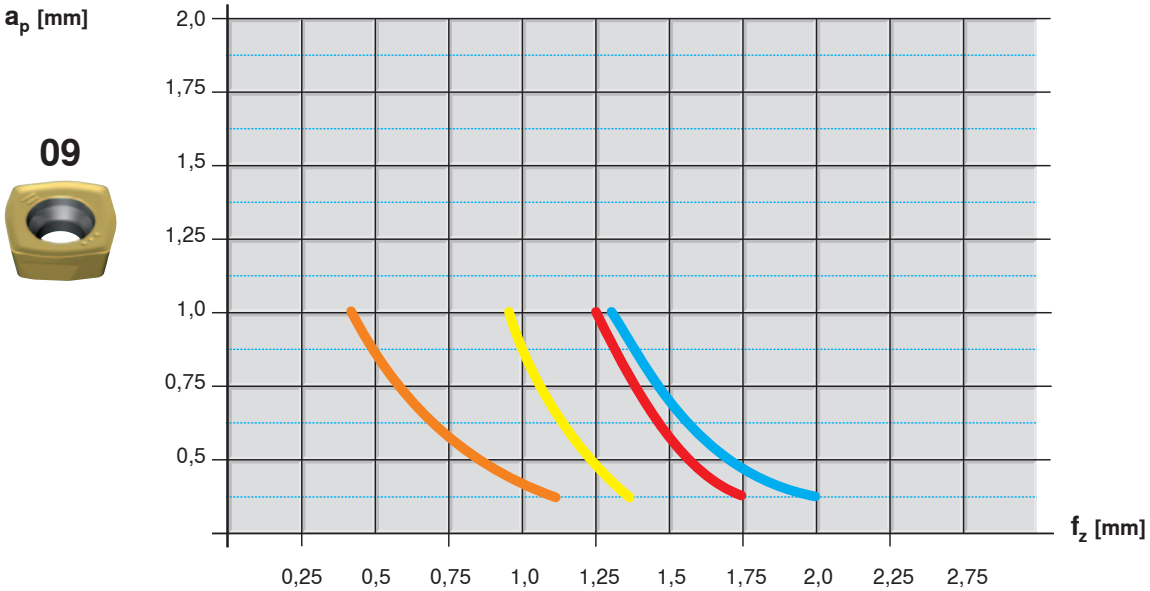


	Example materials			
▼	High alloyed steel	1.000 N/mm^2	1.2312	40CrMnMoS 8-6
▼	Stainless steel, austenitic	600 N/mm^2	1.4571	X6CrNiMoTi 1712 2
▼	Grey cast iron pearlitic, ferritic	HB 180	EN-JL-1040	EN-GJL-250 (GG25)
▼	Super alloys, Ni-base, hardened	1.450 N/mm^2	2.4856	Inconel 625

XPLX



06



09

MaxiMill HFC starting parameters

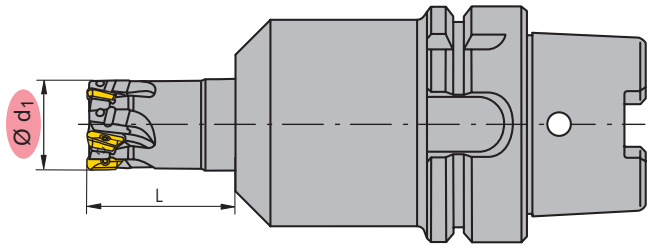
HFC-12

	Example materials			
▼	High alloyed steel	1.000 N/mm^2	1.2312	40CrMnMoS 8-6
▼	Stainless steel, austenitic	600 N/mm^2	1.4571	X6CrNiMoTi 1712 2
▼	Grey cast iron pearlitic, ferritic	HB 180	EN-JL-1040	EN-GJL-250 (GG25)
▼	Super alloys, Ni-base, hardened	1.450 N/mm^2	2.4856	Inconel 625

XOLX

12





Maximum RPM in relation to overhang length L.

The revolution number must be adapted according to the machining situation and the selected tool shank.

211-11

Ø d_1 mm	211-07 n_{max} [min^{-1}]			211-11 n_{max} [min^{-1}]			211-15 n_{max} [min^{-1}]		
	L = 2xØ	L = 3xØ	L = 5xØ	L = 2xØ	L = 3xØ	L = 5xØ	L = 2xØ	L = 3xØ	L = 5xØ
10	72.000	58.000	46.000	–	–	–		–	–
12	67.000	54.000	38.000	56.000	45.000	32.000	–	–	–
16	50.000	41.000	29.000	42.000	34.000	24.000	–	–	–
20	44.000	34.000	23.000	37.000	29.000	20.000	–	–	–
25	40.000	29.000	18.000	33.000	24.000	15.000	27.000	20.000	12.000
32	36.000	25.000	14.000	30.000	21.000	12.000	24.000	17.000	10.000
40	33.000	22.000	11.000	28.000	18.000	9.000	22.000	14.000	7.000
50	30.000	18.000	7.000	25.000	15.000	6.000	20.000	12.000	5.000
63	–	–	–	23.000	13.000	4.000	19.000	10.000	3.000
80	–	–	–	21.000	11.000	–	17.000	8.000	–
100	–	–	–	20.000	8.000	–	16.000	7.000	–
125	–	–	–	18.000	–	–	14.000	–	–
160	–	–	–	17.000	–	–	13.000	–	–

HSC/HPC

Ø d_1 mm	HSC-11 n_{max} [min^{-1}]			HSC-19 n_{max} [min^{-1}]			HPC-19 n_{max} [min^{-1}]		
	L = 2xØ	L = 3xØ	L = 5xØ	L = 2xØ	L = 3xØ	L = 5xØ	L = 2xØ	L = 3xØ	L = 5xØ
16	56.000	49.000	35.000	–	–	–		–	–
18	53.000	47.000	33.000	–	–	–	–	–	–
19	52.000	45.000	32.000	–	–	–	–	–	–
20	50.000	44.000	31.000	–	–	–	–	–	–
22	48.000	42.000	30.000	–	–	–	45.000	42.000	32.000
25	45.000	39.000	28.000	35.000	31.000	22.000	45.000	40.000	28.000
32	40.000	35.000	25.000	29.000	25.000	18.000	40.000	35.000	25.000
40	36.000	31.000	22.000	25.000	22.000	16.000	36.000	31.000	22.000
50	32.000	28.000	20.000	22.000	19.000	14.000	32.000	28.000	20.000
63	28.000	25.000	18.000	19.000	17.000	–	29.000	25.000	–
80	25.000	22.000	–	16.000	14.000	–	25.000	22.000	–
100	22.000	20.000	–	15.000	–	–	23.000	–	–
125	–	–	–	13.000	–	–	20.000	–	–

Forces in the tooling system

F_a = axial force

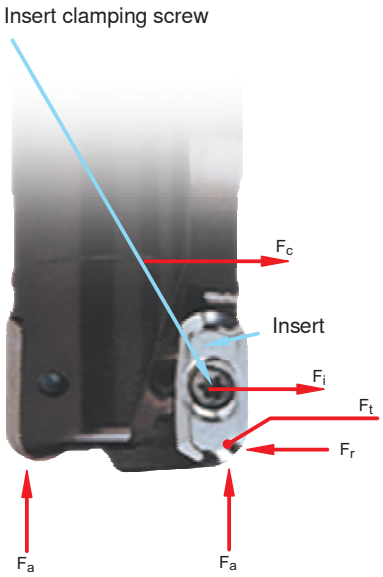
F_r = radial force

F_t = tangential force

F_c = centrifugal force (tool body)

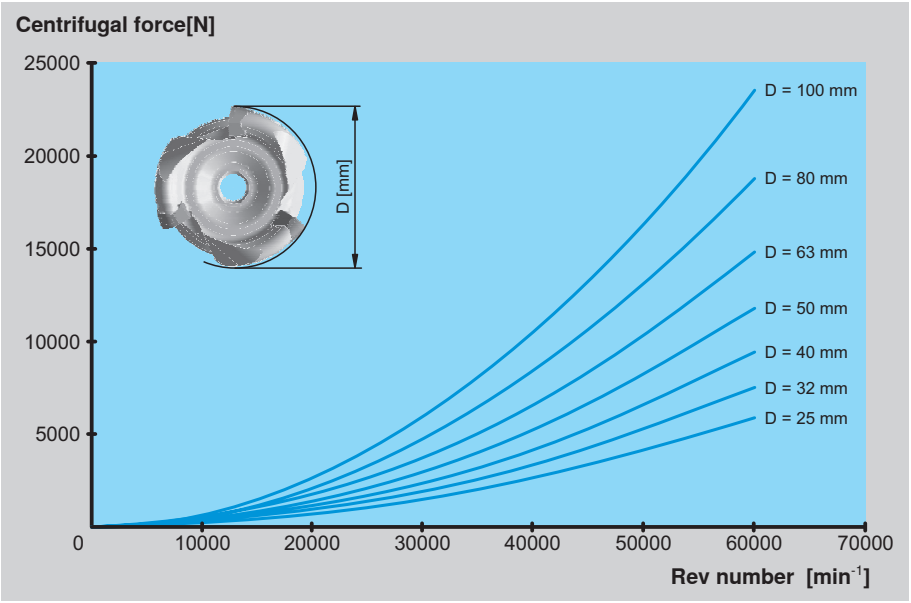
F_i = centrifugal force (insert)

Forces present in the HSC milling cutter during machining. With HSC machining, the centrifugal forces produce considerably more stress on the tool than the cutting forces.



Note safety rules enclosed to the tool.

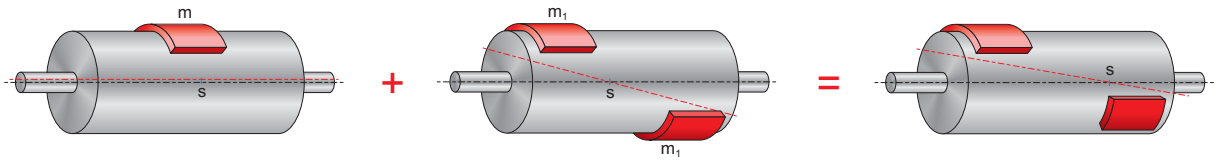
See also permissible residual unbalance: DIN 1940



Centrifugal forces generated are dependant upon tool diameter and rotational speed (rpm), example: indexable insert of 12g.

Revolutions per minute increase times two = centrifugal force increase times four

Balance types:

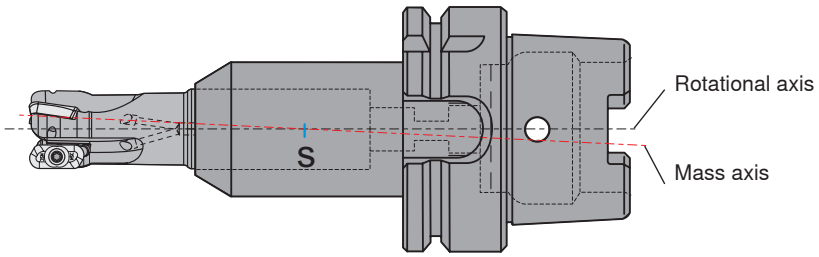


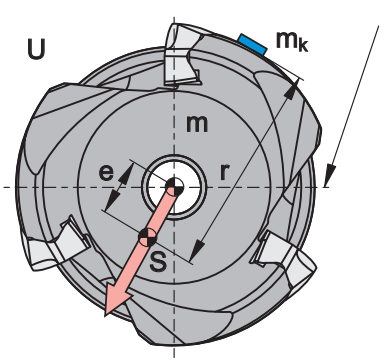
Static unbalance | **Moment unbalance** | **Dynamic unbalance** is the sum of static unbalance and moment unbalance.

Unbalance

is the state of a rotor in which the mass axis does not coincide with the rotational axis.

$U = m \cdot e$ [gmm]





Unbalance is produced by a centrifugal force F which rotates with the rotor.

$$F = u \cdot \omega^2 = m \cdot e \cdot \omega^2 = \frac{m \cdot e\,(2 \cdot x \cdot n)^2}{60^2}\ [N]$$

$$m_k = \frac{m \cdot e}{r}\ [g]$$

m = mass [g]
e = radius of gravity centre [mm]
S = mass axis
m_k = counterweight

U = unbalance
ω = angular velocity [s^{-1}]

Reasons for unsymmetric mass distribution regarding the rotational axis

> Manufacturing tolerance (tool and adapter)
> Driving grooves on the SK/BT flange
> Unprocessed ground of the groove
> Driving grooves at HSK A, B, C, D
> Position of radial clamping screw (Weldon, Whistle Notch)
> Collet chuck (radial position of slots)
> Collet and nut
> Shank detail with Weldon and Whistle Notch
> Differential pitch of milling cutter

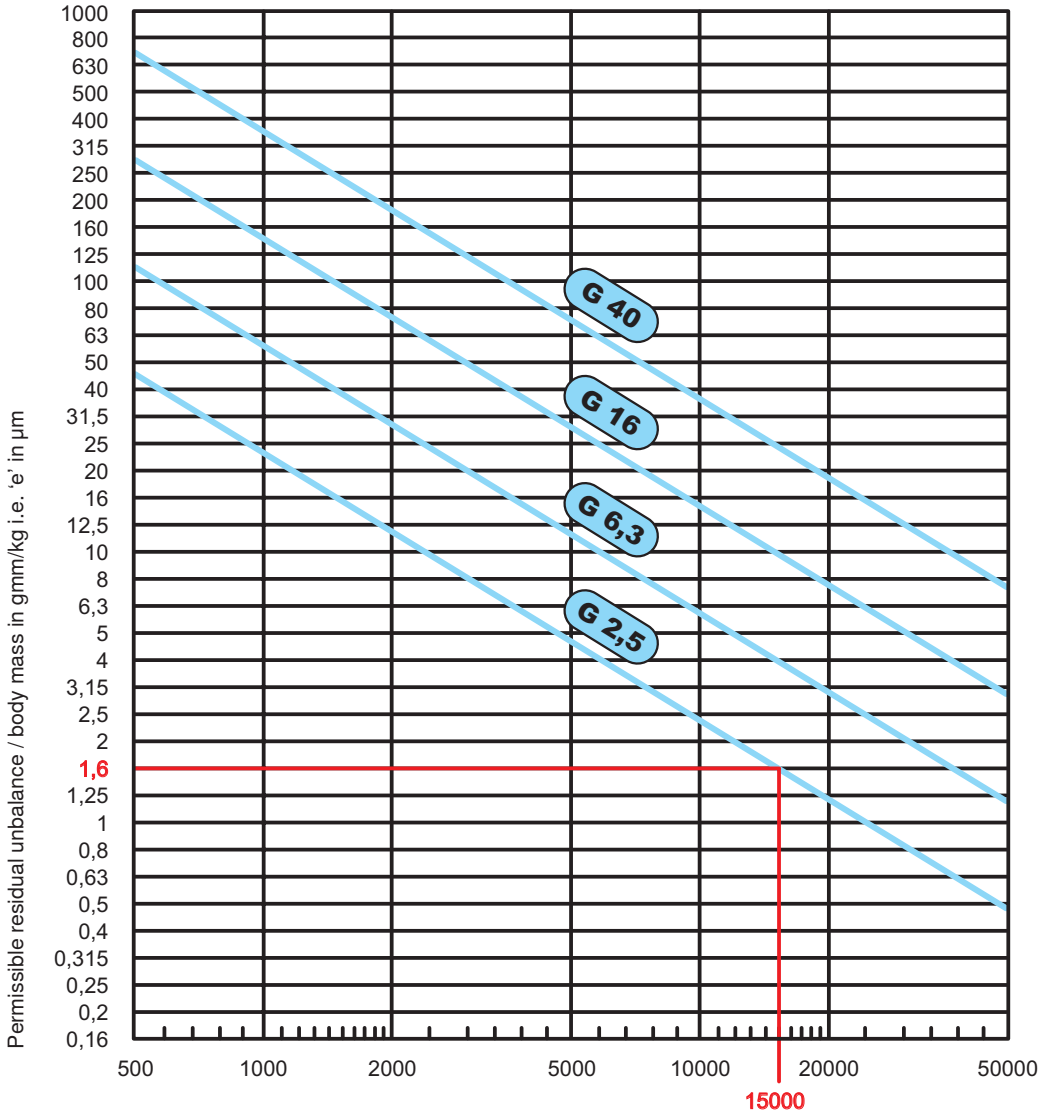
What is a quality class? - Permissible residual unbalance

Quality class means the permissible speed of the gravity centre

G = speed of gravity centre [mm/s]
e = radius of gravity centre [mm]
ω = angular velocity [s^{-1}]

$$G = e \cdot \omega \ [mm/s]$$

DIN/ISO 1940

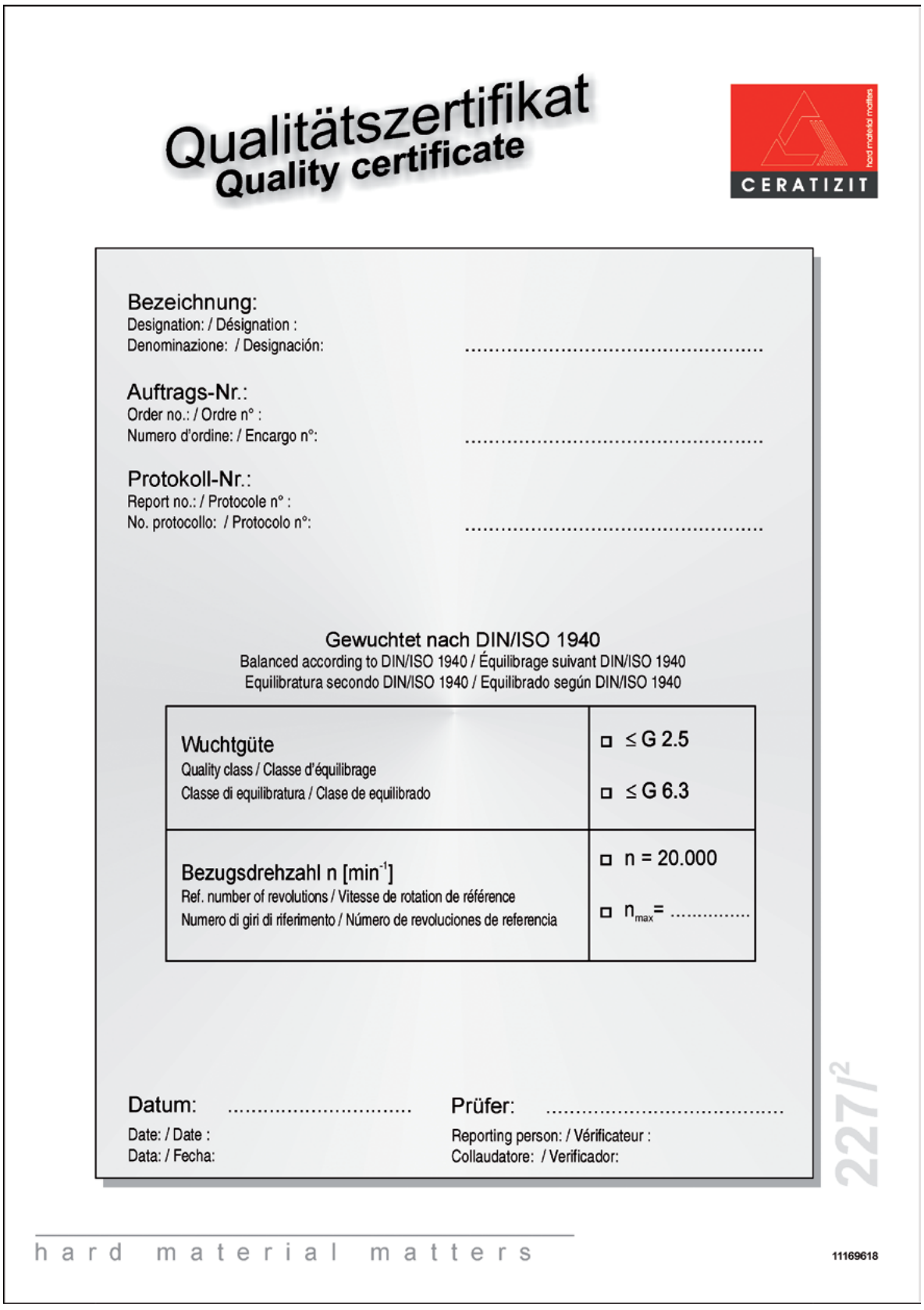


The specific residual unbalance 'e' in µm results from the operating speed and the desired quality class.

e.g.:
m = 2 kg
n = 15,000 min^{-1}
G = 2.5 results in
e = 1.6 μm
U_{tol}= 1.6 μm · 2 kg = 3.2 gmm

As a standard, monobloc tools with HSK connection are precision balanced corresponding to quality class G6.3.

All monobloc tools with direct HSK connection are delivered with a test report.



Qualitätszertifikat
Quality certificate

CERATIZIT

Bezeichnung:
Designation: / Désignation :
Denominazione: / Designación: .....

Auftrags-Nr.:
Order no.: / Ordre n° :
Numero d'ordine: / Encargo n°: .....

Protokoll-Nr.:
Report no.: / Protocole n° :
No. protocollo: / Protocolo n°: .....

Gewuchtet nach DIN/ISO 1940
Balanced according to DIN/ISO 1940 / Équilibrage suivant DIN/ISO 1940
Equilibratura secondo DIN/ISO 1940 / Equilibrado según DIN/ISO 1940

Wuchtgüte Quality class / Classe d'équilibrage Classe di equilibratura / Clase de equilibrado	☐ ≤ G 2.5 ☐ ≤ G 6.3
Bezugsdrehzahl n [min^{-1}] Ref. number of revolutions / Vitesse de rotation de référence Numero di giri di riferimento / Número de revoluciones de referencia	☐ n = 20.000 ☐ n_{max}= .....

Datum: .....
Date: / Date :
Data: / Fecha:

Prüfer: .....
Reporting person: / Vérificateur :
Collaudatore: / Verificador:

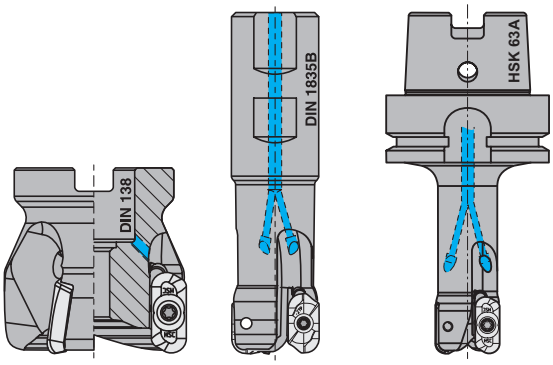
227/2

hard material matters

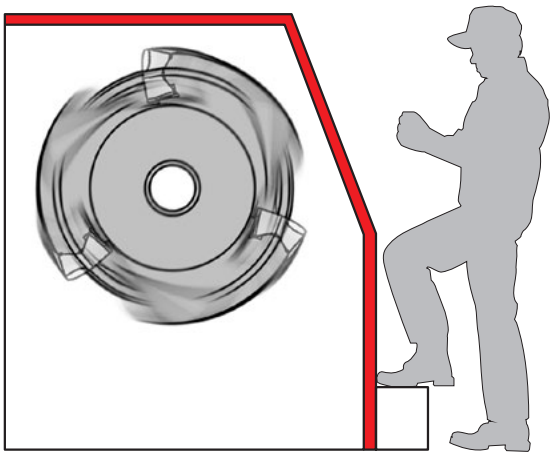
11169618

1. Suitability of the tool for HSC machining:

HSC tools from CERATIZIT have been especially developed for this machining strategy and guarantee maximum machining safety. They are clearly marked as HSC or HPC tools.



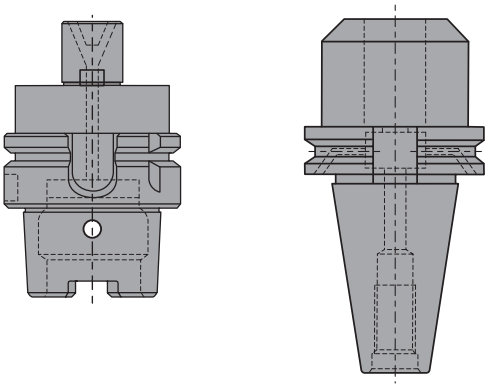
2. Observation of safety precautions of the machine manufacturer:



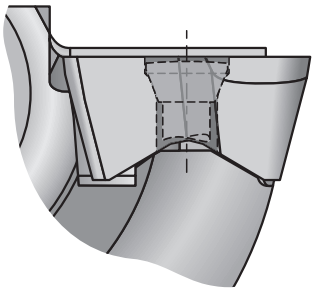
Make sure that all safety precautions of the machine manufacturers are observed (e.g.: enclosed machining units).

3. Suitability of tool adapters for HSC machining:

For fast-rotating milling applications it is necessary to balance tool and tool adapter together dynamically (see directives ISO 1940).



4. Mounting the indexable insert with the centrifugal force protection:

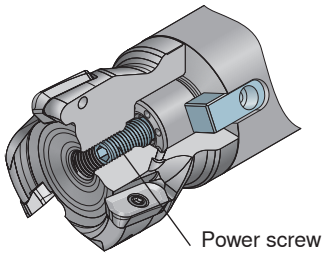


Insert clamping: EURO-patent EP 1083017A1
Make sure that the insert pocket is cleaned and the threaded bore for the clamping screw is in a top state.
Check the axial and radial contact points of the insert in the pocket.

Torque moments and torque keys
B242-B243

5. Optimum fixation of HSC cutters (d_1 = Ø 40/50/63) on end mill adapters by means of power screw:

The ‘power screw’ guarantees a stable connection of tool and milling adapter and is easy to use.



6. Maximum permissible number of revolutions:

Note the maximum permissible number of revolutions stated on the tool. This number is exclusively valid for the specific tool and must be adapted according to the selected tool shank, overhang length and the respective machining situation.

Maximum rpm determined in centrifugal force tests!



Rev numbers
B227

7. Optimum application area of the tool (a_e, a_p, f_z, n):

In order to guarantee productive milling, please observe the recommendations regarding the cutting parameters.

Every HSC/HPC tool is provided with an information sheet (‘Safety precautions’). Non observation of these safety precautions results automatically in exclusion of CERATIZIT’s liability.

Mounting procedure

HSC inserts

How to clamp the insert



Load milling cutter in presetting device or mounting base. Remove clamping screw of the insert.



Clean insert seat and check for damage.



Clean location and contact faces of the insert.

HSC (high speed cutting system): when mounting a new insert replace clamping screw with a new one!



Put insert into cleaned insert seat and press onto location face using two fingers.



Tighten clamping screw while holding the insert in place.

Clamp insert using recommended torque.

MaxiMill 274 – clamping the insert



Place the screw into the hole of the insert.



Push insert and screw into the insert pocket. Tighten the screw slightly.



Align the face of the tool with the clearance face of the insert.



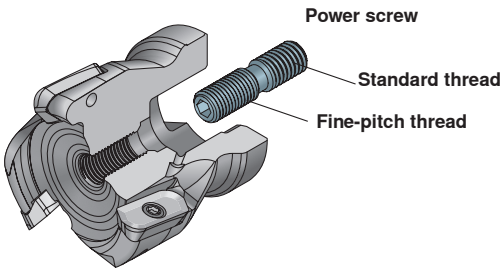
Tighten the screw. Position the screwdriver along the centreline of the screw.



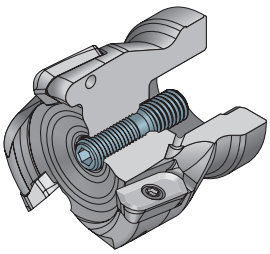
Use a torque screwdriver with 1.6 Nm/14.2 in.lbs.: DMSD 1,6Nm/SORT 08IP

How to use the ‘power screw’

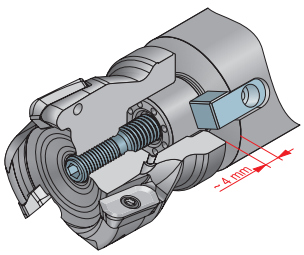
Power screw:
> 3 x clamping force of a standard cap-head screw.
> Stronger cutter body thanks to no counter-bore for cap-head screw.
> The use of a torque screwdriver is recommended!



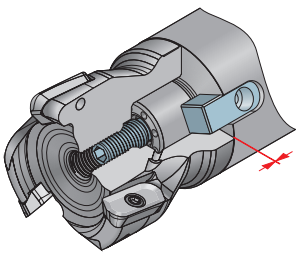
1 The fine-pitch part of the power screw is threaded into the milling cutter.



2 Turn the power screw carefully until the stop (as screw was delivered).



3 In order to guarantee an optimum connection of tool and shank, a gap of 4 mm is required between cutter body and adapter prior to final clamping.



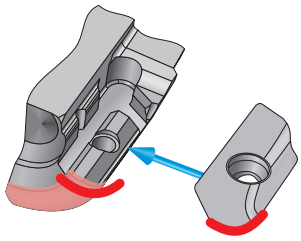
4 Turn power screw.
Torque moment:
M8.0 x 30.0 > 15 Nm!
M10.0 x 31.0 > 20 Nm!

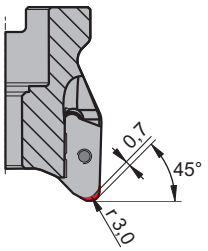
Mounting procedure MaxiMill

Modification of cutter bodies

HSC-11

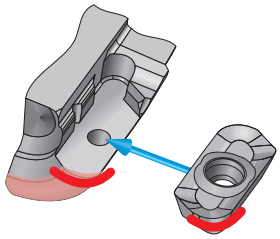
For insert radius r > 3.2 mm

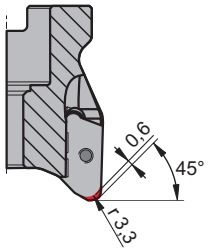




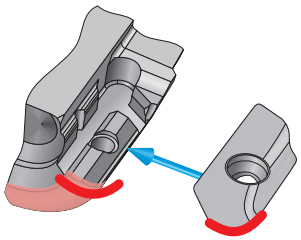
HSC/HPC-19

For insert radius r > 4.0 mm

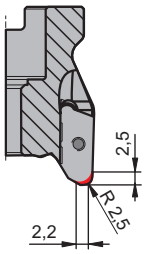




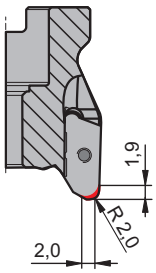
211-11 / -15



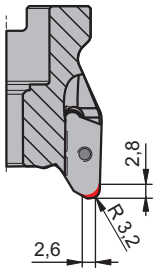
211-11
> r 1,6



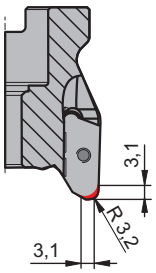
211-15
> r 2,5



211-15
> r 4,0



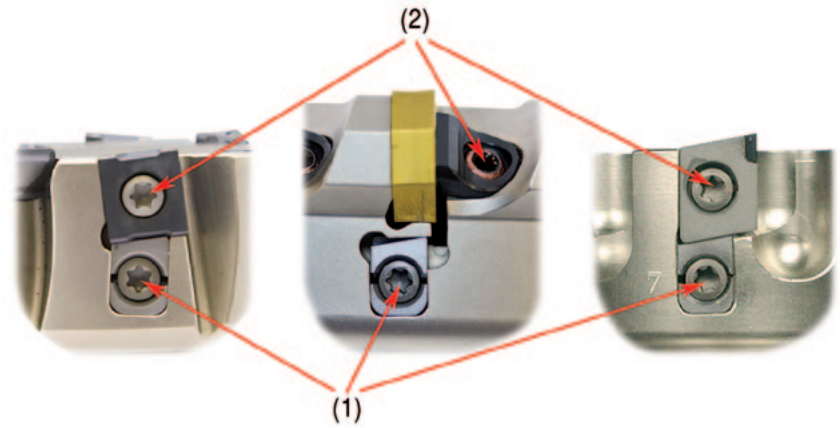
211-15
> r 5,0



210

For insert radius r > 1.6 mm

Precision setting procedure



1. Mount the setting wedges in the cutter (as supplied) and tighten the setting screw (1), to lightly hold the wedge without deforming it.

2. Mount inserts and tighten clamping screws (2) with 1.0 Nm.

3. Mark ‘highest cutting edge’ using a presetting device.

4. Change position of PCD insert by .02 mm turning the setting screw (1) clockwise. For this purpose use the TORX key!

5. Set the other cutting edges to this level, maximum deviation of .005 mm.

Maximum adjustment = .10 mm.

6. Tighten all clamping screws (2):
273-06 with 4.0 Nm
HPC-12 with 5.0 Nm
HEC-11 with 3.2 Nm.

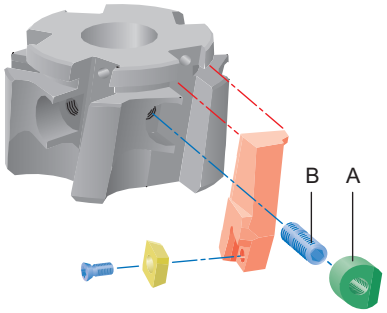
7. Check axial run-out of all inserts
→ target < .005 mm.

When changing the insert, first remove the setting screw (1), turning it counter-clockwise. After the mounting procedure is completed, the setting procedure starts again at point 1.

Setting

A260 cassette cutters

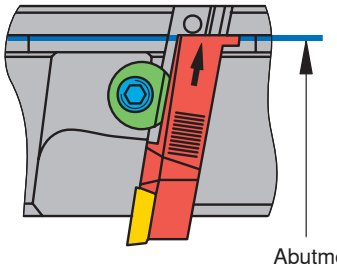
Correct assembly and disassembly of the cassettes



The special construction of the clamping wedge connection ensures that there is no axial movement of the cassette during clamping.

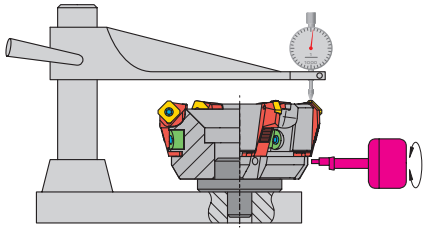
1 Clean the milling tool.
2 Loosen clamping wedge (A) by turning the clamping screw (B) anti-clockwise until the cassette can be removed radially. Screw and wedge remain on the cutter body.
3 Clean all surfaces of both cassette and cutter body.
4 Mount cassette and ease it into the desired position along the groove (e.g. circlip groove).
5 Clamp cassette with wedge.
Screw torque setting: 10 Nm.
Correct assembly of clamping wedge: turn screw once into the clamping wedge with left-handed thread. Screw wedge into cutter body with help of S4 key. Take care to avoid turning of wedge before it is fully engaged with the cutter body.

Setting of axial run-out for roughing



For assembly, simply push cassettes to the ground abutment face. The total axial run-out will be a maximum of .03 mm measured to a master insert (as delivered).

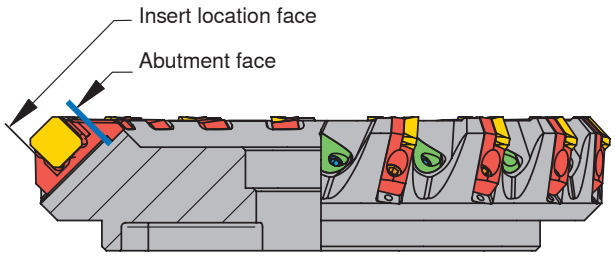
Setting of axial run-out with eccentric key and clock gauge or optical pre-setting equipment



Exact setting of axial run-out up to .002 mm

1 Clean milling tool.
2 Mount cutter on appropriate setting equipment.
3 Loosen clamping wedge, push cassette to abutment and tighten wedge lightly.
4 Insert eccentric key into hole and turn until cassette is in desired position.
5 Keep eccentric key permanently in contact with the cassette so that it remains in position. Tighten clamping wedge (torque moment 10 Nm).

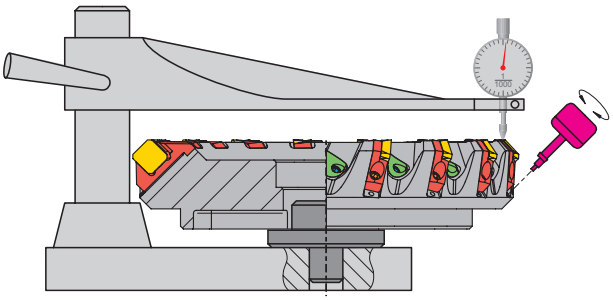
Setting of axial run-out for roughing and finishing



> **Quick and easy setting - precision of axial run-out .03mm**
> **Milling tool can remain in clamped position**

1 Clean the milling tool.
2 For assembly push cassettes to the abutment face of the radial groove, subsequently tighten with screw.
3 Mount insert and clamp with wedge (10 Nm).
4 The total axial run-out will be a maximum of .03 mm measured to a master insert (as delivered).
5 For change of insert, only the clamping wedge has to be loosened.

Setting of run-out with eccentric key and clock gauge or optical presetting equipment



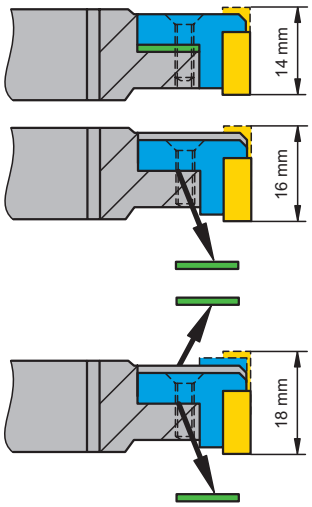
> **Exact setting of radial run-out**

1 Clean the milling tool.
2 Mount cutter body on appropriate setting equipment.
3 Loosen clamping wedge and screw, push cassette to abutment face of radial groove.
4 Press cassette carefully onto abutment face and lightly clamp. Mount insert and fasten gently with wedge.
5 Insert eccentric key into hole and turn until cassette is in desired position.
6 Keep eccentric key permanently in contact with the cassette so that it remains in position. Tighten clamping wedge (torque moment 10 Nm).

90CN change of cutting width

The special cassette design permits a change of the cutting width by max. 4 mm. The integrated precision shims allow modification steps of 2 mm (e.g. 14 mm - 16 mm - 18 mm). Deviating dimensions can be obtained easily through corrections (grinding) of the shims.

Tool example: 125H08N-S90CN12N14 (groove width = 14 - 18 mm)



When assembled (cassettes including precision shims) the nominal width amounts to 14 mm.

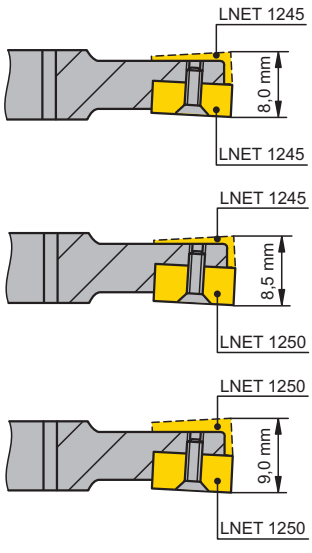
If the shims under the cassettes are removed on one side, a nominal width of 16 mm results.

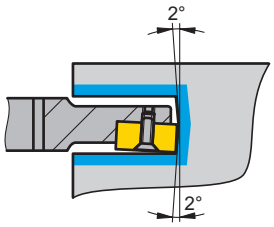
The maximum cutting width is achieved by mounting all the cassettes without shims. The nominal width then is 18 mm.

90LN change of cutting width

The nominal width of side and face milling cutters can be changed replacing the inserts, in modification steps of .5 mm, by maximally 1.0 mm.
Note: always use the screw that is appropriate for the insert!

Tool example: 125H12N-S90LN12N08 (slot width = 8 - 9 mm)

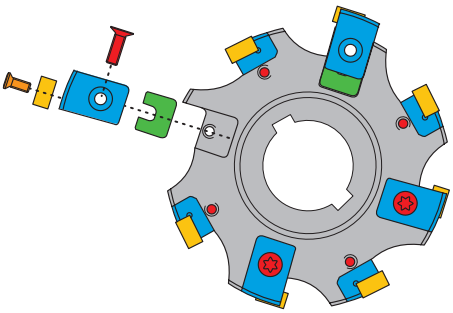




Note: 2° inclination of slot bottom face

MaxiMill 90CN

	Set 10 pcs. clamping screws	Screw driver	Cassette	Clamping screw	Screwdriver	Shim
125H08N-S90CN10N14 **160H10N-S90CN10N14** **200J12N-S90CN10N14**	MS 1273 (M4x11,5)	7724103 (T15)	K-CN1014-R K-CN1014-L	MS-1308 (M5x11,7)	7883304 Torx T25T	KS 1273
125H08N-S90CN12N18 **160H10N-S90CN12N18** **200J12N-S90CN12N18**			K-CN1218-R K-CN1218-L	MS-1309 (M5x15,8)		
125Y08R-S90CN10N14 **160Y10R-S90CN10N14** **200Y12R-S90CN10N14**			K-CN1014-R K-CN1014-L	MS-1308 (M5x11,7)		
125Y08R-S90CN12N18 **160Y10R-S90CN12N18** **200Y12R-S90CN12N18**			K-CN1218-R K-CN1218-L	MS-1309 (M5x15,8)		



MaxiMill 90LN

	Set 10 pcs.			b	
80F08N-S90LN12N06 **100G10N-S90LN12N06** **125H12N-S90LN12N06**	MS 1280 (M4x5) MS 1281 (M4x5,5)	→ →	LNE . 1235 LNE . 1240	6 mm 7 mm	77 24 103 (T15)
80F08N-S90LN12N08 **100G10N-S90LN12N08** **125H12N-S90LN12N08**	MS 1282 (M4x6,8) MS 1283 (M4x8)	→ →	LNE . 1245 LNE . 1250	8 mm 9 mm	
80Y08R-S90LN12N06 **100Y10R-S90LN12N06** **125Y12R-S90LN12N06**	MS 1280 (M4x5) MS 1281 (M4x5,5)	→ →	LNE . 1235 LNE . 1240	6 mm 7 mm	
80Y08R-S90LN12N08 **100Y10R-S90LN12N08** **125Y12R-S90LN12N08**	MS 1282 (M4x6,8) MS 1283 (M4x8)	→ →	LNE . 1245 LNE . 1250	8 mm 9 mm	

Note: when mounting inserts with different thicknesses, use appropriate clamping screws.

Spare parts - torque moments

Spare parts for tools

System	Ø [mm]		 Nm	in.lbs.		
270-09	6-12	7883214 (M3,0x5,7)	1,2	10,6	7724106(T08)	DMSD 1,2Nm/SORT T08
270-09	16-100	7883203 (M3,0x7,3)	1,2	10,6	7724106(T08)	DMSD 1,2Nm/SORT T08
270-12	32-160	7822114 M4,5x10,5)	5,0	44,3	7724104(T20)	DMSD 5,0Nm/SORT T20
270-15	80-125	7883216 (M4,5x13,0)	5,0	44,3	7818121(T20/SW4,5)	DMSD 5,0Nm/SORT T20
270-15	160	7822114 (M4,5x10,5)	5,0	44,3	7818121(T20/SW4,5)	DMSD 5,0Nm/SORT T20
273-06	32-160	10000155 (M5,0x14)	5,0	44,3	7724104(T20)	DMSD 5,0Nm/SORT T20
274-09	20-125	10007562 (M2,5x7,6)	1,6	14,2	10000276(08IP)	DMSD 1,6Nm/SORT 8IP
251-05	10-20	7801175 (M2,0x3,3)	0,7	6,2	7883305(T06)	DMSD 0,7Nm/SORT T06
251-08	16-32	7883204 (M2,5x5,0)	1,2	10,6	7724106(T08)	DMSD 1,2Nm/SORT T08
251-10	20-52	10007085 (M3,0x7,3)	1,0	17,8	7883306(T10)	DMSD 2,0Nm/SORT T10
251-12	40-100	7883209 (M3,5x8,6)	3,2	28,3	7724103(T15)	DMSD 3,2Nm/SORT T15
251-16	50-125	7822114 (M4,5x10,5)	5,0	44,3	7724104(T20)	DMSD 5,0Nm/SORT T20
251-20	80-125	10000155/M5,0x14,0)	5,0	44,3	7724104(T20)	DMSD 5,0Nm/SORT T20
260/041	80-398	7883203 (M3,0x7,3)	1,2	10,6	7724106(T08)	DMSD 1,2Nm/SORT T08
260/031	80-398	7822114 (M4,5x10,5)	5,0	44,3	7724104(T20)	DMSD 5,0Nm/SORT T20
260/029	80-398	7822114 (M4,5x10,5)	5,0	44,3	7724104(T20)	DMSD 5,0Nm/SORT T20
260/032	75-393	7822114 (M4,5x10,5)	5,0	44,3	7724104(T20)	DMSD 5,0Nm/SORT T20
260/018	82-400	7822114 (M4,5x10,5)	5,0	44,3	7724104(T20)	DMSD 5,0Nm/SORT T20
260/052	80-398	7883209 (M3,5x8,6)	3,2	28,3	7724103(T15)	DMSD 3,2Nm/SORT T15
260/053	76-394	7822114 (M4,5x10,5)	5,0	44,3	7724104(T20)	DMSD 5,0Nm/SORT T20
260/057	82-400	10000155 (M5,0x14)	5,0	44,3	7724104(T20)	DMSD 5,0Nm/SORT T20
260/042	89-407	7815101 (M2,5x6,0)	1,2	10,6	7724106(T08)	DMSD 1,2Nm/SORT T08
260/054	89-407	10000125 (M2,5x7,3)	1,6	14,2	10000276(08IP)	DMSD 1,6Nm/SORT 8IP
260/056	89-407	10006887 (M3,5x8,6)	3,2	28,3	10006919(15IP)	DMSD 3,2Nm/SORT 15IP
260/055	89-407	7722111 (M3,5x7,2)	3,2	28,3	7724103(T15)	DMSD 3,2Nm/SORT T15
260/036	88-406	7883203 (M3,0x7,3)	1,2	10,6	7724106(T08)	DMSD 1,2Nm/SORT T08
260/039	89-407	7822114 (M4,5x10,5)	5,0	44,3	7724104(T20)	DMSD 5,0Nm/SORT T20
260/051	89-407	7883209 (M3,5x8,6)	3,2	28,3	7724103(T15)	DMSD 3,2Nm/SORT T15
260/040	89-407	7883209 (M3,5x8,6)	3,2	28,3	7724103(T15)	DMSD 3,2Nm/SORT T15
260/025	89-407	7822114 (M4,5x10,5)	5,0	44,3	7724104(T20)	DMSD 5,0Nm/SORT T20
260/026	89-407	7822114 (M4,5x10,5)	5,0	44,3	7724104(T20)	DMSD 5,0Nm/SORT T20
211-07	10-50	10006888 (M2,2x4,2)	1,0	8,9	10006918(07IP)	DMSD 1,0Nm/SORT 07IP
211-11	12	10005892 (M2,5x5,0)	1,6	14,2	10000276(08IP)	DMSD 1,6Nm/SORT 8IP
211-11	16-32	10000126 (M2,5x5,6)	1,6	14,2	10000276(08IP)	DMSD 1,6Nm/SORT 8IP
211-11	40-160	10000125 (M2,5x7,3)	1,6	14,2	10000276(08IP)	DMSD 1,6Nm/SORT 8IP
211-15	25-160	10006887 (M3,5x8,6)	3,2	28,3	10006919(15IP)	DMSD 3,2Nm/SORT 15IP
HFC-09	20-66	7883209 (M3,5x8,6)	3,2	28,3	7724103(T15)	DMSD 3,2Nm/SORT T15
HFC-12	32-100	7822114 (M4,5x10,5)	5,0	44,3	7724104(T20)	DMSD 5,0Nm/SORT T20
210	15,7-20	7883204 (M2,5x5,0)	1,2	10,6	7724106(T08)	DMSD 1,2Nm/SORT T08
210	24,7-125	7815101 (M2,5x6,0)	1,2	10,6	7724106(T08)	DMSD 1,2Nm/SORT T08
244	20-63	7815101 (M2,5x6,0)	1,2	10,6	7724106(T08)	DMSD 1,2Nm/SORT T08
212	20-25	7815101 (M2,5x6,0)	1,2	10,6	7724106(T08)	DMSD 1,2Nm/SORT T08
141	16	7801177 (M3,5x6,7)	3,2	28,3	7724103(T15)	DMSD 3,2Nm/SORT T15
141	20-40	7722111 (M3,5x7,2)	3,2	28,3	7724103(T15)	DMSD 3,2Nm/SORT T15
241	40-125	7883209 (M3,5x8,6)	3,2	28,3	7724103(T15)	DMSD 3,2Nm/SORT T15
280	40-125	7883203 (M3,0x7,3)	1,2	10,6	7724106(T08)	DMSD 1,2Nm/SORT T08
490-09	25-100	7722111 (M3,5x7,2)	3,2	28,3	7724103(T15)	DMSD 3,2Nm/SORT T15
490-12	50-125	7822114 (M4,5x10,5)	5,0	44,3	7724104(T20)	DMSD 5,0Nm/SORT T20
C BF	10	7883215 (M2,2x4,0)	1,0	8,9	7724105(T07)	DMSD 1,0Nm/SORT T07
C BF	12	7883212 (M2,5x4,2)	1,2	10,6	7724106(T08)	DMSD 1,2Nm/SORT T08
C BF	16-18	7722113 (M2,2x5,0)	1,0	8,9	7724105(T07)	DMSD 1,0Nm/SORT T07
C BF	20	7883204 (M2,5x5,0)	1,2	10,6	7724106(T08)	DMSD 1,2Nm/SORT T08

Spare parts for tools

System	Ø [mm]		 Nm	in.lbs.		
C KF	12	7883212 (M2,5x4,2)	1,2	10,6	7724106(T08)	DMSD 1,2Nm/SORT T08
C KF	16	7883213 (M3,0x5,0)	1,2	10,6	7724106(T08)	DMSD 1,2Nm/SORT T08
C KF	20	7883204 (M2,5x5,0)	1,2	10,6	7724106(T08)	DMSD 1,2Nm/SORT T08
C KF	25	7883203 (M3,0x7,3)	1,2	10,6	7724106(T08)	DMSD 1,2Nm/SORT T08
C KF	32	7722111 (M3,5x7,2)	3,2	28,3	7724103(T15)	DMSD 3,2Nm/SORT T15
C NF	17,5	7883204 (M2,5x5,0)	1,2	10,6	7724106(T08)	DMSD 1,2Nm/SORT T08
C NF	20,5-31	7815101 (M2,5x6,0)	1,2	10,6	7724106(T08)	DMSD 1,2Nm/SORT T08
C NF	37,5-48	7722111 (M3,5x7,2)	3,2	28,3	7724103(T15)	DMSD 3,2Nm/SORT T15
C ZF	25	7815101 (M2,5x6,0)	1,2	10,6	7724106(T08)	DMSD 1,2Nm/SORT T08
C ZF	16	7883209 (M3,5x8,6)	3,2	28,3	7724103(T15)	DMSD 3,2Nm/SORT T15
HSV-22	50-125	7822114 (M4,5x10,5)	5,0	44,3	7724104(T20)	DMSD 5,0Nm/SORT T20
HPC-12	40-315	7818429 (M4,0x11,0)	5,0	44,3	7724103(T15)	DMSD 5,0Nm/SORT T15
HPC-04	20-40	10000125(M2,5X7,3)	1,8	15,9		DMSD 1,6Nm/SORT 08IP
HEC-11	50-125	7815102 (M3,5x11,0)	3,2	28,3	7724103(T15)	DMSD 3,2Nm/SORT T15
HSC-11	16-25	10000126 (M2,5x5,5)	1,8	15,9	10000276(08IP)	DMSD 1,8Nm/SORT 8IP
HSC-11	32-100	10000125 (M2,5x7,3)	1,8	15,9	10000276(08IP)	DMSD 1,8Nm/SORT 8IP
HSC-19	22-25	7818430 (M4,0x7,0)	6,0	53,1	7724103(T15)	DMSD 6,0Nm/SORT T15
HSC-19	32-40	7818428 (M4,0x8,5)	6,0	53,1	7724103(T15)	DMSD 6,0Nm/SORT T15
HSC-19	50-100	7818429 (M4,0x11,0)	6,0	53,1	7724103(T15)	DMSD 6,0Nm/SORT T15
HPC-19	22-25	7818430 (M4,0x7,0)	5,0	44,3	7724103(T15)	DMSD 5,0Nm/SORT T15
HPC-19	32-40	7818428 (M4,0x8,5)	5,0	44,3	7724103(T15)	DMSD 5,0Nm/SORT T15
HPC-19	50-63	7818429 (M4,0x11,0)	5,0	44,3	7724103(T15)	DMSD 5,0Nm/SORT T15
HDM	160-315	10006216 (M5,0x18,0)	5,0	44,3	7724103(T15)	DMSD 5,0Nm/SORT T15

Clamping screws for milling adapters

Maximum torque moments - revolution numbers

Power screw	Ø d_1	Ø d_A	Torque moments Nm	Torque moments ft.lbs.	RPM [1000 min^{-1}]
7818267/M8,0x30,0	32-42	–	15	11,1	16,0
7818268/M10,0x31,0	50-52	–	20	14,8	12,5
Hexagonal screw (DIN 912)					
7818123/M8x25 DIN912 12.9	32	16	30	22,1	16,0
7818123/M8x25 DIN912 12.9	35	16	30	22,1	16,0
7818123/M8x25 DIN912 12.9	40	16	30	22,1	16,0
7818123/M8x25 DIN912 12.9	42	16	30	22,1	16,0
7818124/M10x25 DIN912 12.9	50	22	50	36,9	12,5
7818124/M10x25 DIN912 12.9	52	22	50	36,9	12,5
7818124/M10x25 DIN912 12.9	63	22	50	36,9	10,0
7818124/M10x25 DIN912 12.9	66	22	50	36,9	9,0
7818125/M12x30 DIN912 12.9	80	27	80	59,0	8,0
10001632/M16x30 DIN912 12.9	100	32	110	81,1	6,5
10002601/M20x30 DIN912 12.9	125	40	120	88,5	5,0
M12x50 (4x per milling cutter)	160	40	80	59,0	3,0
Cross recess screw (DIN 6367)					
83 367 040/M20x30-12.9	125	40	–	–	5,0
83 367 040/M20x30-12.9	160	40	–	–	3,0
AHPC-12 special screw					
10002611-0/M20x30 12.9	125	40	120	88,5	–
10002611-0/M20x30 12.9	160	40	120	88,5	–

Spare parts
General

Clamping screws for inserts



7801175	M2,0 x 3,3	T06	
7883215	M2,2 x 4,0	T07	
10006888	M2,2 x 4,2	07IP	
7722113	M2,2 x 5,0	T07	Torx Plus
7883212	M2,5 x 4,2	T08	
7883204	M2,5 x 5,0	T08	
7815101	M2,5 x 6,0	T08	
10005892	M2,5 x 5,0	08TP	Torx Plus
10000126	M2,5 x 5,6	08TP	Torx Plus
10000125	M2,5 x 7,3	08TP	Torx Plus
7883213	M3,0 x 5,0	T08	
7883214	M3,0 x 5,7	T08	
7883203	M3,0 x 7,3	T08	
10007085	M3,0 x 7,3	T10	

7801177	M3,5 x 6,7	T15	
7722111	M3,5 x 7,2	T15	
7883209	M3,5 x 8,6	T15	
10006887	M3,5 x 8,6	15IP	Torx Plus
7818430	M4,0 x 7,0	T15	
7818428	M4,0 x 8,5	T15	
7818429	M4,0 x 11,0	T15	
7822114	M4,5 x 10,5	T20	
7883216	M4,5 x 13	T20	
10000155	M5,0 x 14,0	T20	



7730102/GREASE

Clamping screws for cutter bodies and tool components



400	M8	L/R-threaded
7818044	M8 x 21	L/R-threaded
7818319	M5 x 15	for A2000

7818316	M8 x 1 x 24	L/R-threaded
7818267	M8 x 30	Power screw
7818268	M10 x 31	Power screw

Spare parts



7718120 Shim A270-15



7883101 Threaded bush A270-15



7818043 Clamping wedge A260



7818317 Clamping wedge A2000



7818318 Cassette A2000

HSK accessories

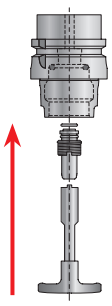


KRS04.HSK63 Special key for coolant set



KMS.HSK63 Coolant set with 2 O-rings

Information on mounting



Assembly devices



7883305	Torx06
7724105	Torx07
10006918	Torx Plus 07IP
7724106	Torx08
10000276	Torx Plus 08IP
7724103	Torx15
10006919	Torx Plus 15IP
7883306	Torx10
7724104	Torx20



7818121 Combination key TX20/SW4.5



7818048 Eccentric key MaxiMill A260



S4/SW4 Clamping key



7812301	SW5 hexagonal key
7480412	Allen key S04
10002362	Torx key T15



Torque key
DMSD1-5Nm/SORT 1x DMSD-G, 1x DMSD-H
1,0-5,0 Nm



DMSD 0,7Nm/SORT T06	1x DMSD-G, 1x DMSD-H, 5x DMSD-B
DMSD 1,0Nm/SORT 07IP	
DMSD 1,0Nm/SORT T15	
DMSD 1,2Nm/SORT T08	
DMSD 1,6Nm/SORT 08IP	
DMSD 1,8Nm/SORT 08IP	
DMSD 2,0Nm/SORT T10	
DMSD 3,2Nm/SORT 15IP	
DMSD 3,2Nm/SORT T15	
DMSD 4,0Nm/SORT T20	
DMSD 5,0Nm/SORT T15	
DMSD 5,0Nm/SORT T20	
DMSD 6,0Nm/SORT T15	



DMSD-B T06-50mm	**DMSD-B T15-50mm**
DMSD-B T07-50mm	**DMSD-B T20-50mm**
DMSD-B T08-50mm	**DMSD-B 07IP-50mm**
DMSD-B T10-50mm	**DMSD-B 08IP-50mm**
DMSD-B 15IP-50mm	



DMSD-H Tool holder



DMSD-G 0,7Nm	**DMSD-G 1-5Nm**
DMSD-G 1,0Nm	**DMSD-G 3,2Nm**
DMSD-G 1,2Nm	**DMSD-G 4,0Nm**
DMSD-G 1,6Nm	**DMSD-G 5,0Nm**
DMSD-G 1,8Nm	**DMSD-G 6,0Nm**
DMSD-G 2,0Nm	



Torque key
7896707/DMS 8-60Nm 3/8" 8-60 Nm



Socket
7896708/SE3/8-SW5
7896709/SE3/8-SW6
7896710/SE3/8-SW10



Edge protecting ring
7722130/SSR D=80
7722131/SSR D=100
7722132/SSR D=125
7722133/SSR D=160
7722139/SSR D=32
7722140/SSR D=40
7722141/SSR D=50
7722142/SSR D=63

MaxiMill HEC-11 / (A)







Ø 50	7818124/M10X25 DIN912-12.9	7815102/M3.5X11,0/T15	10002113-0/ AW-ZNHW12-RH	10006791/KMR22	10002362-0/WS-L T15
Ø 63	7818124/M10X25 DIN912-12.9	7815102/M3.5X11,0/T15	10002113-0/ AW-ZNHW12-RH	10006791/KMR22	10002362-0/WS-L T15
Ø 80	7818125/M12X30 DIN912 - 12.9	7815102/M3.5X11,0/T15	10002113-0/ AW-ZNHW12-RH	10006792/KMR27	10002362-0/WS-L T15
Ø 100	10001632/M16X30 DIN912 - 12.9	7815102/M3.5X11,0/T15	10002113-0/ AW-ZNHW12-RH	10006793/KMR32	10002362-0/WS-L T15
Ø 125	10002611-0/M20 X 30 12.9	7815102/M3.5X11,0/T15	10002113-0/ AW-ZNHW12-RH	10006794/KMR40	10002362-0/WS-L T15
Ø 160	10002611-0/M20 X 30 12.9	7815102/M3.5X11,0/T15	10002113-0/ AW-ZNHW12-RH	–	10002362-0/WS-L T15

Spare parts

HPC-12 / HSV-22

MaxiMill HSV-22

			
Ø 50	7818124/M10X25 DIN912 - 12.9	7722141/SSR D=50	7822114/M4.5X10.5/T20
Ø 63	7818124/M10X25 DIN912 - 12.9	7722142/SSR D=63	7822114/M4.5X10.5/T20
Ø 80	7818125/M12X30 DIN912 - 12.9	7722130/SSR D=8	7822114/M4.5X10.5/T20
Ø 100	10001632/M16X30 DIN912 - 12.9	7722131/SSR D=100	7822114/M4.5X10.5/T20
Ø 125	10002601/M20X30 DIN912 - 12.9	7722132/SSR D=125	7822114/M4.5X10.5/T20

MaxiMill HPC-12

					
Ø 40	7818123/M8X25 DIN912 12.9	7722140/SSR D=40	7818429/M4.0X11/T15	10002113-0/AW-ZNHW12	10002362-0/WS-L T15
Ø 50	7818124/M10X25 DIN912 - 12.9	7722141/SSR D=50	7818429/M4.0X11/T15	10002113-0/AW-ZNHW12	10002362-0/WS-L T15
Ø 63	7818124/M10X25 DIN912 - 12.9	7722142/SSR D=63	7818429/M4.0X11/T15	10002113-0/AW-ZNHW12	10002362-0/WS-L T15
Ø 80	7818125/M12X30 DIN912 - 12.9	7722130/SSR D=80	7818429/M4.0X11/T15	10002113-0/AW-ZNHW12	10002362-0/WS-L T15
Ø 100	10001632/M16X30 DIN912 - 12.9	7722131/SSR D=100	7818429/M4.0X11/T15	10002113-0/AW-ZNHW12	10002362-0/WS-L T15
Ø 125	10002611-0/M20 X 30 12.9	7722132/SSR D=125	7818429/M4.0X11/T15	10002113-0/AW-ZNHW12	10002362-0/WS-L T15
Ø 160	10002611-0/M20 X 30 12.9	7722133/SSR D=160	7818429/M4.0X11/T15	10002113-0/AW-ZNHW12	10002362-0/WS-L T15
Ø 200		7722134/SSR D=200	7818429/M4.0X11/T15	10002113-0/AW-ZNHW12	10002362-0/WS-L T15
Ø 250			7818429/M4.0X11/T15	10002113-0/AW-ZNHW12	10002362-0/WS-L T15
Ø 315			7818429/M4.0X11/T15	10002113-0/AW-ZNHW12	10002362-0/WS-L T15

Assembly devices

	KMS.HSK63 Coolant set for HSK63A	**MHSV-22 MHPC-12**		DMSD 1-5Nm/SORT Torque screwdriver Set: tool holder and handle	**HSV-22 HPC-12**
	KRS04.HSK63 Special key for coolant set	**MHSV-22 MHPC-12**		DMSD 1,0Nm/SORT T15 Set: tool holder + handle + 5 inserts	**273-06 HEC-11 HPC-12**
	7724104/TORX T20	**HSV-22**		DMSD-H Tool holder	**HSV-22 HPC-12**
				DMSD-B T20-50mm	**HSV-22**
				DMSD-B T15-50mm	**HPC-12**

Optimize tool life of cutting edge

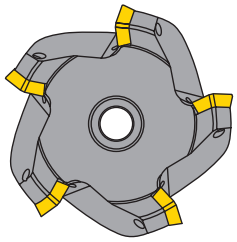
In most cases the following applies to carbide inserts:



Pitch

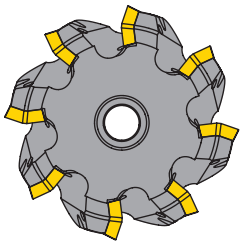
Coarse or normal pitch

- For aluminium alloys
- Non ferrous metals
- Plastic materials
- Low power machines
- Unstable working conditions



Close pitch

- Steel and cast iron
- High-power machines
- Stable work holding
- Stable conditions
- Maximum chip removal rates

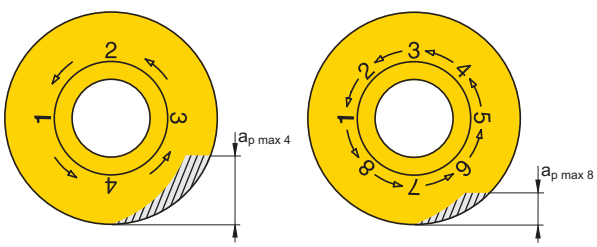


251 - recommended depth of cut

Ø [mm]	4 times a_p [mm]	4 times $a_{p\ max}$ [mm]	8 times $a_{p\ max}$ [mm]
5	1,25	2,0	0,7
8	2,0	3,5	1,1
10	2,5	4,5	1,4
12	3,0	5,5	1,7
16	4,0	7,5	2,3
20	5,0	9,5	2,9
	⚠		

recommended!

Depth of cut to achieve with 4 or 8 indexes of the insert



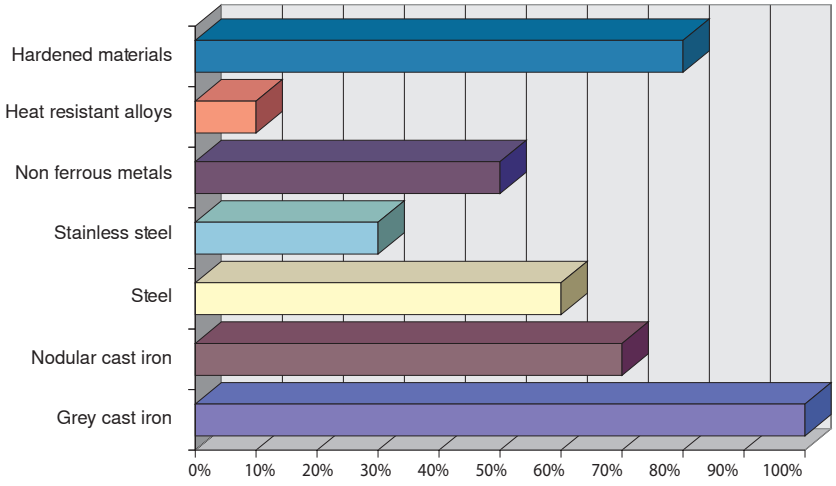
Dry machining

Dry machining is suitable for virtually all modern cutting materials.

Advantages compared to conventional cooling:
- Thanks to the reduced temperature shock when the cutting edge exits the work piece, higher cutting speeds are possible.
- Reduction in manufacturing costs.
- Production of dry swarf.

Suitable for single pieces, small and large batches

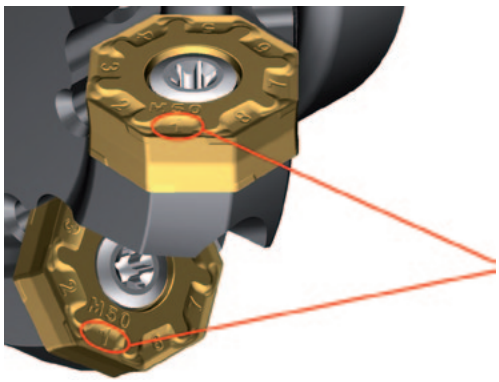
Suitability with regard to the material:



- Mixed ceramic, CBN (cubic boron nitride)
- Carbide, HMC (coated carbide)
- Fine grain carbide, PCD (polycrystalline diamond), carbide diamond coated
- Carbide, HMC (coated carbide)
- Al_2O_3-coated carbide, cermet
- HMC (coated carbide), coated cermet
- Ceramic

Source: Plansee Seminar, article by D. Arnold

MaxiMill 273-06 - position of cutting edge



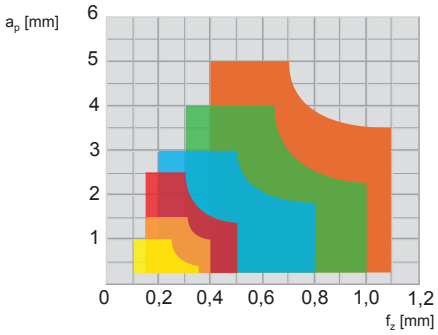
For **optimal surface finish:** place the inserts in their seats in a way that all cutting edges which are in cutting position show the same number.





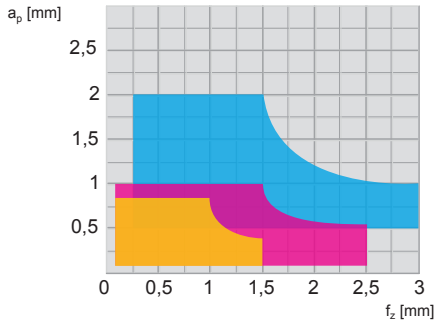
Recommendations for economic milling

251/252



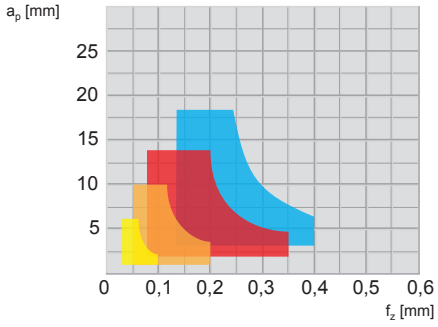
Ø [mm]		a_p	f_z
05	_ _ _ _	0,25 - 1	0,35 - 0,10
08	_ _ _ _	0,25 - 1,5	0,40 - 0,15
10	_ _ _ _	0,25 - 2,5	0,50 - 0,15
12	_ _ _ _	0,25 - 3	0,80 - 0,20
16	_ _ _ _	0,25 - 4	1,00 - 0,30
20	_ _ _ _	0,25 - 5	1,10 - 0,40

HFC



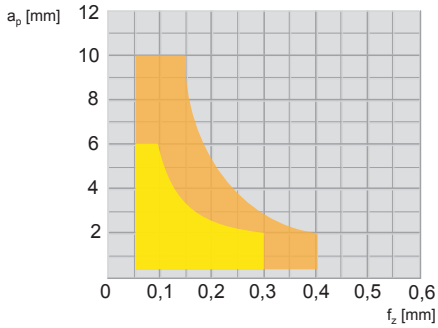
l [mm]		a_p	f_z
06	_ _ _ _	0,1 - 0,8	**0,1 - 1,50**
09	_ _ _ _	0,1 - 1	**2,5 - 0,10**
12	_ _ _ _	0,3 - 2	**3,0 - 0,25**

211



l [mm]		a_p	f_z
07	_ _ _ _	0,1 - 7	0,10 - 0,03
11	_ _ _ _	0,2 - 10	0,20 - 0,05
15	_ _ _ _	1,0 - 14	0,30 - 0,08
20	_ _ _ _	2,5 - 17	0,40 - 0,12

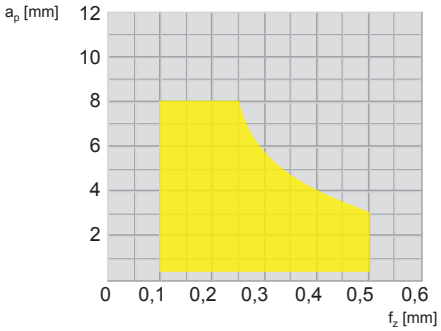
490



l [mm]		a_p	f_z
09	_ _ _ _	0,1 - 8	0,3 - 0,05
12	_ _ _ _	0,1 - 11	0,4 - 0,10

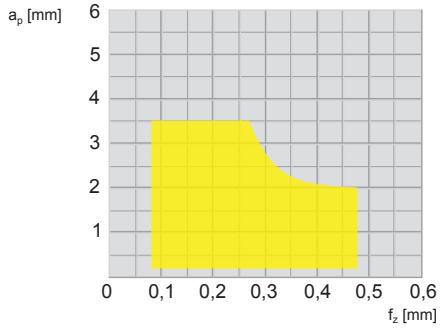
Recommendations for economic milling

271



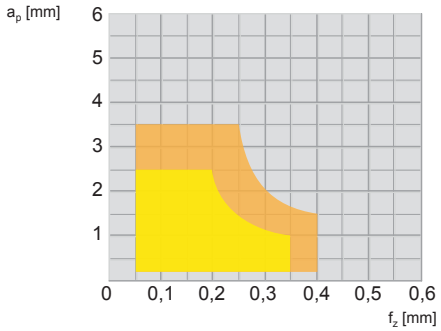
l [mm]		a_p	f_z
17	_ _ _ _	0,1 - 1,6	0,5 - 0,1

273



l [mm]		a_p	f_z
06	_ _ _ _	0,1 - 3,5	0,45 - 0,05

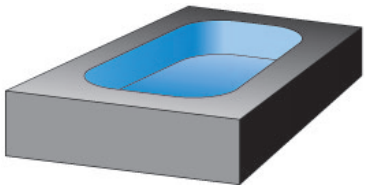
274



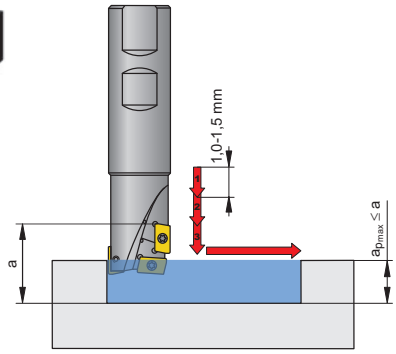
OFH..04
SF..T.09

l [mm]		a_p	f_z
04	_ _ _ _	0,1 - 3,5	0,45 - 0,05
09	_ _ _ _	0,1 - 4,0	0,41 - 0,19

212 - drill and slot cutters

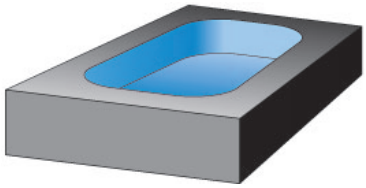


Pocket milling

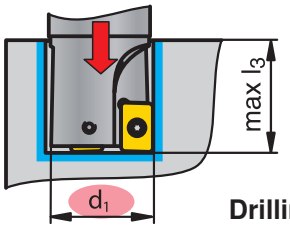


For long chipping materials drilling steps of 1.0 - 1.5 mm are recommended!

C BF - drill and slot cutters



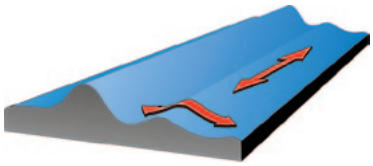
Pocket milling



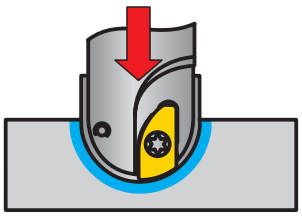
Drilling
l_3 = max.

d_1 [mm]	l_3 [mm]
10	21
12	24
16	25
18	28
20	30

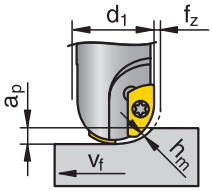
C KF - ball nose milling cutters



Profile milling



Capable of drilling



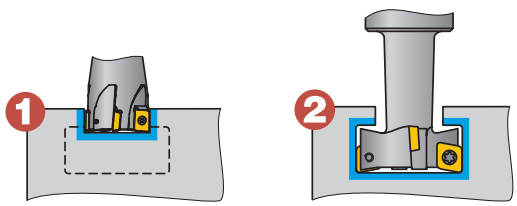
$$f_z = h_m \cdot \sqrt{\frac{d_1}{a_p}} \quad \text{(mm)}$$

$$h_m = f_z \cdot \sqrt{\frac{a_p}{d_1}} \quad \text{(mm)}$$

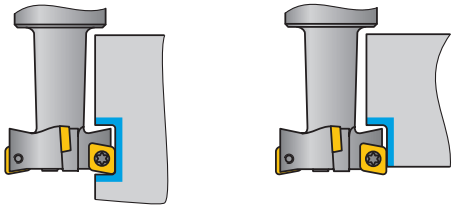
$h_{m\,min}$ = 0,03 mm
$h_{m\,max}$ = 0,08 mm

R112/R114 - ball nose milling cutters

Milling of standard T-slots

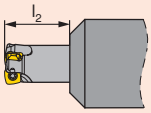
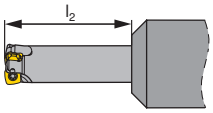
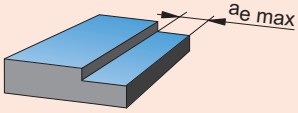
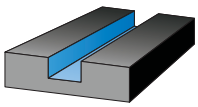
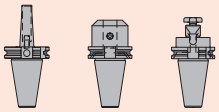
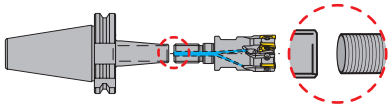


Extended application



1 Rough milling with end mill 211, 210 or 141
2 Finishing of T-slot with C NF

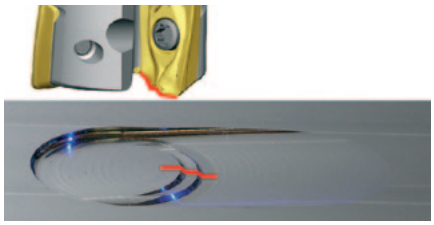
Milling of hard materials (≥ 45 HRC)

Recommendations for machining		
l_2		
z		
$a_{e\ max}$ = 75%		
Adapter		
Cooling		
Plunging	 α_R: –50%	
Starting values	f_z = 0,05 mm V_c = 30 - 60 m/min a_p = 0,5 - 2,5 mm	

MaxiMill 211-11

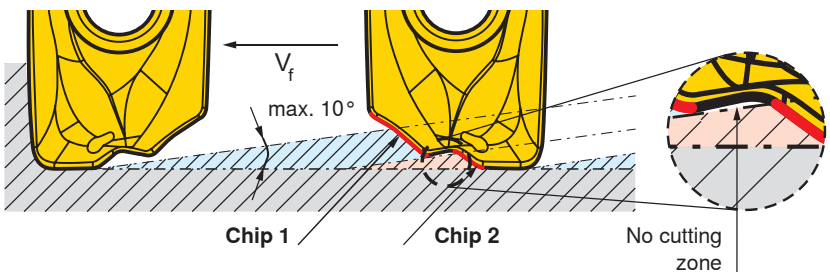
Radial force compensation through ‘the notch’ when helical plunging or ramping: (r < 2.0 mm)

Radial force compensation
- The notch provides additional stability when plunging.
- Reduced machining noise and vibration are therefore guaranteed.



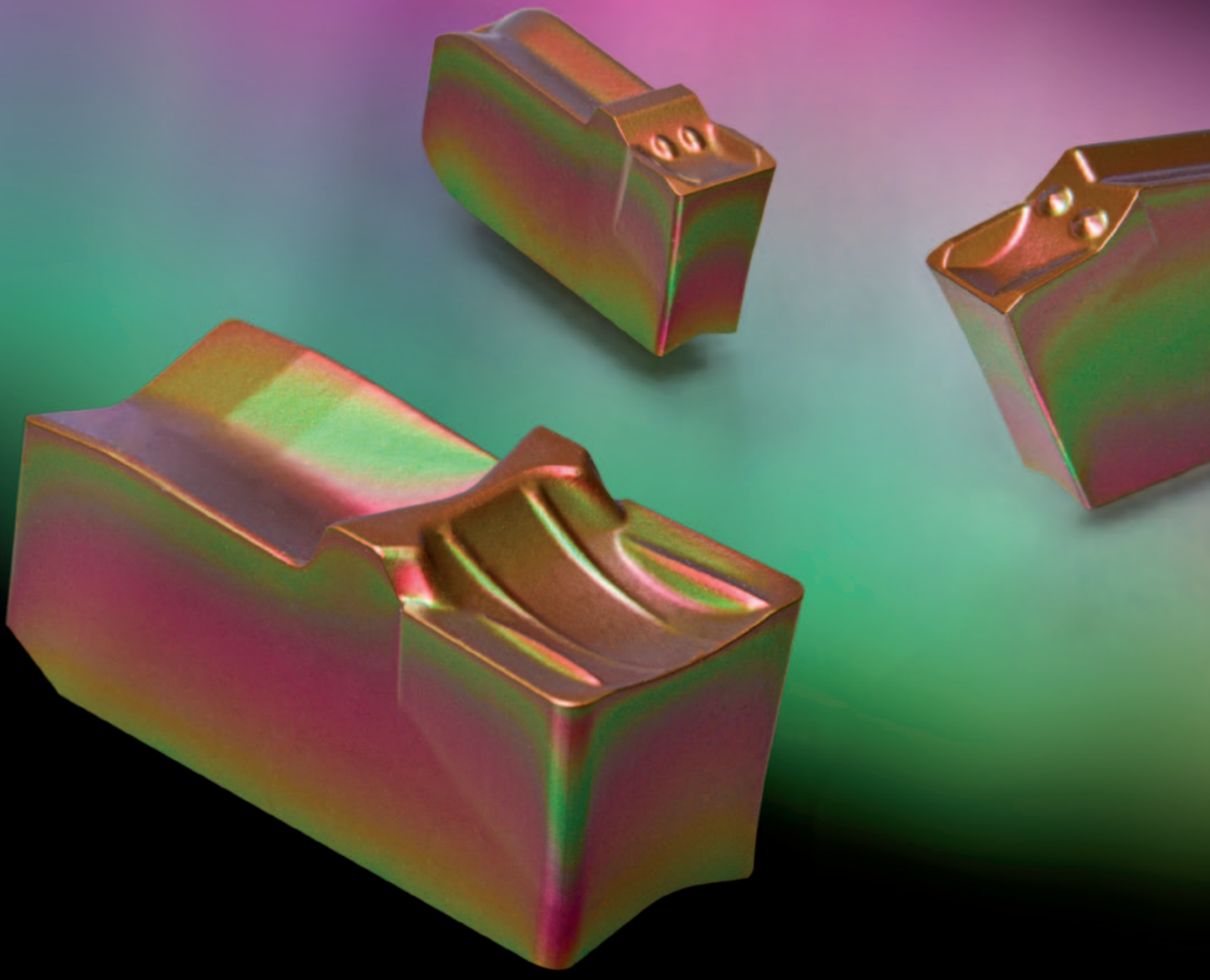
The ADVANTAGE for cutting tool experts:
- Increased cutting performance
- Improved surface quality when machining pockets and slots

Swarf control
- Low cutting pressure
- Low power consumption
- Optimum chip evacuation
- Minimum vibration
- Very good chip formation

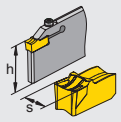


CERATIZIT

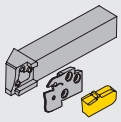
hard material matters



Introduction



C2-C4



C5-C26



C27-C28

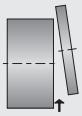


C29-C44

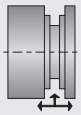


C45-C68

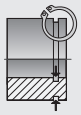
Application



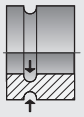
C72-C90



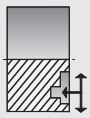
C92-C103



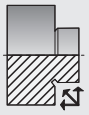
C104-C119



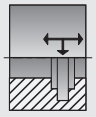
C120-C139



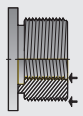
C140-C148



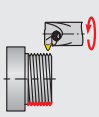
C150-C155



C156-C163



C164-C171



C172-C177

Inserts

GX..E



C180-C181

GX..S



C182

GX..R



C183

AX..



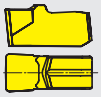
C184

SX..



C185

LX..



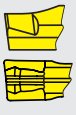
C186

FX..



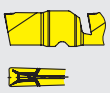
C187

PX..



C188

MC..



C189

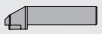
TC..



C190-C193

Tools

Shanks



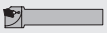
C196-C199

Modules - external



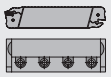
C200-C212

Monobloc - external



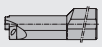
C213-C222

Blocks, blades



C223-C230

Boring bars



C231-C232

Modules - internal



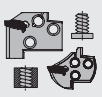
C233-C236

Monobloc - internal



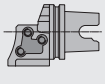
C237-C239

Threading



C240-C245

UTS, HSK-T



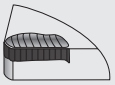
C246-C251

Technical information

General



C253-C259



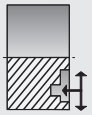
C260-C262



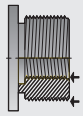
C263-C267



C268-C271



C272-C277



C278-C291



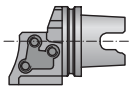
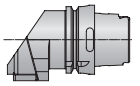
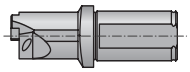
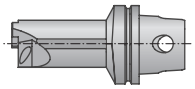
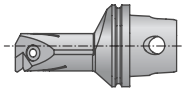
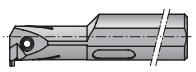
C292-C296

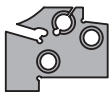
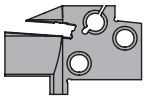
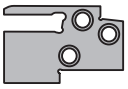
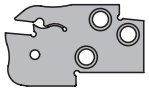
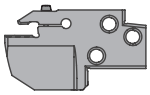
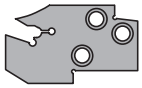
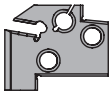
C297

C298-C299

CERATIZIT designation system

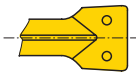
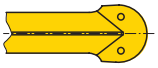
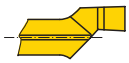
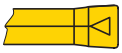
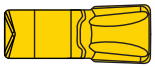
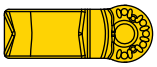
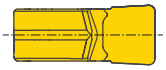
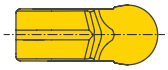
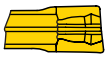
Tool holders

	Systems UTS, HSK-T	System assembly size		MSS system		E = external / I = internal	Assembly size	Hand	Approach angle	Parting and grooving depth		Shank section, type		Shank length		Insert system
				MSS	-	E	25	R	00		-	2525	-	L		
				MSS	-	E	25	R	00		-	AD				
	UT	40	-	MSS	-	E	25	R	00							
	HSK	T63	-	MSS	-	E	32	L	90							
						E	16	R	00	21	-	1616	-	K	-	GX24-1
				MC	-		05	R			-	1010	-	K		
						E	12	R	00		-	1212			-	TC16
				MSS	-	I	25	R	90		-	1.5D				
	UT	40	-	MSS	-	I	32	R	90		-	2D				
	UT	40	-	MSS	-	I	32	R	90		-	2D			-	TC16
						I	12	R	90		-	2.5D			-	GX09

	MSS system		E = external / I = internal	Assembly size	Hand	Max. parting and grooving depth		Insert system	Insert size, cutting width		Width class	Axial diameter range D_{min} - D_{max}
	MSS	-	E	25	R	12	-	GX	16	-	2	
	MSS	-	E	25	R	15	-	GX	24	-	3	A 70-100
	MSS	-	E	25	R	10	-	AX	10			
	MSS	-	E	25	R	25	-	SX	3			
	MSS	-	E	32	N	45	-	LX				
	MSS	-	E	25	R	20	-	FX	3.1			
	MSS	-	E	25	R		-	TC	16	-	2	
	MSS	-	I	25	R	06	-	GX	09	-	1	
	MSS	-	I	32	R		-	TC	16	-	2	

CERATIZIT designation system

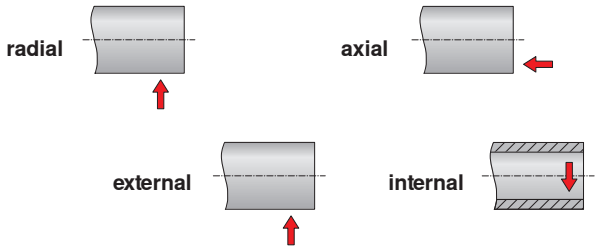
Inserts

	Insert system	Insert size		Number of cutting edges		Width class	Insert shape, application	Cutting width, pitch	Hand, thread standard	Corner radius, angle		Minimum axial grooving diameter		Chip groove code
	GX	16			-	2	E	3.00	N	0.30			-	Code
	GX	16			-	2	R	1.50	N					Code
	GX	16			-	2	S	1.00	R					
	AX	10					E	3.00	N	0.30	-	20	-	Code
	SX						E	2.00	N	0.20			-	Code
	SX						R	1.50	N				-	Code
	LX						E	8.00	N	0.80			-	Code
	LX						R	4.00	N				-	Code
	FX							3.10	N	0.20			-	Code
	PX	20			-	2	E	1.50	L	05			-	Code
	MC	05	-	5	-			1.00	N	0.10			-	Code
	TC	16			-	1	E	1.50	ISO				-	Code

Parting and grooving covers a diverse range of applications and demands, advanced technology and intelligent tool design.

Diverse range of applications

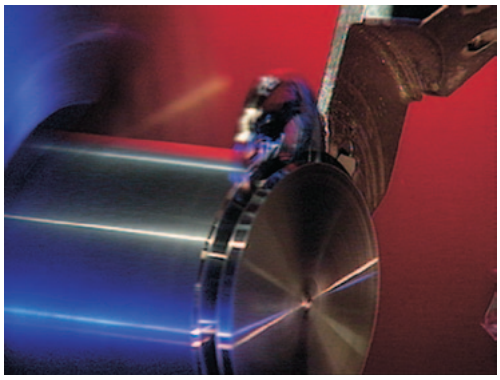
> Radial, axial grooving
> External/internal parting and grooving
> Grooving
> Part-off
> Profile grooving
> Parting, grooving and turning
> Deep grooving





Grooving | Part-off | Profile grooving | Parting, grooving and turning | Deep grooving

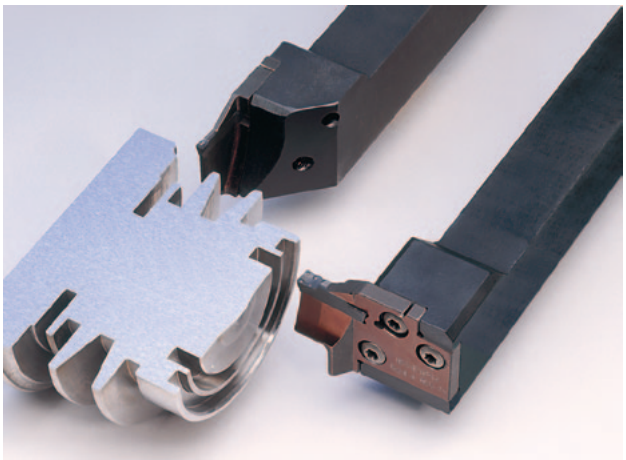
Advanced technology



> Chip formation
> Chip evacuation
> Parallel - flat parting and grooving surface
> Surface finish
> Formation of burrs when parting off tubes
> Formation of pips in part-off operations
> v_c = 0 in the centre
> Entire main cutting edge applied

Intelligent tool design

> Narrow, long overhang
> Insert clamping
> Rigidity
> Resistant against breakage
> Easy handling
> Economy



MSS - The modular parting, grooving and threading system

In order to be able to meet all demands, up-to-date tools have a modular structure.



System features

> Separate shank and tool holder
> Same interface for all parting, grooving and threading applications
> Stable, precise connection
> Extendable through new ‘modules’
> Easy handling
> Clamping features optimized for the various applications

Flexibility

> Adaptable to machining task
> One system only for all parting, grooving and threading operations
> Particularly well-suited for semi-standard tools

Precision

> High accuracy and repeatability when changing the module
> Reduced set-up time
> High-quality work pieces

Stability

> Application security
> Parting, grooving and longitudinal turning possible

Simplicity

> Quick module change in case of tool breakage, short downtime

Economy

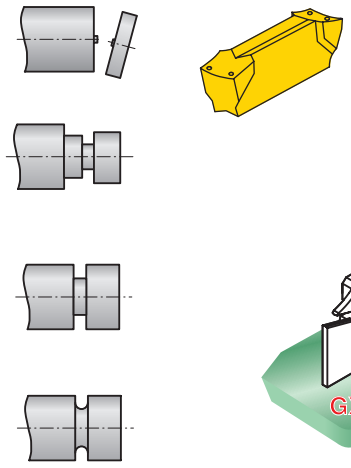
> Low stock inventory provides a large variety of combination possibilities
> In case of tool breakage only change module

Completeness

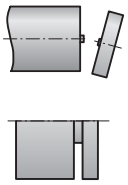
> Components for all work pieces and materials

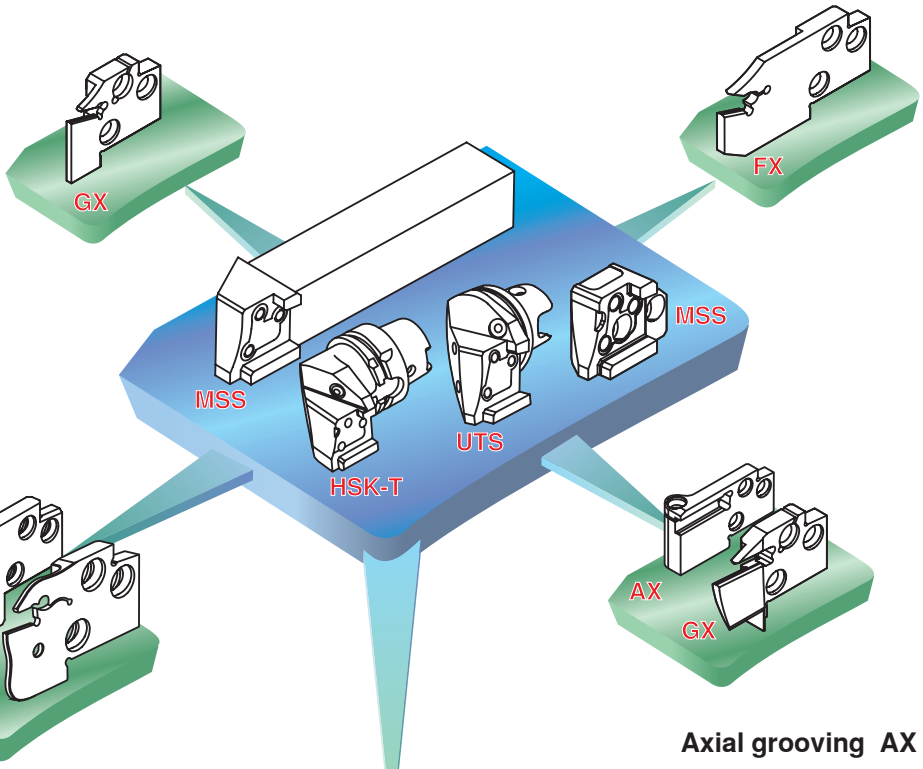
MSS - system components

Parting, grooving and turning GX

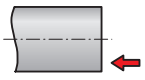


Parting and grooving FX

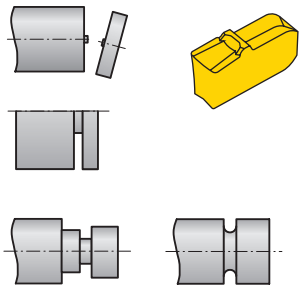


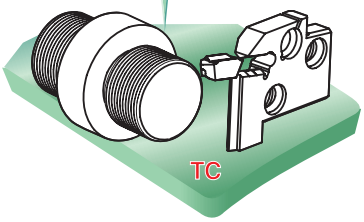


Axial grooving AX + GX

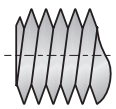


Parting, grooving and turning LX + SX



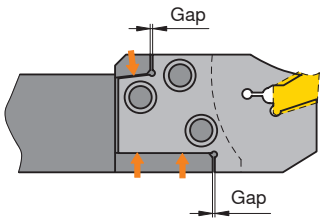


Thread turning TC



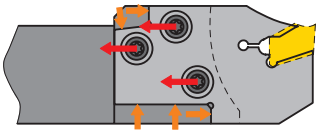
The strong connection

Unclamped module:



> Gap between module and location face for axial clamping

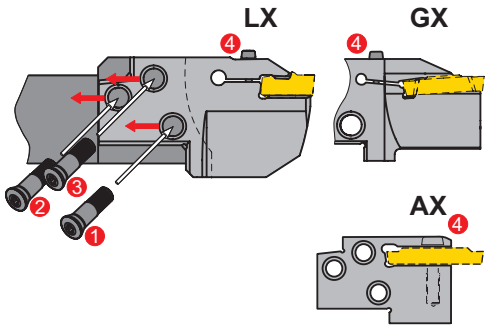
Clamped module:



> Axial clamping with location face
> Connection without clearance, therefore highest stability

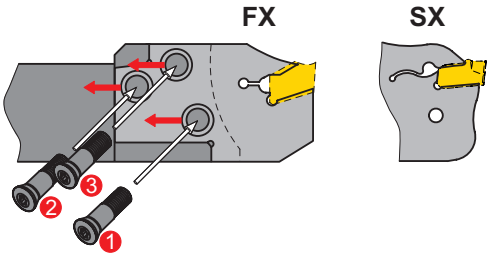
Clamping features

LX / GX / AX:
active insert clamping



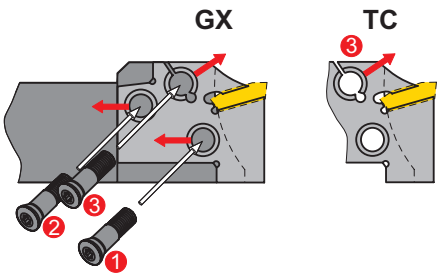
Screws 1, 2 and 3 are used to clamp the module. The insert is self-clamping.
The insert is clamped through the elastic deformation of the module through the additional screw 4.

FX / SX:
Self-clamping inserts



Screws 1, 2 and 3 are used to clamp the module. The insert is self-clamping.

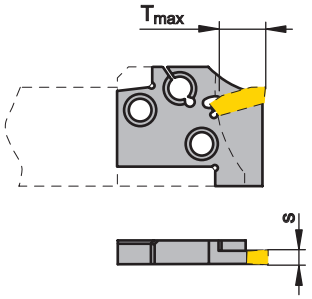
GX / TC:
Active insert clamping



Screws 1, 2 and 3 are used to clamp the module.
Important: clamp the module with screw 1, then screw 2. Afterwards the insert is clamped by means of screw 3.

Parting, grooving, longitudinal turning, axial grooving

GX external

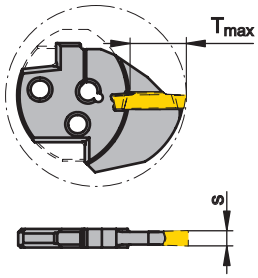


T_{max} = 7 - 21 mm
s = 2.0 - 8.0 mm

Circlip grooves:
T_{max} = .75 - 4.0 mm
s = .6 - 5.25 mm

O-ring grooves:
T_{max} = 1.78 - 2.58 mm
s = 1.6 - 2.4 mm

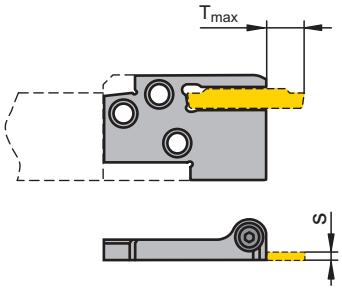
GX internal



T_{max} = 4 - 19 mm
s = 2.0 - 6.0 mm

Axial grooving

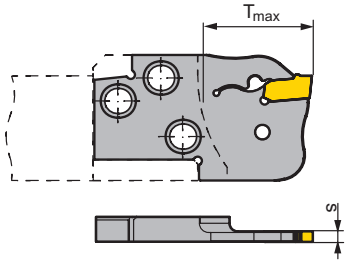
AX



T_{max} = 5 - 15 mm
s = 3 mm

Parting, grooving, longitudinal turning

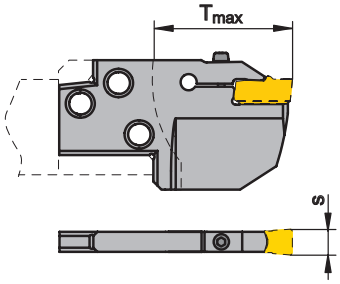
SX



T_{max} = 20 - 35 mm
s = 2 - 4 mm

Parting, grooving, longitudinal turning, axial grooving

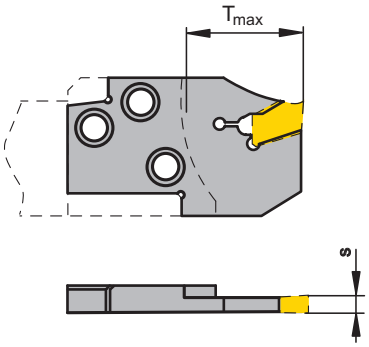
LX



T_{max} = 25 - 45 mm
s = 8.0 - 10.0 mm

Parting, grooving

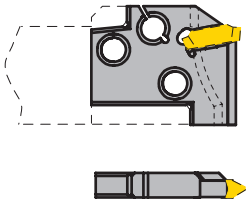
FX



T_{max} 20 = 45 mm
s = 2.2 - 6.5 mm

Thread turning and milling

TC



Pitch:
ISO .5 - 5.0 mm
BSW 28 - 5 TPI

System characteristics

> Modules made of tempered steel with high strength
> Locating surfaces for MSS interface ground with highest precision
> Ground insert seat

Benefits

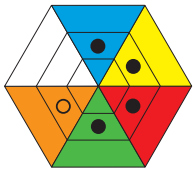
> Long tool life, high rigidity
> Accurate repeatability
> Secure and precise insert clamping

Parting, grooving, longitudinal turning, axial grooving

GX

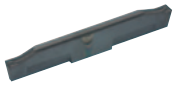


Insert size	s	r	s	r	
09	0,6 - 3,25	0,8 - 1,2	2,0 - 3,5	1,0 - 1,2	Upon request
16	0,6 - 5,25	0,8 - 1,2	2,0 - 6,0	1,5 - 3,0	
24			2,0 - 6,0	1,50 - 3,0	

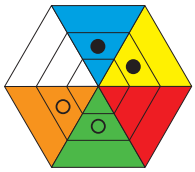


Axial grooving

AX



s
3,0

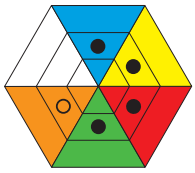


Parting, grooving, longitudinal turning

SX



R	s	s	s
	N	L	R
1,5 - 3,0	2,0 - 6,0	2,0 - 4,0	

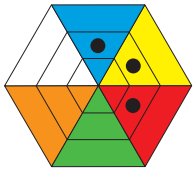


Parting, grooving, longitudinal turning, axial grooving

LX



r	s
4,0	8,0 - 10,0



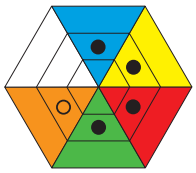
> According to the respective application either precision ground or sintered
> Optimized geometries for all important materials
> Security through ideal combination of substrate and coating
> All inserts for aluminium machining are microfinished

Parting, grooving

FX

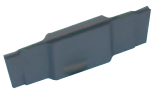


S N	S L	S R
2,2 - 9,7	2,2 - 6,5	

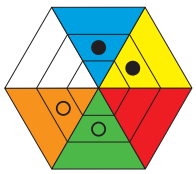


Parting, grooving

PX



S N	S L	S R
1,0 - 2,0	1,0 - 2,0	

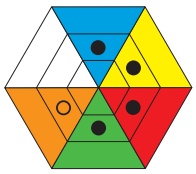


Parting, grooving, longitudinal turning

MC



S N	S L	S R
1,0 - 2,5	1,0 - 2,5	

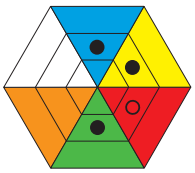


Thread turning and milling

TC

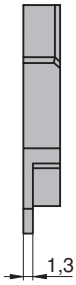
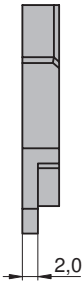
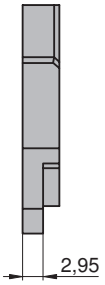
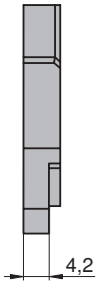
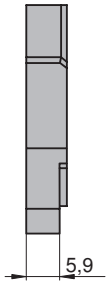
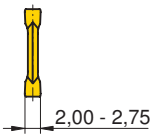
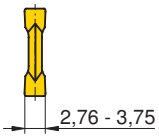
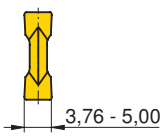
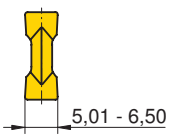
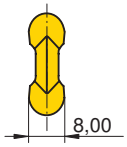
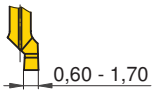
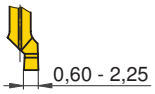


ISO 60°	BSW 55°
Full and partial profile external, internal	Full and partial profile external, internal
Pitch .5 - 5.0 mm	48 - 5 TPI



The width classes

System GX

Width classes	1	2	3	4	5
Parting and grooving modules					
Parting and grooving inserts					
Inserts for circlip grooves					

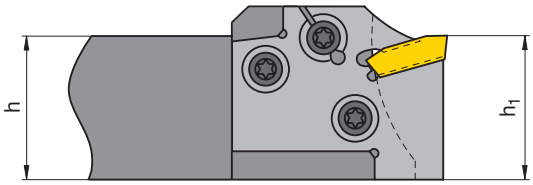
Module designation:
MSS-E20R12-GX16-**2**

Insert designation:
GX16-**2**E3.00N0.30

Width class [1)]

The parting and grooving widths of the MSS system are divided into width classes. Every width class represents a certain range of cutting widths.

1) Ideally the module and the insert have the same width class. This combination results in the best possible application security.



The assembly size is determined by the shank dimensions of the MSS tool holders. In this manner the correct tool holder can be assigned to the correct module size and vice versa.
The following tables will give you an overview of the width classes and insert sizes for the available assembly sizes.

Tool designation:
MSS-**E25**R00-2525L

Module designation:
MSS-**E25**R25-GX16-2

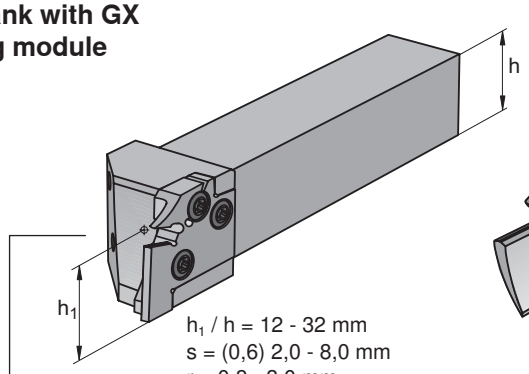
Assembly size (h)

Assembly size (h)	GX external				GX internal			
	Width class							
	1	2	3	4	1	2	3	4
10								
12								
16								
20								
25								
32								
40								

Assembly size (h)	GX Insert size					
	09		16		24	
10	○					
12	○	○	○			
16	○	○	○	○	○	
20		○	○	○	○	
25		○	○	○	○	
32			○	○	○	○
40				○		○

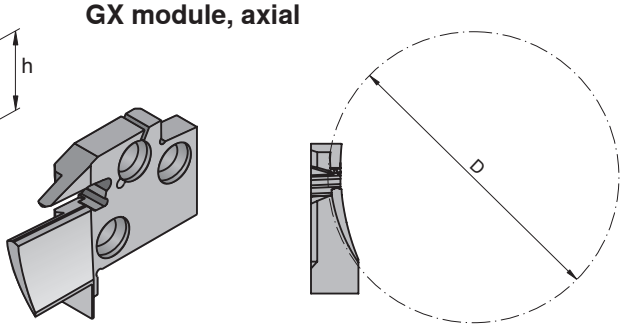
System GX is characterized by a double-ended insert with numerous application possibilities. It is mostly applied for radial grooving and turning. Thanks to special modules the system can easily be adapted for axial and circlip grooving.
For GX inserts a range of modules and boring bars for internal grooving is available.

Tool shank with GX grooving module



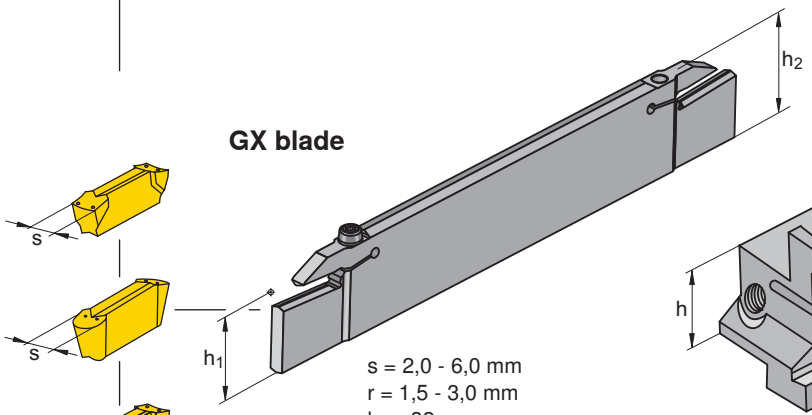
h_1 / h = 12 - 32 mm
s = (0,6) 2,0 - 8,0 mm
r = 0,8 - 3,0 mm

GX module, axial

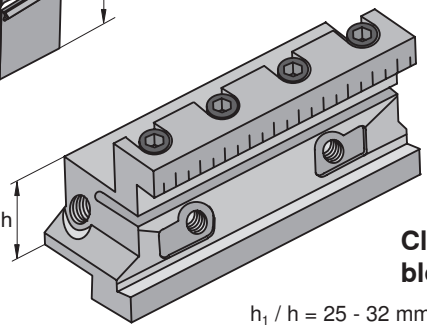


h_1= 25 - 32 mm
s = 3,0 - 6,0 mm
r = 1,5 - 3,0 mm
D = 50 - 900 mm

GX blade



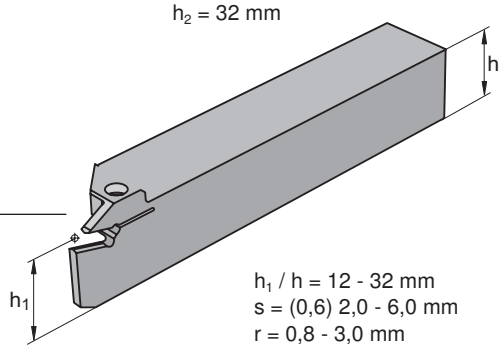
s = 2,0 - 6,0 mm
r = 1,5 - 3,0 mm
h_2 = 32 mm



Clamping block

h_1 / h = 25 - 32 mm

Monobloc tool



h_1 / h = 12 - 32 mm
s = (0,6) 2,0 - 6,0 mm
r = 0,8 - 3,0 mm

System characteristics

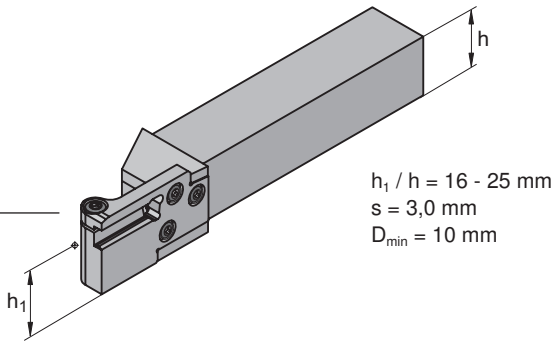
> Double-ended insert
> Ground and directly pressed inserts

Benefits

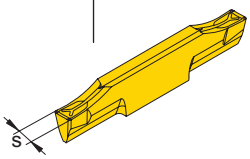
> Good economy
> Optimum solution for all situations

System AX is for axial grooving with small diameters. A special characteristic of the design is that the insert needs no support in the cutting area.

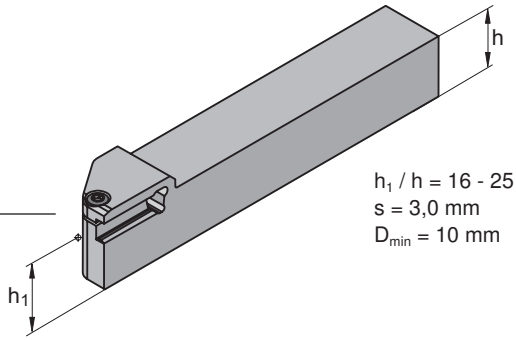
Tool shank with AX parting and grooving module



h_1 / h = 16 - 25 mm
s = 3,0 mm
D_{min} = 10 mm



Monobloc tool



h_1 / h = 16 - 25 mm
s = 3,0 mm
D_{min} = 10 mm



System characteristics

> Neutral insert

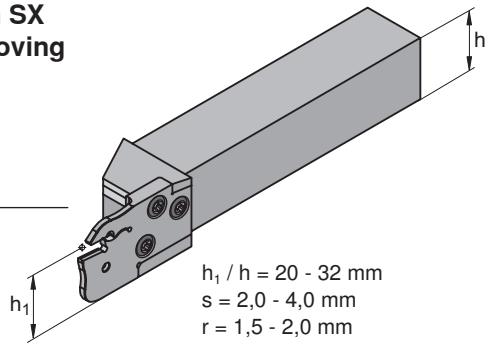
> Monobloc and modular tools

Benefits

> May be applied in left-hand and right-hand tools
> Optimum solution in terms of costs for every application

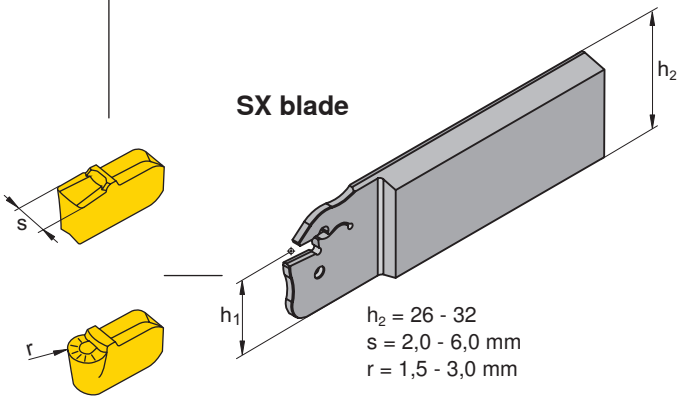
In system SX the insert is self-clamping and fixed with maximum clamping force in the insert seat. Precise cutting edge positioning and easy handling are guaranteed.

Tool shank with SX parting and grooving module

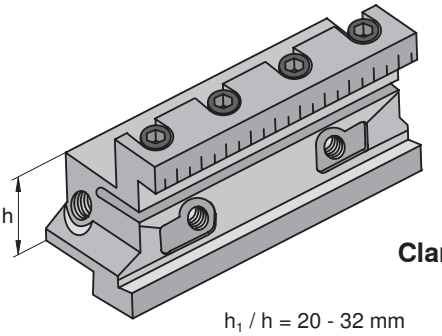


h_1 / h = 20 - 32 mm
s = 2,0 - 4,0 mm
r = 1,5 - 2,0 mm

SX blade

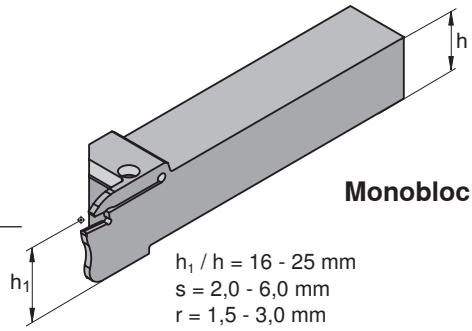


h_2 = 26 - 32
s = 2,0 - 6,0 mm
r = 1,5 - 3,0 mm



Clamping block

h_1 / h = 20 - 32 mm



Monobloc tool

h_1 / h = 16 - 25 mm
s = 2,0 - 6,0 mm
r = 1,5 - 3,0 mm

System characteristics

> Active clamping
> Insert seat with fixed stop
> Easy handling

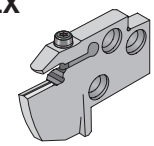
> FEM optimized tool

Benefits

> Inserts will not pull out of the cutting blade
> Exact positioning of the cutting edge
> Quick insert change
> Maximum stability also when longitudinal turning

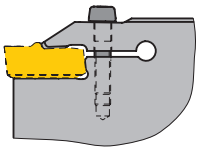
System LX is characterized by high strength and stability. It is most suitable for the production of wide and deep grooves as well as for parting off large bar diameters.

Parting and grooving module LX



s = 8 - 10 mm
r = 4 mm
T_{max} = 25 / 32 / 45 mm

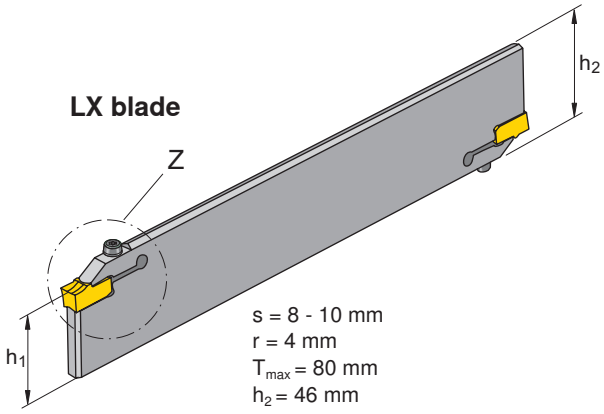
Detail Z
Active insert clamping





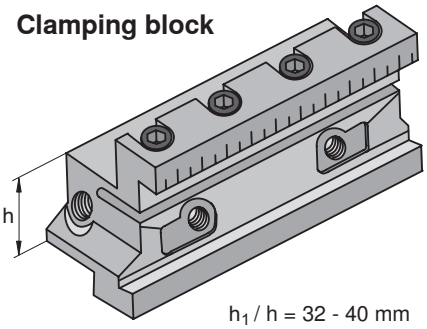


LX blade



s = 8 - 10 mm
r = 4 mm
T_{max} = 80 mm
h_2 = 46 mm

Clamping block



h_1 / h = 32 - 40 mm

Application of LX modules

> Part-off
> Grooving and turning
> Axial grooving with D > 500 mm
> Internal grooving and turning with D > 200 mm

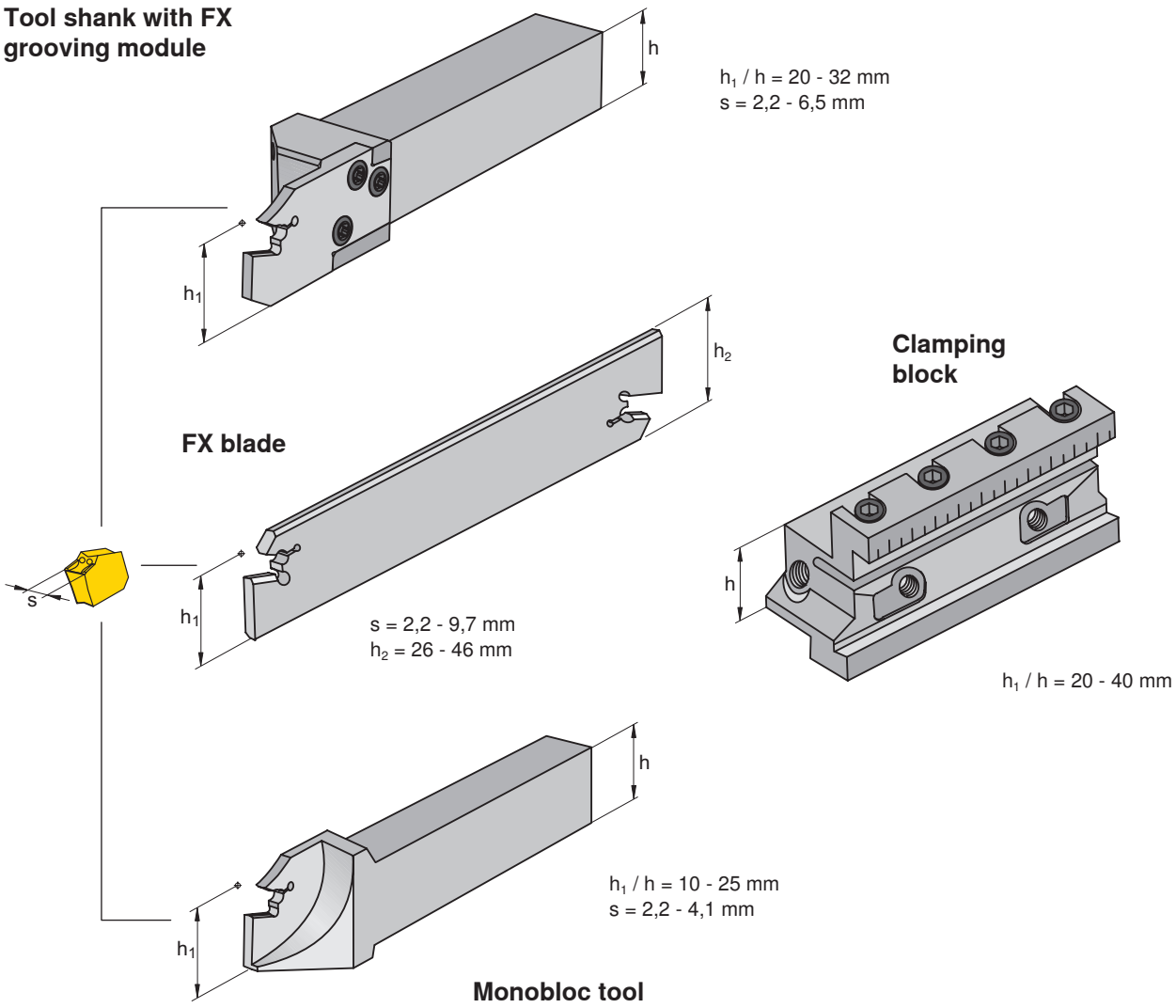
System characteristics

> Robust construction
> Active insert clamping
> Insert with full radius

Benefits

> Application security, high strength and stability
> Well-suited for copy turning

System FX is characterized by a self-clamping single blade insert for deep grooving of large diameters. FX is directly integrated in the MSS system by means of the respective modules. Additionally the tried and tested block/blade solutions and monobloc tools are available.



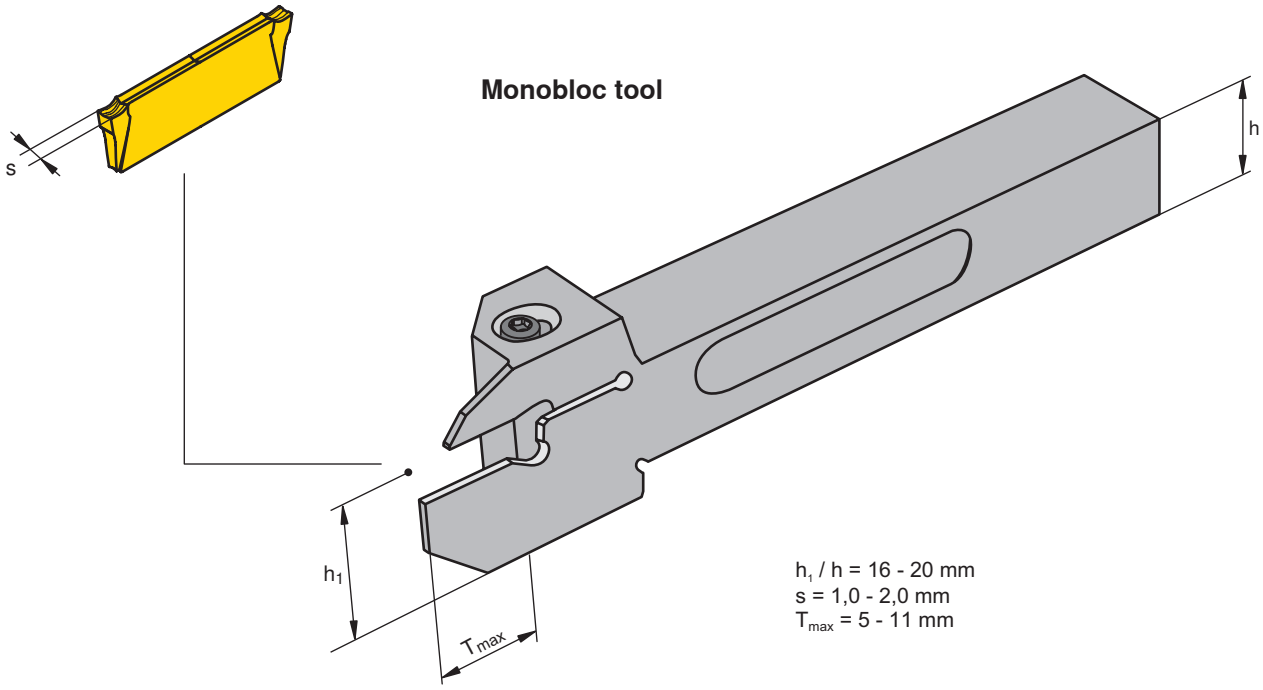
System characteristics

> Self-clamping insert
> Adjustable blade
> Single-blade insert, directly pressed

Benefits

> Easy handling, no clamping parts
> Parting and grooving depth, overhang optimally adjustable
> Economic for deep parting and grooving

This system is the first choice for small parting and grooving widths when maximum flexiblity, repeatability and stability are required in high volume production.



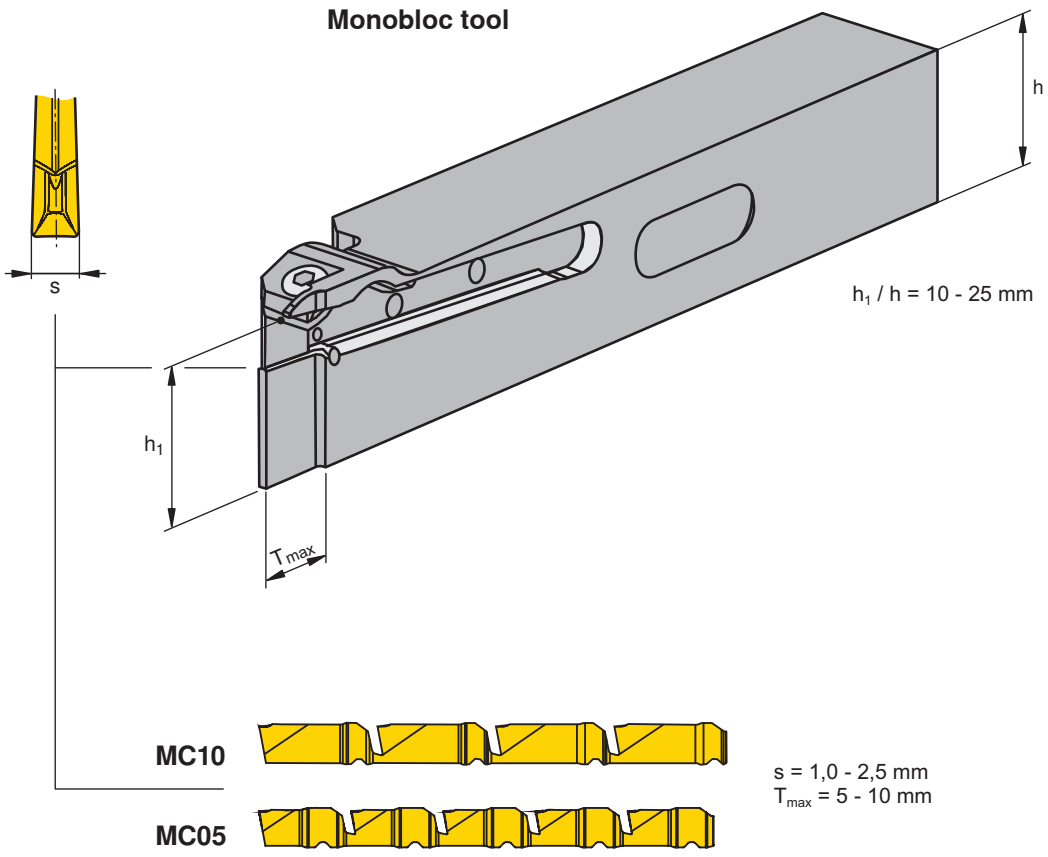
System characteristics

> Maximum precision of the cutting edge when mounted
> Flexible cutting widths possible

Benefits

> Close tolerances on the work piece
> Less material wastage

MaxiClick is characterized by a cutting insert consisting of 4 or 5 cutting elements. The worn cutting edge is broken off towards the side, like a snap-off knife.



System characteristics

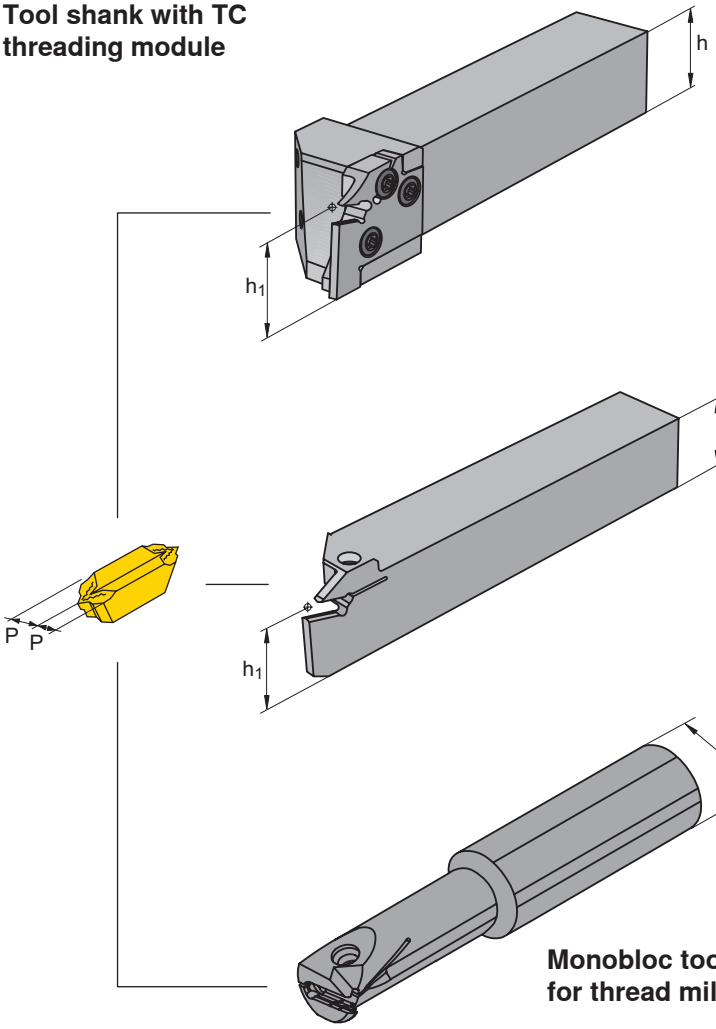
> Extremely narrow part-off and grooving widths are possible
> Excellent surface quality can be achieved
> Multiple part-off operations are possible

Benefits

> Less material wastage
> No additional finishing work necessary
> Reduction of machining costs

With system TC the same insert can be used to produce threads by turning or milling. TC offers numerous advantages which are of decisive importance for many threading applications.

Tool shank with TC threading module



h_1 / h = 20 - 25 mm

Pitch
P = .5 - 5.0 mm
P = 48 - 5 TPI

Monobloc tool

h_1 / h = 12 mm
Pitch

P = .5 - 3.0 mm
P = 48 - 8 TPI

d_1 = 25 - 32 mm

Pitch
P = .5 - 5.0 mm
P = 48 - 5 TPI

Monobloc tool for thread milling

System characteristics

> Turning and milling with the same insert
> Neutral configuration of insert

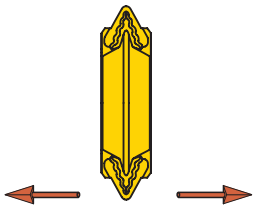
Benefits

> Flexibility, reduced variety and costs
> Right-hand and left-hand threads possible using one insert only
> Reduced storage

System TC – thread turning

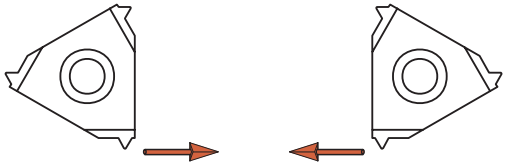
System TC for thread turning is an integrated part of the MSS system. Compared to traditional systems TC offers a series of advantages which are of decisive importance for many threading applications.

System TC

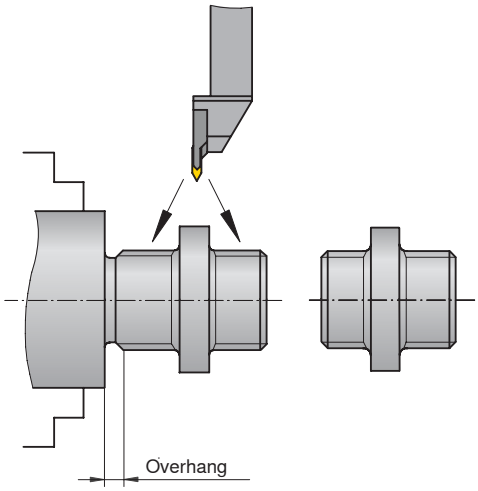


> Neutral configuration of insert makes operation in both directions possible
> Only one threading insert per pitch for partial profile and Whitworth thread; only two threading inserts (internal - external) per pitch for ISO threads
> Reduced storage
> Good chip formation through chip groove with rake angle +10°

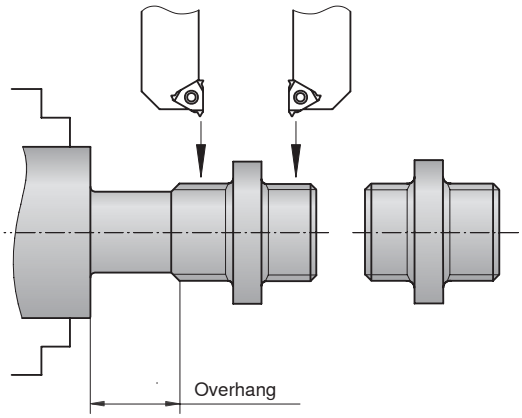
Conventional system



> Right-hand and left-hand version of insert, therefore operation only in one direction
> For every pitch 4 threading inserts are necessary (right-hand - left-hand, internal - external)

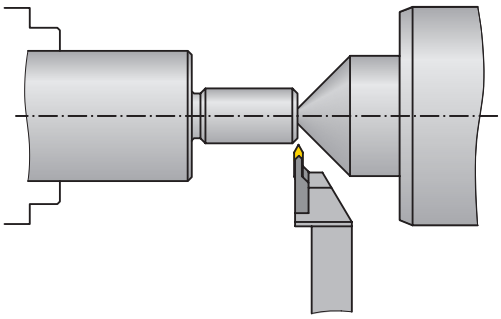


Enhanced economy through
> Reduced machining time
> Fewer tool changes
> Improved stability, small overhang
> Material saving
> Thread turning between shoulders possible
> Fewer tools and inserts



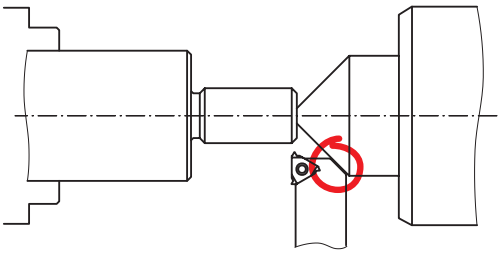
> For this machining method 2 tools are necessary
> Additional loss of stability and material caused by large overhangs

System TC

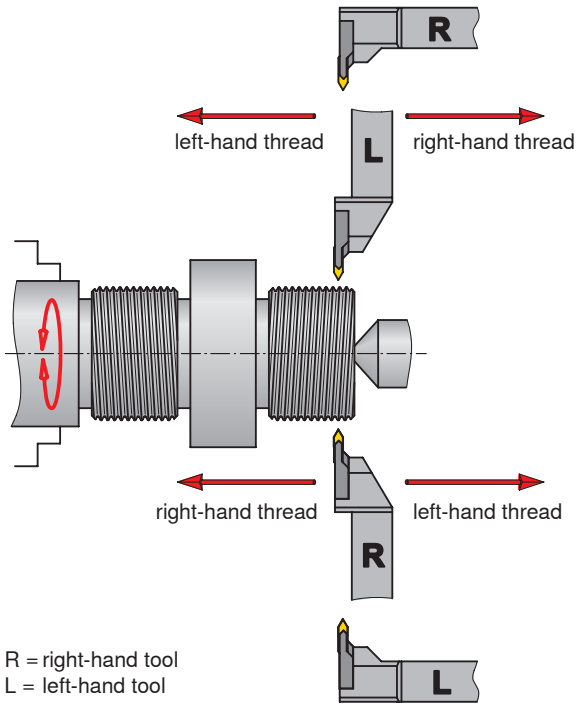


> Easy access to work piece therefore use of tailstock also possible with small thread diameters

Conventional system

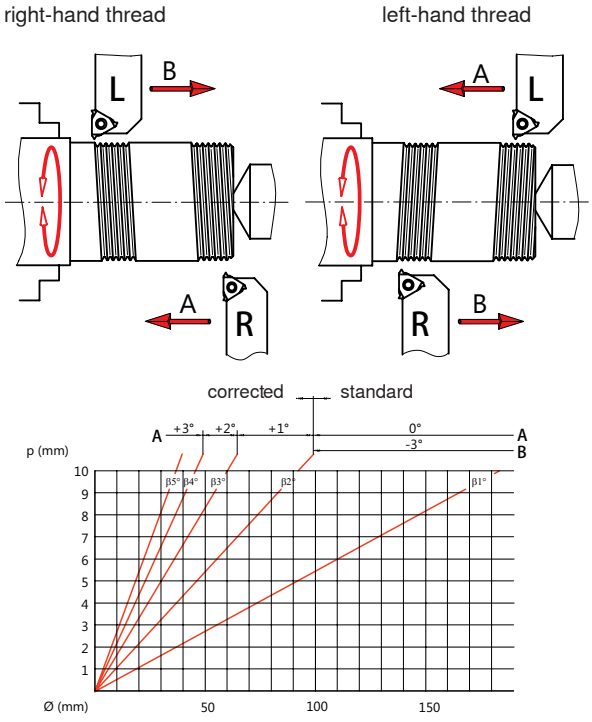


> Difficult component access
> Danger of collision



R = right-hand tool
L = left-hand tool

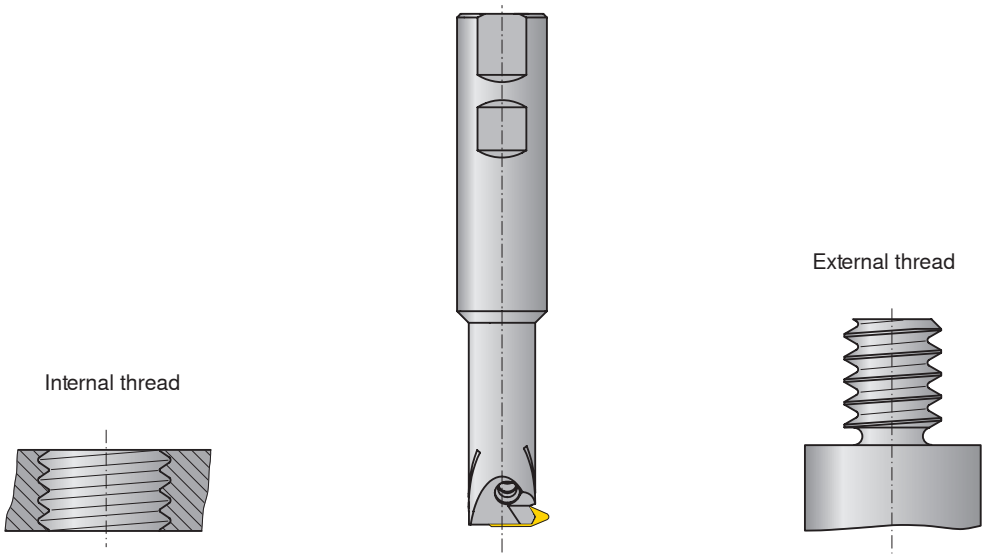
> Easy to apply as the tools can be used in both directions without correcting the helix angle

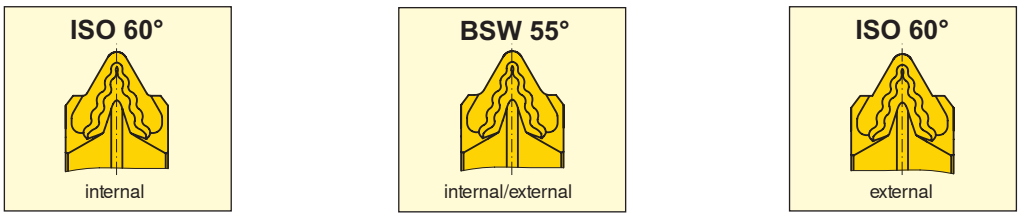


> Correction of helix angle necessary, therefore high degree of application know-how required
> Can only be operated in one direction

System TC – thread milling

For thread milling and turning the same inserts are applied. With special tool shanks, which are characterized by compact and modular construction, **external as well as internal threads** can be produced on all up-to-date machining centres.





System characteristics

> Turning and milling with the same insert
> Single-tooth thread milling

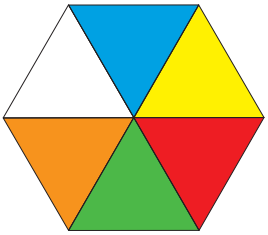
> Thread is cut in one pass

Benefits

> Flexibility, reduced variety and costs

> Low machining forces, large overhang possible, high cutting data (v_c and f), easy programming
> No interruptions or steps in the thread

Material



Based on VDI 3323 CERATIZIT's MasterGuide divides materials into six main groups (P, M, K, N, S, H).
Each is given a colour, according to the system partly adopted in ISO 513.

Blue: steel
Machining, cementation, tempered and constructional steels

Yellow: stainless steel
Ferritic Cr-steels, austenitic CrNi-steels, martensitic Cr-steels, duplex steels

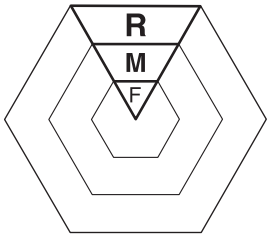
Red: cast iron
Cast iron, grey cast iron, tempered iron, spheroidal cast iron, CGI, sintered iron

Green: non ferrous metals and non metals
Al wrought and Al cast alloys, copper, copper alloys, non metal materials

Orange: heat resistant alloys / titanium
Ni/Co-base alloys, Ti alloys

White: hard materials
Hardened steels (≥ 45 HRC), chilled castings, hard cast irons

Machining application type



Each coloured segment is divided into three sections, and each section indicates the relevant machining application type:

R = rough machining



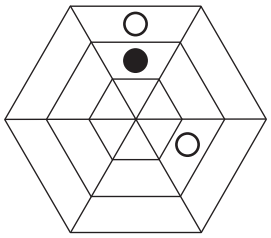
M = medium machining



F = fine machining



Application

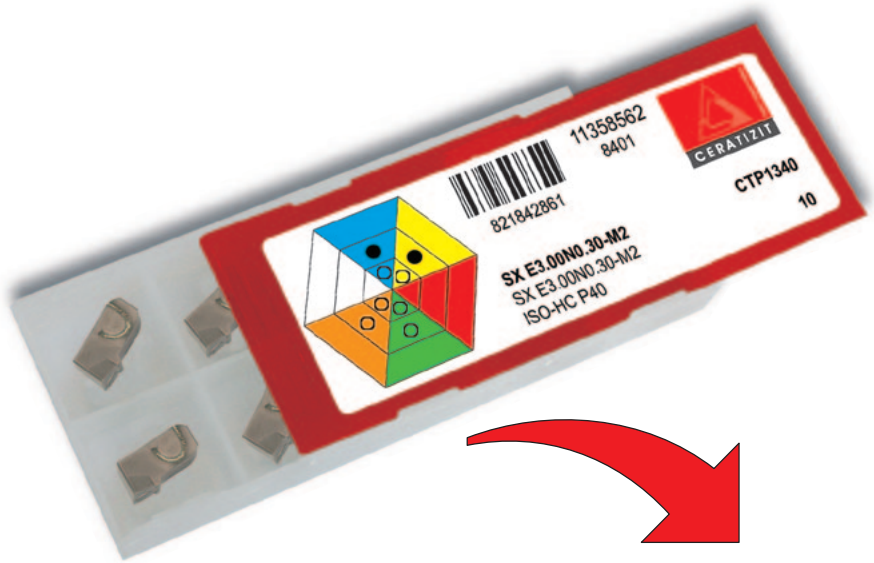


The ideal application area for the insert is indicated by a black circle. Extended applications are indicated by an open circle. The CERATIZIT MasterGuide provides you with an easily understandable structure for choosing a product and enables you to reduce grade and geometry stocks.

● **Main application**

○ **Extended application**

The right indexable insert at a glance



Main application:
Medium machining of steel and stainless steel.

Extended application:
Finish machining of steel and stainless steel.
Medium and finish machining of non ferrous metals and non metals, heat resistant alloys/titanium.

CTC P335

Manufacturer: CERATIZIT

Cutting material

W Uncoated carbide
C CVD coated carbide
P PVD coated carbide
T Uncoated cermet
E Coated cermet
N Uncoated silicon nitride
M Coated silicon nitride
S Mixed ceramic
I Sialon
D PCD
B CBN
L CBN coated
H Sintered HSS

ISO 513 Application range

For example:
05 ISO K05/P05
10
15
25-

Main application (material) Variant 1: number

1 Steel
2 Stainless steel
3 Cast iron
4 Light and non ferrous metals, non metals
5 Heat resistant alloys, titanium
6 Hard materials
7 Universal grade for a variety of applications

Main application (machining method)

1 Turning
2 Milling
3 Parting and grooving
4 Drilling
5 Threading
6 Others
7 Universal grade for a variety of applications

Main application (material) Variant 2: ISO letter

P Steel
M Stainless steel
K Cast iron
N Light and non ferrous metals, non metals
S Heat resistant alloys, titanium
H Hard materials
X Universal grade for a variety of applications

Grade overview - parting and grooving

Grade designation	Standard designation	*Cutting material	Application range 01 05 10 15 20 25 30 35 40 45 50	P Steel	M Stainless	K Cast iron	N Non ferrous metals	S Heat resistant	H Hard materials
CTC1325	HC-P25	C		●					
	HC-M20	C			○				
	HC-K30	C				●			
CTCP335	HC-P35	C		●					
	HC-M30	C			○				
	HC-K35	C				●			
CTP1340	HC-P30	P		●					
	HC-M25	P			●			●	
	HC-K30	P				●	○		
CTPP345	HC-P45	P		●					
	HC-M40	P			●				
	HC-S40	P						○	
CTW7120	HW-M20	W			○				
	HW-K20	W					●	○	
GM127	HC-P30	C		●					
	HC-M25	C			○				
H216T	HW-K15	W				●	●		
S40T	HW-P40	W		●					
	HW-M40	W			●				
SR127	HC-P25	C		●					
	HC-M20	C			○				
	HC-K30	C				●			
TSM20	HW-K15	W				●	●	●	

● Main application

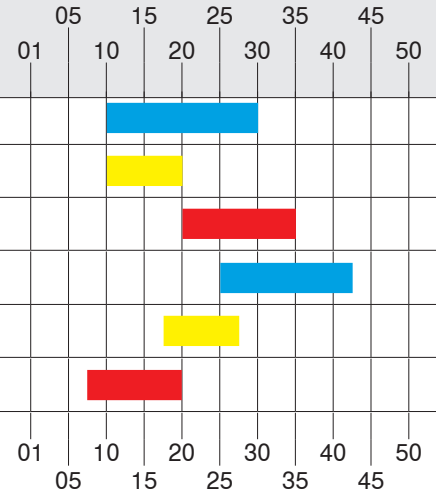
○ Extended application

*Type of cutting material

C29

** to be discontinued

Grade designation	Standard designation	*Cutting material	Application range	P Steel	M Stainless	K Cast iron	N Non ferrous metals	S Heat resistant	H Hard materials
GM213	HC-P20	C		●					
	HC-M15	C			●				
	HC-K25	C				●			
GM240	HC-P35	C		●					
	HC-M25	C			●				
H216T	HW-K15	W				●	●		



● Main application

○ Extended application

*Type of cutting material

C29

Carbide

Reference	Carbide group
HW	Uncoated carbide, consisting mainly of tungsten carbide (WC)
HT[1)]	Uncoated carbide, consisting mainly of titanium carbide (TiC) or titanium nitride (TiN) or both
HC	Carbides as above, but coated

Ceramic

Reference	Ceramic group
CA	Oxide ceramic, consisting mainly of aluminium oxide (Al_2O_3)
CM	Mixed ceramic, based on aluminium oxide (Al_2O_3), but with different oxide components
CN	Nitride ceramic, consisting mainly of silicon nitride (Si_3N_4)
CC	Ceramics as above, but uncoated

Diamond

Reference	Diamond group
DP	Polycrystalline diamond[2)]

[2)] Polycrystalline diamond and polycrystalline boron nitride are also called ultra-hard cutting materials.

Boron nitride

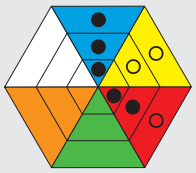
Reference	Boron nitride group
BN	Cubic crystalline boron nitride (polycrystalline boron nitride) [2)]

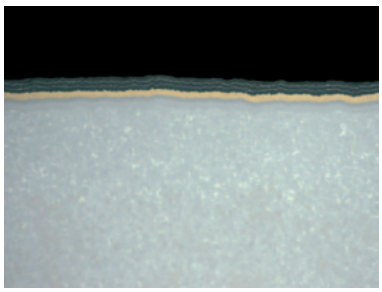
[1)] These carbides are also called ‘cermets’.

[2)] Polycrystalline diamond and polycrystalline boron nitride are also called ultra-hard cutting materials.

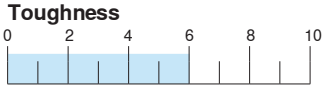
CTC1325

HC-P25
HC-M20
HC-K30





Toughness



Wear resistance



Composition:
Co 7.0%; composite carbides 8.0%; WC balance

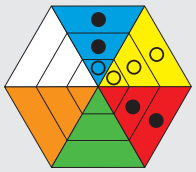
Grain size:
1 - 2 µm

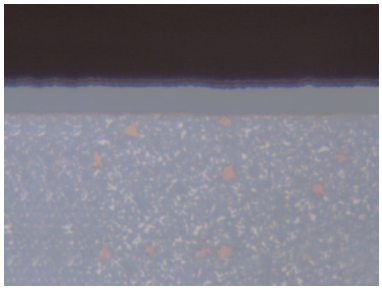
Hardness:
HV_{30} 1450

Coating specification:
CVD
Ti(C,N) + Ti(C,N) + TiN + Al_2O_3; 12 µm

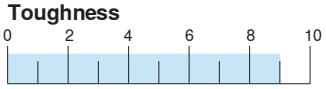
CTCP335

HC-P35
HC-M30
HC-K35

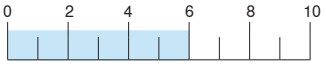




Toughness



Wear resistance



Composition:
Co 10.5%; mixed carbides 2.0%; WC balance

Grain size:
1 - 2 µm

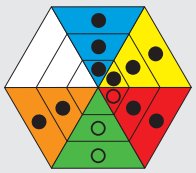
Hardness:
HV_{30} 1400

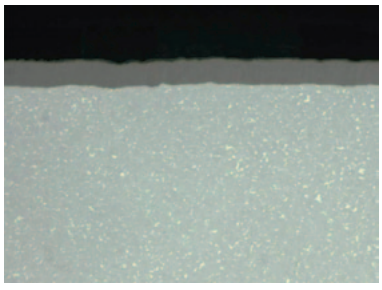
Coating specification:
Ti(C,N) + Al_2O_3; 7.5 µm

Properties, application:
- Excellent wear resistance
- Good resistance to oxidation
- High toughness
- Good heat resistance

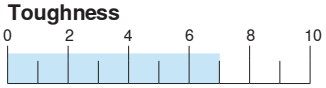
CTP1340

HC-P30
HC-M25
HC-K30

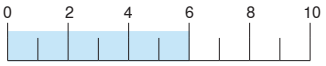




Toughness



Wear resistance



Composition:
Co 9.0%; WC balance

Grain size:
.7 - 1 µm

Hardness:
HV_{30} 1590

Coating specification:
PVD
TiAlN; 4 µm

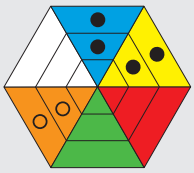
Properties, application:
- Excellent suitability for universal application
- Ideal for stainless steels
- High cutting edge stability

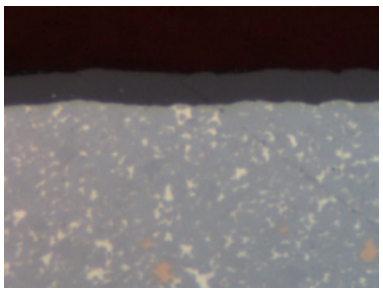
Grade description – parting and grooving

Steel

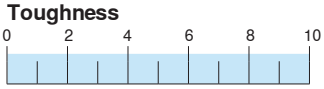
CTPP345

HC-P45
HC-M40
HC-S40

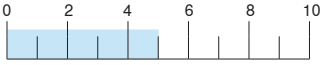




Toughness



Wear resistance



Composition:
Co 12.5%; mixed carbides 2.0%; WC balance

Grain size:
1 - 1.5 μm

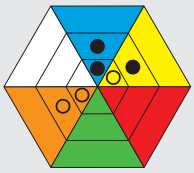
Hardness:
HV_{30} 1380

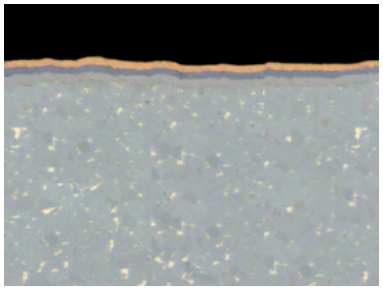
Coating specification:
TiAlN; 7 μm

Properties, application:
- For universal application
- Excellent toughness
- Good wear resistance
- High application security

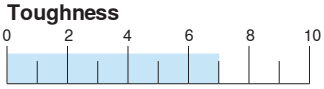
GM127

HC-P30
HC-M25

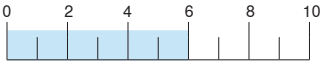




Toughness



Wear resistance



Composition:
Co 6.0%; composite carbides .6%; WC balance

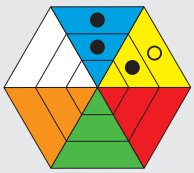
Grain size:
2 μm

Hardness:
HV_{30} 1460

Coating specification:
CVD
TiC + Ti(C,N) + TiN; 5 μm

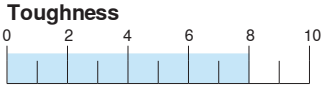
S40T

HW-P40
HW-M40

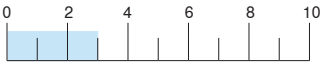




Toughness



Wear resistance



Composition:
Co 11.0%; mixed carbides 12.0%; WC balance

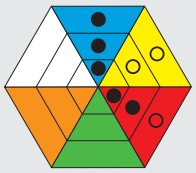
Grain size:
1 - 2 μm

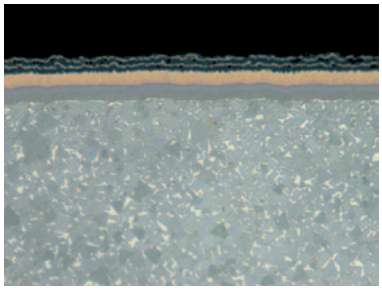
Hardness:
HV_{30} 1420

Properties, application:
- High toughness
- Medium to low cutting speed
- For universal application on steel

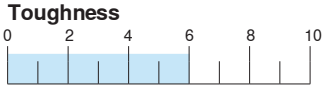
SR127

HC-P25
HC-M20
HC-K30

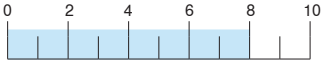




Toughness



Wear resistance



Composition:
Co 6.0%; composite carbides .6%; WC balance

Grain size:
2 μm

Hardness:
HV_{30} 1460

Coating specification:
CVD
Ti(C,N) + TiN + Al_2O_3; 12 μm

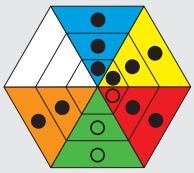
Properties, application:
- Wide range of applications (steel and cast iron)
- Excellent resistance to oxidation
- Good toughness
- High wear resistance

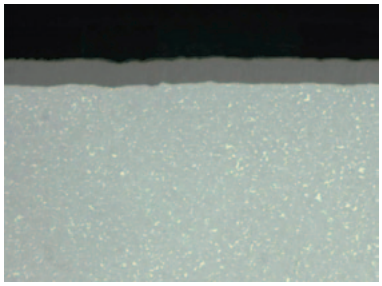
Grade description – parting and grooving

Stainless steel

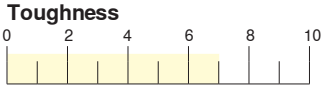
CTP1340

HC-P30
HC-M25
HC-K30

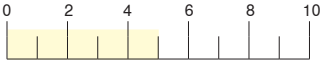




Toughness



Wear resistance



Composition:
Co 9.0%; WC balance

Grain size:
.7 - 1 µm

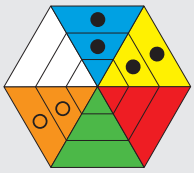
Hardness:
HV_{30} 1590

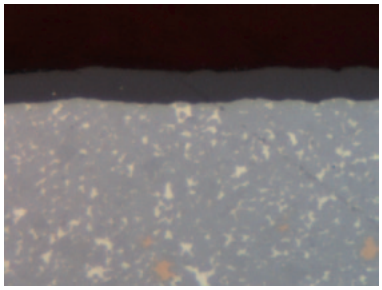
Coating specification:
PVD
TiAlN; 4 µm

Properties, application:
- Excellent suitability for universal application
- Ideal for stainless steels
- High cutting edge stability

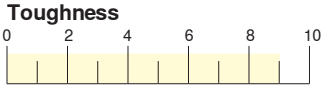
CTPP345

HC-P45
HC-M40
HC-S40

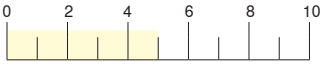




Toughness



Wear resistance



Composition:
Co 12.5%; mixed carbides 2.0%; WC balance

Grain size:
1 - 1.5 µm

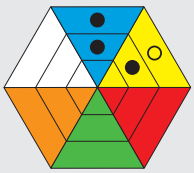
Hardness:
HV_{30} 1380

Coating specification:
TiAlN; 7 µm

Properties, application:
- For universal application
- Excellent toughness
- Good wear resistance
- High application security

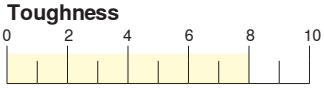
S40T

HW-P40
HW-M40

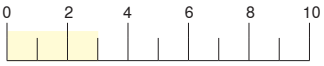




Toughness



Wear resistance



Composition:
Co 11.0%; mixed carbides 12.0%; WC balance

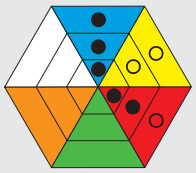
Grain size:
1 - 2 µm

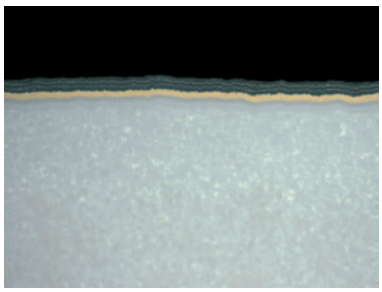
Hardness:
HV_{30} 1420

Properties, application:
- High toughness
- Medium to low cutting speed
- For universal application on steel

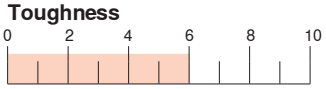
CTC1325

HC-P25
HC-M20
HC-K30

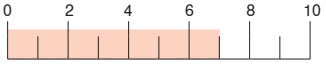




Toughness



Wear resistance



Composition:
Co 7.0%; composite carbides 8.0%; WC balance

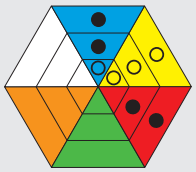
Grain size:
1 - 2 µm

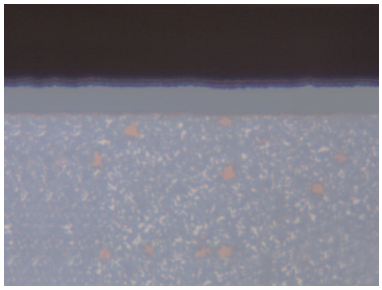
Hardness:
HV_{30} 1450

Coating specification:
CVD
Ti(C,N) + Ti(C,N) + TiN + Al_2O_3; 12 µm

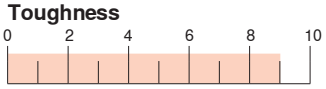
CTCP335

HC-P35
HC-M30
HC-K35

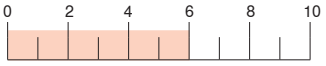




Toughness



Wear resistance



Composition:
Co 10.5%; mixed carbides 2.0%; WC balance

Grain size:
1 - 2 µm

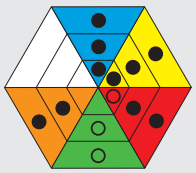
Hardness:
HV_{30} 1400

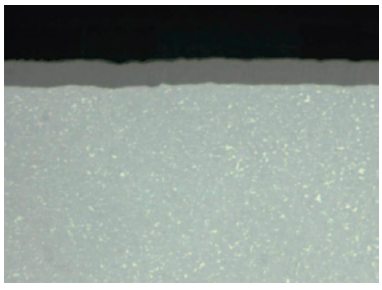
Coating specification:
Ti(C,N) + Al_2O_3; 7.5 µm

Properties, application:
- Excellent wear resistance
- Good resistance to oxidation
- High toughness
- Good heat resistance

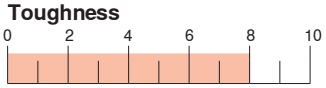
CTP1340

HC-P30
HC-M25
HC-K30

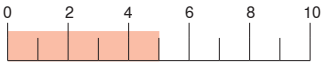




Toughness



Wear resistance



Composition:
Co 9.0%; WC balance

Grain size:
.7 - 1 µm

Hardness:
HV_{30} 1590

Coating specification:
PVD
TiAlN; 4 µm

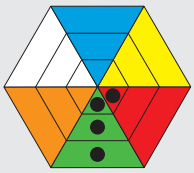
Properties, application:
- Excellent suitability for universal application
- Ideal for stainless steels
- High cutting edge stability

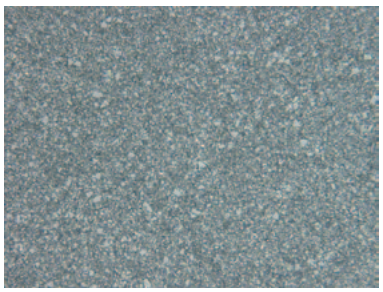
Grade description – parting and grooving

Cast iron

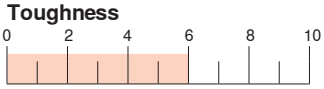
H216T

HW-K15

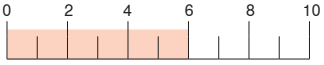




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

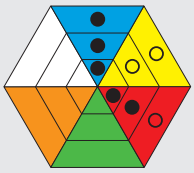
Grain size:
1 μm

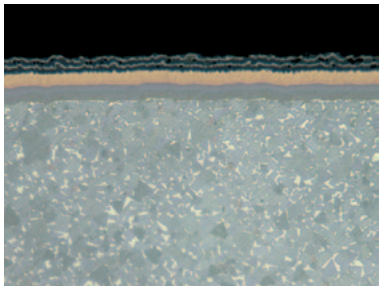
Hardness:
HV_{30} 1630

Properties, application:
- Optimally suitable for aluminium
- High wear resistance
- High heat resistance
- Low tendency to adhesion

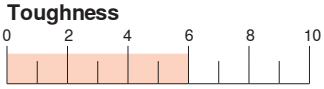
SR127

HC-P25
HC-M20
HC-K30

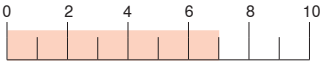




Toughness



Wear resistance



Composition:
Co 6.0%; composite carbides .6%; WC balance

Grain size:
2 μm

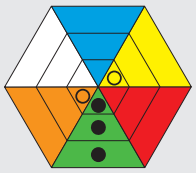
Hardness:
HV_{30} 1460

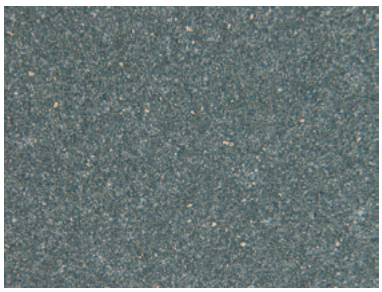
Coating specification:
CVD
Ti(C,N) + TiN + Al_2O_3; 12 μm

Properties, application:
- Wide range of applications (steel and cast iron)
- Excellent resistance to oxidation
- Good toughness
- High wear resistance

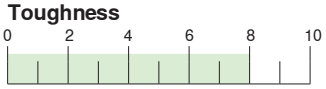
CTW7120

HW-M20
HW-K20





Toughness



Wear resistance



Composition:
Co 10.0%; WC balance

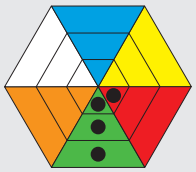
Grain size:
.7 µm (submicron grade)

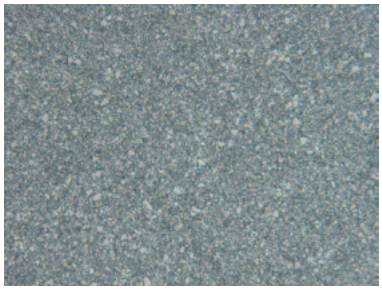
Hardness:
HV_{30} 1550

Properties, application:
- Ideal for non ferrous metals
- Substrate for PVD coatings

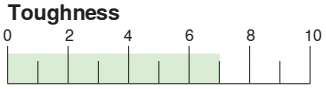
H216T

HW-K15





Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

Grain size:
1 µm

Hardness:
HV_{30} 1630

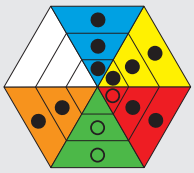
Properties, application:
- Optimally suitable for aluminium
- High wear resistance
- High heat resistance
- Low tendency to adhesion

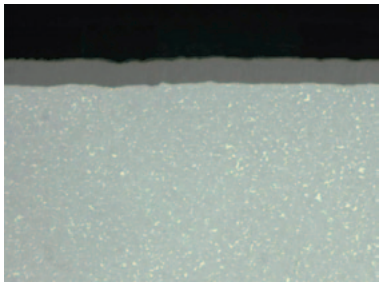
Grade description – parting and grooving

Heat resistant alloys / titanium

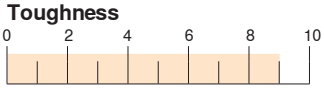
CTP1340

HC-P30
HC-M25
HC-K30

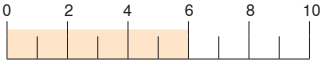




Toughness



Wear resistance



Composition:
Co 9.0%; WC balance

Grain size:
.7 - 1 μm

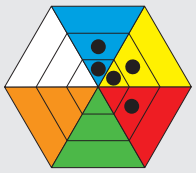
Hardness:
HV_{30} 1590

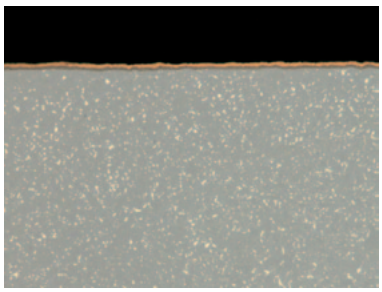
Coating specification:
PVD
TiAlN; 4 μm

Properties, application:
- Excellent suitability for universal application
- Ideal for stainless steels
- High cutting edge stability

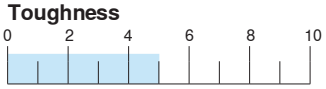
GM213

HC-P20
HC-M15
HC-K25

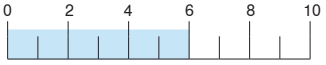




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

Grain size:
1 μm

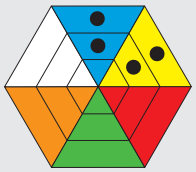
Hardness:
HV_{30} 1630

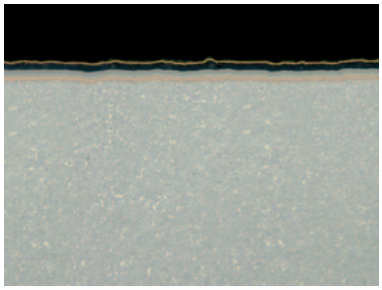
Coating specification:
CVD
TiC + TiN; 3 μm

Properties, application:
- Suitable for high cutting speed
- Good heat resistance
- Good wear resistance

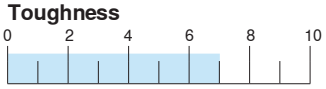
GM240

HC-P35
HC-M25

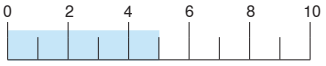




Toughness



Wear resistance



Composition:
Co 10.0%; composite carbides .6%; WC balance

Grain size:
.7 μm

Hardness:
HV_{30} 1590

Coating specification:
CVD
TiC + Ti(C,N) + Al_2O_3 + Ti(N,B); 6 μm

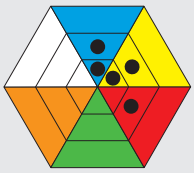
Properties, application:
- For universal application
- High toughness
- Good wear resistance
- Low tendency to adhesion

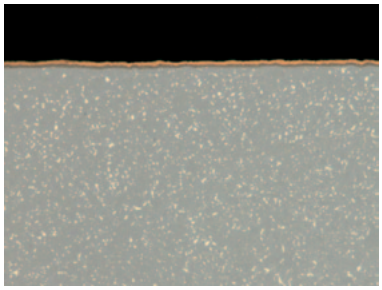
Grade description – threading

Stainless steel

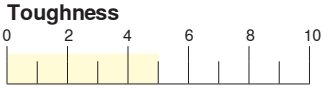
GM213

HC-P20
HC-M15
HC-K25

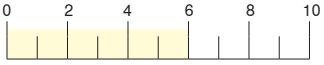




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

Grain size:
1 μm

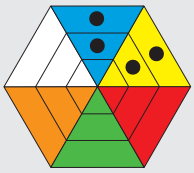
Hardness:
HV_{30} 1630

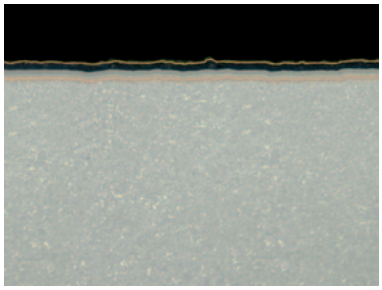
Coating specification:
CVD
TiC + TiN; 3 μm

Properties, application:
- Suitable for high cutting speed
- Good heat resistance
- Good wear resistance

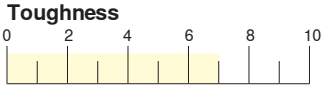
GM240

HC-P35
HC-M25

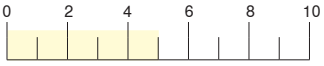




Toughness



Wear resistance



Composition:
Co 10.0%; composite carbides .6%; WC balance

Grain size:
.7 μm

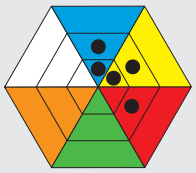
Hardness:
HV_{30} 1590

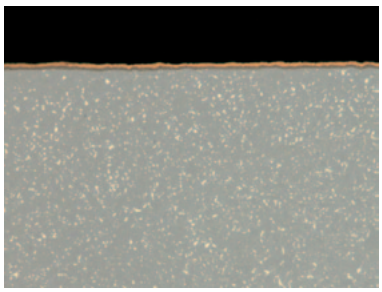
Coating specification:
CVD
TiC + Ti(C,N) + Al_2O_3 + Ti(N,B); 6 μm

Properties, application:
- For universal application
- High toughness
- Good wear resistance
- Low tendency to adhesion

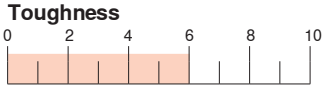
GM213

HC-P20
HC-M15
HC-K25

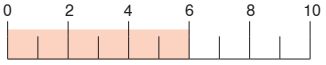




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

Grain size:
1 μm

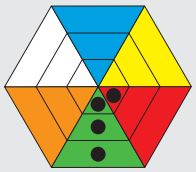
Hardness:
HV_{30} 1630

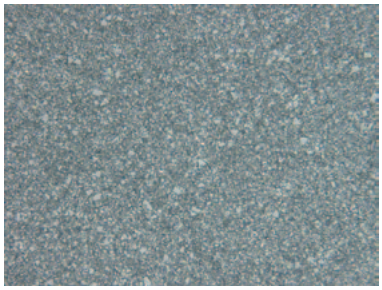
Coating specification:
CVD
TiC + TiN; 3 μm

Properties, application:
- Suitable for high cutting speed
- Good heat resistance
- Good wear resistance

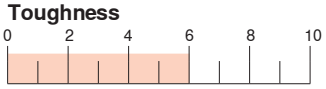
H216T

HW-K15

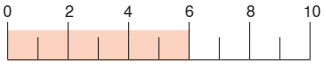




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

Grain size:
1 μm

Hardness:
HV_{30} 1630

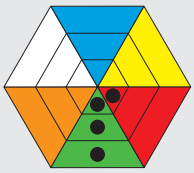
Properties, application:
- Optimally suitable for aluminium
- High wear resistance
- High heat resistance
- Low tendency to adhesion

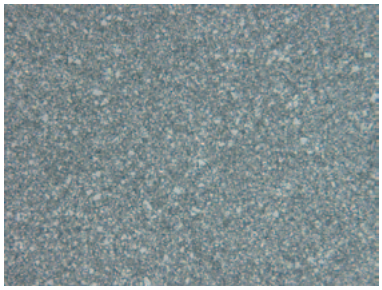
Grade description – threading

Non ferrous metals and non metals

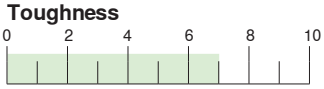
H216T

HW-K15

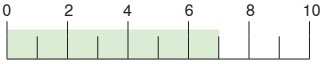




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

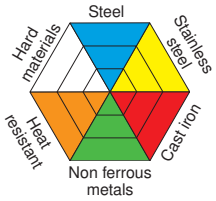
Grain size:
1 μm

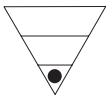
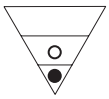
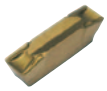
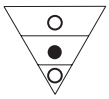
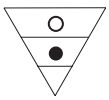
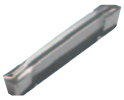
Hardness:
HV_{30} 1630

Properties, application:

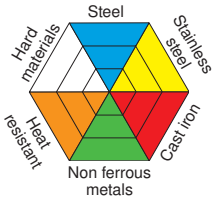
- Optimally suitable for aluminium
- High wear resistance
- High heat resistance
- Low tendency to adhesion

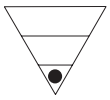
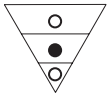
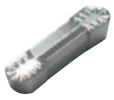
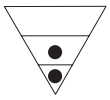
Part-off, grooving, turning



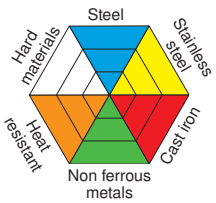
Chip groove	Machining type	Material	Consistent cutting depth	Inconsistent cutting depth	Interrupted cut
-F2	 	●	CTC1325	CTC1325 / CTP1340	CTPP345
		●	CTP1340	CTP1340 / CTPP345	CTPP345
		○	CTC1325	CTC1325 / CTP1340	–
			–	–	–
		○	–	–	–
Standard	  	●	CTC1325	CTC1325 / CTP1340	CTCP335
		○	CTP1340	CTP1340	CTP1340
		●	CTC1325	CTC1325 / CTP1340	CTP1340
			–	–	–
			–	–	–
-M40	 	●	CTC1325	CTC1325 / CTP1340	CTP1340 / CTPP345
		○	CTP1340	CTP1340 / CTPP345	CTPP345
		●	CTC1325	CTC1325	CTP1340
			–	–	–
		○	CTP1340	CTP1340	CTP1340 / CTPP345
-M1	 	●	CTC1325	CTC1325 / CTP1340	CTPP345
		○	CTP1340	CTP1340 / CTPP345	CTPP345
		●	CTC1325	CTC1325 / CTP1340	CTP1340
			–	–	–
		○	CTP1340	CTP1340	CTP1340 / CTPP345
-27P	  		–	–	–
			–	–	–
			–	–	–
		●	H216T	H216T	H216T
			–	–	–

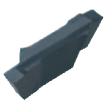
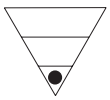
Radius grooves, copy turning



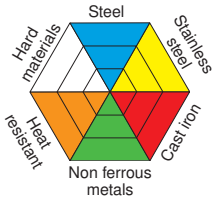
Chip groove	Machining type	Material	Consistent cutting depth	Inconsistent cutting depth	Interrupted cut
R/L	 	●	CTC1325	CTC1325	–
		○	CTC1325	CTC1325	–
		●	CTC1325	CTC1325	–
			–	–	–
			–	–	–
Standard/ -M3	  	●	CTC1325	CTC1325 / CTP1340	CTP1340 / CTCP335
		○	CTC1325 / GM127	CTP1340	CTP1340
		●	CTC1325	CTC1325	CTCP335
			–	–	–
			–	–	–
-27P	  		–	–	–
			–	–	–
			–	–	–
		●	H216T	H216T	H216T
			–	–	–

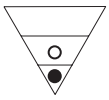
Circlip grooves



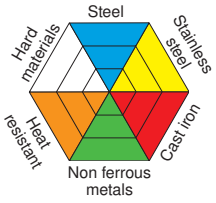
Chip groove	Machining type	Material	Consistent cutting depth	Inconsistent cutting depth	Interrupted cut
L/N/R	  	●	CTP1340	CTP1340	–
		●	CTP1340	CTP1340	–
		○	CTP1340	CTP1340	–
		○	CTP1340	CTP1340	–
		○	CTP1340	CTP1340	–

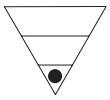
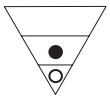
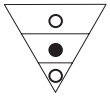
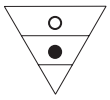
Axial grooving



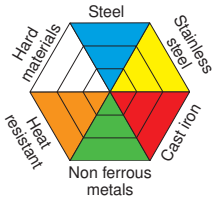
Chip groove	Machining type	Material	Consistent cutting depth	Inconsistent cutting depth	Interrupted cut
-F50			CTP1340	CTP1340	–
			CTP1340	CTP1340	–
			CTP1340	CTP1340	–
			CTP1340	CTP1340	–
			CTP1340	CTP1340	–

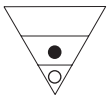
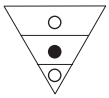
Part-off, grooving, turning



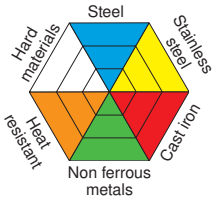
Chip groove	Machining type	Material	Consistent cutting depth	Inconsistent cutting depth	Interrupted cut
-F2			CTC1325	CTC1325 / CTP1340	CTPP345
			CTP1340	CTP1340 / CTPP345	CTPP345
			CTC1325	CTC1325 / CTCP335	–
			–	–	–
			CTP1340	CTP1340 / CTPP345	–
-M2			CTC1325	CTC1325 / CTP1340	CTCP335
			CTP1340	CTP1340 / CTPP345	CTCP335
			CTC1325	CTC1325 / CTP1340	CTCP335
			–	–	–
			CTP1340	CTP1340	CTP1340 / CTPP345
-M3			CTP1340	CTP1340 / CTCP335	CTP1340 / CTCP335
			CTP1340	CTP1340	CTP1340 / CTCP335
			CTP1340	CTCP335	CTCP335
			CTP1340	CTP1340	CTP1340
			CTP1340	CTP1340	CTP1340
-M1			CTC1325	CTP1340 / CTCP335	CTCP335 / CTPP345
			CTP1340	CTP1340 / CTPP345	CTPP345
			CTC1325	CTC1325	CTCP335
			–	–	–
			CTP1340	CTP1340	CTP1340 / CTPP345
-27P			–	–	–
			–	–	–
			–	–	–
			H216T	H216T	H216T
			–	–	–

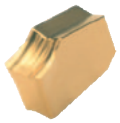
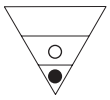
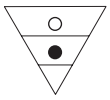
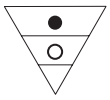
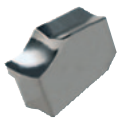
Part-off, grooving, turning



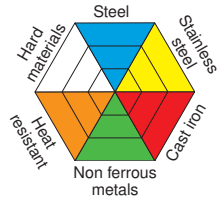
Chip groove	Machining type	Material	Consistent cutting depth	Inconsistent cutting depth	Interrupted cut
-M2			CTC1325	CTC1325 / CTCP335	CTCP335
			CTCP335	CTCP335	CTCP335
			CTC1325	CTC1325	CTCP335
			–	–	–
			–	–	–
-M3			CTC1325	CTC1325 / CTCP335	CTCP335
			CTCP335	CTCP335	CTCP335
			CTC1325	CTC1325	CTCP335
			–	–	–
			–	–	–

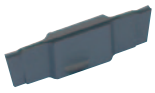
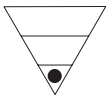
Part-off, grooving



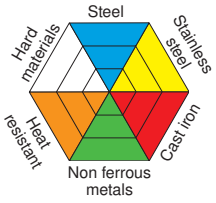
Chip groove	Machining type	Material	Consistent cutting depth	Inconsistent cutting depth	Interrupted cut
-F1			CTC1325	CTC1325 / CTP1340	CTPP345
			CTP1340	CTP1340 / CTPP345	CTPP345
			CTC1325	CTC1325 / CTP1340	–
			–	–	–
			–	–	–
-M1			CTC1325	CTP1340 / CTCP335	CTCP335 / CTPP345
			CTP1340	CTP1340 / CTPP345	CTPP345
			CTC1325	CTC1325	CTCP335
			–	–	–
			CTP1340	CTP1340	CTP1340 / CTPP345
-R2			CTC1325	CTC1325 / CTP1340	CTPP345
			CTP1340	CTP1340 / CTPP345	CTPP345
			CTC1325	CTC1325	CTP1340
			–	–	–
			CTP1340	CTP1340	CTP1340 / CTPP345
-27P			–	–	–
			–	–	–
			–	–	–
			H216T	H216T	H216T
			–	–	–

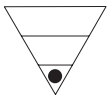
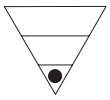
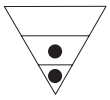
Part-off, grooving



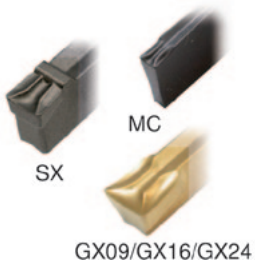
Chip groove	Machining type	Material	Consistent cutting depth	Inconsistent cutting depth	Interrupted cut
-F3			CTP1340	CTP1340	–
			CTP1340	CTP1340	–
			CTP1340	CTP1340	–
			–	–	–
			CTP1340	CTP1340	–

Part-off, grooving



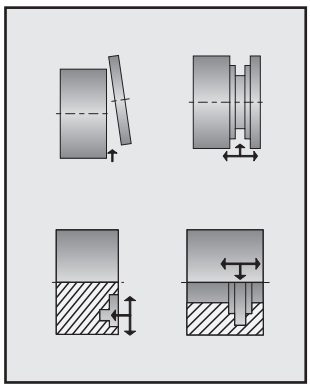
Chip groove	Machining type	Material	Consistent cutting depth	Inconsistent cutting depth	Interrupted cut
-F2			CTP1340	CTP1340	CTP1340
			CTP1340	CTP1340	CTP1340
			CTP1340	CTP1340	CTP1340
			–	–	–
			CTP1340	CTP1340	–
-F3			CTP1340	CTP1340	–
			CTP1340	CTP1340	–
			CTP1340	CTP1340	–
			–	–	–
			CTP1340	CTP1340	–
-27P			–	–	–
			–	–	–
			–	–	–
			CTW7120	CTW7120	CTW7120
			–	–	–

-F2

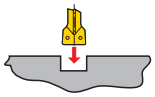


Application:

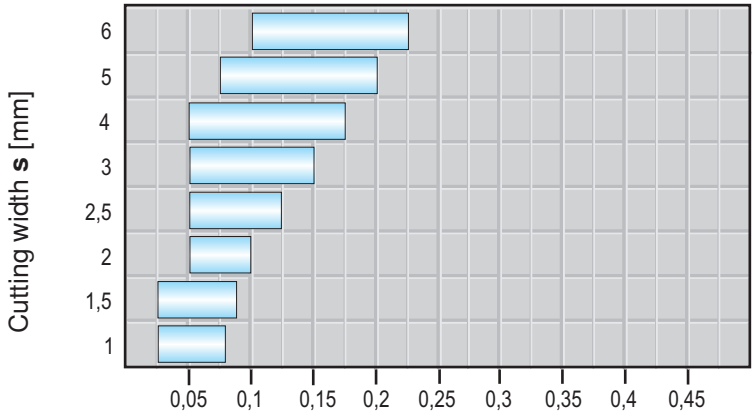




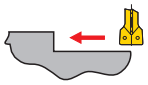
- For steels in general, particularly suitable for **stainless materials**
- Insert with ground periphery
- Tolerance cutting width ± .02 mm
- Suitable also for parting off tubes and thin-walled materials
- Special profiles (SX, GX) possible



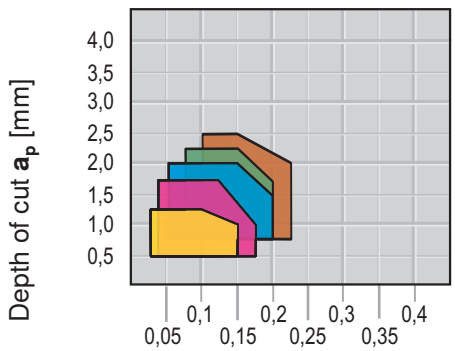
Feed rate for parting and grooving



Feed rate **f** [mm/rev]



Feed rate for longitudinal turning

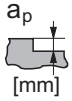


Cutting width **s**:

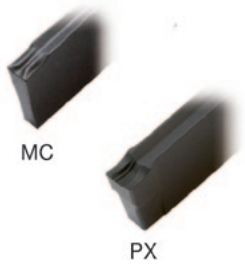
- = 6 mm
- = 5 mm
- = 4 mm
- = 3 mm
- = 2 mm

Feed rate **f** [mm/rev]

a_p [mm]

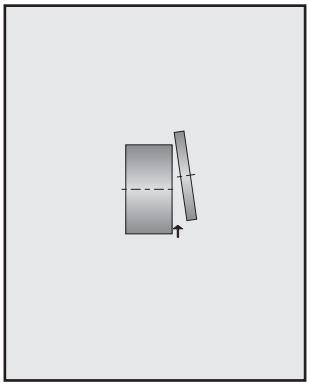


-F3

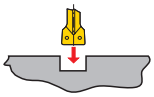


Application:

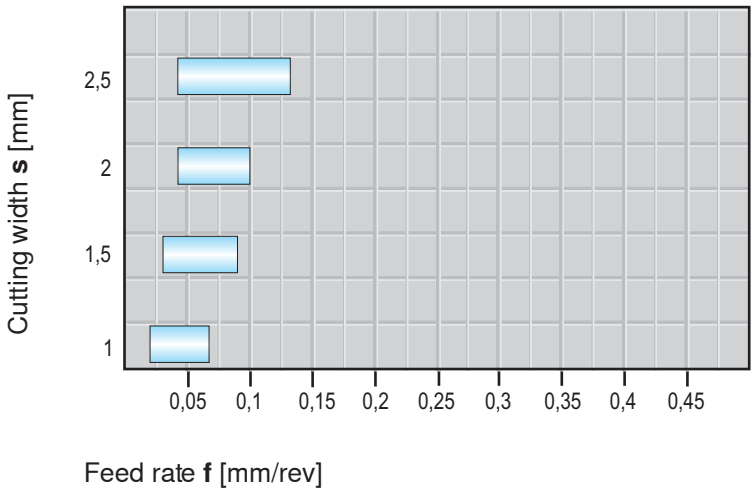




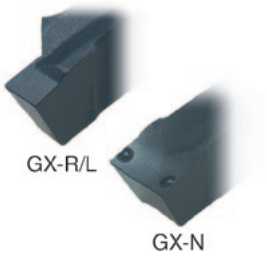
- Particularly suitable also for parting off tubes and thin-walled materials
- For steels in general, particularly suitable for stainless materials
- Special profiles (PX) possible

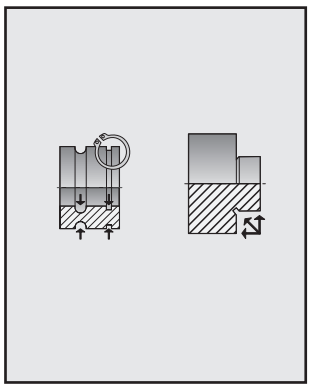


Feed rate for parting and grooving



Circlip grooves L/N/R

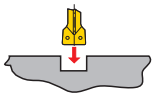




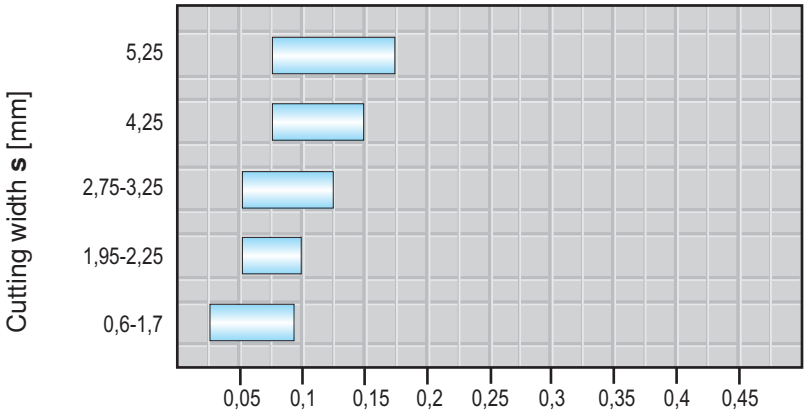
> Insert for circlip grooves according to DIN 471-472
> For internal and external machining

Application:





Feed rate for grooving operations



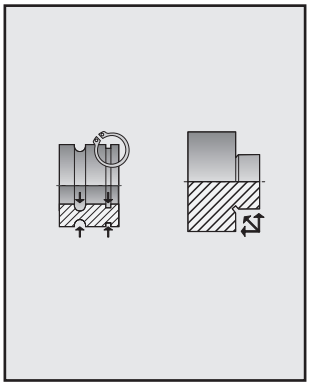
Radius grooves R/L



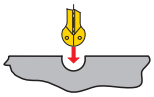
GX R/L

Application:

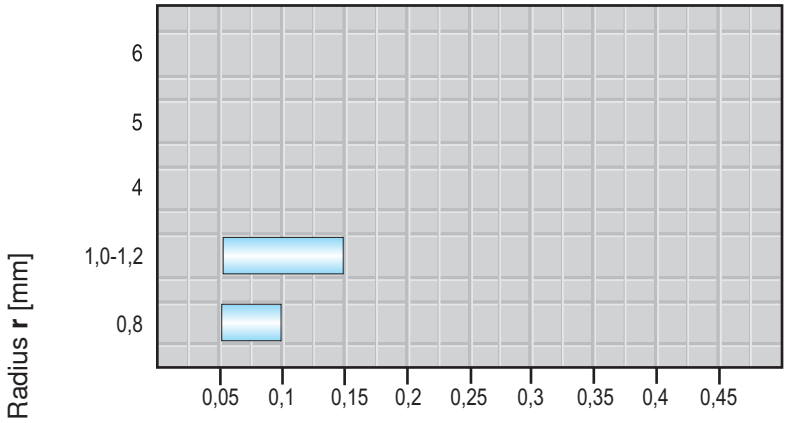




> Inserts for radius grooves and copy turning
> For all steel materials
> For internal and external machining

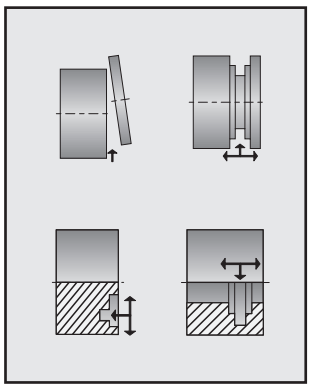


Feed rate for grooving operations



Standard

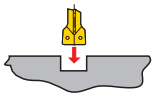




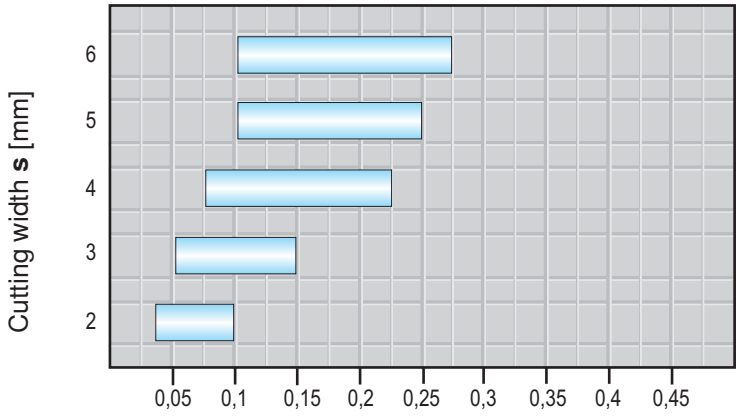
> For all steel materials
> For universal application
> Wide application range

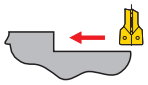
Application:



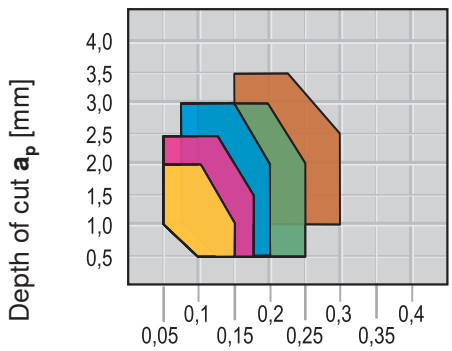


Feed rate for parting and grooving



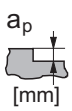


Feed rate for longitudinal turning



Cutting width **s**:

- = 6 mm
- = 5 mm
- = 4 mm
- = 3 mm
- = 2 mm

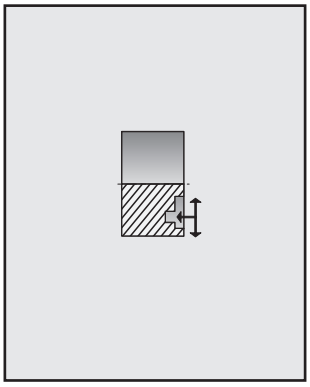


-F50

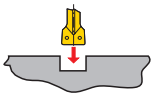


Application:

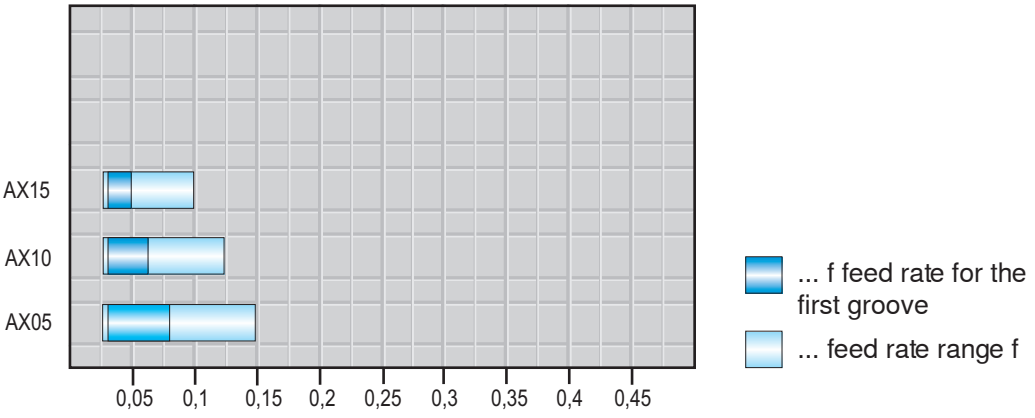




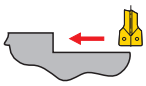
> Universal geometry for:
  - **Steel**
  - **Stainless steel**
  - Cast iron
  - Non ferrous metals
> Insert with ground periphery
> Tolerance cutting width ± .02 mm



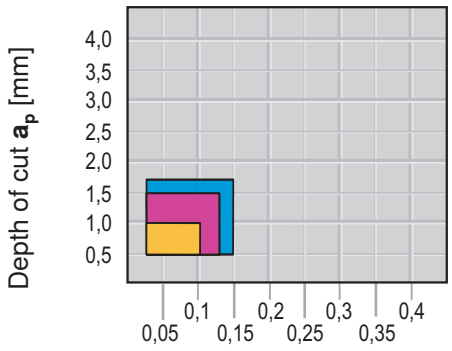
Feed rate axial grooving



Feed rate **f** [mm/rev]



Feed rate face turning



Feed rate **f** [mm/rev]

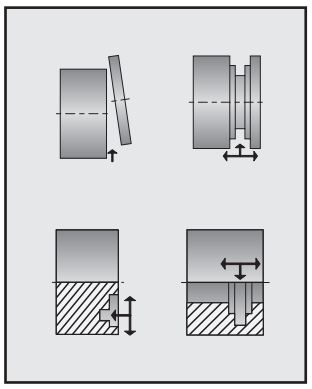
-M2



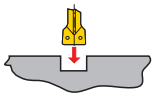
SX/LX

Application:

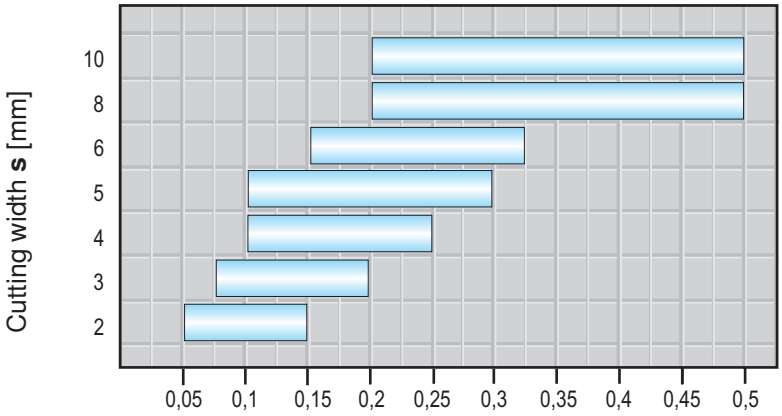




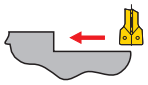
> For grooving and turning
> Suitable for all steel and cast iron materials
> Very good chip control



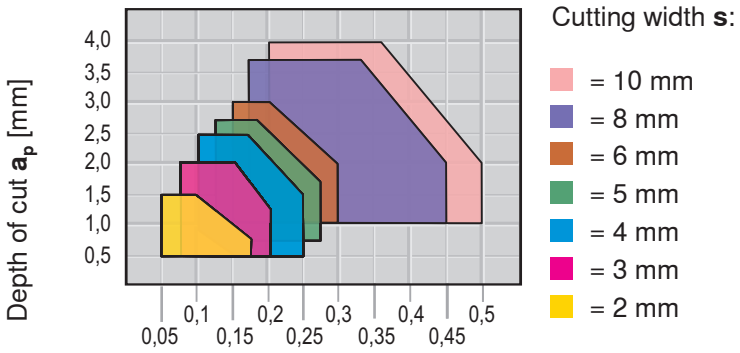
Feed rate for parting and grooving



Feed rate **f** [mm/rev]



Feed rate for longitudinal turning

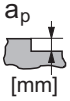


Cutting width **s**:

- = 10 mm
- = 8 mm
- = 6 mm
- = 5 mm
- = 4 mm
- = 3 mm
- = 2 mm

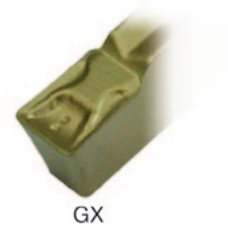
Feed rate **f** [mm/rev]

a_p



[mm]

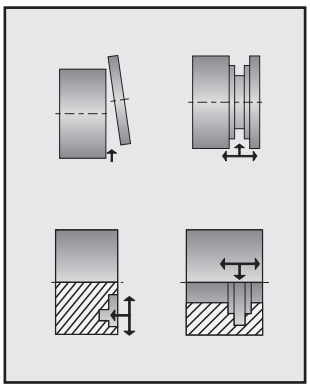
-M40



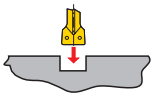
GX

Application:

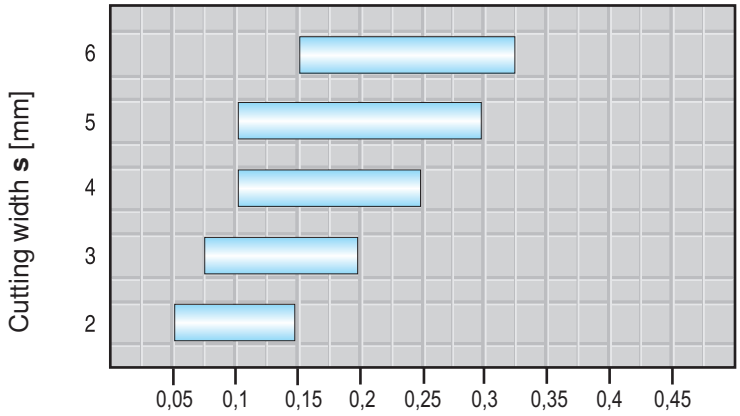




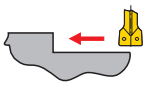
> For grooving and turning
> Suitable for all steel materials
> Very good chip control
> Tolerance cutting width ± .05 mm



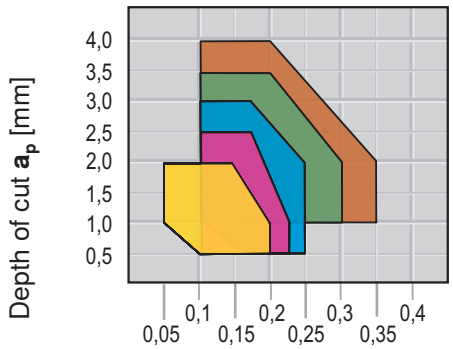
Feed rate for parting and grooving



Feed rate **f** [mm/rev]



Feed rate for longitudinal turning

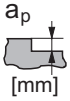


Cutting width **s**:

- = 6 mm
- = 5 mm
- = 4 mm
- = 3 mm
- = 2 mm

Feed rate **f** [mm/rev]

a_p



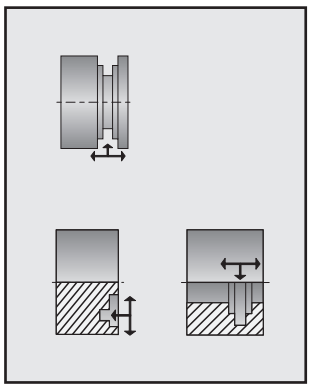
[mm]

-M3

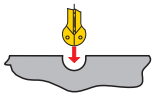


Application:

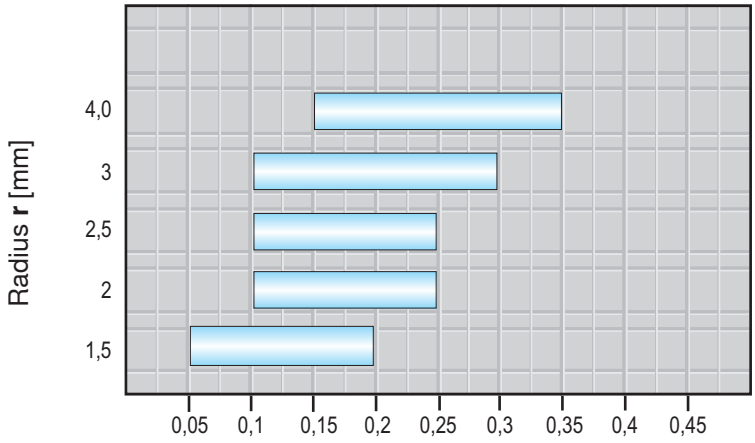


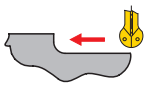


> Insert for radius grooves and copy turning
> For all steel materials
> For internal and external machining

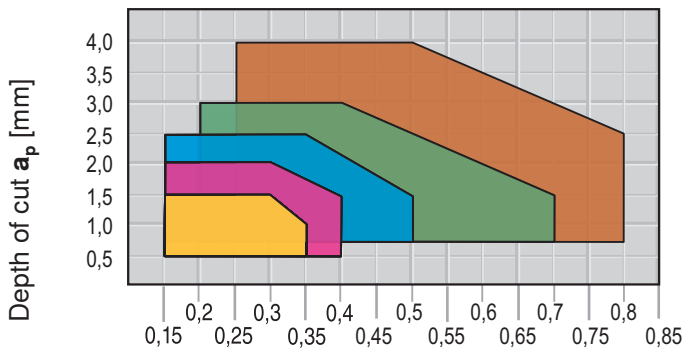


Feed rate for parting and grooving



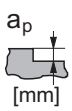


Feed rate for longitudinal turning



Radius **r**:

- = radius 4.0 mm
- = radius 3.0 mm
- = radius 2.5 mm
- = radius 2.0 mm
- = radius 1.5 mm

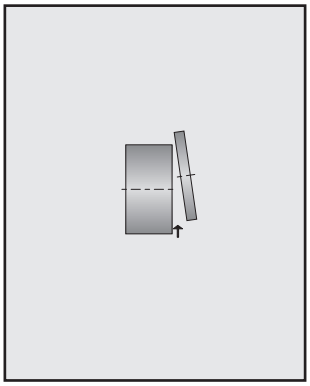


-M1

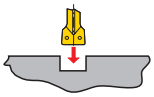


Application:

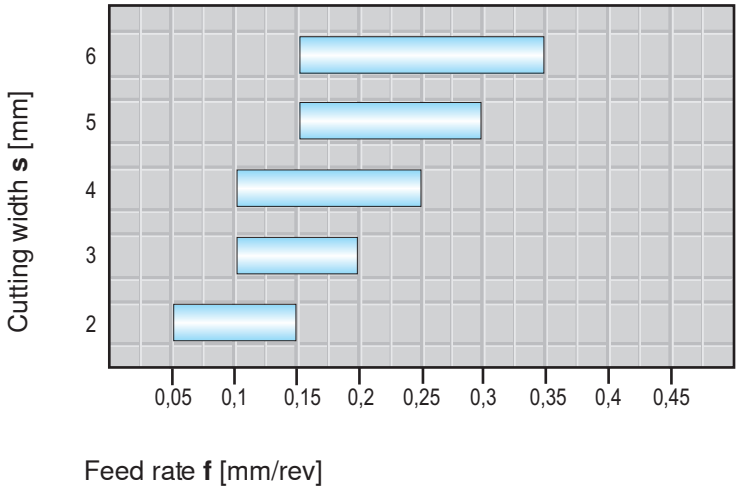




- > Insert with narrow negative chamfer
- > Suitable for all steel materials with high strength
- > Universally applicable grade
- > For steel and grey cast iron



Feed rate for parting and grooving

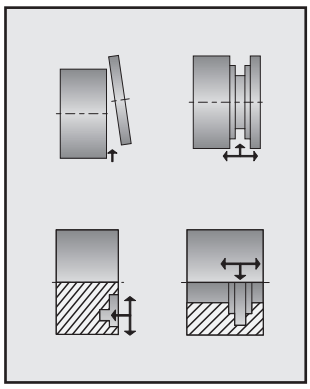


-27P

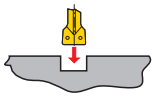


Application:

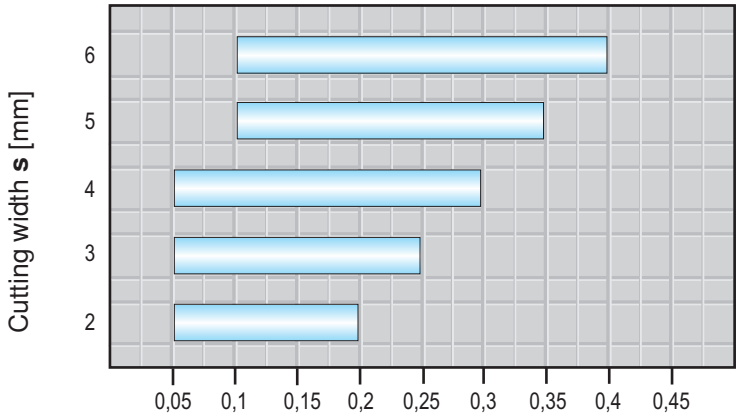


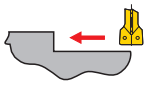


- Particularly suitable for **aluminium and non ferrous metals**
- Insert with highly positive cutting geometry and sharp cutting edge
- Insert with ground periphery
- Tolerance cutting width ± .02 mm
- Extra-smooth rake face through 'microfinish'

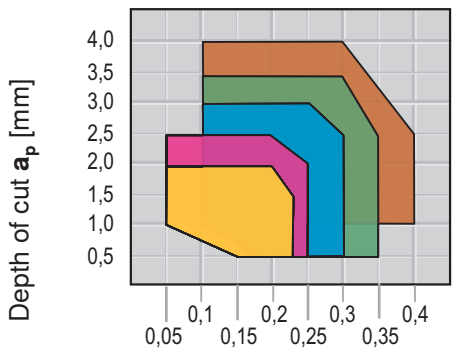


Feed rate for parting and grooving



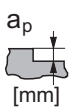


Feed rate for longitudinal turning



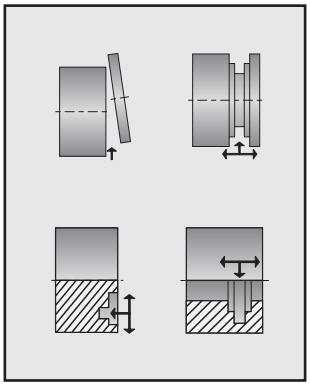
Cutting width **s**:

- = 6 mm
- = 5 mm
- = 4 mm
- = 3 mm
- = 2 mm



-27P

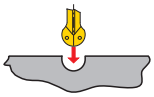




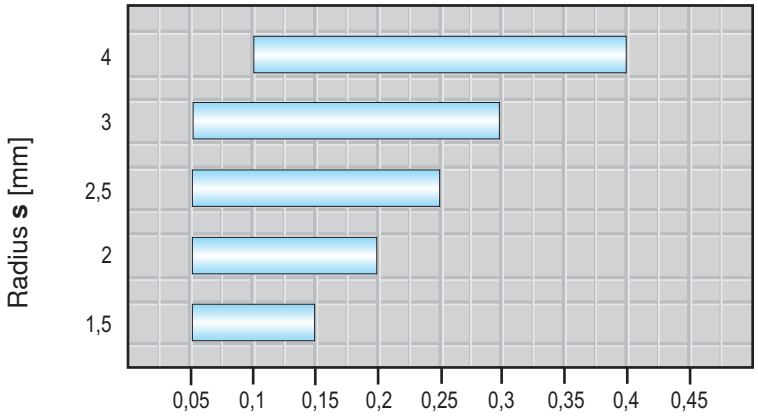
- Particularly suitable for **aluminium and non ferrous metals**
- Insert with highly positive cutting geometry and sharp cutting edge
- Insert with ground periphery
- Tolerance cutting width ± .02 mm
- Extra-smooth rake face through 'microfinish'

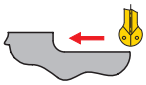
Application:



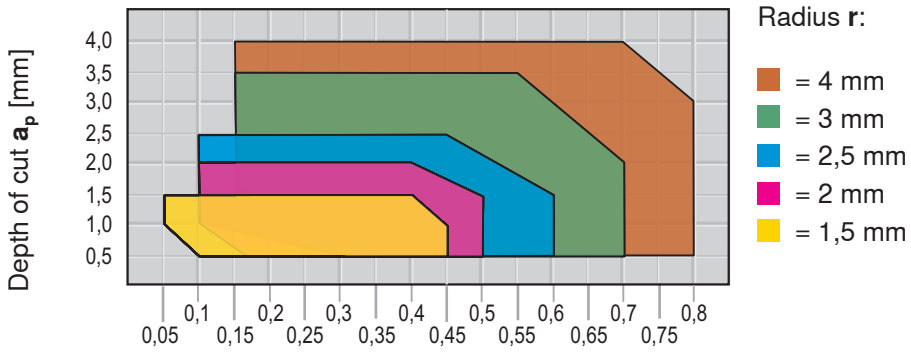


Feed rate for parting and grooving





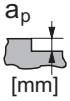
Feed rate for longitudinal turning



Radius **r**:

- = 4 mm
- = 3 mm
- = 2,5 mm
- = 2 mm
- = 1,5 mm

a_p



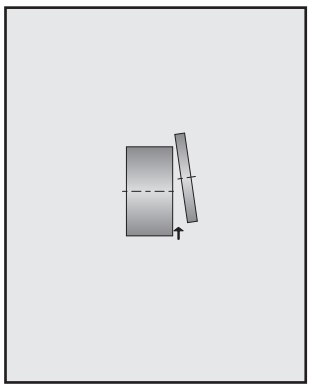
[mm]

-F1

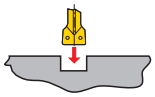

FX

Application:

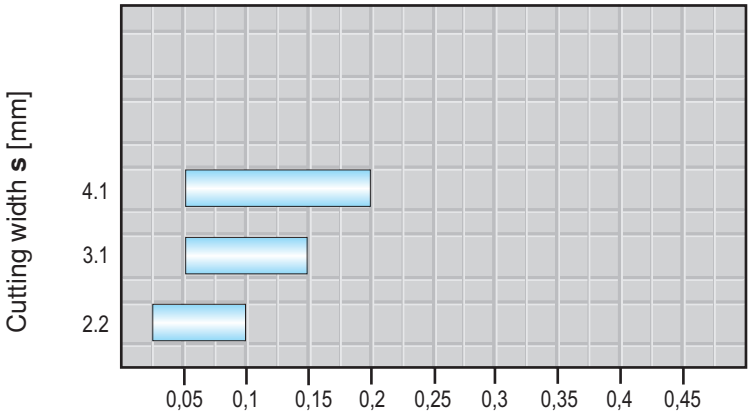




- Excellent cutting geometry with low cutting forces
- For low or medium strength materials
- Particularly suitable for parting off tubes and thin-walled work pieces
- Excellent swarf control also with low feed
- Reduced built-up edge



Feed rate for parting and grooving



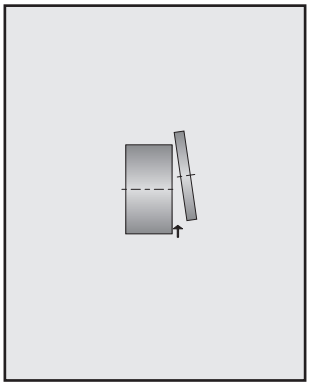
-M1



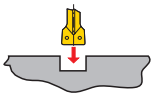
FX

Application:

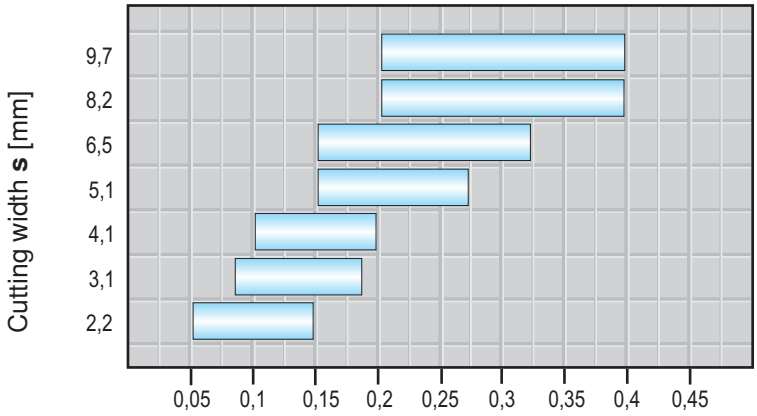




- Insert with narrow negative chamfer
- Suitable for all steel materials with high strength
- Universal application
- For steel and grey cast iron



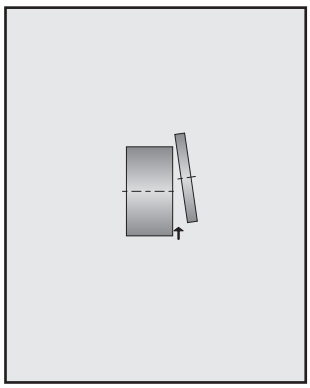
Feed rate for parting and grooving



-R2



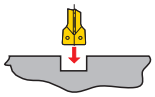
FX



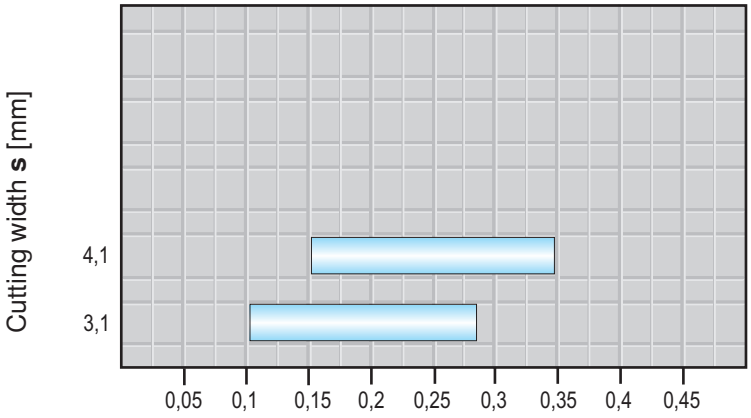
- > Insert with excellent chip formation for a wide feed range
- > Very stable cutting edge
- > Particularly suitable for economic parting when rather intensive formation of burrs and pips does not cause any problems

Application:





Feed rate for parting and grooving

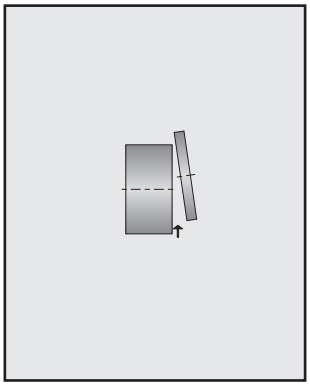


-27P

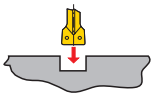


Application:

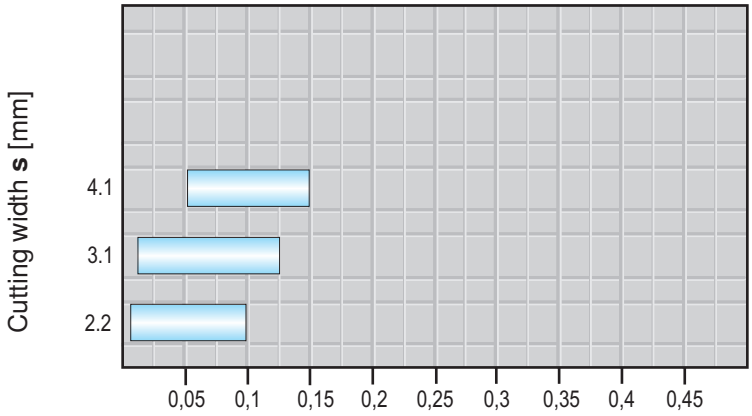


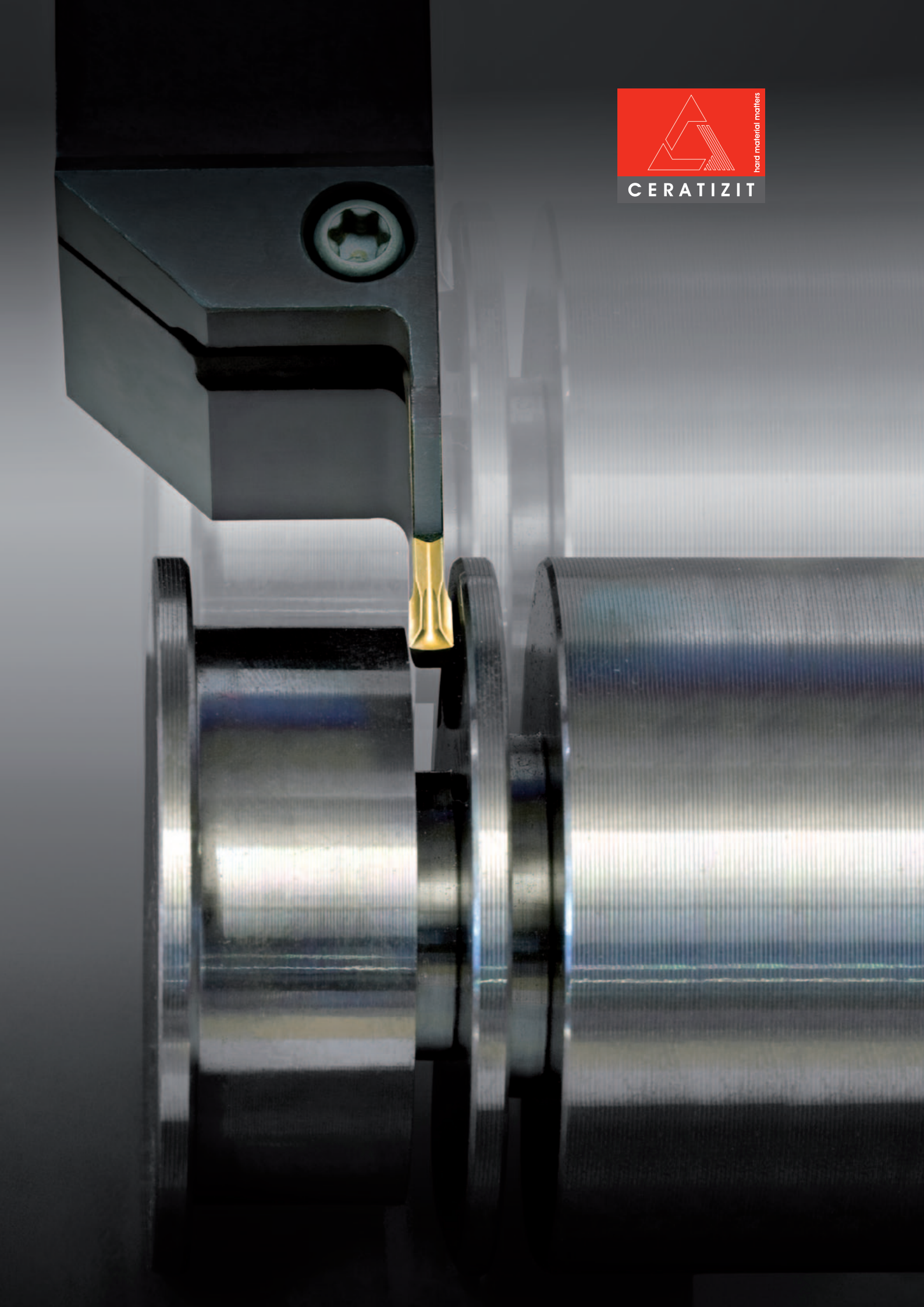


- Particularly suitable for **aluminium and non ferrous metals**
- Insert with highly positive cutting geometry and sharp cutting edge
- Extra-smooth rake face through ‘microfinish’
- Reduced built-up edge

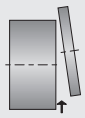


Feed rate for parting and grooving




hard material matters
CERATIZIT

Overview



GX / SX / LX / FX



C76-C81

GX / SX / LX / FX



C78-C81

GX / SX / LX / FX



C80-C81

GX / SX / LX / FX



C82-C84

GX / SX / FX / PX

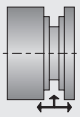


C86-C89

MaxiClick



C90



GX / SX / LX



C96-C100

GX / SX / LX



C99-C100

GX / SX / LX

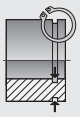


C100

GX / SX



C101-C102



GX



C106-C110

GX



C109-C110

GX



C110

GX



C111-C112

GX



C113-C117

GX

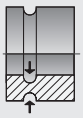


C116-C117

GX



C118-C119



GX / SX / LX



C124-C129

GX / SX / LX



C127-C129

GX



C128-C129

GX



C130-C131

GX / SX



C132-C136

GX / SX

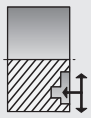


C135-C136

GX



C138-C139



GX / AX



C142-C147

GX / AX



C144-C147

GX



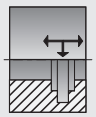
C147

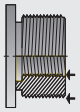
AX

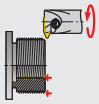


C148









GX



C152-C155

GX



C158-C162

TC16



C166-C167

TC16



C174+C176

GX



C154-C155

GX



C161-C162

TC16



C167

TC16



C175+C177

GX



C163

TC16



C168

TC16



C169

TC16



C169

TC16



C170

TC16

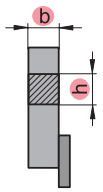


C170

Part-off

Overview – modular structure

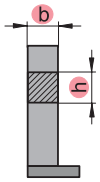
Shanks 0°



h / b
16/16 - 32/32



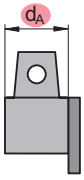
Shanks 90°



h / b
20/20 - 32/32



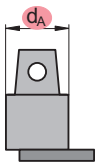
UTS 0°



d_A = 40 - 63



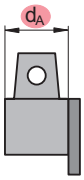
UTS 90°



d_A = 40 - 63



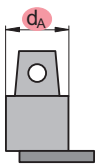
HSK-T 0°



d_A = 63 - 100



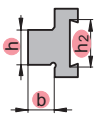
HSK-T 90°



d_A = 63 - 100



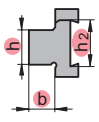
Clamping blocks



h / b
20/20 - 40/37

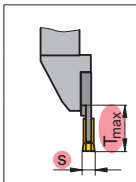


Split clamping blocks



h / b
20/20 - 32/29





GX16

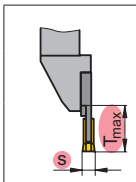
s = 2,0 - 6,5
T_{max} = 12



GX24

s = 2,0 - 5,0
T_{max} = 21





SX

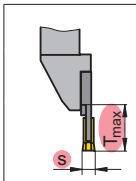
s = 2,0 - 4,0
T_{max} = 20 - 35



LX

s = 8,0 - 10,0
T_{max} = 25 - 45





FX short

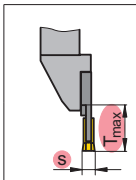
s = 2,2 - 6,5
T_{max} = 20 - 32



FX long

s = 3,1 - 6,5
T_{max} = 35 - 45





GX16

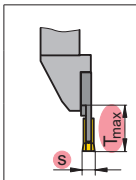
s = 2,0 - 6,5
T_{max} = 12



GX24

s = 2,0 - 5,0
T_{max} = 21





SX

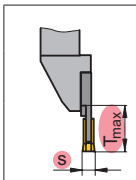
s = 2,0 - 4,0
T_{max} = 20 - 35



LX

s = 8,0 - 10,0
T_{max} = 25 - 45





FX short

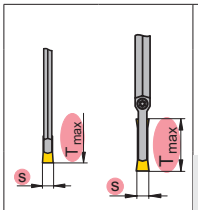
s = 2,2 - 6,5
T_{max} = 20 - 32



FX long

s = 3,1 - 4,5
T_{max} = 35 - 45





GX

s = 2,0 - 6,5
T_{max} = 21



SX

s = 2,0 - 6,0
T_{max} = 25 - 60



LX

s = 8,0 - 10,0
T_{max} = 80



FX

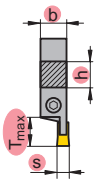
s = 2,2 - 9,7
T_{max} = 25 - 80



Part-off

Overview - monobloc tools

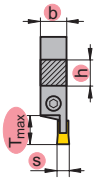
GX16 monobloc tool holders



h / b
12/12 - 25/25
s = 2,0 - 5,0
T_{max} = 12



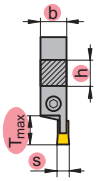
GX24 monobloc tool holders



h / b
16/16 - 32/25
s = 2,0 - 6,5
T_{max} = 21



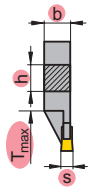
SX monobloc tool holders



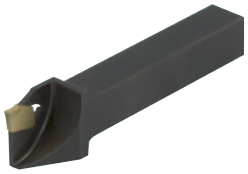
h / b
16/16 - 25/25
s = 2,0 - 6,0
T_{max} = 16 - 32



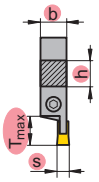
FX monobloc tool holders



h / b
10/10 - 25/20
s = 2,2 - 4,1
D_{max} = 30 - 50



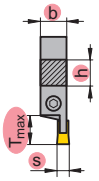
PX monobloc tool holders



h / b
16/16 - 20/20
s = 1,0 - 2,0
D_{max} = 52 - 62



MaxiClick



h / b
10/10 - 25/25
s = 1,0 - 2,5
T_{max} = 5 - 10




hard material matters
CERATIZIT
CERATIZIT
MSS-E25R00-2525L
CERATIZIT
MSS-E25R35
FX4.1
MSS-E25R
TC16-1
CERATIZIT
XLCFR 2608

Part-off

Shanks – GX/SX

BGR E20

0°



C196

b [mm]	h [mm]		Type, description	
20	16	R	MSS-E20R00-1620G	■
	20		MSS-E20R00-2020J	■
	16	L	MSS-E20L00-1620G	●
	20		MSS-E20L00-2020J	●

90°



C197

b [mm]	h [mm]		Type, description	
20	20	R	MSS-E20R90-2020J	●
		L	MSS-E20L90-2020J	■

GX16

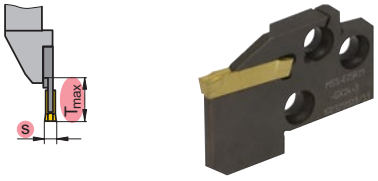


C201

C180-C181

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■	2.00	2.75	12	R	MSS-E20R12-GX16-1	GX16-1..
■	2.76	3.75			MSS-E20R12-GX16-2	GX16-2..
■	3.76	5.00			MSS-E20R12-GX16-3	GX16-3..
●	2.00	2.75		L	MSS-E20L12-GX16-1	GX16-1..
●	2.76	3.75			MSS-E20L12-GX16-2	GX16-2..
●	3.76	5.00			MSS-E20L12-GX16-3	GX16-3..

GX24



C202

C180-C181

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■	2.00	2.75	21	R	MSS-E20R21-GX24-1	GX24-1..
■	2.76	3.75			MSS-E20R21-GX24-2	GX24-2..
■	3.76	5.00			MSS-E20R21-GX24-3	GX24-3..
●	2.00	2.75		L	MSS-E20L21-GX24-1	GX24-1..
●	2.76	3.75			MSS-E20L21-GX24-2	GX24-2..
●	3.76	5.00			MSS-E20L21-GX24-3	GX24-3..

SX



C209

C185

	s [mm]	T_{max} [mm]		L R	Type, description	
■	2.0	20		R	MSS-E20R20-SX2	SX2
■	3.0				MSS-E20R20-SX3	SX3
●	2.0			L	MSS-E20L20-SX2	SX2
●	3.0				MSS-E20L20-SX3	SX3

BGR E20

0°



C196

b [mm]	h [mm]		Type, description	
20	16	R	MSS-E20R00-1620G	■
	20		MSS-E20R00-2020J	■
	16	L	MSS-E20L00-1620G	●
	20		MSS-E20L00-2020J	●

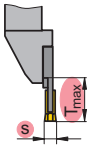
90°



C197

b [mm]	h [mm]		Type, description	
20	20	R	MSS-E20R90-2020J	●
		L	MSS-E20L90-2020J	■

FX – short





C211
C187

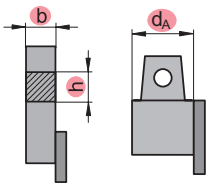
	s [mm]	T_{max} [mm]	L R	Type, description	
■	2.2	20	R	MSS-E20R20-FX2.2	FX 2.2..
■	3.1			MSS-E20R20-FX3.1	FX 3.1..
■	4.1			MSS-E20R20-FX4.1	FX 4.1..
●	2.2		L	MSS-E20L20-FX2.2	FX 2.2..
●	3.1			MSS-E20L20-FX3.1	FX 3.1..
●	4.1			MSS-E20L20-FX4.1	FX 4.1..

Part-off

Shanks – UTS – GX/SX

BGR E25

0°



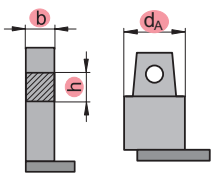




C196 C246

b [mm]	h [mm]	d_A [mm]		Type, description	
25	25		R	MSS-E25R00-2525L	■
		40		UT40-MSS-E25R00	■
		50		UT50-MSS-E25R00	■
		63		UT63-MSS-E25R00	■
25	25		L	MSS-E25L00-2525L	●
		40		UT40-MSS-E25L00	●
		50		UT50-MSS-E25L00	●
		63		UT63-MSS-E25L00	●

90°



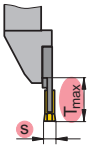




C197 C247

b [mm]	h [mm]	d_A [mm]		Type, description	
25	25		R	MSS-E25R90-2525L	●
		40		UT40-MSS-E25R90	●
		50		UT50-MSS-E25R90	●
25	25		L	MSS-E25L90-2525L	■
		40		UT40-MSS-E25L90	■
		50		UT50-MSS-E25L90	■

GX16

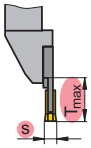




C201
C180-C181

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■	2.00	2.75	12	R	MSS-E25R12-GX16-1	GX16-1..
■	2.76	3.75			MSS-E25R12-GX16-2	GX16-2..
■	3.76	5.00			MSS-E25R12-GX16-3	GX16-3..
●	2.00	2.75		L	MSS-E25L12-GX16-1	GX16-1..
●	2.76	3.75			MSS-E25L12-GX16-2	GX16-2..
●	3.76	5.00			MSS-E25L12-GX16-3	GX16-3..

GX24

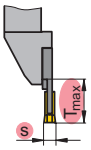




C202
C180-C181

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■	2.00	2.75	21	R	MSS-E25R21-GX24-1	GX24-1..
■	2.76	3.75			MSS-E25R21-GX24-2	GX24-2..
■	3.76	5.00			MSS-E25R21-GX24-3	GX24-3..
●	2.00	2.75		L	MSS-E25L21-GX24-1	GX24-1..
●	2.76	3.75			MSS-E25L21-GX24-2	GX24-2..
●	3.76	5.00			MSS-E25L21-GX24-3	GX24-3..

SX – right-hand





C209
C185

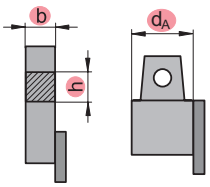
	s [mm]	T_{max} [mm]		L R	Type, description	
■	2.0	20		R	MSS-E25R20-SX2	SX2
■	3.0	25			MSS-E25R25-SX3	SX3
■	3.0	35			MSS-E25R35-SX3	SX3
■	4.0	25			MSS-E25R25-SX4	SX4
■	4.0	35			MSS-E25R35-SX4	SX4

SX – left-hand

	s [mm]	T_{max} [mm]		L R	Type, description	
●	2.0	20		L	MSS-E25L20-SX2	SX2
●	3.0	25			MSS-E25L25-SX3	SX3
●	3.0	35			MSS-E25L35-SX3	SX3
●	4.0	25			MSS-E25L25-SX4	SX4
●	4.0	35			MSS-E25L35-SX4	SX4

BGR E25

0°



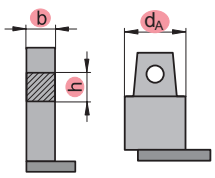




C196 C246

b [mm]	h [mm]	d_A [mm]		Type, description	
25	25		R	MSS-E25R00-2525L	■
		40		UT40-MSS-E25R00	■
		50		UT50-MSS-E25R00	■
		63		UT63-MSS-E25R00	■
25	25		L	MSS-E25L00-2525L	●
		40		UT40-MSS-E25L00	●
		50		UT50-MSS-E25L00	●
		63		UT63-MSS-E25L00	●

90°



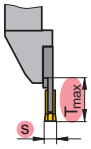




C197 C247

b [mm]	h [mm]	d_A [mm]		Type, description	
25	25		R	MSS-E25R90-2525L	●
		40		UT40-MSS-E25R90	●
		50		UT50-MSS-E25R90	●
25	25		L	MSS-E25L90-2525L	■
		40		UT40-MSS-E25L90	■
		50		UT50-MSS-E25L90	■

FX – short

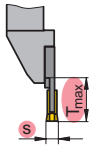




C211
C187

	s [mm]	T_{max} [mm]	L R	Type, description	
■	2.2	20	R	MSS-E25R20-FX2.2	FX 2.2..
■	3.1	25		MSS-E25R25-FX3.1	FX 3.1..
■	4.1			MSS-E25R25-FX4.1	FX 4.1..
■	5.1			MSS-E25R25-FX5.1	FX 5.1..
■	6.5			MSS-E25R25-FX6.5	FX 6.5..
●	2.2	20	L	MSS-E25L20-FX2.2	FX 2.2..
●	3.1	25		MSS-E25L25-FX3.1	FX 3.1..
●	4.1			MSS-E25L25-FX4.1	FX 4.1..
●	5.1			MSS-E25L25-FX5.1	FX 5.1..
●	6.5			MSS-E25L25-FX6.5	FX 6.5..

FX – long





C212
C187

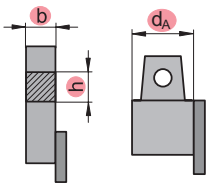
	s [mm]	T_{max} [mm]	L R	Type, description	
■	3.1	35	R	MSS-E25R35-FX3.1	FX 3.1..
■	4.1			MSS-E25R35-FX4.1	FX 4.1..
■	5.1			MSS-E25R35-FX5.1	FX 5.1..
■	6.5			MSS-E25R35-FX6.5	FX 6.5..
●	3.1		L	MSS-E25L35-FX3.1	FX 3.1..
●	4.1			MSS-E25L35-FX4.1	FX 4.1..
●	5.1			MSS-E25L35-FX5.1	FX 5.1..
●	6.5			MSS-E25L35-FX6.5	FX 6.5..

Part-off

Shanks – UTS/HSK-T – GX/SX

BGR E32

0°



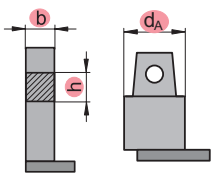




C196 C246+C250

b [mm]	h [mm]	d_A [mm]		Type, description	
25	32		R	MSS-E32R00-3225N	■
32	32			MSS-E32R00-3232Q	■
		50		UT50-MSS-E32R00	■
		63		UT63-MSS-E32R00	■
		63		HSK-T63-MSS-E32R00	■
		100		HSK-T100-MSS-E32R00	■
25	32		L	MSS-E32L00-3225N	●
32	32			MSS-E32L00-3232Q	●
		50		UT50-MSS-E32L00	●
		63		UT63-MSS-E32L00	●
		63		HSK-T63-MSS-E32L00	●
		100		HSK-T100-MSS-E32L00	●

90°



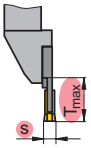




C197 C247+C251

b [mm]	h [mm]	d_A [mm]		Type, description	
25	32		R	MSS-E32R90-3225N	●
32	32			MSS-E32R90-3232R	●
		63		UT63-MSS-E32R90	●
		63		HSK-T63-MSS-E32R90	●
		100		HSK-T100-MSS-E32R90	●
25	32		L	MSS-E32L90-3225N	■
32	32			MSS-E32L90-3232R	■
		63		UT63-MSS-E32L90	■
		63		HSK-T63-MSS-E32L90	■
		100		HSK-T100-MSS-E32L90	■

GX16



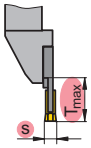


C201

C180-C181

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■	2.76	3.75	12	R	MSS-E32R12-GX16-2	GX16-2..
■	3.76	5.00			MSS-E32R12-GX16-3	GX16-3..
●	2.76	3.75		L	MSS-E32L12-GX16-2	GX16-2..
●	3.76	5.00			MSS-E32L12-GX16-3	GX16-3..

GX24



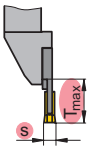


C202

C180-C181

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■	2.76	3.75	21	R	MSS-E32R21-GX24-2	GX24-2..
■	3.76	5.00			MSS-E32R21-GX24-3	GX24-3..
●	2.76	3.75		L	MSS-E32L21-GX24-2	GX24-2..
●	3.76	5.00			MSS-E32L21-GX24-3	GX24-3..

SX





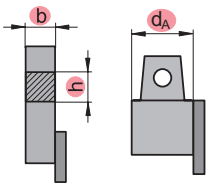
C209

C185

	s [mm]	T_{max} [mm]		L R	Type, description	
■	3.0	35		R	MSS-E32R35-SX3	SX3
■	4.0				MSS-E32R35-SX4	SX4
●	3.0			L	MSS-E32L35-SX3	SX3
●	4.0				MSS-E32L35-SX4	SX4

BGR E32

0°



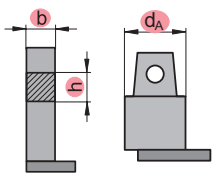




C196 C246+C250

b [mm]	h [mm]	d_A [mm]		Type, description	
25	32		R	MSS-E32R00-3225N	■
32	32			MSS-E32R00-3232Q	■
		50		UT50-MSS-E32R00	■
		63		UT63-MSS-E32R00	■
		63		HSK-T63-MSS-E32R00	■
		100		HSK-T100-MSS-E32R00	■
25	32		L	MSS-E32L00-3225N	●
32	32			MSS-E32L00-3232Q	●
		50		UT50-MSS-E32L00	●
		63		UT63-MSS-E32L00	●
		63		HSK-T63-MSS-E32L00	●
		100		HSK-T100-MSS-E32L00	●

90°



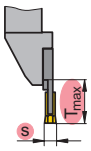




C197 C247+C251

b [mm]	h [mm]	d_A [mm]		Type, description	
25	32		R	MSS-E32R90-3225N	●
32	32			MSS-E32R90-3232R	●
		63		UT63-MSS-E32R90	●
		63		HSK-T63-MSS-E32R90	●
		100		HSK-T100-MSS-E32R90	●
25	32		L	MSS-E32L90-3225N	■
32	32			MSS-E32L90-3232R	■
		63		UT63-MSS-E32L90	■
		63		HSK-T63-MSS-E32L90	■
		100		HSK-T100-MSS-E32L90	■

FX – short

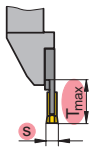




C211
C187

	s [mm]	T_{max} [mm]	L R	Type, description	
■	3.1	32	R	MSS-E32R32-FX3.1	FX 3.1..
■	4.1			MSS-E32R32-FX4.1	FX 4.1..
■	5.1			MSS-E32R32-FX5.1	FX 5.1..
■	6.5			MSS-E32R32-FX6.5	FX 6.5..
●	3.1		L	MSS-E32L32-FX3.1	FX 3.1..
●	4.1			MSS-E32L32-FX4.1	FX 4.1..
●	5.1			MSS-E32L32-FX5.1	FX 5.1..
●	6.5			MSS-E32L32-FX6.5	FX 6.5..

FX – long

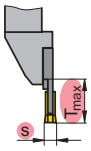




C212
C187

	s [mm]	T_{max} [mm]	L R	Type, description	
■	3.1	45	R	MSS-E32R45-FX3.1	FX 3.1..
■	4.1			MSS-E32R45-FX4.1	FX 4.1..
■	5.1			MSS-E32R45-FX5.1	FX 5.1..
■	6.5			MSS-E32R45-FX6.5	FX 6.5..
●	3.1		L	MSS-E32L45-FX3.1	FX 3.1..
●	4.1			MSS-E32L45-FX4.1	FX 4.1..
●	5.1			MSS-E32L45-FX5.1	FX 5.1..
●	6.5			MSS-E32L45-FX6.5	FX 6.5..

LX



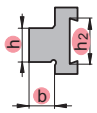


C210
C186

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■ ●	8.00	10.00	25	N	MSS-E32N25-LX	LX-..
■ ●			32		MSS-E32N32-LX	LX-..
■ ●			45		MSS-E32N45-LX	LX-..

H26

Clamping blocks

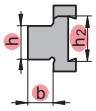




C229

h_2 [mm]	b [mm]	$h=h_1$ [mm]	Type, description	
26	20	20	SBN 2020-26 K	■

Split clamping blocks

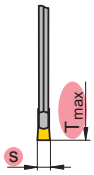




C230

h_2 [mm]	b [mm]	$h=h_1$ [mm]	Type, description	
26	20	20	SBN 2020-26 KS	■

SX

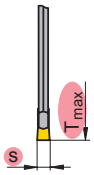




C224
C185

	s [mm]	T_{max} [mm]	L/N/R	Type, description	
■	2.0	25	R	XLCFR 2602-SX2	SX2
■	3.0	35	N	XLCFN 2603-SX3	SX3
■	4.0	40		XLCFN 2604-SX4	SX4
■	2.0	25	L	XLCFL 2602-SX2	SX2

SX – reinforced

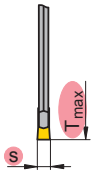




C225
C185

	s [mm]	T_{max} [mm]	L/N/R	Type, description	
■	2.0	22	R	XLCFR 2608-SX2	SX2
■	3.0			XLCFR 2608-SX3	SX3
■	2.0		L	XLCFL 2608-SX2	SX2
■	3.0			XLCFL 2608-SX3	SX3

FX



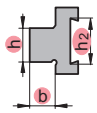


C228
C187

	s [mm]	T_{max} [mm]	L/N/R	Type, description	
■	2.2	25	N	XLCEN 2602 J22 FX	FX 2.2..
■	3.1	35		XLCFN 2603 J31 FX	FX 3.1..
■	4.1	40		XLCFN 2604 J41 FX	FX 4.1..

H32

Clamping blocks

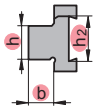




C229

h_2 [mm]	b [mm]	$h=h_1$ [mm]	Type, description	
32	20	25	SBN 2520-32 K	■
32	29	32	SBN 3229-32 K	■

Split clamping blocks

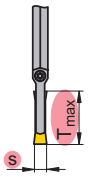




C230

h_2 [mm]	b [mm]	$h=h_1$ [mm]	Type, description	
32	20	25	SBN 2520-32 KS	■
32	29	32	SBN 3229-32 KS	■

GX24

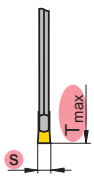




C223
C180-C181

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L/N/R	Type, description	
■	2.00	2.75	21	N	XLCFN 3202-GX24-1S	GX24-1..
■	2.76	3.75			XLCFN 3203 GX24-2S	GX24-2..
■	3.76	5.00			XLCFN 3204 GX24-3S	GX24-3..
■	5.01	6.50			XLCFN 3206 GX24-4S	GX24-4..

SX

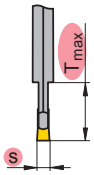




C224
C185

	s [mm]	T_{max} [mm]	L/N/R	Type, description	
■	2.0	25	R	XLCFR 3202-SX2	SX2
■	3.0	50	N	XLCFN 3203-SX3	SX3
■	4.0			XLCFN 3204-SX4	SX4
■	5.0	55		XLCFN 3205-SX5	SX5
■	6.0	60		XLCFN 3206-SX6	SX6
■	2.0	25	L	XLCFL 3202-SX2	SX2

SX – reinforced

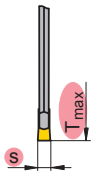




C226
C185

	s [mm]	T_{max} [mm]	L/N/R	Type, description	
■	3.0	33	R	XLCFR 3208-SX3	SX3
■	4.0			XLCFR 3208-SX4	SX4
■	3.0		L	XLCFL 3208-SX3	SX3
■	4.0			XLCFL 3208-SX4	SX4

FX





C228
C187

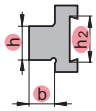
	s [mm]	T_{max} [mm]	L/N/R	Type, description	
■	2.2	30	N	XLCEN 3202 M22 FX	FX 2.2..
■	3.1	50		XLCFN 3203 M31 FX	FX 3.1..
■	4.1			XLCFN 3204 M41 FX	FX 4.1..
■	5.1	55		XLCFN 3205 M51 FX	FX 5.1..
■	6.5			XLCFN 3206 M65 FX	FX 6.5..

Part-off

Clamping blocks, blades – LX/FX

H46

Clamping blocks

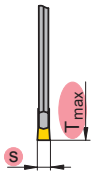




C229

h_2 [mm]	b [mm]	$h=h_1$ [mm]	Type, description	
46	29	32	SBN 3229-46 K	■
	37	40	SBN 4037-46 K	■

FX

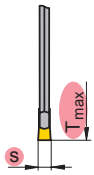




C228
C187

	s [mm]	T_{max} [mm]	L/N/R	Type, description	
■	8.2	80	N	XLCEN 4608 S82 FX	FX 8.2..
■	9.7			XLCEN 4609 S97 FX	FX 9.7..

LX



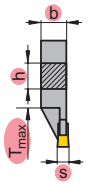


C227
C186

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L/N/R	Type, description	
■	8.00	10.00	80	N	XLCEN 4608 LX	LX-..


hard material matters
CERATIZIT
MSS-E25R35
FX4.1
MSS-E25R21
GX24-3
MSS-E25R25
SX3
MSS-E25R21
GX24-3 ASEC-TC
MSS-I32R09
GX16-2

GX16 – right-hand





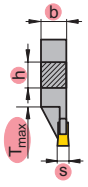
C214 C180-C181

b [mm]	h [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
12	12	2.00	2.75	12	R	E12R0012-1212K-GX16-1	GX16-1..
		0.60	3.75			E12R0012-1212K-GX16-2	GX16-2..
16	16	2.00	2.75			E16R0012-1616K-GX16-1	GX16-1..
		0.60	3.75			E16R0012-1616K-GX16-2	GX16-2..
		3.76	5.00			E16R0012-1616K-GX16-3	GX16-3..
20	20	2.00	2.75			E20R0012-2020K-GX16-1	GX16-1..
		0.60	3.75			E20R0012-2020K-GX16-2	GX16-2..
		3.76	5.00			E20R0012-2020K-GX16-3	GX16-3..
25	25	0.60	3.75			E25R0012-2525M-GX16-2	GX16-2..
		3.76	5.00			E25R0012-2525M-GX16-3	GX16-3..

GX16 – left-hand

b [mm]	h [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
12	12	2.00	2.75	12	L	E12L0012-1212K-GX16-1	GX16-1..
		0.60	3.75			E12L0012-1212K-GX16-2	GX16-2..
16	16	2.00	2.75			E16L0012-1616K-GX16-1	GX16-1..
		0.60	3.75			E16L0012-1616K-GX16-2	GX16-2..
		3.76	5.00			E16L0012-1616K-GX16-3	GX16-3..
20	20	2.00	2.75			E20L0012-2020K-GX16-1	GX16-1..
		0.60	3.75			E20L0012-2020K-GX16-2	GX16-2..
		3.76	5.00			E20L0012-2020K-GX16-3	GX16-3..
25	25	0.60	3.75			E25L0012-2525M-GX16-2	GX16-2..
		3.76	5.00			E25L0012-2525M-GX16-3	GX16-3..

GX24 – right-hand





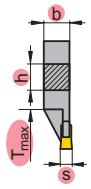
C215 C180-C181

b [mm]	h [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
16	16	2.00	2.75	21	R	E16R0021-1616K-GX24-1	GX24-1..
		2.76	3.75			E16R0021-1616K-GX24-2	GX24-2..
20	20	2.00	2.75			E20R0021-2020K-GX24-1	GX24-1..
		2.76	3.75			E20R0021-2020K-GX24-2	GX24-2..
		3.76	5.00			E20R0021-2020K-GX24-3	GX24-3..
25	25	2.76	3.75			E25R0021-2525M-GX24-2	GX24-2..
		3.76	5.00			E25R0021-2525M-GX24-3	GX24-3..
	32	2.76	3.75			E32R0021-3225P-GX24-2	GX24-2..
		3.76	5.00			E32R0021-3225P-GX24-3	GX24-3..

GX24 – left-hand

b [mm]	h [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
16	16	2.00	2.75	21	L	E16L0021-1616K-GX24-1	GX24-1..
		2.76	3.75			E16L0021-1616K-GX24-2	GX24-2..
20	20	2.00	2.75			E20L0021-2020K-GX24-1	GX24-1..
		2.76	3.75			E20L0021-2020K-GX24-2	GX24-2..
		3.76	5.00			E20L0021-2020K-GX24-3	GX24-3..
25	25	2.76	3.75			E25L0021-2525M-GX24-2	GX24-2..
		3.76	5.00			E25L0021-2525M-GX24-3	GX24-3..
	32	2.76	3.75			E32L0021-3225P-GX24-2	GX24-2..
		3.76	5.00			E32L0021-3225P-GX24-3	GX24-3..

SX – right-hand





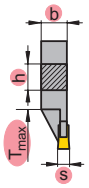
C218 C185

s [mm]	h [mm]	b [mm]	T_{max} [mm]	L R	Type, description	
2.0	16	16	16		E16R0016-1616K-SX2	SX2
	20	20			E20R0016-2020K-SX2	SX2
3.0	16	16	20		E16R0020-1616K-SX3	SX3
	20	20			E20R0020-2020K-SX3	SX3
	25	25		R	E25R0020-2525M-SX3	SX3
4.0	25	25	25		E25R0025-2525M-SX4	SX4
	20	20			E20R0025-2020K-SX4	SX4
5.0	25	25			E25R0025-2525M-SX5	SX5
6.0	25	25	32		E25R0032-2525M-SX6	SX6

SX – left-hand

s [mm]	h [mm]	b [mm]	T_{max} [mm]	L R	Type, description	
2.0	16	16	16		E16L0016-1616K-SX2	SX2
	20	20			E20L0016-2020K-SX2	SX2
3.0	16	16	20		E16L0020-1616K-SX3	SX3
	20	20			E20L0020-2020K-SX3	SX3
	25	25		L	E25L0020-2525M-SX3	SX3
4.0	25	25	25		E25L0025-2525M-SX4	SX4
	20	20			E20L0025-2020K-SX4	SX4
5.0	25	25			E25L0025-2525M-SX5	SX5
6.0	25	25	32		E25L0032-2525M-SX6	SX6

FX – right-hand





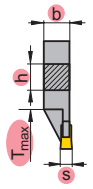
C219 C187

s [mm]	h [mm]	b [mm]	D_{max} [mm]	L R	Type, description	
2.2	10	10	30	R	XLCER 1010 M22 FX	FX 2.2..
	12	12			XLCER 1212 F22 FX	FX 2.2..
	12	12			XLCER 1212 M22 FX	FX 2.2..
	14	14			XLCER 1414 M22 FX	FX 2.2..
	16	12			XLCER 1612 H22 FX	FX 2.2..
3.1	16	12	35		XLCFR 1612 H31 FX	FX 3.1..
	20	16	40		XLCFR 2016 K31 FX	FX 3.1..
	25	20	50		XLCFR 2520 M31 FX	FX 3.1..
4.1	20	16	40		XLCFR 2016 K41 FX	FX 4.1..
	25	20	50		XLCFR 2520 M41 FX	FX 4.1..

FX – left-hand

s [mm]	h [mm]	b [mm]	D_{max} [mm]	L R	Type, description	
2.2	10	10	30	L	XLCEL 1010 M22 FX	FX 2.2..
	12	12			XLCEL 1212 F22 FX	FX 2.2..
	12	12			XLCEL 1212 M22 FX	FX 2.2..
	14	14			XLCEL 1414 M22 FX	FX 2.2..
	16	12			XLCEL 1612 H22 FX	FX 2.2..
3.1	16	12	35		XLCFL 1612 H31 FX	FX 3.1..
	20	16	40		XLCFL 2016 K31 FX	FX 3.1..
	25	20	50		XLCFL 2520 M31 FX	FX 3.1..
4.1	20	16	40		XLCFL 2016 K41 FX	FX 4.1..
	25	20	50		XLCFL 2520 M41 FX	FX 4.1..

PX – right-hand





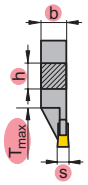
C220 C188

s [mm]	h [mm]	b [mm]	T_{max} [mm]	L R	Type, description	
1.0	16	16	5	R	E16R0005-1616K-PX20-1	PX20-1..
1.5			10		E16R0010-1616K-PX20-2	PX20-2..
2.0					E16R0010-1616K-PX20-3	PX20-3..
1.0	20	20	5		E20R0005-2020L-PX20-1	PX20-1..
1.5			11		E20R0011-2020L-PX20-2	PX20-2..
2.0					E20R0011-2020L-PX20-3	PX20-3..

PX – left-hand

s [mm]	h [mm]	b [mm]	T_{max} [mm]	L R	Type, description	
1.0	16	16	5	L	E16L0005-1616K-PX20-1	PX20-1..
1.5			10		E16L0010-1616K-PX20-2	PX20-2..
2.0					E16L0010-1616K-PX20-3	PX20-3..
1.0	20	20	5		E20L0005-2020L-PX20-1	PX20-1..
1.5			11		E20L0011-2020L-PX20-2	PX20-2..
2.0					E20L0011-2020L-PX20-3	PX20-3..

MC – right-hand



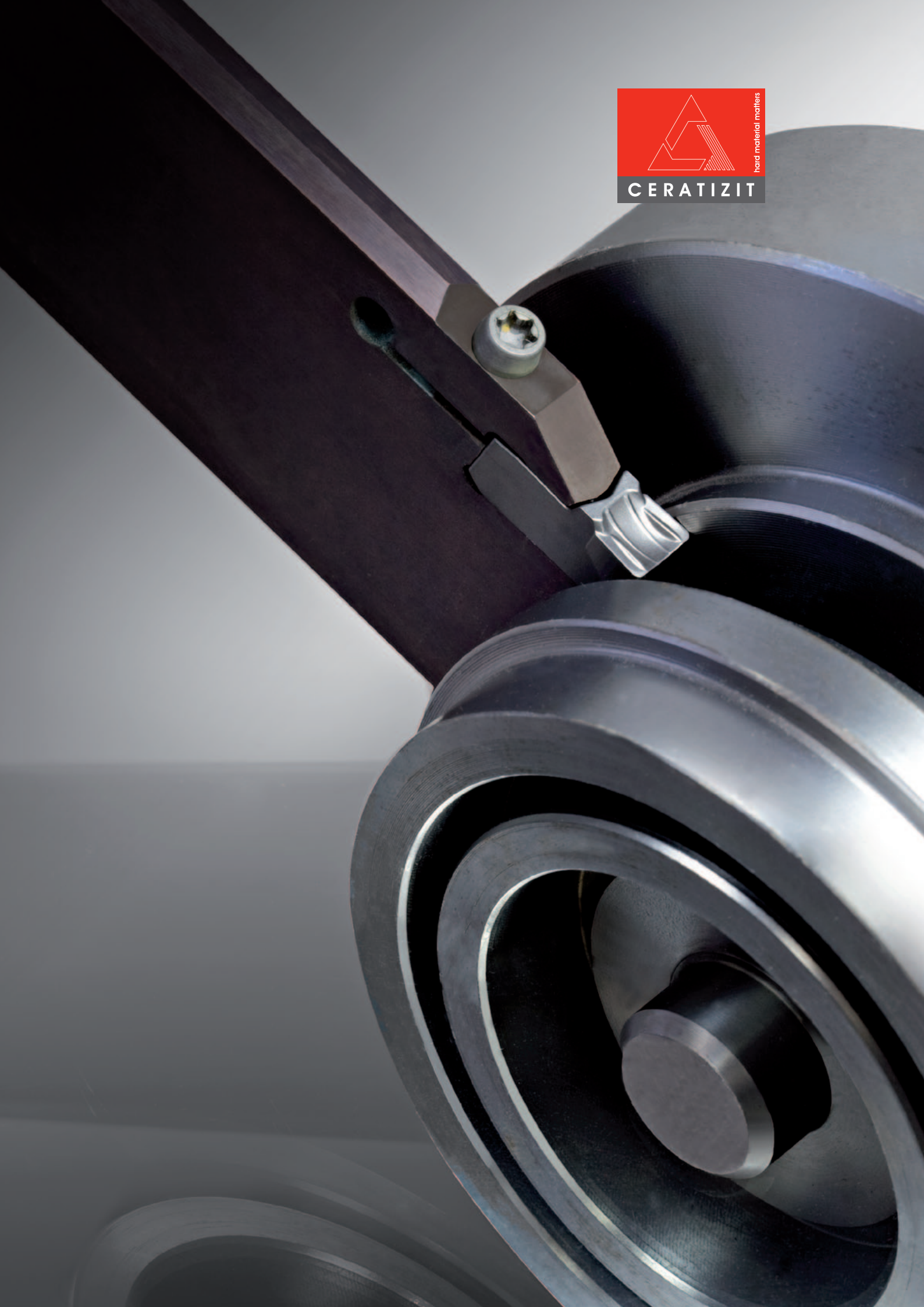


C221-C222 C189

b [mm]	h [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
10	10	1.00	1.50	5	R	MC05R-1010K	MC 05..
12	12					MC05R-1212K	MC 05..
16	16					MC05R-1616K	MC 05..
20	20					MC05R-2020K	MC 05..
25	25					MC05R-2525M	MC 05..
10	10	1.50	2.50	10		MC10R-1010K	MC 10..
10	10					MC10R-1010K-S	MC 10..
12	12					MC10R-1212K	MC 10..
12	12					MC10R-1212K-S	MC 10..
16	16					MC10R-1616K	MC 10..
20	20					MC10R-2020K	MC 10..
25	25					MC10R-2525M	MC 10..

MC – left-hand

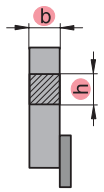
b [mm]	h [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
10	10	1.00	1.50	5	L	MC05L-1010K	MC 05..
12	12					MC05L-1212K	MC 05..
16	16					MC05L-1616K	MC 05..
20	20					MC05L-2020K	MC 05..
25	25					MC05L-2525M	MC 05..
10	10	1.50	2.50	10		MC10L-1010K	MC 10..
12	12					MC10L-1212K	MC 10..
16	16					MC10L-1616K	MC 10..
20	20					MC10L-2020K	MC 10..
25	25					MC10L-2525M	MC 10..
10	10					MC10L-1010K-S	MC 10..
12	12					MC10L-1212K-S	MC 10..


hard material matters
CERATIZIT

Grooving and turning – external

Overview – modular structure

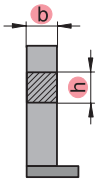
Shanks 0°



h / b
12/12 - 32/32



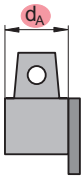
Shanks 90°



h / b
20/20 - 32/32



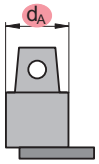
UTS 0°



d_A = 40 - 63



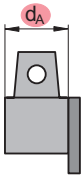
UTS 90°



d_A = 40 - 63



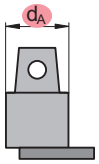
HSK-T 0°



d_A = 63 - 100

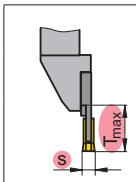


HSK-T 90°



d_A = 63 - 100





GX09

s = 2,0 - 3,75
T_{max} = 7,0



GX16

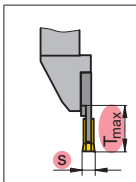
s = 2,0 - 6,5
T_{max} = 12



GX24

s = 2,76 - 8,0
T_{max} = 21





SX

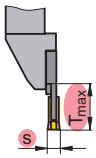
s = 2,0 - 4,0
T_{max} = 20 - 35



LX

s = 8,0 - 10,0
T_{max} = 25 - 45





GX16

s = 2,0 - 6,5
T_{max} = 12



GX24

s = 2,76 - 8,0
T_{max} = 21



SX

s = 2,0 - 4,0
T_{max} = 20 - 35



LX

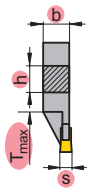
s = 8,0 - 10,0
T_{max} = 25 - 45



Grooving and turning – external

Overview – modular structure

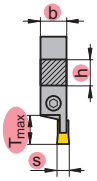
GX09 monobloc tool holders



h / b
10/10
s = 2,0
T_{max} = 7



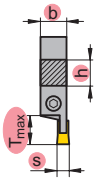
GX16 monobloc tool holders



h / b
12/12 - 25/25
s = 2,0 - 5,0
T_{max} = 12



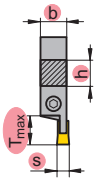
GX24 monobloc tool holders



h / b
16/16 - 32/25
s = 2,0 - 6,5
T_{max} = 21



SX monobloc tool holders



h / b
16/16 - 25/25
s = 2,0 - 6,0
T_{max} = 16 - 32



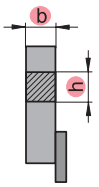

hard material matters
CERATIZIT

Grooving and turning – external

Shanks – GX/SX

BGR E12

0°

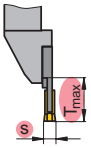




C196

b [mm]	h [mm]			Type, description	
12	12		R	MSS-E12R00-1212E	■
			L	MSS-E12L00-1212E	●

GX09



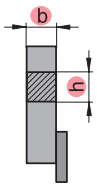


C200
C180

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■	2.00	2.75	7	R	MSS-E12R07-GX09-1	GX09-1..
■	2.76	3.75			MSS-E12R07-GX09-2	GX09-2..
●	2.00	2.75		L	MSS-E12L07-GX09-1	GX09-1..
●	2.76	3.75			MSS-E12L07-GX09-2	GX09-2..

BGR E16

0°

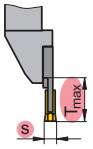




C196

b [mm]	h [mm]			Type, description	
16	16		R	MSS-E16R00-1616G	■
			L	MSS-E16L00-1616G	●

GX09





C200
C180

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■	2.00	2.75	7	R	MSS-E16R07-GX09-1	GX09-1..
■	2.76	3.75			MSS-E16R07-GX09-2	GX09-2..
●	2.00	2.75		L	MSS-E16L07-GX09-1	GX09-1..
●	2.76	3.75			MSS-E16L07-GX09-2	GX09-2..

Grooving and turning – external

Shanks – GX/SX

BGR E20

0°



C196

b [mm]	h [mm]		Type, description	
20	16	R	MSS-E20R00-1620G	■
	20		MSS-E20R00-2020J	■
	16	L	MSS-E20L00-1620G	●
	20		MSS-E20L00-2020J	●

90°



C197

b [mm]	h [mm]		Type, description	
20	20	R	MSS-E20R90-2020J	●
		L	MSS-E20L90-2020J	■

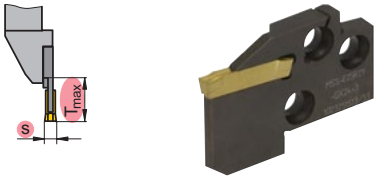
GX16



C201
C180-C181

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■	2.00	2.75	12	R	MSS-E20R12-GX16-1	GX16-1..
■	2.76	3.75			MSS-E20R12-GX16-2	GX16-2..
■	3.76	5.00			MSS-E20R12-GX16-3	GX16-3..
●	2.00	2.75		L	MSS-E20L12-GX16-1	GX16-1..
●	2.76	3.75			MSS-E20L12-GX16-2	GX16-2..
●	3.76	5.00			MSS-E20L12-GX16-3	GX16-3..

GX24



C202
C180-C181

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■	2.76	3.75	21	R	MSS-E20R21-GX24-2	GX24-2..
■	3.76	5.00			MSS-E20R21-GX24-3	GX24-3..
●	2.76	3.75		L	MSS-E20L21-GX24-2	GX24-2..
●	3.76	5.00			MSS-E20L21-GX24-3	GX24-3..

SX

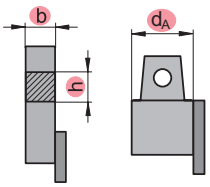


C209
C185

	s [mm]	T_{max} [mm]		L R	Type, description	
■	2.0	20		R	MSS-E20R20-SX2	SX2
■	3.0				MSS-E20R20-SX3	SX3
●	2.0			L	MSS-E20L20-SX2	SX2
●	3.0				MSS-E20L20-SX3	SX3

BGR E25

0°

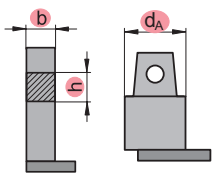





C196 C246

b [mm]	h [mm]	d_A [mm]		Type, description	
25	25		R	MSS-E25R00-2525L	■
		40		UT40-MSS-E25R00	■
		50		UT50-MSS-E25R00	■
		63		UT63-MSS-E25R00	■
25	25		L	MSS-E25L00-2525L	●
		40		UT40-MSS-E25L00	●
		50		UT50-MSS-E25L00	●
		63		UT63-MSS-E25L00	●

90°

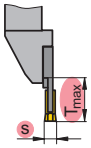





C197 C247

b [mm]	h [mm]	d_A [mm]		Type, description	
25	25		R	MSS-E25R90-2525L	●
		40		UT40-MSS-E25R90	●
		50		UT50-MSS-E25R90	●
25	25		L	MSS-E25L90-2525L	■
		40		UT40-MSS-E25L90	■
		50		UT50-MSS-E25L90	■

GX16

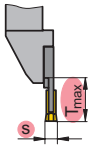




C201
C180-C181

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■	2.00	2.75	12	R	MSS-E25R12-GX16-1	GX16-1..
■	2.76	3.75			MSS-E25R12-GX16-2	GX16-2..
■	3.76	5.00			MSS-E25R12-GX16-3	GX16-3..
■	5.01	6.50			MSS-E25R12-GX16-4	GX16-4..
●	2.00	2.75		L	MSS-E25L12-GX16-1	GX16-1..
●	2.76	3.75			MSS-E25L12-GX16-2	GX16-2..
●	3.76	5.00			MSS-E25L12-GX16-3	GX16-3..
●	5.01	6.50			MSS-E25L12-GX16-4	GX16-4..

GX24

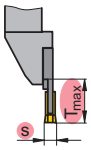




C202
C180-C181

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■	2.76	3.75	21	R	MSS-E25R21-GX24-2	GX24-2..
■	3.76	5.00			MSS-E25R21-GX24-3	GX24-3..
■	5.01	6.50			MSS-E25R21-GX24-4	GX24-4..
■	8.00	8.00			MSS-E25R21-GX24-5	GX24-5..
●	2.76	3.75		L	MSS-E25L21-GX24-2	GX24-2..
●	3.76	5.00			MSS-E25L21-GX24-3	GX24-3..
●	5.01	6.50			MSS-E25L21-GX24-4	GX24-4..
●	8.00	8.00			MSS-E25L21-GX24-5	GX24-5..

SX – right-hand





C209
C185

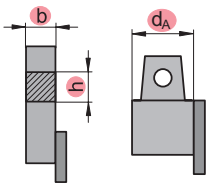
	s [mm]	T_{max} [mm]		L R	Type, description	
■	2.0	20		R	MSS-E25R20-SX2	SX2
■	3.0	25			MSS-E25R25-SX3	SX3
■	3.0	35			MSS-E25R35-SX3	SX3
■	4.0	25			MSS-E25R25-SX4	SX4
■	4.0	35			MSS-E25R35-SX4	SX4

SX – left-hand

	s [mm]	T_{max} [mm]		L R	Type, description	
●	2.0	20		L	MSS-E25L20-SX2	SX2
●	3.0	25			MSS-E25L25-SX3	SX3
●	3.0	35			MSS-E25L35-SX3	SX3
●	4.0	25			MSS-E25L25-SX4	SX4
●	4.0	35			MSS-E25L35-SX4	SX4

BGR E32

0°



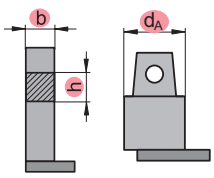




C196 C246+C250

b [mm]	h [mm]	d_A [mm]		Type, description	
25	32		R	MSS-E32R00-3225N	■
32	32			MSS-E32R00-3232Q	■
		63		UT63-MSS-E32R00	■
		63		HSK-T63-MSS-E32R00	■
		100		HSK-T100-MSS-E32R00	■
25	32		L	MSS-E32L00-3225N	●
32	32			MSS-E32L00-3232Q	●
		63		UT63-MSS-E32L00	●
		63		HSK-T63-MSS-E32L00	●
		100		HSK-T100-MSS-E32L00	●

90°



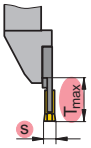




C197 C247+C251

b [mm]	h [mm]	d_A [mm]		Type, description	
25	32		R	MSS-E32R90-3225N	●
32	32			MSS-E32R90-3232R	●
		63		UT63-MSS-E32R90	●
		63		HSK-T63-MSS-E32R90	●
		100		HSK-T100-MSS-E32R90	●
25	32		L	MSS-E32L90-3225N	■
32	32			MSS-E32L90-3232R	■
		63		UT63-MSS-E32L90	■
		63		HSK-T63-MSS-E32L90	■
		100		HSK-T100-MSS-E32L90	■

GX16

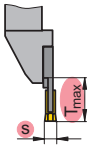




C201
C180-C181

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■	2.76	3.75	12	R	MSS-E32R12-GX16-2	GX16-2..
■	3.76	5.00			MSS-E32R12-GX16-3	GX16-3..
■	5.01	6.50			MSS-E32R12-GX16-4	GX16-4..
●	2.76	3.75		L	MSS-E32L12-GX16-2	GX16-2..
●	3.76	5.00			MSS-E32L12-GX16-3	GX16-3..
●	5.01	6.50			MSS-E32L12-GX16-4	GX16-4..

GX24

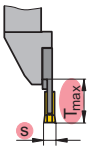




C202
C180-C181

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■	2.76	3.75	21	R	MSS-E32R21-GX24-2	GX24-2..
■	3.76	5.00			MSS-E32R21-GX24-3	GX24-3..
■	5.01	6.50			MSS-E32R21-GX24-4	GX24-4..
●	2.76	3.75		L	MSS-E32L21-GX24-2	GX24-2..
●	3.76	5.00			MSS-E32L21-GX24-3	GX24-3..
●	5.01	6.50			MSS-E32L21-GX24-4	GX24-4..

SX

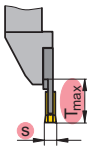




C209
C185

	s [mm]	T_{max} [mm]		L R	Type, description	
■	3.0	35		R	MSS-E32R35-SX3	SX3
■	4.0				MSS-E32R35-SX4	SX4
●	3.0			L	MSS-E32L35-SX3	SX3
●	4.0				MSS-E32L35-SX4	SX4

LX

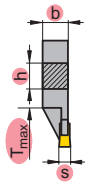




C210
C186

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■ ●	8.00	10.00	25	N	MSS-E32N25-LX	LX-..
■ ●			32		MSS-E32N32-LX	LX-..
■ ●			45		MSS-E32N45-LX	LX-..

GX09

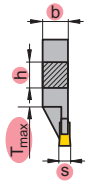




C213 C180

b [mm]	h [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
10	10	0.60	3.75	7	R	E10R00-1010M-GX09	GX09..
					L	E10L00-1010M-GX09	GX09..

GX16 – right-hand





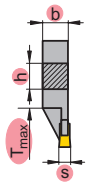
C214 C180-C181

b [mm]	h [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
12	12	2.00	2.75	12	R	E12R0012-1212K-GX16-1	GX16-1..
		0.60	3.75			E12R0012-1212K-GX16-2	GX16-2..
16	16	2.00	2.75			E16R0012-1616K-GX16-1	GX16-1..
		0.60	3.75			E16R0012-1616K-GX16-2	GX16-2..
		3.76	5.00			E16R0012-1616K-GX16-3	GX16-3..
20	20	2.00	2.75			E20R0012-2020K-GX16-1	GX16-1..
		0.60	3.75			E20R0012-2020K-GX16-2	GX16-2..
		3.76	5.00			E20R0012-2020K-GX16-3	GX16-3..
25	25	0.60	3.75			E25R0012-2525M-GX16-2	GX16-2..
		3.76	5.00			E25R0012-2525M-GX16-3	GX16-3..

GX16 – left-hand

b [mm]	h [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
12	12	2.00	2.75	12	L	E12L0012-1212K-GX16-1	GX16-1..
		0.60	3.75			E12L0012-1212K-GX16-2	GX16-2..
16	16	2.00	2.75			E16L0012-1616K-GX16-1	GX16-1..
		0.60	3.75			E16L0012-1616K-GX16-2	GX16-2..
		3.76	5.00			E16L0012-1616K-GX16-3	GX16-3..
20	20	2.00	2.75			E20L0012-2020K-GX16-1	GX16-1..
		0.60	3.75			E20L0012-2020K-GX16-2	GX16-2..
		3.76	5.00			E20L0012-2020K-GX16-3	GX16-3..
25	25	0.60	3.75			E25L0012-2525M-GX16-2	GX16-2..
		3.76	5.00			E25L0012-2525M-GX16-3	GX16-3..

GX24 – right-hand





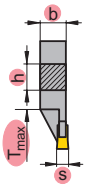
C215 C180-C181

b [mm]	h [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
16	16	2.00	2.75	21	R	E16R0021-1616K-GX24-1	GX24-1..
		2.76	3.75			E16R0021-1616K-GX24-2	GX24-2..
20	20	2.00	2.75			E20R0021-2020K-GX24-1	GX24-1..
		2.76	3.75			E20R0021-2020K-GX24-2	GX24-2..
		3.76	5.00			E20R0021-2020K-GX24-3	GX24-3..
25	25	2.76	3.75			E25R0021-2525M-GX24-2	GX24-2..
		3.76	5.00			E25R0021-2525M-GX24-3	GX24-3..
		5.01	6.50			E25R0021-2525M-GX24-4	GX24-4..
	32	2.76	3.75			E32R0021-3225P-GX24-2	GX24-2..
		3.76	5.00			E32R0021-3225P-GX24-3	GX24-3..
		5.01	6.50			E32R0021-3225P-GX24-4	GX24-4..

GX24 – left-hand

b [mm]	h [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
16	16	2.00	2.75	21	L	E16L0021-1616K-GX24-1	GX24-1..
		2.76	3.75			E16L0021-1616K-GX24-2	GX24-2..
20	20	2.00	2.75			E20L0021-2020K-GX24-1	GX24-1..
		2.76	3.75			E20L0021-2020K-GX24-2	GX24-2..
		3.76	5.00			E20L0021-2020K-GX24-3	GX24-3..
25	25	2.76	3.75			E25L0021-2525M-GX24-2	GX24-2..
		3.76	5.00			E25L0021-2525M-GX24-3	GX24-3..
		5.01	6.50			E25L0021-2525M-GX24-4	GX24-4..
	32	2.76	3.75			E32L0021-3225P-GX24-2	GX24-2..
		3.76	5.00			E32L0021-3225P-GX24-3	GX24-3..
		5.01	6.50			E32L0021-3225P-GX24-4	GX24-4..

SX – right-hand





C218 C185

s [mm]	h [mm]	b [mm]	T_{max} [mm]	L R	Type, description	
2.0	16	16	16	R	E16R0016-1616K-SX2	SX2
	20	20			E20R0016-2020K-SX2	SX2
3.0	16	16	20		E16R0020-1616K-SX3	SX3
	20	20			E20R0020-2020K-SX3	SX3
	25	25			E25R0020-2525M-SX3	SX3
4.0	25	25	25		E25R0025-2525M-SX4	SX4
	20	20			E20R0025-2020K-SX4	SX4
5.0	25	25			E25R0025-2525M-SX5	SX5
6.0	25	25	32		E25R0032-2525M-SX6	SX6

SX – left-hand

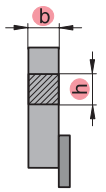
s [mm]	h [mm]	b [mm]	T_{max} [mm]	L R	Type, description	
2.0	16	16	16	L	E16L0016-1616K-SX2	SX2
	20	20			E20L0016-2020K-SX2	SX2
3.0	16	16	20		E16L0020-1616K-SX3	SX3
	20	20			E20L0020-2020K-SX3	SX3
	25	25			E25L0020-2525M-SX3	SX3
4.0	25	25	25		E25L0025-2525M-SX4	SX4
	20	20			E20L0025-2020K-SX4	SX4
5.0	25	25			E25L0025-2525M-SX5	SX5
6.0	25	25	32		E25L0032-2525M-SX6	SX6


hard material matters
CERATIZIT
CERATIZIT
CERATIZIT
3203-SX3
XLCFN 3206-SX6

Circlip grooving – external/internal

Overview

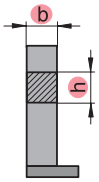
Shanks 0°



h / b
12/12 - 32/32



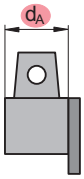
Shanks 90°



h / b
20/20 - 32/32



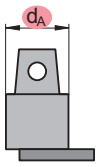
UTS 0°



d_A = 40 - 63



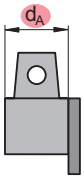
UTS 90°



d_A = 40 - 63



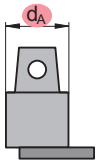
HSK-T 0°



d_A = 63 - 100



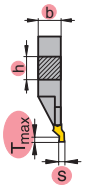
HSK-T 90°



d_A = 63 - 100



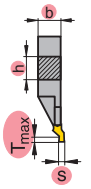
GX09 monobloc tool holders



h / b
10/10
s = 0,6 - 3,25
T_{max} = 0,75 - 7



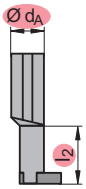
GX16 monobloc tool holders



h / b
12/12 - 25/25
s = 0,6 - 4,25
T_{max} = 0,75 - 12



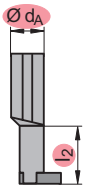
Boring bars 1.5D



d_A = 20 - 40
l_2 = 24 - 60



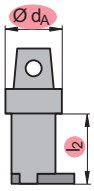
Boring bars 2.5D



d_A = 20 - 50
l_2 = 40 - 100



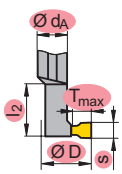
UTS boring bars



d_A = 40 - 63
l_2 = 64 - 80



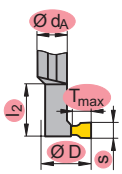
GX09 monobloc boring bars



D = 16,0
l_2 = 30
d_A = 16
s = 0,6 - 3,25
T_{max} = 0,75 - 3,0

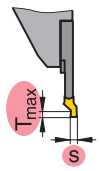


GX16 monobloc boring bars



D = 20,5 - 42
l_2 = 32 - 64
d_A = 16 - 32
s = 0,6 - 4,25
T_{max} = 0,75 - 12





GX09

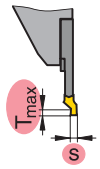
s = 0,6 - 3,25
T_{max} = 0,75 - 7,0



GX16

s = 0,6 - 5,25
T_{max} = 0,75 - 12

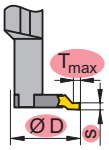




GX16

s = 0,6 - 5,25
T_{max} = 0,75 - 12





GX09

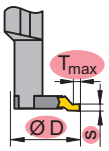
s = 0,6 - 3,25
T_{max} = 0,75 - 7,0
D = 20 - 32



GX16

s = 0,6 - 5,25
T_{max} = 0,75 - 12
D = 40 - 50





GX09

s = 0,6 - 3,25
T_{max} = 0,75 - 7,0
D = 20 - 32



GX16

s = 0,6 - 5,25
T_{max} = 0,75 - 12
D = 40 - 50



Circlip grooving – external

Shanks – GX09

BGR E12

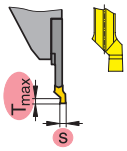
0°



C196

b [mm]	h [mm]		Type, description	
12	12	R	MSS-E12R00-1212E	■
		L	MSS-E12L00-1212E	●

GX09

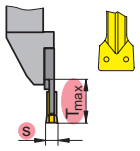




C203
C182

	s [mm]	T_{max} [mm]	L R	Type, description	
■	0.60	0.75	R	MSS-E12R02-GX09-1	GX09-1.. R/L
■	0.80	0.94		MSS-E12R02-GX09-1	GX09-1.. R/L
■	0.90	1.04		MSS-E12R02-GX09-1	GX09-1.. R/L
■	1.00	1.14		MSS-E12R02-GX09-1	GX09-1.. R/L
■	1.20	1.34		MSS-E12R02-GX09-1	GX09-1.. R/L
■	1.40	1.53		MSS-E12R02-GX09-1	GX09-1.. R/L
■	1.70	1.82		MSS-E12R02-GX09-1	GX09-1.. R/L
●	0.60	0.75	L	MSS-E12L02-GX09-1	GX09-1.. R/L
●	0.80	0.94		MSS-E12L02-GX09-1	GX09-1.. R/L
●	0.90	1.04		MSS-E12L02-GX09-1	GX09-1.. R/L
●	1.00	1.14		MSS-E12L02-GX09-1	GX09-1.. R/L
●	1.20	1.34		MSS-E12L02-GX09-1	GX09-1.. R/L
●	1.40	1.53		MSS-E12L02-GX09-1	GX09-1.. R/L
●	1.70	1.82		MSS-E12L02-GX09-1	GX09-1.. R/L

GX09



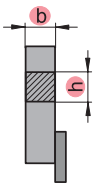


C200
C182

	s [mm]	T_{max} [mm]	L R	Type, description	
■	1.95	7.00	R	MSS-E12R07-GX09-1	GX09-1..
■	2.25			MSS-E12R07-GX09-1	GX09-1..
■	2.75			MSS-E12R07-GX09-2	GX09-2..
■	3.25			MSS-E12R07-GX09-2	GX09-2..
●	1.95		L	MSS-E12L07-GX09-1	GX09-1..
●	2.25			MSS-E12L07-GX09-1	GX09-1..
●	2.75			MSS-E12L07-GX09-2	GX09-2..
●	3.25			MSS-E12L07-GX09-2	GX09-2..

BGR E16

0°

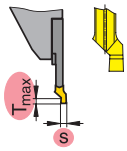




C196

b [mm]	h [mm]		Type, description	
16	16	R	MSS-E16R00-1616G	■
		L	MSS-E16L00-1616G	●

GX09

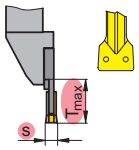




C203
C182

	s [mm]	T_{max} [mm]	L R	Type, description	
■	0.60	0.75	R	MSS-E16R02-GX09-1	GX09-1.. R/L
■	0.80	0.94		MSS-E16R02-GX09-1	GX09-1.. R/L
■	0.90	1.04		MSS-E16R02-GX09-1	GX09-1.. R/L
■	1.00	1.14		MSS-E16R02-GX09-1	GX09-1.. R/L
■	1.20	1.34		MSS-E16R02-GX09-1	GX09-1.. R/L
■	1.40	1.53		MSS-E16R02-GX09-1	GX09-1.. R/L
■	1.70	1.82		MSS-E16R02-GX09-1	GX09-1.. R/L
●	0.60	0.75	L	MSS-E16L02-GX09-1	GX09-1.. R/L
●	0.80	0.94		MSS-E16L02-GX09-1	GX09-1.. R/L
●	0.90	1.04		MSS-E16L02-GX09-1	GX09-1.. R/L
●	1.00	1.14		MSS-E16L02-GX09-1	GX09-1.. R/L
●	1.20	1.34		MSS-E16L02-GX09-1	GX09-1.. R/L
●	1.40	1.53		MSS-E16L02-GX09-1	GX09-1.. R/L
●	1.70	1.82		MSS-E16L02-GX09-1	GX09-1.. R/L

GX09





C200
C182

	s [mm]	T_{max} [mm]	L R	Type, description	
■	1.95	7.00	R	MSS-E16R07-GX09-1	GX09-1..
■	2.25			MSS-E16R07-GX09-1	GX09-1..
■	2.75			MSS-E16R07-GX09-2	GX09-2..
■	3.25			MSS-E16R07-GX09-2	GX09-2..
●	1.95		L	MSS-E16L07-GX09-1	GX09-1..
●	2.25			MSS-E16L07-GX09-1	GX09-1..
●	2.75			MSS-E16L07-GX09-2	GX09-2..
●	3.25			MSS-E16L07-GX09-2	GX09-2..

Circlip grooving – external

Shanks – GX16

BGR E20

0°



C196

b [mm]	h [mm]		Type, description	
20	16	R	MSS-E20R00-1620G	■
	20		MSS-E20R00-2020J	■
	16	L	MSS-E20L00-1620G	●
	20		MSS-E20L00-2020J	●

90°



C197

b [mm]	h [mm]		Type, description	
20	20	R	MSS-E20R90-2020J	●
		L	MSS-E20L90-2020J	■

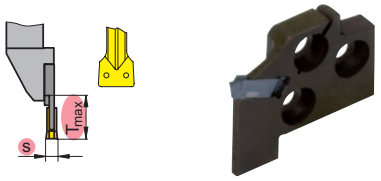
GX16



C204
C182

	s [mm]	T_{max} [mm]	L R	Type, description	
■	0.60	0.75	R	MSS-E20R03-GX16-2	GX16-2.. R/L
■	0.80	0.94		MSS-E20R03-GX16-2	GX16-2.. R/L
■	0.90	1.04		MSS-E20R03-GX16-2	GX16-2.. R/L
■	1.00	1.14		MSS-E20R03-GX16-2	GX16-2.. R/L
■	1.20	1.34		MSS-E20R03-GX16-2	GX16-2.. R/L
■	1.40	1.53		MSS-E20R03-GX16-2	GX16-2.. R/L
■	1.70	1.82		MSS-E20R03-GX16-2	GX16-2.. R/L
■	1.95	2.07		MSS-E20R03-GX16-2	GX16-2.. R/L
■	2.25	2.36		MSS-E20R03-GX16-2	GX16-2.. R/L
●	0.60	0.75	L	MSS-E20L03-GX16-2	GX16-2.. R/L
●	0.80	0.94		MSS-E20L03-GX16-2	GX16-2.. R/L
●	0.90	1.04		MSS-E20L03-GX16-2	GX16-2.. R/L
●	1.00	1.14		MSS-E20L03-GX16-2	GX16-2.. R/L
●	1.20	1.34		MSS-E20L03-GX16-2	GX16-2.. R/L
●	1.40	1.53		MSS-E20L03-GX16-2	GX16-2.. R/L
●	1.70	1.82		MSS-E20L03-GX16-2	GX16-2.. R/L
●	1.95	2.07		MSS-E20L03-GX16-2	GX16-2.. R/L
●	2.25	2.36		MSS-E20L03-GX16-2	GX16-2.. R/L

GX16

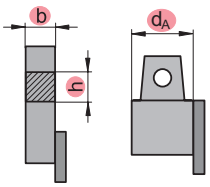


C201
C182

	s [mm]	T_{max} [mm]	L R	Type, description	
■	2.75	12.00	R	MSS-E20R12-GX16-2	GX16-2..
■	3.25			MSS-E20R12-GX16-2	GX16-2..
■	4.25			MSS-E20R12-GX16-3	GX16-3..
●	2.75		L	MSS-E20L12-GX16-2	GX16-2..
●	3.25			MSS-E20L12-GX16-2	GX16-2..
●	4.25			MSS-E20L12-GX16-3	GX16-3..

BGR E25

0°

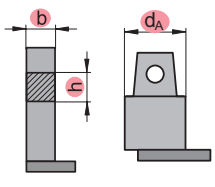





C196 C246

b [mm]	h [mm]	d_A [mm]		Type, description	
25	25		R	MSS-E25R00-2525L	■
		40		UT40-MSS-E25R00	■
		50		UT50-MSS-E25R00	■
		63		UT63-MSS-E25R00	■
25	25		L	MSS-E25L00-2525L	●
		40		UT40-MSS-E25L00	●
		50		UT50-MSS-E25L00	●
		63		UT63-MSS-E25L00	●

90°

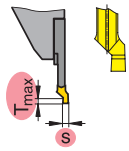





C197 C247

b [mm]	h [mm]	d_A [mm]		Type, description	
25	25		R	MSS-E25R90-2525L	●
		40		UT40-MSS-E25R90	●
		50		UT50-MSS-E25R90	●
25	25		L	MSS-E25L90-2525L	■
		40		UT40-MSS-E25L90	■
		50		UT50-MSS-E25L90	■

GX16

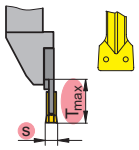




C204
C182

	s [mm]	T_{max} [mm]	L R	Type, description	
■	0.60	0.75	R	MSS-E25R03-GX16-2	GX16-2.. R/L
■	0.80	0.94		MSS-E25R03-GX16-2	GX16-2.. R/L
■	0.90	1.04		MSS-E25R03-GX16-2	GX16-2.. R/L
■	1.00	1.14		MSS-E25R03-GX16-2	GX16-2.. R/L
■	1.20	1.34		MSS-E25R03-GX16-2	GX16-2.. R/L
■	1.40	1.53		MSS-E25R03-GX16-2	GX16-2.. R/L
■	1.70	1.82		MSS-E25R03-GX16-2	GX16-2.. R/L
■	1.95	2.07		MSS-E25R03-GX16-2	GX16-2.. R/L
■	2.25	2.36		MSS-E25R03-GX16-2	GX16-2.. R/L
●	0.60	0.75	L	MSS-E25L03-GX16-2	GX16-2.. R/L
●	0.80	0.94		MSS-E25L03-GX16-2	GX16-2.. R/L
●	0.90	1.04		MSS-E25L03-GX16-2	GX16-2.. R/L
●	1.00	1.14		MSS-E25L03-GX16-2	GX16-2.. R/L
●	1.20	1.34		MSS-E25L03-GX16-2	GX16-2.. R/L
●	1.40	1.53		MSS-E25L03-GX16-2	GX16-2.. R/L
●	1.70	1.82		MSS-E25L03-GX16-2	GX16-2.. R/L
●	1.95	2.07		MSS-E25L03-GX16-2	GX16-2.. R/L
●	2.25	2.36		MSS-E25L03-GX16-2	GX16-2.. R/L

GX16





C201
C182

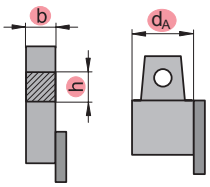
	s [mm]	T_{max} [mm]	L R	Type, description	
■	2.75	12.00	R	MSS-E25R12-GX16-2	GX16-2..
■	3.25			MSS-E25R12-GX16-2	GX16-2..
■	4.25			MSS-E25R12-GX16-3	GX16-3..
■	5.25			MSS-E25R12-GX16-4	GX16-4..
●	2.75		L	MSS-E25L12-GX16-2	GX16-2..
●	3.25			MSS-E25L12-GX16-2	GX16-2..
●	4.25			MSS-E25L12-GX16-3	GX16-3..
●	5.25			MSS-E25L12-GX16-4	GX16-4..

Circlip grooving – external

Shanks – UTS/HSK-T – GX16

BGR E32

0°



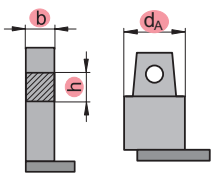




C196 C246+C250

b [mm]	h [mm]	d_A [mm]		Type, description	
25	32		R	MSS-E32R00-3225N	■
32	32			MSS-E32R00-3232Q	■
		50		UT50-MSS-E32R00	■
		63		UT63-MSS-E32R00	■
		63		HSK-T63-MSS-E32R00	■
		100		HSK-T100-MSS-E32R00	■
25	32		L	MSS-E32L00-3225N	●
32	32			MSS-E32L00-3232Q	●
		50		UT50-MSS-E32L00	●
		63		UT63-MSS-E32L00	●
		63		HSK-T63-MSS-E32L00	●
		100		HSK-T100-MSS-E32L00	●

90°



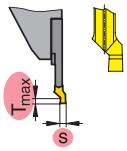




C197 C247+C251

b [mm]	h [mm]	d_A [mm]		Type, description	
25	32		R	MSS-E32R90-3225N	●
32	32			MSS-E32R90-3232R	●
		63		UT63-MSS-E32R90	●
		63		HSK-T63-MSS-E32R90	●
		100		HSK-T100-MSS-E32R90	●
25	32		L	MSS-E32L90-3225N	■
32	32			MSS-E32L90-3232R	■
		63		UT63-MSS-E32L90	■
		63		HSK-T63-MSS-E32L90	■
		100		HSK-T100-MSS-E32L90	■

GX16

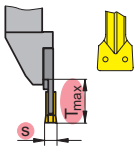




C204
C182

	s [mm]	T_{max} [mm]	L R	Type, description	
■	0.60	0.75	R	MSS-E32R03-GX16-2	GX16-2.. R/L
■	0.80	0.94		MSS-E32R03-GX16-2	GX16-2.. R/L
■	0.90	1.04		MSS-E32R03-GX16-2	GX16-2.. R/L
■	1.00	1.14		MSS-E32R03-GX16-2	GX16-2.. R/L
■	1.20	1.34		MSS-E32R03-GX16-2	GX16-2.. R/L
■	1.40	1.53		MSS-E32R03-GX16-2	GX16-2.. R/L
■	1.70	1.82		MSS-E32R03-GX16-2	GX16-2.. R/L
■	1.95	2.07		MSS-E32R03-GX16-2	GX16-2.. R/L
■	2.25	2.36		MSS-E32R03-GX16-2	GX16-2.. R/L
●	0.60	0.75	L	MSS-E32L03-GX16-2	GX16-2.. R/L
●	0.80	0.94		MSS-E32L03-GX16-2	GX16-2.. R/L
●	0.90	1.04		MSS-E32L03-GX16-2	GX16-2.. R/L
●	1.00	1.14		MSS-E32L03-GX16-2	GX16-2.. R/L
●	1.20	1.34		MSS-E32L03-GX16-2	GX16-2.. R/L
●	1.40	1.53		MSS-E32L03-GX16-2	GX16-2.. R/L
●	1.70	1.82		MSS-E32L03-GX16-2	GX16-2.. R/L
●	1.95	2.07		MSS-E32L03-GX16-2	GX16-2.. R/L
●	2.25	2.36		MSS-E32L03-GX16-2	GX16-2.. R/L

GX16

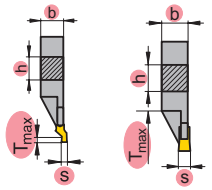




C201
C182

	s [mm]	T_{max} [mm]	L R	Type, description	
■	2.75	12.00	R	MSS-E32R12-GX16-2	GX16-2..
■	3.25			MSS-E32R12-GX16-2	GX16-2..
■	4.25			MSS-E32R12-GX16-3	GX16-3..
■	5.25			MSS-E32R12-GX16-4	GX16-4..
●	2.75		L	MSS-E32L12-GX16-2	GX16-2..
●	3.25			MSS-E32L12-GX16-2	GX16-2..
●	4.25			MSS-E32L12-GX16-3	GX16-3..
●	5.25			MSS-E32L12-GX16-4	GX16-4..

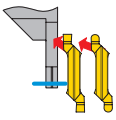
GX09 – right-hand





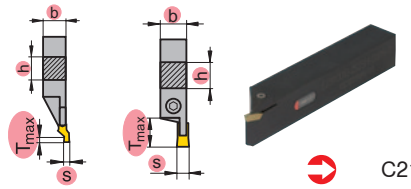
C213 C182

b [mm]	h [mm]	s [mm]	T_{max} [mm]	L R	Type, description	
10	10	0.60	0.75	R	E10R00-1010M-GX09	GX09..
		0.80	0.94		E10R00-1010M-GX09	GX09..
		0.90	1.04		E10R00-1010M-GX09	GX09..
		1.00	1.14		E10R00-1010M-GX09	GX09..
		1.20	1.34		E10R00-1010M-GX09	GX09..
		1.40	1.53		E10R00-1010M-GX09	GX09..
		1.70	1.82		E10R00-1010M-GX09	GX09..
		1.95	7.00		E10R00-1010M-GX09	GX09..
		2.25	7.00		E10R00-1010M-GX09	GX09..
		2.75	7.00		E10R00-1010M-GX09	GX09..
		3.25	7.00		E10R00-1010M-GX09	GX09..
		0.60	0.75	L	E10L00-1010M-GX09	GX09..
		0.80	0.94		E10L00-1010M-GX09	GX09..
		0.90	1.04		E10L00-1010M-GX09	GX09..
		1.00	1.14		E10L00-1010M-GX09	GX09..
		1.20	1.34		E10L00-1010M-GX09	GX09..
		1.40	1.53		E10L00-1010M-GX09	GX09..
		1.70	1.82		E10L00-1010M-GX09	GX09..
		1.95	7.00		E10L00-1010M-GX09	GX09..
		2.25	7.00		E10L00-1010M-GX09	GX09..
		2.75	7.00		E10L00-1010M-GX09	GX09..
		3.25	7.00		E10L00-1010M-GX09	GX09..



Attention:
When using right-hand or left-hand inserts, the tool requires modification to prevent the insert fouling.

GX16 – right-hand

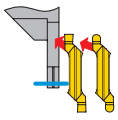


C214 C182

b [mm]	h [mm]	s [mm]	T_{max} [mm]	L R	Type, description	
12	12	0.60	0.75		E12R0012-1212K-GX16-2	GX16-2..
		0.80	0.94		E12R0012-1212K-GX16-2	GX16-2..
		0.90	1.04		E12R0012-1212K-GX16-2	GX16-2..
		1.00	1.14		E12R0012-1212K-GX16-2	GX16-2..
		1.20	1.34		E12R0012-1212K-GX16-2	GX16-2..
		2.75	12.00		E12R0012-1212K-GX16-2	GX16-2..
		1.40	1.53		E12R0012-1212K-GX16-2	GX16-2..
		1.70	1.82		E12R0012-1212K-GX16-2	GX16-2..
		1.95	2.07		E12R0012-1212K-GX16-2	GX16-2..
		2.25	2.36		E12R0012-1212K-GX16-2	GX16-2..
		3.25	12.00		E12R0012-1212K-GX16-2	GX16-2..
16	16	0.60	0.75		E16R0012-1616K-GX16-2	GX16-2..
		0.80	0.94		E16R0012-1616K-GX16-2	GX16-2..
		0.90	1.04		E16R0012-1616K-GX16-2	GX16-2..
		1.00	1.14		E16R0012-1616K-GX16-2	GX16-2..
		1.20	1.34		E16R0012-1616K-GX16-2	GX16-2..
		1.40	1.53		E16R0012-1616K-GX16-2	GX16-2..
		1.70	1.82		E16R0012-1616K-GX16-2	GX16-2..
		1.95	2.07		E16R0012-1616K-GX16-2	GX16-2..
		2.25	2.36		E16R0012-1616K-GX16-2	GX16-2..
		2.75	12.00		E16R0012-1616K-GX16-2	GX16-2..
		3.25	12.00		E16R0012-1616K-GX16-2	GX16-2..
		4.25	12.00		E16R0012-1616K-GX16-3	GX16-3..
20	20	0.60	0.75	R	E20R0012-2020K-GX16-2	GX16-2..
		0.80	0.94		E20R0012-2020K-GX16-2	GX16-2..
		0.90	1.04		E20R0012-2020K-GX16-2	GX16-2..
		1.00	1.14		E20R0012-2020K-GX16-2	GX16-2..
		1.20	1.34		E20R0012-2020K-GX16-2	GX16-2..
		1.40	1.53		E20R0012-2020K-GX16-2	GX16-2..
		1.70	1.82		E20R0012-2020K-GX16-2	GX16-2..
		1.95	2.07		E20R0012-2020K-GX16-2	GX16-2..
		2.25	2.36		E20R0012-2020K-GX16-2	GX16-2..
		2.75	12.00		E20R0012-2020K-GX16-2	GX16-2..
		3.25	12.00		E20R0012-2020K-GX16-2	GX16-2..
		4.25	12.00		E20R0012-2020K-GX16-3	GX16-3..
25	25	0.60	0.75		E25R0012-2525M-GX16-2	GX16-2..
		0.80	0.94		E25R0012-2525M-GX16-2	GX16-2..
		0.90	1.04		E25R0012-2525M-GX16-2	GX16-2..
		1.00	1.14		E25R0012-2525M-GX16-2	GX16-2..
		1.20	1.34		E25R0012-2525M-GX16-2	GX16-2..
		1.40	1.53		E25R0012-2525M-GX16-2	GX16-2..
		1.70	1.82		E25R0012-2525M-GX16-2	GX16-2..
		1.95	2.07		E25R0012-2525M-GX16-2	GX16-2..
		2.25	2.36		E25R0012-2525M-GX16-2	GX16-2..
		2.75	12.00		E25R0012-2525M-GX16-2	GX16-2..
		3.25	12.00		E25R0012-2525M-GX16-2	GX16-2..
		4.25	12.00		E25R0012-2525M-GX16-3	GX16-3..

GX16 – left-hand

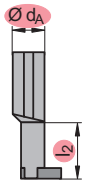
b [mm]	h [mm]	s [mm]	T_{max} [mm]	L R	Type, description	
12	12	0.60	0.75		E12L0012-1212K-GX16-2	GX16-2..
		0.80	0.94		E12L0012-1212K-GX16-2	GX16-2..
		0.90	1.04		E12L0012-1212K-GX16-2	GX16-2..
		1.00	1.14		E12L0012-1212K-GX16-2	GX16-2..
		1.20	1.34		E12L0012-1212K-GX16-2	GX16-2..
		1.40	1.53		E12L0012-1212K-GX16-2	GX16-2..
		1.70	1.82		E12L0012-1212K-GX16-2	GX16-2..
		1.95	2.07		E12L0012-1212K-GX16-2	GX16-2..
		2.25	2.36		E12L0012-1212K-GX16-2	GX16-2..
		2.75	12.00		E12L0012-1212K-GX16-2	GX16-2..
		3.25	12.00		E12L0012-1212K-GX16-2	GX16-2..
16	16	0.60	0.75		E16L0012-1616K-GX16-2	GX16-2..
		0.80	0.94		E16L0012-1616K-GX16-2	GX16-2..
		0.90	1.04		E16L0012-1616K-GX16-2	GX16-2..
		1.00	1.14		E16L0012-1616K-GX16-2	GX16-2..
		1.20	1.34		E16L0012-1616K-GX16-2	GX16-2..
		1.40	1.53		E16L0012-1616K-GX16-2	GX16-2..
		1.70	1.82		E16L0012-1616K-GX16-2	GX16-2..
		1.95	2.07		E16L0012-1616K-GX16-2	GX16-2..
		2.25	2.36		E16L0012-1616K-GX16-2	GX16-2..
		2.75	12.00		E16L0012-1616K-GX16-2	GX16-2..
		3.25	12.00		E16L0012-1616K-GX16-2	GX16-2..
		4.25	12.00		E16L0012-1616K-GX16-3	GX16-3..
20	20	0.60	0.75	L	E20L0012-2020K-GX16-2	GX16-2..
		0.80	0.94		E20L0012-2020K-GX16-2	GX16-2..
		0.90	1.04		E20L0012-2020K-GX16-2	GX16-2..
		1.00	1.14		E20L0012-2020K-GX16-2	GX16-2..
		1.20	1.34		E20L0012-2020K-GX16-2	GX16-2..
		1.40	1.53		E20L0012-2020K-GX16-2	GX16-2..
		1.70	1.82		E20L0012-2020K-GX16-2	GX16-2..
		1.95	2.07		E20L0012-2020K-GX16-2	GX16-2..
		2.25	2.36		E20L0012-2020K-GX16-2	GX16-2..
		2.75	12.00		E20L0012-2020K-GX16-2	GX16-2..
		3.25	12.00		E20L0012-2020K-GX16-2	GX16-2..
		4.25	12.00		E20L0012-2020K-GX16-3	GX16-3..
25	25	0.60	0.75		E25L0012-2525M-GX16-2	GX16-2..
		0.80	0.94		E25L0012-2525M-GX16-2	GX16-2..
		0.90	1.04		E25L0012-2525M-GX16-2	GX16-2..
		1.00	1.14		E25L0012-2525M-GX16-2	GX16-2..
		1.20	1.34		E25L0012-2525M-GX16-2	GX16-2..
		1.40	1.53		E25L0012-2525M-GX16-2	GX16-2..
		1.70	1.82		E25L0012-2525M-GX16-2	GX16-2..
		1.95	2.07		E25L0012-2525M-GX16-2	GX16-2..
		2.25	2.36		E25L0012-2525M-GX16-2	GX16-2..
		2.75	12.00		E25L0012-2525M-GX16-2	GX16-2..
		3.25	12.00		E25L0012-2525M-GX16-2	GX16-2..
		4.25	12.00		E25L0012-2525M-GX16-3	GX16-3..



Attention:
When using right-hand or left-hand inserts, the tool requires modification to prevent the insert fouling.

BGR I16

GX09

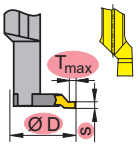




C231-C232

l_2 [mm]	d_A [mm]		Type, description	
24	20	R	MSS-I16R90-1.5D-N	●
40	20		MSS-I16R90-2.5D-N	●
24	20	L	MSS-I16L90-1.5D-N	■
40	20		MSS-I16L90-2.5D-N	■

GX09

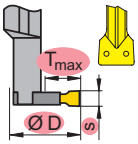




C235
C182

	D_{min} [mm]	s [mm]	T_{max} [mm]	L R	Type, description	
■	20	0.60	0.75	R	MSS-I16R02-GX09-1	GX09-1.. R/L
■		0.80	0.94		MSS-I16R02-GX09-1	GX09-1.. R/L
■		0.90	1.04		MSS-I16R02-GX09-1	GX09-1.. R/L
■		1.00	1.14		MSS-I16R02-GX09-1	GX09-1.. R/L
■		1.20	1.34		MSS-I16R02-GX09-1	GX09-1.. R/L
■		1.40	1.53		MSS-I16R02-GX09-1	GX09-1.. R/L
■		1.70	1.82		MSS-I16R02-GX09-1	GX09-1.. R/L
●		0.60	0.75	L	MSS-I16L02-GX09-1	GX09-1.. R/L
●		0.80	0.94		MSS-I16L02-GX09-1	GX09-1.. R/L
●		0.90	1.04		MSS-I16L02-GX09-1	GX09-1.. R/L
●		1.00	1.14		MSS-I16L02-GX09-1	GX09-1.. R/L
●		1.20	1.34		MSS-I16L02-GX09-1	GX09-1.. R/L
●		1.40	1.53		MSS-I16L02-GX09-1	GX09-1.. R/L
●		1.70	1.82		MSS-I16L02-GX09-1	GX09-1.. R/L

GX09



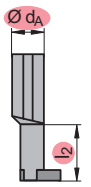


C233
C182

	D_{min} [mm]	s [mm]	T_{max} [mm]	L R	Type, description	
■	20	1.95	7.00	R	MSS-I16R04-GX09-1	GX09-1..
■		2.25			MSS-I16R04-GX09-1	GX09-1..
■		2.75			MSS-I16R04-GX09-2	GX09-2..
■		3.25			MSS-I16R04-GX09-2	GX09-2..
●		1.95		L	MSS-I16L04-GX09-1	GX09-1..
●		2.25			MSS-I16L04-GX09-1	GX09-1..
●		2.75			MSS-I16L04-GX09-2	GX09-2..
●		3.25			MSS-I16L04-GX09-2	GX09-2..

BGR I20

GX09

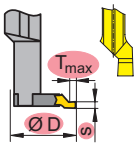


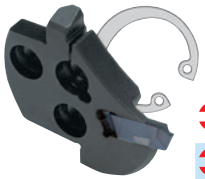


C231-C232

l_2 [mm]	d_A [mm]		Type, description	
30	20	R	MSS-I20R90-1.5D-N	●
50	25		MSS-I20R90-2.5D-N	●
30	20	L	MSS-I20L90-1.5D-N	■
50	25		MSS-I20L90-2.5D-N	■

GX09

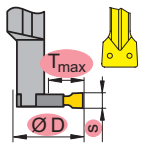




C235
C182

	D_{min} [mm]	s [mm]	T_{max} [mm]	L R	Type, description	
■	25	0.60	0.75	R	MSS-I20R02-GX09-1	GX09-1.. R/L
■		0.80	0.94		MSS-I20R02-GX09-1	GX09-1.. R/L
■		0.90	1.04		MSS-I20R02-GX09-1	GX09-1.. R/L
■		1.00	1.14		MSS-I20R02-GX09-1	GX09-1.. R/L
■		1.20	1.34		MSS-I20R02-GX09-1	GX09-1.. R/L
■		1.40	1.53		MSS-I20R02-GX09-1	GX09-1.. R/L
■		1.70	1.82		MSS-I20R02-GX09-1	GX09-1.. R/L
●		0.60	0.75	L	MSS-I20L02-GX09-1	GX09-1.. R/L
●		0.80	0.94		MSS-I20L02-GX09-1	GX09-1.. R/L
●		0.90	1.04		MSS-I20L02-GX09-1	GX09-1.. R/L
●		1.00	1.14		MSS-I20L02-GX09-1	GX09-1.. R/L
●		1.20	1.34		MSS-I20L02-GX09-1	GX09-1.. R/L
●		1.40	1.53		MSS-I20L02-GX09-1	GX09-1.. R/L
●		1.70	1.82		MSS-I20L02-GX09-1	GX09-1.. R/L

GX09



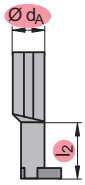


C233
C182

	D_{min} [mm]	s [mm]	T_{max} [mm]	L R	Type, description	
■	25	1.95	7.00	R	MSS-I20R05-GX09-1	GX09-1..
■		2.25			MSS-I20R05-GX09-1	GX09-1..
■		2.75			MSS-I20R05-GX09-2	GX09-2..
■		3.25			MSS-I20R05-GX09-2	GX09-2..
●		1.95		L	MSS-I20L05-GX09-1	GX09-1..
●		2.25			MSS-I20L05-GX09-1	GX09-1..
●		2.75			MSS-I20L05-GX09-2	GX09-2..
●		3.25			MSS-I20L05-GX09-2	GX09-2..

BGR I25

GX09

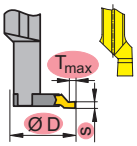




C231-C232

l_2 [mm]	d_A [mm]		Type, description	
38	25	R	MSS-I25R90-1.5D-N	●
63	32		MSS-I25R90-2.5D-N	●
38	25	L	MSS-I25L90-1.5D-N	■
63	32		MSS-I25L90-2.5D-N	■

GX09

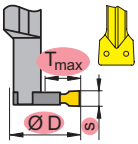




C235
C182

	D_{min} [mm]	s [mm]	T_{max} [mm]	L R	Type, description	
■	32	0.60	0.75	R	MSS-I25R02-GX09-1	GX09-1.. R/L
■		0.80	0.94		MSS-I25R02-GX09-1	GX09-1.. R/L
■		0.90	1.04		MSS-I25R02-GX09-1	GX09-1.. R/L
■		1.00	1.14		MSS-I25R02-GX09-1	GX09-1.. R/L
■		1.20	1.34		MSS-I25R02-GX09-1	GX09-1.. R/L
■		1.40	1.53		MSS-I25R02-GX09-1	GX09-1.. R/L
■		1.70	1.82		MSS-I25R02-GX09-1	GX09-1.. R/L
●		0.60	0.75	L	MSS-I25L02-GX09-1	GX09-1.. R/L
●		0.80	0.94		MSS-I25L02-GX09-1	GX09-1.. R/L
●		0.90	1.04		MSS-I25L02-GX09-1	GX09-1.. R/L
●		1.00	1.14		MSS-I25L02-GX09-1	GX09-1.. R/L
●		1.20	1.34		MSS-I25L02-GX09-1	GX09-1.. R/L
●		1.40	1.53		MSS-I25L02-GX09-1	GX09-1.. R/L
●		1.70	1.82		MSS-I25L02-GX09-1	GX09-1.. R/L

GX09





C233
C182

	D_{min} [mm]	s [mm]	T_{max} [mm]	L R	Type, description	
■	32	1.95	7.00	R	MSS-I25R06-GX09-1	GX09-1..
■		2.25			MSS-I25R06-GX09-1	GX09-1..
■		2.75			MSS-I25R06-GX09-2	GX09-2..
■		3.25			MSS-I25R06-GX09-2	GX09-2..
●		1.95		L	MSS-I25L06-GX09-1	GX09-1..
●		2.25			MSS-I25L06-GX09-1	GX09-1..
●		2.75			MSS-I25L06-GX09-2	GX09-2..
●		3.25			MSS-I25L06-GX09-2	GX09-2..

BGR I32

GX16 – right-hand



C231-C232 C249

l_2 [mm]	d_A [mm]		Type, description	
48	32	R	MSS-I32R90-1.5D-N	●
80	40		MSS-I32R90-2.5D-N	●
64	40		UT40-MSS-I32R90-2D	●

GX16 – left-hand

l_2 [mm]	d_A [mm]		Type, description	
48	32	L	MSS-I32L90-1.5D-N	■
80	40		MSS-I32L90-2.5D-N	■
64	50		UT50-MSS-I32L90-2D	■

Application

Tools and inserts for parting and grooving

GX16



C236
C182

	D_{min} [mm]	s [mm]	T_{max} [mm]	L R	Type, description	
■	40	0.60	0.75	R	MSS-I32R03-GX16-2	GX16-2.. R/L
■		0.80	0.94		MSS-I32R03-GX16-2	GX16-2.. R/L
■		0.90	1.04		MSS-I32R03-GX16-2	GX16-2.. R/L
■		1.00	1.14		MSS-I32R03-GX16-2	GX16-2.. R/L
■		1.20	1.34		MSS-I32R03-GX16-2	GX16-2.. R/L
■		1.40	1.53		MSS-I32R03-GX16-2	GX16-2.. R/L
■		1.70	1.82		MSS-I32R03-GX16-2	GX16-2.. R/L
■		1.95	2.07		MSS-I32R03-GX16-2	GX16-2.. R/L
■		2.25	2.36		MSS-I32R03-GX16-2	GX16-2.. R/L
●		0.60	0.75	L	MSS-I32L03-GX16-2	GX16-2.. R/L
●		0.80	0.94		MSS-I32L03-GX16-2	GX16-2.. R/L
●		0.90	1.04		MSS-I32L03-GX16-2	GX16-2.. R/L
●		1.00	1.14		MSS-I32L03-GX16-2	GX16-2.. R/L
●		1.20	1.34		MSS-I32L03-GX16-2	GX16-2.. R/L
●		1.40	1.53		MSS-I32L03-GX16-2	GX16-2.. R/L
●		1.70	1.82		MSS-I32L03-GX16-2	GX16-2.. R/L
●		1.95	2.07		MSS-I32L03-GX16-2	GX16-2.. R/L
●		2.25	2.36		MSS-I32L03-GX16-2	GX16-2.. R/L

GX16



C234
C182

	D_{min} [mm]	s [mm]	T_{max} [mm]	L R	Type, description	
■	40	2.75	12.00	R	MSS-I32R09-GX16-2	GX16-2..
■		3.25			MSS-I32R09-GX16-2	GX16-2..
■		4.25			MSS-I32R09-GX16-3	GX16-3..
■		5.25			MSS-I32R09-GX16-4	GX16-4..
●		2.75		L	MSS-I32L09-GX16-2	GX16-2..
●		3.25			MSS-I32L09-GX16-2	GX16-2..
●		4.25			MSS-I32L09-GX16-3	GX16-3..
●		5.25			MSS-I32L09-GX16-4	GX16-4..

BGR I40

GX – right-hand



C231-C232 C249

l_2 [mm]	d_A [mm]		Type, description	
60	40	R	MSS-I40R90-1.5D-N	●
100	50		MSS-I40R90-2.5D-N	●
80	40		UT40-MSS-I40R90-2D	●
80	63		UT63-MSS-I40R90-2D	●

GX16 – left-hand

l_2 [mm]	d_A [mm]		Type, description	
60	40	L	MSS-I40L90-1.5D-N	■
100	50		MSS-I40L90-2.5D-N	■
80	40		UT40-MSS-I40L90-2D	■

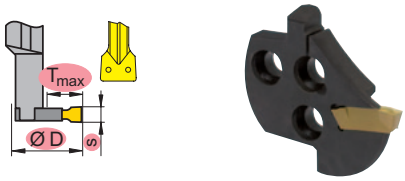
GX16



C236
C182

	D_{min} [mm]	s [mm]	T_{max} [mm]	L R	Type, description	
■	50	0.60	0.75	R	MSS-I40R03-GX16-2	GX16-2.. R/L
■		0.80	0.94		MSS-I40R03-GX16-2	GX16-2.. R/L
■		0.90	1.04		MSS-I40R03-GX16-2	GX16-2.. R/L
■		1.00	1.14		MSS-I40R03-GX16-2	GX16-2.. R/L
■		1.20	1.34		MSS-I40R03-GX16-2	GX16-2.. R/L
■		1.40	1.53		MSS-I40R03-GX16-2	GX16-2.. R/L
■		1.70	1.82		MSS-I40R03-GX16-2	GX16-2.. R/L
■		1.95	2.07		MSS-I40R03-GX16-2	GX16-2.. R/L
■		2.25	2.36		MSS-I40R03-GX16-2	GX16-2.. R/L
●		0.60	0.75	L	MSS-I40L03-GX16-2	GX16-2.. R/L
●		0.80	0.94		MSS-I40L03-GX16-2	GX16-2.. R/L
●		0.90	1.04		MSS-I40L03-GX16-2	GX16-2.. R/L
●		1.00	1.14		MSS-I40L03-GX16-2	GX16-2.. R/L
●		1.20	1.34		MSS-I40L03-GX16-2	GX16-2.. R/L
●		1.40	1.53		MSS-I40L03-GX16-2	GX16-2.. R/L
●		1.70	1.82		MSS-I40L03-GX16-2	GX16-2.. R/L
●		1.95	2.07		MSS-I40L03-GX16-2	GX16-2.. R/L
●		2.25	2.36		MSS-I40L03-GX16-2	GX16-2.. R/L

GX16



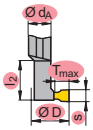
C234
C182

	D_{min} [mm]	s [mm]	T_{max} [mm]	L R	Type, description	
■	50	2.75	12.00	R	MSS-I40R10-GX16-2	GX16-2..
■		3.25			MSS-I40R10-GX16-2	GX16-2..
■		4.25			MSS-I40R10-GX16-3	GX16-3..
■		5.25			MSS-I40R10-GX16-4	GX16-4..
●		2.75		L	MSS-I40L10-GX16-2	GX16-2..
●		3.25			MSS-I40L10-GX16-2	GX16-2..
●		4.25			MSS-I40L10-GX16-3	GX16-3..
●		5.25			MSS-I40L10-GX16-4	GX16-4..

Circlip grooving – internal

Monobloc boring bars – GX09

GX09 – right-hand



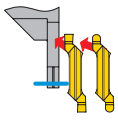


C237 C182

d_A [mm]	l_2 [mm]	D [mm]	s [mm]	T_{max} [mm]	L R	Type, description	
16	30	16	0.60	3	R	I12R90-2.5D-GX09	GX09..
			0.80			I12R90-2.5D-GX09	GX09..
			0.90			I12R90-2.5D-GX09	GX09..
			1.00			I12R90-2.5D-GX09	GX09..
			1.20			I12R90-2.5D-GX09	GX09..
			1.40			I12R90-2.5D-GX09	GX09..
			1.70			I12R90-2.5D-GX09	GX09..
			1.95			I12R90-2.5D-GX09	GX09..
			2.25			I12R90-2.5D-GX09	GX09..
			2.75			I12R90-2.5D-GX09	GX09..
			3.25			I12R90-2.5D-GX09	GX09..

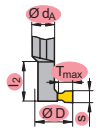
GX09 – left-hand

d_A [mm]	l_2 [mm]	D [mm]	s [mm]	T_{max} [mm]	L R	Type, description	
16	30	16	0.60	3	L	I12L90-2.5D-GX09	GX09..
			0.80			I12L90-2.5D-GX09	GX09..
			0.90			I12L90-2.5D-GX09	GX09..
			1.00			I12L90-2.5D-GX09	GX09..
			1.20			I12L90-2.5D-GX09	GX09..
			1.40			I12L90-2.5D-GX09	GX09..
			1.70			I12L90-2.5D-GX09	GX09..
			1.95			I12L90-2.5D-GX09	GX09..
			2.25			I12L90-2.5D-GX09	GX09..
			2.75			I12L90-2.5D-GX09	GX09..
			3.25			I12L90-2.5D-GX09	GX09..



Attention:
When using right-hand or left-hand inserts, the tool requires modification to prevent the insert fouling.

GX16 – right-hand



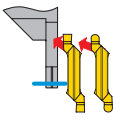


C238 C182

d_A [mm]	l_2 [mm]	D [mm]	s [mm]	T_{max} [mm]	L R	Type, description	
16	32	20.5	0.60	0.75	R	I16R90-2.0D-GX16-2	GX16-2..
			0.80	0.94		I16R90-2.0D-GX16-2	GX16-2..
			0.90	1.04		I16R90-2.0D-GX16-2	GX16-2..
			1.00	1.14		I16R90-2.0D-GX16-2	GX16-2..
			1.20	1.34		I16R90-2.0D-GX16-2	GX16-2..
			1.40	1.53		I16R90-2.0D-GX16-2	GX16-2..
			1.70	1.82		I16R90-2.0D-GX16-2	GX16-2..
			1.95	2.07		I16R90-2.0D-GX16-2	GX16-2..
			2.25	2.36		I16R90-2.0D-GX16-2	GX16-2..
			2.75	12.00		I16R90-2.0D-GX16-2	GX16-2..
			3.25	12.00		I16R90-2.0D-GX16-2	GX16-2..
20	40	25.0	0.60	0.75		I20R90-2.0D-GX16-2	GX16-2..
			0.80	0.94		I20R90-2.0D-GX16-2	GX16-2..
			0.90	1.04		I20R90-2.0D-GX16-2	GX16-2..
			1.00	1.14		I20R90-2.0D-GX16-2	GX16-2..
			1.20	1.34		I20R90-2.0D-GX16-2	GX16-2..
			1.40	1.53		I20R90-2.0D-GX16-2	GX16-2..
			1.70	1.82		I20R90-2.0D-GX16-2	GX16-2..
			1.95	2.07		I20R90-2.0D-GX16-2	GX16-2..
			2.25	2.36		I20R90-2.0D-GX16-2	GX16-2..
			2.75	12.00		I20R90-2.0D-GX16-2	GX16-2..
			3.25	12.00		I20R90-2.0D-GX16-2	GX16-2..
25	50	32.0	0.60	0.75		I25R90-2.0D-GX16-2	GX16-2..
			0.80	0.94		I25R90-2.0D-GX16-2	GX16-2..
			0.90	1.04		I25R90-2.0D-GX16-2	GX16-2..
			1.00	1.14		I25R90-2.0D-GX16-2	GX16-2..
			1.20	1.34		I25R90-2.0D-GX16-2	GX16-2..
			1.40	1.53		I25R90-2.0D-GX16-2	GX16-2..
			1.70	1.82		I25R90-2.0D-GX16-2	GX16-2..
			1.95	2.07		I25R90-2.0D-GX16-2	GX16-2..
			2.25	2.36		I25R90-2.0D-GX16-2	GX16-2..
			2.75	12.00		I25R90-2.0D-GX16-2	GX16-2..
			3.25	12.00		I25R90-2.0D-GX16-2	GX16-2..
			4.25	12.00		I25R90-2.0D-GX16-3	GX16-3..
32	64	42.0	0.60	0.75		I32R90-2.0D-GX16-2	GX16-2..
			0.80	0.94		I32R90-2.0D-GX16-2	GX16-2..
			0.90	1.04		I32R90-2.0D-GX16-2	GX16-2..
			1.00	1.14		I32R90-2.0D-GX16-2	GX16-2..
			1.20	1.34		I32R90-2.0D-GX16-2	GX16-2..
			1.40	1.53		I32R90-2.0D-GX16-2	GX16-2..
			1.70	1.82		I32R90-2.0D-GX16-2	GX16-2..
			1.95	2.07		I32R90-2.0D-GX16-2	GX16-2..
			2.25	2.36		I32R90-2.0D-GX16-2	GX16-2..
			2.75	12.00		I32R90-2.0D-GX16-2	GX16-2..
			3.25	12.00		I32R90-2.0D-GX16-2	GX16-2..
			4.25	12.00		I32R90-2.0D-GX16-3	GX16-3..

GX16 – left-hand

d_A [mm]	l_2 [mm]	D [mm]	s [mm]	T_{max} [mm]	L R	Type, description	
16	32	20.5	0.60	0.75	L	I16L90-2.0D-GX16-2	GX16-2..
			0.80	0.94		I16L90-2.0D-GX16-2	GX16-2..
			0.90	1.04		I16L90-2.0D-GX16-2	GX16-2..
			1.00	1.14		I16L90-2.0D-GX16-2	GX16-2..
			1.20	1.34		I16L90-2.0D-GX16-2	GX16-2..
			1.40	1.53		I16L90-2.0D-GX16-2	GX16-2..
			1.70	1.82		I16L90-2.0D-GX16-2	GX16-2..
			1.95	2.07		I16L90-2.0D-GX16-2	GX16-2..
			2.25	2.36		I16L90-2.0D-GX16-2	GX16-2..
			2.75	12.00		I16L90-2.0D-GX16-2	GX16-2..
			3.25	12.00		I16L90-2.0D-GX16-2	GX16-2..
20	40	25.0	0.60	0.75		I20L90-2.0D-GX16-2	GX16-2..
			0.80	0.94		I20L90-2.0D-GX16-2	GX16-2..
			0.90	1.04		I20L90-2.0D-GX16-2	GX16-2..
			1.00	1.14		I20L90-2.0D-GX16-2	GX16-2..
			1.20	1.34		I20L90-2.0D-GX16-2	GX16-2..
			1.40	1.53		I20L90-2.0D-GX16-2	GX16-2..
			1.70	1.82		I20L90-2.0D-GX16-2	GX16-2..
			1.95	2.07		I20L90-2.0D-GX16-2	GX16-2..
			2.25	2.36		I20L90-2.0D-GX16-2	GX16-2..
			2.75	12.00		I20L90-2.0D-GX16-2	GX16-2..
			3.25	12.00		I20L90-2.0D-GX16-2	GX16-2..
25	50	32.0	0.60	0.75		I25L90-2.0D-GX16-2	GX16-2..
			0.80	0.94		I25L90-2.0D-GX16-2	GX16-2..
			0.90	1.04		I25L90-2.0D-GX16-2	GX16-2..
			1.00	1.14		I25L90-2.0D-GX16-2	GX16-2..
			1.20	1.34		I25L90-2.0D-GX16-2	GX16-2..
			1.40	1.53		I25L90-2.0D-GX16-2	GX16-2..
			1.70	1.82		I25L90-2.0D-GX16-2	GX16-2..
			1.95	2.07		I25L90-2.0D-GX16-2	GX16-2..
			2.25	2.36		I25L90-2.0D-GX16-2	GX16-2..
			2.75	12.00		I25L90-2.0D-GX16-2	GX16-2..
			3.25	12.00		I25L90-2.0D-GX16-2	GX16-2..
			4.25	12.00		I25L90-2.0D-GX16-3	GX16-3..
32	64	42.0	0.60	0.75		I32L90-2.0D-GX16-2	GX16-2..
			0.80	0.94		I32L90-2.0D-GX16-2	GX16-2..
			0.90	1.04		I32L90-2.0D-GX16-2	GX16-2..
			1.00	1.14		I32L90-2.0D-GX16-2	GX16-2..
			1.20	1.34		I32L90-2.0D-GX16-2	GX16-2..
			1.40	1.53		I32L90-2.0D-GX16-2	GX16-2..
			1.70	1.82		I32L90-2.0D-GX16-2	GX16-2..
			1.95	2.07		I32L90-2.0D-GX16-2	GX16-2..
			2.25	2.36		I32L90-2.0D-GX16-2	GX16-2..
			2.75	12.00		I32L90-2.0D-GX16-2	GX16-2..
			3.25	12.00		I32L90-2.0D-GX16-2	GX16-2..
			4.25	12.00		I32L90-2.0D-GX16-3	GX16-3..

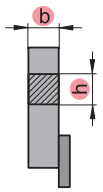


Attention:
When using right-hand or left-hand inserts, the tool requires modification to prevent the insert fouling.

Radius grooves – external/internal

Overview – modular structure

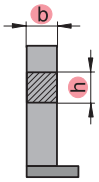
Shanks 0°



h / b
12/12 - 32/32



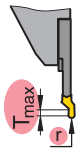
Shanks 90°



h / b
20/20 - 32/32



SX



r = 1.5 - 2.0
T_{max} = 20 - 35

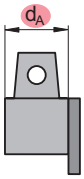


LX

r = 4
T_{max} = 25 - 45



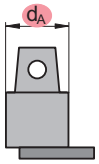
UTS 0°



d_A = 40 - 63



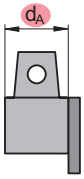
UTS 90°



d_A = 40 - 63



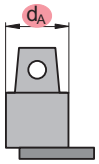
HSK-T 0°



d_A = 63 - 100



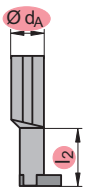
HSK-T 90°



d_A = 63 - 100



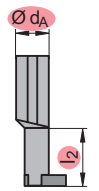
Boring bars 1.5D



d_A = 20 - 40
l_2 = 24 - 60



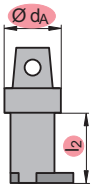
Boring bars 2.5D



d_A = 20 - 50
l_2 = 40 - 100

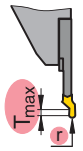


UTS boring bars



d_A = 40 - 63
l_2 = 64 - 80





GX09

r = 0,8 - 1,2
T_{max} = 1,78 - 7



GX16

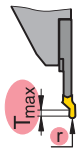
r = 0,8 - 3,0
T_{max} = 1,78 - 12



GX24

r = 1,5 - 3
T_{max} = 21





GX16

r = 0,8 - 3,0
T_{max} = 1,78 - 12



GX24

r = 1,5 - 3
T_{max} = 21



SX

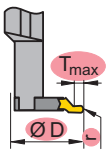
r = 1,5 - 2,0
T_{max} = 20 - 35



LX

r = 4
T_{max} = 25 - 45





GX09

r = 0,8 - 1,2
T_{max} = 1,78 - 6
D = 20 - 32



GX16

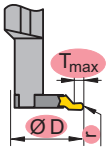
r = 0,8 - 3,0
T_{max} = 1,78 - 10
D = 40 - 50



GX24

r = 1,5 - 3,0
T_{max} = 19
D = 60





GX09

r = 0,8 - 1,2
T_{max} = 1,78 - 6
D = 20 - 32



GX16

r = 0,8 - 3,0
T_{max} = 1,78 - 10
D = 40 - 50



GX24

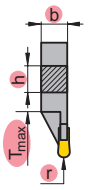
r = 1,5 - 3,0
T_{max} = 19
D = 60



Radius grooves – external/internal

Overview – modular structure

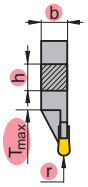
GX09 monobloc tool holders



h / b
10/10
r = 0,8 - 1,2
T_{max} = 1,78 - 7



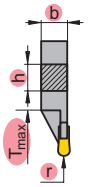
GX16 monobloc tool holders



h / b
12/12 - 25/25
r = 0,8 - 2,5
T_{max} = 1,78 - 12



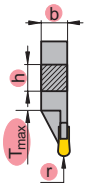
GX24 monobloc tool holders



h / b
16/16 - 32/25
r = 1,5 - 3,0
T_{max} = 21



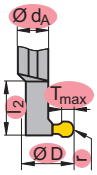
SX monobloc tool holders



h / b
16/16 - 25/25
r = 1,5 - 3,0
T_{max} = 20 - 32



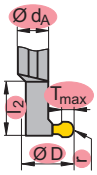
GX09 monobloc boring bars



D = 16,0
l_2 = 30
d_A = 16
r = 0,8 - 1,2
T_{max} = 1,78 - 3



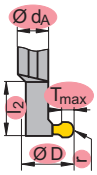
GX16 monobloc boring bars



D = 20,5 - 42
l_2 = 32 - 64
d_A = 16 - 32
r = 0,8 - 3
T_{max} = 2,5 - 11



GX24 monobloc boring bars



D = 42 - 57
l_2 = 64 - 80
d_A = 32 - 40
r = 1,5 - 3
T_{max} = 11 - 17,5




hard material matters
CERATIZIT

Radius grooves – external

Shanks – GX

BGR E12

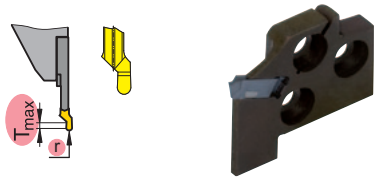
0°



C196

b [mm]	h [mm]		Type, description	
12	12	R	MSS-E12R00-1212E	■
		L	MSS-E12L00-1212E	●

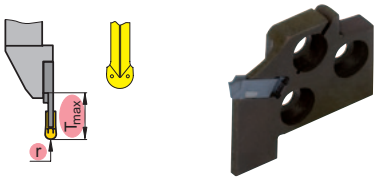
GX09



C203
C183

	r [mm]	T_{max} [mm]	L R	Type, description	
■	0.80	1.78	R	MSS-E12R02-GX09-1	GX09-1.. R/L
●			L	MSS-E12L02-GX09-1	GX09-1.. R/L

GX09

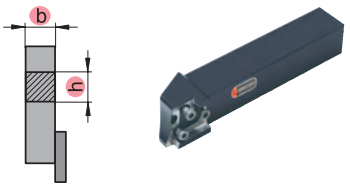


C200
C183

	r [mm]	T_{max} [mm]	L R	Type, description	
■	1.00	7.00	R	MSS-E12R07-GX09-1	GX09-1..
■	1.20			MSS-E12R07-GX09-1	GX09-1..
●	1.00		L	MSS-E12L07-GX09-1	GX09-1..
●	1.20			MSS-E12L07-GX09-1	GX09-1..

BGR E16

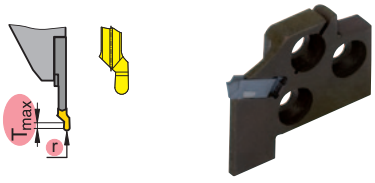
0°



C196

b [mm]	h [mm]		Type, description	
16	16	R	MSS-E16R00-1616G	■
		L	MSS-E16L00-1616G	●

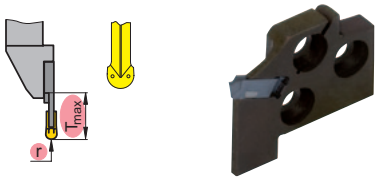
GX09



C203
C183

	r [mm]	T_{max} [mm]	L R	Type, description	
■	0.80	1.78	R	MSS-E16R02-GX09-1	GX09-1.. R/L
●		1.78	L	MSS-E16L02-GX09-1	GX09-1.. R/L

GX09



C200
C183

	r [mm]	T_{max} [mm]	L R	Type, description	
■	1.00	7.00	R	MSS-E16R07-GX09-1	GX09-1..
■	1.20			MSS-E16R07-GX09-1	GX09-1..
●	1.00		L	MSS-E16L07-GX09-1	GX09-1..
●	1.20			MSS-E16L07-GX09-1	GX09-1..

BGR E20

0°



C196

b [mm]	h [mm]		Type, description	
20	16	R	MSS-E20R00-1620G	■
	20		MSS-E20R00-2020J	■
	16	L	MSS-E20L00-1620G	●
	20		MSS-E20L00-2020J	●

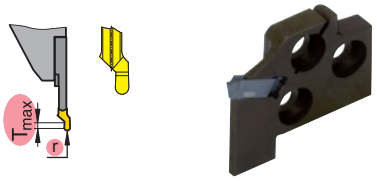
90°



C197

b [mm]	h [mm]		Type, description	
20	20	R	MSS-E20R90-2020J	●
		L	MSS-E20L90-2020J	■

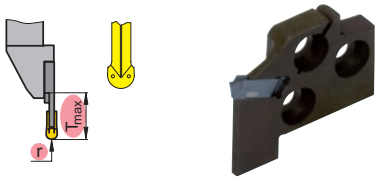
GX16



C204
C183

	r [mm]	T_{max} [mm]	L R	Type, description	
■	0.80	1.78	R	MSS-E20R03-GX16-2	GX16-2.. R/L
■	1.00	2.18		MSS-E20R03-GX16-2	GX16-2.. R/L
■	1.20	2.58		MSS-E20R03-GX16-2	GX16-2.. R/L
●	0.80	1.78	L	MSS-E20L03-GX16-2	GX16-2.. R/L
●	1.00	2.18		MSS-E20L03-GX16-2	GX16-2.. R/L
●	1.20	2.58		MSS-E20L03-GX16-2	GX16-2.. R/L

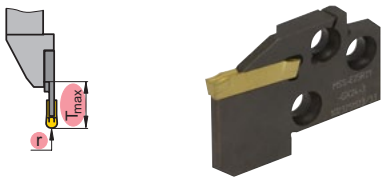
GX16



C201
C183

	r [mm]	T_{max} [mm]	L R	Type, description	
■	1.50	12.00	R	MSS-E20R12-GX16-2	GX16-2..
■	2.00			MSS-E20R12-GX16-3	GX16-3..
■	2.50			MSS-E20R12-GX16-3	GX16-3..
●	1.50		L	MSS-E20L12-GX16-2	GX16-2..
●	2.00			MSS-E20L12-GX16-3	GX16-3..
●	2.50			MSS-E20L12-GX16-3	GX16-3..

GX24



C202
C183

	r [mm]	T_{max} [mm]	L R	Type, description	
■	1.50	21.00	R	MSS-E20R21-GX24-2	GX24-2..
■	2.00			MSS-E20R21-GX24-3	GX24-3..
■	2.50			MSS-E20R21-GX24-3	GX24-3..
●	1.50		L	MSS-E20L21-GX24-2	GX24-2..
●	2.00			MSS-E20L21-GX24-3	GX24-3..
●	2.50			MSS-E20L21-GX24-3	GX24-3..

SX

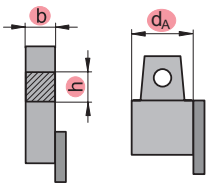


C209
C185

	r [mm]	T_{max} [mm]	L R	Type, description	
■	1.50	20	L	MSS-E20L20-SX3	SX3
●			R	MSS-E20R20-SX3	SX3

BGR E25

0°

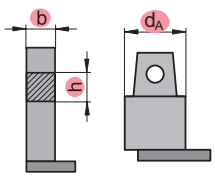





C196 C246

b [mm]	h [mm]	d_A [mm]		Type, description	
25	25		R	MSS-E25R00-2525L	■
		40		UT40-MSS-E25R00	■
		50		UT50-MSS-E25R00	■
		63		UT63-MSS-E25R00	■
25	25		L	MSS-E25L00-2525L	●
		40		UT40-MSS-E25L00	●
		50		UT50-MSS-E25L00	●
		63		UT63-MSS-E25L00	●

90°

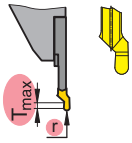





C197 C247

b [mm]	h [mm]	d_A [mm]		Type, description	
25	25		R	MSS-E25R90-2525L	●
		40		UT40-MSS-E25R90	●
		50		UT50-MSS-E25R90	●
25	25		L	MSS-E25L90-2525L	■
		40		UT40-MSS-E25L90	■
		50		UT50-MSS-E25L90	■

GX16

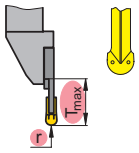




C204
C183

	r [mm]	T_{max} [mm]	L R	Type, description	
■	0.80	1.78	R	MSS-E25R03-GX16-2	GX16-2.. R/L
■	1.00	2.18		MSS-E25R03-GX16-2	GX16-2.. R/L
■	1.20	2.58		MSS-E25R03-GX16-2	GX16-2.. R/L
●	0.80	1.78	L	MSS-E25L03-GX16-2	GX16-2.. R/L
●	1.00	2.18		MSS-E25L03-GX16-2	GX16-2.. R/L
●	1.20	2.58		MSS-E25L03-GX16-2	GX16-2.. R/L

GX16

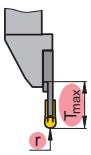




C201
C183

	r [mm]	T_{max} [mm]	L R	Type, description	
■	1.50	12.00	R	MSS-E25R12-GX16-2	GX16-2..
■	2.00			MSS-E25R12-GX16-3	GX16-3..
■	2.50			MSS-E25R12-GX16-3	GX16-3..
■	3.00			MSS-E25R12-GX16-4	GX16-4..
●	1.50		L	MSS-E25L12-GX16-2	GX16-2..
●	2.00			MSS-E25L12-GX16-3	GX16-3..
●	2.50			MSS-E25L12-GX16-3	GX16-3..
●	3.00			MSS-E25L12-GX16-4	GX16-4..

GX24

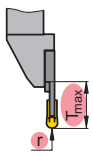




C202
C183

	r [mm]	T_{max} [mm]	L R	Type, description	
■	1.50	21.00	R	MSS-E25R21-GX24-2	GX24-2..
■	2.00			MSS-E25R21-GX24-3	GX24-3..
■	2.50			MSS-E25R21-GX24-3	GX24-3..
■	3.00			MSS-E25R21-GX24-4	GX24-4..
●	1.50		L	MSS-E25L21-GX24-2	GX24-2..
●	2.00			MSS-E25L21-GX24-3	GX24-3..
●	2.50			MSS-E25L21-GX24-3	GX24-3..
●	3.00			MSS-E25L21-GX24-4	GX24-4..

SX





C209
C185

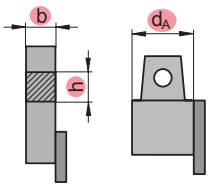
	r [mm]	T_{max} [mm]	L R	Type, description	
■	1.50	25	R	MSS-E25R25-SX3	SX3
■	2.00			MSS-E25R25-SX4	SX4
■	1.50	35		MSS-E25R35-SX3	SX3
■	2.00			MSS-E25R35-SX4	SX4
●	1.50	25	L	MSS-E25L25-SX3	SX3
●	2.00			MSS-E25L25-SX4	SX4
●	1.50	35		MSS-E25L35-SX3	SX3
●	2.00			MSS-E25L35-SX4	SX4

Radius grooves – external

Shanks – UTS/HSK-T – GX

BGR E32

0°



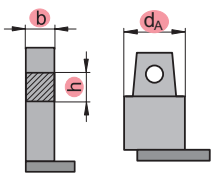




C196 C246+C250

b [mm]	h [mm]	d_A [mm]		Type, description	
25	32		R	MSS-E32R00-3225N	■
32	32			MSS-E32R00-3232Q	■
		50		UT50-MSS-E32R00	■
		63		UT63-MSS-E32R00	■
		63		HSK-T63-MSS-E32R00	■
		100		HSK-T100-MSS-E32R00	■
25	32		L	MSS-E32L00-3225N	●
32	32			MSS-E32L00-3232Q	●
		50		UT50-MSS-E32L00	●
		63		UT63-MSS-E32L00	●
		63		HSK-T63-MSS-E32L00	●
		100		HSK-T100-MSS-E32L00	●

90°



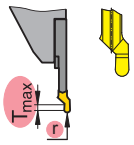




C197 C247+C251

b [mm]	h [mm]	d_A [mm]		Type, description	
25	32		R	MSS-E32R90-3225N	●
32	32			MSS-E32R90-3232R	●
		63		UT63-MSS-E32R90	●
		63		HSK-T63-MSS-E32R90	●
		100		HSK-T100-MSS-E32R90	●
25	32		L	MSS-E32L90-3225N	■
32	32			MSS-E32L90-3232R	■
		63		UT63-MSS-E32L90	■
		63		HSK-T63-MSS-E32L90	■
		100		HSK-T100-MSS-E32L90	■

GX16

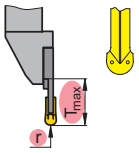




C204
C183

	r [mm]	T_{max} [mm]	L R	Type, description	
■	0.80	1.78	R	MSS-E32R03-GX16-2	GX16-2.. R/L
■	1.00	2.18		MSS-E32R03-GX16-2	GX16-2.. R/L
■	1.20	2.58		MSS-E32R03-GX16-2	GX16-2.. R/L
●	0.80	1.78	L	MSS-E32L03-GX16-2	GX16-2.. R/L
●	1.00	2.18		MSS-E32L03-GX16-2	GX16-2.. R/L
●	1.20	2.58		MSS-E32L03-GX16-2	GX16-2.. R/L

GX16

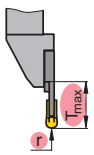




C201
C183

	r [mm]	T_{max} [mm]	L R	Type, description	
■	1.50	12.00	R	MSS-E32R12-GX16-2	GX16-2..
■	2.00			MSS-E32R12-GX16-3	GX16-3..
■	2.50			MSS-E32R12-GX16-3	GX16-3..
■	3.00			MSS-E32R12-GX16-4	GX16-4..
●	1.50		L	MSS-E32L12-GX16-2	GX16-2..
●	2.00			MSS-E32L12-GX16-3	GX16-3..
●	2.50			MSS-E32L12-GX16-3	GX16-3..
●	3.00			MSS-E32L12-GX16-4	GX16-4..

GX24



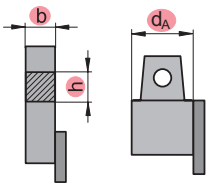


C202
C183

	r [mm]	T_{max} [mm]	L R	Type, description	
■	1.50	21.00	R	MSS-E32R21-GX24-2	GX24-2..
■	2.00			MSS-E32R21-GX24-3	GX24-3..
■	2.50			MSS-E32R21-GX24-3	GX24-3..
■	3.00			MSS-E32R21-GX24-4	GX24-4..
●	1.50		L	MSS-E32L21-GX24-2	GX24-2..
●	2.00			MSS-E32L21-GX24-3	GX24-3..
●	2.50			MSS-E32L21-GX24-3	GX24-3..
●	3.00			MSS-E32L21-GX24-4	GX24-4..

BGR E32

0°



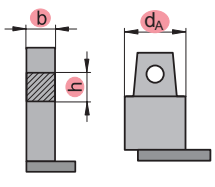




C196 C246+C250

b [mm]	h [mm]	d_A [mm]		Type, description	
25	32		R	MSS-E32R00-3225N	■
32	32			MSS-E32R00-3232Q	■
		50		UT50-MSS-E32R00	■
		63		UT63-MSS-E32R00	■
		63		HSK-T63-MSS-E32R00	■
		100		HSK-T100-MSS-E32R00	■
25	32		L	MSS-E32L00-3225N	●
32	32			MSS-E32L00-3232Q	●
		50		UT50-MSS-E32L00	●
		63		UT63-MSS-E32L00	●
		63		HSK-T63-MSS-E32L00	●
		100		HSK-T100-MSS-E32L00	●

90°



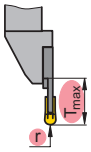




C197 C247+C251

b [mm]	h [mm]	d_A [mm]		Type, description	
25	32		R	MSS-E32R90-3225N	●
32	32			MSS-E32R90-3232R	●
		63		UT63-MSS-E32R90	●
		63		HSK-T63-MSS-E32R90	●
		100		HSK-T100-MSS-E32R90	●
25	32		L	MSS-E32L90-3225N	■
32	32			MSS-E32L90-3232R	■
		63		UT63-MSS-E32L90	■
		63		HSK-T63-MSS-E32L90	■
		100		HSK-T100-MSS-E32L90	■

SX

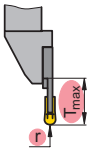




C209
C185

	r [mm]	T_{max} [mm]	L R	Type, description	
■	1.50	35	R	MSS-E32R35-SX3	SX3
■	2.00			MSS-E32R35-SX4	SX4
●	1.50		L	MSS-E32L35-SX3	SX3
●	2.00			MSS-E32L35-SX4	SX4

LX





C210
C186

	r [mm]	T_{max} [mm]	L R	Type, description	
■ ●	4.00	25	N	MSS-E32N25-LX	LX-..
■ ●		32		MSS-E32N32-LX	LX-..
■ ●		45		MSS-E32N45-LX	LX-..

GX09 – right-hand



C213 C183

b [mm]	h [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
10	10	0.80	1.78	R	E10R00-1010M-GX09	GX09..
				L	E10L00-1010M-GX09	GX09..

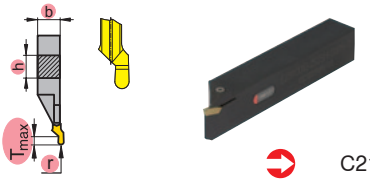
GX09 – right-hand



C213 C183

b [mm]	h [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
10	10	1.00	7.00	R	E10R00-1010M-GX09	GX09..
		1.20		R	E10R00-1010M-GX09	GX09..
		1.00		L	E10L00-1010M-GX09	GX09..
		1.20		L	E10L00-1010M-GX09	GX09..

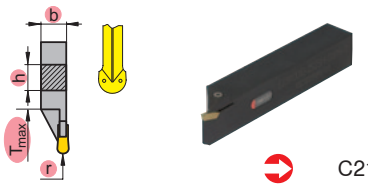
GX16



C214 C183

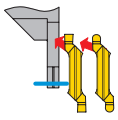
b [mm]	h [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
12	12	0.80	1.78	R	E12R0012-1212K-GX16-2	GX16-2..
16	16				E16R0012-1616K-GX16-2	GX16-2..
16	16	1.00	2.18		E16R0012-1616K-GX16-2	GX16-2..
16	16	1.20	2.58		E16R0012-1616K-GX16-2	GX16-2..
20	20	0.80	1.78		E20R0012-2020K-GX16-2	GX16-2..
20	20	1.00	2.18		E20R0012-2020K-GX16-2	GX16-2..
20	20	1.20	2.58		E20R0012-2020K-GX16-2	GX16-2..
25	25	0.80	1.78		E25R0012-2525M-GX16-2	GX16-2..
25	25	1.00	2.18		E25R0012-2525M-GX16-2	GX16-2..
25	25	1.20	2.58		E25R0012-2525M-GX16-2	GX16-2..
12	12	0.80	1.78	L	E12L0012-1212K-GX16-2	GX16-2..
16	16				E16L0012-1616K-GX16-2	GX16-2..
16	16	1.00	2.18		E16L0012-1616K-GX16-2	GX16-2..
16	16	1.20	2.58		E16L0012-1616K-GX16-2	GX16-2..
20	20	0.80	1.78		E20L0012-2020K-GX16-2	GX16-2..
20	20	1.00	2.18		E20L0012-2020K-GX16-2	GX16-2..
20	20	1.20	2.58		E20L0012-2020K-GX16-2	GX16-2..
25	25	0.80	1.78		E25L0012-2525M-GX16-2	GX16-2..
25	25	1.20	2.58		E25L0012-2525M-GX16-2	GX16-2..

GX16



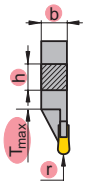
C214 C183

b [mm]	h [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
16	16	1.50	12.00	R	E16R0012-1616K-GX16-2	GX16-2..
		2.00	12.00		E16R0012-1616K-GX16-3	GX16-3..
		2.50	12.00		E16R0012-1616K-GX16-3	GX16-3..
20	20	1.50	12.00		E20R0012-2020K-GX16-2	GX16-2..
		2.00	12.00		E20R0012-2020K-GX16-3	GX16-3..
		2.50	12.00		E20R0012-2020K-GX16-3	GX16-3..
25	25	2.50	12.00		E25R0012-2525M-GX16-3	GX16-3..
		2.00	12.00		E25R0012-2525M-GX16-3	GX16-3..
		1.50	12.00		E25R0012-2525M-GX16-2	GX16-2..
16	16	1.50	12.00	L	E16L0012-1616K-GX16-2	GX16-2..
		2.00	12.00		E16L0012-1616K-GX16-3	GX16-3..
		2.50	12.00		E16L0012-1616K-GX16-3	GX16-3..
20	20	1.50	12.00		E20L0012-2020K-GX16-2	GX16-2..
		2.00	12.00		E20L0012-2020K-GX16-3	GX16-3..
		2.50	12.00		E20L0012-2020K-GX16-3	GX16-3..
25	25	1.50	12.00		E25L0012-2525M-GX16-2	GX16-2..
		2.00	12.00		E25L0012-2525M-GX16-3	GX16-3..
		2.50	12.00		E25L0012-2525M-GX16-3	GX16-3..



Attention:
When using right-hand or left-hand inserts, the tool requires modification to prevent the insert fouling.

GX24 – right-hand





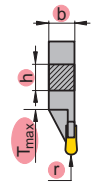
C215 C183

b [mm]	h [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
16	16	1.50	21.00	R	E16R0021-1616K-GX24-2	GX24-2..
20	20	1.50			E20R0021-2020K-GX24-2	GX24-2..
		2.00			E20R0021-2020K-GX24-3	GX24-3..
		2.50			E20R0021-2020K-GX24-3	GX24-3..
25	25	1.50			E25R0021-2525M-GX24-2	GX24-2..
		2.00			E25R0021-2525M-GX24-3	GX24-3..
		2.50			E25R0021-2525M-GX24-3	GX24-3..
		3.00			E25R0021-2525M-GX24-4	GX24-4..
	32	1.50			E32R0021-3225P-GX24-2	GX24-2..
		2.00			E32R0021-3225P-GX24-3	GX24-3..
		2.50			E32R0021-3225P-GX24-3	GX24-3..
		3.00			E32R0021-3225P-GX24-4	GX24-4..

GX24 – left-hand

b [mm]	h [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
16	16	1.50	21.00	L	E16L0021-1616K-GX24-2	GX24-2..
20	20	1.50			E20L0021-2020K-GX24-2	GX24-2..
		2.00			E20L0021-2020K-GX24-3	GX24-3..
		2.50			E20L0021-2020K-GX24-3	GX24-3..
25	25	1.50			E25L0021-2525M-GX24-2	GX24-2..
		2.00			E25L0021-2525M-GX24-3	GX24-3..
		2.50			E25L0021-2525M-GX24-3	GX24-3..
		3.00			E25L0021-2525M-GX24-4	GX24-4..
	32	1.50			E32L0021-3225P-GX24-2	GX24-2..
		2.00			E32L0021-3225P-GX24-3	GX24-3..
		2.50			E32L0021-3225P-GX24-3	GX24-3..
		3.00			E32L0021-3225P-GX24-4	GX24-4..

SX – right-hand





C218 C185

s [mm]	h [mm]	b [mm]	T_{max} [mm]	L R	Type, description	
3.0	16	16	20	R	E16R0020-1616K-SX3	SX3
	20	20			E20R0020-2020K-SX3	SX3
	25	25			E25R0020-2525M-SX3	SX3
4.0	25	25	25		E25R0025-2525M-SX4	SX4
	20	20			E20R0025-2020K-SX4	SX4
5.0	25	25			E25R0025-2525M-SX5	SX5
6.0	25	25	32		E25R0032-2525M-SX6	SX6

SX – left-hand

s [mm]	h [mm]	b [mm]	T_{max} [mm]	L R	Type, description	
3.0	16	16	20	L	E16L0020-1616K-SX3	SX3
	20	20			E20L0020-2020K-SX3	SX3
	25	25			E25L0020-2525M-SX3	SX3
4.0	25	25	25		E25L0025-2525M-SX4	SX4
	20	20			E20L0025-2020K-SX4	SX4
5.0	25	25			E25L0025-2525M-SX5	SX5
6.0	25	25	32		E25L0032-2525M-SX6	SX6

Radius grooves – internal

Boring bars – GX

BGR I16

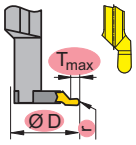
GX09



C231-C232

l_2 [mm]	d_A [mm]		Type, description	
24	20	R	MSS-I16R90-1.5D-N	●
40	20		MSS-I16R90-2.5D-N	●
24	20	L	MSS-I16L90-1.5D-N	■
40	20		MSS-I16L90-2.5D-N	■

GX09

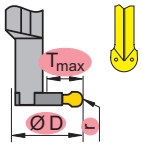




C235
C183

	D_{min} [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
■	20	0.80	1.78	R	MSS-I16R02-GX09-1	GX09-1.. R/L
●				L	MSS-I16L02-GX09-1	GX09-1.. R/L

GX09



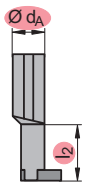


C233
C183

	D_{min} [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
■	20	1.00	4	R	MSS-I16R04-GX09-1	GX09-1..
■		1.20	4		MSS-I16R04-GX09-1	GX09-1..
●		1.00	4	L	MSS-I16L04-GX09-1	GX09-1..
●		1.20	4		MSS-I16L04-GX09-1	GX09-1..

BGR I20

GX09

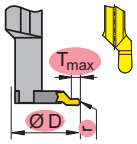




C231-C232

l_2 [mm]	d_A [mm]		Type, description	
30	20	R	MSS-I20R90-1.5D-N	●
50	25		MSS-I20R90-2.5D-N	●
30	20	L	MSS-I20L90-1.5D-N	■
50	25		MSS-I20L90-2.5D-N	■

GX09

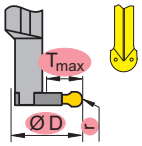




C235
C183

	D_{min} [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
■	25	0.80	1.78	R	MSS-I20R02-GX09-1	GX09-1.. R/L
●				L	MSS-I20L02-GX09-1	GX09-1.. R/L

GX09



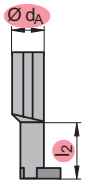


C233
C183

	D_{min} [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
■	25	1.00	5	R	MSS-I20R05-GX09-1	GX09-1..
■		1.20	5		MSS-I20R05-GX09-1	GX09-1..
●		1.00	5	L	MSS-I20L05-GX09-1	GX09-1..
●		1.20	5		MSS-I20L05-GX09-1	GX09-1..

BGR I25

GX09

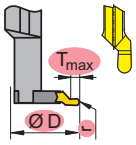




C231-C232

l_2 [mm]	d_A [mm]		Type, description	
38	25	R	MSS-I25R90-1.5D-N	●
63	32		MSS-I25R90-2.5D-N	●
38	25	L	MSS-I25L90-1.5D-N	■
63	32		MSS-I25L90-2.5D-N	■

GX09

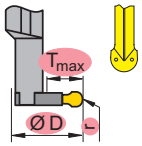




C235
C183

	D_{min} [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
■	32	0.80	1.78	R	MSS-I25R02-GX09-1	GX09-1.. R/L
●			1.78	L	MSS-I25L02-GX09-1	GX09-1.. R/L

GX09





C233
C183

	D_{min} [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
■	32	1.00	6	R	MSS-I25R06-GX09-1	GX09-1..
■		1.20	6		MSS-I25R06-GX09-1	GX09-1..
●		1.00	6	L	MSS-I25L06-GX09-1	GX09-1..
●		1.20	6		MSS-I25L06-GX09-1	GX09-1..

BGR I32

GX16 – right-hand



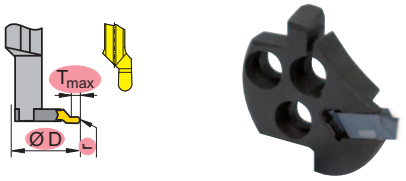
C231-C232 C249

l_2 [mm]	d_A [mm]		Type, description	
48	32	R	MSS-I32R90-1.5D-N	●
80	40		MSS-I32R90-2.5D-N	●
64	40		UT40-MSS-I32R90-2D	●

GX16 – left-hand

l_2 [mm]	d_A [mm]		Type, description	
48	32	L	MSS-I32L90-1.5D-N	■
80	40		MSS-I32L90-2.5D-N	■
64	50		UT50-MSS-I32L90-2D	■

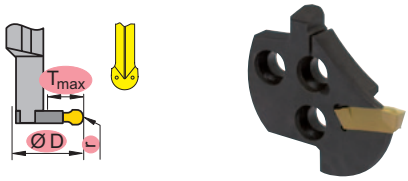
GX16



C236 C183

	D_{min} [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
■	40	0.80	1.78	R	MSS-I32R03-GX16-2	GX16-2.. R/L
■		1.00	2.18		MSS-I32R03-GX16-2	GX16-2.. R/L
■		1.20	2.58		MSS-I32R03-GX16-2	GX16-2.. R/L
●		0.80	1.78	L	MSS-I32L03-GX16-2	GX16-2.. R/L
●		1.00	2.18		MSS-I32L03-GX16-2	GX16-2.. R/L
●		1.20	2.58		MSS-I32L03-GX16-2	GX16-2.. R/L

GX16



C234 C183

	D_{min} [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
■	40	1.50	9	R	MSS-I32R09-GX16-2	GX16-2..
■		2.00	9		MSS-I32R09-GX16-3	GX16-3..
■		2.50	9		MSS-I32R09-GX16-3	GX16-3..
■		3.00	9		MSS-I32R09-GX16-4	GX16-4..
●		1.50	9	L	MSS-I32L09-GX16-2	GX16-2..
●		2.00	9		MSS-I32L09-GX16-3	GX16-3..
●		2.50	9		MSS-I32L09-GX16-3	GX16-3..
●		3.00	9		MSS-I32L09-GX16-4	GX16-4..

BGR I40

GX16/24 – right-hand



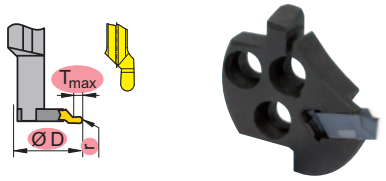
C231-C232 C249

l_2 [mm]	d_A [mm]		Type, description	
60	40	R	MSS-I40R90-1.5D-N	●
100	50	R	MSS-I40R90-2.5D-N	●
80	40	R	UT40-MSS-I40R90-2D	●
80	63	R	UT63-MSS-I40R90-2D	●

GX16/24 – left-hand

l_2 [mm]	d_A [mm]		Type, description	
60	40	L	MSS-I40L90-1.5D-N	■
100	50	L	MSS-I40L90-2.5D-N	■
80	40	L	UT40-MSS-I40L90-2D	■

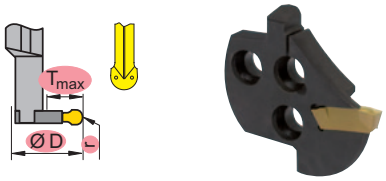
GX16



C236
C183

	D_{min} [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
■	50	0.80	1.78	R	MSS-I40R03-GX16-2	GX16-2.. R/L
■		1.00	2.18	R	MSS-I40R03-GX16-2	GX16-2.. R/L
■		1.20	2.58	R	MSS-I40R03-GX16-2	GX16-2.. R/L
●		0.80	1.78	L	MSS-I40L03-GX16-2	GX16-2.. R/L
●		1.00	2.18	L	MSS-I40L03-GX16-2	GX16-2.. R/L
●		1.20	2.58	L	MSS-I40L03-GX16-2	GX16-2.. R/L

GX16



C234
C183

	D_{min} [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
■	50	1.50	10	R	MSS-I40R10-GX16-2	GX16-2..
■		2.00	10	R	MSS-I40R10-GX16-3	GX16-3..
■		2.50	10	R	MSS-I40R10-GX16-3	GX16-3..
■		3.00	10	R	MSS-I40R10-GX16-4	GX16-4..
●		1.50	10	L	MSS-I40L10-GX16-2	GX16-2..
●		2.00	10	L	MSS-I40L10-GX16-3	GX16-3..
●		2.50	10	L	MSS-I40L10-GX16-3	GX16-3..
●		3.00	10	L	MSS-I40L10-GX16-4	GX16-4..

GX24



C234
C183

	D_{min} [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
■ ●	60	1.50	19	N	MSS-I40N19-GX24-2	GX24-2..
■ ●		2.00	19	N	MSS-I40N19-GX24-3	GX24-3..
■ ●		2.50	19	N	MSS-I40N19-GX24-3	GX24-3..
■ ●		3.00	19	N	MSS-I40N19-GX24-4	GX24-4..


hard material matters
CERATIZIT

Radius grooves – internal

Monobloc boring bars – GX

GX09



C237 C183

D [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
16	0.80	1.78	R	I12R90-2.5D-GX09	GX09..
	0.80	1.78	L	I12L90-2.5D-GX09	GX09..

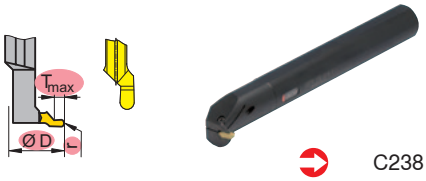
GX09



C237 C183

D [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
16	1.00	3	R	I12R90-2.5D-GX09	GX09..
	1.20	3		I12R90-2.5D-GX09	GX09..
	1.00	3	L	I12L90-2.5D-GX09	GX09..
	1.20	3		I12L90-2.5D-GX09	GX09..

GX16



C238 C183

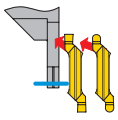
D [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
20.5	0.80	1.78	R	I16R90-2.0D-GX16-2	GX16-2..
	1.00	2.18		I16R90-2.0D-GX16-2	GX16-2..
	1.20	2.58		I16R90-2.0D-GX16-2	GX16-2..
	0.80	1.78	L	I16L90-2.0D-GX16-2	GX16-2..
	1.00	2.18		I16L90-2.0D-GX16-2	GX16-2..
	1.20	2.58		I16L90-2.0D-GX16-2	GX16-2..
25.0	0.80	1.78	R	I20R90-2.0D-GX16-2	GX16-2..
	1.00	2.18		I20R90-2.0D-GX16-2	GX16-2..
	1.20	2.58		I20R90-2.0D-GX16-2	GX16-2..
	0.80	1.78	L	I20L90-2.0D-GX16-2	GX16-2..
	1.00	2.18		I20L90-2.0D-GX16-2	GX16-2..
	1.20	2.58		I20L90-2.0D-GX16-2	GX16-2..
32.0	0.80	1.78		I25L90-2.0D-GX16-2	GX16-2..
	1.00	2.18		I25L90-2.0D-GX16-2	GX16-2..
	1.20	2.58		I25L90-2.0D-GX16-2	GX16-2..
	0.80	1.78	R	I25R90-2.0D-GX16-2	GX16-2..
	1.00	2.18		I25R90-2.0D-GX16-2	GX16-2..
	1.20	2.58		I25R90-2.0D-GX16-2	GX16-2..
42.0	0.80	1.78		I32R90-2.0D-GX16-2	GX16-2..
	1.00	2.18		I32R90-2.0D-GX16-2	GX16-2..
	1.20	2.58		I32R90-2.0D-GX16-2	GX16-2..
	0.80	1.78	L	I32L90-2.0D-GX16-2	GX16-2..
	1.00	2.18		I32L90-2.0D-GX16-2	GX16-2..
	1.20	2.58		I32L90-2.0D-GX16-2	GX16-2..

GX16



C238 C183

D [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
20.5	1.50	5.5	R	I16R90-2.0D-GX16-2	GX16-2..
	1.50	5.5	L	I16L90-2.0D-GX16-2	GX16-2..
25.0	1.50	5.5	R	I20R90-2.0D-GX16-2	GX16-2..
	1.50	5.5	L	I20L90-2.0D-GX16-2	GX16-2..
32.0	2.50	10.0	R	I25R90-2.0D-GX16-3	GX16-3..
	2.00	10.0		I25R90-2.0D-GX16-3	GX16-3..
	1.50	8.0		I25R90-2.0D-GX16-2	GX16-2..
	1.50	8.0	L	I25L90-2.0D-GX16-2	GX16-2..
	2.00	10.0		I25L90-2.0D-GX16-3	GX16-3..
	2.50	10.0		I25L90-2.0D-GX16-3	GX16-3..
42.0	2.50	11.0	R	I32R90-2.0D-GX16-3	GX16-3..
	2.00	11.0		I32R90-2.0D-GX16-3	GX16-3..
	1.50	11.0		I32R90-2.0D-GX16-2	GX16-2..
	1.50	11.0	L	I32L90-2.0D-GX16-2	GX16-2..
	2.00	11.0		I32L90-2.0D-GX16-3	GX16-3..
	2.50	11.0		I32L90-2.0D-GX16-3	GX16-3..



Attention:
When using right-hand or left-hand inserts, the tool requires modification to prevent the insert fouling.

GX24



C239 C183

D [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
42	1.50	11.0	R	I32R90-2.0D-GX24-2	GX24-2..
42	2.00			I32R90-2.0D-GX24-3	GX24-3..
42	2.50			I32R90-2.0D-GX24-3	GX24-3..
47	3.00	17.5		I32R90-2.0D-GX24-4	GX24-4..
42	1.50	11.0	L	I32L90-2.0D-GX24-2	GX24-2..
42	2.00			I32L90-2.0D-GX24-3	GX24-3..
42	2.50			I32L90-2.0D-GX24-3	GX24-3..
47	3.00	17.5		I32L90-2.0D-GX24-4	GX24-4..

GX24



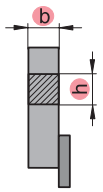
C239 C183

D [mm]	r [mm]	T_{max} [mm]	L R	Type, description	
53	2.00	12.0	R	I40R90-2.0D-GX24-3	GX24-3..
53	2.50			I40R90-2.0D-GX24-3	GX24-3..
57	3.00	17.5		I40R90-2.0D-GX24-4	GX24-4..
53	2.00	12.0	L	I40L90-2.0D-GX24-3	GX24-3..
53	2.50			I40L90-2.0D-GX24-3	GX24-3..
57	3.00	17.5		I40L90-2.0D-GX24-4	GX24-4..

Axial grooving

Overview – modular structure

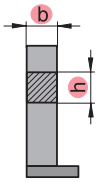
Shanks 0°



h / b
16/16 - 32/32



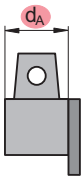
Shanks 90°



h / b
20/20 - 32/32



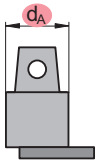
UTS 0°



d_A = 40 - 63



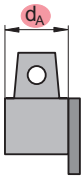
UTS 90°



d_A = 40 - 63



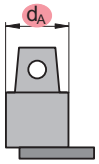
HSK-T 0°



d_A = 63 - 100



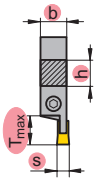
HSK-T 90°



d_A = 63 - 100



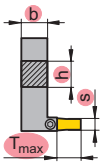
AX 0° monobloc



h / b
16/16 - 25/25
s = 3
T_{max} = 5 - 15

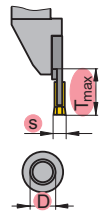
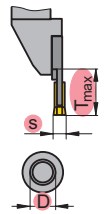
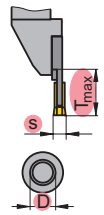


AX 90° monobloc



h / b
16/16 - 25/25
s = 3
T_{max} = 5 - 15



	**GX axial short** s = 2,76 - 6,5 T_{max} = 14 - 15 D = 50 - 900 	**GX axial long** s = 3.76 - 6.5 T_{max} = 21 - 25 D = 50 - 300 	**AX** s = 3 T_{max} = 5 - 15 
	**GX axial short** s = 2,76 - 6,5 T_{max} = 14 - 15 D = 50 - 900 	**GX axial long** s = 3.76 - 6.5 T_{max} = 21 - 25 D = 50 - 300 	**AX** s = 3 T_{max} = 5 - 15 
	**GX axial short** s = 2,76 - 6,5 T_{max} = 14 - 15 D = 50 - 900 		

Axial grooving

Shanks – AX

BGR E16

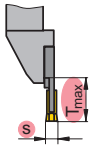
0°

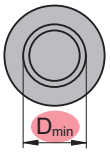


C196

b [mm]	h [mm]		Type, description	
16	16	R	MSS-E16R00-1616G	■
		L	MSS-E16L00-1616G	●

AX





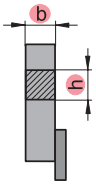


C208
C184

	s [mm]	D_{min} [mm]	T_{max} [mm]			L R	Type, description	
■	3.0	10	5			R	MSS-E16R05-AX05	AX05..
●						L	MSS-E16L05-AX05	AX05..

BGR E20

0°

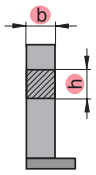




C196

b [mm]	h [mm]		Type, description	
20	16	R	MSS-E20R00-1620G	■
	20		MSS-E20R00-2020J	■
	16	L	MSS-E20L00-1620G	●
	20		MSS-E20L00-2020J	●

90°

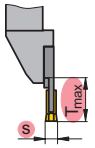


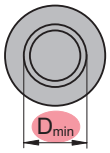


C197

b [mm]	h [mm]		Type, description	
20	20	R	MSS-E20R90-2020J	●
		L	MSS-E20L90-2020J	■

GX24 axial short



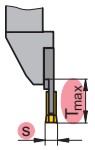


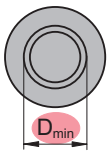


C205
C180-C183

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	D_{min} [mm]	D_{max} [mm]	L R	Type, description	
■	2.76	3.75	14	50	70	R	MSS-E20R14-GX24-2 A50-70	GX24-2..
■				70	100		MSS-E20R14-GX24-2 A70-100	GX24-2..
■				100	150		MSS-E20R14-GX24-2 A100-150	GX24-2..
●				50	70	L	MSS-E20L14-GX24-2 A50-70	GX24-2..
●				70	100		MSS-E20L14-GX24-2 A70-100	GX24-2..
●				100	150		MSS-E20L14-GX24-2 A100-150	GX24-2..

AX







C208
C184

	s [mm]	D_{min} [mm]	T_{max} [mm]			L R	Type, description	
■	3.0	10	5			R	MSS-E20R05-AX05	AX05..
■		20	10				MSS-E20R10-AX10	AX10..
■		30	15				MSS-E20R15-AX15	AX15..
●		10	5			L	MSS-E20L05-AX05	AX05..
●		20	10				MSS-E20L10-AX10	AX10..
●		30	15				MSS-E20L15-AX15	AX15..

BGR E25

0°



C196 C246

b [mm]	h [mm]	d_A [mm]		Type, description	
25	25		R	MSS-E25R00-2525L	■
		40		UT40-MSS-E25R00	■
		50		UT50-MSS-E25R00	■
		63		UT63-MSS-E25R00	■
25	25		L	MSS-E25L00-2525L	●
		40		UT40-MSS-E25L00	●
		50		UT50-MSS-E25L00	●
		63		UT63-MSS-E25L00	●

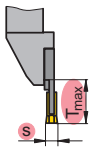
90°

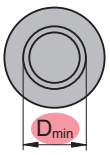


C197 C247

b [mm]	h [mm]	d_A [mm]		Type, description	
25	25		R	MSS-E25R90-2525L	●
		40		UT40-MSS-E25R90	●
		50		UT50-MSS-E25R90	●
25	25		L	MSS-E25L90-2525L	■
		40		UT40-MSS-E25L90	■
		50		UT50-MSS-E25L90	■

GX24 axial short





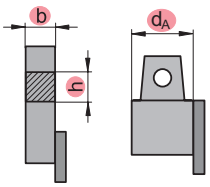


C205-C206
C180-C183

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	D_{min} [mm]	D_{max} [mm]	L R	Type, description	
■	2.76	3.75	15	50	70	R	MSS-E25R15-GX24-2 A50-70	GX24-2..
■	2.76	3.75		70	100		MSS-E25R15-GX24-2 A70-100	GX24-2..
■	2.76	3.75		100	150		MSS-E25R15-GX24-2 A100-150	GX24-2..
■	3.76	5.00		50	70		MSS-E25R15-GX24-3 A50-70	GX24-3..
■	3.76	5.00		70	100		MSS-E25R15-GX24-3 A70-100	GX24-3..
■	3.76	5.00		100	150		MSS-E25R15-GX24-3 A100-150	GX24-3..
■	3.76	5.00		150	300		MSS-E25R15-GX24-3 A150-300	GX24-3..
■	5.01	6.50		50	70		MSS-E25R15-GX24-4 A50-70	GX24-4..
■	5.01	6.50		70	100		MSS-E25R15-GX24-4 A70-100	GX24-4..
■	5.01	6.50		100	150		MSS-E25R15-GX24-4 A100-150	GX24-4..
■	5.01	6.50		150	300		MSS-E25R15-GX24-4 A150-300	GX24-4..
●	2.76	3.75		50	70	L	MSS-E25L15-GX24-2 A50-70	GX24-2..
●	2.76	3.75		70	100		MSS-E25L15-GX24-2 A70-100	GX24-2..
●	2.76	3.75		100	150		MSS-E25L15-GX24-2 A100-150	GX24-2..
●	3.76	5.00		50	70		MSS-E25L15-GX24-3 A50-70	GX24-3..
●	3.76	5.00		70	100		MSS-E25L15-GX24-3 A70-100	GX24-3..
●	3.76	5.00		100	150		MSS-E25L15-GX24-3 A100-150	GX24-3..
●	3.76	5.00		150	300		MSS-E25L15-GX24-3 A150-300	GX24-3..
●	5.01	6.50		50	70		MSS-E25L15-GX24-4 A50-70	GX24-4..
●	5.01	6.50		70	100		MSS-E25L15-GX24-4 A70-100	GX24-4..
●	5.01	6.50		100	150		MSS-E25L15-GX24-4 A100-150	GX24-4..
●	5.01	6.50		150	300		MSS-E25L15-GX24-4 A150-300	GX24-4..

BGR E25

0°

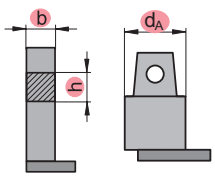





C196 C246

b [mm]	h [mm]	d_A [mm]		Type, description	
25	25		R	MSS-E25R00-2525L	■
		40		UT40-MSS-E25R00	■
		50		UT50-MSS-E25R00	■
		63		UT63-MSS-E25R00	■
25	25		L	MSS-E25L00-2525L	●
		40		UT40-MSS-E25L00	●
		50		UT50-MSS-E25L00	●
		63		UT63-MSS-E25L00	●

90°

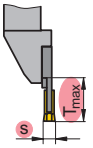


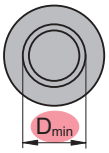



C197 C247

b [mm]	h [mm]	d_A [mm]		Type, description	
25	25		R	MSS-E25R90-2525L	●
		40		UT40-MSS-E25R90	●
		50		UT50-MSS-E25R90	●
25	25		L	MSS-E25L90-2525L	■
		40		UT40-MSS-E25L90	■
		50		UT50-MSS-E25L90	■

GX24 axial long







C207
C180-C183

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	D_{min} [mm]	D_{max} [mm]	L R	Type, description	
■	3.76	5.00	21	50	70	R	MSS-E25R21-GX24-3 AS50-70	GX24-3..
■	3.76	5.00		70	100		MSS-E25R21-GX24-3 AS70-100	GX24-3..
■	3.76	5.00		100	150		MSS-E25R21-GX24-3 AS100-150	GX24-3..
■	3.76	5.00		150	300		MSS-E25R21-GX24-3 AS150-300	GX24-3..
■	5.01	6.50	25	50	70		MSS-E25R25-GX24-4 AS50-70	GX24-4..
■	5.01	6.50		70	100		MSS-E25R25-GX24-4 AS70-100	GX24-4..
■	5.01	6.50		100	150		MSS-E25R25-GX24-4 AS100-150	GX24-4..
■	5.01	6.50		150	300		MSS-E25R25-GX24-4 AS150-300	GX24-4..
●	3.76	5.00	21	50	70	L	MSS-E25L21-GX24-3 AS50-70	GX24-3..
●	3.76	5.00		70	100		MSS-E25L21-GX24-3 AS70-100	GX24-3..
●	3.76	5.00		100	150		MSS-E25L21-GX24-3 AS100-150	GX24-3..
●	3.76	5.00		150	300		MSS-E25L21-GX24-3 AS150-300	GX24-3..
●	5.01	6.50	25	50	70		MSS-E25L25-GX24-4 AS50-70	GX24-4..
●	5.01	6.50		70	100		MSS-E25L25-GX24-4 AS70-100	GX24-4..
●	5.01	6.50		100	150		MSS-E25L25-GX24-4 AS100-150	GX24-4..
●	5.01	6.50		150	300		MSS-E25L25-GX24-4 AS150-300	GX24-4..

BGR E25

0°



C196 C246

b [mm]	h [mm]	d_A [mm]		Type, description	
25	25		R	MSS-E25R00-2525L	■
		40		UT40-MSS-E25R00	■
		50		UT50-MSS-E25R00	■
		63		UT63-MSS-E25R00	■
25	25		L	MSS-E25L00-2525L	●
		40		UT40-MSS-E25L00	●
		50		UT50-MSS-E25L00	●
		63		UT63-MSS-E25L00	●

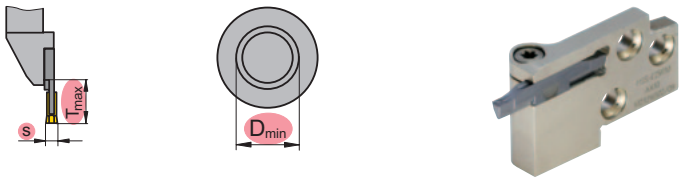
90°



C197 C247

b [mm]	h [mm]	d_A [mm]		Type, description	
25	25		R	MSS-E25R90-2525L	●
		40		UT40-MSS-E25R90	●
		50		UT50-MSS-E25R90	●
25	25		L	MSS-E25L90-2525L	■
		40		UT40-MSS-E25L90	■
		50		UT50-MSS-E25L90	■

AX

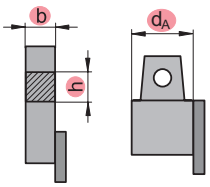


C208
C184

	s [mm]	D_{min} [mm]	T_{max} [mm]			L R	Type, description	
■	3.0	10	5			R	MSS-E25R05-AX05	AX05..
■		20	10				MSS-E25R10-AX10	AX10..
■		30	15				MSS-E25R15-AX15	AX15..
●		10	5			L	MSS-E25L05-AX05	AX05..
●		20	10				MSS-E25L10-AX10	AX10..
●		30	15				MSS-E25L15-AX15	AX15..

BGR E32

0°

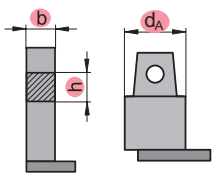





C196 C246+C250

b [mm]	h [mm]	d_A [mm]		Type, description	
25	32		R	MSS-E32R00-3225N	■
32	32			MSS-E32R00-3232Q	■
		50		UT50-MSS-E32R00	■
		63		UT63-MSS-E32R00	■
		63		HSK-T63-MSS-E32R00	■
		100		HSK-T100-MSS-E32R00	■
25	32		L	MSS-E32L00-3225N	●
32	32			MSS-E32L00-3232Q	●
		50		UT50-MSS-E32L00	●
		63		UT63-MSS-E32L00	●
		63		HSK-T63-MSS-E32L00	●
		100		HSK-T100-MSS-E32L00	●

90°

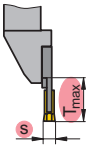


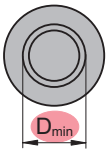



C197 C247+C251

b [mm]	h [mm]	d_A [mm]		Type, description	
25	32		R	MSS-E32R90-3225N	●
32	32			MSS-E32R90-3232R	●
		63		UT63-MSS-E32R90	●
		63		HSK-T63-MSS-E32R90	●
		100		HSK-T100-MSS-E32R90	●
25	32		L	MSS-E32L90-3225N	■
32	32			MSS-E32L90-3232R	■
		63		UT63-MSS-E32L90	■
		63		HSK-T63-MSS-E32L90	■
		100		HSK-T100-MSS-E32L90	■

GX24 axial short



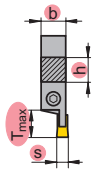


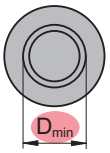


C206
C180-C183

	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	D_{min} [mm]	D_{max} [mm]	L R	Type, description	
■	3.76	5.00	15	70	100	R	MSS-E32R15-GX24-3 A70-100	GX24-3..
■	3.76	5.00		100	150		MSS-E32R15-GX24-3 A100-150	GX24-3..
■	3.76	5.00		150	300		MSS-E32R15-GX24-3 A150-300	GX24-3..
■	5.01	6.50		70	100		MSS-E32R15-GX24-4 A70-100	GX24-4..
■	5.01	6.50		100	150		MSS-E32R15-GX24-4 A100-150	GX24-4..
■	5.01	6.50		150	300		MSS-E32R15-GX24-4 A150-300	GX24-4..
■	5.01	6.50		300	900		MSS-E32R15-GX24-4 A300-900	GX24-4..
●	3.76	5.00		70	100	L	MSS-E32L15-GX24-3 A70-100	GX24-3..
●	3.76	5.00		100	150		MSS-E32L15-GX24-3 A100-150	GX24-3..
●	3.76	5.00		150	300		MSS-E32L15-GX24-3 A150-300	GX24-3..
●	5.01	6.50		70	100		MSS-E32L15-GX24-4 A70-100	GX24-4..
●	5.01	6.50		100	150		MSS-E32L15-GX24-4 A100-150	GX24-4..
●	5.01	6.50		150	300		MSS-E32L15-GX24-4 A150-300	GX24-4..
●	5.01	6.50		300	900		MSS-E32L15-GX24-4 A300-900	GX24-4..

AX – 0°



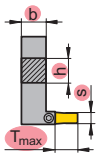


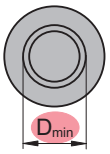


C216
C184

b [mm]	h [mm]	s [mm]	D_{min} [mm]	T_{max} [mm]		L R	Type, description	
16	16	3.0	10	5		R	E16R0005-1616L-AX05	AX05..
			20	10			E16R0010-1616L-AX10	AX10..
			10	5		L	E16L0005-1616L-AX05	AX05..
			20	10			E16L0010-1616L-AX10	AX10..
20	20		10	5		R	E20R0005-2020L-AX05	AX05..
			20	10			E20R0010-2020L-AX10	AX10..
			30	15			E20R0015-2020L-AX15	AX15..
			10	5		L	E20L0005-2020L-AX05	AX05..
			20	10			E20L0010-2020L-AX10	AX10..
			30	15			E20L0015-2020L-AX15	AX15..
25	25		10	5		R	E25R0005-2525N-AX05	AX05..
			20	10			E25R0010-2525N-AX10	AX10..
			30	15			E25R0015-2525N-AX15	AX15..
			10	5		L	E25L0005-2525N-AX05	AX05..
			20	10			E25L0010-2525N-AX10	AX10..
			30	15			E25L0015-2525N-AX15	AX15..

AX – 90°







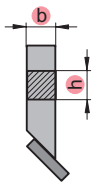
C217
C184

b [mm]	h [mm]	s [mm]	D_{min} [mm]	T_{max} [mm]		L R	Type, description	
16	16	3.0	10	5		R	E16R9005-1616J-AX05	AX05..
			20	10			E16R9010-1616J-AX10	AX10..
			10	5		L	E16L9005-1616J-AX05	AX05..
			20	10			E16L9010-1616J-AX10	AX10..
20	20		10	5		R	E20R9005-2020J-AX05	AX05..
			20	10			E20R9010-2020J-AX10	AX10..
			30	15			E20R9015-2020J-AX15	AX15..
			10	5		L	E20L9005-2020J-AX05	AX05..
			20	10			E20L9010-2020J-AX10	AX10..
			30	15			E20L9015-2020J-AX15	AX15..
25	25		10	5		R	E25R9005-2525L-AX05	AX05..
			20	10			E25R9010-2525J-AX10	AX10..
			30	15			E25R9015-2525L-AX15	AX15..
			10	5		L	E25L9005-2525L-AX05	AX05..
			20	10			E25L9010-2525J-AX10	AX10..
			30	15			E25L9015-2525L-AX15	AX15..


CERATIZIT
hard material matters
MSS-E25R03
-GX16-2
1023251513/27

External recessing

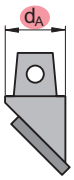
Overview – modular structure



Shanks 45°

h / b
20/20 - 25/25

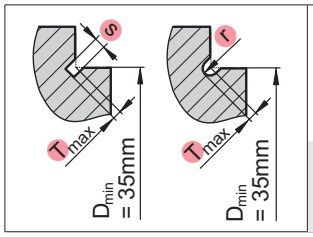




UTS 45°

d_A = 40

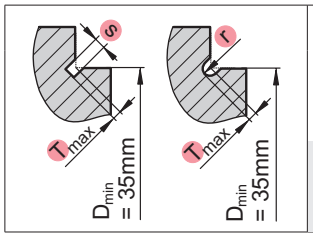




GX16

s = 1,0 - 6,0
r = 0,8 - 3,0
T_{max} = 1,14 - 3,0





GX16

s = 1,0 - 6,0
r = 0,8 - 3,0
T_{max} = 1,14 - 3,0

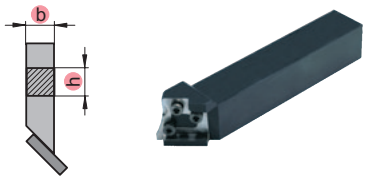


External recessing

Shanks – GX16

BGR E20

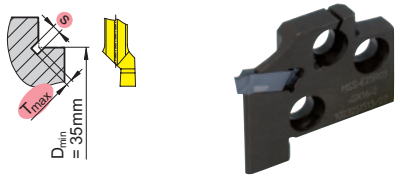
45°



C198

b [mm]	h [mm]		Type, description	
20	20	R	MSS-E20R45-2020J	●
		L	MSS-E20L45-2020J	■

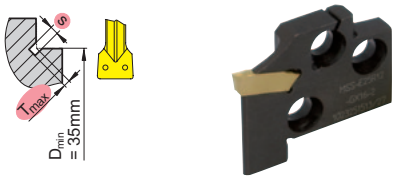
GX16



C204
C182

	s [mm]	T max [mm]	L R	Type, description	
■	1.00	1.14	R	MSS-E20R03-GX16-2	GX16-2.. R/L
■	1.20	1.34		MSS-E20R03-GX16-2	GX16-2.. R/L
■	1.40	1.53		MSS-E20R03-GX16-2	GX16-2.. R/L
■	1.70	1.82		MSS-E20R03-GX16-2	GX16-2.. R/L
■	1.95	2.07		MSS-E20R03-GX16-2	GX16-2.. R/L
■	2.25	2.36		MSS-E20R03-GX16-2	GX16-2.. R/L
●	1.00	1.14	L	MSS-E20L03-GX16-2	GX16-2.. R/L
●	1.20	1.34		MSS-E20L03-GX16-2	GX16-2.. R/L
●	1.40	1.53		MSS-E20L03-GX16-2	GX16-2.. R/L
●	1.70	1.82		MSS-E20L03-GX16-2	GX16-2.. R/L
●	1.95	2.07		MSS-E20L03-GX16-2	GX16-2.. R/L
●	2.25	2.36		MSS-E20L03-GX16-2	GX16-2.. R/L

GX16

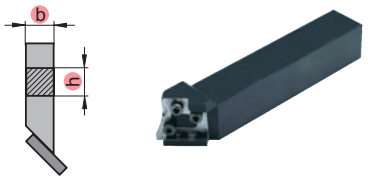


C201
C182

	s [mm]	T max [mm]	L R	Type, description	
■	3.00	3	L	MSS-E20L03-GX16-2	GX16-2..
■	3.25			MSS-E20L03-GX16-2	GX16-2..
■	3.50			MSS-E20L03-GX16-2	GX16-2..
■	4.00			MSS-E20L03-GX16-2	GX16-2..
■	4.25			MSS-E20L03-GX16-2	GX16-2..
■	4.50			MSS-E20L03-GX16-2	GX16-2..
■	5.00			MSS-E20L03-GX16-2	GX16-2..
●	3.00		R	MSS-E20R03-GX16-2	GX16-2..
●	3.25			MSS-E20R03-GX16-2	GX16-2..
●	3.50			MSS-E20R03-GX16-2	GX16-2..
●	4.00			MSS-E20R03-GX16-2	GX16-2..
●	4.25			MSS-E20R03-GX16-2	GX16-2..
●	4.50			MSS-E20R03-GX16-2	GX16-2..
●	5.00			MSS-E20R03-GX16-2	GX16-2..

BGR E20

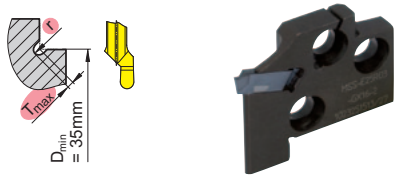
45°



C198

b [mm]	h [mm]		Type, description	
20	20	R	MSS-E20R45-2020J	●
		L	MSS-E20L45-2020J	■

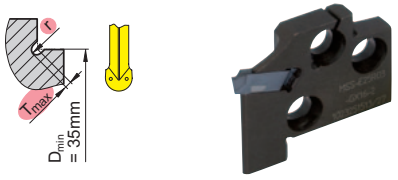
GX16



C204
C183

	r [mm]	T_{max} [mm]	L R	Type, description	
■	0.80	1.78	R	MSS-E20R03-GX16-2	GX16-2.. R/L
■	1.00	2.18		MSS-E20R03-GX16-2	GX16-2.. R/L
■	1.20	2.58		MSS-E20R03-GX16-2	GX16-2.. R/L
●	0.80	1.78	L	MSS-E20L03-GX16-2	GX16-2.. R/L
●	1.00	2.18		MSS-E20L03-GX16-2	GX16-2.. R/L
●	1.20	2.58		MSS-E20L03-GX16-2	GX16-2.. R/L

GX16



C201
C183

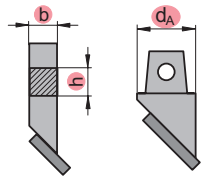
	r [mm]	T_{max} [mm]	L R	Type, description	
■	1.50	12.00	R	MSS-E20R03-GX16-2	GX16-2..
■	2.00	12.00		MSS-E20R03-GX16-2	GX16-2..
■	2.50	12.00		MSS-E20R03-GX16-2	GX16-2..
●	1.50	12.00	L	MSS-E20L03-GX16-2	GX16-2..
●	2.00	12.00		MSS-E20L03-GX16-2	GX16-2..
●	2.50	12.00		MSS-E20L03-GX16-2	GX16-2..

External recessing

Shanks – UTS – GX16

BGR E25

45°



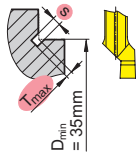




C198 C248

b [mm]	h [mm]	d_A [mm]		Type, description	
25	25		R	MSS-E25R45-2525L	●
25	25		L	MSS-E25L45-2525L	■
		40		UT40-MSS-E25L45	■

GX16

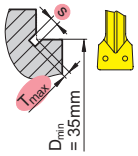




C204 C182

	s [mm]	T_{max} [mm]	L R	Type, description	
■	1.00	1.14	R	MSS-E25R03-GX16-2	GX16-2.. R/L
■	1.20	1.34		MSS-E25R03-GX16-2	GX16-2.. R/L
■	1.40	1.53		MSS-E25R03-GX16-2	GX16-2.. R/L
■	1.70	1.82		MSS-E25R03-GX16-2	GX16-2.. R/L
■	1.95	2.07		MSS-E25R03-GX16-2	GX16-2.. R/L
■	2.25	2.36		MSS-E25R03-GX16-2	GX16-2.. R/L
●	1.00	1.14	L	MSS-E25L03-GX16-2	GX16-2.. R/L
●	1.20	1.34		MSS-E25L03-GX16-2	GX16-2.. R/L
●	1.40	1.53		MSS-E25L03-GX16-2	GX16-2.. R/L
●	1.70	1.82		MSS-E25L03-GX16-2	GX16-2.. R/L
●	1.95	2.07		MSS-E25L03-GX16-2	GX16-2.. R/L
●	2.25	2.36		MSS-E25L03-GX16-2	GX16-2.. R/L

GX16



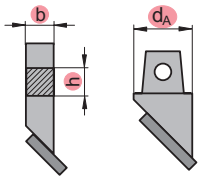


C201 C182

	s [mm]	T_{max} [mm]	L R	Type, description	
■	3.00	3	R	MSS-E25R03-GX16-2	GX16-2..
■	3.25			MSS-E25R03-GX16-2	GX16-2..
■	3.50			MSS-E25R03-GX16-2	GX16-2..
■	4.00			MSS-E25R03-GX16-2	GX16-2..
■	4.25			MSS-E25R03-GX16-2	GX16-2..
■	4.50			MSS-E25R03-GX16-2	GX16-2..
■	5.00			MSS-E25R03-GX16-2	GX16-2..
■	5.25			MSS-E25R03-GX16-2	GX16-2..
■	6.00			MSS-E25R03-GX16-2	GX16-2..
●	3.00		L	MSS-E25L03-GX16-2	GX16-2..
●	3.25			MSS-E25L03-GX16-2	GX16-2..
●	3.50			MSS-E25L03-GX16-2	GX16-2..
●	4.00			MSS-E25L03-GX16-2	GX16-2..
●	4.25			MSS-E25L03-GX16-2	GX16-2..
●	4.50			MSS-E25L03-GX16-2	GX16-2..
●	5.00			MSS-E25L03-GX16-2	GX16-2..
●	5.25			MSS-E25L03-GX16-2	GX16-2..
●	6.00			MSS-E25L03-GX16-2	GX16-2..

BGR E25

45°



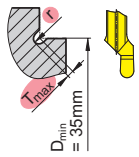




C198 C248

b [mm]	h [mm]	d_A [mm]		Type, description	
25	25		R	MSS-E25R45-2525L	●
25	25		L	MSS-E25L45-2525L	■
		40		UT40-MSS-E25L45	■

GX16

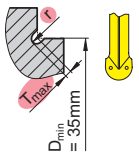




C204 C183

	r [mm]	T_{max} [mm]	L R	Type, description	
■	0.80	1.78	R	MSS-E25R03-GX16-2	GX16-2.. R/L
■	1.00	2.18		MSS-E25R03-GX16-2	GX16-2.. R/L
■	1.20	2.58		MSS-E25R03-GX16-2	GX16-2.. R/L
●	0.80	1.78	L	MSS-E25L03-GX16-2	GX16-2.. R/L
●	1.00	2.18		MSS-E25L03-GX16-2	GX16-2.. R/L
●	1.20	2.58		MSS-E25L03-GX16-2	GX16-2.. R/L

GX16





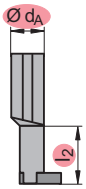
C201 C183

	r [mm]	T_{max} [mm]	L R	Type, description	
■	1.50	3	R	MSS-E25R03-GX16-2	GX16-2..
■	2.00			MSS-E25R03-GX16-2	GX16-2..
■	2.50			MSS-E25R03-GX16-2	GX16-2..
■	3.00			MSS-E25R03-GX16-2	GX16-2..
●	1.50		L	MSS-E25L03-GX16-2	GX16-2..
●	2.00			MSS-E25L03-GX16-2	GX16-2..
●	2.50			MSS-E25L03-GX16-2	GX16-2..
●	3.00			MSS-E25L03-GX16-2	GX16-2..

Grooving and turning – internal

Overview – modular structure

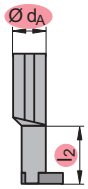
Boring bars 1.5D



d_A = 20 - 40
l_2 = 24 - 60



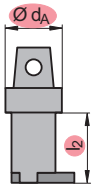
Boring bars 2.5D



d_A = 20 - 50
l_2 = 40 - 100



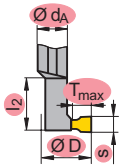
UTS boring bars



d_A = 40 - 63
l_2 = 64 - 80



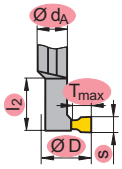
GX09 monobloc boring bars



D = 16,0
l_2 = 30
d_A = 16
s = 2,0 - 3,75
T_{max} = 3,0



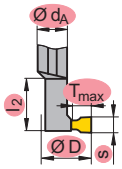
GX16 monobloc boring bars



D = 20,5 - 42
l_2 = 32 - 64
d_A = 16 - 32
s = 2,0 - 5,0
T_{max} = 5,5 - 11

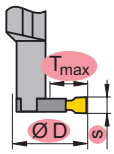


GX24 monobloc boring bars



D = 42 - 57
l_2 = 64 - 80
d_A = 32 - 40
s = 2,76 - 6,5
T_{max} = 11 - 17,5





GX09

D = 20 - 32
s = 2,0 - 3,75
T_{max} = 4 - 6



GX16

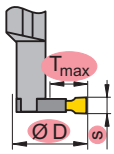
D = 40 - 50
s = 2,0 - 6,5
T_{max} = 9 - 10



GX24

D = 60
s = 3,0 - 6,0
T_{max} = 19





GX09

D = 20 - 32
s = 2,0 - 3,75
T_{max} = 4 - 6



GX16

D = 40 - 50
s = 2,0 - 6,5
T_{max} = 9 - 10



GX24

D = 60
s = 3,0 - 6,0
T_{max} = 19



BGR I16

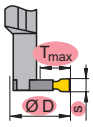
GX09



C231-C232

l_2 [mm]	d_A [mm]		Type, description	
24	20	R	MSS-I16R90-1.5D-N	●
40	20		MSS-I16R90-2.5D-N	●
24	20	L	MSS-I16L90-1.5D-N	■
40	20		MSS-I16L90-2.5D-N	■

GX09



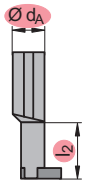


C233
C180

	D_{min} [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■	20	2.00	2.75	4	R	MSS-I16R04-GX09-1	GX09-1..
■		2.76	3.75			MSS-I16R04-GX09-2	GX09-2..
●		2.00	2.75		L	MSS-I16L04-GX09-1	GX09-1..
●		2.76	3.75			MSS-I16L04-GX09-2	GX09-2..

BGR I20

GX09

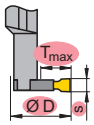




C231-C232

l_2 [mm]	d_A [mm]		Type, description	
30	20	R	MSS-I20R90-1.5D-N	●
50	25		MSS-I20R90-2.5D-N	●
30	20	L	MSS-I20L90-1.5D-N	■
50	25		MSS-I20L90-2.5D-N	■

GX09





C233
C180

	D_{min} [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■	25	2.00	2.75	5	R	MSS-I20R05-GX09-1	GX09-1..
■		2.76	3.75			MSS-I20R05-GX09-2	GX09-2..
●		2.00	2.75		L	MSS-I20L05-GX09-1	GX09-1..
●		2.76	3.75			MSS-I20L05-GX09-2	GX09-2..

BGR I25

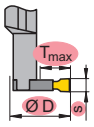
GX09



C231-C232

l_2 [mm]	d_A [mm]		Type, description	
38	25	R	MSS-I25R90-1.5D-N	●
63	32		MSS-I25R90-2.5D-N	●
38	25	L	MSS-I25L90-1.5D-N	■
63	32		MSS-I25L90-2.5D-N	■

GX09





C233
C180

	D_{min} [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■	32	2.00	2.75	6	R	MSS-I25R06-GX09-1	GX09-1..
■		2.76	3.75			MSS-I25R06-GX09-2	GX09-2..
●		2.00	2.75		L	MSS-I25L06-GX09-1	GX09-1..
●		2.76	3.75			MSS-I25L06-GX09-2	GX09-2..

BGR I32

GX16 – right-hand



C231-C232 C249

l_2 [mm]	d_A [mm]		Type, description	
48	32	R	MSS-I32R90-1.5D-N	●
80	40		MSS-I32R90-2.5D-N	●
64	40		UT40-MSS-I32R90-2D	●

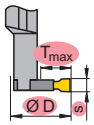
GX16 – left-hand



C231-C232 C249

l_2 [mm]	d_A [mm]		Type, description	
48	32	L	MSS-I32L90-1.5D-N	■
80	40		MSS-I32L90-2.5D-N	■
64	50		UT50-MSS-I32L90-2D	■

GX16





C234
C180-C181

	D_{min} [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■	40	2.00	2.75	9	R	MSS-I32R09-GX16-1	GX16-1..
■		2.76	3.75			MSS-I32R09-GX16-2	GX16-2..
■		3.76	5.00			MSS-I32R09-GX16-3	GX16-3..
■		5.01	6.50			MSS-I32R09-GX16-4	GX16-4..
●		2.00	2.75		L	MSS-I32L09-GX16-1	GX16-1..
●		2.76	3.75			MSS-I32L09-GX16-2	GX16-2..
●		3.76	5.00			MSS-I32L09-GX16-3	GX16-3..
●		5.01	6.50			MSS-I32L09-GX16-4	GX16-4..

BGR I40

GX – right-hand



C231-C232 C249

l_2 [mm]	d_A [mm]		Type, description	
60	40	R	MSS-I40R90-1.5D-N	●
100	50		MSS-I40R90-2.5D-N	●
80	40		UT40-MSS-I40R90-2D	●
80	63		UT63-MSS-I40R90-2D	●

GX – left-hand



C231-C232 C249

l_2 [mm]	d_A [mm]		Type, description	
60	40	L	MSS-I40L90-1.5D-N	■
100	50		MSS-I40L90-2.5D-N	■
80	40		UT40-MSS-I40L90-2D	■

GX16



C234
C180-C181

	D_{min} [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L R	Type, description	
■	50	2.00	2.75	10	R	MSS-I40R10-GX16-1	GX16-1..
■		2.76	3.75			MSS-I40R10-GX16-2	GX16-2..
■		3.76	5.00			MSS-I40R10-GX16-3	GX16-3..
■		5.01	6.50			MSS-I40R10-GX16-4	GX16-4..
●		2.00	2.75		L	MSS-I40L10-GX16-1	GX16-1..
●		2.76	3.75			MSS-I40L10-GX16-2	GX16-2..
●		3.76	5.00			MSS-I40L10-GX16-3	GX16-3..
●		5.01	6.50			MSS-I40L10-GX16-4	GX16-4..

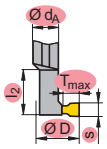
GX24



C234
C180-C181

	D_{min} [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	L/N/R	Type, description	
■ ●	60	2.76	3.75	19	N	MSS-I40N19-GX24-2	GX24-2..
■ ●		3.76	5.00			MSS-I40N19-GX24-3	GX24-3..
■ ●		5.01	6.50			MSS-I40N19-GX24-4	GX24-4..

GX09 monobloc boring bars

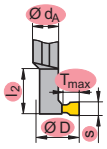




C237 C180

d_A [mm]	l_2 [mm]	D [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]		L R	Type, description	
16	30	16	0.60	3.75	3		R	I12R90-2.5D-GX09	GX09..
							L	I12L90-2.5D-GX09	GX09..

GX16 monobloc boring bars

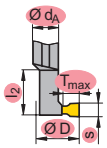




C238 C180-C181

d_A [mm]	l_2 [mm]	D [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]		L R	Type, description	
16	32	20.5	2.00	2.75	5.5		R	I16R90-2.0D-GX16-1	GX16-1..
16	32	20.5	0.60	3.75	5.5			I16R90-2.0D-GX16-2	GX16-2..
20	40	25.0	0.60	3.75	5.5			I20R90-2.0D-GX16-2	GX16-2..
25	50	32.0	0.60	3.75	8.0			I25R90-2.0D-GX16-2	GX16-2..
25	50	32.0	3.76	5.00	10.0			I25R90-2.0D-GX16-3	GX16-3..
32	64	42.0	0.60	3.75	11.0			I32R90-2.0D-GX16-2	GX16-2..
32	64	42.0	3.76	5.00	11.0			I32R90-2.0D-GX16-3	GX16-3..
16	32	20.5	2.00	2.75	5.5		L	I16L90-2.0D-GX16-1	GX16-1..
16	32	20.5	0.60	3.75	5.5			I16L90-2.0D-GX16-2	GX16-2..
20	40	25.0	0.60	3.75	5.5			I20L90-2.0D-GX16-2	GX16-2..
25	50	32.0	0.60	3.75	8.0			I25L90-2.0D-GX16-2	GX16-2..
25	50	32.0	3.76	5.00	10.0			I25L90-2.0D-GX16-3	GX16-3..
32	64	42.0	0.60	3.75	11.0			I32L90-2.0D-GX16-2	GX16-2..
32	64	42.0	3.76	5.00	11.0			I32L90-2.0D-GX16-3	GX16-3..

GX24 monobloc boring bars





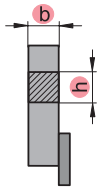
C239 C180-C181

d_A [mm]	l_2 [mm]	D [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]		L R	Type, description	
32	64	42	2.76	3.75	11.0		R	I32R90-2.0D-GX24-2	GX24-2..
32	64	42	3.76	5.00	11.0			I32R90-2.0D-GX24-3	GX24-3..
32	64	47	5.01	6.50	17.5			I32R90-2.0D-GX24-4	GX24-4..
40	80	53	3.76	5.00	12.0			I40R90-2.0D-GX24-3	GX24-3..
40	80	57	5.01	6.50	17.5			I40R90-2.0D-GX24-4	GX24-4..
32	64	42	2.76	3.75	11.0		L	I32L90-2.0D-GX24-2	GX24-2..
32	64	42	3.76	5.00	11.0			I32L90-2.0D-GX24-3	GX24-3..
32	64	47	5.01	6.50	17.5			I32L90-2.0D-GX24-4	GX24-4..
40	80	53	3.76	5.00	12.0			I40L90-2.0D-GX24-3	GX24-3..
40	80	57	5.01	6.50	17.5			I40L90-2.0D-GX24-4	GX24-4..

Thread turning

Overview – modular structure

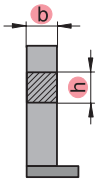
Shanks 0°



h / b
16/20 - 25/25



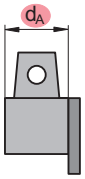
Shanks 90°



h / b
20/20 - 25/25



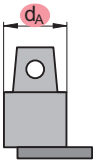
UTS 0°



d_A = 40 - 63



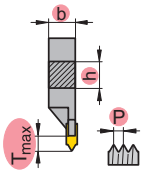
UTS 90°



d_A = 40 - 50



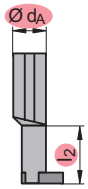
Monobloc tool holders 0°



h / b
12/12
P = .5 - 3.0
P = 48 - 8 TPI
T_{max} = 10



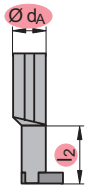
Boring bars 1.5D



d_A = 32
l_2 = 48



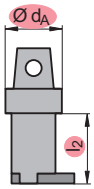
Boring bars 2.5D



d_A = 40
l_2 = 80



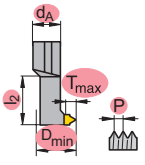
UTS boring bars



d_A = 40 - 50
l_2 = 64



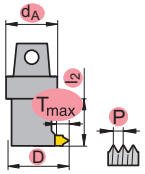
Monobloc boring bars



d_A = 20 - 32
l_2 = 32 - 50
D = 20 - 32
T_{max} = 4,0 - 6,0
P = .5 - 5.0mm
P = 48 - 5 TPI

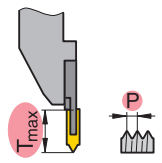


UTS monobloc boring bars



d_A = 40
l_2 = 32 - 50
D = 20 - 32
T_{max} = 4.0 - 6.0
P = .5 - 5.0mm
P = 48 - 5 TPI

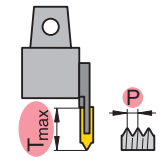




TC16

P = .5 - 5.0mm
P = 48 - 5 TPI
T_{max} = 8.0 - 12

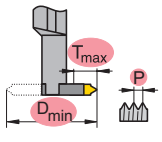




TC16

P = .5 - 5.0mm
P = 48 - 5 TPI
T_{max} = 8.0 - 12

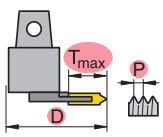




TC16

D = 40
P = .5 - 5.0mm
P = 48 - 5 TPI
T_{max} = 7.0





TC16

D = 40
P = .5 - 5.0mm
P = 48 - 5 TPI
T_{max} = 7.0



Thread turning – external

Shanks – TC

BGR E20

0°



C196

b [mm]	h [mm]		Type, description	
20	16	R	MSS-E20R00-1620G	■
	20		MSS-E20R00-2020J	■
	16	L	MSS-E20L00-1620G	●
	20		MSS-E20L00-2020J	●

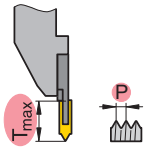
90°



C197

b [mm]	h [mm]		Type, description	
20	20	R	MSS-E20R90-2020J	●
		L	MSS-E20L90-2020J	■

TC16





C240

C190-C193

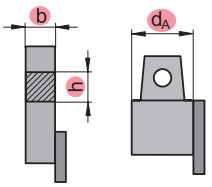
	P_{min} [mm]	P_{max} [mm]	P_{min} [TPI]	P_{max} [TPI]	T_{max} [mm]	L/N/R	Type, description	
■	0.50	1.50	48	16	8	R	MSS-E20R-TC16-1	TC16-1..
■ ●	1.75	3.00	14	8	12	N	MSS-E20N-TC16-2	TC16-2..
●	0.50	1.50	48	16	8	L	MSS-E20L-TC16-1	TC16-1..

Thread turning

C278-C282

BGR E25

0°



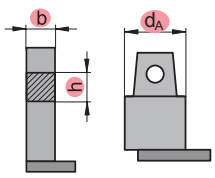




C196 C246

b [mm]	h [mm]	d_A [mm]		Type, description	
25	25		R	MSS-E25R00-2525L	■
		40		UT40-MSS-E25R00	■
		50		UT50-MSS-E25R00	■
		63		UT63-MSS-E25R00	■
25	25		L	MSS-E25L00-2525L	●
		40		UT40-MSS-E25L00	●
		50		UT50-MSS-E25L00	●
		63		UT63-MSS-E25L00	●

90°



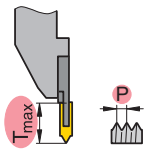




C197 C247

b [mm]	h [mm]	d_A [mm]		Type, description	
25	25		R	MSS-E25R90-2525L	●
		40		UT40-MSS-E25R90	●
		50		UT50-MSS-E25R90	●
25	25		L	MSS-E25L90-2525L	■
		40		UT40-MSS-E25L90	■
		50		UT50-MSS-E25L90	■

TC16



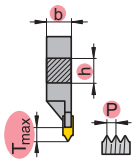


C240
C190-C193

	P_{min} [mm]	P_{max} [mm]	P_{min} [TPI]	P_{max} [TPI]	T_{max} [mm]	L/N/R	Type, description	
■	0.50	1.50	48	16	8	R	MSS-E25R-TC16-1	TC16-1..
■	1.75	3.00	14	8	10		MSS-E25R-TC16-2	TC16-2..
■ ●	3.50	5.00	7	5	12	N	MSS-E25N-TC16-3	TC16-3..
●	0.50	1.50	48	16	8	L	MSS-E25L-TC16-1	TC16-1..
●	1.75	3.00	14	8	10		MSS-E25L-TC16-2	TC16-2..

Thread turning
C278-C282

TC16





C241 C190-C193

h [mm]	b [mm]	T_{max} [mm]	P_{min} [mm]	P_{max} [mm]	P_{min} [TPI]	P_{max} [TPI]	L R	Type, description	
12	12	10	0.50	3.00	48	8	R	E12R00-1212-TC16	TC16-1/2..
							L	E12L00-1212-TC16	TC16-1/2..

Thread turning
C278-C282

BGR I32

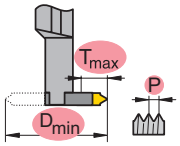
TC16



C231-C232 C249

l_2 [mm]	d_A [mm]		Type, description	
48	32	R	MSS-I32R90-1.5D-N	●
80	40		MSS-I32R90-2.5D-N	●
64	40		UT40-MSS-I32R90-2D	●
48	32	L	MSS-I32L90-1.5D-N	■
80	40		MSS-I32L90-2.5D-N	■
64	50		UT50-MSS-I32L90-2D	■

TC16



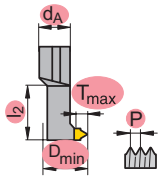


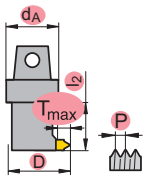
C242
C190-C193

	D_{min} [mm]	T_{max} [mm]	P_{min} [mm]	P_{max} [mm]	P_{min} [TPI]	P_{max} [TPI]	L/N/R	Type, description	
■	40	7	0.50	1.50	48	16	R	MSS-I32R-TC16-1	TC16-1..
■			1.75	3.00	14	8		MSS-I32R-TC16-2	TC16-2..
■ ●			3.50	5.00	7	5	N	MSS-I32N-TC16-3	TC16-3..
●			0.50	1.50	48	16	L	MSS-I32L-TC16-1	TC16-1..
●			1.75	3.00	14	8		MSS-I32L-TC16-2	TC16-2..

Thread turning
C278-C282

TC16









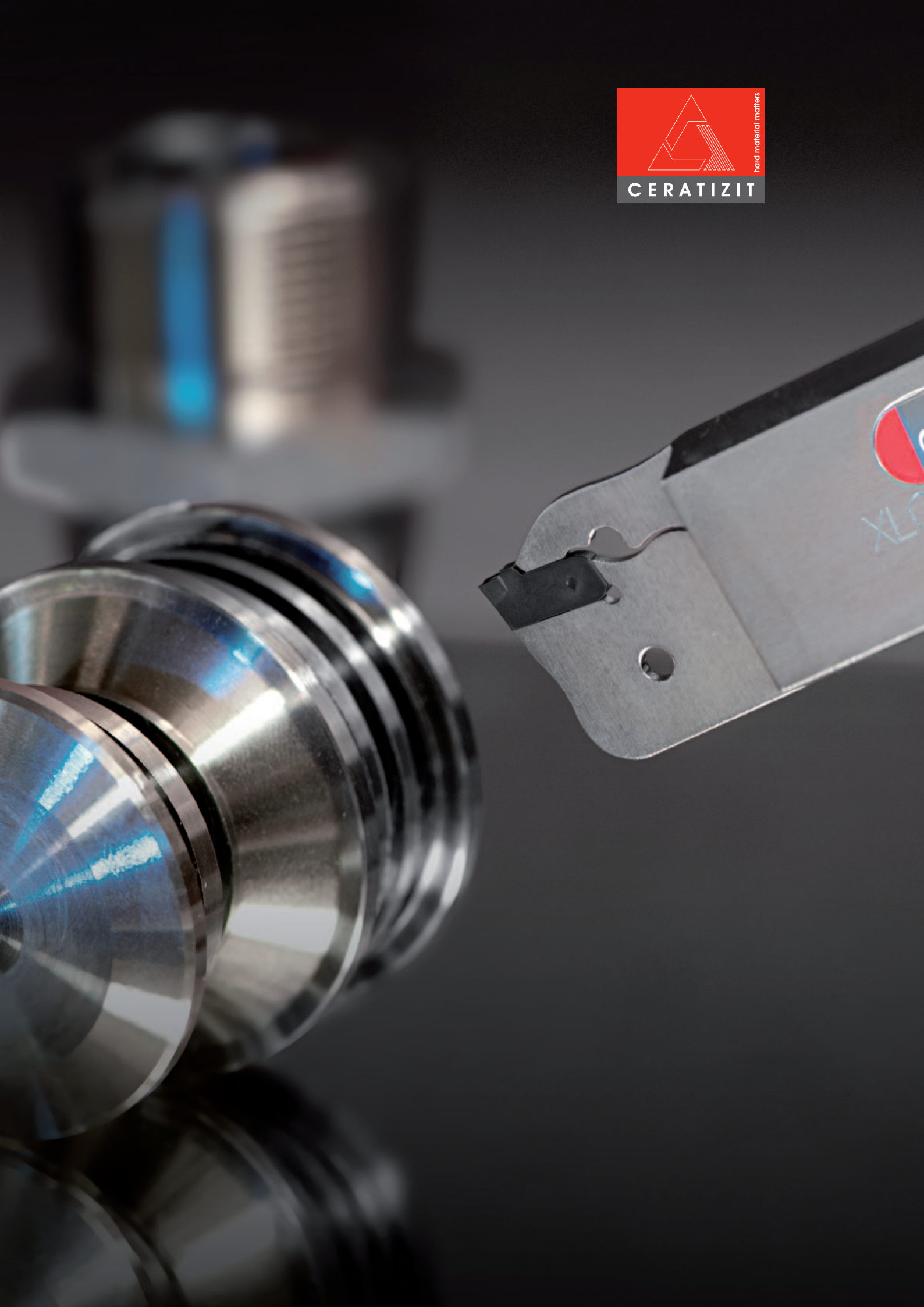
C243 C190-C193

C245 C190-C193

D_{min} [mm]	l_2 [mm]	d_A [mm]	T_{max} [mm]	P_{min} [mm]	P_{max} [mm]	P_{min} [TPI]	P_{max} [TPI]	L R	Type, description	
20	32	20	4	0.50	3.00	48	8	R	I16R90-2D-TC16	TC16-1/2..
	32	20	4	0.50	3.00	48	8	L	I16L90-2D-TC16	TC16-1/2..
25	40	25	5	0.50	5.00	48	5	R	I20R90-2D-TC16	TC16-..
	40	25	5	0.50	5.00	48	5	L	I20L90-2D-TC16	TC16-..
32	50	32	6	0.50	5.00	48	5	R	I25R90-2D-TC16	TC16-..
	50	32	6	0.50	5.00	48	5	L	I25L90-2D-TC16	TC16-..
20	32	40	4	0.50	3.50	48	8	R	UT40-MSS-I16R90-2D-TC16	TC16-1/2..
25	40	40	5	0.50	5.00	48	5	R	UT40-MSS-I20R90-2D-TC16	TC16-..
32	50	40	6	0.50	5.00	48	5	R	UT40-MSS-I25R90-2D-TC16	TC16-..
	50	40	6	0.50	5.00	48	5	L	UT40-MSS-I25L90-2D-TC16	TC16-..

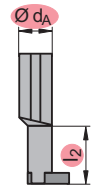
Thread turning

C278-C282


hard material matters
CERATIZIT

Thread milling

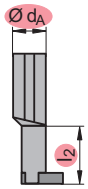
Overview – modular structure



Boring bars 1.5D

d_A = 32
l_2 = 48

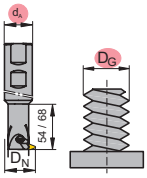




Boring bars 2.5D

d_A = 40
l_2 = 80

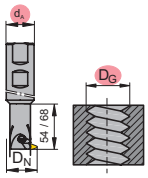




TC milling cutters

d_A = 25 - 32
DG = M16 - M80
DG = $R^5/_8$ - $R1^3/_4$

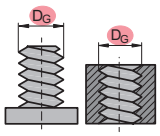




TC milling cutters

d_A = 25 - 32
DG = M27 - M80
DG = $R1^1/_4$ - $R2^1/_2$





TC16

DG = M82
- M300
DG = R2 3/4 - R6



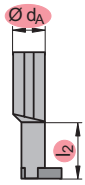
CERATIZIT hard material matters

Thread milling – internal

Boring bars – TC

BGR I32

90°

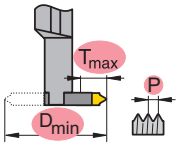




C231-C232

d_A [mm]	l_2 [mm]			Type, description	
32	48		R	MSS-I32R90-1.5D-N	■
40	80			MSS-I32R90-2.5D-N	■

TC16



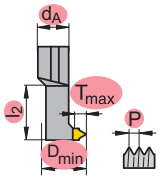


C242
C190-C193

	D_{min} [mm]	T_{max} [mm]	P_{min} [mm]	P_{max} [mm]	P_{min} [TPI]	P_{max} [TPI]	L/N/R	Type, description	
■	44	7	1.75	3.00	14	8	R	MSS-I32R-TC16-2	TC16-2..
■			3.50	5.00	7	5	N	MSS-I32N-TC16-3	TC16-3..
■	59		1.75	3.00	14	8	R	MSS-I32R-TC16-2	TC16-2..
■			3.50	5.00	7	5	N	MSS-I32N-TC16-3	TC16-3..

For further information on thread milling see

C283-C289





C244 C190-C193

D_N [mm]	l_2 [mm]	d_A [mm]	T_{max} [mm]	P_{min} [mm]	P_{max} [mm]	P_{min} [TPI]	P_{max} [TPI]	L R	Type, description	
25	54	25	3.0	0.50	5.00	28	5	R	I25R90-2D-TC16-W	TC16-..
32	68	32	3.5						I32R90-2D-TC16-W	TC16-..

For further information on thread milling see

C283-C289

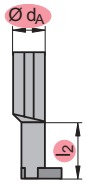
CERATIZIT hard material matters

Thread milling – external

Boring bars – TC

BGR E32

90°

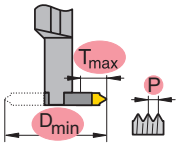




C231-C232

d_A [mm]	l_2 [mm]			Type, description	
32	48		R	MSS-I32R90-1.5D-N	■
40	80			MSS-I32R90-2.5D-N	■

TC16





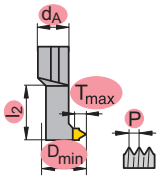
C242
C190-C193

	D_{min} [mm]	T_{max} [mm]	P_{min} [mm]	P_{max} [mm]	P_{min} [TPI]	P_{max} [TPI]	L/N/R	Type, description	
■	44	7	1.75	3.00	14	8	R	MSS-I32R-TC16-2	TC16-2..
■			3.50	5.00	7	5	N	MSS-I32N-TC16-3	TC16-3..
■	59		1.75	3.00	14	8	R	MSS-I32R-TC16-2	TC16-2..
■			3.50	5.00	7	5	N	MSS-I32N-TC16-3	TC16-3..

For further information on thread milling see

C283-C289

90°





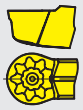
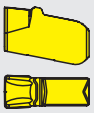
C244 C190-C193

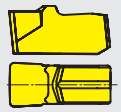
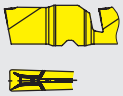
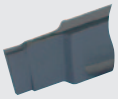
D_N [mm]	l_2 [mm]	d_A [mm]	T_{max} [mm]	P_{min} [mm]	P_{max} [mm]	P_{min} [TPI]	P_{max} [TPI]	L R	Type, description	
25	54	25	3.0	0.50	5.00	28	5	R	I25R90-2D-TC16-W	TC16-..
32	68	32	3.5						I32R90-2D-TC16-W	TC16-..

For further information on thread milling see

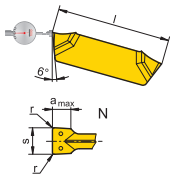
C283-C289

Overview

GX..E	GX..S	GX..R	AX	SX
				
s = 2,0 – 6,0	s = 0,6 – 5,25	s = 1,6 – 8,0	s = 3,0	s = 2,0 – 6,0
				
C180-C181	C182	C183	C184	C185

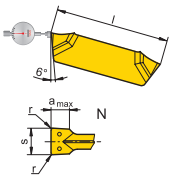
LX	FX	PX	MC	TC
				
s = 8,0 – 10,0	s = 2,2 – 9,7	s = 1,0 – 2,5	s = 1,0 – 1,5	**Partial profile 60°**
				
C186	C187	C188	C189	C190
				Partial profile 55°
				
				C191
				Full profile metr. 60°
				
				C192
				Full profile Whitw. 55°
				
				C193

			H216T	TSM20	CTW7120	S40T	CTC1325	SR127	GM127	CTP1340	CTCP335	CTPP345	CTD4110	LNR	s [mm]	l [mm]	r [mm]	a_{max} [mm]
			P			●	●	●	●	●	●	●						
			M		○	●	○	○	○	●	○	●						
			K	●			●	●		●	●							
			N	●	○	●				○			●					
			S		●	○				●		○						
			H															
-F2		GX09-1E2.00N0.20-F2					●			●				N	2.00	9.0	0.20	2.0
		GX09-1E2.50N0.20-F2					●			●				N	2.50	9.0	0.20	2.0
		GX09-2E3.00N0.30-F2					●			●				N	3.00	9.0	0.30	2.5
		GX16-1E2.00N0.20-F2					●			●				N	2.00	16.0	0.20	2.0
		GX16-2E3.00N0.30-F2					●			●				N	3.00	16.0	0.30	2.5
		GX16-3E4.00N0.40-F2					●			●				N	4.00	16.0	0.40	3.0
		GX16-3E5.00N0.40-F2					●			●				N	5.00	16.0	0.40	3.0
		GX24-2E3.00N0.30-F2					●			●		●		N	3.00	24.0	0.30	2.5
		GX24-2E3.50N0.30-F2						●				●		N	3.50	24.0	0.30	2.5
		GX24-3E4.00N0.40-F2					●	●		●		●		N	4.00	24.0	0.40	3.0
		GX24-3E5.00N0.40-F2					●	●		●		●		N	5.00	24.0	0.40	3.0
		GX24-4E6.00N0.50-F2					●	●		●		●		N	6.00	24.0	0.50	3.5
EN		GX09-1E2.00N0.20					●	●	●	●				N	2.00	9.0	0.20	1.5
		GX09-1E2.50N0.20					●	●	●	●				N	2.50	9.0	0.20	1.5
		GX09-2E3.00N0.30					●	●	●	●				N	3.00	9.0	0.30	2.0
		GX09-2E3.50N0.30					●	●	●					N	3.50	9.0	0.30	2.0
		GX16-1E2.00N0.20					●	●	●	●	●			N	2.00	16.0	0.20	2.0
		GX16-1E2.50N0.20					●	●	●	●	●			N	2.50	16.0	0.20	2.0
		GX16-2E3.00N0.30					●	●	●	●	●			N	3.00	16.0	0.30	2.5
		GX16-2E3.00N0.50					●	●						N	3.00	16.0	0.50	2.5
		GX16-2E3.50N0.30					●	●	●	●	●			N	3.50	16.0	0.30	2.5
		GX16-3E4.00N0.40					●	●	●	●	●			N	4.00	16.0	0.40	3.0
		GX16-3E4.00N0.60					●							N	4.00	16.0	0.60	3.0
		GX16-3E4.50N0.40					●	●						N	4.50	16.0	0.40	3.0
		GX16-3E5.00N0.40					●	●	●	●	●			N	5.00	16.0	0.40	3.0
		GX16-3E5.00N0.60					●	●						N	5.00	16.0	0.60	3.0
		GX16-4E6.00N0.50					●	●	●	●				N	6.00	16.0	0.50	3.5
		GX16-4E6.00N0.80					●	●						N	6.00	16.0	0.80	3.5
		GX24-2E3.00N0.30					●	●		●	●			N	3.00	24.0	0.30	2.5
		GX24-3E4.00N0.40					●	●		●	●			N	4.00	24.0	0.40	3.0
		GX24-3E5.00N0.40					●	●		●	●			N	5.00	24.0	0.40	3.0
		GX24-4E6.00N0.50					●	●		●	●			N	6.00	24.0	0.50	3.5
-M40		GX09-1E2.00N0.20-M40					●	●		●		●		N	2.00	9.0	0.20	1.5
		GX09-2E3.00N0.30-M40					●	●		●		●		N	3.00	9.0	0.30	2.0
		GX16-1E2.00N0.20-M40					●	●		●		●		N	2.00	16.0	0.20	2.0
		GX16-2E3.00N0.30-M40					●	●		●		●		N	3.00	16.0	0.30	3.0
		GX16-3E4.00N0.40-M40					●	●		●		●		N	4.00	16.0	0.40	3.5
		GX16-3E5.00N0.40-M40					●	●		●		●		N	5.00	16.0	0.40	3.5
		GX16-4E6.00N0.50-M40					●	●		●		●		N	6.00	16.0	0.50	4.0
		GX24-2E3.00N0.30-M40					●			●		●		N	3.00	24.0	0.30	3.5
		GX24-3E4.00N0.40-M40					●			●		●		N	4.00	24.0	0.40	4.0
		GX24-3E5.00N0.40-M40					●			●		●		N	5.00	24.0	0.40	4.0
		GX24-4E6.00N0.50-M40					●			●		●		N	6.00	24.0	0.50	4.0
			H216T	TSM20	CTW7120	S40T	CTC1325	SR127	GM127	CTP1340	CTCP335	CTPP345	CTD4110	LNR	s	l	r	a_{max}



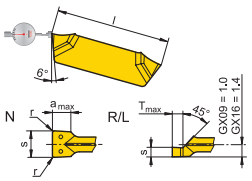
C53-C68 C70-C71 C268-C271 C255 GX C200-C202 GX-A C205-C207 GX C213-C215 GX C223 GX C233-C234 GX C237-C239

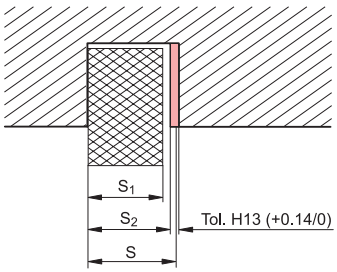
			H216T	TSM20	CTW7120	S40T	CTC1325	SR127	GM127	CTP1340	CTCP335	CTPP345	CTD4110	LNR	s [mm]	l [mm]	r [mm]	a_{max} [mm]
-M1		GX16-1E2.00N0.20-M1					●			●				N	2.00	16.0	0.20	2.0
		GX16-2E3.00N0.20-M1					●			●				N	3.00	16.0	0.20	2.5
		GX16-3E4.00N0.30-M1					●			●				N	4.00	16.0	0.30	3.0
		GX24-1E2.00N0.20-M1					●			●		●		N	2.00	24.0	0.20	2.5
		GX24-2E3.00N0.20-M1					●			●		●		N	3.00	24.0	0.20	2.5
		GX24-3E4.00N0.30-M1					●			●		●		N	4.00	24.0	0.30	3.0
-27P		GX16-1E2.00N0.20-27P	●											N	2.00	16.0	0.20	2.0
		GX16-2E3.00N0.30-27P	●											N	3.00	16.0	0.30	2.5
		GX16-3E4.00N0.40-27P	●											N	4.00	16.0	0.40	3.0
		GX16-4E6.00N0.50-27P	●											N	6.00	16.0	0.50	3.5
		GX24-2E3.00N0.30-27P	●											N	3.00	24.0	0.30	2.5
		GX24-3E4.00N0.40-27P	●											N	4.00	24.0	0.40	3.0
		GX24-3E5.00N0.40-27P	●											N	5.00	24.0	0.40	3.0
		GX24-4E6.00N0.50-27P	●											N	6.00	24.0	0.50	3.5
			H216T	TSM20	CTW7120	S40T	CTC1325	SR127	GM127	CTP1340	CTCP335	CTPP345	CTD4110	LNR	s	l	r	a_{max}



C53-C68 C70-C71 C268-C271 C255 GX C200-C202 GX-A C205-C207 GX C213-C215 GX C223 GX C233-C234 GX C237-C239

			H216T	TSM20	CTW7120	S40T	CTC1325	SR127	GM127	CTP1340	CTCP335	CTPP345	CTD4110	LNR	s [mm]	s_1 [mm]	s_2 [mm]	l [mm]	r [mm]	T_{max} [mm]	a_{max} [mm]
P					●	●	●	●	●	●	●										
M				○	●	○	○	○	●	○	●										
K			●			●	●		●	●											
N			●	○	●					○			●								
S				●	○					●		○									
H																					
ER-EL		GX09-1S0.60L						●		●				L	0.60	0.4	0.5	9.0		0.75	
		GX09-1S0.60R						●		●				R	0.60	0.4	0.5	9.0		0.75	
		GX09-1S0.80L						●		●				L	0.80	0.6	0.7	9.0		0.94	
		GX09-1S0.80R						●		●				R	0.80	0.6	0.7	9.0		0.94	
		GX09-1S0.90L						●		●				L	0.90	0.7	0.8	9.0		1.04	
		GX09-1S0.90R						●		●				R	0.90	0.7	0.8	9.0		1.04	
		GX09-1S1.00L						●		●				L	1.00	0.8	0.9	9.0		1.14	
		GX09-1S1.00R						●		●				R	1.00	0.8	0.9	9.0		1.14	
		GX09-1S1.20L						●		●				L	1.20	1.0	1.1	9.0		1.34	
		GX09-1S1.20R						●		●				R	1.20	1.0	1.1	9.0		1.34	
		GX09-1S1.40L						●		●				L	1.40	1.2	1.3	9.0		1.53	
		GX09-1S1.40R						●		●				R	1.40	1.2	1.3	9.0		1.53	
		GX09-1S1.70L						●		●				L	1.70	1.5	1.6	9.0		1.82	
		GX09-1S1.70R						●		●				R	1.70	1.5	1.6	9.0		1.82	
		GX16-2S0.60L						●		●				L	0.60	0.40	0.50	16.0		0.75	
		GX16-2S0.60R						●		●				R	0.60	0.40	0.50	16.0		0.75	
		GX16-2S0.80L						●		●				L	0.80	0.60	0.70	16.0		0.94	
		GX16-2S0.80R						●		●				R	0.80	0.60	0.70	16.0		0.94	
		GX16-2S0.90L						●		●				L	0.90	0.70	0.80	16.0		1.04	
		GX16-2S0.90R						●		●				R	0.90	0.70	0.80	16.0		1.04	
		GX16-2S1.00L						●		●				L	1.00	0.80	0.90	16.0		1.14	
		GX16-2S1.00R						●		●				R	1.00	0.80	0.90	16.0		1.14	
		GX16-2S1.20L						●		●				L	1.20	1.00	1.10	16.0		1.34	
		GX16-2S1.20R						●		●				R	1.20	1.00	1.10	16.0		1.34	
		GX16-2S1.40L						●		●				L	1.40	1.20	1.30	16.0		1.53	
		GX16-2S1.40R						●		●				R	1.40	1.20	1.30	16.0		1.53	
		GX16-2S1.70L						●		●				L	1.70	1.50	1.60	16.0		1.82	
		GX16-2S1.70R						●		●				R	1.70	1.50	1.60	16.0		1.82	
		GX16-2S1.95L						●		●				L	1.95	1.75	1.85	16.0		2.07	
		GX16-2S1.95R						●		●				R	1.95	1.75	1.85	16.0		2.07	
		GX16-2S2.25L						●		●				L	2.25	2.00	2.15	16.0		2.36	
		GX16-2S2.25R						●		●				R	2.25	2.00	2.15	16.0		2.36	
EN		GX09-1S1.95N						●		●				N	1.95	1.75	1.85	9.0	0.10	7.00	2.0
		GX09-1S2.25N						●		●				N	2.25	2.00	2.15	9.0	0.10	7.00	2.0
		GX09-2S2.75N						●		●				N	2.75	2.50	2.65	9.0	0.10	7.00	2.0
		GX09-2S3.25N						●		●				N	3.25	3.00	3.15	9.0	0.10	7.00	2.0
		GX16-2S2.75N						●		●				N	2.75	2.50	2.65	16.0	0.10	12.00	3.0
		GX16-2S3.25N						●		●				N	3.25	3.00	3.15	16.0	0.10	12.00	3.0
		GX16-3S4.25N						●		●				N	4.25	4.00	4.15	16.0	0.20	12.00	3.5
		GX16-4S5.25N						●		●				N	5.25	5.00	5.15	16.0	0.20	12.00	4.0
			H216T	TSM20	CTW7120	S40T	CTC1325	SR127	GM127	CTP1340	CTCP335	CTPP345	CTD4110	LNR	s [mm]	s_1 [mm]	s_2 [mm]	l [mm]	r [mm]	T_{max} [mm]	a_{max} [mm]





DIN 471 - 472: DIN standard for circlip grooves

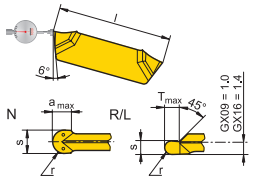
s: insert width

s_1: circlip width

s_2: standard groove width H13 (+0.14/0)

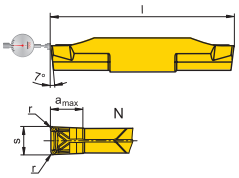
C53-C68 C70-C71 C268-C271 C255 C203-C204 C213-C214 C235-C236 C237-C238

			H216T	TSM20	CTW7120	S40T	CTC1325	SR127	GM127	CTP1340	CTCP335	CTPP345	CTD4110	LNR	s [mm]	l [mm]	r [mm]	T_{max} [mm]	a_{max} [mm]
ER-EL		GX09-1R0.80L					●	●						L	1.60	9.0	0.80	1.78	
		GX09-1R0.80R					●	●						R	1.60	9.0	0.80	1.78	
		GX16-2R0.80L					●	●						L	1.60	16.0	0.80	1.78	
		GX16-2R0.80R					●	●						R	1.60	16.0	0.80	1.78	
		GX16-2R1.00L					●	●						L	2.00	16.0	1.00	2.18	
		GX16-2R1.00R					●	●						R	2.00	16.0	1.00	2.18	
		GX16-2R1.20L					●	●						L	2.40	16.0	1.20	2.58	
		GX16-2R1.20R					●	●						R	2.40	16.0	1.20	2.58	
EN		GX09-1R1.00N					●	●	●					N	2.00	9.0	1.00	7.00	1.0
		GX09-1R1.20N					●	●	●					N	2.40	9.0	1.20	7.00	1.2
		GX16-2R1.50N					●	●	●	●				N	6.00	16.0	1.50	12.00	1.5
		GX16-3R2.00N					●	●	●	●				N	6.00	16.0	2.00	12.00	2.0
		GX16-3R2.50N					●	●	●	●				N	5.00	16.0	2.50	12.00	2.5
		GX16-4R3.00N					●	●	●	●				N	6.00	16.0	3.00	12.00	3.0
-M3		GX24-2R1.50N-M3					●	●			●			N	3.00	24.4	1.50	21.00	1.5
		GX24-3R2.00N-M3					●	●			●			N	4.00	24.4	2.00	21.00	2.5
		GX24-3R2.50N-M3					●	●			●			N	5.00	24.4	2.50	21.00	3.0
		GX24-4R3.00N-M3					●	●			●			N	6.00	24.4	3.00	21.00	4.0
-27P		GX16-2R1.50N-27P	●											N	3.00	16.0	1.50	12.00	1.5
		GX16-3R2.00N-27P	●											N	4.00	16.0	2.00	12.00	2.0
		GX16-3R2.50N-27P	●											N	5.00	16.0	2.50	12.00	2.5
		GX24-4R3.00N-27P		●										N	6.00	25.3	3.00	21.00	4.0
			H216T	TSM20	CTW7120	S40T	CTC1325	SR127	GM127	CTP1340	CTCP335	CTPP345	CTD4110	LNR	s	l	r	T_{max}	a_{max}

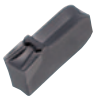
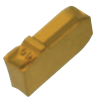


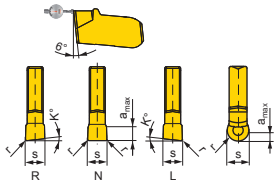
System AX

	H216T	TSM20	CTW7120	S40T	CTC1325	SR127	GM127	CTP1340	CTCP335	CTPP345	CTD4110	LNR	s [mm]	l [mm]	r [mm]	a_{max} [mm]
P				●	●	●	●	●	●	●						
M			O	●	O	O	O	●	O	●						
K	●				●	●		●	●							
N	●	O	●					O			●					
S		●	O					●		O						
H																
-F50	AX05-E3.00N0.30-10-F50							●				N	3.00	24.0	0.30	5.0
	AX10-E3.00N0.30-20-F50							●				N	3.00	34.0	0.30	10.0
	AX15-E3.00N0.30-30-F50							●				N	3.00	44.0	0.30	15.0



C53-C68 C70-C71 C268-C271 C255 AX C208 AX C216-C217

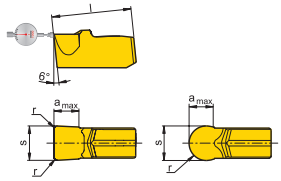
		H216T	TSM20	CTW7120	S40T	CTC1325	SR127	GM127	CTP1340	CTCP335	CTPP345	CTD4110	LNR	s [mm]	r [mm]	a_{max} [mm]	K [°]
P					●	●	●	●	●	●	●						
M				O	●	O	O	O	●	O	●						
K		●				●	●		●	●							
N		●	O	●					O			●					
S			●	O					●		O						
H																	
-F2																	
	SX E2.00N0.20-F2					●			●				N	2.00	0.20	1.5	
	SX E3.00N0.30-F2					●			●	●	●		N	3.00	0.30	2.0	
	SX E4.00N0.40-F2					●			●				N	4.00	0.40	2.5	
-M2																	
	SX E2.00N0.20-M2					●			●	●	●		N	2.00	0.20	1.5	
	SX E3.00N0.30-M2					●			●	●	●		N	3.00	0.30	2.0	
	SX E4.00N0.40-M2					●			●	●	●		N	4.00	0.40	2.5	
	SX E5.00N0.40-M2					●			●				N	5.00	0.40	2.7	
	SX E6.00N0.50-M2					●			●				N	6.00	0.50	3.0	
-M3																	
	SX R1.50N-M3								●	●			N	3.00	1.50	1.5	
	SX R2.00N-M3								●	●			N	4.00	2.00	2.0	
	SX R2.50N-M3								●	●			N	5.00	2.50	2.5	
	SX R3.00N-M3								●				N	6.00	3.00	3.0	
-M1																	
	SX E2.00L6-M1					●			●				L	2.00	0.20		6
	SX E2.00N0.20-M1					●			●		●		N	2.00	0.20		
	SX E2.00R6-M1					●			●				R	2.00	0.20		6
	SX E3.00L6-M1					●			●				L	3.00	0.20		6
	SX E3.00N0.20-M1					●			●	●	●		N	3.00	0.20		
	SX E3.00R6-M1					●			●				R	3.00	0.20		6
	SX E4.00L6-M1					●			●				L	4.00	0.30		6
	SX E4.00N0.30-M1					●			●	●	●		N	4.00	0.30		
	SX E4.00R6-M1					●			●				R	4.00	0.30		6
	SX E5.00N0.30-M1					●			●				N	5.00	0.30		
	SX E6.00N0.40-M1					●			●				N	6.00	0.40		
-27P																	
	SX E2.00N0.20-27P	●											N	2.00	0.20	2.0	
	SX E3.00N0.30-27P	●											N	3.00	0.30	2.5	
	SX E4.00N0.40-27P	●											N	4.00	0.40	3.0	
		H216T	TSM20	CTW7120	S40T	CTC1325	SR127	GM127	CTP1340	CTCP335	CTPP345	CTD4110	LNR	s	r	a_{max}	K



C53-C68 C70-C71 C268-C271 C255 SX C209 SX C218 SX C224-C226

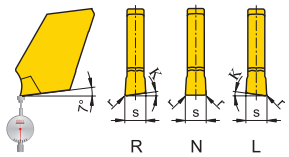
System LX

	H216T	TSM20	CTW7120	S40T	CTC1325	SR127	GM127	CTP1340	CTCP335	CTPP345	CTD4110	LNR	s [mm]	l [mm]	r [mm]	a_{max} [mm]
P				●	●	●	●	●	●	●						
M			O	●	O	O	O	●	O	●						
K	●				●	●		●	●							
N	●	O	●					O			●					
S		●	O					●		O						
H																
-M2		LX E10.00N0.80-M2				●	●			●			N	10.00	19.0	0.80	5.0
		LX E8.00N0.80-M2				●	●			●			N	8.00	19.0	0.80	5.0
-M3		LX R4.00N-M3				●	●			●			N	8.00	19.0	4.00	5.0



C53-C68 C70-C71 C268-C271 C255 C210 C227

			H216T	TSM20	CTW7120	S40T	CTC1325	SR127	GM127	CTP1340	CTCP335	CTPP345	CTD4110	LNR	s [mm]	r [mm]	K [°]
		P				●	●	●	●	●	●	●					
		M			○	●	○	○	○	●	○	●					
		K	●				●	●		●	●						
		N	●	○	●					○			●				
		S		●	○					●		○					
		H															
-F1		FX 2.2L5-F1								●		●		L	2.20	0.15	5
		FX 2.2N0.15-F1					●	●		●		●		N	2.20	0.15	
		FX 2.2R5-F1								●		●		R	2.20	0.15	5
		FX 3.1L5-F1								●		●		L	3.10	0.20	5
		FX 3.1L8-F1										●		L	3.10	0.20	8
		FX 3.1N0.20-F1					●	●		●		●		N	3.10	0.20	
		FX 3.1N0.40-F1					●	●		●		●		N	3.10	0.40	
		FX 3.1R5-F1								●		●		R	3.10	0.20	5
		FX 3.1R8-F1										●		R	3.10	0.20	8
		FX 4.1N0.20-F1					●	●		●		●		N	4.10	0.20	
		FX 4.1N0.50-F1						●				●		N	4.10	0.50	
-M1		FX 2.2L4-M1				●	●	●		●	●			L	2.20	0.10	4
		FX 2.2N0.10-M1				●	●	●		●	●	●		N	2.20	0.10	
		FX 2.2R4-M1				●	●	●		●	●			R	2.20	0.10	4
		FX 3.1L6-M1				●	●	●		●	●			L	3.10	0.15	6
		FX 3.1N0.15-M1				●	●	●		●	●	●		N	3.10	0.15	
		FX 3.1R6-M1				●	●	●		●	●			R	3.10	0.15	6
		FX 4.1L6-M1					●	●		●	●			L	4.10	0.20	6
		FX 4.1N0.20-M1				●	●	●		●	●	●		N	4.10	0.20	
		FX 4.1R6-M1					●	●		●	●			R	4.10	0.20	6
		FX 5.1L6-M1					●	●						L	5.10	0.25	6
		FX 5.1N0.25-M1				●	●	●		●	●	●		N	5.10	0.25	
		FX 5.1R6-M1										●		R	5.10	0.25	6
		FX 6.5L6-M1					●	●						L	6.50	0.30	6
		FX 6.5N0.30-M1					●	●		●	●			N	6.50	0.30	
		FX 8.2N0.40-M1				●	●	●		●	●			N	8.20	0.40	
		FX 9.7N0.40-M1					●	●		●	●			N	9.70	0.40	
-R2		FX 3.1N0.40-R2					●	●		●		●		N	3.10	0.40	
		FX 4.1N0.50-R2					●	●		●		●		N	4.10	0.50	
-27P		FX 2.2N0.10-27P	●											N	2.20	0.10	
		FX 3.1N0.15-27P	●											N	3.10	0.15	
		FX 4.1N0.15-27P	●											N	4.10	0.20	
			H216T	TSM20	CTW7120	S40T	CTC1325	SR127	GM127	CTP1340	CTCP335	CTPP345	CTD4110	LNR	s	r	K



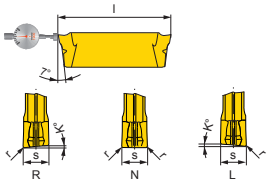
C53-C68 C70-C71 C268-C271 C255 FX C211-C212 FX C219 FX C228

	H216T	TSM20	CTW7120	S40T	CTC1325	SR127	GM127	CTP1340	CTCP335	CTPP345	CTD4110
P				●	●	●	●	●	●	●	
M			○	●	○	○	○	●	○	●	
K	●				●	●		●	●		
N	●	○	●					○			●
S		●	○					●		○	
H											

			LNR	s [mm]	l [mm]	r [mm]	K [°]
-F3		PX20-1E1.00L05-F3	L	1.00	20.0	0.08	5
		PX20-1E1.00N0.10-F3	N	1.00	20.0	0.10	
		PX20-1E1.00R05-F3	R	1.00	20.0	0.08	5
		PX20-2E1.50L05-F3	L	1.50	20.3	0.08	5
		PX20-2E1.50N0.10-F3	N	1.50	20.3	0.10	
		PX20-2E1.50R05-F3	R	1.50	20.3	0.08	5
		PX20-3E2.00L05-F3	L	2.00	20.3	0.08	5
		PX20-3E2.00N0.15-F3	N	2.00	20.3	0.15	
		PX20-3E2.00R05-F3	R	2.00	20.3	0.08	5

	H216T	TSM20	CTW7120	S40T	CTC1325	SR127	GM127	CTP1340	CTCP335	CTPP345	CTD4110

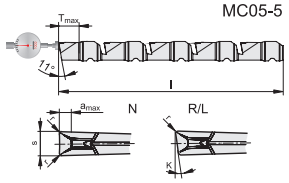
	LNR	s	l	r	K



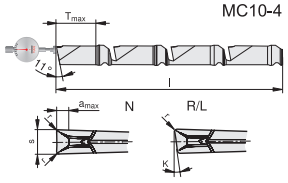
C53-C68 C70-C71 C268-C271 C255 PX C220

			H216T	TSM20	CTW7120	S40T	CTC1325	SR127	GM127	CTP1340	CTCP335	CTPP345	CTD4110	LNR	s [mm]	l [mm]	r [mm]	a_{max} [mm]	T_{max} [mm]	K [°]
P					●	●	●	●	●	●	●	●								
M					O	●	O	O	O	●	O	●								
K			●				●	●		●	●									
N			●	O	●					O			●							
S				●	O					●		O								
H																				
-F2		MC 05-5-1.00L07-F2								●				L	1.00	59.2	0.10		5.00	7
		MC 05-5-1.00N0.10-F2								●				N	1.00	59.2	0.10	0.5	5.00	
		MC 05-5-1.00R07-F2								●				R	1.00	59.2	0.10		5.00	7
		MC 05-5-1.50L07-F2								●				L	1.50	59.2	0.10		5.00	7
		MC 05-5-1.50N0.10-F2								●				N	1.50	59.2	0.10	0.7	5.00	
		MC 05-5-1.50R07-F2								●				R	1.50	59.2	0.10		5.00	7
		MC 10-4-1.50L07-F2								●				L	1.50	59.2	0.10		10.00	7
		MC 10-4-1.50N0.10-F2								●				N	1.50	59.2	0.10	1.0	10.00	
		MC 10-4-1.50R07-F2								●				R	1.50	59.2	0.10		10.00	7
		MC 10-4-2.00L07-F2								●				L	2.00	59.2	0.10		10.00	7
		MC 10-4-2.00N0.10-F2								●				N	2.00	59.2	0.10	1.2	10.00	
		MC 10-4-2.00R07-F2								●				R	2.00	59.2	0.10		10.00	7
		MC 10-4-2.50L07-F2								●				L	2.50	59.2	0.10		10.00	7
		MC 10-4-2.50N0.10-F2								●				N	2.50	59.2	0.10	1.5	10.00	
		MC 10-4-2.50R07-F2								●				R	2.50	59.2	0.10		10.00	7
-F3		MC 10-4-1.50L12-F3								●				L	1.50	59.2	0.10		10.00	12
		MC 10-4-1.50R12-F3								●				R	1.50	59.2	0.10		10.00	12
		MC 10-4-2.00L12-F3								●				L	2.00	59.2	0.10		10.00	12
		MC 10-4-2.00R12-F3								●				R	2.00	59.2	0.10		10.00	12
		MC 10-4-2.50L12-F3								●				L	2.50	59.2	0.10		10.00	12
		MC 10-4-2.50R12-F3								●				R	2.50	59.2	0.10		10.00	12
-27P		MC 10-4-1.50N0.10-27P			●									N	1.50	59.2	0.10	1.0	10.00	
		MC 10-4-2.00N0.10-27P			●									N	2.00	59.2	0.10	1.2	10.00	
		MC 10-4-2.50N0.10-27P			●									N	2.50	59.2	0.10	1.5	10.00	
			H216T	TSM20	CTW7120	S40T	CTC1325	SR127	GM127	CTP1340	CTCP335	CTPP345	CTD4110	LNR	s	l	r	a_{max}	T_{max}	K

MC05-5



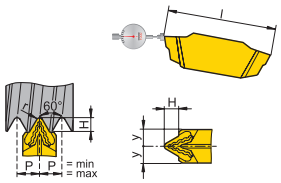
MC10-4



C53-C68 C70-C71 C268-C271 C255 C221-C222

System TC, partial profile 60°

			P	M	K	N	S	H	P_{min} [mm]	P_{max} [mm]	P_{min} [TPI]	P_{max} [TPI]	l [mm]	r [mm]	H [mm]	y [mm]
			H216T	GM213	GM240											
-27P		TC16-1 EI-A60-27P	●						0.50	1.50	16	48	16.0	0.05	1.28	1.05
		TC16-2 EI-AG60-27P	●						0.50	3.00	8	48	16.0	0.05	2.58	2.15
		TC16-2 EI-G60-27P	●						1.75	3.00	8	14	16.0	0.15	2.49	2.15
		TC16-3 EI-N60-27P	●						3.50	5.00	5	7	16.0	0.25	4.11	3.10
EN		TC16-1 EI-A60		●	●				0.50	1.50	16	48	16.0	0.05	1.28	1.05
		TC16-2 EI-AG60		●	●				0.50	3.00	8	48	16.0	0.05	2.58	2.15
		TC16-2 EI-G60		●	●				1.75	3.00	8	14	16.0	0.15	2.49	2.15
		TC16-3 EI-N60		●	●				3.50	5.00	5	7	16.0	0.25	4.11	3.10
			H216T	GM213	GM240				P_{min}	P_{max}	P_{min}	P_{max}	l	r	H	y



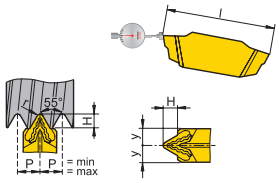
C164-C177 C280-C291 C255 TC C240 TC C241 TC C242 TC C243 TC-F C244 UTS-TC C245

	H216T	GM213	GM240
P		●	●
M		●	●
K	●	●	
N	●		
S			
H			

			P_{min} [mm]	P_{max} [mm]	P_{min} [TPI]	P_{max} [TPI]	l [mm]	r [mm]	H [mm]	y [mm]
EN		TC16-1 EI-A55	0.50	1.50	16	48	16.0	0.12	1.39	1.05
		TC16-2 EI-AG55	0.50	3.00	8	48	16.0	0.12	2.92	2.15
		TC16-2 EI-G55	1.75	3.00	8	14	16.0	0.23	2.78	2.15
		TC16-3 EI-N55	3.50	5.00	5	7	16.0	0.46	4.34	3.10

	H216T	GM213	GM240
P		●	●
M		●	●
K	●	●	
N	●		
S			
H			

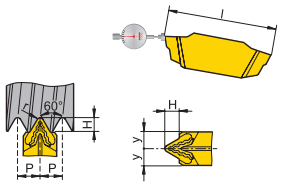
P_{min}	P_{max}	P_{min}	P_{max}	l	r	H	y
[mm]	[mm]	[TPI]	[TPI]	[mm]	[mm]	[mm]	[mm]



C164-C177 C280-C291 C255 TC C240 TC C241 TC C242 TC C243 TC-F C244 UTS-TC C245

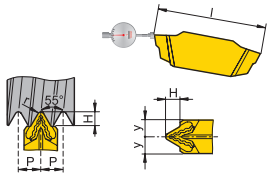
System TC, full profile 60°

			H216T	GM213	GM240	P_{min} [mm]	l [mm]	r [mm]	H [mm]	y [mm]
-27P		TC16-1 E 0,5 ISO-27P	●			0.50	16.0	0.05	0.33	1.05
		TC16-1 E 0,75 ISO-27P	●			0.75	16.0	0.08	0.49	1.05
		TC16-1 E 1,0 ISO-27P	●			1.00	16.0	0.12	0.64	1.05
		TC16-1 E 1,25 ISO-27P	●			1.25	16.0	0.15	0.80	1.05
		TC16-1 E 1,5 ISO-27P	●			1.50	16.0	0.18	0.96	1.05
		TC16-1 I 1,0 ISO-27P	●			1.00	16.0	0.05	0.60	1.05
		TC16-1 I 1,5 ISO-27P	●			1.50	16.0	0.08	0.89	1.05
		TC16-2 E 1,75 ISO-27P	●			1.75	16.0	0.22	1.11	2.15
		TC16-2 E 2,0 ISO-27P	●			2.00	16.0	0.25	1.27	2.15
		TC16-2 E 2,5 ISO-27P	●			2.50	16.0	0.31	1.58	2.15
		TC16-2 E 3,0 ISO-27P	●			3.00	16.0	0.38	1.90	2.15
		TC16-2 I 2,0 ISO-27P	●			2.00	16.0	0.12	1.18	2.15
		TC16-2 I 3,0 ISO-27P	●			3.00	16.0	0.19	1.76	2.15
EN		TC16-1 E 0,5 ISO		●	●	0.50	16.0	0.05	0.33	1.05
		TC16-1 E 0,75 ISO		●	●	0.75	16.0	0.08	0.49	1.05
		TC16-1 E 1,0 ISO		●	●	1.00	16.0	0.12	0.64	1.05
		TC16-1 E 1,25 ISO		●	●	1.25	16.0	0.15	0.80	1.05
		TC16-1 E 1,5 ISO		●	●	1.50	16.0	0.18	0.96	1.05
		TC16-1 I 0,5 ISO		●	●	0.50	16.0	0.02	0.30	1.05
		TC16-1 I 0,75 ISO		●	●	0.75	16.0	0.04	0.45	1.05
		TC16-1 I 1,0 ISO		●	●	1.00	16.0	0.05	0.60	1.05
		TC16-1 I 1,25 ISO		●	●	1.25	16.0	0.07	0.75	1.05
		TC16-1 I 1,5 ISO		●	●	1.50	16.0	0.08	0.89	1.05
		TC16-2 E 1,75 ISO		●	●	1.75	16.0	0.22	1.11	2.15
		TC16-2 E 2,0 ISO		●	●	2.00	16.0	0.25	1.27	2.15
		TC16-2 E 2,5 ISO		●	●	2.50	16.0	0.31	1.58	2.15
		TC16-2 E 3,0 ISO		●	●	3.00	16.0	0.38	1.90	2.15
		TC16-2 I 1,75 ISO		●	●	1.75	16.0	0.11	1.03	2.15
		TC16-2 I 2,0 ISO		●	●	2.00	16.0	0.12	1.18	2.15
		TC16-2 I 2,5 ISO		●	●	2.50	16.0	0.16	1.47	2.15
		TC16-2 I 3,0 ISO		●	●	3.00	16.0	0.19	1.76	2.15
		TC16-3 E 3,5 ISO		●	●	3.50	16.0	0.44	2.22	3.10
		TC16-3 E 4,0 ISO		●	●	4.00	16.0	0.50	2.53	3.10
		TC16-3 E 4,5 ISO		●	●	4.50	16.0	0.56	2.85	3.10
		TC16-3 E 5,0 ISO		●	●	5.00	16.0	0.63	3.16	3.10
		TC16-3 I 3,5 ISO		●	●	3.50	16.0	0.22	2.06	3.10
		TC16-3 I 4,0 ISO		●	●	4.00	16.0	0.25	2.35	3.10
		TC16-3 I 4,5 ISO		●	●	4.50	16.0	0.28	2.64	3.10
		TC16-3 I 5,0 ISO		●	●	5.00	16.0	0.31	2.94	3.10
			H216T	GM213	GM240	P_{min}	l	r	H	y



C164-C177 C280-C291 C255 TC C240 TC C241 TC C242 TC C243 TC-F C244 UTS-TC C245

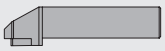
			H216T	GM213	GM240	P_{min} [TPI]	l [mm]	r [mm]	H [mm]	y [mm]
-27P		TC16-1 EI 19 W-27P	●			19	16.0	0.17	0.89	1.05
		TC16-2 EI 11 W-27P	●			11	16.0	0.29	1.54	2.15
		TC16-2 EI 14 W-27P	●			14	16.0	0.23	1.21	2.15
EN		TC16-1 EI 16 W		●	●	16	16.0	0.20	1.06	1.05
		TC16-1 EI 18 W		●	●	18	16.0	0.18	0.94	1.05
		TC16-1 EI 19 W		●	●	19	16.0	0.17	0.89	1.05
		TC16-1 EI 20 W		●	●	20	16.0	0.16	0.84	1.05
		TC16-1 EI 24 W		●	●	24	16.0	0.13	0.70	1.05
		TC16-1 EI 26 W		●	●	26	16.0	0.12	0.65	1.05
		TC16-1 EI 28 W		●	●	28	16.0	0.12	0.60	1.05
		TC16-2 EI 10 W		●	●	10	16.0	0.32	1.69	2.15
		TC16-2 EI 11 W		●	●	11	16.0	0.29	1.54	2.15
		TC16-2 EI 12 W		●	●	12	16.0	0.27	1.41	2.15
		TC16-2 EI 14 W		●	●	14	16.0	0.23	1.21	2.15
		TC16-2 EI 8 W		●	●	8	16.0	0.40	2.11	2.15
		TC16-2 EI 9 W		●	●	9	16.0	0.36	1.88	2.15
		TC16-3 EI 5 W		●	●	5	16.0	0.64	3.38	3.10
		TC16-3 EI 6 W		●		6	16.0	0.54	2.82	3.10
		TC16-3 EI 7 W		●	●	7	16.0	0.46	2.41	3.10
			H216T	GM213	GM240	P_{min}	l	r	H	y



C164-C177 C280-C291 C255 TC C240 TC C241 TC C242 TC C243 TC-F C244 UTS-TC C245

Overview

Shanks



MSS 0°



C196

MSS 90°



C197

MSS 45°



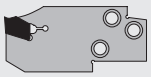
C198

Adapters



C199

Modules - external



GX09



C200

GX16



C201

GX24



C202

GX09



C203

GX16



C204

GX24 axial



C205-C206

GX axial long



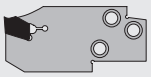
C207

AX



C208

Modules - external



SX



C209

LX



C210

FX



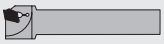
C211

FX long



C212

Monobloc - external



GX09



C213

GX16



C214

GX24



C215

AX 0°/90°



C216-C217

SX



C218

FX



C219

PX



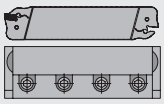
C220

MC



C221-C222

Blocks/ blades



GX



C223

SX



C224

SX reinforced



C225-C226

LX



C227

FX



C228

SBN...K

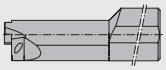
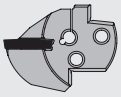
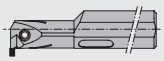
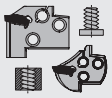
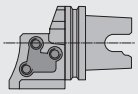


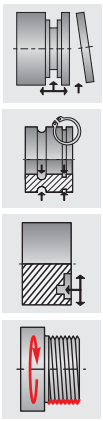
C229

SBN...KS



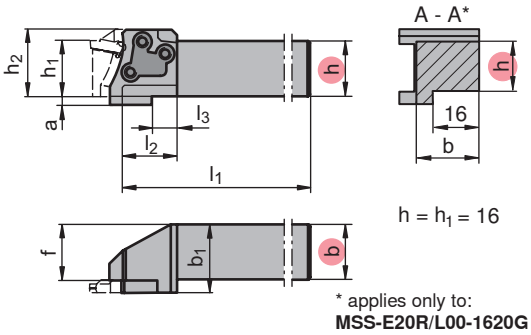
C230

Boring bars	Modules - internal	Monobloc - internal	Threading	UTS/HSK-T
				
1,5 x D  C231	**GX09**  C233	**GX09**  C237	**TC16**  C240	**UTS 0°**  C246
2,5 x D  C232	**GX16**  C234	**GX16**  C238	**TC monobloc**  C241	**UTS 90°**  C247
	GX24  C234	**GX24**  C239	**TC16**  C242	**UTS 45°**  C248
	GX09  C235		**TC monobloc**  C243	**UTS**  C249
	GX16  C236		**TC milling**  C244	**HSK-T 0°**  C250
			TC monobloc UTS  C245	**HSK-T 90°**  C251



Shanks 0°





* applies only to:
MSS-E20R/L00-1620G

Picture shows right-hand version

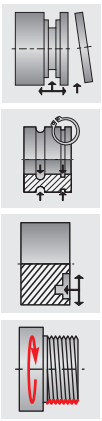
Bgr.	Type, description	L N R	h [mm]	b [mm]	h_1 [mm]	h_2 [mm]	b_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	a [mm]	
12	MSS-E12R00-1212E	R	12	12	12	14.5	15.25	70	12		11.75		MSS-E12R..
	MSS-E12L00-1212E	L	12	12	12	14.5	15.25	70	12		11.75		MSS-E12L..
16	MSS-E16R00-1616G	R	16	16	16	19.5	19.25	90	16		15.75		MSS-E16R..
	MSS-E16L00-1616G	L	16	16	16	19.5	19.25	90	16		15.75		MSS-E16L..
20	MSS-E20R00-1620G	R	16	20	16	24.0	24.25	90	20		20.15		MSS-E20R..
	MSS-E20R00-2020J	R	20	20	20	24.0	24.25	110	20		20.15		MSS-E20R..
	MSS-E20L00-1620G	L	16	20	16	24.0	24.25	90	20		20.15		MSS-E20L..
	MSS-E20L00-2020J	L	20	20	20	24.0	24.25	110	20		20.15		MSS-E20L..
25	MSS-E25R00-2525L	R	25	25	25	30.0	31.00	140	25		25.50		MSS-E25R..
	MSS-E25L00-2525L	L	25	25	25	30.0	31.00	140	25		25.50		MSS-E25L..
32	MSS-E32R00-3225N	R	32	25	32	38.0	31.00	160	32		25.50		MSS-E32R..
	MSS-E32R00-3232Q	R	32	32	32	38.8	38.00	180	32	16.0	32.50	3.00	MSS-E32R..
	MSS-E32L00-3225N	L	32	25	32	38.0	31.00	160	32		25.50		MSS-E32L..
	MSS-E32L00-3232Q	L	32	32	32	38.8	38.00	180	32	16.0	32.50	3.00	MSS-E32L..

Ordering example: 1 piece MSS-E12R00-1212E

Bgr. = assembly size

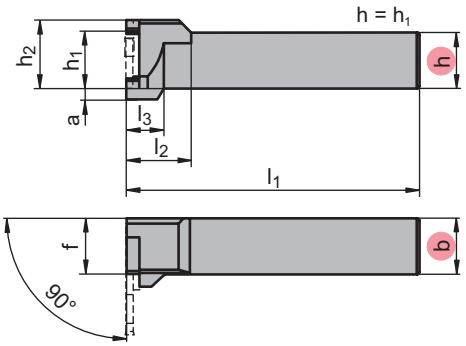
Bgr.			
12	7897200/M2,5X10/T08		7724106/TORX T08
16	7897202/M3,5X12,5/T15	7897208/TORX T15 T	
20	7897203/M4,0X14/T15	7897208/TORX T15 T	
25	7897205/M5,0X18/T20	7897207/TORX T20 T	
32	7897206/M6,0X20/T25	7883304/TORX T25 T	

GX C200-C202 **GX** C203-C204 **GX-A** C205-C207 **AX** C208 **SX** C209 **LX** C210 **FX** C211-C212 **TC** C240



Shanks 90°





Picture shows right-hand version

Bgr.	Type, description	LNR	h [mm]	b [mm]	h_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	a [mm]		
20	MSS-E20R90-2020J	R	20	20	24.0	110	20		20.00			MSS-E20L..
	MSS-E20L90-2020J	L	20	20	24.0	110	20		20.00			MSS-E20R..
25	MSS-E25R90-2525L	R	25	25	30.0	140	28		25.00			MSS-E25L..
	MSS-E25L90-2525L	L	25	25	30.0	140	28		25.00			MSS-E25R..
32	MSS-E32R90-3225N	R	32	25	38.0	160	34		32.00			MSS-E32L..
	MSS-E32R90-3232R	R	32	32	38.8	200	34	19.2	32.00	3.00		MSS-E32L..
	MSS-E32L90-3225N	L	32	25	38.0	160	34		32.00			MSS-E32R..
	MSS-E32L90-3232R	L	32	32	38.8	200	34	19.2	32.00	3.00		MSS-E32R..

Ordering example: 1 piece MSS-E20R90-2020J

Bgr. = assembly size

In case of 90deg please note:
Right-hand shank - left-hand module
Left-hand shank - right-hand module

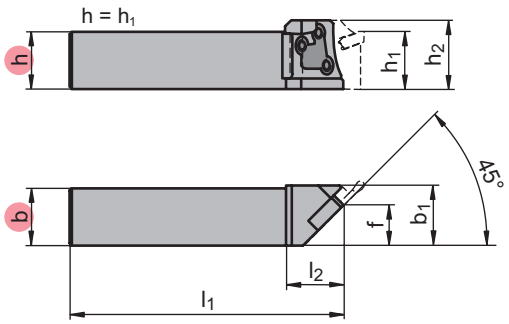
Bgr.			
20	7897203/M4,0X14/T15	7897208/TORX T15 T	
25	7897205/M5,0X18/T20	7897207/TORX T20 T	
32	7897206/M6,0X20/T25	7883304/TORX T25 T	

GX C201-C202 **GX** C204 **GX-A** C205-C207 **AX** C208 **SX** C209 **LX** C210 **FX** C211-C212 **TC** C240



Shanks 45°





Picture shows right-hand version

Bgr.	Type, description	L N R	h [mm]	b [mm]	h_2 [mm]	b_1 [mm]	l_1 [mm]	l_2 [mm]	f [mm]		
20	MSS-E20R45-2020J	R	20	20	24.0	21.50	110	20	14.50		MSS-E20L..
	MSS-E20L45-2020J	L	20	20	24.0	21.50	110	20	14.50		MSS-E20R..
25	MSS-E25R45-2525L	R	25	25	30.0	26.00	140	25	18.00		MSS-E25L..
	MSS-E25L45-2525L	L	25	25	30.0	26.00	140	25	18.00		MSS-E25R..

Ordering example: 1 piece MSS-E20R45-2020J

Bgr. = assembly size

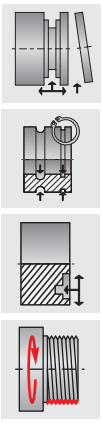


In case of 45deg please note:
Right-hand shank - left-hand module
Left-hand shank - right-hand module

Bgr.			
20	7897203/M4,0X14/T15	7897209/M4,0X11/T15	7897208/TORX T15 T
25	7897205/M5,0X18/T20	7897210/M5,0X13,5/T20	7897207/TORX T20 T

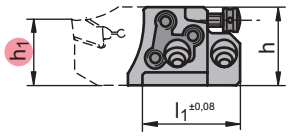
GX

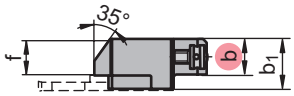
C204



Adapters







Picture shows right-hand version

Bgr.	Type, description	L N R	h_1 [mm]	b [mm]	h [mm]	b_1 [mm]	l_1 [mm]	f [mm]			
20	MSS-E20R00-AD		20	10.7	24	15.3	30	11.2			MSS-E20R..
	MSS-E20L00-AD		20	10.7	24	15.3	30	11.2			MSS-E20L..
25	MSS-E25R00-AD		25	12.6	30	18.6	37	13.1			MSS-E25R..
	MSS-E25L00-AD		25	12.6	30	18.6	37	13.1			MSS-E25L..
32	MSS-E32R00-AD		32	14.6	38	20.6	46	15.1			MSS-E32R..
	MSS-E32L00-AD		32	14.6	38	20.6	46	15.1			MSS-E32L..

Ordering example: 1 piece MSS-E20R00-AD

Bgr. = assembly size

For additional assembly dimensions see

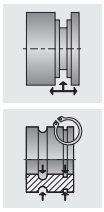
C298-C299

Bgr.			
20	7897203/M4,0X14/T15	7897211/M4X12 DIN 912 - 12.9	7897208/TORX T15 T
25	7897205/M5,0X18/T20	7818319/M5,0X16,0/DIN912-12.9	7897207/TORX T20 T
32	7897206/M6,0X20/T25	7897213/M6X20 12.9 DIN 912	7883304/TORX T25 T

GX C201-C202 **GX** C204 **GX-A** C205-C207 **AX** C208 **SX** C209 **LX** C210 **FX** C211-C212 **TC** C240

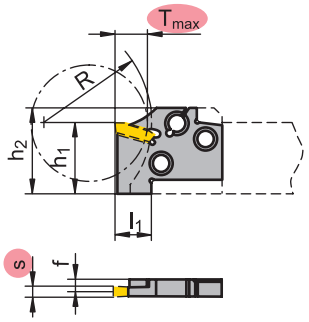
MSS modules – external

Grooving and turning – GX09



GX09





Picture shows right-hand version

Bgr.	Type, description	L N R	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	h_1 [mm]	h_2 [mm]	l_1 [mm]	f [mm]	R [mm]	
12	MSS-E12R07-GX09-1	R	2.00	2.75	7	12	14.5	8	3.15	18	GX09-1..
	MSS-E12R07-GX09-2		2.76	3.75	7	12	14.5	8	3.15	18	GX09-2..
	MSS-E12L07-GX09-1	L	2.00	2.75	7	12	14.5	8	3.15	18	GX09-1..
	MSS-E12L07-GX09-2		2.76	3.75	7	12	14.5	8	3.15	18	GX09-2..
16	MSS-E16R07-GX09-1	R	2.00	2.75	7	16	19.5	8	3.15	24	GX09-1..
	MSS-E16R07-GX09-2		2.76	3.75	7	16	19.5	8	3.15	24	GX09-2..
	MSS-E16L07-GX09-1	L	2.00	2.75	7	16	19.5	8	3.15	24	GX09-1..
	MSS-E16L07-GX09-2		2.76	3.75	7	16	19.5	8	3.15	24	GX09-2..

Ordering example: 1 piece MSS-E12R07-GX09-1

Bgr. = assembly size

GX-E



C180

GX-S



C182

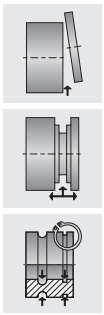
GX-R



C183

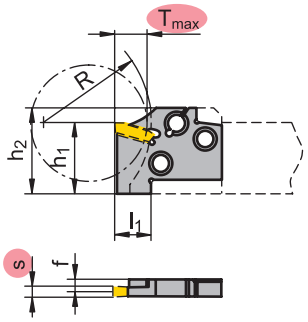


C196



GX16





Picture shows right-hand version

Bgr.	Type, description	L N R	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	h_1 [mm]	h_2 [mm]	l_1 [mm]	f [mm]	R [mm]	
20	MSS-E20R12-GX16-1	R	2.00	2.75	12	20	24	13	3.75	30	GX16-1..
	MSS-E20R12-GX16-2		2.76	3.75	12	20	24	13	3.40	30	GX16-2..
	MSS-E20R12-GX16-3		3.76	5.00	12	20	24	13	2.93	30	GX16-3..
	MSS-E20L12-GX16-1	L	2.00	2.75	12	20	24	13	3.75	30	GX16-1..
	MSS-E20L12-GX16-2		2.76	3.75	12	20	24	13	3.40	30	GX16-2..
	MSS-E20L12-GX16-3		3.76	5.00	12	20	24	13	2.93	30	GX16-3..
25	MSS-E25R12-GX16-1	R	2.00	2.75	12	25	30	13	5.25	37.5	GX16-1..
	MSS-E25R12-GX16-2		2.76	3.75	12	25	30	13	4.90	37.5	GX16-2..
	MSS-E25R12-GX16-3		3.76	5.00	12	25	30	13	4.43	37.5	GX16-3..
	MSS-E25R12-GX16-4		5.01	6.50	12	25	30	13	3.80	37.5	GX16-4..
	MSS-E25L12-GX16-1	L	2.00	2.75	12	25	30	13	5.25	37.5	GX16-1..
	MSS-E25L12-GX16-2		2.76	3.75	12	25	30	13	4.90	37.5	GX16-2..
	MSS-E25L12-GX16-3		3.76	5.00	12	25	30	13	4.43	37.5	GX16-3..
	MSS-E25L12-GX16-4		5.01	6.50	12	25	30	13	3.80	37.5	GX16-4..
32	MSS-E32R12-GX16-2	R	2.76	3.75	12	32	38	13	4.90	48	GX16-2..
	MSS-E32R12-GX16-3		3.76	5.00	12	32	38	13	4.43	48	GX16-3..
	MSS-E32R12-GX16-4		5.01	6.50	12	32	38	13	3.80	48	GX16-4..
	MSS-E32L12-GX16-2	L	2.76	3.75	12	32	38	13	4.90	48	GX16-2..
	MSS-E32L12-GX16-3		3.76	5.00	12	32	38	13	4.43	48	GX16-3..
	MSS-E32L12-GX16-4		5.01	6.50	12	32	38	13	3.80	48	GX16-4..

Ordering example: 1 piece MSS-E20R12-GX16-1

Bgr. = assembly size

GX-E  C180-C181

GX-S  C182

GX-R  C183

 C196

 C197

 C199

 C246

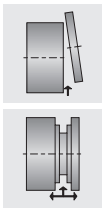
 C247

 C250

 C251

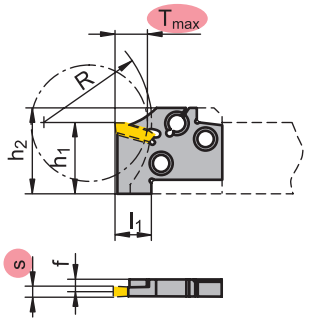
MSS modules – external

Grooving and turning – GX24



GX24





Picture shows right-hand version

Bgr.	Type, description	L N R	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	h_1 [mm]	h_2 [mm]	l_1 [mm]	f [mm]	R [mm]	
20	MSS-E20R21-GX24-1	R	2.00	2.75	21	20	24	22	3.65	30	GX24-1..
	MSS-E20R21-GX24-2		2.76	3.75	21	20	24	22	3.40	30	GX24-2..
	MSS-E20R21-GX24-3		3.76	5.00	21	20	24	22	3.00	30	GX24-3..
	MSS-E20L21-GX24-1	L	2.00	2.75	21	20	24	22	3.65	30	GX24-1..
	MSS-E20L21-GX24-2		2.76	3.75	21	20	24	22	3.40	30	GX24-2..
	MSS-E20L21-GX24-3		3.76	5.00	21	20	24	22	3.00	30	GX24-3..
25	MSS-E25R21-GX24-1	R	2.00	2.75	21	25	30	22	5.15	37.5	GX24-1..
	MSS-E25R21-GX24-2		2.76	3.75	21	25	30	22	4.90	37.5	GX24-2..
	MSS-E25R21-GX24-3		3.76	5.00	21	25	30	22	4.43	37.5	GX24-3..
	MSS-E25R21-GX24-4		5.01	6.50	21	25	30	22	3.80	37.5	GX24-4..
	MSS-E25R21-GX24-5		8.00	8.00	21	25	30	23	2.95	37.5	GX24-5..
	MSS-E25L21-GX24-1	L	2.00	2.75	21	25	30	22	5.15	37.5	GX24-1..
	MSS-E25L21-GX24-2		2.76	3.75	21	25	30	22	4.90	37.5	GX24-2..
	MSS-E25L21-GX24-3		3.76	5.00	21	25	30	22	4.43	37.5	GX24-3..
	MSS-E25L21-GX24-4		5.01	6.50	21	25	30	22	3.80	37.5	GX24-4..
	MSS-E25L21-GX24-5		8.00	8.00	21	25	30	23	2.95	37.5	GX24-5..
32	MSS-E32R21-GX24-2	R	2.76	3.75	21	32	38	22	4.95	48	GX24-2..
	MSS-E32R21-GX24-3		3.76	5.00	21	32	38	22	4.43	48	GX24-3..
	MSS-E32R21-GX24-4		5.01	6.50	21	32	38	22	3.80	48	GX24-4..
	MSS-E32L21-GX24-2	L	2.76	3.75	21	32	38	22	4.95	48	GX24-2..
	MSS-E32L21-GX24-3		3.76	5.00	21	32	38	22	4.43	48	GX24-3..
	MSS-E32L21-GX24-4		5.01	6.50	21	32	38	22	3.80	48	GX24-4..

Ordering example: 1 piece MSS-E20R21-GX24-1

Bgr. = assembly size

When using the radius insert GX24-4/GX24-5 l_1 = 23 mm

GX-E



C180-C181

GX-R



C183



C196



C197



C199



C246



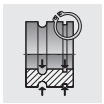
C247



C250

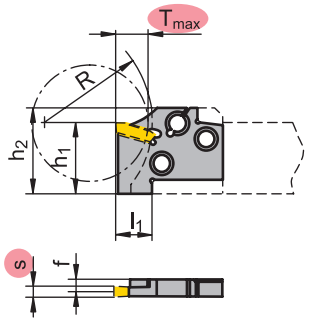


C251



GX09





Picture shows right-hand version

Bgr.	Type, description	L N R	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	h_1 [mm]	h_2 [mm]	l_1 [mm]	f [mm]	R [mm]	
12	MSS-E12R02-GX09-1	R	0.60	1.95	2	12	14.5	8	3.15	18	GX09-1.. R/L
	MSS-E12L02-GX09-1	L	0.60	1.95	2	12	14.5	8	3.15	18	GX09-1.. R/L
16	MSS-E16R02-GX09-1	R	0.60	1.95	2	16	19.5	8	3.15	24	GX09-1.. R/L
	MSS-E16L02-GX09-1	L	0.60	1.95	2	16	19.5	8	3.15	24	GX09-1.. R/L

Ordering example: 1 piece MSS-E12R02-GX09-1

Bgr. = assembly size

GX-S

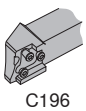


C182

GX-R



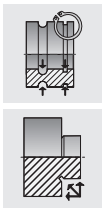
C183



C196

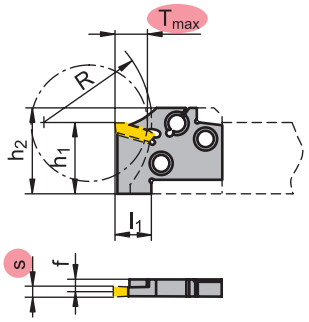
MSS modules – external

Circlip and radius grooves – GX16



GX16





Picture shows right-hand version

Bgr.	Type, description	LNR	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	h_1 [mm]	h_2 [mm]	l_1 [mm]	f [mm]	R [mm]	
20	MSS-E20R03-GX16-2	R	0.60	2.75	3	20	24	13	3.40	30	GX16-2.. R/L
	MSS-E20L03-GX16-2	L	0.60	2.75	3	20	24	13	3.40	30	GX16-2.. R/L
25	MSS-E25R03-GX16-2	R	0.60	2.75	3	25	30	13	4.90	37.5	GX16-2.. R/L
	MSS-E25L03-GX16-2	L	0.60	2.75	3	25	30	13	4.90	37.5	GX16-2.. R/L
32	MSS-E32R03-GX16-2	R	0.60	2.75	3	32	38	13	4.90	48	GX16-2.. R/L
	MSS-E32L03-GX16-2	L	0.60	2.75	3	32	38	13	4.90	48	GX16-2.. R/L

Ordering example: 1 piece MSS-E20R03-GX16-2

Bgr. = assembly size

GX-S

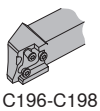


C182

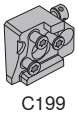
GX-R



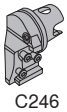
C183



C196-C198



C199



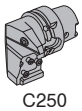
C246



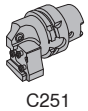
C247



C248



C250

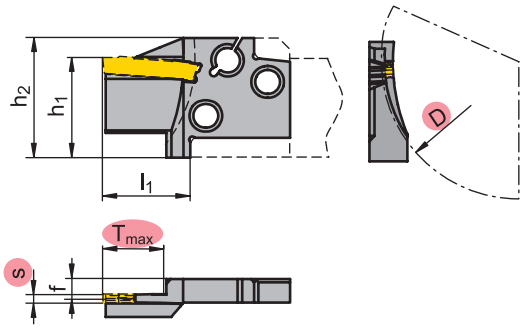


C251



GX24 axial





Picture shows right-hand version

Bgr.	Type, description	L N R	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	D_{min} [mm]	D_{max} [mm]	h_1 [mm]	h_2 [mm]	l_1 [mm]	f [mm]	
20	MSS-E20R14-GX24-2 A50-70	R	2.76	3.75	14	50	70	20	24	22	3.40	GX24-2..
	MSS-E20R14-GX24-2 A70-100		2.76	3.75	14	70	100	20	24	22	3.40	GX24-2..
	MSS-E20R14-GX24-2 A100-150		2.76	3.75	14	100	150	20	24	22	3.40	GX24-2..
	MSS-E20L14-GX24-2 A50-70	L	2.76	3.75	14	50	70	20	24	22	3.40	GX24-2..
	MSS-E20L14-GX24-2 A70-100		2.76	3.75	14	70	100	20	24	22	3.40	GX24-2..
	MSS-E20L14-GX24-2 A100-150		2.76	3.75	14	100	150	20	24	22	3.40	GX24-2..
25	MSS-E25R15-GX24-2 A50-70	R	2.76	3.75	15	50	70	25	30	22	4.90	GX24-2..
	MSS-E25R15-GX24-2 A70-100		2.76	3.75	15	70	100	25	30	22	4.90	GX24-2..
	MSS-E25R15-GX24-2 A100-150		2.76	3.75	15	100	150	25	30	22	4.90	GX24-2..
	MSS-E25R15-GX24-3 A50-70		3.76	5.00	15	50	70	25	30	22	4.43	GX24-3..
	MSS-E25R15-GX24-3 A70-100		3.76	5.00	15	70	100	25	30	22	4.43	GX24-3..
	MSS-E25R15-GX24-3 A100-150		3.76	5.00	15	100	150	25	30	22	4.43	GX24-3..
	MSS-E25R15-GX24-3 A150-300		3.76	5.00	15	150	300	25	30	22	4.43	GX24-3..
	MSS-E25R15-GX24-4 A50-70		5.01	6.50	15	50	70	25	30	22	3.80	GX24-4..
	MSS-E25R15-GX24-4 A70-100		5.01	6.50	15	70	100	25	30	22	3.80	GX24-4..
	MSS-E25R15-GX24-4 A100-150		5.01	6.50	15	100	150	25	30	22	3.80	GX24-4..
	MSS-E25R15-GX24-4 A150-300		5.01	6.50	15	150	300	25	30	22	3.80	GX24-4..
	MSS-E25L15-GX24-2 A50-70	L	2.76	3.75	15	50	70	25	30	22	4.90	GX24-2..
	MSS-E25L15-GX24-2 A70-100		2.76	3.75	15	70	100	25	30	22	4.90	GX24-2..
	MSS-E25L15-GX24-2 A100-150		2.76	3.75	15	100	150	25	30	22	4.90	GX24-2..
	MSS-E25L15-GX24-3 A50-70		3.76	5.00	15	50	70	25	30	22	4.43	GX24-3..
	MSS-E25L15-GX24-3 A70-100		3.76	5.00	15	70	100	25	30	22	4.43	GX24-3..
	MSS-E25L15-GX24-3 A100-150		3.76	5.00	15	100	150	25	30	22	4.43	GX24-3..
	MSS-E25L15-GX24-3 A150-300		3.76	5.00	15	150	300	25	30	22	4.43	GX24-3..
	MSS-E25L15-GX24-4 A50-70		5.01	6.50	15	50	70	25	30	22	3.80	GX24-4..
	MSS-E25L15-GX24-4 A70-100		5.01	6.50	15	70	100	25	30	22	3.80	GX24-4..
	MSS-E25L15-GX24-4 A100-150		5.01	6.50	15	100	150	25	30	22	3.80	GX24-4..
	MSS-E25L15-GX24-4 A150-300		5.01	6.50	15	150	300	25	30	22	3.80	GX24-4..

Ordering example: 1 piece MSS-E20R14-GX24-2 A50-70

Bgr. = assembly size

GX-E

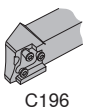


C180-C181

GX-R



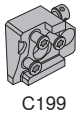
C183



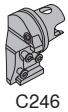
C196



C197



C199



C246



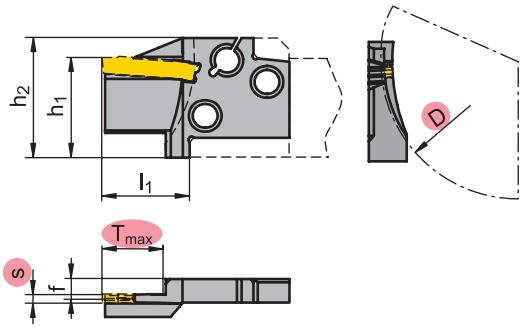
C247

MSS modules – external

Axial grooves – GX24

GX24 axial





Picture shows right-hand version

Bgr.	Type, description	L N R	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	D_{min} [mm]	D_{max} [mm]	h_1 [mm]	h_2 [mm]	l_1 [mm]	f [mm]	
32	MSS-E32R15-GX24-3 A70-100	R	3.76	5.00	15	70	100	32	38	22	4.43	GX24-3..
	MSS-E32R15-GX24-3 A100-150		3.76	5.00	15	100	150	32	38	22	4.43	GX24-3..
	MSS-E32R15-GX24-3 A150-300		3.76	5.00	15	150	300	32	38	22	4.43	GX24-3..
	MSS-E32R15-GX24-4 A70-100		5.01	6.50	15	70	100	32	38	22	3.80	GX24-4..
	MSS-E32R15-GX24-4 A100-150		5.01	6.50	15	100	150	32	38	22	4.43	GX24-4..
	MSS-E32R15-GX24-4 A150-300		5.01	6.50	15	150	300	32	38	22	3.80	GX24-4..
	MSS-E32R15-GX24-4 A300-900		5.01	6.50	15	300	900	32	38	22	3.80	GX24-4..
	MSS-E32L15-GX24-3 A70-100	L	3.76	5.00	15	70	100	32	38	22	4.43	GX24-3..
	MSS-E32L15-GX24-3 A100-150		3.76	5.00	15	100	150	32	38	22	4.43	GX24-3..
	MSS-E32L15-GX24-3 A150-300		3.76	5.00	15	150	300	32	38	22	4.43	GX24-3..
	MSS-E32L15-GX24-4 A70-100		5.01	6.50	15	70	100	32	38	22	3.80	GX24-4..
	MSS-E32L15-GX24-4 A100-150		5.01	6.50	15	100	150	32	38	22	3.80	GX24-4..
	MSS-E32L15-GX24-4 A150-300		5.01	6.50	15	150	300	32	38	22	3.80	GX24-4..
	MSS-E32L15-GX24-4 A300-900		5.01	6.50	15	300	900	32	38	22	3.80	GX24-4..

Ordering example: 1 piece MSS-E32R15-GX24-3 A70-100

Bgr. = assembly size

GX-E



C180-C181

GX-R



C183



C196



C197



C199



C246



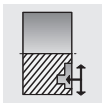
C247



C250

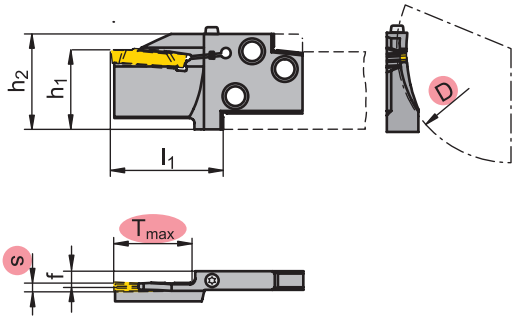


C251



GX24 axial long





Picture shows right-hand version

Bgr.	Type, description	L N R	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	D_{min} [mm]	D_{max} [mm]	h_1 [mm]	h_2 [mm]	l_1 [mm]	f [mm]	
25	MSS-E25R21-GX24-3 AS50-70	R	3.76	5.00	21	50	70	25	30	35	4.43	GX24-3..
	MSS-E25R21-GX24-3 AS70-100		3.76	5.00	21	70	100	25	30	35	4.43	GX24-3..
	MSS-E25R21-GX24-3 AS100-150		3.76	5.00	21	100	150	25	30	35	4.43	GX24-3..
	MSS-E25R21-GX24-3 AS150-300		3.76	5.00	21	150	300	25	30	35	4.43	GX24-3..
	MSS-E25R25-GX24-4 AS50-70		5.01	6.50	25	50	70	25	30	35	3.80	GX24-4..
	MSS-E25R25-GX24-4 AS70-100		5.01	6.50	25	70	100	25	30	35	3.80	GX24-4..
	MSS-E25R25-GX24-4 AS100-150		5.01	6.50	25	100	150	25	30	35	3.80	GX24-4..
	MSS-E25R25-GX24-4 AS150-300		5.01	6.50	25	150	300	25	30	35	3.80	GX24-4..
	MSS-E25L21-GX24-3 AS50-70	L	3.76	5.00	21	50	70	25	30	35	4.43	GX24-3..
	MSS-E25L21-GX24-3 AS70-100		3.76	5.00	21	70	100	25	30	35	4.43	GX24-3..
	MSS-E25L21-GX24-3 AS100-150		3.76	5.00	21	100	150	25	30	35	4.43	GX24-3..
	MSS-E25L21-GX24-3 AS150-300		3.76	5.00	21	150	300	25	30	35	4.43	GX24-3..
	MSS-E25L25-GX24-4 AS50-70		5.01	6.50	25	50	70	25	30	35	3.80	GX24-4..
	MSS-E25L25-GX24-4 AS70-100		5.01	6.50	25	70	100	25	30	35	3.80	GX24-4..
	MSS-E25L25-GX24-4 AS100-150		5.01	6.50	25	100	150	25	30	35	3.80	GX24-4..
	MSS-E25L25-GX24-4 AS150-300		5.01	6.50	25	150	300	25	30	35	3.80	GX24-4..

Ordering example: 1 piece MSS-E25R21-GX24-3 AS50-70

Bgr. = assembly size

Axial modules in long version can be clamped from either side.

C272-C275

Bgr.			
25	7897221/M3,5X14,0/T15	7897208/TORX T15 T	DMSD 3,2Nm/SORT T15

GX-E

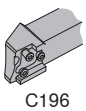


C180-C181

GX-R



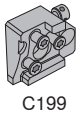
C183



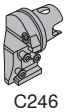
C196



C197



C199



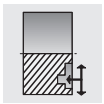
C246



C247

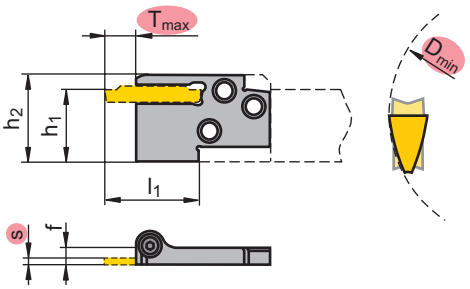
MSS modules – external

Axial grooves – AX



AX





Picture shows right-hand version

Bgr.	Type, description	L N R	s [mm]	D_{min} [mm]	T_{max} [mm]	h_1 [mm]	h_2 [mm]	l_1 [mm]	f [mm]	
16	MSS-E16R05-AX05	R	3.0	10	5	16	20.5	24	2.50	AX05..
	MSS-E16L05-AX05	L	3.0	10	5	16	20.5	24	2.50	AX05..
20	MSS-E20R05-AX05	R	3.0	10	5	20	25	28	3.10	AX05..
	MSS-E20R10-AX10		3.0	20	10	20	25	33	3.10	AX10..
	MSS-E20R15-AX15		3.0	30	15	20	25	44	3.10	AX15..
	MSS-E20L05-AX05	L	3.0	10	5	20	25	28	3.10	AX05..
	MSS-E20L10-AX10		3.0	20	10	20	25	33	3.10	AX10..
	MSS-E20L15-AX15		3.0	30	15	20	25	44	3.10	AX15..
25	MSS-E25R05-AX05	R	3.0	10	5	25	30	27.5	4.60	AX05..
	MSS-E25R10-AX10		3.0	20	10	25	30	32.5	4.60	AX10..
	MSS-E25R15-AX15		3.0	30	15	25	30	43.5	4.60	AX15..
	MSS-E25L05-AX05	L	3.0	10	5	25	30	27.5	4.60	AX05..
	MSS-E25L10-AX10		3.0	20	10	25	30	32.5	4.60	AX10..
	MSS-E25L15-AX15		3.0	30	15	25	30	43.5	4.60	AX15..

Ordering example: 1 piece MSS-E16R05-AX05

Bgr. = assembly size

Bgr.			
16	7897202/M3,5X12,5/T15	7897208/TORX T15 T	
20	7897203/M4,0X14/T15	7897208/TORX T15 T	
25	7897205/M5,0X18/T20	7897207/TORX T20 T	

AX


C184

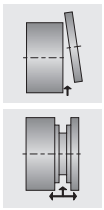

C196


C197


C199

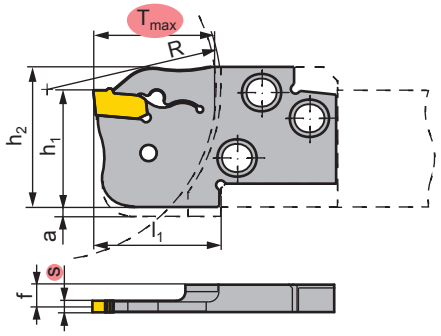

C246


C247



SX





Picture shows right-hand version

Bgr.	Type, description	L N R	s [mm]	T_{max} [mm]	h_1 [mm]	h_2 [mm]	l_1 [mm]	f [mm]	a [mm]	R [mm]	
20	MSS-E20R20-SX2	R	2.0	20	20	24	22	3.57	3.00	30	SX2
	MSS-E20R20-SX3		3.0	20	20	24	22	3.20	3.00	30	SX3
	MSS-E20L20-SX2	L	2.0	20	20	24	22	3.57	3.00	30	SX2
	MSS-E20L20-SX3		3.0	20	20	24	22	3.20	3.00	30	SX3
25	MSS-E25R20-SX2	R	2.0	20	25	30	22	5.07		37.5	SX2
	MSS-E25R25-SX3		3.0	25	25	30	27	4.70		37.5	SX3
	MSS-E25R35-SX3		3.0	35	25	30	37	4.70		37.5	SX3
	MSS-E25R25-SX4		4.0	25	25	30	27	4.30		37.5	SX4
	MSS-E25R35-SX4		4.0	35	25	30	37	4.30		37.5	SX4
	MSS-E25L20-SX2	L	2.0	20	25	30	22	5.07		37.5	SX2
	MSS-E25L25-SX3		3.0	25	25	30	27	4.70		37.5	SX3
	MSS-E25L35-SX3		3.0	35	25	30	37	4.70		37.5	SX3
	MSS-E25L25-SX4		4.0	25	25	30	27	4.30		37.5	SX4
	MSS-E25L35-SX4		4.0	35	25	30	37	4.30		37.5	SX4
32	MSS-E32R35-SX3	R	3.0	35	32	38	37	4.70		48	SX3
	MSS-E32R35-SX4		4.0	35	32	38	37	4.30		48	SX4
	MSS-E32L35-SX3	L	3.0	35	32	38	37	4.70		48	SX3
	MSS-E32L35-SX4		4.0	35	32	38	37	4.30		48	SX4

Ordering example: 1 piece MSS-E20R20-SX2

Bgr. = assembly size

	s [mm]			
SX2	**2.0**	10005884/S12-3		
SX3	**3.0**	10005884/S12-3		
SX4	**4.0**	10001365/S15-4		

SX-E

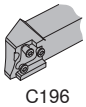


C185

SX-R



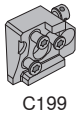
C185



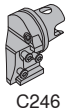
C196



C197



C199



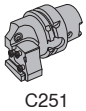
C246



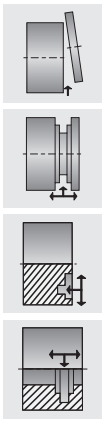
C247



C250

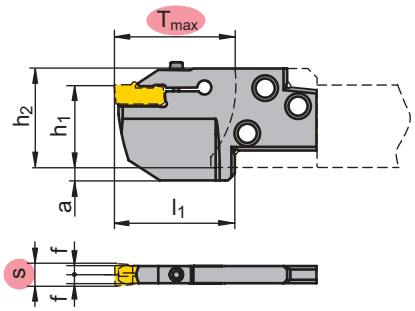


C251



System LX





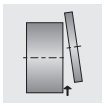
Bgr.	Type, description	LNR	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	h_1 [mm]	h_2 [mm]	l_1 [mm]	f [mm]	a [mm]	
32	MSS-E32N25-LX	N	8.00	10.00	25	32	38.75	27	3.40	5.25	LX-..
	MSS-E32N32-LX		8.00	10.00	32	32	38.75	34	3.40	5.25	
	MSS-E32N45-LX		8.00	10.00	45	32	38.75	47	3.40	5.25	

Ordering example: 1 piece MSS-E32N25-LX

Bgr. = assembly size

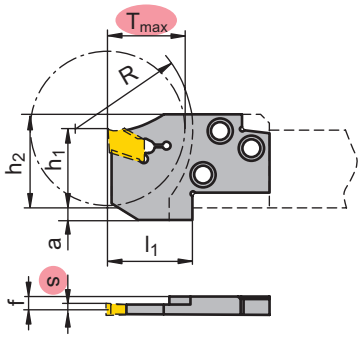
LX-..	7897218/M4,0X18/T20	7897207/TORX T20 T	DMSD 4,0Nm/SORT T20

LX-E C186 **LX-R** C186 C196 C197 C199 C246 C247 C250 C251



FX short





Picture shows right-hand version

Bgr.	Type, description	L N R	s [mm]	T_{max} [mm]	h_1 [mm]	h_2 [mm]	l_1 [mm]	f [mm]	a [mm]	R [mm]	
20	MSS-E20R20-FX2.2	R	2.2	20	20	24	22	3.58	3.00	30	FX 2.2..
	MSS-E20R20-FX3.1		3.1	20	20	24	22	3.20	3.00	30	FX 3.1..
	MSS-E20R20-FX4.1		4.1	20	20	24	22	2.80	3.00	30	FX 4.1..
	MSS-E20L20-FX2.2	L	2.2	20	20	24	22	3.58	3.00	30	FX 2.2..
	MSS-E20L20-FX3.1		3.1	20	20	24	22	3.20	3.00	30	FX 3.1..
	MSS-E20L20-FX4.1		4.1	20	20	24	22	2.80	3.00	30	FX 4.1..
25	MSS-E25R20-FX2.2	R	2.2	20	25	30	22	5.08		37.5	FX 2.2..
	MSS-E25R25-FX3.1		3.1	25	25	30	27	4.70		37.5	FX 3.1..
	MSS-E25R25-FX4.1		4.1	25	25	30	27	4.30		37.5	FX 4.1..
	MSS-E25R25-FX5.1		5.1	25	25	30	27	3.90		37.5	FX 5.1..
	MSS-E25R25-FX6.5		6.5	25	25	30	27	3.30		37.5	FX 6.5..
	MSS-E25L20-FX2.2	L	2.2	20	25	30	22	5.08		37.5	FX 2.2..
	MSS-E25L25-FX3.1		3.1	25	25	30	27	4.70		37.5	FX 3.1..
	MSS-E25L25-FX4.1		4.1	25	25	30	27	4.30		37.5	FX 4.1..
	MSS-E25L25-FX5.1		5.1	25	25	30	27	3.90		37.5	FX 5.1..
	MSS-E25L25-FX6.5		6.5	25	25	30	27	3.30		37.5	FX 6.5..
32	MSS-E32R32-FX3.1	R	3.1	32	32	38	34	4.70		48	FX 3.1..
	MSS-E32R32-FX4.1		4.1	32	32	38	34	4.30		48	FX 4.1..
	MSS-E32R32-FX5.1		5.1	32	32	38	34	3.90		48	FX 5.1..
	MSS-E32R32-FX6.5		6.5	32	32	38	34	3.30		48	FX 6.5..
	MSS-E32L32-FX3.1	L	3.1	32	32	38	34	4.70		48	FX 3.1..
	MSS-E32L32-FX4.1		4.1	32	32	38	34	4.30		48	FX 4.1..
	MSS-E32L32-FX5.1		5.1	32	32	38	34	3.90		48	FX 5.1..
	MSS-E32L32-FX6.5		6.5	32	32	38	34	3.30		48	FX 6.5..

Ordering example: 1 piece MSS-E20R20-FX2.2

Bgr. = assembly size

FX 2.2..	7802180/A 2,2		
FX 3.1..	7802181/A 3,1		
FX 4.1..	7802181/A 3,1		
FX 5.1..	7802181/A 3,1		
FX 6.5..	7802181/A 3,1		

FX


C187


C196


C197


C199


C246


C247

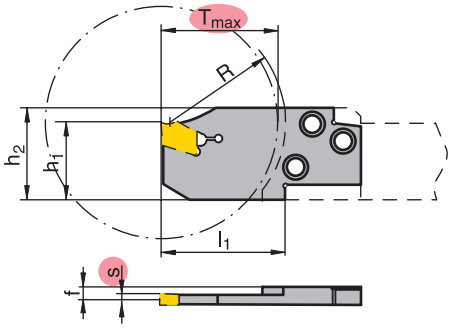

C250


C251



FX long





Picture shows right-hand version

Bgr.	Type, description	L N R	s [mm]	T max [mm]	h1 [mm]	h2 [mm]	l1 [mm]	f [mm]	R [mm]		
25	MSS-E25R35-FX3.1	R	3.1	35	25	30	37	4.70	37.5		FX 3.1..
	MSS-E25R35-FX4.1		4.1	35	25	30	37	4.30	37.5		FX 4.1..
	MSS-E25R35-FX5.1		5.1	35	25	30	37	3.90	37.5		FX 5.1..
	MSS-E25R35-FX6.5		6.5	35	25	30	37	3.30	37.5		FX 6.5..
	MSS-E25L35-FX3.1	L	3.1	35	25	30	37	4.70	37.5		FX 3.1..
	MSS-E25L35-FX4.1		4.1	35	25	30	37	4.30	37.5		FX 4.1..
	MSS-E25L35-FX5.1		5.1	35	25	30	37	3.90	37.5		FX 5.1..
	MSS-E25L35-FX6.5		6.5	35	25	30	37	3.30	37.5		FX 6.5..
32	MSS-E32R45-FX3.1	R	3.1	45	32	38	47	4.70	48		FX 3.1..
	MSS-E32R45-FX4.1		4.1	45	32	38	47	4.30	48		FX 4.1..
	MSS-E32R45-FX5.1		5.1	45	32	38	47	3.90	48		FX 5.1..
	MSS-E32R45-FX6.5		6.5	45	32	38	47	3.30	48		FX 6.5..
	MSS-E32L45-FX3.1	L	3.1	45	32	38	47	4.70	48		FX 3.1..
	MSS-E32L45-FX4.1		4.1	45	32	38	47	4.30	48		FX 4.1..
	MSS-E32L45-FX5.1		5.1	45	32	38	47	3.90	48		FX 5.1..
	MSS-E32L45-FX6.5		6.5	45	32	38	47	3.30	48		FX 6.5..

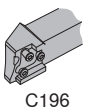
Ordering example: 1 piece MSS-E25R35-FX3.1

Bgr. = assembly size

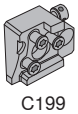
FX 3.1..	7802181/A 3,1		
FX 4.1..	7802181/A 3,1		
FX 5.1..	7802181/A 3,1		
FX 6.5..	7802181/A 3,1		

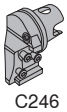
FX


C187

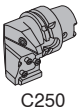

C196

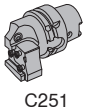

C197

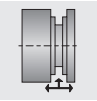

C199


C246


C247


C250

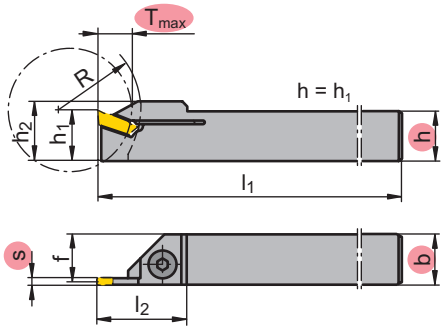

C251





GX monobloc tool holders

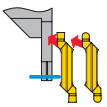




Picture shows right-hand version

Type, description	L N R	h [mm]	b [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	h_2 [mm]	l_1 [mm]	l_2 [mm]	f [mm]	R [mm]		
E10R00-1010M-GX09	R	10	10	0.60	3.75	7	12.0	150	18	9.35	15		GX09..
E10L00-1010M-GX09	L												

Ordering example: 1 piece E10R00-1010M-GX09



Attention:
When using right-hand or left-hand inserts, the tool requires modification to prevent the insert fouling.

h [mm]			
10	7897209/M4,0X11/T15	7897208/TORX T15 T	

GX-E

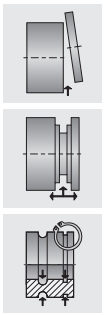
C180

GX-S

C182

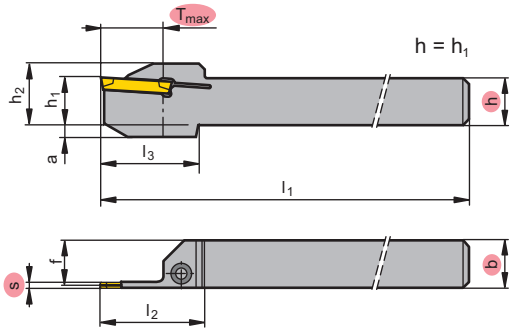
GX-R

C183



GX monobloc tool holders

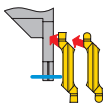




Picture shows right-hand version

Type, description	L N R	h [mm]	b [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	h_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	a [mm]	
E12R0012-1212K-GX16-1	R	12	12	2.00	2.75	12	17.0	125	26	24.0	11.35	4.00	GX16-1..
E12R0012-1212K-GX16-2			12	0.60	3.75	12	17.0	125	26	24.0	11.00	4.00	GX16-2..
E12L0012-1212K-GX16-1	L		12	2.00	2.75	12	17.0	125	26	24.0	11.35	4.00	GX16-1..
E12L0012-1212K-GX16-2			12	0.60	3.75	12	17.0	125	26	24.0	11.00	4.00	GX16-2..
E16R0012-1616K-GX16-1	R	16	16	2.00	2.75	12	21.0	125	26	24.0	15.35	4.00	GX16-1..
E16R0012-1616K-GX16-2			16	0.60	3.75	12	21.0	125	26	24.0	15.00	4.00	GX16-2..
E16R0012-1616K-GX16-3			16	3.76	5.00	12	21.0	125	26	24.0	14.53	4.00	GX16-3..
E16L0012-1616K-GX16-1	L		16	2.00	2.75	12	21.0	125	26	24.0	15.35	4.00	GX16-1..
E16L0012-1616K-GX16-2			16	0.60	3.75	12	21.0	125	26	24.0	15.00	4.00	GX16-2..
E16L0012-1616K-GX16-3			16	3.76	5.00	12	21.0	125	26	24.0	14.53	4.00	GX16-3..
E20R0012-2020K-GX16-1	R	20	20	2.00	2.75	12	25.0	125	26		19.35		GX16-1..
E20R0012-2020K-GX16-2			20	0.60	3.75	12	25.0	125	26		19.00		GX16-2..
E20R0012-2020K-GX16-3			20	3.76	5.00	12	25.0	125	26		18.53		GX16-3..
E20L0012-2020K-GX16-1	L		20	2.00	2.75	12	25.0	125	26		19.35		GX16-1..
E20L0012-2020K-GX16-2			20	0.60	3.75	12	25.0	125	26		19.00		GX16-2..
E20L0012-2020K-GX16-3			20	3.76	5.00	12	25.0	125	26		18.53		GX16-3..
E25R0012-2525M-GX16-2	R	25	25	0.60	3.75	12	30.0	150	26		24.00		GX16-2..
E25R0012-2525M-GX16-3			25	3.76	5.00	12	30.0	150	26		23.53		GX16-3..
E25L0012-2525M-GX16-2	L		25	0.60	3.75	12	30.0	150	26		24.00		GX16-2..
E25L0012-2525M-GX16-3			25	3.76	5.00	12	30.0	150	26		23.53		GX16-3..

Ordering example: 1 piece E12R0012-1212K-GX16-1



Attention:
When using right-hand or left-hand inserts, the tool requires modification to prevent the insert fouling.

h [mm]			
12 - 25	7897221/M3,5X14,0/T15	7897208/TORX T15 T	

GX-E

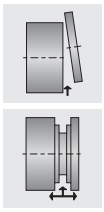
C180-C181

GX-S

C182

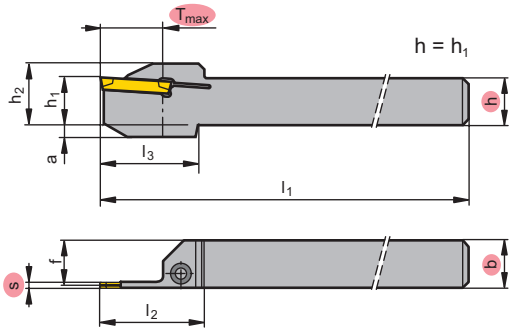
GX-R

C183



GX monobloc tool holders





Picture shows right-hand version

Type, description	L N R	h [mm]	b [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	h_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	a [mm]	
E16R0021-1616K-GX24-1	R	16	16	2.00	2.75	21	21.0	125	35	32.0	15.20	4.00	GX24-1..
E16R0021-1616K-GX24-2			16	2.76	3.75	21	21.0	125	35	32.0	15.00	4.00	GX24-2..
E16L0021-1616K-GX24-1	L		16	2.00	2.75	21	21.0	125	35	32.0	15.20	4.00	GX24-1..
E16L0021-1616K-GX24-2			16	2.76	3.75	21	21.0	125	35	32.0	15.00	4.00	GX24-2..
E20R0021-2020K-GX24-1	R	20	20	2.00	2.75	21	25.0	125	35		19.20		GX24-1..
E20R0021-2020K-GX24-2			20	2.76	3.75	21	25.0	125	35		19.00		GX24-2..
E20R0021-2020K-GX24-3			20	3.76	5.00	21	25.0	125	35		18.53		GX24-3..
E20L0021-2020K-GX24-1	L		20	2.00	2.75	21	25.0	125	35		19.20		GX24-1..
E20L0021-2020K-GX24-2			20	2.76	3.75	21	25.0	125	35		19.00		GX24-2..
E20L0021-2020K-GX24-3			20	3.76	5.00	21	25.0	125	35		18.53		GX24-3..
E25R0021-2525M-GX24-2	R	25	25	2.76	3.75	21	30.0	150	35		24.00		GX24-2..
E25R0021-2525M-GX24-3			25	3.76	5.00	21	30.0	150	35		23.53		GX24-3..
E25R0021-2525M-GX24-4			25	5.01	6.50	21	30.0	150	35		22.90		GX24-4..
E25L0021-2525M-GX24-2	L		25	2.76	3.75	21	30.0	150	35		24.00		GX24-2..
E25L0021-2525M-GX24-3			25	3.76	5.00	21	30.0	150	35		23.53		GX24-3..
E25L0021-2525M-GX24-4			25	5.01	6.50	21	30.0	150	35		22.90		GX24-4..
E32R0021-3225P-GX24-2	R	32	25	2.76	3.75	21	37.0	170	35		24.00		GX24-2..
E32R0021-3225P-GX24-3			25	3.76	5.00	21	37.0	170	35		23.53		GX24-3..
E32R0021-3225P-GX24-4			25	5.01	6.50	21	37.0	170	35		22.90		GX24-4..
E32L0021-3225P-GX24-2	L		25	2.76	3.75	21	37.0	170	35		24.00		GX24-2..
E32L0021-3225P-GX24-3			25	3.76	5.00	21	37.0	170	35		23.53		GX24-3..
E32L0021-3225P-GX24-4			25	5.01	6.50	21	37.0	170	35		22.90		GX24-4..

Ordering example: 1 piece E16R0021-1616K-GX24-1

 h [mm]			
16 - 32	7897218/M4,0X18/T20	7897207/TORX T20 T	

GX-E



C180-C181

GX-R

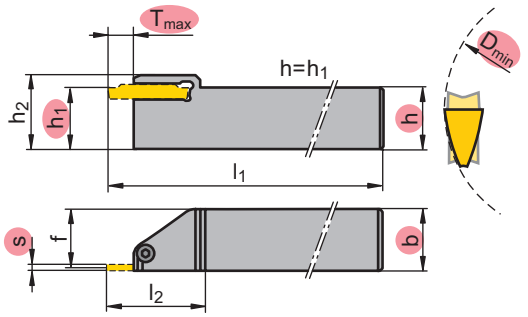


C183

Monobloc tool holders – AX

AX monobloc tool holders 0°





Picture shows right-hand version

Type, description	L N R	h [mm]	b [mm]	s [mm]	D_{min} [mm]	T_{max} [mm]	h_2 [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
E16R0005-1616L-AX05	R	16	16	3.0	10	5	21.0	140	28	14.70	AX05..
E16R0010-1616L-AX10			16	3.0	20	10	21.0	140	38	14.70	AX10..
E16L0005-1616L-AX05	L		16	3.0	10	5	21.0	140	28	14.70	AX05..
E16L0010-1616L-AX10			16	3.0	20	10	21.0	140	38	14.70	AX10..
E20R0005-2020L-AX05	R	20	20	3.0	10	5	25.0	140	28	18.70	AX05..
E20R0010-2020L-AX10			20	3.0	20	10	25.0	140	38	18.70	AX10..
E20R0015-2020L-AX15			20	3.0	30	15	25.0	140	49	18.70	AX15..
E20L0005-2020L-AX05	L		20	3.0	10	5	25.0	140	28	18.70	AX05..
E20L0010-2020L-AX10			20	3.0	20	10	25.0	140	38	18.70	AX10..
E20L0015-2020L-AX15			20	3.0	30	15	25.0	140	49	18.70	AX15..
E25R0005-2525N-AX05	R	25	25	3.0	10	5	30.0	160	28	23.70	AX05..
E25R0010-2525N-AX10			25	3.0	20	10	30.0	160	38	23.70	AX10..
E25R0015-2525N-AX15			25	3.0	30	15	30.0	160	49	23.70	AX15..
E25L0005-2525N-AX05	L		25	3.0	10	5	30.0	160	28	23.70	AX05..
E25L0010-2525N-AX10			25	3.0	20	10	30.0	160	38	23.70	AX10..
E25L0015-2525N-AX15			25	3.0	30	15	30.0	160	49	23.70	AX15..

Ordering example: 1 piece E16R0005-1616L-AX05

	h [mm]			
AX05..	**16**	7897203/M4,0X14/T15	7897208/TORX T15 T	
AX05..	**20 - 25**	7897205/M5,0X18/T20	7897207/TORX T20 T	
AX10..	**16**	7897203/M4,0X14/T15	7897208/TORX T15 T	
AX10..	**20 - 25**	7897205/M5,0X18/T20	7897207/TORX T20 T	
AX15..	**20 - 25**	7897205/M5,0X18/T20	7897207/TORX T20 T	

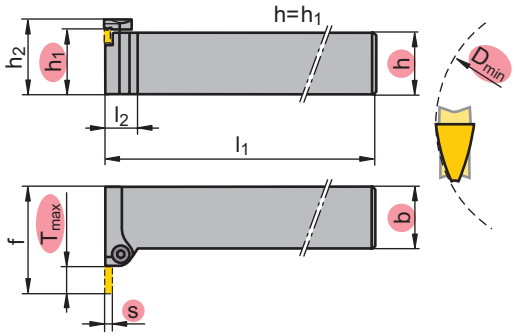
AX



C184

AX monobloc tool holders 90°





Picture shows right-hand version

Type, description	L N R	h [mm]	b [mm]	s [mm]	D_{min} [mm]	T_{max} [mm]	h_2 [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
E16R9005-1616J-AX05	R	16	16	3.0	10	5	21.0	110	13.5	28.00	AX05..
E16R9010-1616J-AX10	R	16	16	3.0	20	10	21.0	110	13.0	38.00	AX10..
E16L9005-1616J-AX05	L	16	16	3.0	10	5	21.0	110	13.5	28.00	AX05..
E16L9010-1616J-AX10	L	16	16	3.0	20	10	21.0	110	13.0	38.00	AX10..
E20R9005-2020J-AX05	R	20	20	3.0	10	5	25.0	110	12.0	28.00	AX05..
E20R9010-2020J-AX10	R	20	20	3.0	20	10	25.0	110	13.0	38.00	AX10..
E20R9015-2020J-AX15	R	20	20	3.0	30	15	25.0	110	13.0	49.00	AX15..
E20L9005-2020J-AX05	L	20	20	3.0	10	5	25.0	110	12.0	28.00	AX05..
E20L9010-2020J-AX10	L	20	20	3.0	20	10	25.0	110	13.0	38.00	AX10..
E20L9015-2020J-AX15	L	20	20	3.0	30	15	25.0	110	13.0	49.00	AX15..
E25R9005-2525L-AX05	R	25	25	3.0	10	5	30.0	140	12.0	33.00	AX05..
E25R9010-2525J-AX10	R	25	25	3.0	20	10	30.0	110	13.0	43.00	AX10..
E25R9015-2525L-AX15	R	25	25	3.0	30	15	30.0	140	13.0	49.00	AX15..
E25L9005-2525L-AX05	L	25	25	3.0	10	5	30.0	140	12.0	33.00	AX05..
E25L9010-2525J-AX10	L	25	25	3.0	20	10	30.0	110	13.0	43.00	AX10..
E25L9015-2525L-AX15	L	25	25	3.0	30	15	30.0	140	13.0	49.00	AX15..

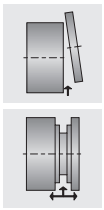
Ordering example: 1 piece E16R9005-1616J-AX05

	h [mm]			
AX05..	**16 - 25**	7897203/M4,0X14/T15	7897208/TORX T15 T	
AX10..	**16**	7897203/M4,0X14/T15	7897208/TORX T15 T	
AX10..	**20 - 25**	7897205/M5,0X18/T20	7897207/TORX T20 T	
AX15..	**20 - 25**	7897205/M5,0X18/T20	7897207/TORX T20 T	

AX

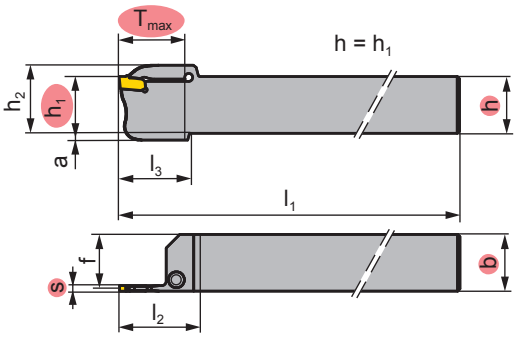


C184



SX monobloc tool holders





Picture shows right-hand version

Type, description	L N R	h [mm]	b [mm]	s [mm]	T_{max} [mm]	h_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	a [mm]	
E16R0016-1616K-SX2	R	16	16	2.0	16	21.0	125	31	26.0	15.20	7.00	SX2
E16R0020-1616K-SX3	R	16	16	3.0	20	21.0	125	36	30.0	14.75	7.00	SX3
E16L0016-1616K-SX2	L	16	16	2.0	16	21.0	125	31	26.0	15.20	7.00	SX2
E16L0020-1616K-SX3	L	16	16	3.0	20	21.0	125	36	30.0	14.75	7.00	SX3
E20R0016-2020K-SX2	R	20	20	2.0	16	25.0	125	31	26.0	19.20	5.00	SX2
E20R0020-2020K-SX3	R	20	20	3.0	20	25.0	125	38	30.0	18.75	5.00	SX3
E20R0025-2020K-SX4	R	20	20	4.0	25	27.0	125	44	35.0	18.35	5.00	SX4
E20L0016-2020K-SX2	L	20	20	2.0	16	25.0	125	31	26.0	19.20	5.00	SX2
E20L0020-2020K-SX3	L	20	20	3.0	20	25.0	125	38	30.0	18.75	5.00	SX3
E20L0025-2020K-SX4	L	20	20	4.0	25	27.0	125	44	35.0	18.35	5.00	SX4
E25R0020-2525M-SX3	R	25	25	3.0	20	30.0	150	40	30.0	23.75	5.00	SX3
E25R0025-2525M-SX4	R	25	25	4.0	25	32.0	150	46	35.0	23.35	5.00	SX4
E25R0025-2525M-SX5	R	25	25	5.0	25	32.0	150	46	35.0	22.85	5.00	SX5
E25R0032-2525M-SX6	R	25	25	6.0	32	33.0	150	54	43.0	22.40	6.00	SX6
E25L0020-2525M-SX3	L	25	25	3.0	20	30.0	150	40	30.0	23.75	5.00	SX3
E25L0025-2525M-SX4	L	25	25	4.0	25	32.0	150	46	35.0	23.35	5.00	SX4
E25L0025-2525M-SX5	L	25	25	5.0	25	32.0	150	46	35.0	22.85	5.00	SX5
E25L0032-2525M-SX6	L	25	25	6.0	32	33.0	150	54	43.0	22.40	6.00	SX6

Ordering example: 1 piece E16R0016-1616K-SX2

 h [mm]			
16 - 25	7897218/M4,0X18/T20	7897207/TORX T20 T	

SX-E

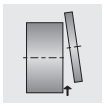


C185

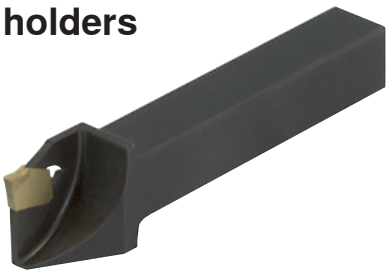
SX-R

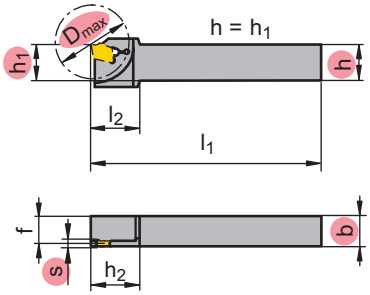


C185



FX monobloc tool holders





Picture shows left-hand version

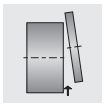
Type, description	L N R	h [mm]	b [mm]	s [mm]	D_{max} [mm]	h_2 [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
XLCER 1010 M22 FX	R	10	10	2.2	30	19.5	150	19	9.18	FX 2.2..
XLCEL 1010 M22 FX	L		10	2.2	30	19.5	150	19	9.18	FX 2.2..
XLCER 1212 F22 FX	R	12	12	2.2	30	19.5	80	19	11.18	FX 2.2..
XLCER 1212 M22 FX	R		12	2.2	30	19.5	150	19	11.18	FX 2.2..
XLCEL 1212 F22 FX	L		12	2.2	30	19.5	80	19	11.18	FX 2.2..
XLCEL 1212 M22 FX	L		12	2.2	30	19.5	150	19	11.18	FX 2.2..
XLCER 1414 M22 FX	R	14	14	2.2	30	19.5	150	19	13.18	FX 2.2..
XLCEL 1414 M22 FX	L		14	2.2	30	19.5	150	19	13.18	FX 2.2..
XLCER 1612 H22 FX	R	16	12	2.2	30	19.5	100	19	11.18	FX 2.2..
XLCFR 1612 H31 FX	R		12	3.1	35	22.5	100	22	10.80	FX 3.1..
XLCEL 1612 H22 FX	L		12	2.2	30	19.5	100	19	11.18	FX 2.2..
XLCFL 1612 H31 FX	L		12	3.1	35	22.5	100	22	10.80	FX 3.1..
XLCFR 2016 K31 FX	R	20	16	3.1	40	26.0	125	26	14.80	FX 3.1..
XLCFR 2016 K41 FX	R		16	4.1	40	26.0	125	26	14.40	FX 4.1..
XLCFL 2016 K31 FX	L		16	3.1	40	26.0	125	26	14.80	FX 3.1..
XLCFL 2016 K41 FX	L		16	4.1	40	26.0	125	26	14.40	FX 4.1..
XLCFR 2520 M31 FX	R	25	20	3.1	50	31.5	150	32	18.80	FX 3.1..
XLCFR 2520 M41 FX	R		20	4.1	50	31.5	150	32	18.40	FX 4.1..
XLCFL 2520 M31 FX	L		20	3.1	50	31.5	150	32	18.80	FX 3.1..
XLCFL 2520 M41 FX	L		20	4.1	50	31.5	150	32	18.40	FX 4.1..

Ordering example: 1 piece XLCER 1010 M22 FX

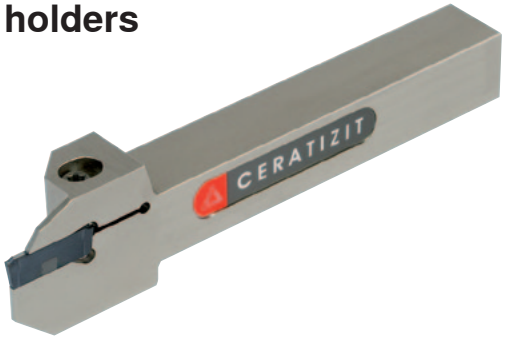
s [mm]			
2.2	7802180/A 2,2		
3.1	7802181/A 3,1		
4.1	7802181/A 3,1		

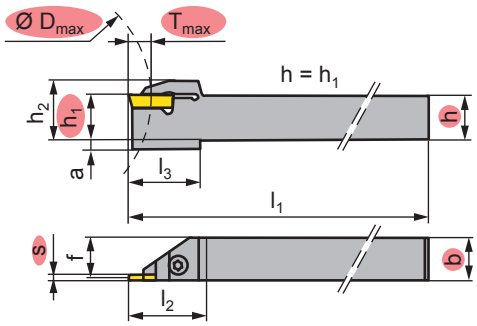
FX

C187



PX monobloc tool holders





Picture shows right-hand version

Type, description	L N R	h [mm]	b [mm]	s [mm]	T_{max} [mm]	D_{max} [mm]	h_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	a [mm]	
E16R0005-1616K-PX20-1	R	16	16	1.0	5	52	23.0	125	31	32.0	15.00	4.00	PX20-1..
E16R0010-1616K-PX20-2			16	1.5	10	52	23.0	125	31	32.0	15.40	4.00	PX20-2..
E16R0010-1616K-PX20-3			16	2.0	10	52	23.0	125	31	32.0	15.20	4.00	PX20-3..
E16L0005-1616K-PX20-1	L		16	1.0	5	52	23.0	125	31	32.0	15.00	4.00	PX20-1..
E16L0010-1616K-PX20-2			16	1.5	10	52	23.0	125	31	32.0	15.40	4.00	PX20-2..
E16L0010-1616K-PX20-3			16	2.0	10	52	23.0	125	31	32.0	15.20	4.00	PX20-3..
E20R0005-2020L-PX20-1	R	20	20	1.0	5	62	27.0	140	34		19.00		PX20-1..
E20R0011-2020L-PX20-2			20	1.5	11	62	27.0	140	34		19.40		PX20-2..
E20R0011-2020L-PX20-3			20	2.0	11	62	27.0	140	34		19.20		PX20-3..
E20L0005-2020L-PX20-1	L		20	1.0	5	62	27.0	140	34		19.00		PX20-1..
E20L0011-2020L-PX20-2			20	1.5	11	62	27.0	140	34		19.40		PX20-2..
E20L0011-2020L-PX20-3			20	2.0	11	62	27.0	140	34		19.20		PX20-3..

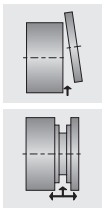
Ordering example: 1 piece E16R0005-1616K-PX20-1

 h [mm]			
16	7897218/M4,0X18/T20	7897207/TORX T20 T	10008867/GS-M4.0
20	7897218/M4,0X18/T20	7883304/TORX T25 T	10008868/GS-M5.0

PX

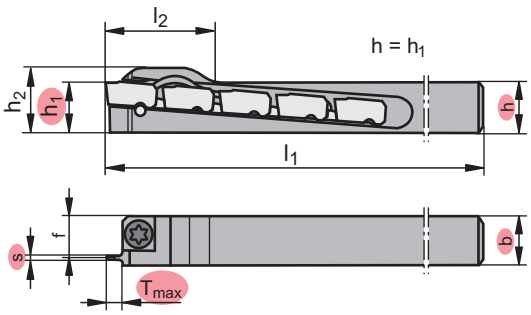


C188



MaxiClick 05





Picture shows right-hand version

Type, description	LNR	h [mm]	b [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	h_2 [mm]	l_1 [mm]	l_2 [mm]	f [mm]		
MC05R-1010K	R	10	10	1.00	1.50	5	13.0	125	23	8.50		MC 05..
MC05L-1010K	L		10	1.00	1.50	5	13.0	125	23	8.50		
MC05R-1212K	R	12	12	1.00	1.50	5	15.0	125	23	10.50		
MC05L-1212K	L		12	1.00	1.50	5	15.0	125	23	10.50		
MC05R-1616K	R	16	16	1.00	1.50	5	19.0	125	23	14.50		
MC05L-1616K	L		16	1.00	1.50	5	19.0	125	23	14.50		
MC05R-2020K	R	20	20	1.00	1.50	5	23.0	125	23	18.50		
MC05L-2020K	L		20	1.00	1.50	5	23.0	125	23	18.80		
MC05R-2525M	R	25	25	1.00	1.50	5	28.0	150	23	23.50		
MC05L-2525M	L		25	1.00	1.50	5	28.0	150	23	23.50		

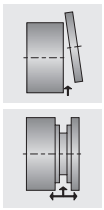
Ordering example: 1 piece MC05R-1010K

 h [mm]			
10 - 25	7818429/M4,0X11/T15	7897208/TORX T15 T	

MaxiClick

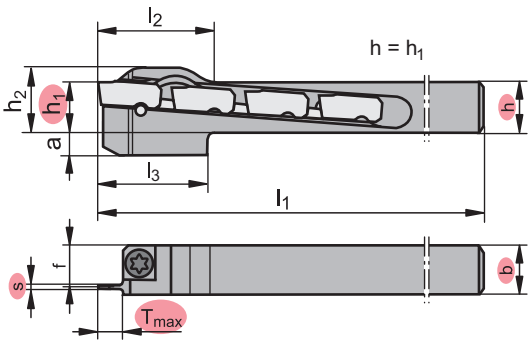


C189



MaxiClick 10





Picture shows right-hand version

Type, description	L N R	h [mm]	b [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	h_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	a [mm]	
MC10R-1010K	R	10	10	1.50	2.50	10	13.0	125	28		8.50		MC 10..
MC10R-1010K-S	R		10	1.50	2.50	10	19.0	125	28	27.0	8.50	6.00	
MC10L-1010K	L		10	1.50	2.50	10	13.0	125	28		8.50		
MC10L-1010K-S	L		10	1.50	2.50	10	19.0	125	28	27.0	8.50	6.00	
MC10R-1212K	R	12	12	1.50	2.50	10	15.0	125	28		10.50		
MC10R-1212K-S	R		12	1.50	2.50	10	19.0	125	28	27.0	10.50	4.00	
MC10L-1212K	L		12	1.50	2.50	10	15.0	125	28		10.50		
MC10L-1212K-S	L		12	1.50	2.50	10	19.0	125	28	27.0	10.50	4.00	
MC10R-1616K	R	16	16	1.50	2.50	10	19.0	125	28		14.50		
MC10L-1616K	L		16	1.50	2.50	10	19.0	125	28		14.50		
MC10R-2020K	R	20	20	1.50	2.50	10	23.0	125	28		18.50		
MC10L-2020K	L		20	1.50	2.50	10	23.0	125	28		18.50		
MC10R-2525M	R	25	25	1.50	2.50	10	28.0	152	28		23.50		
MC10L-2525M	L		25	1.50	2.50	10	28.0	152	28		23.50		

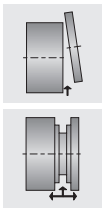
Ordering example: 1 piece MC10R-1010K

 h [mm]			
10 - 25	7818429/M4,0X11/T15	7897208/TORX T15 T	

MaxiClick

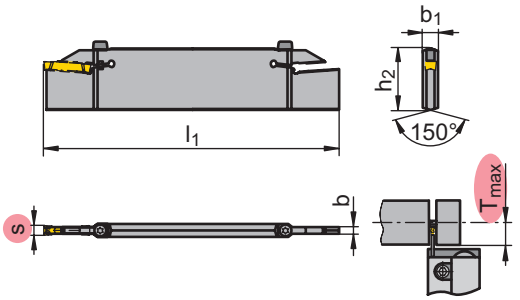


C189



GX blades





h_2 [mm]	Type, description	LNR	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	b [mm]	b_1 [mm]	l_1 [mm]	
32	XLCFN 3202-GX24-1S	N	2.00	2.75	21	1.60	6.2	180	GX24-1..
	XLCFN 3203 GX24-2S		2.76	3.75	21	2.10	6.2	180	GX24-2..
	XLCFN 3204 GX24-3S		3.76	5.00	21	3.05	6.2	180	GX24-3..
	XLCFN 3206 GX24-4S		5.01	6.50	21	4.20	6.2	180	GX24-4..

Ordering example: 1 piece XLCFN 3202-GX24-1S

 h_2 [mm]			
32	7897221/M3,5X14,0/T15	7897208/TORX T15 T	DMSD 3,2Nm/SORT T15

GX-E



C180

GX-R

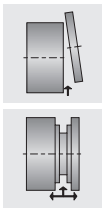


C183

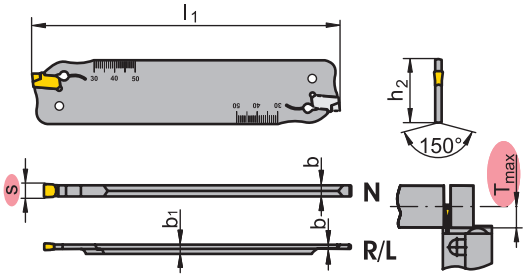


C229-C230

Blades – SX







h_2 [mm]	Type, description	L N R	s [mm]	T_{max} [mm]		b [mm]	b_1 [mm]	l_1 [mm]	
26	XLCFR 2602-SX2	R	2.0	25		1.50	2.4	110	SX2
	XLCFL 2602-SX2	L	2.0	25		1.50	2.4	110	SX2
	XLCFN 2603-SX3	N	3.0	35		2.40		110	SX3
	XLCFN 2604-SX4	N	4.0	40		3.20		110	SX4
32	XLCFR 3202-SX2	R	2.0	25		1.50	2.4	150	SX2
	XLCFL 3202-SX2	L	2.0	25		1.50	2.4	150	SX2
	XLCFN 3203-SX3	N	3.0	50		2.40		150	SX3
	XLCFN 3204-SX4	N	4.0	50		3.20		150	SX4
	XLCFN 3205-SX5	N	5.0	55		4.20		150	SX5
	XLCFN 3206-SX6	N	6.0	60		5.20		150	SX6

Ordering example: 1 piece XLCFR 2602-SX2

	s [mm]			
SX2	**2.0**	10005884/S12-3		
SX3	**3.0**	10005884/S12-3		
SX4	**4.0**	10001365/S15-4		
SX5	**5.0**	10001365/S15-4		
SX6	**6.0**	10001365/S15-4		

SX-E



C185

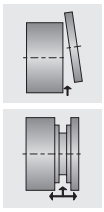
SX-R



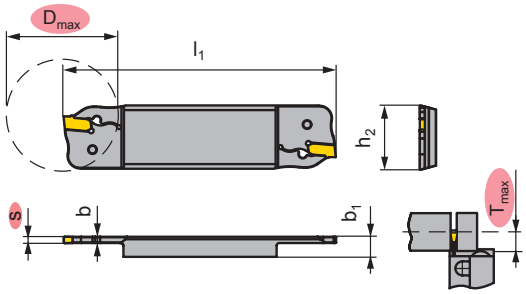
C185



C229-C230







Picture shows right-hand version

h_2 [mm]	Type, description	L N R	s [mm]	T_{max} [mm]	D_{max} [mm]	b [mm]	b_1 [mm]	l_1 [mm]	
26	XLCFR 2608-SX2	R	2.0	22	44	1.50	8.0	110	SX2
	XLCFR 2608-SX3		3.0	22	44	2.50	8.0	110	SX3
	XLCFL 2608-SX2	L	2.0	22	44	1.50	8.0	110	SX2
	XLCFL 2608-SX3		3.0	22	44	2.50	8.0	110	SX3

Ordering example: 1 piece XLCFR 2608-SX2

	s [mm]			
SX2	**2.0**	10005884/S12-3		
SX3	**3.0**	10005884/S12-3		

SX-E



C185

SX-R

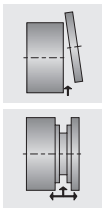


C185

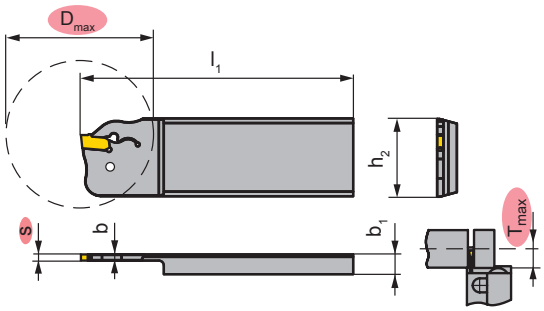


C229-C230

Blades SX, reinforced blade







Picture shows right-hand version

h2 [mm]	Type, description	L N R	s [mm]	Tmax [mm]	Dmax [mm]	b [mm]	b1 [mm]	l1 [mm]	
32	XLCFR 3208-SX3	R	3.0	33	66	2.50	8.0	110	SX3
	XLCFR 3208-SX4		4.0	33	66	3.40	8.0	110	SX4
	XLCFL 3208-SX3	L	3.0	33	66	2.50	8.0	110	SX3
	XLCFL 3208-SX4		4.0	33	66	3.40	8.0	110	SX4

Ordering example: 1 piece XLCFR 3208-SX3

	s [mm]			
SX3	**3.0**	10005884/S12-3		
SX4	**4.0**	10001365/S15-4		

SX-E



C185

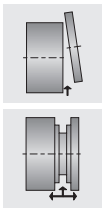
SX-R



C185

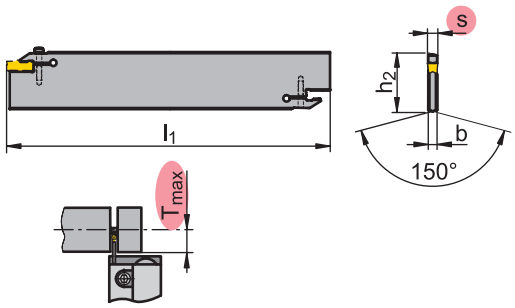


C229-C230



LX blades





h2 [mm]	Type, description	LNR	smin [mm]	smax [mm]	Tmax [mm]	b [mm]	l1 [mm]		
46	XLCEN 4608 LX	N	8.00	10.00	80	6.80	250		LX-..

Ordering example: 1 piece XLCEN 4608 LX

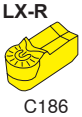
h2 [mm]			
46	7897218/M4,0X18/T20	7897207/TORX T20 T	DMSD 4,0Nm/SORT T20

LX-E



C186

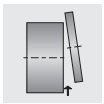
LX-R



C186

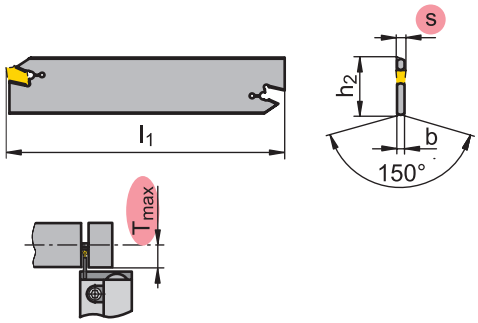


C229



FX blades





h_2 [mm]	Type, description	L N R	s [mm]	T_{max} [mm]	b [mm]	l_1 [mm]	
26	XLCEN 2602 J22 FX	N	2.2	25	1.65	110	FX 2.2..
	XLCFN 2603 J31 FX		3.1	35	2.40	110	FX 3.1..
	XLCFN 2604 J41 FX		4.1	40	3.20	110	FX 4.1..
32	XLCEN 3202 M22 FX		2.2	30	1.65	150	FX 2.2..
	XLCFN 3203 M31 FX		3.1	50	2.40	150	FX 3.1..
	XLCFN 3204 M41 FX		4.1	50	3.20	150	FX 4.1..
	XLCFN 3205 M51 FX		5.1	55	4.00	150	FX 5.1..
	XLCFN 3206 M65 FX		6.5	55	5.20	150	FX 6.5..
46	XLCEN 4608 S82 FX		8.2	80	6.80	250	FX 8.2..
	XLCEN 4609 S97 FX		9.7	80	8.00	250	FX 9.7..

Ordering example: 1 piece XLCEN 2602 J22 FX

FX 2.2..	7802180/A 2,2		
FX 3.1..	7802181/A 3,1		
FX 8.2..	7802182/A 8,2		

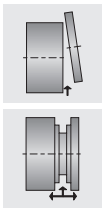
FX



C187

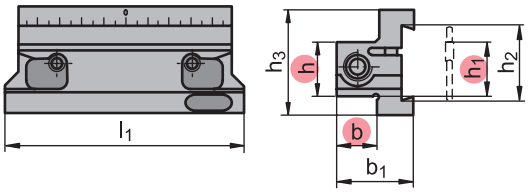


C229-C230



Clamping blocks





h_2 [mm]	Type, description	$h=h_1$ [mm]	b [mm]		l_1 [mm]	b_1 [mm]	h_3 [mm]		
26	SBN 2020-26 K	20	20		90	33.0	39		XLC.. 26..
32	SBN 2520-32 K	25	20		110	36.0	48		XLC.. 32..
	SBN 3229-32 K	32	29		120	44.5	48		XLC.. 32..
46	SBN 3229-46 K	32	29		150	52.0	70		XLC.. 46..
	SBN 4037-46 K	40	37		150	60.0	70		XLC.. 46..

Ordering example: 1 piece SBN 2020-26 K

The blocks are delivered without coolant set.
When applying through-tool coolant, order the additional coolant set separately.

 h_2 [mm]			
26	7802115/M6X25 DIN 912	7812301/SW 5	7802148/R1/8"/SORT
32	7802115/M6X25 DIN 912	7812301/SW 5	7802148/R1/8"/SORT
46	7802133/M8X35 DIN 912	7812302/SW 6	7802143/R1/4" SET

GX

C223

SX

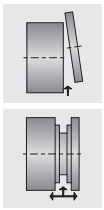
C224-C226

LX

C227

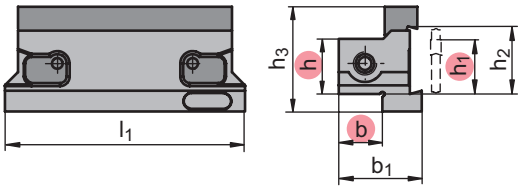
FX

C228



Split clamping blocks





h_2 [mm]	Type, description	$h=h_1$ [mm]	b [mm]		h_3 [mm]	b_1 [mm]	l_1 [mm]		
26	SBN 2020-26 KS	20	20		43	37	90		XLC.. 26..
32	SBN 2520-32 KS	25	20		49	38	110		XLC.. 32..
32	SBN 3229-32 KS	32	29		52	47	120		XLC.. 32..

Ordering example: 1 piece SBN 2020-26 KS



The blocks are delivered without coolant set.
When applying through-tool coolant, order the additional coolant set separately.

 h_2 [mm]			
26	7802115/M6X25 DIN 912	7812301/SW 5	7802148/R1/8"/SORT
32	7802115/M6X25 DIN 912	7812301/SW 5	7802148/R1/8"/SORT

GX



C223

SX

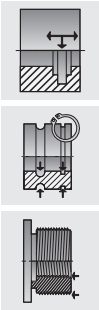


C224-C226

FX

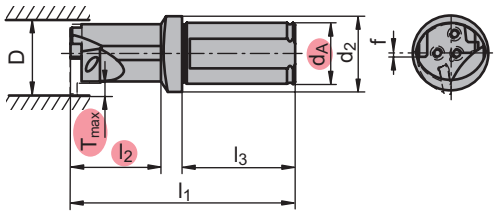


C228



Boring bars 1.5D



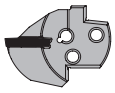


Picture shows right-hand version

Bgr.	Type, description	L N R	d_A [mm]	l_2 [mm]	T_{max} [mm]	D [mm]	d_2 [mm]	l_1 [mm]	l_3 [mm]	f [mm]	
16	MSS-I16R90-1.5D-N	R	20	24	4	20	25	82	50	1.00	MSS-I16R..
	MSS-I16L90-1.5D-N	L	20	24	4	20	25	82	50	1.00	MSS-I16L..
20	MSS-I20R90-1.5D-N	R	20	30	5	25	25	87	50	1.00	MSS-I20R..
	MSS-I20L90-1.5D-N	L	20	30	5	25	25	87	50	1.00	MSS-I20L..
25	MSS-I25R90-1.5D-N	R	25	38	6	32	32	102	56	1.50	MSS-I25R..
	MSS-I25L90-1.5D-N	L	25	38	6	32	32	102	56	1.50	MSS-I25L..
32	MSS-I32R90-1.5D-N	R	32	48	9	40	40	119	60	2.00	MSS-I32R..
	MSS-I32L90-1.5D-N	L	32	48	9	40	40	119	60	2.00	MSS-I32L..
40	MSS-I40R90-1.5D-N	R	40	60	10	50	50	142	70	2.50	MSS-I40R..
	MSS-I40L90-1.5D-N	L	40	60	10	50	50	142	70	2.50	MSS-I40L..

Ordering example: 1 piece MSS-I16R90-1.5D-N

Bgr. = assembly size



When using module
MSS-I40N19-GX24.. the following applies:

GX24:
T_{max} = +9 mm
D = +10 mm

C234

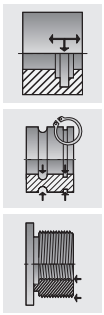
Bgr.			
16	7897200/M2,5X10/T08	7724106/TORX T08	
20	7897201/M3,0X11/T10	7883306/TORX T10	
25	7897202/M3,5X12,5/T15		7897208/TORX T15 T
32	7897204/M4,5X17/T20		7897207/TORX T20 T
40	7897205/M5,0X18/T20		7897207/TORX T20 T

GX

C233-C236

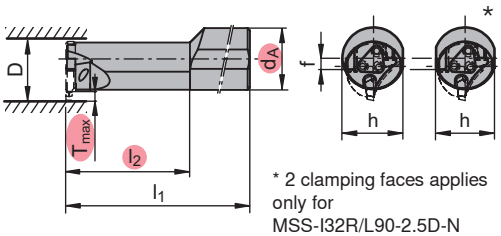
TC

C242



Boring bars 2.5D





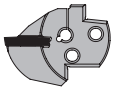
* 2 clamping faces applies only for MSS-I32R/L90-2.5D-N

Picture shows right-hand version

Bgr.	Type, description	L N R	d_A [mm]	l_2 [mm]	T_{max} [mm]	h [mm]	l_1 [mm]	D [mm]	f [mm]		
16	MSS-I16R90-2.5D-N	R	20	40	4	19	180	20	4.50		MSS-I16R..
	MSS-I16L90-2.5D-N	L	20	40	4	19	180	20	4.50		MSS-I16L..
20	MSS-I20R90-2.5D-N	R	25	50	5	24	200	25	6.00		MSS-I20R..
	MSS-I20L90-2.5D-N	L	25	50	5	24	200	25	6.00		MSS-I20L..
25	MSS-I25R90-2.5D-N	R	32	63	6	31	250	32	7.00		MSS-I25R..
	MSS-I25L90-2.5D-N	L	32	63	6	31	250	32	7.00		MSS-I25L..
32	MSS-I32R90-2.5D-N	R	40	80	9	38	300	40	9.50		MSS-I32R..
	MSS-I32L90-2.5D-N	L	40	80	9	38	300	40	9.50		MSS-I32L..
40	MSS-I40R90-2.5D-N	R	50	100	10	48.5	350	50	11.00		MSS-I40R..
	MSS-I40L90-2.5D-N	L	50	100	10	48.5	350	50	11.00		MSS-I40L..

Ordering example: 1 piece MSS-I16R90-2.5D-N

Bgr. = assembly size



When using module MSS-I40N19-GX24.. the following applies:

GX24:
T_{max} = +9 mm
D = +10 mm

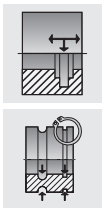
Bgr.			
16	7897200/M2,5X10/T08	7724106/TORX T08	
20	7897201/M3,0X11/T10	7883306/TORX T10	
25	7897202/M3,5X12,5/T15		7897208/TORX T15 T
32	7897204/M4,5X17/T20		7897207/TORX T20 T
40	7897205/M5,0X18/T20		7897207/TORX T20 T

GX

C233-C236

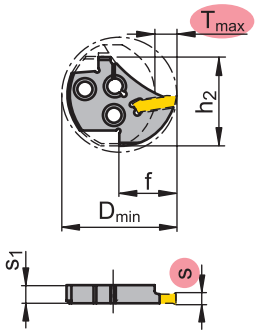
TC

C242



GX09





Picture shows right-hand version

Bgr.	Type, description	L N R	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	h_2 [mm]	D_{min} [mm]	f [mm]	s_1 [mm]		
16	MSS-I16R04-GX09-1	R	2.00	2.75	4	16.4	20	10.00	3.8		GX09-1..
	MSS-I16R04-GX09-2		2.76	3.75	4	16.4	20	10.00	3.8		GX09-2..
	MSS-I16L04-GX09-1	L	2.00	2.75	4	16.4	20	10.00	3.8		GX09-1..
	MSS-I16L04-GX09-2		2.76	3.75	4	16.4	20	10.00	3.8		GX09-2..
20	MSS-I20R05-GX09-1	R	2.00	2.75	5	20.3	25	12.00	3.8		GX09-1..
	MSS-I20R05-GX09-2		2.76	3.75	5	20.3	25	12.00	3.8		GX09-2..
	MSS-I20L05-GX09-1	L	2.00	2.75	5	20.3	25	12.00	3.8		GX09-1..
	MSS-I20L05-GX09-2		2.76	3.75	5	20.3	25	12.00	3.8		GX09-2..
25	MSS-I25R06-GX09-1	R	2.00	2.75	6	24.9	32	15.50	3.8		GX09-1..
	MSS-I25R06-GX09-2		2.76	3.75	6	24.9	32	15.50	3.8		GX09-2..
	MSS-I25L06-GX09-1	L	2.00	2.75	6	24.9	32	15.50	3.8		GX09-1..
	MSS-I25L06-GX09-2		2.76	3.75	6	24.9	32	15.50	3.8		GX09-2..

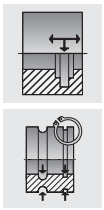
Ordering example: 1 piece MSS-I16R04-GX09-1

Bgr. = assembly size

GX-E C180 **GX-S** C182 **GX-R** C183 **1.5D** C231 **2.5D** C232

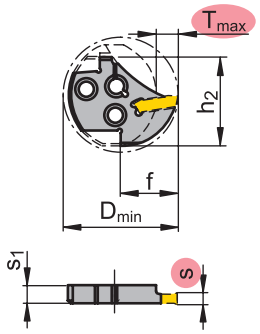
MSS modules – internal

Grooving and turning – GX16/24



GX16/24





Picture shows right-hand version

Bgr.	Type, description	L N R	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	h_2 [mm]	D_{min} [mm]	f [mm]	s_1 [mm]		
32	MSS-I32R09-GX16-1	R	2.00	2.75	9	32.2	40	20.00	5.9		GX16-1..
	MSS-I32R09-GX16-2		2.76	3.75	9	32.2	40	20.00	5.9		GX16-2..
	MSS-I32R09-GX16-3		3.76	5.00	9	32.2	40	20.00	5.9		GX16-3..
	MSS-I32R09-GX16-4		5.01	6.50	9	32.2	40	20.00	5.9		GX16-4..
	MSS-I32L09-GX16-1	L	2.00	2.75	9	32.2	40	20.00	5.9		GX16-1..
	MSS-I32L09-GX16-2		2.76	3.75	9	32.2	40	20.00	5.9		GX16-2..
	MSS-I32L09-GX16-3		3.76	5.00	9	32.2	40	20.00	5.9		GX16-3..
	MSS-I32L09-GX16-4		5.01	6.50	9	32.2	40	20.00	5.9		GX16-4..
40	MSS-I40R10-GX16-1	R	2.00	2.75	10	39.6	50	24.50	5.9		GX16-1..
	MSS-I40R10-GX16-2		2.76	3.75	10	39.6	50	24.50	5.9		GX16-2..
	MSS-I40R10-GX16-3		3.76	5.00	10	39.6	50	24.50	5.9		GX16-3..
	MSS-I40R10-GX16-4		5.01	6.50	10	39.6	50	24.50	5.9		GX16-4..
	MSS-I40L10-GX16-1	L	2.00	2.75	10	39.6	50	24.50	5.9		GX16-1..
	MSS-I40L10-GX16-2		2.76	3.75	10	39.6	50	24.50	5.9		GX16-2..
	MSS-I40L10-GX16-3		3.76	5.00	10	39.6	50	24.50	5.9		GX16-3..
	MSS-I40L10-GX16-4		5.01	6.50	10	39.6	50	24.50	5.9		GX16-4..
	MSS-I40N19-GX24-2	N	2.76	3.75	19	40.7	60	33.50	6.2		GX24-2..
	MSS-I40N19-GX24-3		3.76	5.00	19	40.7	60	33.50	6.2		GX24-3..
	MSS-I40N19-GX24-4		5.01	6.50	19	40.7	60	33.50	6.2		GX24-4..

Ordering example: 1 piece MSS-I32R09-GX16-1

Bgr. = assembly size

GX-E C180-C181

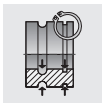
GX-S C182

GX-R C183

1.5D C231

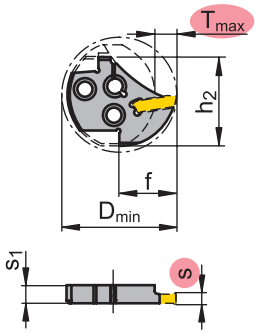
2.5D C232

UTS C249



GX09





Picture shows right-hand version

Bgr.	Type, description	L N R	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	h_2 [mm]	D_{min} [mm]	f [mm]	s_1 [mm]		
16	MSS-I16R02-GX09-1	R	0.60	1.95	2	16.45	20	10.00	3.8		GX09-1.. R/L
	MSS-I16L02-GX09-1	L	0.60	1.95	2	16.45	20	10.00	3.8		
20	MSS-I20R02-GX09-1	R	0.60	1.95	2	20.35	25	12.00	3.8		
	MSS-I20L02-GX09-1	L	0.60	1.95	2	20.35	25	12.00	3.8		
25	MSS-I25R02-GX09-1	R	0.60	1.95	2	24.95	32	15.50	3.8		
	MSS-I25L02-GX09-1	L	0.60	1.95	2	24.95	32	15.50	3.8		

Ordering example: 1 piece MSS-I16R02-GX09-1

Bgr. = assembly size

GX-S

C182

GX-R

C183

1.5D

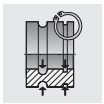
C231

2.5D

C232

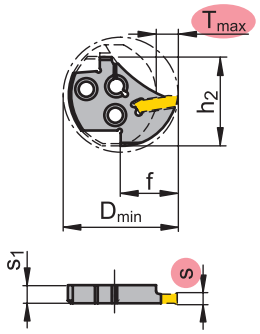
MSS modules – internal

Circlip and radius grooves – GX16



GX16





Picture shows right-hand version

Bgr.	Type, description	L N R	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	h_2 [mm]	D_{min} [mm]	f [mm]	s_1 [mm]		
32	MSS-I32R03-GX16-2	R	0.60	2.75	3	32.2	40	20.00	5.9		GX16-2.. R/L
	MSS-I32L03-GX16-2	L	0.60	2.75	3	32.2	40	20.00	5.9		
40	MSS-I40R03-GX16-2	R	0.60	2.75	3	39.6	50	24.50	5.9		
	MSS-I40L03-GX16-2	L	0.60	2.75	3	39.6	50	24.50	5.9		

Ordering example: 1 piece MSS-I32R03-GX16-2

Bgr. = assembly size

GX-S  C182

GX-R  C183

1.5D  C231

2.5D  C232

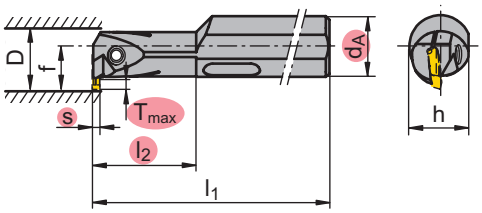
UTS  C249





GX monobloc boring bars

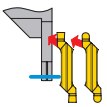




Picture shows right-hand version

Type, description	L N R	d_A [mm]	l_2 [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	h [mm]	l_1 [mm]	D [mm]	f [mm]		
I12R90-2.5D-GX09	R	16	30	0.60	3.75	3	15.25	150	16	11		GX09..
I12L90-2.5D-GX09	L											

Ordering example: 1 piece I12R90-2.5D-GX09



Attention:
When using right-hand or left-hand inserts, the tool requires modification to prevent the insert fouling.

			
16	7897202/M3,5X12,5/T15	7897208/TORX T15 T	

GX-E

C180

GX-S

C182

GX-R

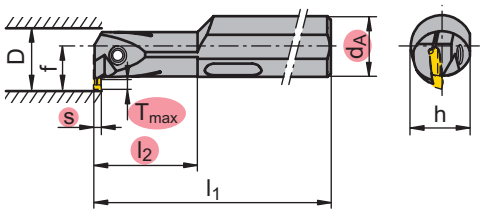
C183





GX monobloc boring bars

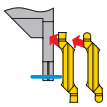




Picture shows right-hand version

Type, description	L N R	d_A [mm]	l_2 [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	h [mm]	l_1 [mm]	D [mm]	f [mm]		
I16R90-2.0D-GX16-1	R	16	32	2.00	2.75	5.5	15.25	150	20.5	13.5		GX16-1..
I16R90-2.0D-GX16-2			32	0.60	3.75	5.5	15.25	150	20.5	13.5		GX16-2..
I16L90-2.0D-GX16-1	L		32	2.00	2.75	5.5	15.25	150	20.5	13.5		GX16-1..
I16L90-2.0D-GX16-2			32	0.60	3.75	5.5	15.25	150	20.5	13.5		GX16-2..
I20R90-2.0D-GX16-2	R	20	40	0.60	3.75	5.5	19	180	25.0	15.5		GX16-2..
I20L90-2.0D-GX16-2	L		40	0.60	3.75	5.5	19	180	25.0	15.5		GX16-2..
I25R90-2.0D-GX16-2	R	25	50	0.60	3.75	8.0	24	200	32.0	20.5		GX16-2..
I25R90-2.0D-GX16-3			50	3.76	5.00	10.0	24	200	32.0	22.5		GX16-3..
I25L90-2.0D-GX16-2	L		50	0.60	3.75	8.0	24	200	32.0	20.5		GX16-2..
I25L90-2.0D-GX16-3			50	3.76	5.00	10.0	24	200	32.0	22.5		GX16-3..
I32R90-2.0D-GX16-2	R	32	64	0.60	3.75	11.0	31	250	42.0	27.5		GX16-2..
I32R90-2.0D-GX16-3			64	3.76	5.00	11.0	31	250	42.0	27.5		GX16-3..
I32L90-2.0D-GX16-2	L		64	0.60	3.75	11.0	31	250	42.0	27.5		GX16-2..
I32L90-2.0D-GX16-3			64	3.76	5.00	11.0	31	250	42.0	27.5		GX16-3..

Ordering example: 1 piece I16R90-2.0D-GX16-1



Attention:
When using right-hand or left-hand inserts, the tool requires modification to prevent the insert fouling.

d_A [mm]			
16 - 32	7897203/M4,0X14/T15	7897208/TORX T15 T	

GX-E

C180-C181

GX-S

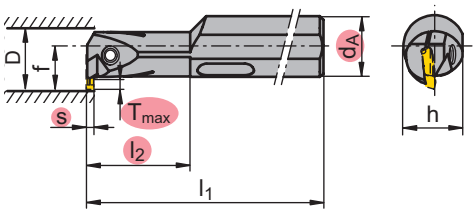
C182

GX-R

C183

GX monobloc boring bars





Picture shows right-hand version

Type, description	L N R	d_A [mm]	l_2 [mm]	s_{min} [mm]	s_{max} [mm]	T_{max} [mm]	h [mm]	l_1 [mm]	D [mm]	f [mm]		
I32R90-2.0D-GX24-2	R	32	64	2.76	3.75	11.0	31.0	250	42	27.5		GX24-2..
I32R90-2.0D-GX24-3			64	3.76	5.00	11.0	31.0	250	42	27.5		GX24-3..
I32R90-2.0D-GX24-4			64	5.01	6.50	17.5	31.0	250	47	30.4		GX24-4..
I32L90-2.0D-GX24-2	L		64	2.76	3.75	11.0	31	250	42	27.5		GX24-2..
I32L90-2.0D-GX24-3			64	3.76	5.00	11.0	31.0	250	42	27.5		GX24-3..
I32L90-2.0D-GX24-4			64	5.01	6.50	17.5	31.0	250	47	30.4		GX24-4..
I40R90-2.0D-GX24-3	R	40	80	3.76	5.00	12.0	38.5	300	53	32.5		GX24-3..
I40R90-2.0D-GX24-4			80	5.01	6.50	17.5	38.5	300	57	34.4		GX24-4..
I40L90-2.0D-GX24-3	L		80	3.76	5.00	12.0	38.5	300	53	32.5		GX24-3..
I40L90-2.0D-GX24-4			80	5.01	6.50	17.5	38.5	300	57	34.4		GX24-4..

Ordering example: 1 piece I32R90-2.0D-GX24-2

 d_A [mm]			
32 - 40	7897205/M5,0X18/T20	7897207/TORX T20 T	

GX-E



C180-C181

GX-R



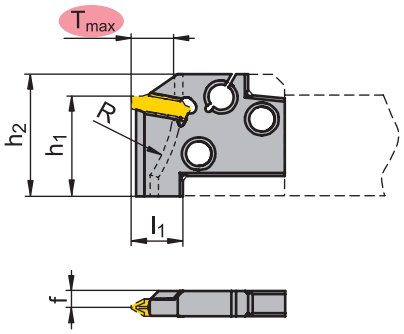
C183

MSS modules – external

Thread turning – TC

TC16





Picture shows right-hand version

Bgr.	Type, description	L N R	Pitch P P_{min} [mm]	P_{max} [mm]	P_{min} [TPI]	P_{max} [TPI]	T_{max} [mm]	h_1 [mm]	h_2 [mm]	l_1 [mm]	f [mm]	R [mm]	
20	MSS-E20R-TC16-1	R	0.50	1.50	48	16	8	20	24	20	3.45	30	TC16-1..
	MSS-E20N-TC16-2	N	1.75	3.00	14	8	12	20	24	20	2.20		TC16-2..
	MSS-E20L-TC16-1	L	0.50	1.50	48	16	8	20	24	20	3.45	30	TC16-1..
25	MSS-E25R-TC16-1	R	0.50	1.50	48	16	8	25	30	25	5.20	37.5	TC16-1..
	MSS-E25R-TC16-2	R	1.75	3.00	14	8	10	25	30	25	4.10	37.5	TC16-2..
	MSS-E25N-TC16-3	N	3.50	5.00	7	5	12	25	30	25	3.10		TC16-3..
	MSS-E25L-TC16-1	L	0.50	1.50	48	16	8	25	30	25	5.20	37.5	TC16-1..
	MSS-E25L-TC16-2	L	1.75	3.00	14	8	10	25	30	25	4.10	37.5	TC16-2..

Ordering example: 1 piece MSS-E20R-TC16-1

Bgr. = assembly size

TC 60°



C190+C192

TC 55°



C191+C193



C196



C197



C199



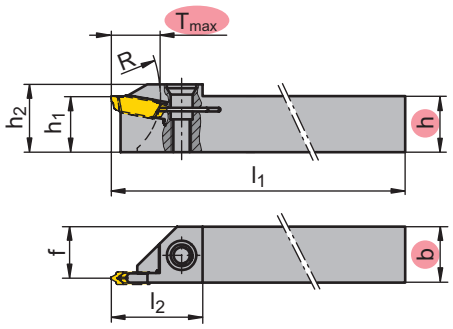
C246



C247

TC monobloc tool holders

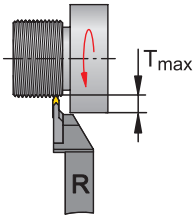




Picture shows right-hand version

Type, description	L N R	h [mm]	b [mm]	Pitch P: P min [mm]	P max [mm]	P min [TPI]	P max [TPI]	T max [mm]	h1 [mm]	h2 [mm]	l1 [mm]	l2 [mm]	f [mm]	R [mm]	
E12R00-1212-TC16	R	12	12	0.50	3.00	48	8	10	12	14.5	150	20	11	15	TC16-1/2..
E12L00-1212-TC16	L														

Ordering example: 1 piece E12R00-1212-TC16



h [mm]			
12	7897209/M4,0X11/T15	7897208/TORX T15 T	

TC 60°



C190+C192

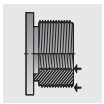
TC 55°



C191+C193

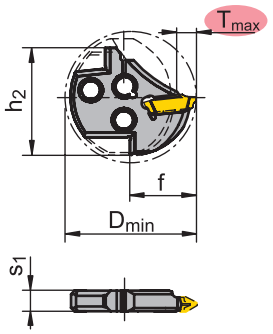
MSS modules – internal

Thread turning – TC



TC16





Picture shows right-hand version

Bgr.	Type, description	L N R	Pitch P P_{min} [mm]	P_{max} [mm]	P_{min} [TPI]	P_{max} [TPI]	T_{max} [mm]	h_2 [mm]	f [mm]	D_{min} [mm]	s_1 [mm]	
32	MSS-I32R-TC16-1	R	0.50	1.50	48	16	7	32.2	20.00	40	6.2	TC16-1..
	MSS-I32R-TC16-2		1.75	3.00	14	8	7	32.2	20.00	40	6.2	TC16-2..
	MSS-I32N-TC16-3	N	3.50	5.00	7	5	7	32.2	20.00	40	6.2	TC16-3..
	MSS-I32L-TC16-1	L	0.50	1.50	48	16	7	32.2	20.00	40	6.2	TC16-1..
	MSS-I32L-TC16-2		1.75	3.00	14	8	7	32.2	20.00	40	6.2	TC16-2..

Ordering example: 1 piece MSS-I32R-TC16-1

Bgr. = assembly size

TC 60°

C190+C192

TC 55°

C191+C193

1.5D

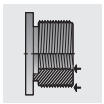
C231

2.5D

C232

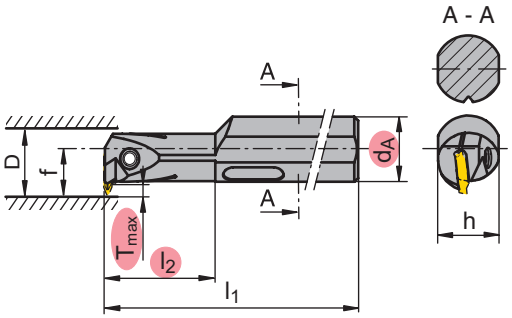
UTS

C249



TC monobloc boring bars





Picture shows right-hand version

Type, description	L N R	d_A [mm]	l_2 [mm]	Pitch P P_{min} [mm]	Pitch P P_{max} [mm]	Pitch P P_{min} [TPI]	Pitch P P_{max} [TPI]	T_{max} [mm]	h [mm]	l_1 [mm]	D_{min} [mm]	f [mm]			
I16R90-2D-TC16	R	20	32	0.50	3.00	48	8	4	18	181	20	14.00			TC16-1/2..
I16L90-2D-TC16	L		32	0.50	3.00	48	8	4	18	181	20	14.00			TC16-1/2..
I20R90-2D-TC16	R	25	40	0.50	5.00	48	5	5	23	200	25	17.50			TC16-..
I20L90-2D-TC16	L		40	0.50	5.00	48	5	5	23	200	25	17.50			TC16-..
I25R90-2D-TC16	R	32	50	0.50	5.00	48	5	6	30	250	32	22.00			TC16-..
I25L90-2D-TC16	L		50	0.50	5.00	48	5	6	30	250	32	22.00			TC16-..

Ordering example: 1 piece I16R90-2D-TC16

d_A [mm]			
20	7897203/M4,0X14/T15	7897208/TORX T15 T	
25	7897205/M5,0X18/T20	7897207/TORX T20 T	
32	7897206/M6,0X20/T25	7883304/TORX T25 T	

TC 60°

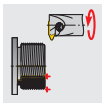


C190+C192

TC 55°

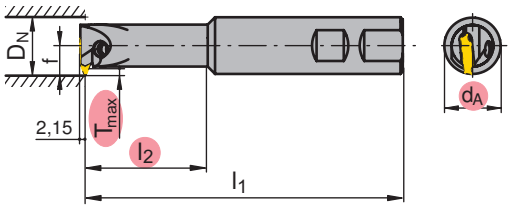


C191+C193



TC milling cutters





Picture shows right-hand version

Type, description	L N R	d_A [mm]	l_2 [mm]	T_{max} [mm]			l_1 [mm]	D_N [mm]	f [mm]			
I25R90-2D-TC16-W	R	25	54	3.0			140	25	12.5			TC16-..
I32R90-2D-TC16-W		32	68	3.5			166	32	16.0			

Ordering example: 1 piece I25R90-2D-TC16-W

d_A [mm]			
25	7897207/TORX T20 T	7897204/M4,5X17/T20	
32	7883304/TORX T25 T	7897206/M6,0X20/T25	

TC 60°

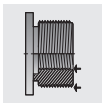


C190+C192

TC 55°

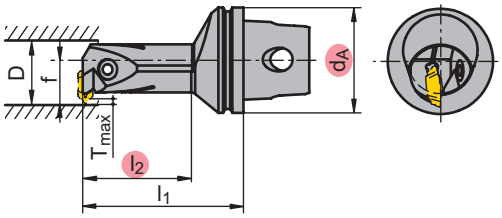


C191+C193



TC monobloc boring bars





Picture shows right-hand version

Type, description	LNR	d_A [mm]	l_2 [mm]	l_1 [mm]	D_{min} [mm]	f [mm]	T_{max} [mm]		
UT40-MSS-I16R90-2D-TC16	R	40	32	50	20	14	4		TC16-1/2..
UT40-MSS-I20R90-2D-TC16	R	40	40	60	25	17.5	5		TC16-..
UT40-MSS-I25R90-2D-TC16	R	40	50	70	32	22	6		TC16-..
UT40-MSS-I25L90-2D-TC16	L	40	50	70	32	22	6		TC16-..

Ordering example: 1 piece UT40-MSS-I16R90-2D-TC16

d_A [mm]	Bgr.				
40	16	7897203/M4,0X14/T15	7897208/TORX T15 T	7896900/O-RING 40	
40	20	7897205/M5,0X18/T20	7897207/TORX T20 T	7896900/O-RING 40	
40	25	7897206/M6,0X20/T25	7883304/TORX T25 T	7896900/O-RING 40	

TC 60°

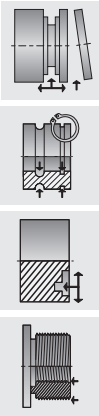


C190+C192

TC 55°

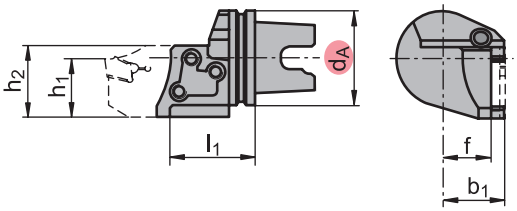


C191+C193



UTS 0°





Picture shows right-hand version

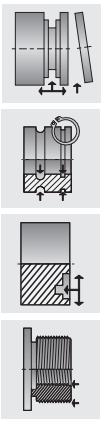
Bgr.	Type, description	L N R	d_A [mm]	h_1 [mm]	h_2 [mm]	b_1 [mm]	l_1 [mm]	f [mm]	
25	UT40-MSS-E25R00	R	40	25	30.0	26.40	36	20.50	MSS-E25R..
	UT50-MSS-E25R00		50	25	30.0	31.40	42	25.50	MSS-E25R..
	UT63-MSS-E25R00		63	25	30.0	37.40	50	31.50	MSS-E25R..
	UT40-MSS-E25L00	L	40	25	30.0	26.40	36	20.50	MSS-E25L..
	UT50-MSS-E25L00		50	25	30.0	31.40	42	25.50	MSS-E25L..
	UT63-MSS-E25L00		63	25	30.0	37.40	50	31.50	MSS-E25L..
32	UT50-MSS-E32R00	R	50	35	41.8	31.40	49	25.50	MSS-E32R..
	UT63-MSS-E32R00		63	35	41.8	37.40	50	31.50	MSS-E32R..
	UT50-MSS-E32L00	L	50	35	41.8	31.40	49	25.50	MSS-E32L..
	UT63-MSS-E32L00		63	35	41.8	37.40	50	31.50	MSS-E32L..

Ordering example: 1 piece UT40-MSS-E25R00

Bgr. = assembly size

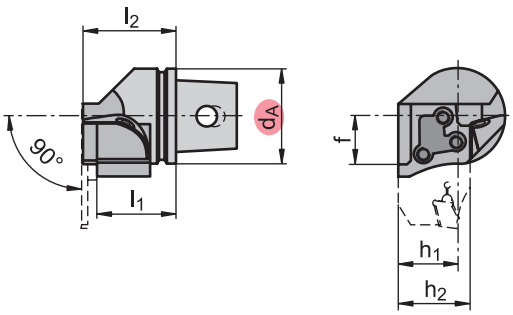
d_A [mm]	Bgr.				
40	25	7897205/M5,0X18/T20	7897207/TORX T20 T	7896900/O-RING 40	7896904/SD 8X6
50	25	7897205/M5,0X18/T20	7897207/TORX T20 T	7896940/O-RING 50	7896904/SD 8X6
63	25	7897205/M5,0X18/T20	7897207/TORX T20 T	7896941/O-RING 63	7896944/SD 12X8
50	32	7897206/M6,0X20/T25	7883304/TORX T25 T	7896940/O-RING 50	7896904/SD 8X6
63	32	7897206/M6,0X20/T25	7883304/TORX T25 T	7896941/O-RING 63	7896944/SD 12X8

GX C201-C202 | GX C204 | GX-A C205-C207 | AX C208 | SX C209 | LX C210 | FX C211-C212 | TC C240



UTS 90°





Picture shows right-hand version

Bgr.	Type, description	L N R	d_A [mm]	h_1 [mm]	h_2 [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	UT40-MSS-E25R90	R	40	25	30.0	33.5	39	20.00	MSS-E25L..
	UT50-MSS-E25R90	R	50	25	30.0	43.5	49	25.00	MSS-E25L..
	UT40-MSS-E25L90	L	40	25	30.0	33.5	39	20.00	MSS-E25R..
	UT50-MSS-E25L90	L	50	25	30.0	43.5	49	25.00	MSS-E25R..
32	UT63-MSS-E32R90	R	63	32	38.0	53.5	59	27.00	MSS-E32L..
	UT63-MSS-E32L90	L	63	32	38.0	53.5	59	27.00	MSS-E32R..

Ordering example: 1 piece UT40-MSS-E25R90

Bgr. = assembly size

In case of 90deg please note:
Right-hand shank - left-hand module
Left-hand shank - right-hand module

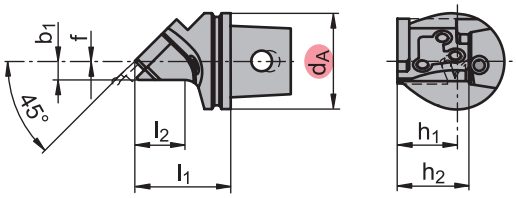
d_A [mm]	Bgr.				
40	25	7897205/M5,0X18/T20	7897207/TORX T20 T	7896900/O-RING 40	7896904/SD 8X6
50	25	7897205/M5,0X18/T20	7897207/TORX T20 T	7896940/O-RING 50	7896904/SD 8X6
63	32	7897206/M6,0X20/T25	7883304/TORX T25 T	7896941/O-RING 63	7896944/SD 12X8

GX C201-C202 **GX** C204 **GX-A** C205-C207 **AX** C208 **SX** C209 **LX** C210 **FX** C211-C212 **TC** C240



UTS 45°





Picture shows left-hand version

Bgr.	Type, description	L NR	d_A [mm]	h_1 [mm]	h_2 [mm]	b_1 [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	UT40-MSS-E25L45	L	40	25	30.0	8.00	40	21	0.00	MSS-E25R..

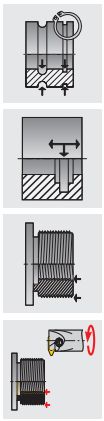
Ordering example: 1 piece UT40-MSS-E25L45

Bgr. = assembly size

Bgr.				
25	7897210/M5,0X13,5/T20	7897205/M5,0X18/T20	7897207/TORX T20 T	7896904/SD 8X6

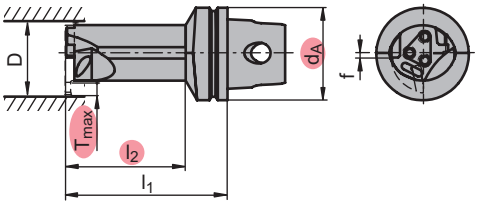
GX

C204



UTS boring bars



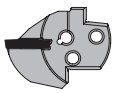


Picture shows right-hand version

Bgr.	Type, description	L N R	d_A [mm]	l_2 [mm]	T_{max} [mm]	l_1 [mm]	D_{min} [mm]	f [mm]			
32	UT40-MSS-I32R90-2D	R	40	64	9	80	40	2.00			MSS-I32R..
	UT50-MSS-I32L90-2D	L	50	64	9	90	40	2.00			MSS-I32L..
40	UT40-MSS-I40R90-2D	R	40	80	10	92	50	2.50			MSS-I40R..
	UT63-MSS-I40R90-2D	R	63	80	10	110	50	2.50			MSS-I40R..
	UT40-MSS-I40L90-2D	L	40	80	10	92	50	2.50			MSS-I40L..

Ordering example: 1 piece UT40-MSS-I32R90-2D

Bgr. = assembly size



When using module MSS-I40N19-GX24.. the following applies:

GX24:
T_{max} = +9 mm
D = +10 mm

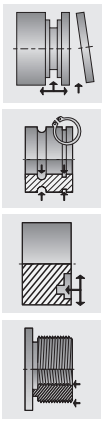
Bgr.			
32	7897204/M4,5X17/T20	7897207/TORX T20 T	
40	7897205/M5,0X18/T20	7897207/TORX T20 T	

GX

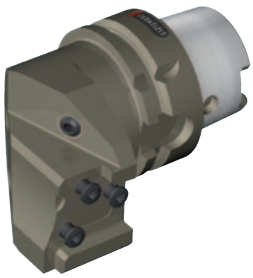
C234+C236

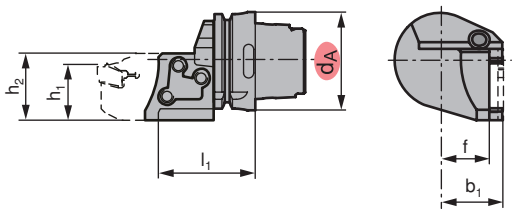
TC

C242



HSK-T 0°





Picture shows right-hand version

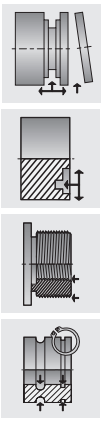
Bgr.	Type, description	L N R	d_A [mm]	h_1 [mm]	h_2 [mm]	l_1 [mm]	b_1 [mm]	f [mm]	
32	HSK-T63-MSS-E32R00	R	63	35	41.0	74	44.20	38.70	MSS-E32R..
	HSK-T100-MSS-E32R00		100	43.8	49.8	77	54.20	48.70	MSS-E32R..
	HSK-T63-MSS-E32L00	L	63	35	41.0	74	44.20	38.70	MSS-E32L..
	HSK-T100-MSS-E32L00		100	43.8	49.8	77	54.20	48.70	MSS-E32L..

Ordering example: 1 piece HSK-T63-MSS-E32R00

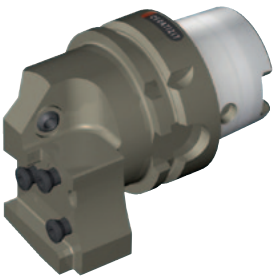
Bgr. = assembly size

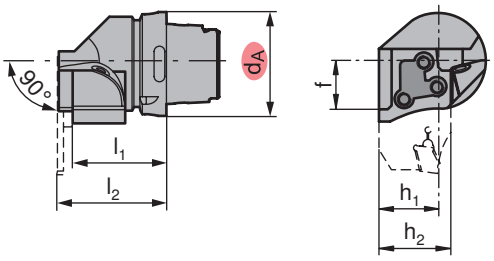
d_A [mm]	Bgr.				
63 - 100	32	7897206/M6,0X20/T25	7883304/TORX T25 T	7896944/SD 12X8	

GX C201-C202 | GX C204 | GX-A C205-C207 | SX C209 | LX C210 | FX C211-C212



HSK-T 90°





Picture shows right-hand version

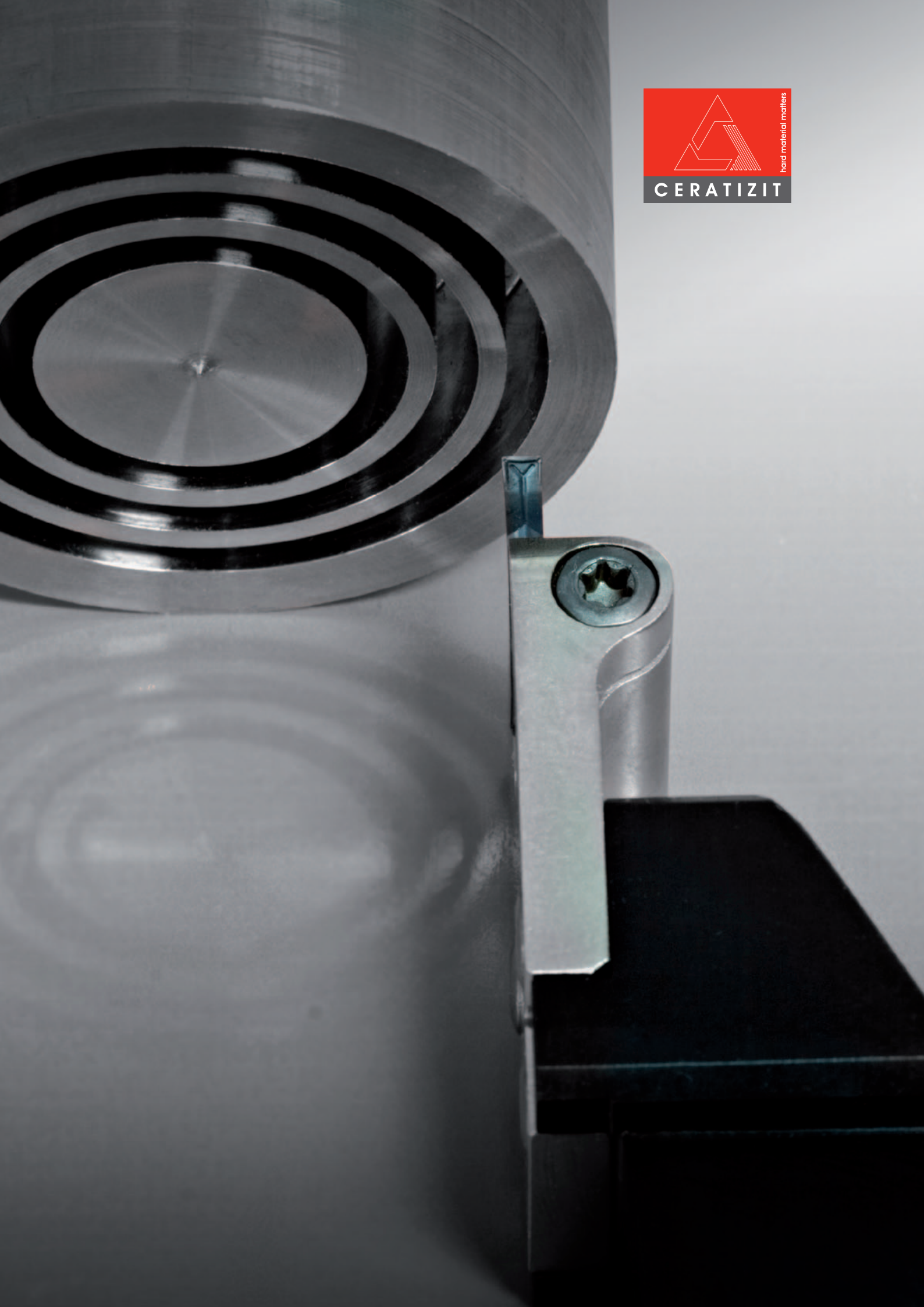
Bgr.	Type, description	L N R	d_A [mm]	h_1 [mm]	h_2 [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
32	HSK-T63-MSS-E32R90	R	63	34.8	40.9	63.7	69.2	31.50	MSS-E32L..
	HSK-T100-MSS-E32R90		100	43.8	49.8	73.7	79.2	50.00	MSS-E32L..
	HSK-T63-MSS-E32L90	L	63	34.8	40.9	63.7	69.2	31.50	MSS-E32R..
	HSK-T100-MSS-E32L90		100	43.8	49.8	73.7	79.2	50.00	MSS-E32R..

Ordering example: 1 piece HSK-T63-MSS-E32R90

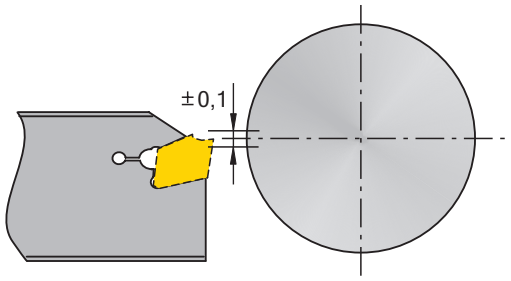
Bgr. = assembly size

d_A [mm]	Bgr.				
63 - 100	32	7897206/M6,0X20/T25	7883304/TORX T25 T	7896944/SD 12X8	

GX C201-C202 **GX** C204 **GX-A** C205-C207 **SX** C209 **LX** C210 **FX** C211-C212

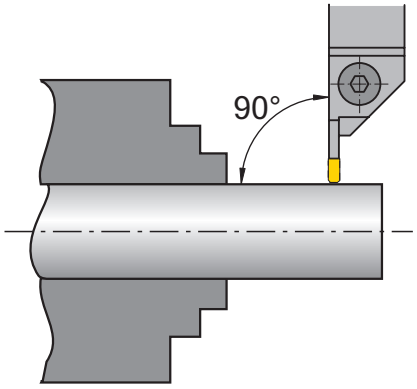

hard material matters
CERATIZIT

Centre height



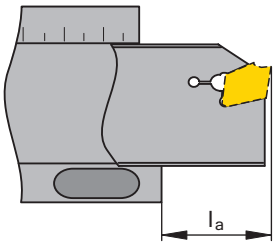
The centre height should be set within a tolerance of ± .1 mm to the work piece axis. This is especially important when parting into centre.

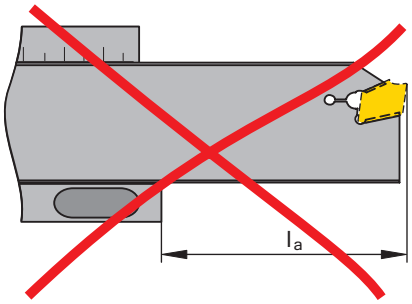
Tool setting



The parting and grooving tool must be mounted with a 90° angle to the axis of the work piece.

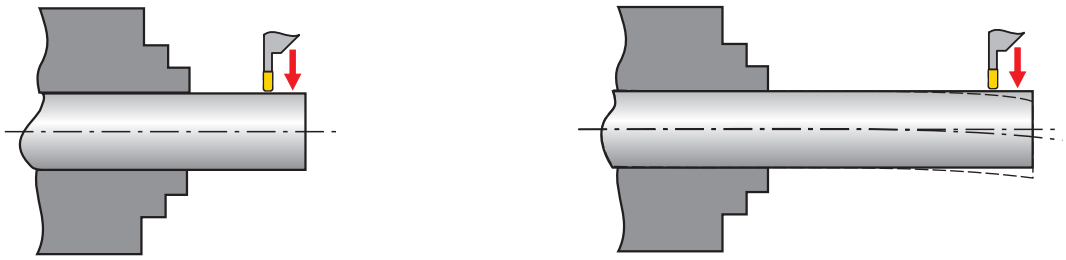
Tool overhang





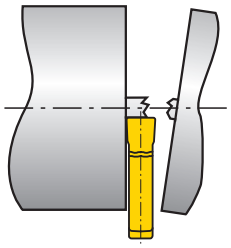
For optimum stability the tool overhang has to be kept as short as possible. The following rule can be applied: overhang l_a should not be larger than 8 x s (cutting width).

Work piece overhang



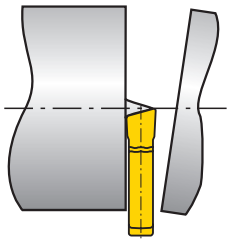
In order to avoid vibration the work piece should be clamped with the minimum overhang possible.

Advice for part-off operations



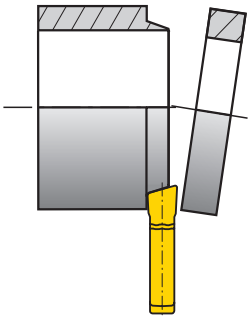
From dia. 5 mm on, reduce feed rate ‘f’ by approx. 50%.

No part-off across centre (risk of breakage).



For parting pip-free, use R or L inserts.

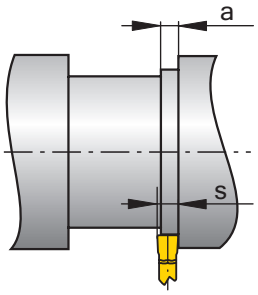
Because of lateral deflection reduce feed rate ‘f’ by approx. 20% - 50%.



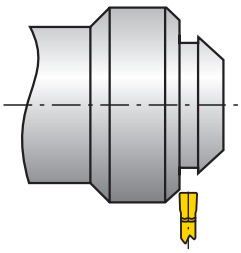
In order to prevent ring formation, use R or L inserts.

Because of lateral deflection reduce feed rate ‘f’ by approx. 20% - 50%.

Advice for grooving operations



When grooving with an axial displacement the width ‘a’ should be at least 70% of the cutting width ‘s’.



When grooving inclined surfaces the feed should be reduced by approx. 20% - 50% at the beginning.

GX09-S / GX16-S			
	Tolerances (mm)		
Chip groove	x	s	r
R/L	±0,02	±0,02	–
N			±0,05

GX09-R			
	Tolerances (mm)		
Chip groove	x	s	r
–	±0,02	±0,02	±0,05

GX16-R			
	Tolerances (mm)		
Chip groove	x	s	r
-27P	±0,02	±0,02	±0,05
–			

GX24-R			
	Tolerances (mm)		
Chip groove	x	s	r
-27P	±0,02	±0,02	±0,05
-M3	±0,15	±0,05	±0,05

GX09-E			
	Tolerances (mm)		
Chip groove	x	s	r
-F2	±0,02	±0,02	±0,05
–			
-M40	±0,1	±0,05	

GX16-E			
	Tolerances (mm)		
Chip groove	x	s	r
-27P	±0,02	±0,02	±0,05
-F2			
–			
-M1	±0,15	±0,05	
-M40			

GX24-E			
	Tolerances (mm)		
Chip groove	x	s	r
-27P	±0,02	±0,02	±0,05
-F2			
–			
-M40	±0,15	±0,05	
-M1			

AX			
	Tolerances (mm)		
Chip groove	x	s	r
-F50	±0,02	±0,02	±0,05

SX			
	Tolerances (mm)		
Chip groove	x	s	r
-27P	±0,02	±0,02	±0,05
-F2			
-M1	±0,1	±0,05	±0,05
-M2			
-M3			

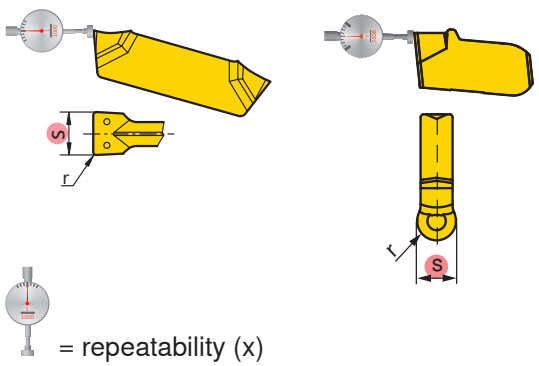
LX			
	Tolerances (mm)		
Chip groove	x	s	r
-M2	±0,15	±0,08	±0,08
-M3	±0,15	±0,08	±0,08

FX				
		Tolerances (mm)		
Chip groove	Width	x	s	r
-27P	2,2 - 4,1	±0,05	±0,05	±0,05
-F1	2,2 - 4,1	±0,13	±0,05	±0,05
-M1	2,2 - 4,1	±0,13	-0,1	±0,05
	5,1 - 6,5		-0,15	
	8,2 - 9,7	±0,15	-0,2	±0,01
-R2	3,1 - 4,1	±0,13	±0,05	±0,05

PX			
	Tolerances (mm)		
Chip groove	x	s	r
-F3	±0,02	±0,02	±0,05

MaxiClick			
	Tolerances (mm)		
Chip groove	x	s	r
-27P	±0,025	±0,03	–
-F2			
-F3			

TC			
	Tolerances (mm)		
Chip groove	x	s	r
-27P	±0,02	–	–
–			



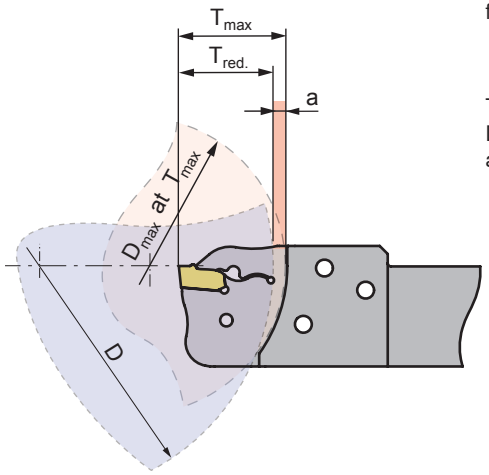
= repeatability (x)

MSS-GX, SX, LX, FX

Reduced parting and grooving depth

Reduced parting and grooving depth:

The MSS parting and grooving modules are selected by size to suit a certain work piece diameter (D_{max}). If the diameter of the work piece is bigger than D_{max} of the module, then the achievable parting and grooving depth is reduced by dimension 'a'. The extent of the reduction is established by reference to the following table.



T_{max} = maximum grooving depth
D_{max} = maximum work piece diameter with full grooving depth T_{max} (a = 0)
a = reduction of grooving depth

$$T_{red.} = T_{max} - a$$

Assembly size	Work piece diameter (mm)																
E12	**35**	40	45	60	75	115	>250										
E16	**50**	55	60	70	80	100	130	200	>420								
E20	**60**	65	70	75	85	95	110	130	165	220	>330						
E25	**75**	80	85	90	100	110	125	140	160	190	240	320	>500				
E32	**95**	100	105	110	120	125	135	145	160	180	200	225	270	320	400	530	>800
		0,5	**1,0**	**1,5**	**2,0**	**2,5**	**3,0**	**3,5**	**4,0**	**4,5**	**5,0**	**5,5**	**6,0**	**6,5**	**7,0**	**7,5**	**8,0**
		Reduction of the maximum grooving depth a (mm)															

Maximum work piece diameter (D_{max}) in case of full parting and grooving depth (T_{max}) in mm

Calculation example: module

MSS-**E25**R**21**-GX24-3

assembly size 25

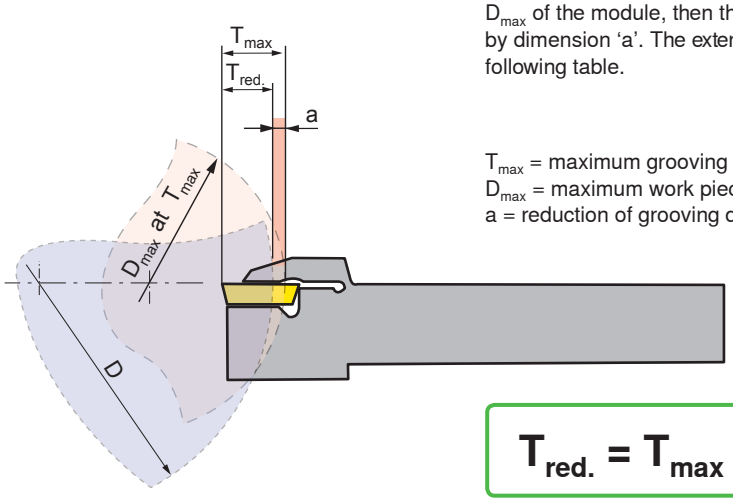
T_{max} = 21 mm, Ø 75 mm

D = Ø 100 mm

=> T_{max} - a = $T_{red.}$
21 - 2 = **19 mm**

Reduced parting and grooving depth:

The MSS parting and grooving modules are selected by size to suit a certain work piece diameter (D_{max}). If the diameter of the work piece is bigger than D_{max} of the module, then the achievable parting and grooving depth is reduced by dimension 'a'. The extent of the reduction is established by reference to the following table.



T_{max} = maximum grooving depth
D_{max} = maximum work piece diameter with full grooving depth T_{max} (a = 0)
a = reduction of grooving depth

$$T_{red.} = T_{max} - a$$

Assembly size	T_{max}	Work piece diameter (mm)																
E16...PX20-1	5	**52**	64	74	74	88	108	144	214	428	∞							
E16...PX20-2 E16...PX20-3	10	**52**	55	58	62	68	74	83	93	108	128	159	211	316	630	∞		
E20...PX20-1	5	**62**	68	77	89	106	131	174	259	518	∞							
E20...PX20-2 E20...PX20-3	11	**62**	66	72	79	88	99	115	136	170	225	337	672	∞				
			0,5	**1,0**	**1,5**	**2,0**	**2,5**	**3,0**	**3,5**	**4,0**	**4,5**	**5,0**	**5,5**	**6,0**	**6,5**	**7,0**	**7,5**	**8,0**
		Reduction of the maximum grooving depth a (mm)																

**Maximum work piece diameter (D_{max})
in case of full parting and grooving depth (T_{max}) in mm**

Calculation example: system PX

E20R00**11**-2020L-PX20-2

assembly size 20

T_{max} = 11 mm, Ø 62 mm

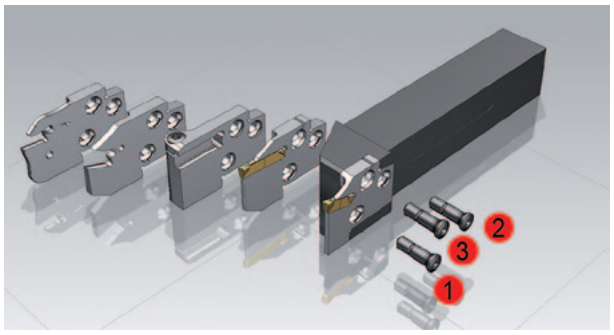
D = Ø 115 mm

=> T_{max} - a = $T_{red.}$
11 - 3 = **8 mm**

Torque moments

MSS module clamping screws

MSS tool shanks

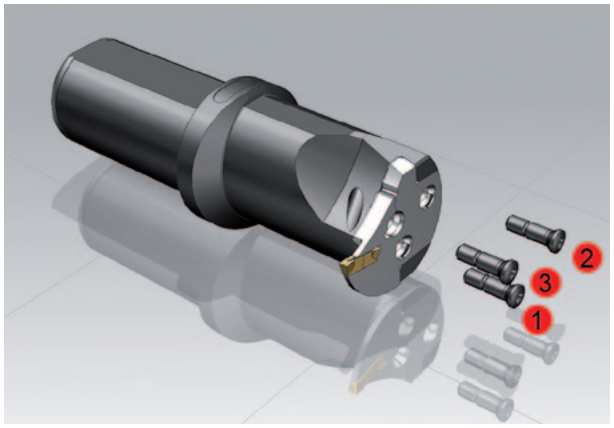


Note the order in which screws must be clamped!

C9

MSS tool shanks	Screw	Torx	Torque moments Nm	Torque moments in.lbs
MSS-E12…	7897200/M2,5x10/T08	T08	**1,2**	**10,6**
MSS-E16…	7897202/M3,5x12,5/T15	T15	**3,2**	**28,3**
MSS-E20…	7897203/M4x14/T15	T15	**4**	**35,4**
MSS-E25…	7897205/M5x18/T20	T20	**5**	**44,3**
MSS-E32…	7897206/M6x20/T25	T25	**6**	**53,1**

MSS boring bars



Note the order in which screws must be clamped!

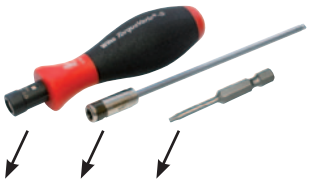
C9

MSS boring bars	Screw	Torx	Torque moments Nm	Torque moments in.lbs
MSS-I16…	7897200/M2,5x10/T08	T08	**1,2**	**10,6**
MSS-I20…	7897201/M3x11/T10	T10	**2**	**17,7**
MSS-I25…	7897202/M3,5x12,5/T15	T15	**3,2**	**28,3**
MSS-I32…	7897204/M4,5x17/T20	T20	**4**	**35,4**
MSS-I40…	7897205/M5x18/T20	T20	**5**	**44,3**

Recommended torque moments

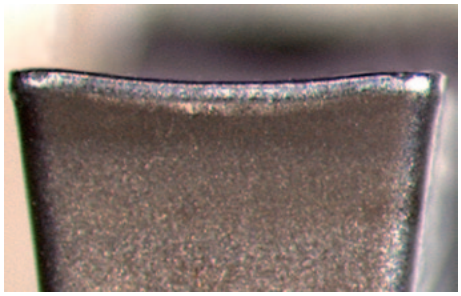
Tool	Screw	Torx	Torque moments	
			Nm	in.lbs
SX 	7897218/M4,0X18/T20	T20	4,0	35,4
PX 	7897218/M4,0X18/T20	T20	4,0	35,4
AX 	7897202/M3,5X12,5/T15 7897203/M4,0X14/T15 7897205/M5,0X18/T20	T15 T15 T20	3,2 4,0 5,0	28,3 35,4 44,3

Torque key (inserts/bits)

 **1 + 1 + 5 pcs. (incl. in delivery)**	DMSD 1,2Nm/SORT T08 DMSD 2,0Nm/SORT T10 DMSD 3,2Nm/SORT T15 DMSD 4,0Nm/SORT T15 DMSD 4,0Nm/SORT T20 DMSD 5,0Nm/SORT T20 DMSD 6,0Nm/SORT T25	Torque moment set to: 1.2 - 6.0 Nm
 **1 + 1 piece (incl. in delivery)**	DMSD 1-5Nm/SORT	Torque moment can be adjusted flexibly: 1.0-5.0 Nm
	DMSD 2-8Nm/SORT	Torque moment can be adjusted flexibly: 2.0-8.0 Nm
	DMSD-B T08-50MM DMSD-B T10-50MM DMSD-B T15-50MM DMSD-B T20-50MM DMSD-B T25-50MM	

Types of wear

Flank wear

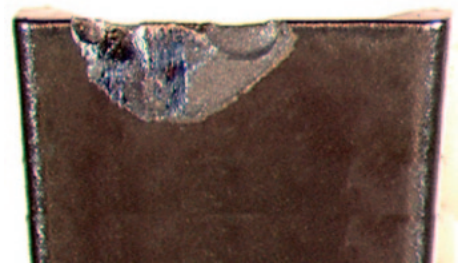


Abrasion on the flank, normal wear after a certain machining time.

Reasons:
> Cutting speed too high
> Carbide grade with insufficient wear resistance
> Insufficient amount of cooling lubricant

Remedies:
> Reduce cutting speed
> Select more wear resistant carbide grade
> Improve coolant supply

Edge chipping



Through excessive mechanical stress at the cutting edge fracture and chipping can take place.

Reasons:
> Grade with too high wear resistance
> Vibration
> Feed rate too high or excessive depth of cut
> Swarf damage

Remedies:
> Use tougher grade
> Use negative cutting edge geometry with chip groove
> Reduce overhang; check centre height
> Increase stability of cutting edge

Cratering



The hot chip which is being evacuated causes cratering at the rake face of the cutting edge.

Reasons:
> Cutting speed and / or feed rate too high
> Rake angle too shallow
> Grade with insufficient wear resistance
> Incorrect coolant supply

Remedies:
> Reduce cutting speed and / or feed rate
> Increase coolant quantity and / or pressure, optimize coolant supply
> Use grade which is more resistant to cratering

Plastic deformation



High machining temperature and simultaneous mechanical stress may lead to plastic deformation.

Reasons:
> Too high machining temperature resulting in softening of substrate
> Wear / heat resistance of carbide grade too low
> Insufficient coolant supply

Remedies:
> Reduce cutting speed
> Choose carbide grade with higher wear resistance
> Provide cooling

Built-up edge

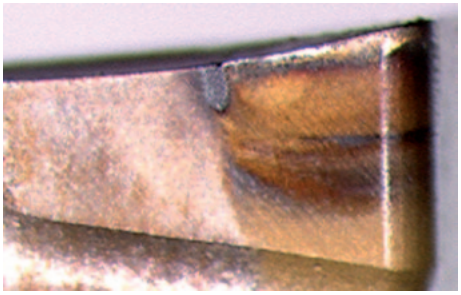


Built-up edge occurs when the chip is not evacuated properly due to insufficient cutting temperature.

Reasons:
> Cutting speed too low
> Rake angle too small
> Wrong cutting material
> Lack of cooling / lubrication

Remedies:
> Increase cutting speed
> Enlarge rake angle
> Apply TiN-coating
> Use emulsion with higher concentration

Notching



Notch at the maximum depth of cut

Reasons:
> Oxidation of the cutting edge
> Excessive heat on the cutting edge

Remedies:
> Use various depths of cut
> Reduce cutting speed
> Improve coolant supply

CERATIZIT hard material matters

Measures for parting and grooving problems

Type of problem

Type of wear				Work piece problems				Swarf control		Corrective measures	
Edge chipping	Built-up edge	Flank wear	Plastic deformation	Vibration	Formation of pips and burrs	Chattered surface	Surface quality	Chip too long (tangled swarf)	Chip too short (fragmented chip)		
	↑	↓	↓	↓			↑	↓		Cutting speed	Cutting values
↓		~	↓	↑		↓	↓	↑	↓	Feed rate	
↓		↓	↓		↓	↓	↓			Feed - centre area	
↑	↓		~	~	↓	↓	↓	↓	↑	Chip groove ↓ -R -M -F ↑	Selection of inserts
					●					R / L - right-hand / left-hand version	
↑		↑	↑	↓	↓	↓	↑			Corner radius larger ↓ ↑ smaller	
↓		↑	↑							Cutting material wear resistance ↓ ↑ toughness	
				↓		↑	↑			Cutting width	
~				~		~	~			Clamping of tool	General criteria
~				~		~	~			Clamping of work piece	
~				~			↓			Overhang	
~		~		~	~		~			Tip height	
	●	●	●		●		●	●		Cooling lubricant	

↑ raise, increase, large influence

↓ avoid, reduce large influence

~ check, optimize

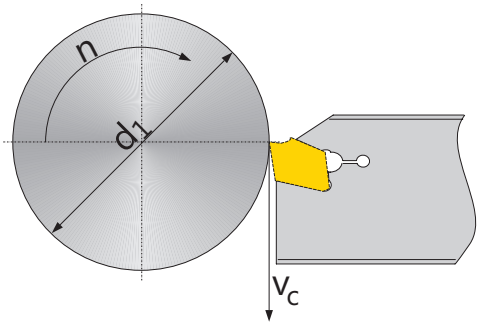
↑ raise, increase low influence

↓ avoid, reduce low influence

● use

Cutting speed (v_c)

$$v_c = \frac{d_1 \cdot \pi \cdot n}{1000} \quad [m/min]$$



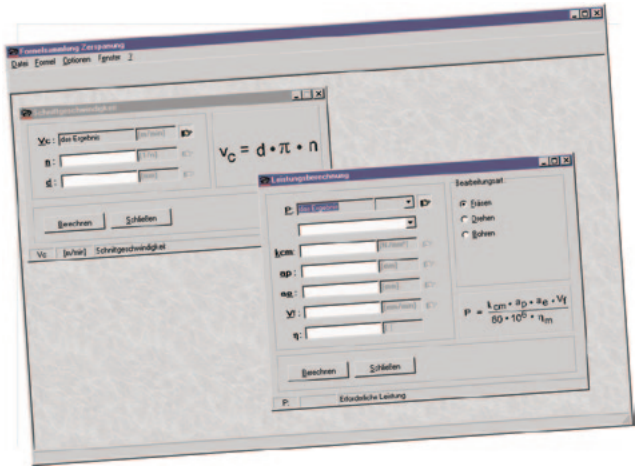
Revolutions per minute (n)

$$n = \frac{v_c \cdot 1000}{d_1 \cdot \pi} \quad [rev./min]$$

Feed rate (v_f)

$$v_f = f \cdot n \quad [mm/min]$$

The CERATIZIT formula collection CT-CALC



> PC - aided calculation of machining parameters:
  - cutting speed
  - chip removal rate
  - power consumption
  - medium chip thickness
> Languages: DE, EN, FR, IT, ES, DA, SE, FI
> Free of charge download from **www.ceratizit.com**

CERATIZIT hard material matters

Hardness values

Comparison table

Tensile strength N/mm²	Vickers HV	Brinell HB	Rockwell HRC	Shore C
575	180	171		
595	185	176		
610	190	181		
625	195	185		
640	200	190	12,0	
660	205	195	13,0	
675	210	199	14,0	
690	215	204	15,0	
705	220	209	15,5	28
720	225	214	16,0	
740	230	219	17,0	29
755	235	223	18,0	
770	240	228	20,3	30
785	245	233	21,3	
800	250	238	22,2	31
820	255	242	23,1	32
835	260	247	24,0	33
850	265	252	24,8	
865	270	257	25,6	
880	275	261	26,4	34
900	280	268	27,1	
915	285	271	27,8	35
930	290	276	28,5	
950	295	280	29,2	36
965	300	285	29,8	37
995	310	295	31,0	38
1030	320	304	32,2	39
1060	330	314	33,3	40
1095	340	323	34,3	41
1125	350	333	35,5	42
1155	360	342	36,6	43
1190	370	352	37,7	44
1220	380	361	38,8	45
1255	390	371	39,8	46
1290	400	380	40,8	47
1320	410	390	41,8	48
1350	420	399	42,7	
1385	430	409	43,6	49
1420	440	418	44,5	
1455	450	428	45,3	51
1485	460	437	46,1	52
1520	470	447	46,9	53
1555	480	465	47,7	54
1595	490	466	48,4	
1630	500	475	49,1	57
1665	510	485	49,8	58
1700	520	494	50,5	59
1740	530	504	51,1	60

Tensile strength N/mm²	Vickers HV	Brinell HB	Rockwell HRC	Shore C
1775	540	513	51,7	61
1810	550	523	52,3	62
1845	560	532	53,0	63
1880	570	542	53,6	64
1920	580	551	54,1	65
1955	590	561	54,7	66
1995	600	570	55,2	67
2030	610	580	55,7	68
2070	620	589	56,3	69
2105	630	599	56,8	70
2145	640	608	57,3	71
2180	650	618	57,8	72
2210	660	628	58,3	73
2240	665	633	58,8	74
2280	670	638	59,3	
2310	675	643	59,8	75
2350	680	648	60,3	76
2380	685	653	61,1	77
2410	690	658	61,3	78
2450	695	663	61,7	79
2480	710	668	62,2	80
2520	720	678	62,6	81
2550	730	683	63,1	82
2590	740	693	63,5	
2630	750	703	63,9	83
2660	760	708	64,3	84
2700	770	718	64,7	85
2730	780	723	65,1	
2770	790	733	65,5	86
2800	800	738	65,9	
2840	810	748	66,3	87
2870	820	753	66,7	88
2910	830	763	67,0	
2940	840	768	67,4	89
2980	850		67,7	
3010	860		68,1	90
3050	870		68,4	
3080	880		68,7	91
3120	890		69,0	
3150	900		69,3	92
3190	910		69,6	
3220	920		69,9	
3260	930		70,1	

The figures given are approximate according to DIN EN ISO18265 (02-2004)

Germany DIN	Mat. no.	United Kingdom BS	France AFNOR	Sweden SS	United States AISI	Japan JIS	$K_{c1.1}$ N/mm²	m_c	VDI 3323 group
10 SPb 20	1.0722		10 PbF 2		11 L 08		1350	.21	1
100 Cr 6	1.2067	BL 3	Y 100 C 6		L 3	SUJ2	1775	.24	6/9
105 WCr 6	1.2419		105 WC 13			SKS31	1775	.24	6/9
12 CrMo 9 10	1.7380	1501-622 Gr. 31; 45	10 CD 9.10	2218	A 182-F22	SPVA,SCMV4	1675	.24	6/7
12 Ni 19	1.5680		Z 18 N 5		2515		2450	.23	10/11
13 CrMo 4 4	1.7335	1501-620 Gr. 27	15 CD 3.5	2216	A 182-F11; F12	SPVAF12	1675	.24	6/7
14 MoV 6 3	1.7715	1503-660-440					1675	.24	6/7
14 Ni 6	1.5622		16 N 6		A 350-LF 5		1675	.24	6/7
14 NiCr 10	1.5732		14 NC 11		3415	SNC415(H)	1675	.24	6/7
14 NiCr 14	1.5752	655 M 13	12 NC 15		3310; 9314	SNC815(H)	1675	.24	6/7
14 NiCrMo 13 4	1.6657						1675	.24	6/7
15 Cr 3	1.7015	523 M 15	12 C 3		5015		1675	.24	6/7
15 CrMo 5	1.7262		12 CD 4			SCM415(H)	1675	.24	6/7
15 Mo 3	1.5415	1501-240	15 D 3	2912	A 204 Gr. A		1675	.24	6/7
16 MnCr 5	1.7131	527 M 17	16 MC 5	2511	5115	SCR415	1675	.24	6/7
16 Mo 5	1.5423	1503-245-420			4520	SB450M	1675	.24	6/7
17 CrNiMo 6	1.6587	820 A 16	18 NCD 6				1675	.24	6/7
21 NiCrMo 2	1.6523	805 M 20	20 NCD 2	2506	8620	SNCM220(H)	1725	.24	6/8
25 CrMo 4	1.7218	1717 CDS 110	25 CD 4 S	2225	4130	SM420;SCM430	1725	.24	6/8
28 Mn 6	1.1170	150 M 28	20 M 5		1330		1500	.22	2
32 CrMo 12	1.7361	722 M 24	30 CD 12	2240			1775	.24	6/9
34 Cr 4	1.7033	530 A 32	32 C 4		5132	SCR430(H)	1725	.24	6/8
34 CrMo 4	1.7220	708 A 37	35 CD 4	2234	4135; 4137	SCM432;SCCRM3	1775	.24	6/9
34 CrNiMo 6	1.6582	817 M 40	35 NCD 6	2541	4340	SNCM447	1775	.24	6/9
35 S 20	1.0726	212 M 36	35 MF 4	1957	1140		1525	.22	2/3
36 CrNiMo 4	1.6511	816 M 40	40 NCD 3		9840	SNCM447	1775	.24	6/9
36 Mn 5	1.1167						1525	.22	2/3
36 NiCr 6	1.5710	640 A 35	35 NC 6		3135	SNC236	1800	.24	3/9
38 MnSi 4	1.5120						1800	.24	3/9
39 CrMoV 13 9	1.8523	897 M 39					1775	.24	6/9
40 Mn 4	1.1157	150 M 36	35 M 5		1039		1525	.22	2/3
40 NiCrMo 2 2	1.6546	311-Type 7	40 NCD 2		8740	SNCM240	1775	.24	6/9
41 Cr 4	1.7035	530 M 40	42 C 4		5140	SCR440(H)	1775	.24	6/9
41 CrAlMo 7	1.8509	905 M 39	40 CAD 6.12	2940	A 355 Cl. A	SACM645	1775	.24	6/9
41 CrMo 4	1.7223	708 M 40	42 CD 4 TS	2244	4142; 4140	SCM440	1775	.24	6/9
42 Cr 4	1.7045	530 A 40	42 C 4 TS	2245	5140	SCr440	1775	.24	6/9
42 CrMo 4	1.7225	708 M 40	42 CD 4	2244	4142; 4140	SCM440(H)	1775	.24	6/9
45 WCrV 7	1.2542	BS 1		2710	S 1		1775	.24	6/9
50 CrV 4	1.8159	735 A 50	50 CV 4	2230	6150	SUP10	1775	.24	6/9
55 Cr 3	1.7176	527 A 60	55 C 3	2253	5155	SUP9(A)	1775	.24	6/9
55 NiCrMoV 6	1.2713		55 NCDV 7		L 6	SKH1;SKT4	1775	.24	6/9
55 Si 7	1.0904	250 A 53	55 S 7	2085; 2090	9255		1775	.24	6/9
58 CrV 4	1.8161						1775	.24	6/9
60 SiCr 7	1.0961		60 SC 7		9262		1775	.24	6/9
9 SMn 28	1.0715	230 M 07	S 250	1912	1213	SUM22	1350	.21	1
9 SMn 36	1.0736	240 M 07	S 300		1215		1350	.21	1
9 SMnPb 28	1.0718		S 250 Pb	1914	12 L 13	SUM22L	1350	.21	1
9 SMnPb 36	1.0737		S 300 Pb	1926	12 L 14		1350	.21	1
Al99	3.0205						700	.25	21
AlCuMg1	3.1325						700	.25	22

CERATIZIT hard material matters

Comparison of materials

Germany DIN	Mat. no.	United Kingdom BS	France AFNOR	Sweden SS	United States AISI	Japan JIS	$K_{c1.1}$ N/mm²	m_c	VDI 3323 group
AlMg1	3.3315						700	.25	21
AlMgSi1	3.2315						700	.25	22
C 105 W1	1.1545		Y1 105	1880	W 110	SK3	1675	.24	3
C 125 W	1.1663		Y2 120		W 112		1675	.24	3
C 15	1.0401	080 M 15	AF3 7 C 12; XC 18	1350	1015	S15C	1350	.21	1
C 22	1.0402	050 A 20	AF 42 C 20	1450	1020	S20C, S22C	1350	.21	1
C 35	1.0501	060 A 35	AF 55 C 35	1550	1035	S35C	1525	.22	2/3
C 45	1.0503	080 M 46	AF 65 C 45	1650	1045	S45C	1525	.22	2/3
C 55	1.0535	070 M 55		1655	1055	S55C	1675	.24	3
C 60	1.0601	080 A 62	CC 55		1060	S60C	1675	.24	3
Cf 35	1.1183					S35C	1525	.22	2/3
Cf 53	1.1213					S50C	1525	.22	2/3
Ck 101	1.1274	060 A 96		1870	1095		1675	.24	3
Ck 15	1.1141	080 M 15	XC 15; XC 18	1370	1015	S15C	1350	.21	1
Ck 55	1.1203	070 M 55	XC 55		1055	S55C	1675	.24	3
Ck 60	1.1221	080 A 62	XC 60	1665; 1678	1060	S58C	1675	.24	3
CoCr20W15Ni	2.4764						3300	.24	35
CuZn15	2.0240						700	.27	27
CuZn36Pb3	2.0375						700	.27	26
E-Cu57	2.0060						700	.27	28
G-AlSi10Mg	3.2381						700	.25	24
G-AlSi12	3.2581						700	.25	23
G-AlSi9Cu3	3.2163						700	.25	23
G-CuSn5ZnPb	2.1096						700	.27	26
G-CuZn40Fe	2.0590						700	.27	28
G-X 120 Mn 12	1.3401	Z 120 M 12	Z 120 M 12		A 128 (A)		3300	.24	35
G-X 20 Cr 14	1.4027	420 C 29	Z 20 C 13 M			SCS2	1875	.21	12/13
G-X 40 NiCrSi 38 18	1.4865	330 C 40					2600	.24	31
G-X 45 CrSi 9 3	1.4718	401 S 45	Z 45 CS 9		HNV 3		2450	.23	10/11
G-X 5 CrNi 13 4	1.4313	425 C 11	Z 5 CN 13.4	2385	CA 6-NM		1875	.21	12/13
G-X 5 CrNiMoNb 18 10	1.4581	318 C 17	Z 4 CNDNb 18.12 M				2150	.2	14
G-X 6 CrNi 18 9	1.4308	304 C 15	Z 6 CN 18.10 M	2333	CF-8		2150	.2	14
G-X 6 CrNiMo 18 10	1.4408						2150	.2	14
G-X 7 Cr 13	1.4001						1875	.21	12/13
GG-10	.6010		Ft 10 D	01 10-00	A48-20 B	FC100	1150	.2	15
GG-15	.6015	Grade 150	Ft 15 D	01 15-00	A48-25 B	FC150	1150	.2	15
GG-20	.6020	Grade 220	Ft 20 D	01 20-00	A48-30 B	FC200	1150	.2	15
GG-25	.6025	Grade 260	Ft 25 D	01 25-00	A48-40 B	FC250	1250	.24	15/16
GG-30	.6030	Grade 300	Ft 30 D	01 30-00	A48-45 B	FC300	1350	.28	16
GG-35	.6035	Grade 350	Ft 35 D	01 35-00	A48-50 B	FC350	1350	.28	16
GG-40	.6040	Grade 400	Ft 40 D	01 40-00	A48-60 B	FC400	1350	.28	16
GGG-35.3	.7033					FCD350	1225	.25	17
GGG-40	.7040	SNG 420/12	FGS 400-12	0717-02	60-40-18	FCD400	1225	.25	17
GGG-40.3	.7043	SNG 370/17	FGS 370-17	0717-15		FCD400	1225	.25	17
GGG-50	.7050	SNG 500/7	FGS 500-7	0727-02	65-45-12	FCD500	1350	.28	18
GGG-60	.7060	SNG 600/3	FGS 600-3	0732-03	80-55-06	FCD600	1350	.28	18
GGG-70	.7070	SNG 700/2	FGS 700-2	0737-01	100-70-03	FCD700	1350	.28	18
GGG-NiCr 20 2	.7660	S-NiCr 20 2	S-NC 20 2		A 439 Type D-2		1350	.28	18
GGG-NiMn 13 7	.7652	S-NiMn 13 7	S-NM 13 7				1350	.28	18
GS-Ck 45	1.1191	080 M 46	XC 42	1672	1045	S45C	1525	.22	2/3

Germany DIN	Mat. no.	United Kingdom BS	France AFNOR	Sweden SS	United States AISI	Japan JIS	$K_{c1.1}$ N/mm²	m_c	VDI 3323 group
GTS-35-10	.8135	B 340/12	MN 35-10				1225	.25	19
GTS-45-06	.8145	P 440/7					1420	.3	20
GTS-55-04	.8155	P 510/4	MP 50-5				1420	.3	20
GTS-65-02	.8165	P 570/3	MP 60-3				1420	.3	20
GTS-70-02	.8170	P 690/2	IP 70-2				1420	.3	20
NiCr20TiAl	2.4631	HR 401; 601	Nimonic 80 A				3300	.24	33
NiCr22Mo9Nb	2.4856		Inconel 625				3300	.24	33
NiCu30Al	2.4375		Monel K 500				3300	.24	34
NiFe25Cr20NbTi	2.4955						3300	.24	34
S 18-0-1	1.3355	BT 1	Z 80 WCV 18-04-01		T 1		2450	.23	10/11
S 18-1-2-5	1.3255	BT 4	Z 80 WKCV 18-05-04-0		T 4		2450	.23	10/11
S 2-9-2	1.3348		Z 100 DCWV 09-04-02-	2782	M 7		2450	.23	10/11
S 6-5-2	1.3343	BM 2	Z 85 WDCV 06-05-04-0	2722	M 2	SKH9; SKH51	2450	.23	10/11
S 6-5-2-5	1.3243		Z 85 WDKCV 06-05-05-	2723		SKH55	2450	.23	10/11
TiAl6V4	3.7165	TA 10 bis TA 13	T-A 6 V				2110	.22	37
X 10 Cr 13	1.4006	410 S 21	Z 12 C 13	2302	410; CA-15	SUS410	1875	.21	12/13
X 10 CrNiMoNb 18 12	1.4583				318		2150	.2	14
X 10 CrNiS 18 9	1.4305	303 S 21	Z 10 CNF 18.09	2346	303		2150	.2	14
X 100 CrMoV 5 1	1.2363	BA 2	Z 100 CDV 5	2260	A 2		2450	.23	10/11
X 12 CrMoS 17	1.4104		Z 10 CF 17	2383	430 F	SUS430F	1875	.21	12/13
X 12 CrNi 17 7	1.4310	301 S 21	Z 12 CN 17.07		301		2150	.2	14
X 12 CrNi 22 12	1.4829					SUS301	1350	.28	16
X 12 CrNi 25 21	1.4845	310 S24	Z 12 CN 25.20	2361	310 S	SUH310; SUS310S	2150	.2	14
X 12 CrNiTi 18 9	1.4878	321 S 20	Z 6 CNT 18.12 (B)	2337	321		2150	.2	14
X 12 NiCrSi 36 16	1.4864	NA 17	Z 12 NCS 37.18		330	SUH330	2600	.24	31
X 15 CrNiSi 20 12	1.4828	309 S 24	Z 15 CNS 20.12		309	SUH309	1350	.28	16
X 165 CrMoV 12	1.2601			2310			2450	.23	10/11
X 2 CrNiMo 18 13	1.4440						2150	.2	14
X 2 CrNiMoN 17 13 3	1.4429	316 S 62	Z 2 CND 17.13 Az	2375	316 LN	SUS316LN	2150	.2	14
X 2 CrNiN 18 10	1.4311	304 S 62	Z 2 CN 18 .10	2371	304 LN	SUS304LN	2150	.2	14
X 20 CrNi 17 2	1.4057	431 S 29	Z 15 CN 16.02	2321	431	SUS431	1875	.21	12/13
X 210 Cr 12	1.2080	BD 3	Z 200 C 12		D 3		2450	.23	10/11
X 210 CrW 12	1.2436			2312			2450	.23	10/11
X 30 WCrV 9 3	1.2581	BH 21	Z 30 WCV 9		H 21	SKD5	2450	.23	10/11
X 40 CrMoV 5 1	1.2344	BH 13	Z 40 CDV 5	2242	H 13	SKD61	2450	.23	10/11
X 46 Cr 13	1.4034	420 S 45	Z 40 C 14				1875	.21	12/13
X 5 CrNi 18 9	1.4301	304 S 15	Z 6 CN 18.09	2332; 2333	304; 304 H	SUS304	2150	.2	14
X 5 CrNiMo 17 13 3	1.4436	316 S 16	Z 6 CND 17.12	2343	316	SUS316	2150	.2	14
X 5 CrNiMo 18 10	1.4401	316 S 16	Z 6 CND 17.11	2347	316	SUS316	2150	.2	14
X 53 CrMnNiN 21 9	1.4871	349 S 54	Z 52 CMN 21.09		EV 8		1875	.21	12/13
X 6 Cr 13	1.4000	403 S 17	Z 6 C 13	2301	403	SUS403	1875	.21	12/13
X 6 Cr 17	1.4016	430 S 15	Z 8 C 17	2320	430	SUS430	1875	.21	12/13
X 6 CrMo 17	1.4113	434 S 17	Z 8 CD 17.01	2325	434	SUS434	1875	.21	12/13
X 6 CrNiMoTi 17 12 2	1.4571	320 S 31	Z 6 CNT 17.12	2350	316 Ti		2150	.2	14
X 6 CrNiNb 18 10	1.4550	347 S 17	Z 6 CNNb 18.10	2338	347		2150	.2	14
X 6 CrNiTi 18 10	1.4541	321 S 12	Z 6 CNT 18.10	2337	321		2150	.2	14
X2 CrNi 18-8	1.4317						2150	.2	14

$k_{c1.1}$ value = specific cutting force at a cutting rake angle of 0 degrees. For positive rake angles the $k_{c1.1}$ value has to be reduced (increased for negative rake angles) by 1% per degree of rake angle. The m_c value is the exponent for the conversion of the $k_{c1.1}$ value.

CERATIZIT hard material matters

Cutting data

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ .15% C	1	125
		annealed	.15% - .45% C	2	150 - 250
		tempered	≥ .45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% Si	23	80
		hardened	< 12% Si	24	90
		non hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	–
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	–
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

Uncoated carbide		
H216T v_c [m/min]	**CTW7120** v_c [m/min]	
–	–	
–	–	
–	–	
–	–	
–	–	
–	–	
–	–	
–	–	
–	–	
–	–	
–	–	
–	–	
–	–	
–	–	
120 - 160	–	
90 - 140	–	
130 - 170	–	
90 - 130	–	
140 - 200	–	
120 - 160	–	
300 - 2500	100 - 500	
200 - 2000	100 - 300	
400 - 1500	100 - 500	
400 - 1500	100 - 300	
200 - 800	100 - 300	
250 - 600	100 - 500	
200 - 600	100 - 500	
150 - 400	100 - 300	
150 - 300	100 - 300	
80 - 180	80 - 180	
60 - 150	60 - 150	
100 - 250	100 - 250	
30 - 45	–	
20 - 35	–	
20 - 35	–	
18 - 30	–	
15 - 25	–	
60 - 120	50 - 120	
30 - 80	30 - 50	
–	–	
–	–	
–	–	
–	–	

CERATIZIT hard material matters

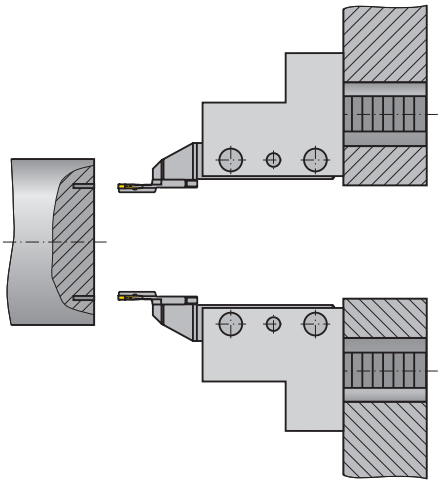
Cutting data

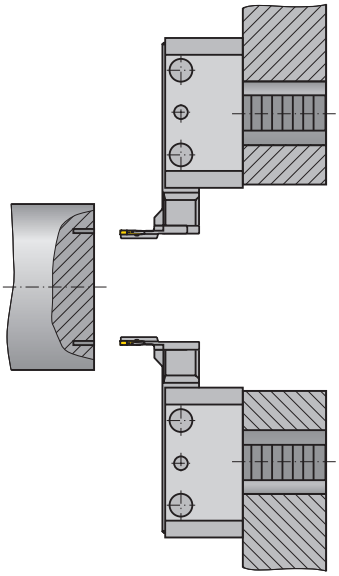
	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ .15% C	1	125
		annealed	.15% - .45% C	2	150 - 250
		tempered	≥ .45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% Si	23	80
		hardened	< 12% Si	24	90
		non hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	–
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	–
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

Coated carbide					
CTC1325 v_c [m/min]	**SR127** v_c [m/min]	**GM127** v_c [m/min]	**CTP1340** v_c [m/min]	**CTCP335** v_c [m/min]	**CTPP345** v_c [m/min]
150 - 280	150 - 280	150 - 280	120 - 250	130 - 250	110 - 190
130 - 240	130 - 240	130 - 240	80 - 180	110 - 190	80 - 150
100 - 200	100 - 200	100 - 200	60 - 150	70 - 170	70 - 140
140 - 220	140 - 220	140 - 220	80 - 180	120 - 200	70 - 140
130 - 180	130 - 180	130 - 180	60 - 150	110 - 180	70 - 120
100 - 160	100 - 160	100 - 160	60 - 120	70 - 150	60 - 120
120 - 170	120 - 170	120 - 170	80 - 160	90 - 170	60 - 100
100 - 150	100 - 150	100 - 150	50 - 120	70 - 160	60 - 100
150 - 250	150 - 250	150 - 250	50 - 200	120 - 200	90 - 160
60 -100	60 -100	60 - 100	50 - 150	60 - 100	60 - 100
140 - 220	140 - 220	140 - 220	50 - 200	120 - 200	100 - 180
120 - 200	120 - 200	120 - 200	50 - 180	100 - 170	80 - 150
80 - 130	80 - 130	80 - 130	50 - 100	70 - 110	70 - 110
60 - 100	60 - 100	60 - 100	50 - 80	60 - 90	60 - 90
120 - 220	120 - 220	–	100 - 200	90 - 180	–
100 - 200	100 - 200	–	90 - 160	80 - 150	–
130 - 190	130 - 190	–	100 - 180	100 - 160	–
100 - 190	100 - 190	–	80 - 160	70 - 140	–
140 - 280	140 - 280	–	110 - 230	100 - 200	–
90 - 190	90 - 190	–	80 - 160	80 - 150	–
–	–	–	100 - 500	–	–
–	–	–	100 - 300	–	–
–	–	–	100 - 500	–	–
–	–	–	100 - 300	–	–
–	–	–	100 - 200	–	–
–	–	–	100 - 500	–	–
–	–	–	100 - 500	–	–
–	–	–	100 - 300	–	–
–	–	–	100 - 300	–	–
–	–	–	80 - 180	–	–
–	–	–	60 - 150	–	–
–	–	–	100 - 250	–	–
25 - 45	25 - 45	25 - 45	20 - 50	–	–
20 - 40	20 - 40	20 - 40	20 - 40	–	20 - 40
15 - 25	15 - 25	15 - 25	15 - 25	–	20 - 30
10 - 20	10 - 20	10 - 20	10 - 20	–	–
10 - 20	10 - 20	10 - 20	10 - 20	–	–
–	–	–	50 - 120	–	–
–	–	–	30 - 50	–	–
10 - 20	10 - 20	–	–	–	–
–	–	–	–	–	–
10 - 20	10 - 20	–	–	–	–
10 - 20	10 - 20	–	–	–	–

Tool configuration





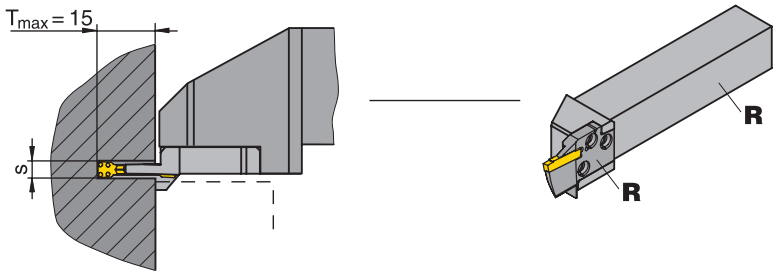
MSS tools 0°

> Large overhang
> Danger of collision
> Special VDI adapter necessary

MSS tools 90°

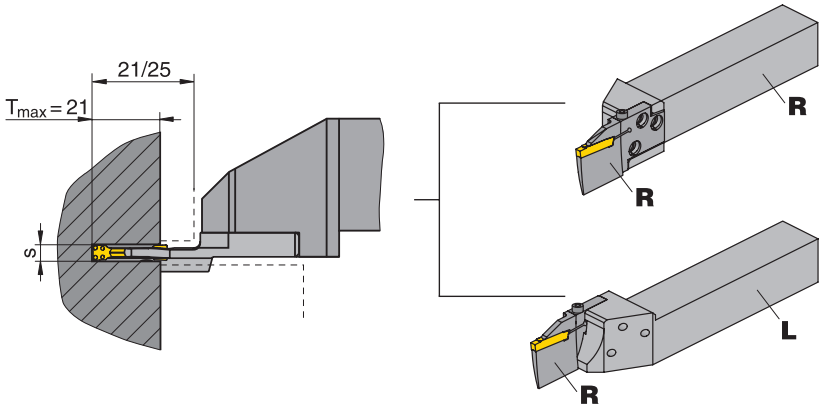
> Short overhang
> Increased stability
> Normal clamping in VDI shank possible

Parting and grooving depth



Short axial module

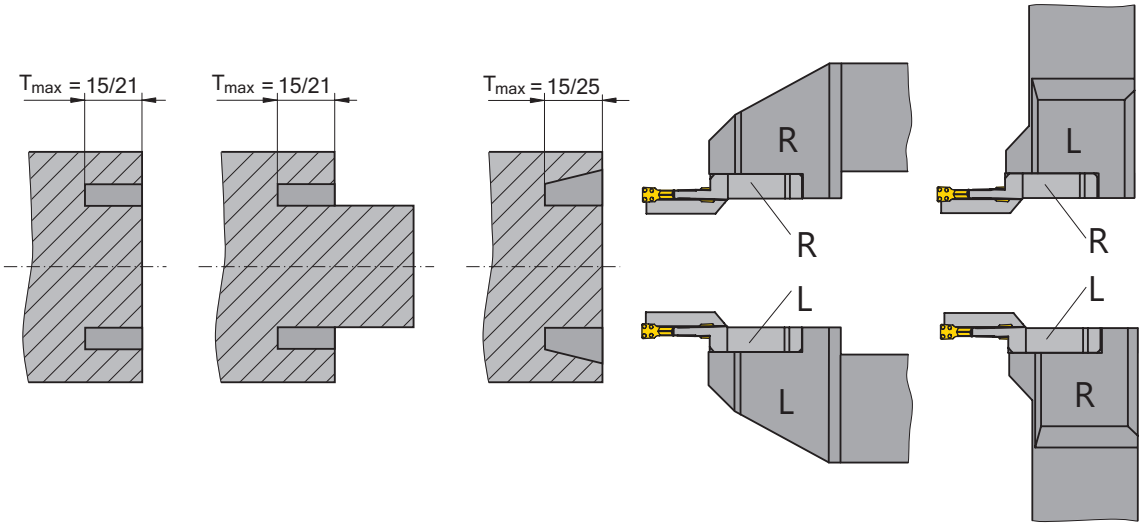
> Can be clamped on one side only
> Parting and grooving depth max. 15 mm



Long axial module

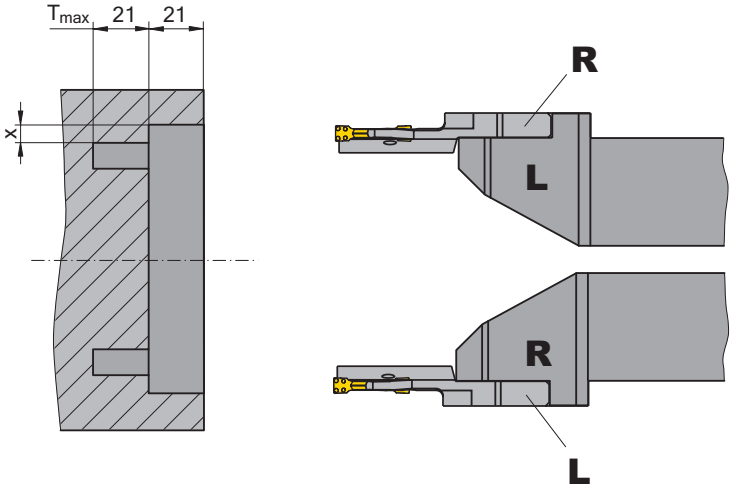
> Can be clamped from either side
> Parting and grooving depth max. 21 mm

Machining possibilities with short/long axial module

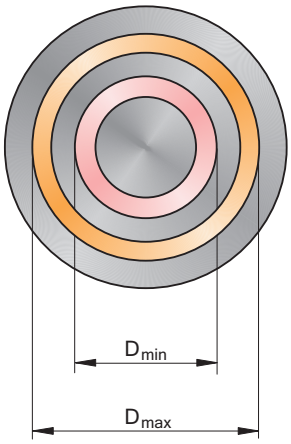


Machining possibilities with long axial module only

Depending on the diameter range or width class an axial displacement (dimension ‘x’) might be necessary when producing the second groove.
The dimension ‘x’ depends on the groove diameter and shank height.



Axial grooving and face turning

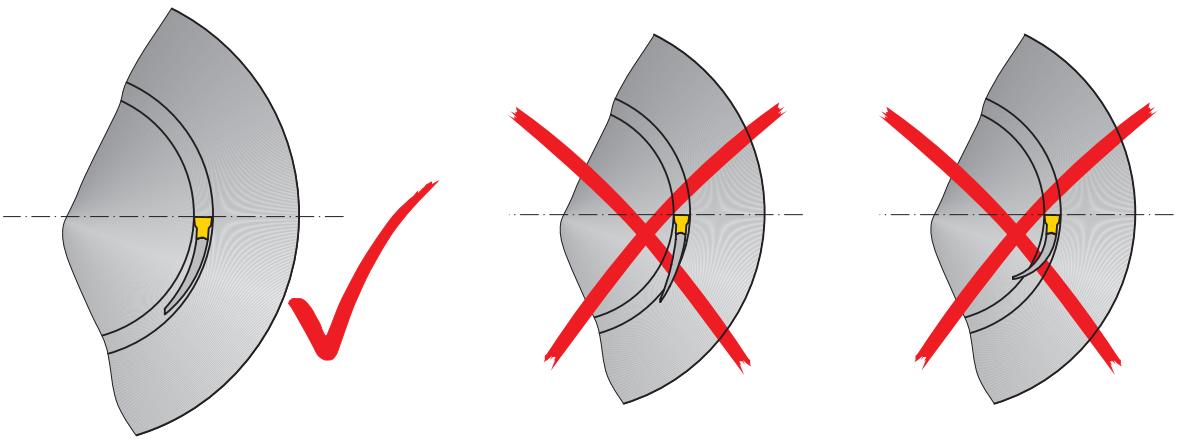


Diameter range (D_{min} - D_{max})
50 - 70 mm
70 - 100 mm
100 - 150 mm
150 - 300 mm
300 - 900 mm

Important: the indicated diameter refers to the outside diameter of the groove.

	MSS assembly size							
	20	25					32	
	Cutting width	Cutting width					Cutting width	
		Short module			Long module			
Diameter range	2,76 - 3,75	2,76 - 3,75	3,76 - 5,00	5,01 - 6,50	3,76 - 5,00	5,01 - 6,50	3,76 - 5,00	5,01 - 6,50
50 - 70	●	●	●	●				
70 - 100	●	●	●	●	●	●	●	●
100 - 150	●	●	●	●	●	●	●	●
150 - 300			●	●	●	●	●	●
300 - 900								●
max. grooving depth	14	15			21		15	

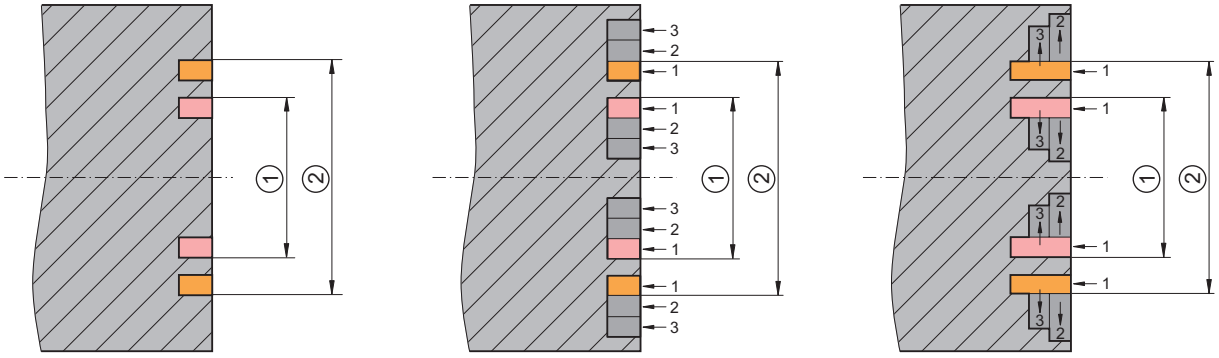
Please note: the diameter of face grooves must lie within the diameter range indicated on the module. Otherwise the tool may be damaged or destroyed.



Correct axial grooving module

Incorrect axial grooving module

Application advice for axial grooving and face turning



① Minimum grooving diameter
② Maximum grooving diameter

Axial grooving

is only possible within the diameter range for that module (e.g. 50 - 70 mm) - see page E24.

Please note: the indicated diameter range refers to the outside diameter of the groove.

Axial grooving - groove widening

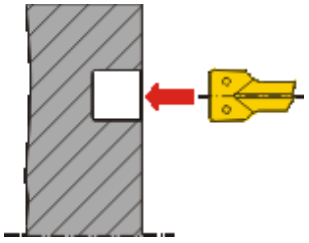
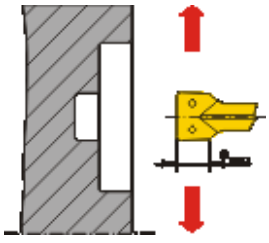
Groove widening is possible above and below the diameter range indicated on the module.

Please note: only the first groove must lie within the diameter range of the module. The depth of the widening groove must not be larger than the depth of the original groove.

Axial grooving and face turning

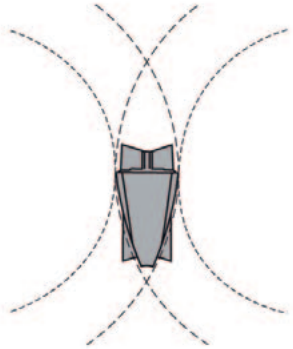
When face turning it is possible to widen the groove above and below the diameter range indicated on the module.

Please note: only the first groove must lie within the diameter range of the module.

Axial grooving and face turning			
			
Designation	**f [mm/rev]**	**a_{max} [mm]**	**f [mm/rev]**
GX24-2E3.00N0.30	0,05 - 0,15	2,5	0,05 - 0,20
GX24-3E4.00N0.40	0,05 - 0,15	3,0	0,05 - 0,25
GX24-3E5.00N0.40	0,05 - 0,15	3,0	0,10 - 0,25
GX24-4E6.00N0.50	0,05 - 0,20	3,5	0,10 - 0,30
GX24-2E3.00N0.30-F2	0,025 - 0,125	2,5	0,05 - 0,15
GX24-2E3.50N0.30-F2	0,025 - 0,125	2,5	0,05 - 0,15
GX24-3E4.00N0.40-F2	0,05 - 0,15	3,0	0,10 - 0,20
GX24-3E4.50N0.40-F2	0,05 - 0,15	3,0	0,10 - 0,20
GX24-3E5.00N0.40-F2	0,075 - 0,20	3,5	0,10 - 0,20
GX24-4E6.00N0.50-F2	0,05 - 0,15	4,0	0,10 - 0,25

MSS-AX

Product characteristics, customer benefits



Neutral insert

- May be applied in left-hand and right-hand tools
- Application is indenpent on the groove diameter (tool position is possible in x+ or x-)
- Only limited by D_{min} for first grooving operation



Geometry -F50

- Universal application, suitable for all materials
- Suitable for grooving and turning



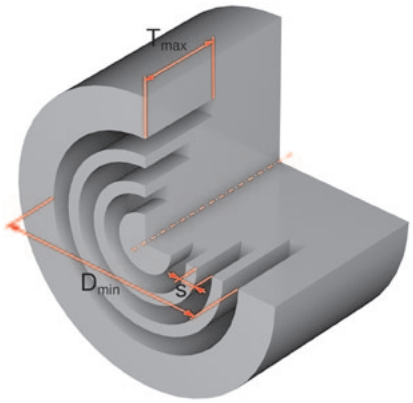
Tools provided with 'hard & tough' coating

- Maximum wear protection
- Maximum corrosion resistance

Monobloc and modular tools

- High flexibility
- Cost-optimized solution for every application





System GX

T_{max} / $D_{min} – D_{max}$	15 [mm]	21 [mm]
50 - 70	x	x
70 - 100	x	x
100 - 150	x	x
150 - 300	x	x
300 - 900	x	
S [mm]	2,76 - 6,5	3,76 - 6,5



System AX

T_{max} / $D_{min} – D_{max}$	AX05	AX10	AX15
$D_{min} – D_{max}$	10 – ∞	20 – ∞	30 – ∞
T_{max}	5,0	10,0	15,0
S [mm]	3,0	3,0	3,0



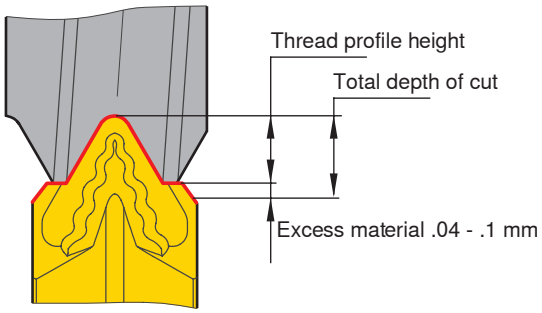
System LX

T_{max} / $D_{min} – D_{max}$	E32N25	E32N32	E32N45
$D_{min} – D_{max}$	500 – ∞	500 – ∞	500 – ∞
T_{max}	19	26	39
S [mm]	8 - 10	8 - 10	8 - 10



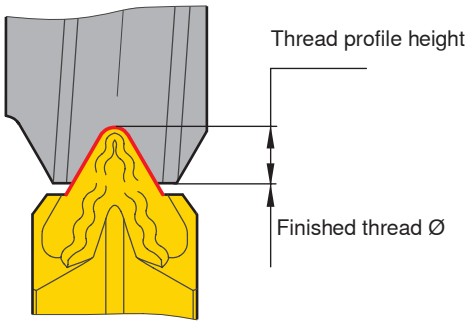
Differences between full and partial profile inserts

Full profile insert



+ The entire thread profile including the external dia. is machined (excess material .04 - .1 mm over finished diameter) + high profile precision
+ Incresaed tool life thanks to larger point radii
+ Burr-free thread
- One insert per pitch

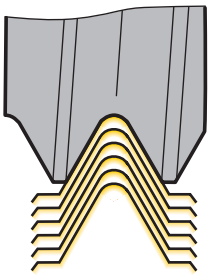
Partial profile insert



+ One insert for several pitches
- Therefore the thread profile does not exactly meet the standard
- The external dia. (or the core dia. in case of internal threads) is not machined

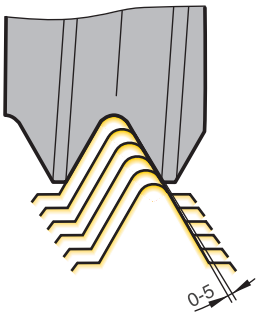
Approach selection

Radial approach



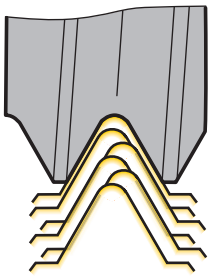
+ Conventional lathes
+ With pitches < 2 mm
+ With short chipping materials
- Reduced swarf control

Flank approach



+ Preferred approach on CNC-machines
+ With pitches from 2 to 4 mm
+ Long chipping materials
+ Good swarf control

Alternating approach



+ With pitches > 4 mm
+ Long chipping materials
+ Uniform insert wear
+ Long tool life
+ Good swarf control
- More complex NC programming

Type of problem												
Type of wear				Work piece problems				Swarf control			Corrective measures	
Flank wear	Edge chipping	Plastic deformation	Built-up edge	Burr formation at external thread Ø	Profile precision	Surface quality	Chatter marks, vibration	Chip cross section too large	Chip cross section too small	Chip shape (tangled swarf)		
↓		↓	↑			↑	↓				Cutting speed	Cutting values
a,b	a,b		a,b	a,b		a,b	a,b	a,b		a,b	Feed motion a) via the flanks b) alternating via the flanks	Cutting values
↑	↓	↓		↓	↓	↓	↓	↓	↑	~	Approach (depth of cut)	Cutting values
↓	↑	↑		~	~	↑	~	↑	↓	↓	Number of passes	Cutting values
				●	●	●					Finish cut (idle cut)	Cutting values
			●			●	●			●	Chip groove	Selection of inserts
↑	↓	↑									Cutting material ↓ wear resistance toughness ↑	Selection of inserts
				●	●	●					Full profile	Selection of inserts
											Partial profile	Selection of inserts
	~					~	~				Stability tool - insert	General criteria
	~					~	~				Stability - work piece	General criteria
	↓					↓	↓				Overhang	General criteria
~	~	~			~	~	~				Tip height	General criteria
●	●	●	●	●		●					Cooling lubricant	General criteria

↑ raise, increase, large influence
↓ avoid, reduce large influence
~ check, optimize
↑ raise, increase low influence
↓ avoid, reduce low influence
● use

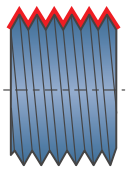
TC - thread turning

Recommended values for depth and number of cuts

Full profile



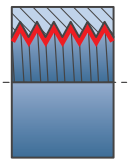
Metric ISO 60° external threads



Pitch [mm]	0,5	0,75	1,0	1,25	1,5	1,75	2,0	2,5	3,0	3,5	4,0	4,5	5,0
Number of cuts	4 ↓ 6	4 ↓ 7	5 ↓ 8	5 ↓ 9	6 ↓ 10	7 ↓ 11	8 ↓ 12	9 ↓ 14	10 ↓ 18	10 ↓ 18	12 ↓ 20	12 ↓ 20	12 ↓ 20
Thread profile height	0,32	0,48	0,64	0,80	0,95	1,10	1,26	1,58	1,89	2,21	2,53	2,84	3,16

These are recommended values for steel machining

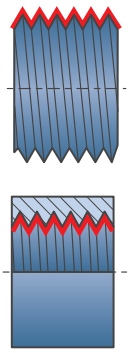
Metric ISO 60° internal threads



Pitch [mm]	0,5	0,75	1,0	1,25	1,5	1,75	2,0	2,5	3,0	3,5	4,0	4,5	5,0
Number of cuts	4 ↓ 6	4 ↓ 7	5 ↓ 8	5 ↓ 9	6 ↓ 10	7 ↓ 11	8 ↓ 12	9 ↓ 14	10 ↓ 18	10 ↓ 18	12 ↓ 20	12 ↓ 20	12 ↓ 20
Thread profile height	0,30	0,45	0,59	0,74	0,89	1,02	1,17	1,46	1,76	2,02	2,35	2,64	2,93

These are recommended values for steel machining

Whitworth 55° external and internal threads

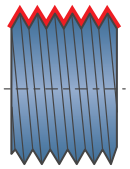


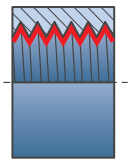
Pitch [passes/inch]	28	26	24	20	19	18	16	14	12	11	10	9	8	7	6	5
Number of cuts	5 ↓ 8	5 ↓ 8	5 ↓ 9	5 ↓ 9	6 ↓ 10	6 ↓ 10	7 ↓ 11	8 ↓ 12	9 ↓ 14	9 ↓ 14	10 ↓ 17	10 ↓ 18	10 ↓ 18	12 ↓ 20	12 ↓ 20	12 ↓ 20
Thread profile height	0,60	0,65	0,70	0,84	0,88	0,93	1,05	1,20	1,40	1,53	1,68	1,87	2,11	2,41	2,81	3,37

These are recommended values for steel machining

Partial profile





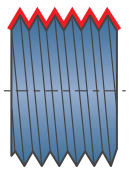


60° external and internal threads

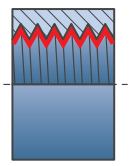
Threading insert	TC16-2EI-AG60									TC16-2EI-G60				TC16-3EI-N60			
	TC16-1EI-A60																
Pitch [mm]	0,5	0,75	1,0	1,25	1,5	1,75	2,0	2,5	3,0	1,75	2,0	2,5	3,0	3,5	4,0	4,5	5,0
Number of cuts	4 ↓ 6	4 ↓ 7	5 ↓ 9	6 ↓ 10	7 ↓ 11	8 ↓ 12	9 ↓ 14	10 ↓ 15	12 ↓ 19	8 ↓ 12	9 ↓ 14	10 ↓ 15	12 ↓ 20	12 ↓ 20	13 ↓ 21	14 ↓ 22	14 ↓ 22
Thread profile height external	0,33	0,52	0,71	0,90	1,09	1,28	1,47	1,84	2,22	1,23	1,42	1,79	2,17	2,45	2,83	3,21	3,59
Thread profile height internal	0,27	0,44	0,60	0,76	0,92	1,09	1,25	1,57	1,90	1,04	1,20	1,52	1,85	2,07	2,4	2,72	3,05

These are recommended values for steel machining

55° external and internal threads



Threading insert	TC16-2EI-AG55												
	TC16-1EI-A55												
Pitch [passes/inch]	28	26	24	20	19	18	16	14	12	11	10	9	8
Number of cuts	5 ↓ 8	5 ↓ 8	6 - 9	6 ↓ 9	7 ↓ 12	7 ↓ 12	8 ↓ 14	9 ↓ 14	10 ↓ 16	10 ↓ 16	11 ↓ 18	12 ↓ 20	12 ↓ 20
Thread profile height	0,66	0,72	0,79	0,95	1,01	1,07	1,21	1,39	1,63	1,79	1,97	2,20	2,48

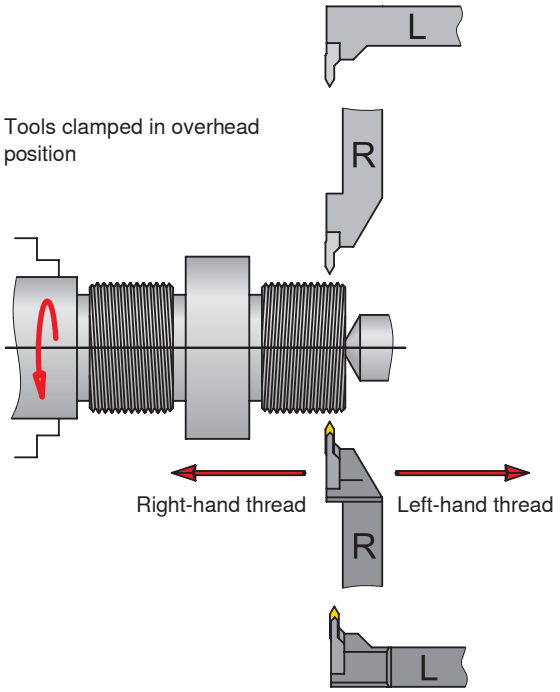


Threading insert	TC16-2EI-G55						TC16-3EI-N55		
Pitch [passes/inch]	14	12	11	10	9	8	7	6	5
Number of cuts	8 ↓ 12	9 ↓ 14	10 ↓ 15	11 ↓ 18	12 ↓ 20	12 ↓ 20	12 ↓ 20	12 ↓ 20	14 ↓ 22
Thread profile height	1,22	1,46	1,56	1,80	2,03	2,31	2,40	2,89	3,56

These are recommended values for steel machining

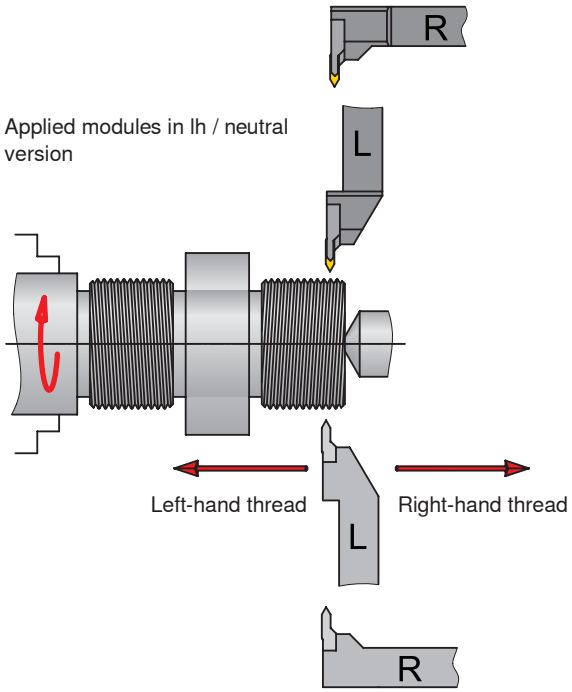
Application methods for external machining

Tools clamped in overhead position



Applied modules in rh / neutral version

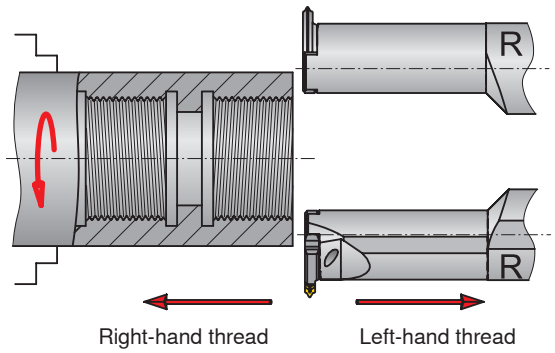
Applied modules in lh / neutral version



Tools clamped in overhead position

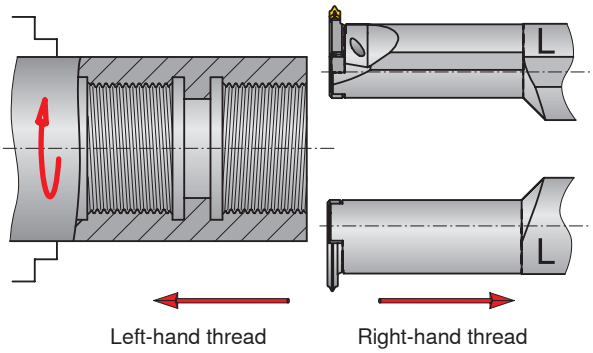
Application methods for internal machining

Tools clamped in overhead position



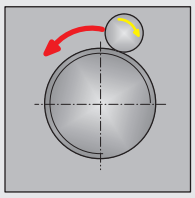
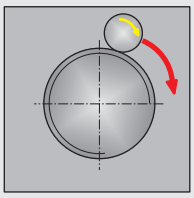
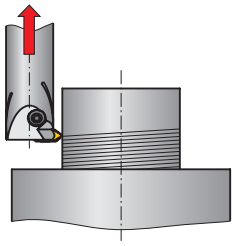
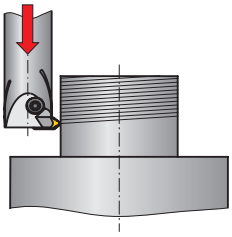
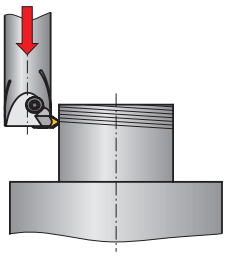
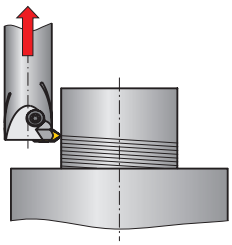
Applied modules in rh / neutral version

Applied modules in lh / neutral version

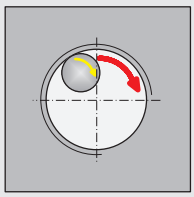
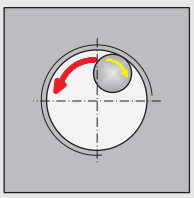
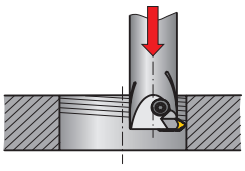
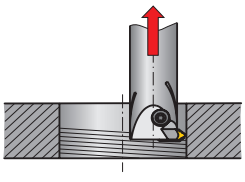
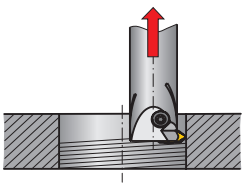
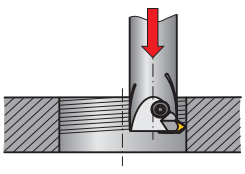


Tools clamped in overhead position

External thread

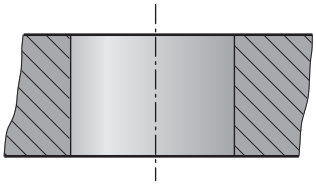
	Conventional milling	Climb milling
		
Right-hand thread		
Left-hand thread		

Internal thread

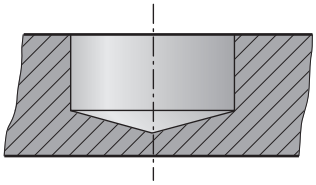
	Conventional milling	Climb milling
		
Right-hand thread		
Left-hand thread		

Drilling

Through-hole thread

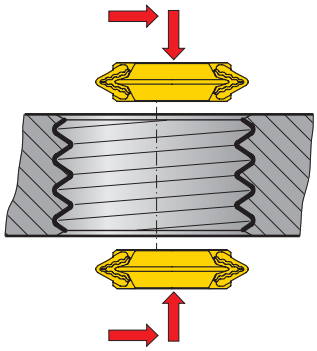


Bottom hole thread



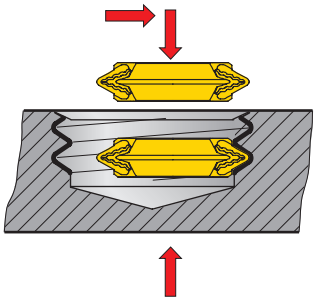
Threading

Through-hole thread



No radial plunging necessary, radial approach above or below work piece + spiral movement

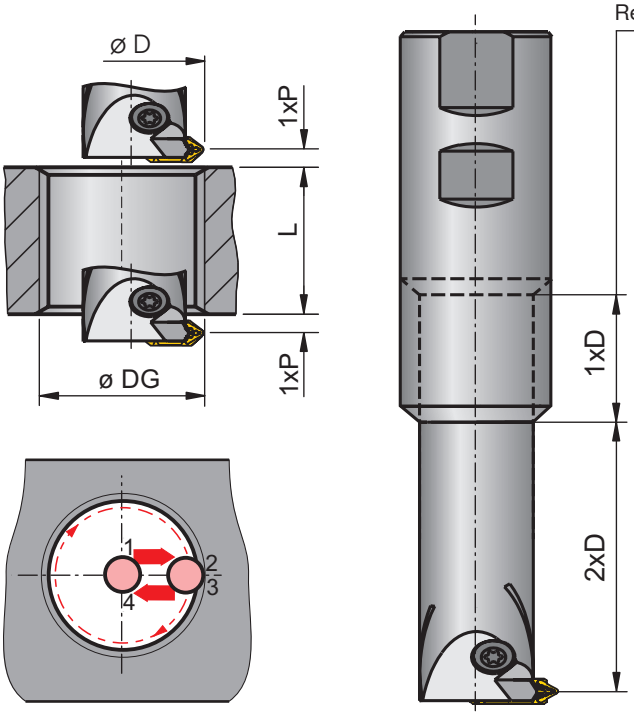
Bottom hole thread



Radial approach until total profile depth + spiral movement

Radial plunging + spiral movement

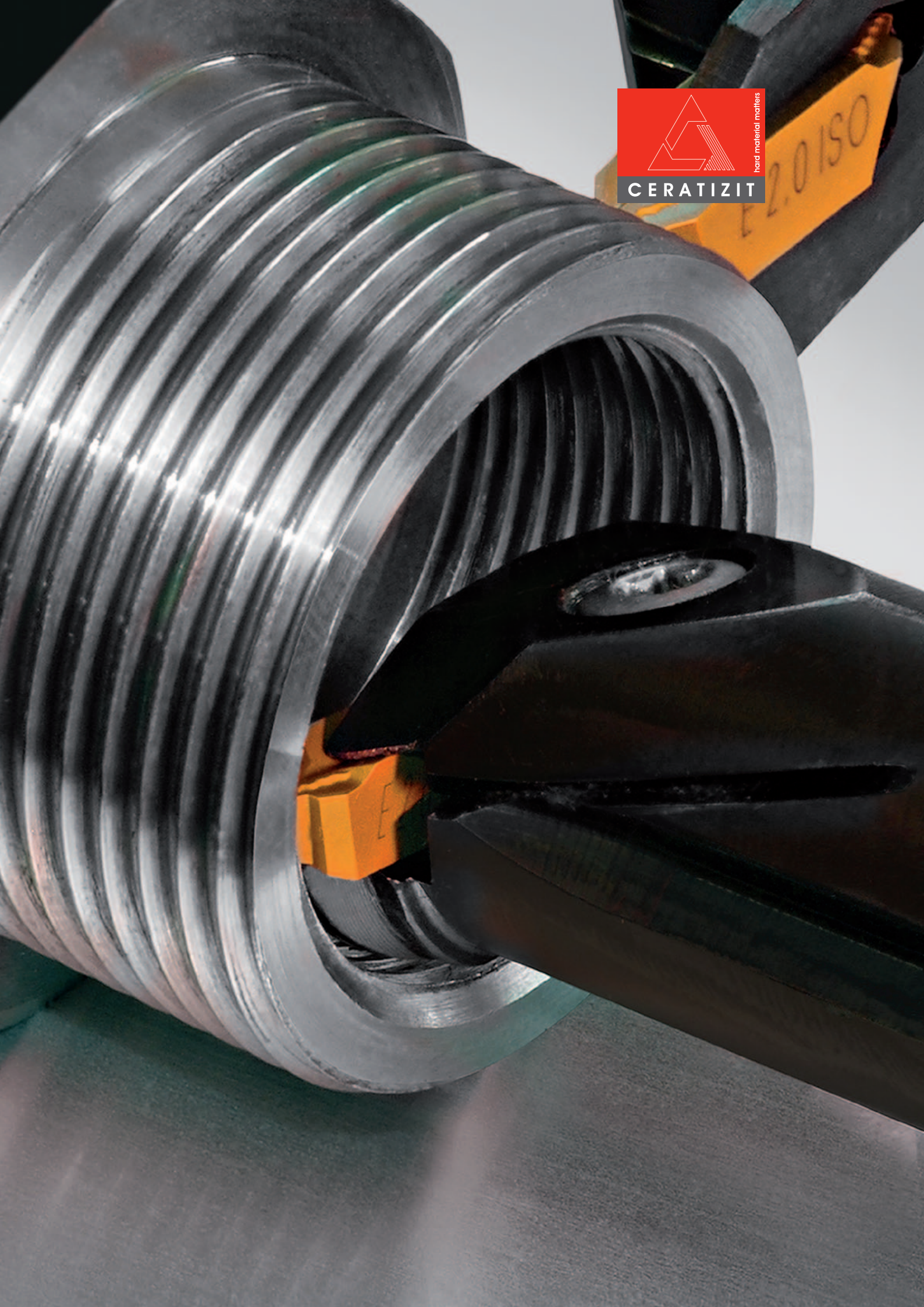
Advantages compared to multi-tooth threading inserts



Readjustment possible when necessary

I25R90-2D-TC16-W
I32R90-2D-TC16W

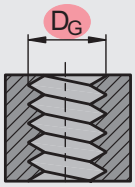
- > Same insert for thread turning and milling
- > Considerably lower cost of TC inserts
- > Thread is cut in a single feed from outside inwards or vice versa, so no step in the thread
- > Low cutting forces possible through single-tooth thread milling
- > Stable conditions
- > Standard reach is 2xD. Tools may be modified up to 3xD.
- > Higher cutting values (vc + f) in this manner machining times are similar to multi-tooth insert machining
- > Easy programming

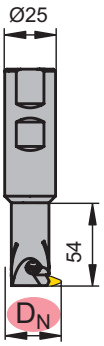

F 2.0 ISO
CERATIZIT
hard material matters

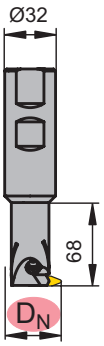
CERATIZIT hard material matters

Thread milling – external

Milling tool system MSS-TC







D_N	Type, description	D_G [mm]	Full profile metric ISO 60° – TC threading inserts: TC16-1 I 0,5 ISO	TC16-1 I 0,75 ISO	TC16-1 I 1,0 ISO	TC16-1 I 1,5 ISO	TC16-1 I 2,0 ISO	TC16-1 I 2,5 ISO	TC16-1 I 3,0 ISO	TC16-1 I 3,5 ISO	TC16-1 I 4,0 ISO	TC16-1 I 4,5 ISO	TC16-1 I 5,0 ISO	D_G [inch]	Full profile Whitworth 55° – TC threading inserts: TC16-2 EI 14W	TC16-2 EI 12W	TC16-2 EI 11W	TC16-2 EI 10W	TC16-2 EI 9W	TC16-2 EI 8W	TC16-3 EI 7W	TC16-3 EI 6W	TC16-3 EI 5W
25	**I25**R90-2D-TC16-W	M27	x	x																			
		M28	x	x	x																		
		M30	x	x	x	x																	
		M32	x	x	x	x	x							R 1 1/4			x						
		M33	x	x	x	x	x																
		M34	x	x	x	x	x		x														
		M35	x	x	x	x	x		x														
		M36	x	x	x	x	x		x		x												
		M38	x	x	x	x	x		x					1 1/2								x	
		M39	x	x	x	x	x		x		x												
		M40	x	x	x	x	x		x		x			R 1 1/2			x						
		M42	x	x	x	x	x		x		x	x		1 5/8									x
		M45	x	x	x	x	x		x		x	x		1 3/4									x
		M48	x	x	x	x	x		x		x		x										
32	**I32**R90-2D-TC16-W	**M36**	x	x	x																		
		M38	x	x	x	x																	
		M39	x	x	x	x	x																
		M40	x	x	x	x	x																
		M42	x	x	x	x	x		x														
		M45	x	x	x	x	x		x														
		M48	x	x	x	x	x		x		x												
		M50	x	x	x	x	x		x		x			R2			x						
		M52		x	x	x	x		x		x		x										
		M55		x	x	x	x		x		x												
		M56		x	x	x	x		x		x												
		M58		x	x	x	x		x		x												
		M60		x	x	x	x		x		x												
		M62		x	x	x	x		x		x												
		M64		x	x	x	x		x		x												
		M65		x	x	x	x		x		x			R2 1/4			x						
		M68		x	x	x	x		x		x												
		M70		x	x	x	x		x		x												
		M72		x	x	x	x		x		x												
		M75		x	x	x	x		x		x			R2 1/2			x						
		M76		x	x	x	x		x		x												
		M78		x	x	x	x		x		x												
		M80			x	x	x	x		x		x												

D_N = nominal milling Ø

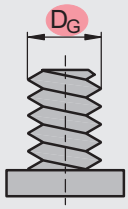
= standard thread

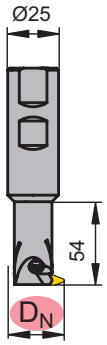
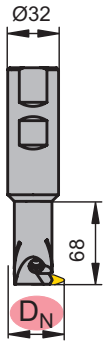
Bgr.	Type, description	D_G [mm]	Full profile metric ISO 60°			Full profile Whitworth 55°	
			MSS-**I32R**-TC16-2		MSS-**I32N**-TC16-3	MSS-**I32R**-TC16-2	
			TC16-2 I **2,0** ISO	TC16-2 I **3,0** ISO	TC16-3 I **4,0** ISO	D_G [inch]	TC16-2 **EI** 11W
32	**1.5D** MSS-**I32R**90-1.5D	M82	x	x	x	R 2 3/4	x
		M85	x	x	x		
		M90	x	x	x	R3	x
		M95	x	x	x	R3 1/4	x
		M100	x	x	x	R3 1/2	x
		M105	x	x	x	R3 3/4	x
		M110	x	x	x	R4	x
		M115	x	x	x		
		M120	x	x	x		
		M125	x	x	x	R4 1/2	x
		M130	x	x	x		
		M135	x	x	x		
		M140	x	x	x	R5	x
		M145	x	x	x		
		M150	x	x	x	R5 1/2	x
		M155		x	x		
		M160		x	x		
		M165		x	x	R6	x
		M170		x	x		
	2.5D MSS-**I32R**90-2.5D	M175		x	x		
		M180		x	x		
		M185		x	x		
		M190		x	x		
		M195		x	x		
		M200		x	x		
		M205		x	x		
		M210		x	x		
		M215		x	x		
		M220		x	x		
		M225		x	x		
		M230		x	x		
		M235		x	x		
		M240		x	x		
		M245		x	x		
		M250		x	x		
		↓		↓	↓		
		M300		x	x		

Bgr. = assembly size

Thread milling – external

Milling tool system MSS-TC



D_N	Type, description	D_G [mm]	Full profile metric ISO 60° — TC threading inserts: TC16-1 **I 0,5** ISO	TC16-1 **I 0,75** ISO	TC16-1 **I 1,0** ISO	TC16-1 **I 1,5** ISO	TC16-1 **I 2,0** ISO	TC16-1 **I 2,5** ISO	TC16-1 **I 3,0** ISO	TC16-1 **I 3,5** ISO	TC16-1 **I 4,0** ISO	TC16-1 **I 4,5** ISO	TC16-1 **I 5,0** ISO
25	**I25**R90-2D-TC16-W	↓											
		M16											
		↓											
32	**I32**R90-2D-TC16-W	↓	External threads in the range between M16 and M80 can be milled with both tools, I25... or I32.... Choose the adequate threading inserts with the required pitch.										
													
		↓											
		M80											

D_G [inch]	Full profile Whitworth 55° — TC threading inserts: TC16-2 **EI** 14W	TC16-2 **EI** 12W	TC16-2 **EI** 11W	TC16-2 **EI** 10W	TC16-2 **EI** 9W	TC16-2 **EI** 8W	TC16-3 **EI** 7W	TC16-3 **EI** 6W	TC16-3 **EI** 5W
↓									
5/8			x						
3/4				x					
7/8					x				
1						x			
1 1/8							x		
1 3/8								x	
1 1/2								x	
1 5/8									x
1 3/4									x

D_N = nominal milling Ø

Bgr.	Type, description	D_G [mm]	Full profile metric ISO 60°		
			MSS-**I32R**-TC16-2		MSS-**I32N**-TC16-3
			TC16-2 I **2,0** ISO	TC16-2 I **3,0** ISO	TC16-3 I **4,0** ISO
32	**1.5D** MSS-**I32R**90-1.5D	M82	x	x	x
		M85	x	x	x
		M90	x	x	x
		M95	x	x	x
		M100	x	x	x
		M105	x	x	x
		M110	x	x	x
		M115	x	x	x
		M120	x	x	x
		M125	x	x	x
		M130	x	x	x
		M135	x	x	x
		M140	x	x	x
		M145	x	x	x
		M150	x	x	x
		M155		x	x
		M160		x	x
		M165		x	x
		M170		x	x
	2.5D MSS-**I32R**90-2.5D	M175		x	x
		M180		x	x
		M185		x	x
		M190		x	x
		M195		x	x
		M200		x	x
		M205		x	x
		M210		x	x
		M215		x	x
		M220		x	x
		M225		x	x
		M230		x	x
		M235		x	x
		M240		x	x
		M245		x	x
		M250		x	x
		↓		↓	↓
		M300		x	x

Bgr. = assembly size

CERATIZIT hard material matters

Cutting data – threading

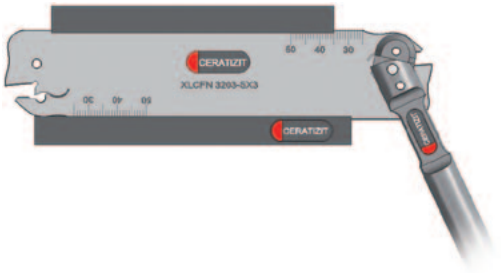
	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ .15% C	1	125
		annealed	.15% - .45% C	2	150 - 250
		tempered	≥ .45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% Si	23	80
		hardened	< 12% Si	24	90
		non hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	–
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	–
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

Coated carbide			Uncoated carbide		
GM213 v_c [m/min]	**GM240** v_c [m/min]		**H216T** v_c [m/min]		
150 - 250	200 - 270		–		
110 - 180	180 - 230		–		
90 - 160	140 - 190		–		
100 - 170	180 - 240		–		
80 - 150	120 - 190		–		
70 - 120	120 - 160		–		
90 - 130	140 - 200		–		
70 - 110	100 -160		–		
110 - 170	170 - 230		–		
90 - 140	130 - 190		–		
110 - 180	150 - 200		–		
80 - 140	–		–		
70 - 100	–		–		
70 - 120	–		–		
120 - 160	130 - 200		–		
100 - 130	120 - 180		–		
160 - 200	120 - 170		–		
90 - 140	120 - 190		–		
120 - 140	150 - 230		–		
90 - 130	120 - 170		–		
–	–		100 - 800		
–	–		100 - 800		
–	–		100 - 500		
–	–		100 - 500		
–	–		100 - 350		
–	–		80 - 300		
–	–		80 - 500		
–	–		80 - 500		
–	–		80 - 500		
–	–		80 - 500		
–	–		80 - 500		
–	–		80 - 500		
30 - 50	20 - 40		–		
25 - 35	20 - 30		–		
15 - 25	10 - 20		–		
10 - 20	10 - 20		–		
10 - 25	10 - 20		–		
100 - 150	70 - 100		–		
40 - 60	25 - 45		–		
35 - 45	–		30 - 40		
–	–		–		
10 - 20	–		5 - 15		
35 - 45	–		30 - 40		

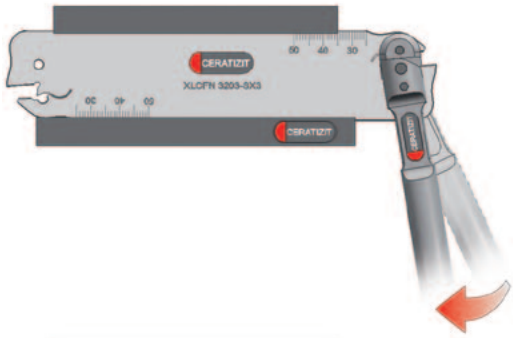
MSS-SX

How to use the system



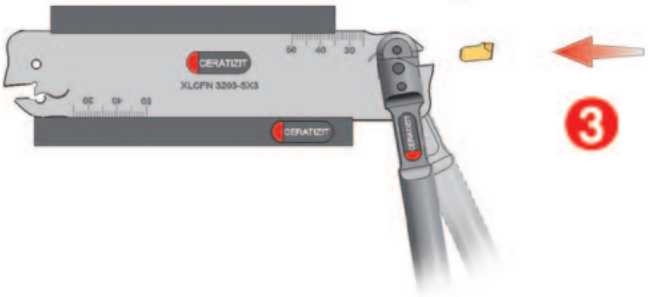
1

Insert mounting key with handle towards the front into the 2 tool location points.



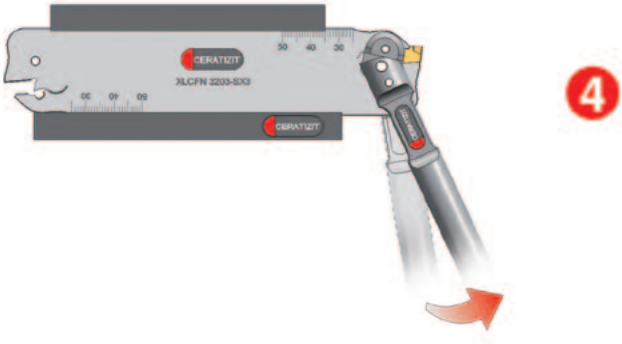
2

When moving the mounting key in the direction of the arrows the insert seat is opened.



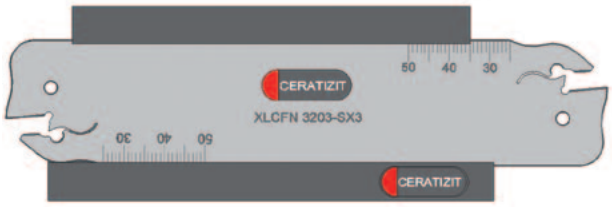
3

Position the insert pressing it against the location face.



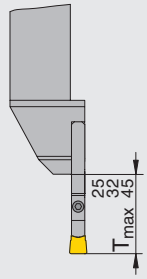
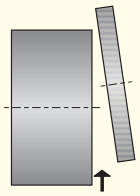
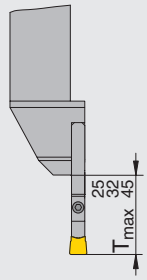
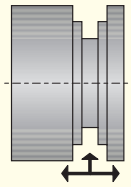
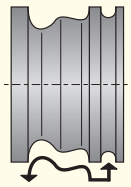
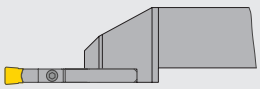
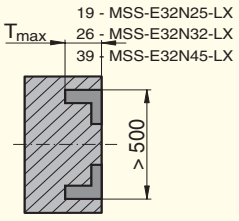
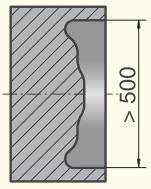
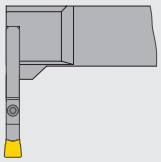
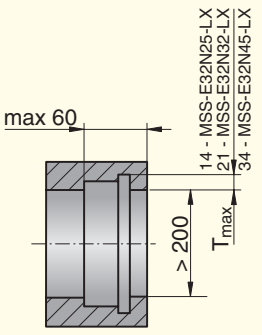
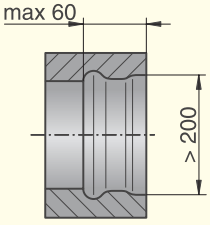
4

Moving the mounting key forward the insert seat locks and the insert is clamped securely.



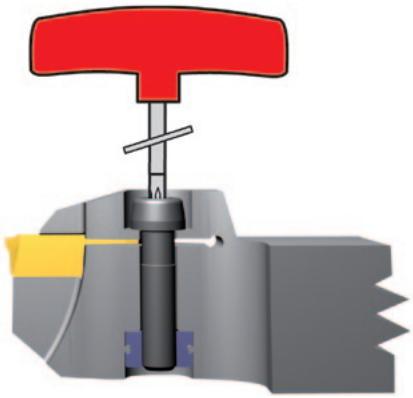
The clamping system is designed in such a way that the mounting key can be inserted into the blade from either side.



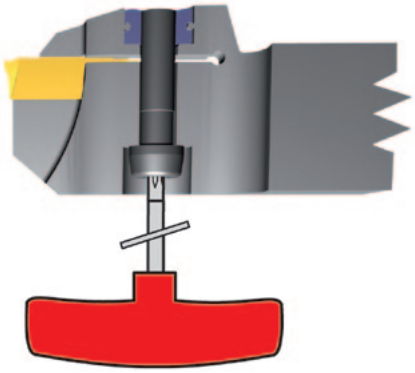
Application \ Insert	8-10	R 4
Part-off 		
Grooving and turning 		
Axial grooving 		
Internal grooving and turning  For this type of internal machining the external tool MSS-E32R/L90-3225N or MSS-E32R/L90-3232R is used		

Can be clamped from either above or below

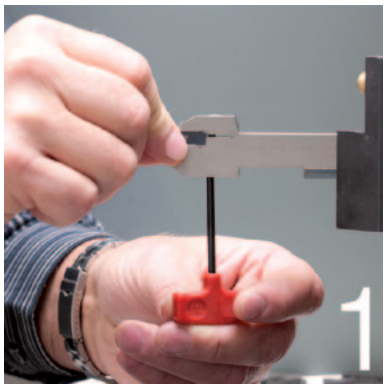
Threaded bush on bottom



Threaded bush on top



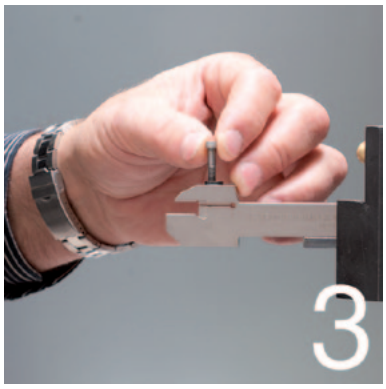
Change of threaded bush



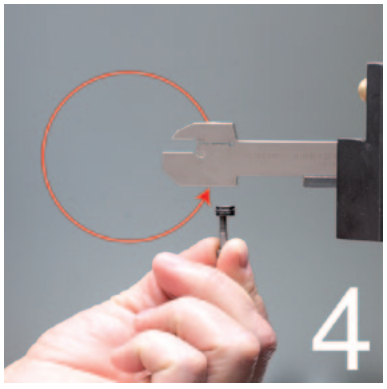
Loosen the clamping screw and remove the insert ...



... fully unscrew the clamping screw and remove it ...



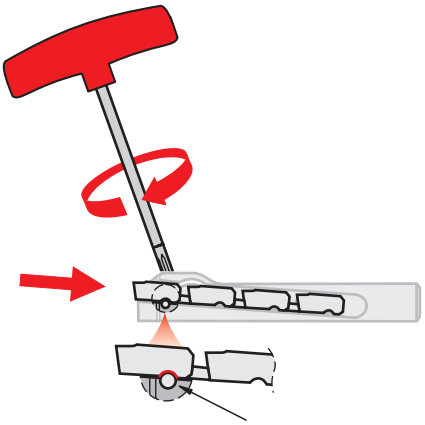
... draw out the threaded bush using the clamping screw ...



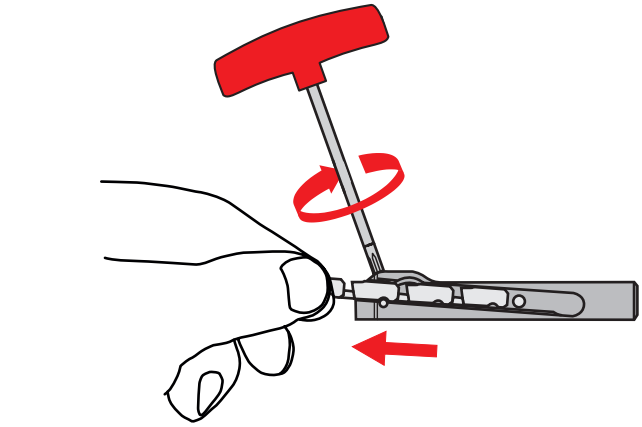
...press the threaded bush onto the milled recess on the opposite side ...



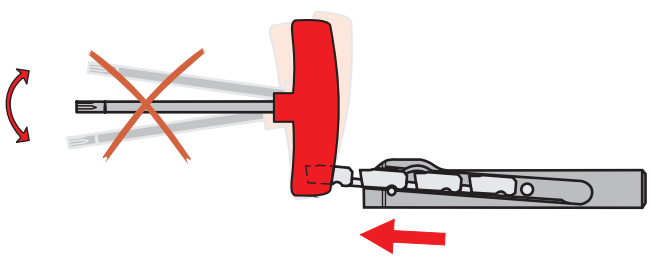
... push the insert onto the contact faces to the stop and fix it in place with the clamping screw.



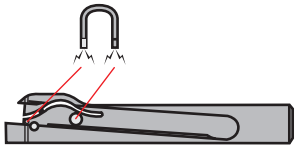
Important: ensure insert is correctly located on pin.



To change to the next cutting edge draw the insert forward.



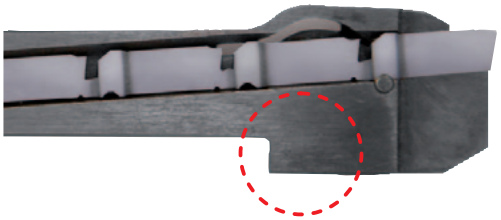
Worn cutting edge must be broken off to left or right



Information: during the positioning procedure, the magnets prevent the cutting inserts from falling out of the tool holder

MaxiClick

Product characteristics



Reinforced tool head for additional stability



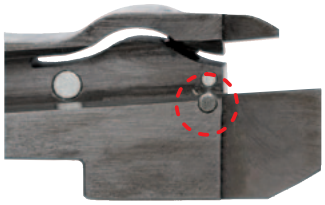
Microfinish -27P to avoid the formation of built-up edge



12° angle for part-off operations without burrs



‘Break-off notch’ for a clean breakage line



Carbide positioning pin for accurate repeatability

You can download the form below at our website www.ceratizit.com ->Download ->Forms or using the QR code.

Kunde: Kunden-Nr.:

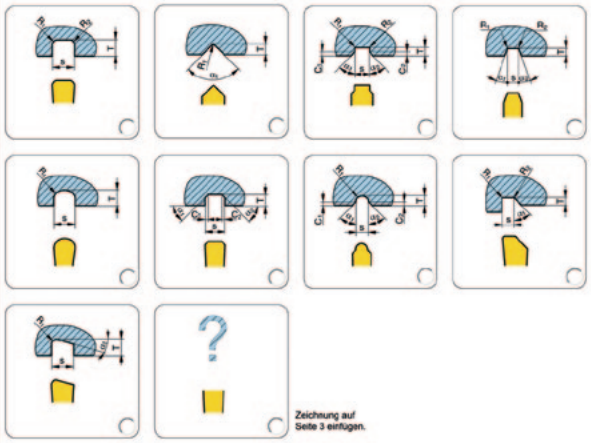
Ansprechpartner: Datum:

E-Mail: Tel.:

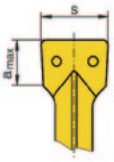
Stückzahl: Werkzeug / Modul:

Werkstoff: Festigkeit: [N/mm²]

GX-Stechwendeplatten sind auf Wunsch auch in verschiedenen Sonderformen lieferbar. In der folgenden Übersicht sind die Wichtigsten angeführt. Die eingetragenen Maße zeigen welche Mindestangaben zur Definition der Sonderformen erforderlich sind.
Wichtig: Maße und Toleranzen des Werkstückes anführen!



Rohlingstypen für Sonderformen			
Breitenklasse	WSP-Größe	s	a_{max}
1	09	2,00 - 2,75	1,5
2	09	2,76 - 3,75	2,0
1	16	2,00 - 2,75	2,5
2	16	2,76 - 3,75	3,0
3	16	3,76 - 5,00	3,5
4	16	5,01 - 6,50	4,0
1	24	2,00 - 2,75	2,5
2	24	2,76 - 3,75	2,5
3	24	3,76 - 5,00	3,5
4	24	5,01 - 6,50	4,0



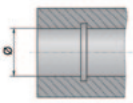
Wendeplattengröße: 09 16 24

Breitenklasse:

Maße:

	Maß	Toleranz	
s			[mm]
T			[mm]
R_1			[mm]
R_2			[mm]
C_1			[mm]
C_2			[mm]
α_1			[°]
α_2			[°]

Innenbearbeitung - Bohrung Ø [mm]



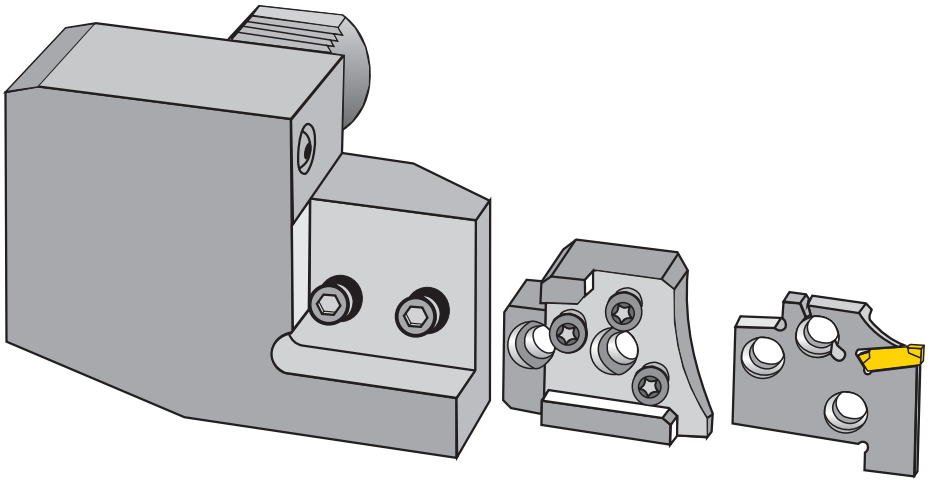
Ihre Anmerkungen:

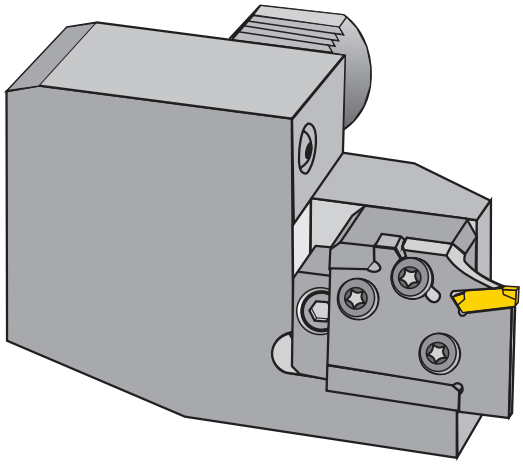
Application possibilities

Application possibilities for MSS adapters:

MSS adapters offer the possibility to apply the modular parting and grooving system where conventional tool shanks or Maxiflex UTS tool heads cannot be used.

For example in case of:
> Special solutions of all kinds
> Special tools and shanks
> Rotating tools for circular milling
> Special machines
> Limited space

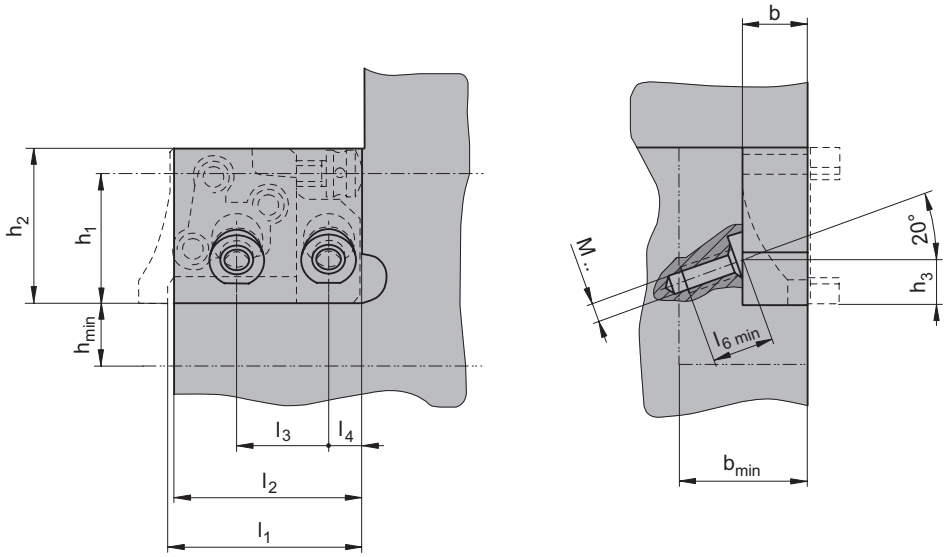




Assembly example:
Adapters in combination with VDI shank

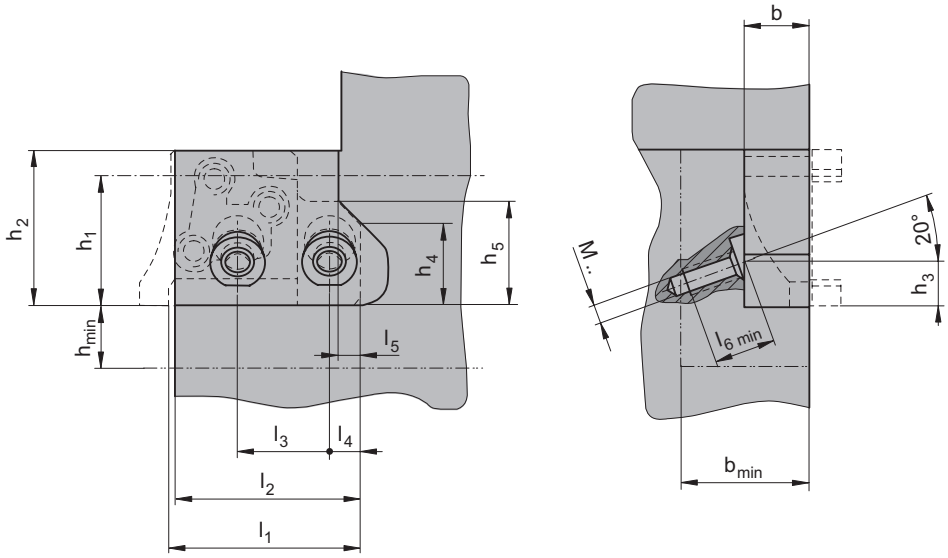
Assembly type A:

> For low or medium loads
> Adjustable adapter



Assembly type B:

> For heavy machining (large parting and grooving depths)
> Adapter not adjustable



Adapters for:	Dimensions in mm														
	h_1	h_2	$h_3^{\pm 0,1}$	h_4	h_5	$h_{min.}$	b	$b_{min.}$	l_1	l_2	l_3	l_4	l_5	$l_{6\ min.}$	M..
MSS-E20R00-AD MSS-E20L00-AD	20	24	6,0	13	16	10	10,7	19	30	29,0	14,25	5,0	3	8	M4
MSS-E25R00-AD MSS-E25L00-AD	25	30	8,5	16	20	12	12,6	25	37	36,0	18,00	6,5	4	12	M5
MSS-E32R00-AD MSS-E32L00-AD	32	38	13,5	22	26	16	14,6	30	46	44,5	23,50	7,5	4	15	M6


hard material matters
CERATIZIT



Introduction

D2

Grade overview D2
Grade description D3
Chip grooves D8
System characteristics for Classic D10
Application for Classic D13

System characteristics for 900 D15
Application for 900 D16



Inserts

D18

WCGT.. D18
XOMT.. D18
SONT.. D19



Tools

D20

MaxiDrill Classic 2D D20
MaxiDrill Classic 3D D22
MaxiDrill Classic 4D D24
MaxiDrill 900 3D D26
MaxiDrill 900 4D D28

MaxiDrill 900 5D D29



Technical information

D30

Cutting data for grades/materials D30
Cutting data for Classic D32
Cutting data for 900 D34
Offset-drilling into solid material D40
Coolant pressure D42

Formula collection D43

Grade overview

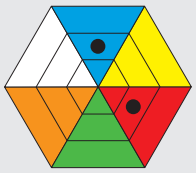
Grade designation	Standard designation	*Cutting material	Application range	P Steel	M Stainless	K Cast iron	N Non ferrous metals	S Heat resistant	H Hard materials
U17T	HW-M15	W	01 05 10 15 20 25 30 35 40 45 50					○	
	HW-K15	W					●		
SR226	HC-P25	C		●					
	HC-K20	C				●			
SR127	HC-P25	C		●					
	HC-M20	C			○				
	HC-K30	C				●			
CTPP430	HC-P30	P		●					
	HC-M25	P			●			○	
		P				○	○		
CTC1435	HC-P35	C		●					
	HC-M30	C			○				
	HC-K20	C				○			
GM40	HC-P35	C		●					
	HC-M30	C			●				
S40T	HW-P40	W		●					
	HW-M40	W			●				

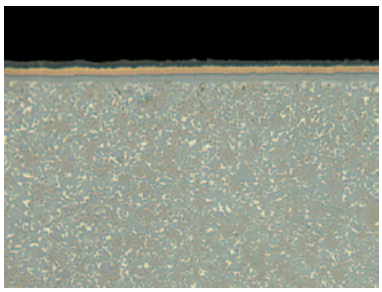
● Main application

○ Extended application

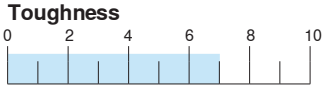
SR226

HC-P25
HC-K20

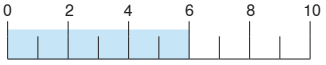




Toughness



Wear resistance



Composition:
Co 11.0%; composite carbides 12.0%; WC balance

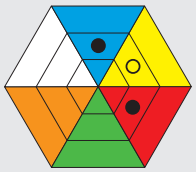
Grain size:
1 - 2 µm

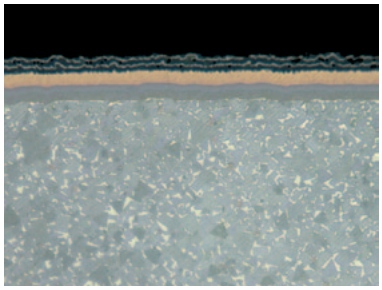
Hardness:
HV 1420

Coating specification:
CVD
Ti(C,N) + TiN + Al_2O_3; 5.5 µm

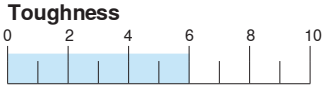
SR127

HC-P25
HC-M20
HC-K20





Toughness



Wear resistance



Composition:
Co 6.0%; composite carbides .6%; WC balance

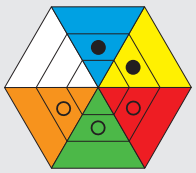
Grain size:
2 µm

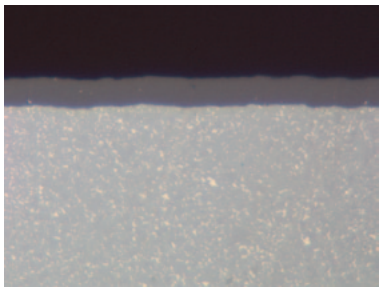
Hardness:
HV_{30} 1460

Coating specification:
CVD
Ti(C,N) + TiN + Al_2O_3; 12 µm

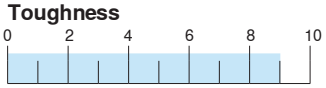
CTPP430

HC-P30
HC-M25

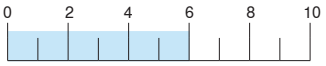




Toughness



Wear resistance



Composition:
Co 9.0%; WC balance

Grain size:
.85 µm

Hardness:
HV 1590

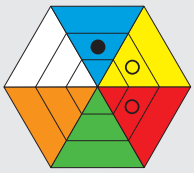
Coating specification:
PVD; TiAlN; 7 µm

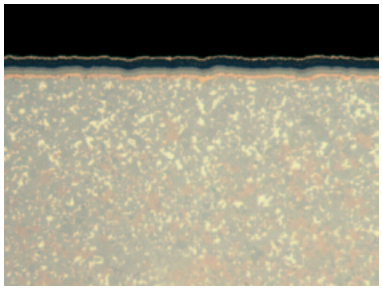
Grade description

Steel

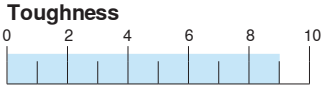
CTC1435

HC-P35
HC-M30
HC-K20

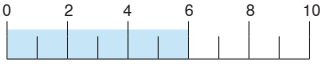




Toughness



Wear resistance



Composition:
Co 9.6%; mixed carbides 7.4%; WC balance

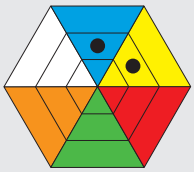
Grain size:
1 - 2 μm

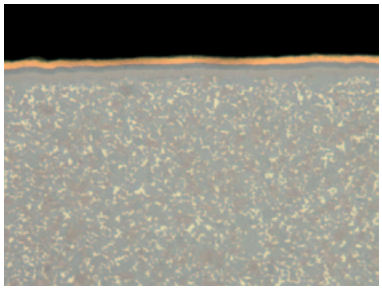
Hardness:
HV 1400

Coating specification:
CVD
TiN + Ti (C,N) + Ti (N,B) + Al_2O_3 + Ti (C,N,B); 6 μm

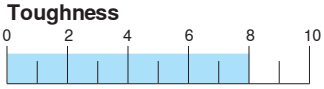
GM40

HC-P35
HC-M30

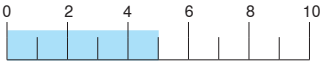




Toughness



Wear resistance



Composition:
Co 11.0%; composite carbides 12.0%; WC balance

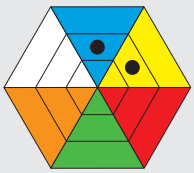
Grain size:
1 - 2 μm

Hardness:
HV_{30} 1420

Coating specification:
CVD
TiC + Ti(C,N) + TiN; 5.5 μm

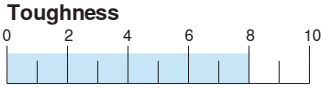
S40T

HW-P40
HW-M40

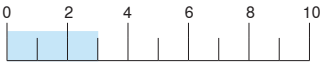




Toughness



Wear resistance



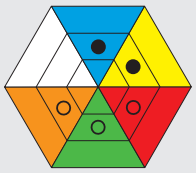
Composition:
Co 11.0%; mixed carbides 12.0%; WC balance

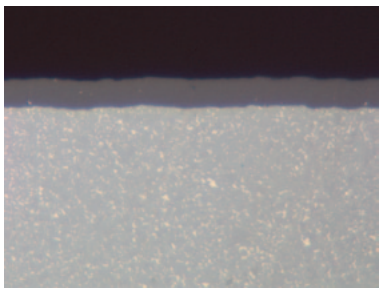
Grain size:
1 - 2 μm

Hardness:
HV_{30} 1420

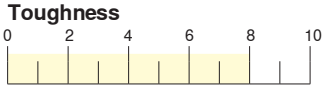
CTPP430

HC-P30
HC-M25

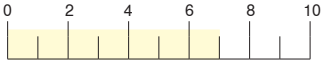




Toughness



Wear resistance



Composition:
Co 9.0%; WC balance

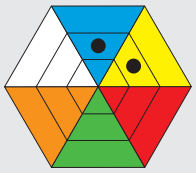
Grain size:
.85 µm

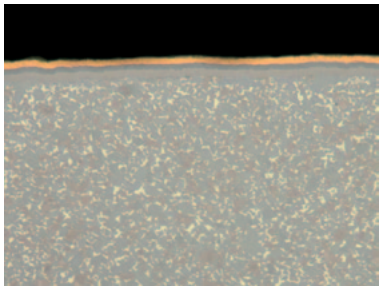
Hardness:
HV 1590

Coating specification:
PVD; TiAlN; 7 µm

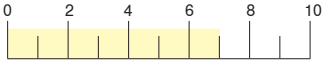
GM40

HC-P35
HC-M30

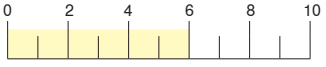




Toughness



Wear resistance



Composition:
Co 11.0%; composite carbides 12.0%; WC balance

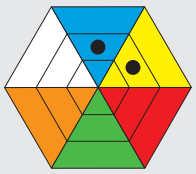
Grain size:
1 - 2 µm

Hardness:
HV_{30} 1420

Coating specification:
CVD
TiC + Ti(C,N) + TiN; 5.5 µm

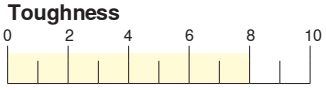
S40T

HW-P40
HW-M40





Toughness



Wear resistance



Composition:
Co 11.0%; mixed carbides 12.0%; WC balance

Grain size:
1 - 2 µm

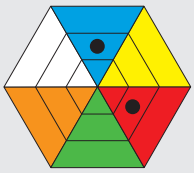
Hardness:
HV_{30} 1420

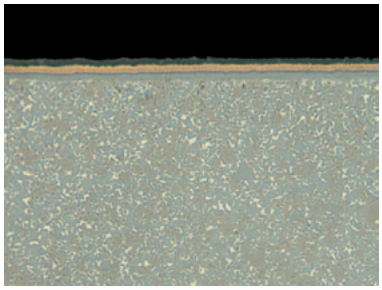
Grade description

Cast iron

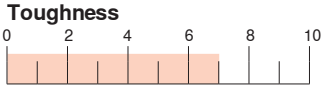
SR226

HC-P25
HC-K20

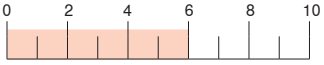




Toughness



Wear resistance



Composition:
Co 11.0%; composite carbides 12.0%; WC balance

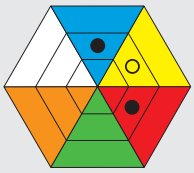
Grain size:
1 - 2 μm

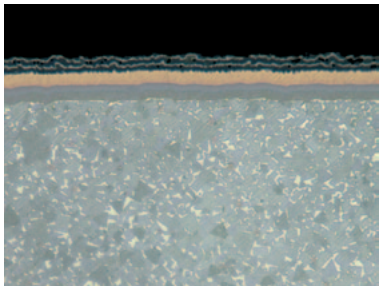
Hardness:
HV 1420

Coating specification:
CVD
Ti(C,N) + TiN + Al_2O_3; 5.5 μm

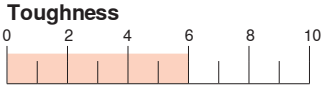
SR127

HC-P25
HC-M20
HC-K20

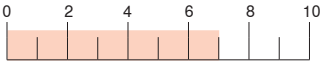




Toughness



Wear resistance



Composition:
Co 6.0%; composite carbides .6%; WC balance

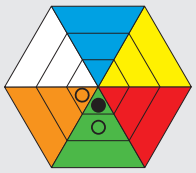
Grain size:
2 μm

Hardness:
HV_{30} 1460

Coating specification:
CVD
Ti(C,N) + TiN + Al_2O_3; 12 μm

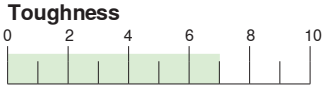
U17T

HW-M15
HW-K15





Toughness



Wear resistance

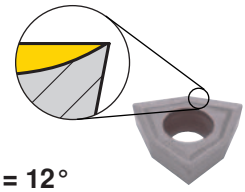
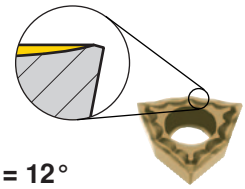
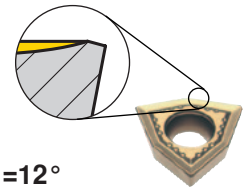
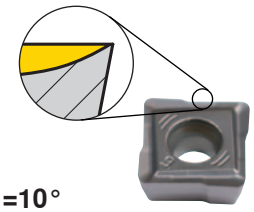


Composition:
Co 6.0%; composite carbides 8.0%; WC balance

Grain size:
1.5 μm

Hardness:
HV 1570

Chip grooves

Chip groove	Material	Machining situation and stability				Machining type F / M / R
 γ = 12°	FN	▼ ▽	✗	✗			F
 γ = 12°	-29	▼ ▽ ▼	✗	✗	✗		M
 γ =12°	SN	▼ ▼ ▼	✗	✗	✗		M
 γ =10°	-M30	▼ ▼ ▼	✗	✗			M

MasterGuide:

- ▼ Steel
- ▼ Stainless
- ▼ Cast iron
- ▼ Non ferrous metals
- ▼ Heat resistant
- ▽ Hard materials

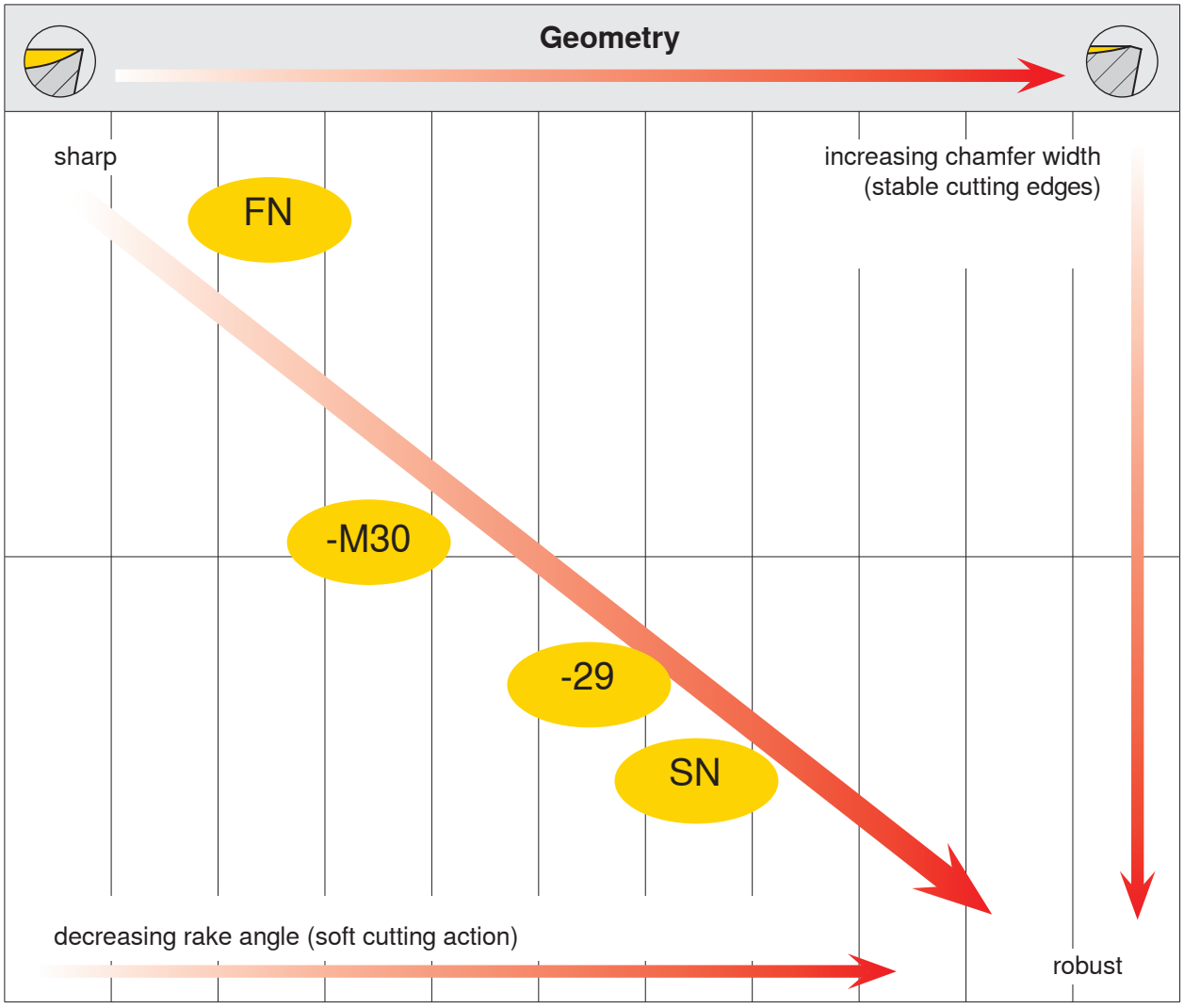
- ▼ Main application
- ▽ Extended application

Machining situation and stability:

- ◯ excellent
- ◯ good
- ◔ acceptable
- ⬡ difficult

Machining type:

F Fine machining
M Medium machining
R Rough machining


Geometry
sharp
increasing chamfer width
(stable cutting edges)
FN
-M30
-29
SN
decreasing rake angle (soft cutting action)
robust

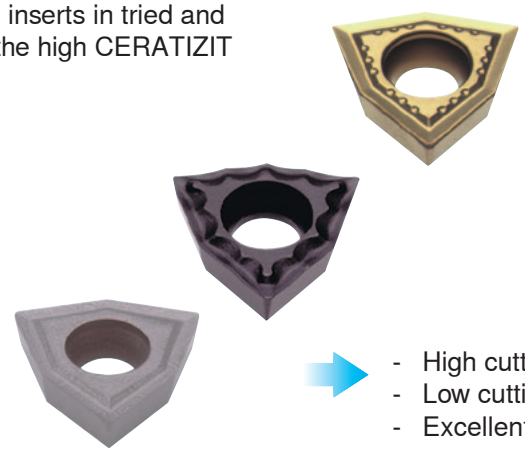
System characteristics

MaxiDrill Classic

Variable application of the insert group in all drilling tools type 2D, 3D and 4D

Advantages

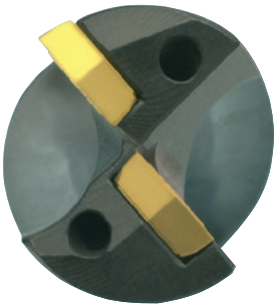
✓ Coated and uncoated inserts in tried and tested geometry and the high CERATIZIT quality



Customer benefits

- High cutting speed
- Low cutting forces
- Excellent swarf control

✓ Optimum compensation of radial forces thanks to specially positioned inserts



- Drill will not wander
- Produces consistent true holes when deep hole drilling

✓ Helical flute with through coolant holes on the drill point



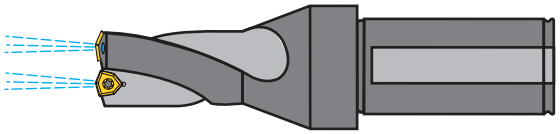
- Maximum system rigidity
- No deviation of tool
- Reduced machining noise
- Optimum chip evacuation

For fixed and rotating applications
Insert drills with helical chip flutes

Classic

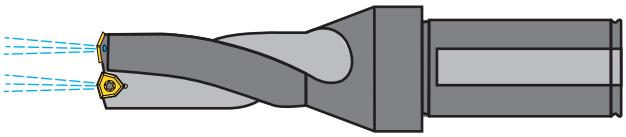
2 x D

Ø
14 – 53 mm



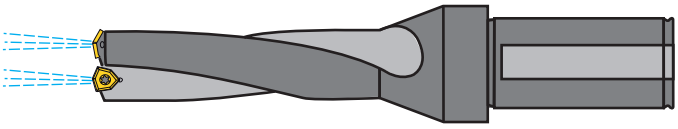
3 x D

Ø
14 – 53 mm



4 x D

Ø
18 – 50 mm



Helical chip flutes

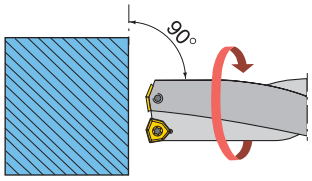
- Low deflection
- Optimum chip evacuation
- Possibly occurring transverse forces are absorbed without problems

MaxiDrill Classic or MaxiDrill HFD

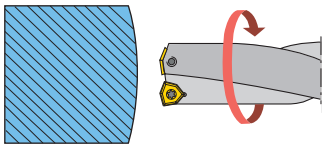


Ideal for:
- Universal application
- Less stable machines
- Low power machines
- High precision of drilled holes

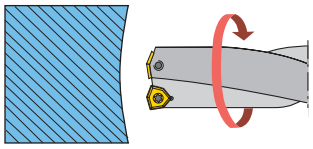
Insert drills with helical chip flutes

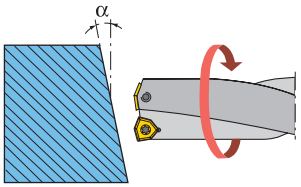


In stable conditions and with a flat surface of the work piece you can drill with maximum feed.

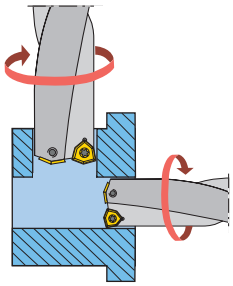


When the drill enters the convex work piece surface the central insert cuts first.

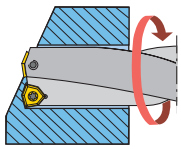




When the drill enters oblique or concave work piece surfaces the peripheral insert cuts first. It is recommended to reduce the feed by approx. 30-50 % for this application.

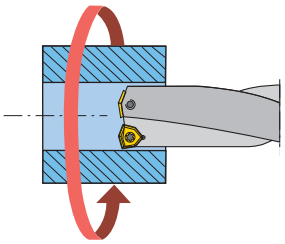


Reduce the feed when the drill enters the transverse hole. With transverse holes you should drill from both sides if possible.

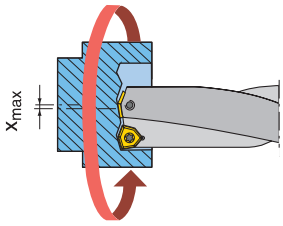


In case of drill exit on oblique work piece surfaces, reduce the feed by 30-50 %.

Insert drills with helical chip flutes



Drilling into solid material



Off-centre drilling into solid material
X_{max} = see page 40

Safety precautions
Using a fixed drill and a rotating work piece in case of bores a sharp disc will result. Safety precautions must be observed. A safety guard has to be provided as protection.

Advantages

YOUR benefits

Minimal drill wander due to specialized insert geometries.	> Excellent drilling action > High process security even with difficult drilling situations
Rigid construction allows maximum feed rates for holes up to 5xD.	> Increased productivity combined with high process security.
Insert with 4 cutting edges for solid carbide drilling.	> Optimum economy.
Peripheral and central cutting edges have the same geometry, size and grade.	> The same insert fits both pockets, preventing mis-location and reducing inventory
Grade for a wide range of applications	> Universal application > High flexibility

Drilling in the high-feed range

System 900

> Optimum chip evacuation thanks to helical chip pockets adapted to the chip shape and size

hard & tough

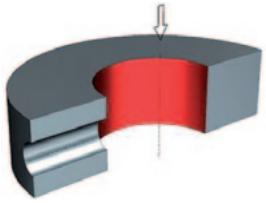
> Long tool life thanks to hard & tough coating



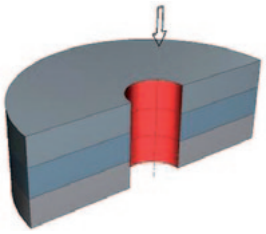
Special application options

This solid carbide tool shows its high performance capacity in a wide application range and most difficult situations.

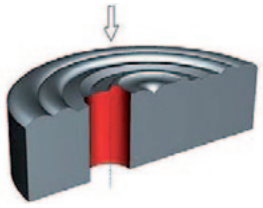
Note: feed rate reduction between 30 and 60 % is necessary in the depicted cutting situations! The machining possibilities are reduced in case of long-chipping tough materials.



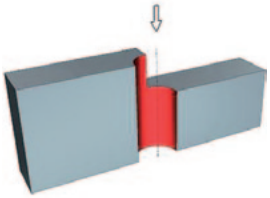
Producing a transverse through hole



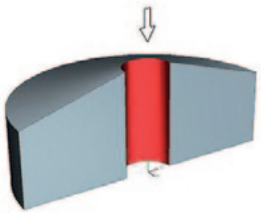
Stack drilling



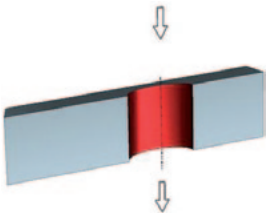
Drilling on an uneven surface



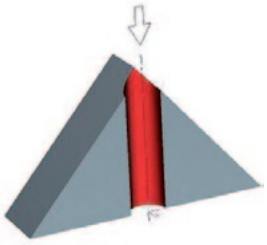
Drilling on a stepped surface



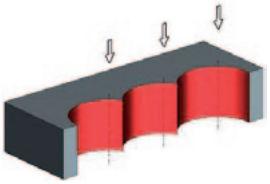
Drilling of a convex surface



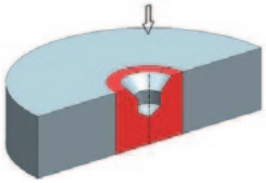
Drilling on inclined surfaces: the drill exits at an angle



Drilling on a ridge



Chain drilling is possible depending on the material



Spot drilling in a central hole or bead



Reboring not possible!



When the drill exits the material, in the case of through-holes, a sharp-edged disk is produced.

When the tool is stationary, this sharp-edged disk may be thrown out of the clamping chuck at high speed and can cause damage and personal injury.

In order to prevent this happening, safety precautions must be taken.

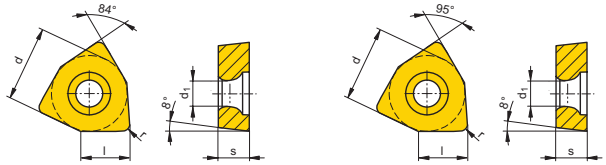



hard material matters
CERATIZIT

MaxiDrill Classic

WC.. XO..

			U17T	S40T	SR127	SR226	CTPP430	CTC1435	GM40	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P				●	●	●	●	●	●					
M				●	○		●	○	●					
K					●	●	○	○						
N			●				○							
S			○				○							
H														
-FN		WCGT 030204FN	●							6.00	3.97	2.50	0.40	2.50
		WCGT 050304FN	●							8.00	5.29	3.00	0.40	2.80
		WCGT 060304FN	●							10.00	6.62	3.00	0.40	4.40
		WCGT 07T304FN	●							12.00	7.94	3.80	0.40	4.40
-29		WCGT 020204SN-29			●					5.50	3.39	2.30	0.40	2.25
		WCGT 030204SN-29			●			●		6.00	3.97	2.50	0.40	2.50
		WCGT 050304SN-29			●			●		8.00	5.29	3.00	0.40	2.80
		WCGT 060304SN-29			●			●		10.00	6.62	3.00	0.40	4.40
		WCGT 07T304SN-29			●			●		12.00	7.94	3.80	0.40	4.40
-SN		XOMT 020204SN				●			●	5.50	3.39	2.30	0.40	2.25
		XOMT 030204SN		●		●			●	6.00	3.97	2.50	0.40	2.50
		XOMT 050304SN		●		●			●	8.00	5.29	3.00	0.40	2.80
		XOMT 060304SN		●		●			●	10.00	6.62	3.00	0.40	4.00
		XOMT 07T304SN		●		●			●	12.00	3.97	3.80	0.40	4.40
			U17T	S40T	SR127	SR226	CTPP430	CTC1435	GM40	d	l	s	r	d_1



Inserts

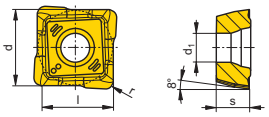
Tools and inserts for drilling

D3-D7

D32-D33

D20-D25

		U17T	S40T	SR127	SR226	CTPP430	CTC1435	GM40	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P		●	●	●	●	●	●						
M		●	O		●	O	●						
K			●	●	O	O							
N	●				O								
S	O				O								
H													
-M30		SONT 062506ER-M30				●			5.90	5.50	2.50	0.60	2.50
		SONT 072907ER-M30				●			6.50	6.10	2.90	0.70	2.50
		SONT 083308ER-M30				●			7.70	7.30	3.30	0.80	2.90
		SONT 093808ER-M30				●			8.90	8.50	3.80	0.80	3.50
		SONT 104408ER-M30				●			10.10	9.60	4.40	0.80	4.10
			U17T	S40T	SR127	SR226	CTPP430	CTC1435	GM40	d	l	s	r	d_1

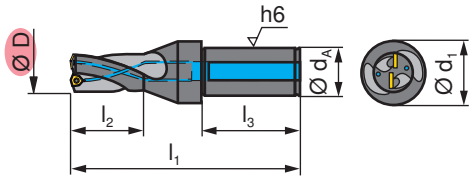


D3-D7
D34-D39
D26-D29

MaxiDrill Classic – 2D

Ø 14 – 29 mm





Picture shows right-hand version

D [mm]	Type, description	L / R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	
14	2D.140.R.02	R	25	32	114	30	54	WC.. / XO.. 02..
14.5	2D.145.R.02		25	32	115	31	54	
15	2D.150.R.02		25	32	116	32	54	
15.5	2D.155.R.02		25	32	117	33	54	
16	2D.160.R.02		25	32	118	34	54	
16.5	2D.165.R.02		25	32	119	35	54	
17	2D.170.R.02		25	32	120	36	54	
17.5	2D.175.R.02		25	32	121	37	54	
18	2D.180.R.03		25	32	122	38	54	WC.. / XO.. 03..
19	2D.190.R.03		25	32	124	40	54	
20	2D.200.R.03		25	32	126	42	54	
21	2D.210.R.03		25	32	128	44	54	
22	2D.220.R.03		25	32	130	46	54	
23	2D.230.R.03		25	32	132	48	54	
24	2D.240.R.05		25	32	134	50	54	WC.. / XO.. 05..
25	2D.250.R.05		25	32	136	52	54	
26	2D.260.R.05		25	32	138	54	54	
27	2D.270.R.05		25	32	140	56	54	
28	2D.280.R.05		25	32	142	58	54	
29	2D.290.R.05		25	32	144	60	54	

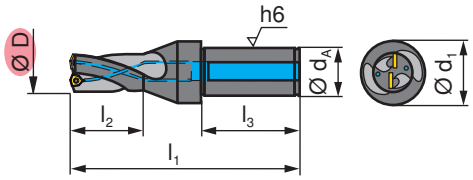
Ordering example: 1 piece 2D.140.R.02

	D [mm]			
WC.. / XO.. 02..	14 - 17.5	7729113/M2,0X4,8/T06		7729112/TORX T06 F
WC.. / XO.. 03..	18 - 23	7722113/M2,2X5/T07	7724105/TORX T07	
WC.. / XO.. 05..	24 - 29	7815101/M2,5X6,0/T08	7724106/TORX T08	



D18





Picture shows right-hand version

D [mm]	Type, description	L / R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	
30	2D.300.R.06	R	32	49	150	62	58	WC.. / XO.. 06..
31	2D.310.R.06		32	49	152	64	58	
32	2D.320.R.06		32	49	154	66	58	
34	2D.340.R.06		32	49	158	70	58	
35	2D.350.R.06		32	49	160	72	58	
36	2D.360.R.06		32	49	162	74	58	
37	2D.370.R.06		32	49	164	76	58	
38	2D.380.R.07		32	49	166	78	58	WC.. / XO.. 07..
39	2D.390.R.07		32	49	168	80	58	
40	2D.400.R.07		32	49	170	82	58	
42	2D.420.R.07		32	49	174	86	58	
44	2D.440.R.07		32	49	178	90	58	
46	2D.460.R.07		40	59	197	94	68	
48	2D.480.R.07		40	59	201	98	68	
50	2D.500.R.07		40	59	205	102	68	
53	2D.530.R.07		40	59	211	108	68	

Ordering example: 1 piece 2D.300.R.06

	D [mm]			
WC.. / XO.. 06..	30 - 37	7724103/TORX T15	7815102/M3,5X11,0/T15	
WC.. / XO.. 07..	38 - 53	7724103/TORX T15	7815102/M3,5X11,0/T15	

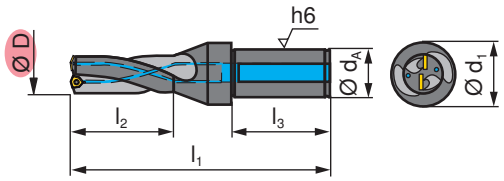


D18

MaxiDrill Classic – 3D

Ø 14 – 29 mm





Picture shows right-hand version

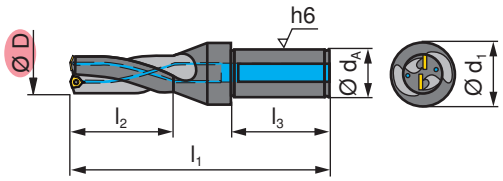
D [mm]	Type, description	L / R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	
14	3D.140.R.02		25	32	128	44	54	
14.5	3D.145.R.02		25	32	129.5	45.5	54	
15	3D.150.R.02		25	32	131	47	54	
15.5	3D.155.R.02		25	32	132.5	48.5	54	
16	3D.160.R.02		25	32	134	50	54	WC.. / XO.. 02..
16.5	3D.165.R.02		25	32	135.5	51.5	54	
17	3D.170.R.02		25	32	137	53	54	
17.5	3D.175.R.02		25	32	138.5	54.5	54	
18	3D.180.R.03		25	32	140	56	54	
18.5	3D.185.R.03		25	32	140.5	57.5	53	
19	3D.190.R.03		25	32	143	59	54	
19.5	3D.195.R.03		25	32	144.5	60.5	54	
20	3D.200.R.03		25	32	146	62	54	
20.5	3D.205.R.03		25	32	147.5	63.5	54	
21	3D.210.R.03	R	25	32	149	65	54	WC.. / XO.. 03..
21.5	3D.215.R.03		25	32	150.5	66.5	54	
22	3D.220.R.03		25	32	152	68	54	
22.5	3D.225.R.03		25	32	153.5	69.5	54	
23	3D.230.R.03		25	32	155	71	54	
23.5	3D.235.R.03		25	32	156.5	72.5	54	
24	3D.240.R.05		25	32	158	74	54	
24.5	3D.245.R.05		25	32	159.5	75.5	54	
25	3D.250.R.05		25	32	161	77	54	
25.5	3D.255.R.05		25	32	162.5	78.5	54	
26	3D.260.R.05		25	32	164	80	54	WC.. / XO.. 05..
26.5	3D.265.R.05		25	32	165.5	81.5	54	
27	3D.270.R.05		25	32	167	83	54	
28	3D.280.R.05		25	32	170	86	54	
29	3D.290.R.05		25	32	173	89	54	

Ordering example: 1 piece 3D.140.R.02

	D [mm]			
WC.. / XO.. 02..	14 - 17.5	7729113/M2,0X4,8/T06		7729112/TORX T06 F
WC.. / XO.. 03..	18 - 23.5	7722113/M2,2X5/T07	7724105/TORX T07	
WC.. / XO.. 05..	24 - 29	7815101/M2,5X6,0/T08	7724106/TORX T08	

D18





Picture shows right-hand version

D [mm]	Type, description	L / R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	
30	3D.300.R.06	R	32	49	180	92	58	WC.. / XO.. 06..
31	3D.310.R.06		32	49	183	95	58	
32	3D.320.R.06		32	49	186	98	58	
33	3D.330.R.06		32	49	189	101	58	
34	3D.340.R.06		32	49	192	104	58	
35	3D.350.R.06		32	49	195	107	58	
36	3D.360.R.06		32	49	198	110	58	
37	3D.370.R.06		32	49	201	113	58	
38	3D.380.R.07		32	49	204	116	58	WC.. / XO.. 07..
39	3D.390.R.07		32	49	207	119	58	
40	3D.400.R.07		32	49	210	122	58	
41	3D.410.R.07		32	49	213	125	58	
42	3D.420.R.07		32	49	216	128	58	
43	3D.430.R.07		32	49	219	131	58	
44	3D.440.R.07		32	49	222	134	58	
45	3D.450.R.07		40	59	240	137	68	
46	3D.460.R.07		40	59	243	140	68	
47	3D.470.R.07		40	59	246	143	68	
48	3D.480.R.07		40	59	249	146	68	
49	3D.490.R.07		40	59	252	149	68	
50	3D.500.R.07		40	59	255	152	68	
51	3D.510.R.07		40	59	258	155	68	
52	3D.520.R.07		40	59	261	158	68	
53	3D.530.R.07		40	59	264	161	68	

Ordering example: 1 piece 3D.300.R.06

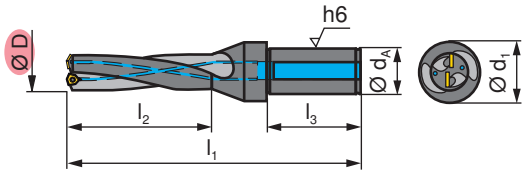
	D [mm]			
WC.. / XO.. 06..	30 - 37	7815102/M3,5X11,0/T15	7724103/TORX T15	
WC.. / XO.. 07..	38 - 53	7815102/M3,5X11,0/T15	7724103/TORX T15	

D18

MaxiDrill Classic – 4D

Ø 18 – 29 mm





Picture shows right-hand version

D [mm]	Type, description	L / R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	
18	4D.180.R.03		25	32	158	74	54	
18.5	4D.185.R.03		25	32	160	76	54	
19	4D.190.R.03		25	32	162	78	54	
19.5	4D.195.R.03		25	32	164	80	54	
20	4D.200.R.03		25	32	166	82	54	
20.5	4D.205.R.03		25	32	168	84	54	
21	4D.210.R.03		25	32	170	86	54	WC.. / XO.. 03..
21.5	4D.215.R.03		25	32	172	88	54	
22	4D.220.R.03		25	32	174	90	54	
22.5	4D.225.R.03		25	32	176	92	54	
23	4D.230.R.03	R	25	32	178	94	54	
23.5	4D.235.R.03		25	32	180	96	54	
24	4D.240.R.05		25	32	182	98	54	
24.5	4D.245.R.05		25	32	184	100	54	
25	4D.250.R.05		25	32	186	102	54	
25.5	4D.255.R.05		25	32	188	104	54	
26	4D.260.R.05		25	32	190	106	54	WC.. / XO.. 05..
26.5	4D.265.R.05		25	32	192	108	54	
27	4D.270.R.05		25	32	194	110	54	
28	4D.280.R.05		25	32	198	114	54	
29	4D.290.R.05		25	32	202	118	54	

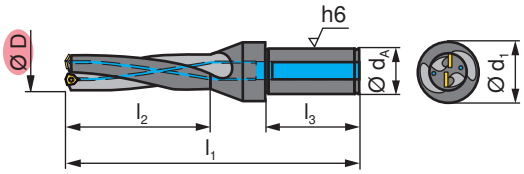
Ordering example: 1 piece 4D.180.R.03

	D [mm]			
WC.. / XO.. 03..	18 - 23.5	7722113/M2,2X5/T07	7724105/TORX T07	
WC.. / XO.. 05..	24 - 29	7815101/M2,5X6,0/T08	7724106/TORX T08	



D18





Picture shows right-hand version

D [mm]	Type, description	L / R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	
30	4D.300.R.06		32	49	210	122	58	
31	4D.310.R.06		32	49	214	126	58	
32	4D.320.R.06		32	49	218	130	58	
33	4D.330.R.06		32	49	222	134	58	
34	4D.340.R.06		32	49	226	138	58	WC.. / XO.. 06..
35	4D.350.R.06		32	49	230	142	58	
36	4D.360.R.06		32	49	234	146	58	
37	4D.370.R.06		32	49	238	150	58	
38	4D.380.R.07		32	49	242	154	58	
39	4D.390.R.07		32	49	246	158	58	
40	4D.400.R.07	R	32	49	250	162	58	
41	4D.410.R.07		32	49	254	166	58	
42	4D.420.R.07		32	49	258	170	58	
43	4D.430.R.07		32	49	262	174	58	
44	4D.440.R.07		32	49	266	178	58	WC.. / XO.. 07..
45	4D.450.R.07		40	59	285	182	68	
46	4D.460.R.07		40	59	289	186	68	
47	4D.470.R.07		40	59	293	190	68	
48	4D.480.R.07		40	59	297	194	68	
49	4D.490.R.07		40	59	301	198	68	
50	4D.500.R.07		40	59	305	202	68	

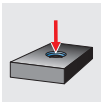
Ordering example: 1 piece 4D.300.R.06

	D [mm]			
WC.. / XO.. 06..	30 - 37	7815102/M3,5X11,0/T15	7724103/TORX T15	
WC.. / XO.. 07..	38 - 50	7815102/M3,5X11,0/T15	7724103/TORX T15	

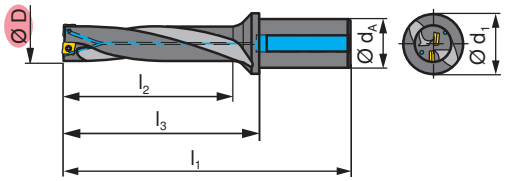
D18

System 900 – 3D

Ø 19 – 32 mm





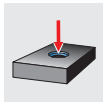


D [mm]	Type, description	L / R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	
19	C900.3D.190.R.06		25	32	131	57	75	
19.5	C900.3D.195.R.06		25	32	133	59	77	SONT 06..
20	C900.3D.200.R.06		25	32	134	60	78	
20.5	C900.3D.205.R.06		25	32	136	62	80	
21	C900.3D.210.R.07		25	32	138	63	82	
21.5	C900.3D.215.R.07		25	32	140	65	84	
22	C900.3D.220.R.07		25	32	141	66	85	SONT 07..
22.5	C900.3D.225.R.07		25	32	143	68	87	
23	C900.3D.230.R.07		25	32	144	69	88	
23.5	C900.3D.235.R.07		25	32	146	71	90	
24	C900.3D.240.R.08		32	40	155	72	95	
24.5	C900.3D.245.R.08		32	40	157	74	97	
25	C900.3D.250.R.08		32	40	158	75	98	
25.5	C900.3D.255.R.08	R	32	40	160	77	100	SONT 08..
26	C900.3D.260.R.08		32	40	161	78	101	
26.5	C900.3D.265.R.08		32	40	163	80	103	
27	C900.3D.270.R.08		32	40	164	81	104	
27.5	C900.3D.275.R.08		32	40	166	83	106	
28	C900.3D.280.R.09		32	40	167	84	107	
28.5	C900.3D.285.R.09		32	40	169	86	109	
29	C900.3D.290.R.09		32	40	170	87	110	
29.5	C900.3D.295.R.09		32	40	172	89	112	
30	C900.3D.300.R.09		32	40	173	90	113	SONT 09..
30.5	C900.3D.305.R.09		32	40	175	92	115	
31	C900.3D.310.R.09		32	40	176	93	116	
31.5	C900.3D.315.R.09		32	40	178	95	118	
32	C900.3D.320.R.09		32	40	179	96	119	

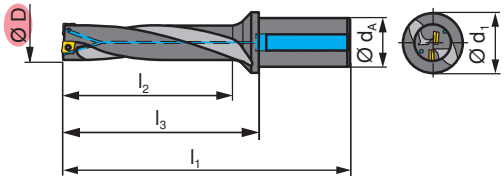
Ordering example: 1 piece C900.3D.190.R.06

	D [mm]			
SONT 06..	19 - 20.5	M2,2x5-07IP/10009244	10006918/TORX 07IP	DMSD 1,0Nm/SORT 07IP
SONT 07..	21 - 23.5	M2,2x5-07IP/10009244	10006918/TORX 07IP	DMSD 1,0Nm/SORT 07IP
SONT 08..	24 - 27.5	M2,5x6-08IP/10009243	10000276/TORX 08IP	DMSD 1,2NM/SORT 08IP
SONT 09..	28 - 32	M3x7-09IP/10003007	10009333/TORX 09IP	DMSD 2,2NM/SORT 09IP

D19







D [mm]	Type, description	L / R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	
32.5	C900.3D.325.R.10	R	40	50	192	98	124	SONT 10..
33	C900.3D.330.R.10		40	50	193	99	125	
33.5	C900.3D.335.R.10		40	50	195	101	127	
34	C900.3D.340.R.10		40	50	196	102	128	
34.5	C900.3D.345.R.10		40	50	198	104	130	
35	C900.3D.350.R.10		40	50	199	105	131	
35.5	C900.3D.355.R.10		40	50	201	107	133	
36	C900.3D.360.R.10		40	50	202	108	134	
36.5	C900.3D.365.R.10		40	50	204	110	136	

Ordering example: 1 piece C900.3D.325.R.10

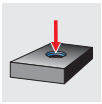
	D [mm]			
SONT 10..	32.5 - 36.5	M3,5X8,6-15IP/10008749	10006919/TORX 15IP	DMSD 3,2Nm/SORT 15IP



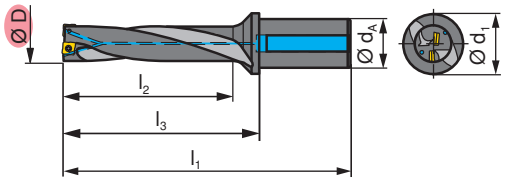
D19

System 900 – 4D

Ø 19 – 36 mm







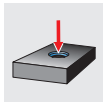
D [mm]	Type, description	L / R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	
19	C900.4D.190.R.06	R	25	32	150	76	94	SONT 06..
20	C900.4D.200.R.06		25	32	154	80	98	
21	C900.4D.210.R.07		25	40	159	84	103	SONT 07..
22	C900.4D.220.R.07		25	40	163	88	107	
23	C900.4D.230.R.07		25	40	167	92	111	
24	C900.4D.240.R.08		32	40	179	96	119	SONT 08..
25	C900.4D.250.R.08		32	40	183	100	123	
26	C900.4D.260.R.08		32	40	187	104	127	
27	C900.4D.270.R.08		32	40	191	108	131	
28	C900.4D.280.R.09		32	40	195	112	135	SONT 09..
29	C900.4D.290.R.09		32	40	199	116	139	
30	C900.4D.300.R.09		32	40	203	120	143	
31	C900.4D.310.R.09		32	40	207	124	147	
32	C900.4D.320.R.09		32	40	211	128	151	
33	C900.4D.330.R.10		40	50	226	132	159	SONT 10..
34	C900.4D.340.R.10		40	50	230	136	162	
35	C900.4D.350.R.10		40	50	234	140	166	
36	C900.4D.360.R.10		40	50	238	144	170	

Ordering example: 1 piece C900.4D.190.R.06

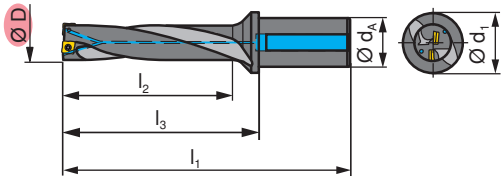
	D [mm]			
SONT 06..	19 - 20	M2,2x5-07IP/10009244	10006918/TORX 07IP	DMSD 1,0Nm/SORT 07IP
SONT 07..	21 - 23	M2,2x5-07IP/10009244	10006918/TORX 07IP	DMSD 1,0Nm/SORT 07IP
SONT 08..	24 - 27	M2,5x6-08IP/10009243	10000276/TORX 08IP	DMSD 1,2NM/SORT 08IP
SONT 09..	28 - 32	M3x7-09IP/10003007	10009333/TORX 09IP	DMSD 2,2NM/SORT 09IP
SONT 10..	33 - 36	M3,5X8,6-15IP/10008749	10006919/TORX 15IP	DMSD 3,2Nm/SORT 15IP



D19







D [mm]	Type, description	L / R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	
19	C900.5D.190.R.06	R	25	32	169	95	113	SONT 06..
20	C900.5D.200.R.06		25	32	174	100	118	
21	C900.5D.210.R.07		25	32	180	105	124	SONT 07..
22	C900.5D.220.R.07		25	32	184	110	128	
23	C900.5D.230.R.07		25	32	189	115	133	
24	C900.5D.240.R.08		32	40	203	120	143	SONT 08..
25	C900.5D.250.R.08		32	40	208	125	148	
26	C900.5D.260.R.08		32	40	212	130	152	
27	C900.5D.270.R.08		32	40	217	135	157	
28	C900.5D.280.R.09		32	40	221	140	161	SONT 09..
29	C900.5D.290.R.09		32	40	226	145	166	
30	C900.5D.300.R.09		32	40	230	150	170	
31	C900.5D.310.R.09		32	40	235	155	175	
32	C900.5D.320.R.09		32	40	239	160	179	
33	C900.5D.330.R.10		40	50	259	165	191	SONT 10..
34	C900.5D.340.R.10		40	50	264	170	196	
35	C900.5D.350.R.10		40	50	269	175	201	
36	C900.5D.360.R.10		40	50	274	180	206	

Ordering example: 1 piece C900.5D.190.R.06

	D [mm]			
SONT 06..	19 - 20	M2,2x5-07IP/10009244	10006918/TORX 07IP	DMSD 1,0Nm/SORT 07IP
SONT 07..	21 - 23	M2,2x5-07IP/10009244	10006918/TORX 07IP	DMSD 1,0Nm/SORT 07IP
SONT 08..	24 - 27	M2,5x6-08IP/10009243	10000276/TORX 08IP	DMSD 1,2NM/SORT 08IP
SONT 09..	28 - 32	M3x7-09IP/10003007	10009333/TORX 09IP	DMSD 2,2NM/SORT 09IP
SONT 10..	33 - 36	M3,5X8,6-15IP/10008749	10006919/TORX 15IP	DMSD 3,2Nm/SORT 15IP



D19

Cutting data

Grades, material

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ .15% C	1	125
		annealed	.15% - .45% C	2	150 - 250
		tempered	≥ .45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% Si	23	80
		hardened	< 12% Si	24	90
		non hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	–
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	–
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

Uncoated carbide			Coated carbide				
U17T v_c [m/min]	**S40T** v_c [m/min]		**SR127** v_c [m/min]	**SR226** v_c [m/min]	**CTC1435** v_c [m/min]	**CTPP430** v_c [m/min]	**GM40** v_c [m/min]
–	–		–	150 - 280	220 - 300	200-300	220 - 300
–	–		–	120 - 200	180 - 250	160-250	180 - 250
–	–		–	100 - 180	180 - 250	160-250	180 - 250
–	–		–	120 - 200	200 - 280	180-280	200 - 280
–	–		–	90 - 160	180 - 220	150-220	180 - 220
–	–		–	80 - 140	120 - 200	100-200	120 - 200
–	–		–	110 - 180	140 - 220	130-200	140 - 220
–	–		–	80 - 140	120 - 160	100-160	120 - 160
–	–		–	–	180 - 250	150-250	180 - 250
–	–		–	–	100 - 150	80-150	100 - 150
60 - 150	–		–	–	180 - 250	100-160	180 - 250
60 - 150	–		–	–	180 - 250	100-180	180 - 250
50 - 100	–		–	–	100 - 140	80-140	100 - 140
30 - 100	–		–	–	80 - 140	80-140	80 - 140
–	–		100 - 150	100 - 150	–	120-200	–
–	–		100 - 150	100 - 150	–	100-180	–
–	–		100 - 140	100 - 140	–	120-200	–
–	–		100 - 140	100 - 140	–	100-180	–
–	–		100 - 162	100 - 160	–	80-160	–
–	–		100 - 160	100 - 160	–	70-150	–
–	200 - 500		100 - 500	100 - 500	–	150-500	–
–	200 - 500		100 - 300	100 - 300	–	150-450	–
–	200 - 500		100 - 500	100 - 500	–	150-350	–
–	200 - 500		100 - 300	100 - 300	–	150-300	–
–	200 - 500		100 - 300	100 - 300	–	150-250	–
–	250 - 350		100 - 500	100 - 500	–	150-350	–
–	180 - 240		100- 500	100 - 500	–	150-350	–
–	180 - 240		100 - 300	100 - 300	–	150-350	–
–	180 - 240		100 - 300	100 - 300	–	200-400	–
–	50 - 180		80 - 180	80 - 180	–	50-150	–
–	50 - 150		60 - 150	60 - 150	–	50-140	–
–	50 - 200		100 - 250	100 - 250	–	80-200	–
20 - 40	–		–	–	20 - 80	20-80	–
20 - 40	–		–	–	20 - 80	20-80	–
20 - 40	–		–	–	20 - 80	20-80	–
20 - 40	–		–	–	20 - 80	20-80	–
20 - 40	–		–	–	20 - 80	20-80	–
30 - 80	40 - 120		50 - 120	50 - 120	40 - 100	40-100	–
30 - 80	40 - 120		30 - 50	30 - 50	40 - 100	40-100	–
–	–		–	–	–	–	–
–	–		–	–	–	–	–
–	–		–	–	–	–	–
–	–		–	–	–	–	–

CERATIZIT hard material matters

Cutting data

MaxiDrill Classic

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ .15% C	1	125
		annealed	.15% - .45% C	2	150 - 250
		tempered	≥ .45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% Si	23	80
		hardened	< 12% Si	24	90
		non hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	–
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	–
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

	Drill diameter (mm)				
	Ø 14 - 17,5	Ø 18 - 23,5	Ø 24 - 29	Ø 30 - 42	Ø 38 - 53
N/mm²	f (mm/rev.)	f (mm/rev.)	f (mm/rev.)	f (mm/rev.)	f (mm/rev.)
420	–	–	–	–	–
500 - 850	0,03 - 0,10	0,05 - 0,12	0,08 - 0,12	0,08 - 0,15	0,1 - 0,25
1000	0,03 - 0,10	0,05 - 0,12	0,08 - 0,12	0,08 - 0,15	0,1 - 0,25
600	0,03 - 0,10	0,05 - 0,14	0,08 - 0,14	0,10 - 0,17	0,1 - 0,20
850 - 1000	0,03 - 0,10	0,05 - 0,14	0,08 - 0,14	0,10 - 0,17	0,1 - 0,20
1180	0,03 - 0,10	0,05 - 0,14	0,08 - 0,14	0,10 - 0,17	0,1 - 0,20
680	00,3 - 0,10	0,05 - 0,14	0,08 - 0,14	0,10 - 0,17	0,1 - 0,20
1180	00,3 - 0,10	0,05 - 0,14	0,08 - 0,14	0,10 - 0,17	0,1 - 0,20
–	0,03 - 0,10	0,04 - 0,14	0,08 - 0,16	0,10 - 0,18	0,12 - 0,20
–	0,03 - 0,10	0,04 - 0,14	0,08 - 0,16	0,10 - 0,18	0,12 - 0,20
1100	0,03 - 0,10	0,04 - 0,14	0,08 - 0,16	0,10 - 0,18	0,12 - 0,20
–	0,03 - 0,10	0,04 - 0,12	0,08 - 0,14	0,10 - 0,16	0,1 - 0,18
–	0,03 - 0,10	0,04 - 0,12	0,08 - 0,14	0,10 - 0,16	0,1 - 0,18
–	0,03 - 0,10	0,04 - 0,12	0,08 - 0,14	0,10 - 0,16	0,1 - 0,18
–	0,04 - 0,12	0,06 - 0,16	0,12 - 0,18	0,14 - 0,22	0,15 - 0,25
–	0,04 - 0,12	0,06 - 0,16	0,12 - 0,18	0,14 - 0,22	0,15 - 0,25
–	0,04 - 0,10	0,08 - 0,14	0,12 - 0,18	0,14 - 0,20	0,15 - 0,22
–	0,04 - 0,10	0,08 - 0,14	0,12 - 0,18	0,14 - 0,20	0,15 - 0,22
–	0,04 - 0,12	0,08 - 0,16	0,10 - 0,18	0,12 - 0,20	0,15 - 0,25
–	0,04 - 0,12	0,08 - 0,16	0,10 - 0,18	0,12 - 0,20	0,15 - 0,25
–	–	0,06 - 0,16	0,10 - 0,18	0,12 - 0,22	0,14 - 0,25
–	–	0,06 - 0,16	0,10 - 0,18	0,12 - 0,22	0,14 - 0,25
–	–	0,06 - 0,16	0,10 - 0,18	0,12 - 0,22	0,14 - 0,25
–	–	0,06 - 0,16	0,10 - 0,18	0,12 - 0,22	0,14 - 0,25
–	–	0,06 - 0,16	0,10 - 0,18	0,12 - 0,22	0,14 - 0,25
–	–	0,06 - 0,16	0,10 - 0,18	0,12 - 0,22	0,14 - 0,25
–	–	0,06 - 0,16	0,10 - 0,18	0,12 - 0,22	0,14 - 0,25
–	–	0,06 - 0,16	0,10 - 0,18	0,12 - 0,22	0,14 - 0,25
–	–	0,06 - 0,16	0,10 - 0,18	0,12 - 0,22	0,14 - 0,25
–	–	0,06 - 0,16	0,10 - 0,18	0,12 - 0,22	0,14 - 0,25
–	–	0,05 - 0,10	0,08 - 0,12	0,10 - 0,15	0,10 - 0,20
–	–	0,05 - 0,10	0,08 - 0,12	0,10 - 0,15	0,10 - 0,20
–	–	0,05 - 0,10	0,08 - 0,12	0,10 - 0,15	0,10 - 0,20
–	–	0,04 - 0,08	0,06 - 0,10	0,08 - 0,12	0,09 - 0,14
–	–	0,04 - 0,08	0,06 - 0,10	0,08 - 0,12	0,09 - 0,14
–	–	0,04 - 0,08	0,06 - 0,10	0,08 - 0,12	0,09 - 0,14
–	–	0,04 - 0,08	0,06 - 0,10	0,08 - 0,12	0,09 - 0,14
–	–	0,04 - 0,08	0,06 - 0,10	0,08 - 0,12	0,09 - 0,14
–	–	0,05 - 0,12	0,08 - 0,12	0,10 - 0,15	0,1 - 0,20
–	–	0,05 - 0,12	0,08 - 0,12	0,10 - 0,15	0,1 - 0,20
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CERATIZIT hard material matters

Cutting data

MaxiDrill 900 3D

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ .15% C	1	125
		annealed	.15% - .45% C	2	150 - 250
		tempered	≥ .45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% Si	23	80
		hardened	< 12% Si	24	90
		non hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	–
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	–
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

SONT 06 Ø 19-20,5 f [mm/rev]	SONT 07 Ø 21-23,5 f [mm/rev]	SONT 08 Ø 24 - 27,5 f [mm/rev]	SONT 09 Ø 28 - 32 f [mm/rev]	SONT 10 Ø 32,5 - 36,5 f [mm/rev]
0,05-0,15	0,07-0,15	0,08-0,17	0,08-0,18	0,09-0,19
0,05-0,16	0,07-0,17	0,08-0,19	0,08-0,20	0,09-0,21
0,05-0,18	0,08-0,20	0,09-0,22	0,09-0,23	0,10-0,24
0,05-0,20	0,08-0,22	0,09-0,23	0,09-0,24	0,10-0,25
0,05-0,18	0,08-0,20	0,09-0,21	0,09-0,22	0,10-0,23
0,05-0,18	0,08-0,20	0,09-0,21	0,09-0,22	0,10-0,23
0,05-0,18	0,08-0,20	0,09-0,21	0,09-0,22	0,10-0,23
0,05-0,18	0,08-0,20	0,09-0,21	0,09-0,22	0,10-0,23
0,05-0,15	0,08-0,15	0,08-0,17	0,08-0,18	0,09-0,19
0,05-0,15	0,08-0,15	0,08-0,17	0,08-0,18	0,09-0,19
0,05-0,14	0,05-0,16	0,05-0,18	0,07-0,18	0,08-0,21
0,05-0,13	0,05-0,15	0,06-0,16	0,07-0,16	0,08-0,20
0,05-0,13	0,05-0,15	0,06-0,15	0,07-0,16	0,08-0,20
0,05-0,12	0,05-0,14	0,05-0,15	0,06-0,15	0,07-0,19
0,08-0,24	0,10-0,25	0,1-0,28	0,1-0,28	0,1-0,30
0,08-0,22	0,10-0,24	0,1-0,26	0,1-0,26	0,1-0,28
0,08-0,22	0,10-0,25	0,1-0,28	0,1-0,28	0,1-0,28
0,08-0,20	0,10-0,23	0,1-0,25	0,1-0,25	0,1-0,25
0,08-0,21	0,10-0,25	0,1-0,28	0,1-0,28	0,1-0,30
0,08-0,21	0,10-0,25	0,1-0,28	0,1-0,28	0,1-0,30
0,08-0,15	0,10-0,15	0,10-0,15	0,10-0,17	0,10-0,17
0,08-0,15	0,10-0,15	0,10-0,15	0,10-0,17	0,10-0,17
0,08-0,15	0,10-0,18	0,10-0,18	0,10-0,19	0,10-0,19
0,08-0,15	0,10-0,18	0,10-0,18	0,10-0,19	0,10-0,19
0,08-0,15	0,13-0,20	0,13-0,20	0,13-0,22	0,13-0,22
0,08-0,15	0,10-0,16	0,10-0,16	0,10-0,17	0,10-0,17
0,08-0,18	0,10-0,18	0,10-0,18	0,10-0,20	0,10-0,20
0,08-0,18	0,10-0,18	0,10-0,18	0,10-0,20	0,10-0,20
0,08-0,16	0,10-0,16	0,10-0,16	0,10-0,17	0,10-0,17
0,05-0,10	0,05-0,12	0,05-0,12	0,05-0,12	0,05-0,12
0,08-0,15	0,10-0,16	0,10-0,16	0,10-0,16	0,10-0,16
0,06-0,12	0,08-0,14	0,08-0,14	0,08-0,14	0,08-0,14
0,04-0,08	0,05-0,08	0,05-0,10	0,05-0,10	0,05-0,12
0,04-0,08	0,05-0,08	0,05-0,10	0,05-0,10	0,05-0,12
0,04-0,08	0,05-0,08	0,05-0,10	0,05-0,10	0,05-0,12
0,04-0,08	0,05-0,08	0,05-0,10	0,05-0,10	0,05-0,12
0,04-0,08	0,05-0,08	0,05-0,10	0,05-0,10	0,05-0,12
0,07-0,10	0,05-0,12	0,06-0,12	0,07-0,15	0,07-0,15
0,07-0,10	0,05-0,12	0,06-0,12	0,07-0,15	0,07-0,15
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CERATIZIT hard material matters

Cutting data

MaxiDrill 900 4D

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ .15% C	1	125
		annealed	.15% - .45% C	2	150 - 250
		tempered	≥ .45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% Si	23	80
		hardened	< 12% Si	24	90
		non hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	–
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	–
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

SONT 06 Ø19-20 f [mm/rev]	SONT 07 Ø 21-23 f [mm/rev]	SONT 08 Ø 24 - 27 f [mm/rev]	SONT 09 Ø 28 - 32 f [mm/rev]	SONT 10 Ø 33 - 36 f [mm/rev]
0,05-0,12	0,05-0,13	0,06-0,15	0,06-0,17	0,06-0,17
0,05-0,14	0,05-0,15	0,06-0,17	0,06-0,19	0,06-0,19
0,05-0,16	0,06-0,18	0,07-0,20	0,07-0,22	0,07-0,22
0,05-0,18	0,06-0,20	0,07-0,20	0,07-0,23	0,07-0,23
0,05-0,15	0,06-0,17	0,07-0,20	0,07-0,23	0,07-0,23
0,05-0,15	0,06-0,18	0,07-0,21	0,07-0,23	0,07-0,23
0,05-0,15	0,06-0,18	0,07-0,20	0,07-0,23	0,07-0,23
0,05-0,15	0,06-0,18	0,07-0,20	0,07-0,23	0,07-0,23
0,05-0,12	0,06-0,12	0,06-0,15	0,06-0,17	0,06-0,17
0,05-0,12	0,06-0,12	0,06-0,15	0,06-0,17	0,06-0,17
0,05-0,13	0,05-0,15	0,05-0,16	0,07-0,16	0,08-0,20
0,05-0,11	0,05-0,13	0,06-0,14	0,07-0,15	0,08-0,19
0,05-0,11	0,05-0,12	0,06-0,12	0,07-0,14	0,08-0,17
0,05-0,10	0,05-0,11	0,05-0,12	0,06-0,13	0,07-0,16
0,08-0,22	0,10-0,24	0,1-0,25	0,1-0,25	0,1-0,28
0,08-0,20	0,10-0,22	0,1-0,25	0,1-0,25	0,1-0,27
0,08-0,20	0,10-0,24	0,1-0,26	0,1-0,26	0,1-0,26
0,08-0,18	0,10-0,22	0,1-0,22	0,1-0,22	0,1-0,23
0,08-0,18	0,10-0,22	0,1-0,25	0,1-0,25	0,1-0,28
0,08-0,18	0,10-0,22	0,1-0,25	0,1-0,25	0,1-0,28
0,08-0,15	0,10-0,15	0,10-0,15	0,10-0,17	0,10-0,17
0,08-0,15	0,10-0,15	0,10-0,15	0,10-0,17	0,10-0,17
0,08-0,15	0,10-0,18	0,10-0,18	0,10-0,19	0,10-0,19
0,08-0,15	0,10-0,18	0,10-0,18	0,10-0,19	0,10-0,19
0,08-0,15	0,13-0,20	0,13-0,20	0,13-0,22	0,13-0,22
0,08-0,15	0,10-0,16	0,10-0,16	0,10-0,17	0,10-0,17
0,08-0,18	0,10-0,18	0,10-0,18	0,10-0,20	0,10-0,20
0,08-0,18	0,10-0,18	0,10-0,18	0,10-0,20	0,10-0,20
0,08-0,16	0,10-0,16	0,10-0,16	0,10-0,17	0,10-0,17
0,05-0,08	0,05-0,10	0,05-0,10	0,05-0,12	0,05-0,12
0,08-0,14	0,10-0,15	0,10-0,16	0,10-0,16	0,10-0,16
0,06-0,10	0,08-0,12	0,08-0,14	0,08-0,14	0,08-0,14
0,04-0,07	0,04-0,07	0,05-0,08	0,05-0,08	0,05-0,10
0,04-0,07	0,04-0,07	0,05-0,08	0,05-0,08	0,05-0,10
0,04-0,07	0,04-0,07	0,05-0,08	0,05-0,08	0,05-0,10
0,04-0,07	0,04-0,07	0,05-0,08	0,05-0,08	0,05-0,10
0,04-0,07	0,04-0,07	0,05-0,08	0,05-0,08	0,05-0,10
0,05-0,10	0,05-0,12	0,05-0,12	0,06-0,15	0,07-0,15
0,05-0,10	0,05-0,12	0,05-0,12	0,06-0,15	0,07-0,15
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CERATIZIT hard material matters

Cutting data

MaxiDrill 900 5D

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ .15% C	1	125
		annealed	.15% - .45% C	2	150 - 250
		tempered	≥ .45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% Si	23	80
		hardened	< 12% Si	24	90
		non hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	–
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	–
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

SONT 06 Ø19-20 f [mm/rev]	SONT 07 Ø 21-23 f [mm/rev]	SONT 08 Ø 24 - 27 f [mm/rev]	SONT 09 Ø 28 - 32 f [mm/rev]	SONT 10 Ø 33 - 36 f [mm/rev]
0,04-0,09	0,04-0,10	0,06-0,12	0,06-0,13	0,08-0,17
0,05-0,11	0,05-0,12	0,06-0,14	0,06-0,15	0,08-0,19
0,05-0,13	0,05-0,15	0,07-0,17	0,08-0,18	0,10-0,22
0,05-0,16	0,05-0,17	0,07-0,18	0,08-0,19	0,10-0,23
0,05-0,14	0,05-0,15	0,07-0,17	0,08-0,18	0,10-0,22
0,05-0,14	0,05-0,15	0,07-0,17	0,08-0,18	0,10-0,22
0,05-0,14	0,05-0,15	0,07-0,17	0,08-0,18	0,10-0,22
0,05-0,14	0,05-0,15	0,07-0,17	0,08-0,18	0,10-0,22
0,04-0,09	0,04-0,10	0,06-0,12	0,07-0,14	0,09-0,18
0,04-0,09	0,04-0,10	0,06-0,12	0,07-0,14	0,09-0,18
0,05-0,12	0,05-0,13	0,05-0,14	0,06-0,15	0,08-0,18
0,05-0,09	0,05-0,11	0,05-0,12	0,06-0,13	0,08-0,17
0,05-0,08	0,05-0,09	0,05-0,10	0,06-0,11	0,07-0,14
0,05-0,08	0,05-0,09	0,05-0,10	0,06-0,11	0,07-0,14
0,08-0,22	0,10-0,23	0,10-0,25	0,10-0,25	0,10-0,25
0,08-0,18	0,10-0,20	0,10-0,22	0,10-0,22	0,10-0,22
0,08-0,18	0,10-0,23	0,10-0,25	0,10-0,25	0,10-0,25
0,08-0,16	0,10-0,20	0,10-0,22	0,10-0,22	0,10-0,22
0,08-0,16	0,10-0,20	0,10-0,22	0,10-0,22	0,10-0,22
0,08-0,16	0,10-0,20	0,10-0,22	0,10-0,22	0,10-0,22
0,08-0,14	0,10-0,15	0,10-0,15	0,10-0,17	0,10-0,17
0,08-0,14	0,10-0,15	0,10-0,15	0,10-0,17	0,10-0,17
0,08-0,14	0,10-0,18	0,10-0,18	0,10-0,19	0,10-0,19
0,08-0,14	0,10-0,18	0,10-0,18	0,10-0,19	0,10-0,19
0,10-0,15	0,13-0,20	0,13-0,20	0,13-0,22	0,13-0,22
0,08-0,15	0,10-0,16	0,10-0,16	0,10-0,17	0,10-0,17
0,08-0,16	0,10-0,18	0,10-0,18	0,10-0,20	0,10-0,20
0,08-0,16	0,10-0,18	0,10-0,18	0,10-0,20	0,10-0,20
0,08-0,14	0,10-0,16	0,10-0,16	0,10-0,17	0,10-0,17
0,04-0,08	0,05-0,10	0,05-0,10	0,05-0,10	0,05-0,10
0,08-0,14	0,10-0,15	0,10-0,15	0,10-0,15	0,10-0,15
0,06-0,10	0,08-0,12	0,08-0,12	0,08-0,12	0,08-0,12
0,04-0,06	0,04-0,06	0,04-0,07	0,05-0,08	0,05-0,08
0,04-0,06	0,04-0,06	0,04-0,07	0,05-0,08	0,05-0,08
0,04-0,06	0,04-0,06	0,04-0,07	0,05-0,08	0,05-0,08
0,04-0,06	0,04-0,06	0,04-0,07	0,05-0,08	0,05-0,08
0,04-0,06	0,04-0,06	0,04-0,07	0,05-0,08	0,05-0,08
0,04-0,08	0,05-0,11	0,05-0,11	0,06-0,12	0,07-0,12
0,04-0,08	0,05-0,11	0,05-0,11	0,06-0,12	0,07-0,12
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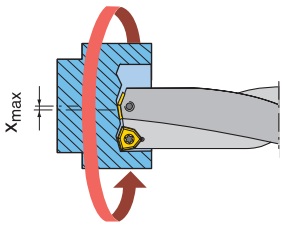
Off-centre drilling

MaxiDrill Classic

Maximum offset ‘X’ when offset drilling into solid material for fixed applications

Ø [mm]	Classic	X_{max} [mm]
14	02	2.0
15	02	1.8
16	02	1.5
17	02	1.2
18	03	2,0
19	03	1.8
20	03	1.6
21	03	1.3
22	03	1.0
23	03	0.8
24	05	2.3
25	05	2.2
26	05	2.0
27	05	1.8
28	05	1.6
29	05	1.5
30	06	3.2
31	06	3.2
32	06	3.2
33	06	3.0
34	06	2.7
35	06	2.5
36	06	2.2
37	06	1.9
38	06	1.6
39	06	1.4
40	06	1.2
41	06	1.0
42	06	0.6
38	07	3.5
39	07	3.3
40	07	3.0
41	07	2.8
42	07	2.5
43	07	2.3
44	07	2.0
45	07	1.9
46	07	1.8
47	07	1.5
48	07	1.4
49	07	1.2
50	07	1.0



Permissible feed rates for X_{max}:
f x .05 - .08 mm/rev.

With the maximum offset X_{max} the hole becomes
$D_{max} = D + 2X_{max}$

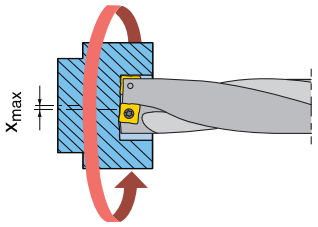
for example for D = 38 mm, X_{max} = 1.6 mm
$D_{max} = D + 3.2 = 41.2$ mm

Please note:

When drilling off-centre the radial forces are not compensated, which results in instability.

Maximum offset ‘X’ when offset drilling into solid material for fixed applications

Ø [mm]	SONT	X_{max} [mm]
19	06	0,25
20	06	0,25
21	07	0,25
22	07	0,25
23	07	0,25
24	08	0,25
25	08	0,25
26	08	0,25
27	08	0,25
28	09	0,25
29	09	0,25
30	09	0,25
31	09	0,25
32	09	0,25
33	10	0,25
34	10	0,25
35	10	0,25
36	10	0,25



Permissible feed rates for X_{max}:
f x .05 - .08 mm/rev.

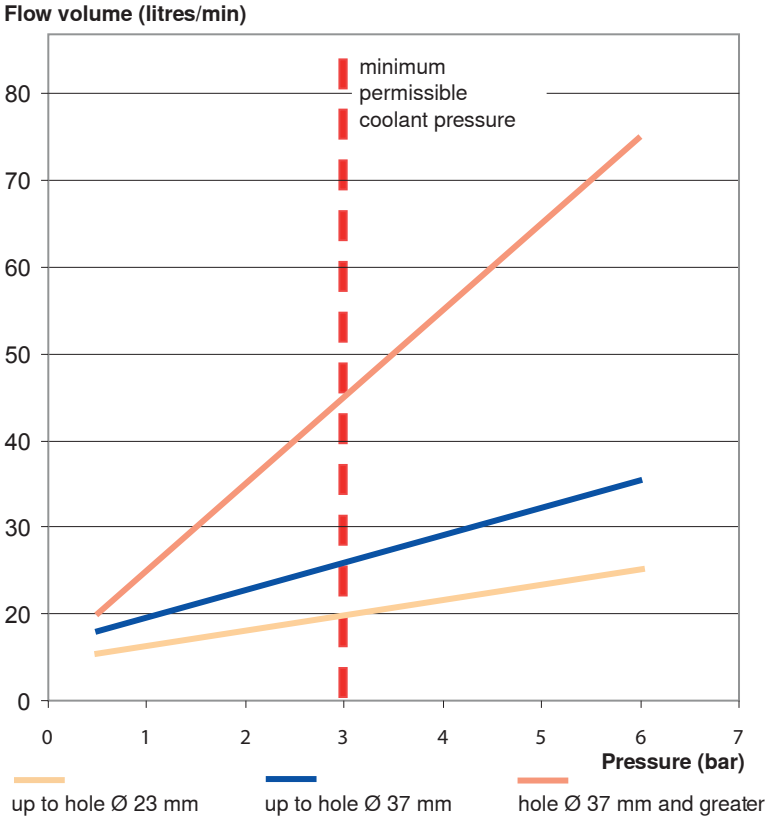
With the maximum offset X_{max} the hole becomes
$D_{max} = D + 2X_{max}$

for example for D = 38 mm, X_{max} = 1.6 mm
$D_{max} = D + 3.2 = 41.2$ mm

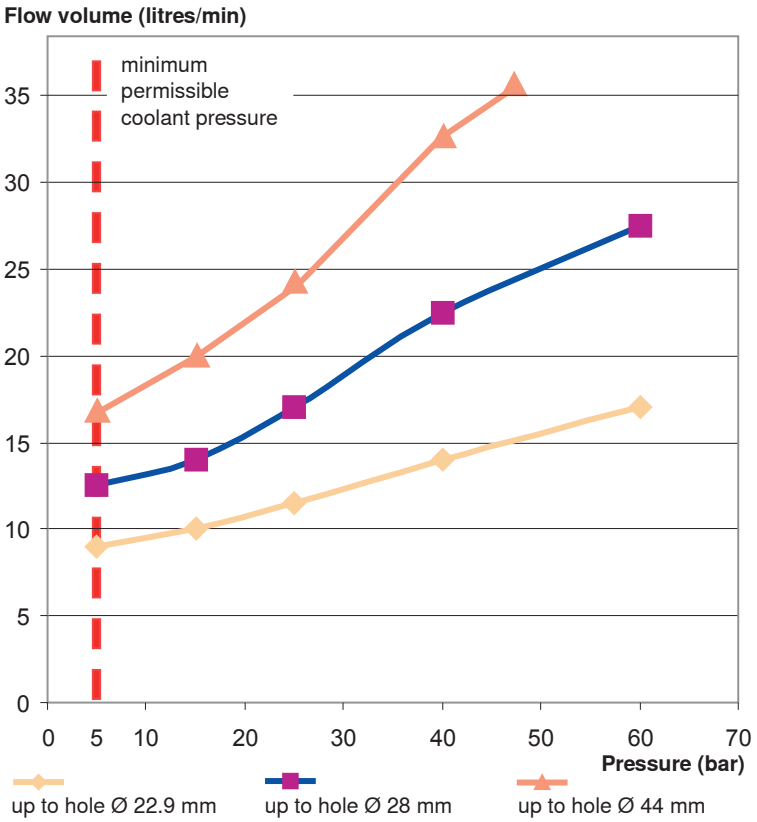
Feed rate reduction!

Tool 3xD = feed rate 100%
Tool 4xD = feed rate 75%
Tool 5xD = feed rate 50%

MaxiDrill Classic – recommended coolant pressure and coolant flow



MaxiDrill C900 – recommended coolant pressure and coolant flow



Formula collection for MaxiDrill tools

Revolution number

$$n = \frac{vc \cdot 1000}{\pi \cdot D} \quad [min^{-1}]$$

Cutting speed

$$v_c = \frac{\pi \cdot D \cdot n}{1000} \quad [m/min]$$

Feed rate

$$f \quad [mm/rev.]$$

Feed rate

$$v_f = f \cdot n \quad [m/min]$$

Machining cross section

$$A_T = \frac{\pi \cdot D^2}{4} \quad [mm^2]$$

Metal removal rate

$$Q = \frac{vf \cdot AT}{1000} \quad [cm^3/min]$$

Specific cutting force

$$k_c = \text{see table} \quad [N/mm^2]$$

Power requirements

$$P_c = \frac{Q}{60 \cdot 1000 \cdot \eta} \cdot k_c \quad [kW]$$

Torque moment

$$M_c = \frac{f \cdot kc}{1000} \cdot \frac{D^2}{8} \quad [Nm]$$

Feed force (approx.)

$$F_f \approx 0{,}7 \frac{D}{2} \cdot f \cdot k_c \quad [N]$$

Drilling time

$$T_c = \frac{L + h}{vf} \quad [min]$$

Clearance

$$h \quad [mm]$$

Drilling depth

$$L \quad [mm]$$

Material	Specific cutting force k_c (N/mm^2)
St 37.11; St 42.11	1740
St 50.11	1950
St 60.11	2070
St 70.11	2220
C 35, C 45, Ck 45	2060/2175
C 60, Ck 60	2090
16 Mn Cr 5	2060
18 Cr Ni 6	2220
34 Cr Mo 4	2190
50 Cr V 4	2175
tempered 100 Cr 6	2335
Mn, Cr Ni alloyed steel	2335
Cr Mo alloyed steel	2570
Corrosion resistant steel	2530
Hot working steel	2570
Nitriding steel	2570
GS 45	1570
GS 52	1765
GG 22, GG 25	1140
GGG 42	1370
Aluminium cast alloys	640

Please note! The k_c-values depend on the feed. Therefore the table contains their upper limit values. The calculated power is possibly higher than the power actually needed (~ 10 - 20%).

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hard material matters



C	
CCGT	A88, A89
CCGW	A89
CCLNR/L	A174
CCMT	A88, A89
CCMX	A97, A98
CKJNR/L	A175
CNGA	A86
CNGM	A72, A73, A74, A75
CNGN	A99
CNGP	A72, A73, A74, A75
CNGX	A86
CNMA	A75, A86
CNMG	A72, A73, A74, A75
CNMM	A74, A75
CNMN	A99
CNMX	A86
CNNX	A86
CRDNN	A176
CRGNR/L	A177
CRSNR	A215
CSBNR/L	A178
CSDNN	A179
CTANR	A180
CTAPR/L	A184
CTFNR	A181
CTFPR/L	A185, A216
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CTGPR/L	A186
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DCGW	A91
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DCLNR	A118
DCLNR/L	A188
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DCMX	A97
DDJNR/L	A119
DDUNR/L	A189
DNGA	A86
DNGN	A100
DNGP	A76, A77, A78
DNGX	A86
DNMA	A78
DNMG	A76, A77, A78
DNMM	A77, A78
DNMX	A86
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DSDNN	A121
DSKNR/L	A122, A190
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DVVNN	A126
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MTGCR/L	A171
MTJCR/L	A172
MTNCR/L	A173
MTUCR/L	A214
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PDNNR/L	A132
PDUNR/L	A193
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PRGCR/L	A134
PSBNR/L	A135
PSDNN	A136
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SCLCL	A199
SCLCR	A198
SCLCR/L	A146, A200
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SCMT	A93
SCMX	A98
SCSCR/L	A149
SDACR/L	A150
SDHCR/L	A151
SDJCR/L	A152
SDNCN	A153
SDQCR/L	A201
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SDUCR	A202
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SNMG	A79, A80
SNMM	A80
SNMN	A102, A103
SNNX	A87
SNUN	A102, A103
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TNMN	A104
TNMX	A87
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TPUN	A108
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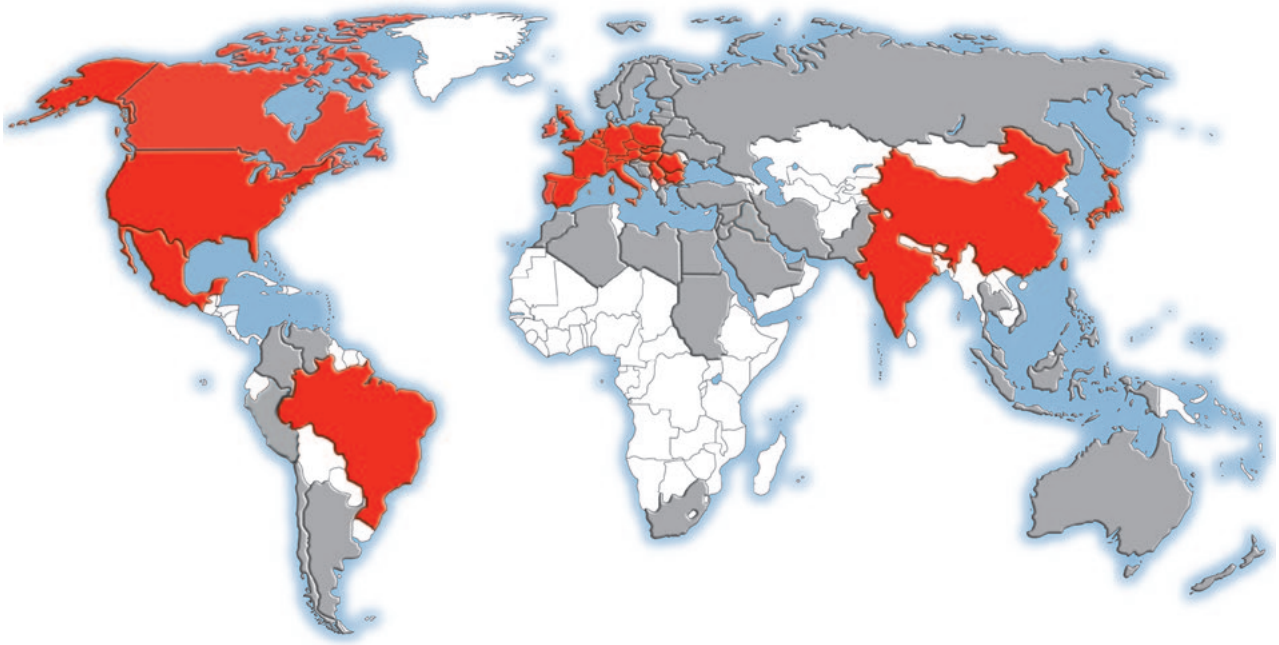

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CERATIZIT Luxembourg S. à r.l.
Route de Holzem 101
L-8232 Mamer
Tel.: +352 312 085-1
Fax: +352 311 911
E-mail: info@ceratizit.com
www.ceratizit.com

Contact for further information:

CERATIZIT Austria Gesellschaft m.b.H.
A-6600 Reutte/Tyrol
Tel.: +43 (5672) 200-0
Fax: +43 (5672) 200-502
E-mail: info.austria@ceratizit.com
www.ceratizit.com

Parent company in Luxembourg

CERATIZIT Luxembourg Sàrl
Route de Holzem 101
L-8232 Mamer
Tel.: +352 312 085-1
Fax: +352 311 911
E-mail: info@ceratizit.com
www.ceratizit.com

Contact for further information:

CERATIZIT Austria Gesellschaft m.b.H.
A-6600 Reutte/Tyrol
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