hard material matters
CERATIZIT

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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

A 90°	B 75°	C 90°	D 45°	E 60°
F 90°	G 90°	H 107,5°	J 93°	K 75°
L 95°	M 50°	N 63°	P 117,5°	R 75°
S 45°	T 60°	U 93°	V 72,5°	W 60°
				Y 85°

Cutting direction

R

L

N

1	2	3	4	5
S	C	L	C	R

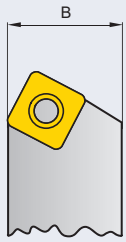
Insert shape

Included angle		V
		D
		E
		C
		M
Included angle		K
		B
		A
Other shapes	L	R
	P	S
	H	T
	O	W

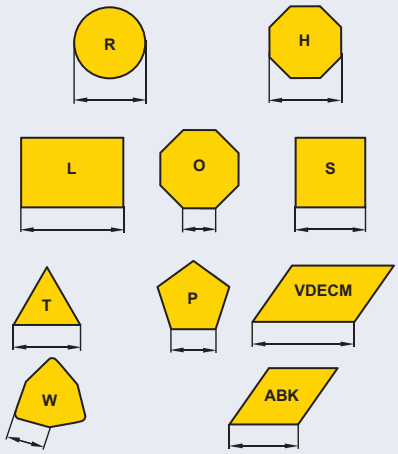
Clearance angle

	A		F
	B		G
	C		N
	D		P
	E		

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



Shank width

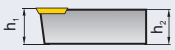


Cutting edge length

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

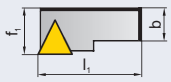
Tool length

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		

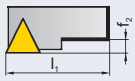
Special tolerances

Qualified
high-precision
tools

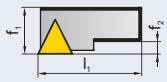
Q



F



B



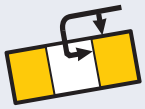
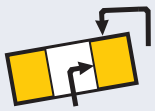
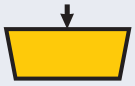
CERATIZIT designation system

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

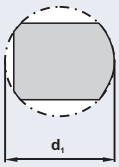
D	 Retained from above and via bore	S	Retained via centre screw
M	 Retained from above and via bore	P	Retained via the bore
C	 Retained from above		

X Special version

1	2	3	4	5
S	32	U	S	S

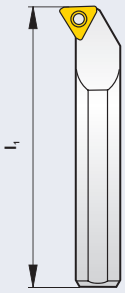
6 KDQN

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



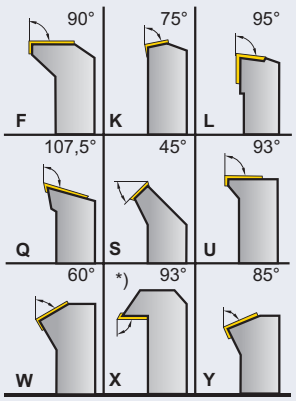
Tool length

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



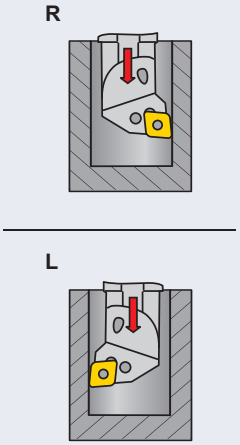
Insert shape

Included angle					V
					D
					E
					C
					M
Included angle					K
					B
					A
Other shapes		L		2	R
		P			S
		H			T
		O			W

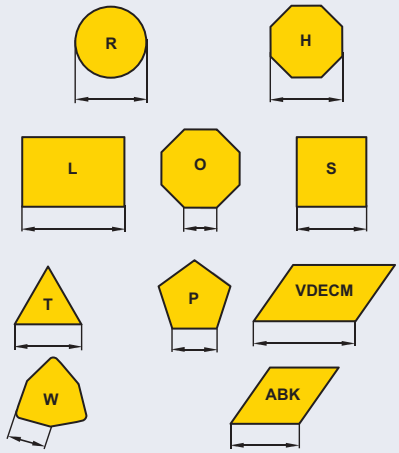


*) CERATIZIT factory standard

Style



Cutting direction



Cutting edge length

K	C	R	3
6	7	8	9

Clearance angle

▯	A	▯▯	F
▯	B	▯▯	G
▯	C	▯	N
▯▯	D	▯▯	P
▯▯	E		

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

CERATIZIT designation system

Inserts

Insert shape

Included angle		V
		D
		E
		C
		M
Included angle		K
		B
		A
Other shapes		L
		P
		H
		O
	2	R
		S
		T
		W

Clearance angles

	A		F
	B		G
	C		N
	D		P
	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

Cutting edge length

d mm	
06 08 10 12	16 20 25 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

Insert thickness

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

Corner radius

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**

Cutting edge

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

Cutting direction

R
L
N

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

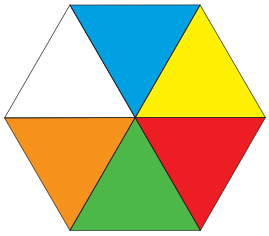
	T / S		K / P [1]	
015	0,15 mm	A	[illegible]	
020	0,20 mm	B	[illegible]	
025	0,25 mm	C	[illegible]	
050	0,50 mm	D	[illegible]	
075	0,75 mm	E	[illegible]	
100	1,00 mm	F	[illegible]	

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

For example:

BE = FKDP IHJDQJ[illegible]
FKDP IHJDQJ[illegible]

Material



%DVHG RQ 9' ,&(5 7,=,7·V 0 DVWHU XLGH GLYLGHV P DWHULDO LQWR 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

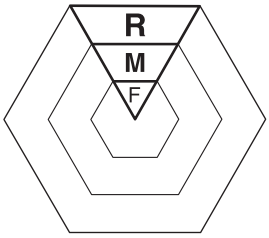
Red: cast iron
Cast iron, grey cast iron, tempered iron, spheroidal cast iron, CGI, sintered iron

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



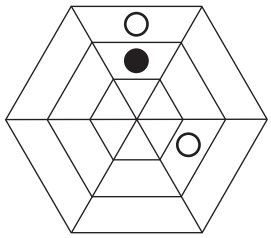
Each coloured segment is divided into three sections, and each section indicates the relevant machining application type:

R = rough machining

M = medium machining

F = fine machining

Application

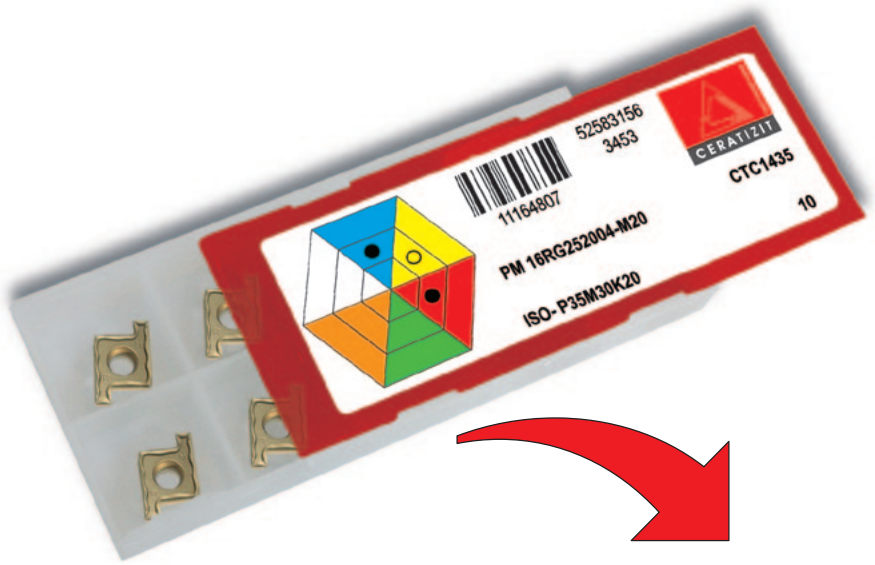


The ideal application area for the insert is indicated by a black circle. Extended applications are indicated by an open circle. The CERATIZIT MasterGuide provides you with an easily understandable structure for choosing a product and enables you to reduce grade and geometry stocks.

● **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

CTC P125

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

CERATIZIT hard material matters

Grade overview

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
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 (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
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					●		

● 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)] 7KHVH FDUELGHV DUH DOVR FDOOHG FHUPHWV

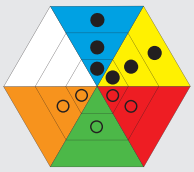
[2)] Polycrystalline diamond and polycrystalline boron nitride are also called ultra-hard cutting materials.

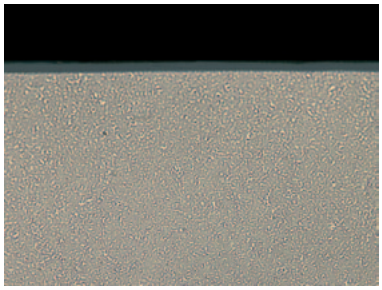
Grade description

Steel

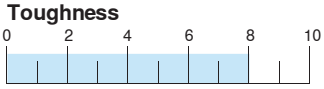
CM45

HC-P45
HC-M40
HC-K25

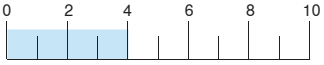




Toughness



Wear resistance



Composition:
Co 10.0%; WC balance

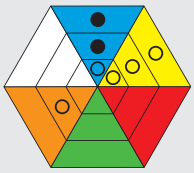
Grain size:
.7 μm (submicron grade)

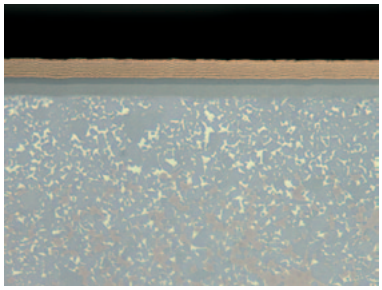
Hardness:
HV 1600

Coating specification:
PVD
TiAlN; 2 - 4 μm

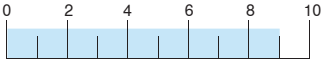
CTC1135

HC-P35
HC-M25

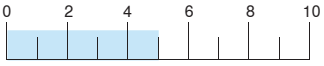




Toughness



Wear resistance



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

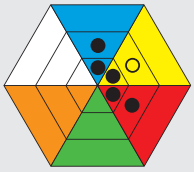
Grain size:
1 - 2 μm

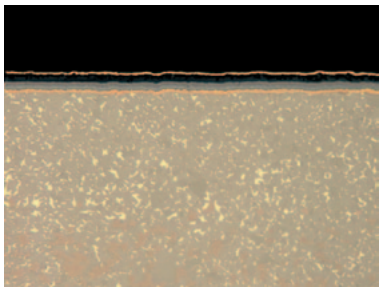
Hardness:
HV 1400

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

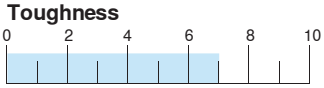
CTC1425

HC-P25
HC-M20
HC-K15

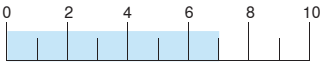




Toughness



Wear resistance



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

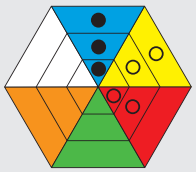
Grain size:
1 - 2 μm

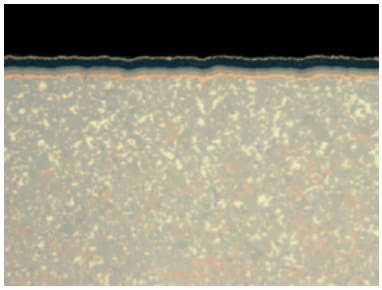
Hardness:
HV 1450

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
0 2 4 6 8 10

Wear resistance
0 2 4 6 8 10

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

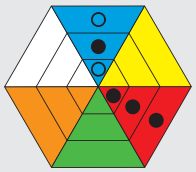
Grain size:
1 - 2 μm

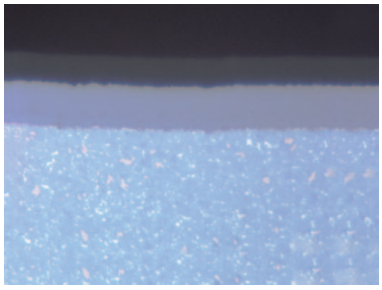
Hardness:
HV 1400

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
0 2 4 6 8 10

Wear resistance
0 2 4 6 8 10

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

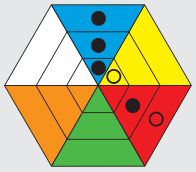
Grain size:
1 μm

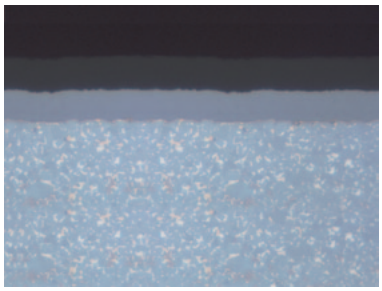
Hardness:
HV 1630

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

CTCP115

HC-P15
HC-M10
HC-K25





Toughness
0 2 4 6 8 10

Wear resistance
0 2 4 6 8 10

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

Grain size:
1 - 2 μm

Hardness:
HV 1550

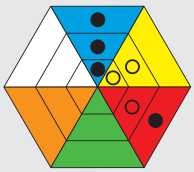
Coating specification:
CVD
Ti (C,N) + Al_2O_3; 18.5 μm

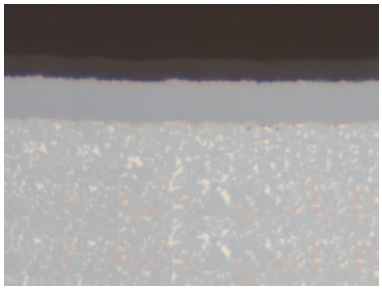
Grade description

Steel

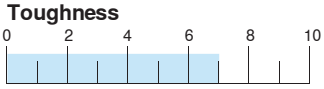
CTCP125

HC-P25
HC-M20
HC-K25

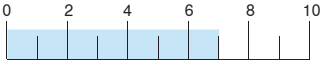




Toughness



Wear resistance



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

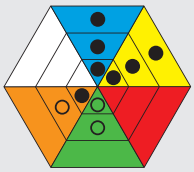
Grain size:
1 - 2 μm

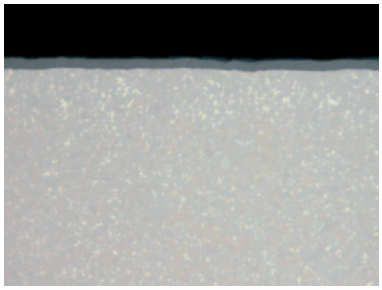
Hardness:
HV 1450

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

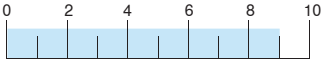
CTP2440

HC-P40
HC-M35
HC-K25

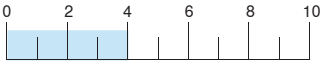




Toughness



Wear resistance



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

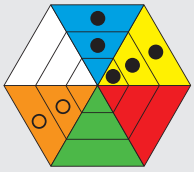
Grain size:
1 - 2 μm

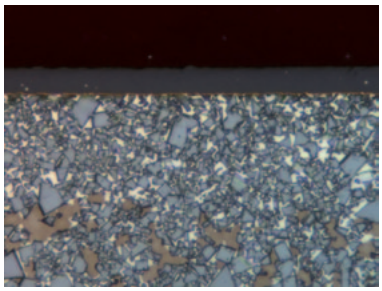
Hardness:
HV 1400

Coating specification:
PVD
TiAlN; 3 - 5 μm

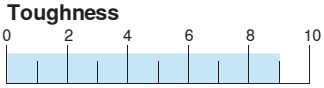
CTPM125

HC-P35
HC-M25

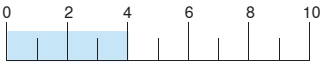




Toughness



Wear resistance



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

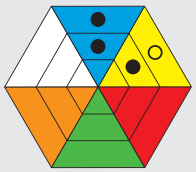
Grain size:
1 - 2 μm

Hardness:
HV 1460

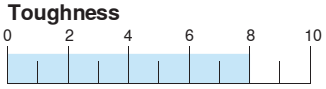
Coating specification:
PVD
TiN / TiAlN; 6 μm

S40T

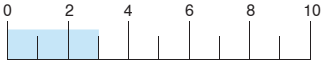
HW-P40
HW-M40



Toughness



Wear resistance



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

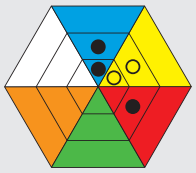
Grain size:
1 - 2 μm

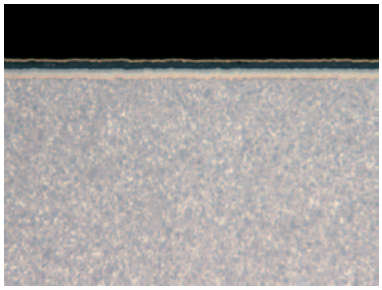
Hardness:
HV_{30} 1420

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

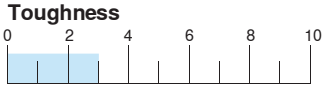
TCC410

HC-P10
HC-M10
HC-K05

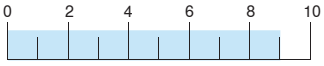




Toughness



Wear resistance



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

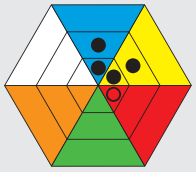
Hardness:
HV 1620

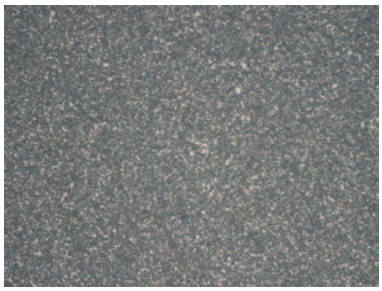
Coating specification:
CVD
TiN + Ti (C,N) + Ti (C,N) + Al_2O_3 +
Ti (C,N,B); 6 μm

Properties, application:
- Excellent resistance to oxidation

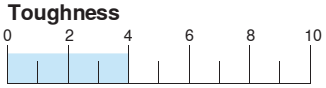
TCM10

HT-P15
HT-M10
HT-K10

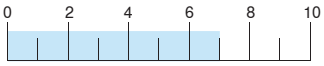




Toughness



Wear resistance



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

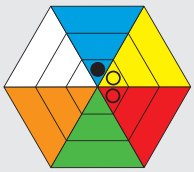
Hardness:
HV 1620

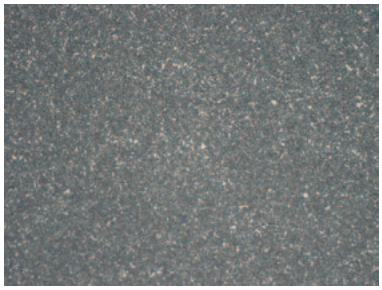
Grade description

Steel

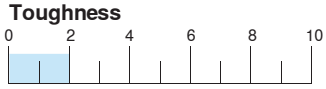
TCM407

HT-P10
HT-M05
HT-K05

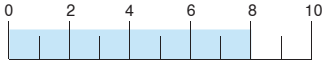




Toughness



Wear resistance



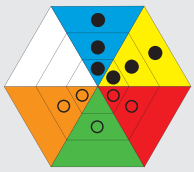
Composition: cermet
Co/Ni 8.0%; WC 16.0%; TaNbC 10.0%; TiCN balance

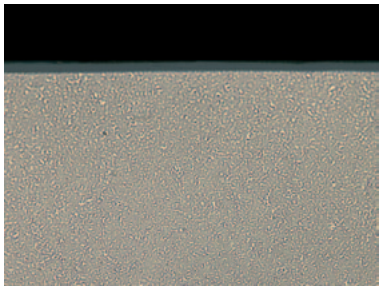
Hardness:
HV 1780

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

CM45

HC-P45
HC-M40
HC-K25





Toughness
0 2 4 6 8 10

Wear resistance
0 2 4 6 8 10

Composition:
Co 10.0%; WC balance

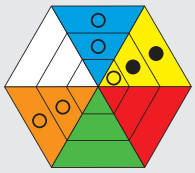
Grain size:
.7 µm (submicron grade)

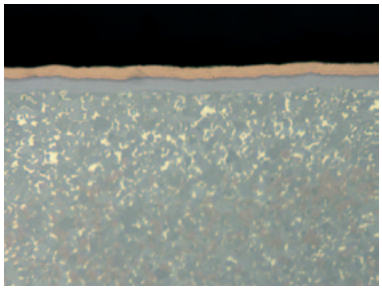
Hardness:
HV 1600

Coating specification:
PVD
TiAlN; 2 - 4 µm

CTC2135

HC-P35
HC-M30





Toughness
0 2 4 6 8 10

Wear resistance
0 2 4 6 8 10

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

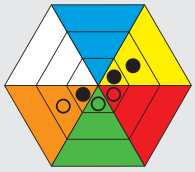
Grain size:
1 - 2 µm

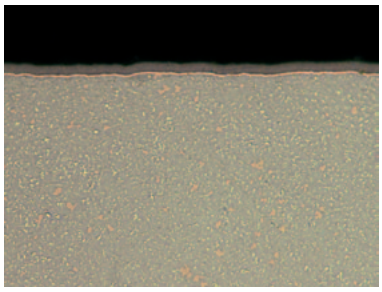
Hardness:
HV 1400

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
0 2 4 6 8 10

Wear resistance
0 2 4 6 8 10

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

Grain size:
1 µm

Hardness:
HV 1560

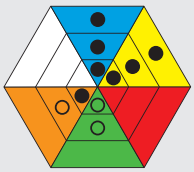
Coating specification:
PVD
TiAlN; 2 - 5 µm

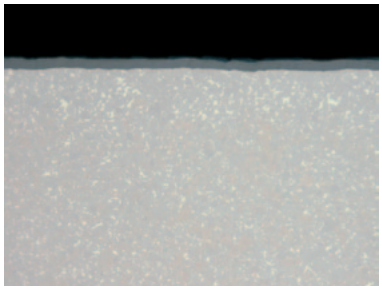
Grade description

Stainless steel

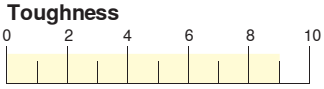
CTP2440

HC-P40
HC-M35
HC-K25

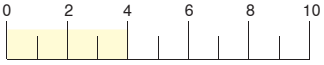




Toughness



Wear resistance



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

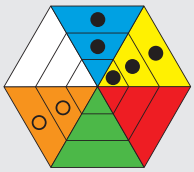
Grain size:
1 - 2 μm

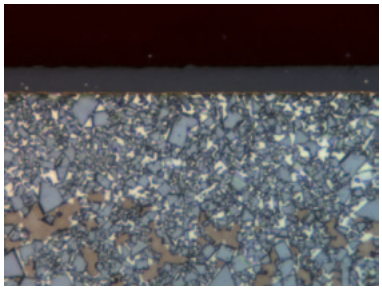
Hardness:
HV 1400

Coating specification:
PVD
TiAlN; 3 - 5 μm

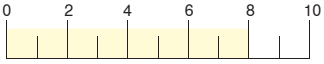
CTPM125

HC-P35
HC-M25

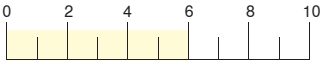




Toughness



Wear resistance



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

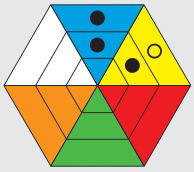
Grain size:
1 - 2 μm

Hardness:
HV 1460

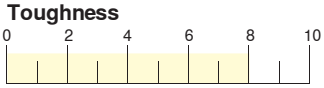
Coating specification:
PVD
TiN / TiAlN; 6 μm

S40T

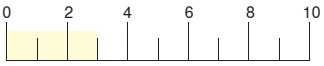
HW-P40
HW-M40



Toughness



Wear resistance



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

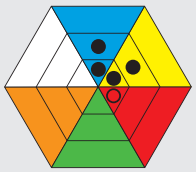
Grain size:
1 - 2 μm

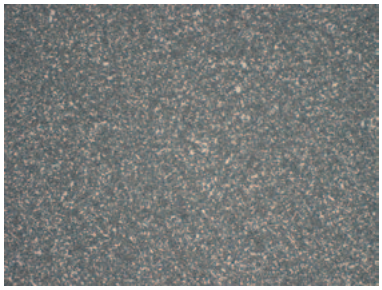
Hardness:
HV_{30} 1420

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

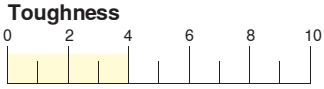
TCM10

HT-P15
HT-M10
HT-K10

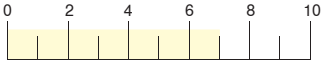




Toughness



Wear resistance



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

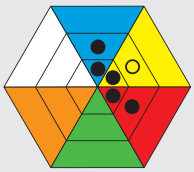
Hardness:
HV 1620

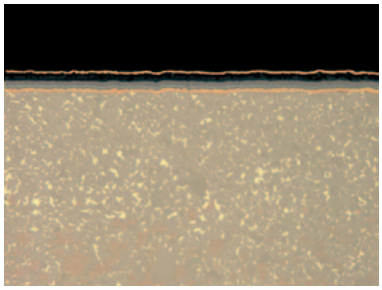
Grade description

Cast iron

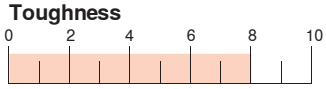
CTC1425

HC-P25
HC-M20
HC-K15

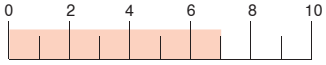




Toughness



Wear resistance



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

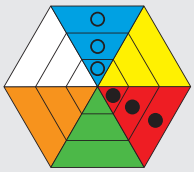
Grain size:
1 - 2 μm

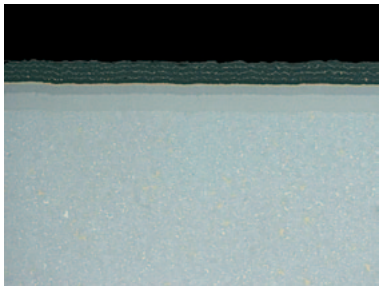
Hardness:
HV 1450

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

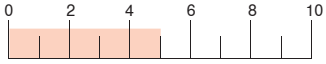
CTC3110

HC-P10
HC-K10

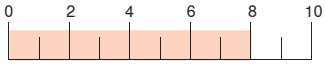




Toughness



Wear resistance



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

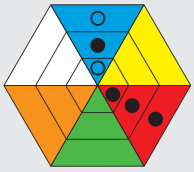
Grain size:
1 μm

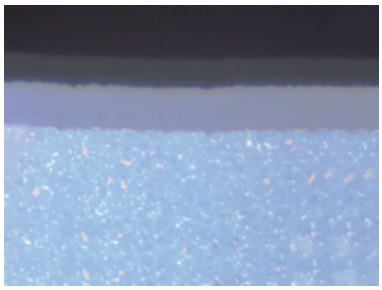
Hardness:
HV 1650

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

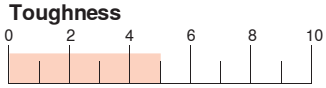
CTCK120

HC-P10
HC-K20

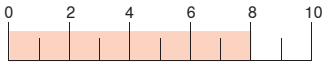




Toughness



Wear resistance



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

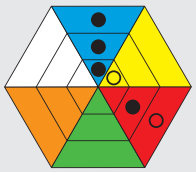
Grain size:
1 μm

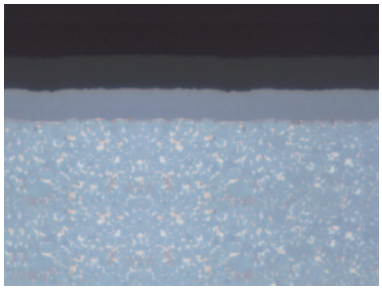
Hardness:
HV 1630

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

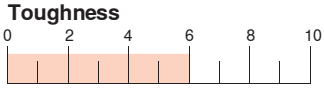
CTCP115

HC-P15
HC-M10
HC-K25

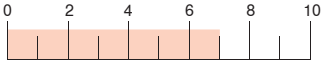




Toughness



Wear resistance



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

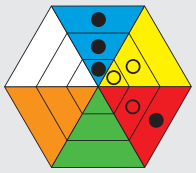
Grain size:
1 - 2 μm

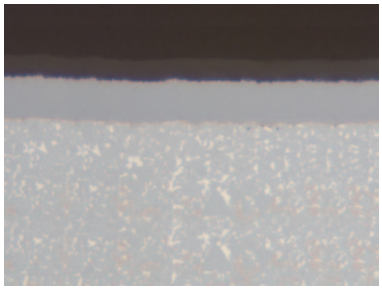
Hardness:
HV 1550

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

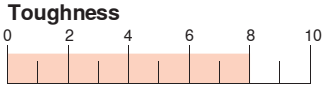
CTCP125

HC-P25
HC-M20
HC-K25

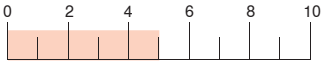




Toughness



Wear resistance



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

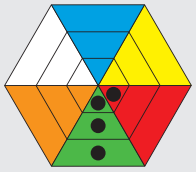
Grain size:
1 - 2 μm

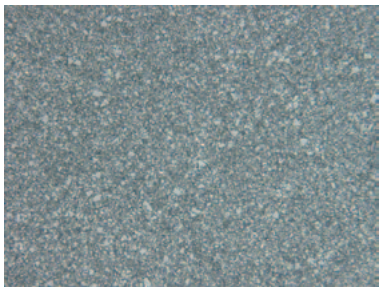
Hardness:
HV 1450

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

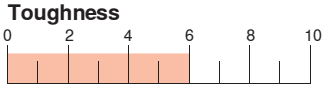
H10T

HW-K15

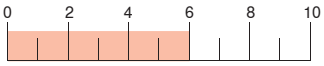




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

Grain size:
1 μm

Hardness:
HV_{30} 1630

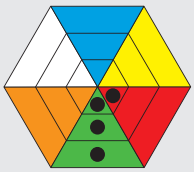
Properties, application:
- Optimally suitable for aluminium
- High wear resistance
- High heat resistance
- Low tendency to adhesion

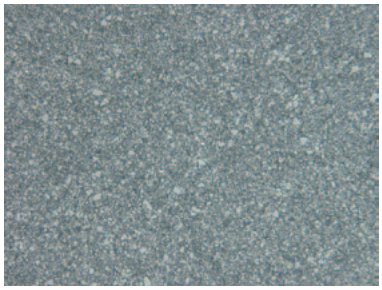
Grade description

Cast iron

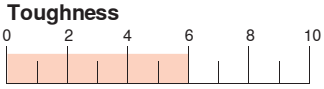
H216T

HW-K15

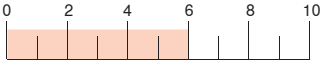




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

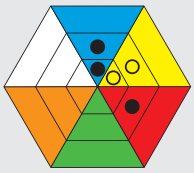
Grain size:
1 μm

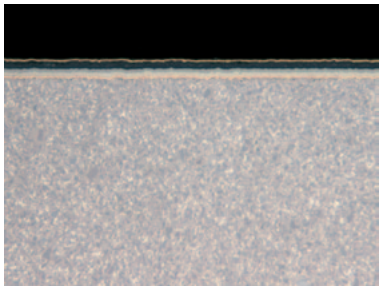
Hardness:
HV_{30} 1630

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

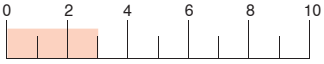
TCC410

HC-P10
HC-M10
HC-K05

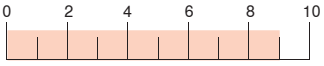




Toughness



Wear resistance



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

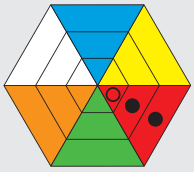
Hardness:
HV 1620

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

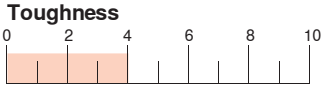
Properties, application:
- Excellent resistance to oxidation

CTM3110

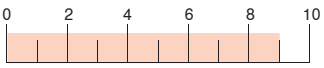
CC-K10



Toughness



Wear resistance



Composition:
Si_3N_4

Grain size:
> 2 μm

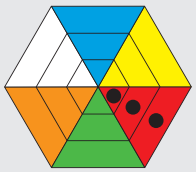
Hardness:
HV 1550

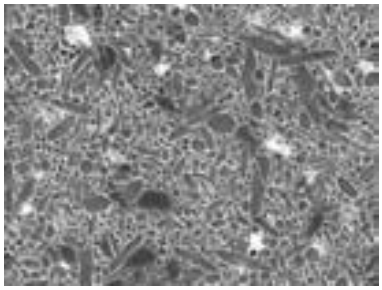
Coating specification:
CVD
Ti (C,N) + TiN; > 2μm

Properties, application:
- For chromium cast alloys

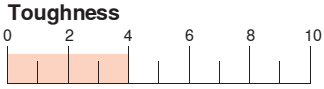
CTN3105

CN-K05

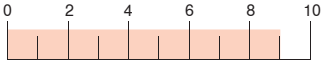




Toughness



Wear resistance



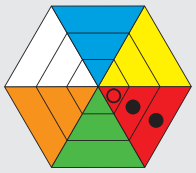
Composition:
β - Si_3N_4

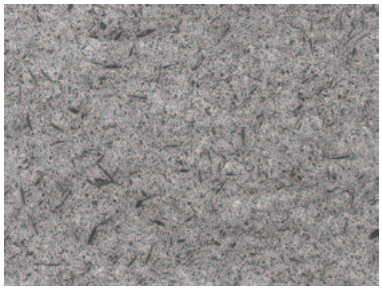
Hardness:
HV10 1620

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

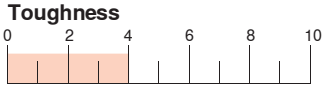
CTN3110

CN-K10

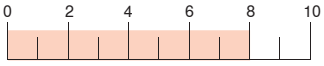




Toughness



Wear resistance



Composition:
Si_3N_4

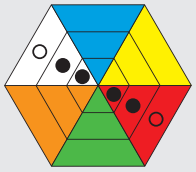
Grain size:
> 2 µm

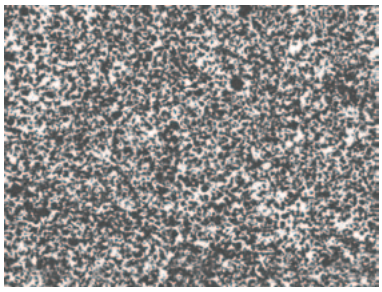
Hardness:
HV10 1500

Properties, application:
- For roughing

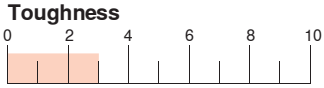
CTS3105

CM-K05

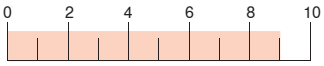




Toughness



Wear resistance



Composition:
Al_2O_3; TiC

Grain size:
> 1 µm

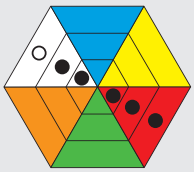
Hardness:
HV 2100

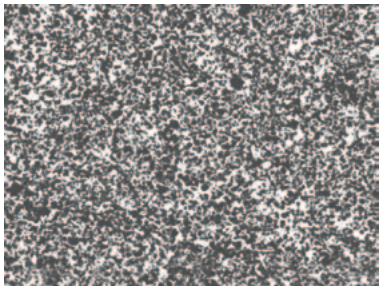
Grade description

Cast iron

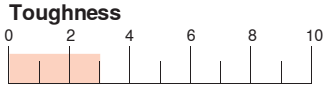
CTS3110

CM-K10

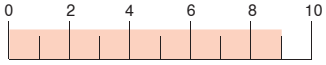




Toughness



Wear resistance



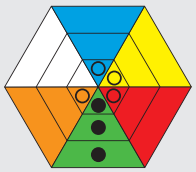
Composition:
Al_2O_3 + Ti (C,N)

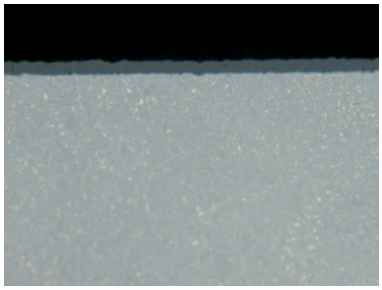
Grain size:
> 1 μm

Hardness:
HV10 2200

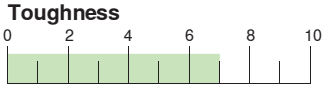
AMZ

HC-K10

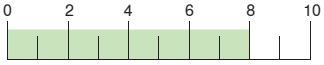




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

Grain size:
1 μm

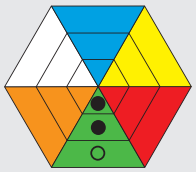
Hardness:
HV 1630

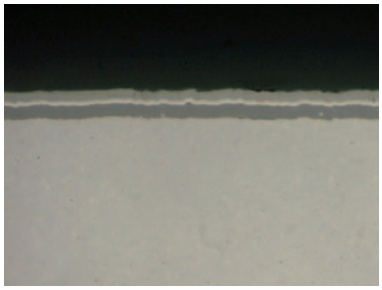
Coating specification:
PVD
TiAlN; 2 - 4 μm

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

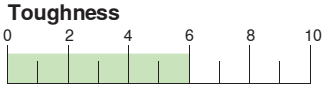
CTP4115

HC-K15

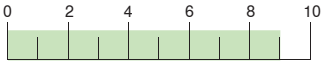




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

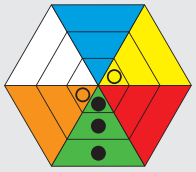
Grain size:
0.8 μm

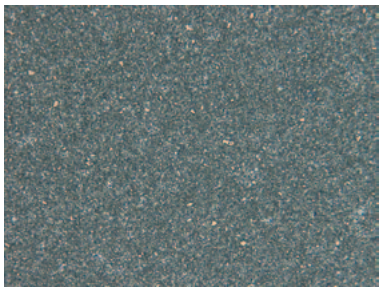
Hardness:
HV 1820

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

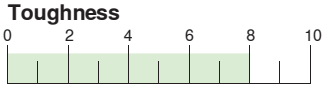
CTW7120

HW-M20
HW-K20

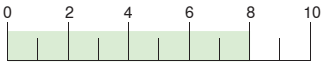




Toughness



Wear resistance



Composition:
Co 10.0%; WC balance

Grain size:
.7 μm (submicron grade)

Hardness:
HV_{30} 1550

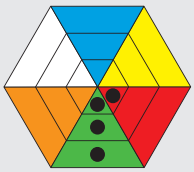
Properties, application:
- Ideal for non ferrous metals
- Substrate for PVD coatings

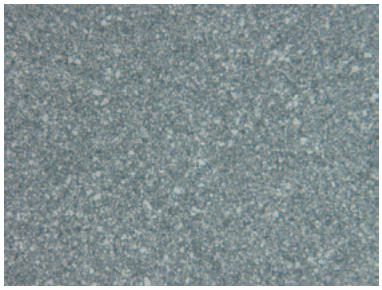
Grade description

Non ferrous metals and non metals

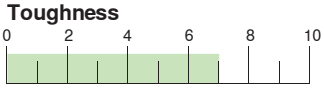
H10T

HW-K15

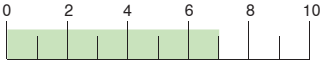




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

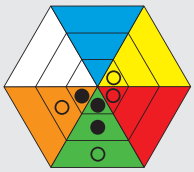
Grain size:
1 μm

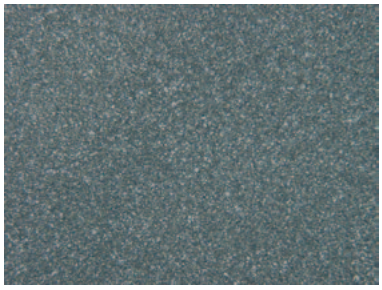
Hardness:
HV_{30} 1630

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

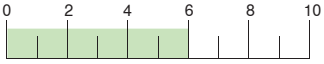
H210T

HW-M10
HW-K10

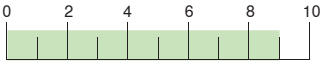




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

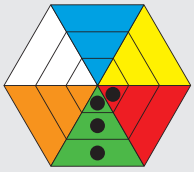
Grain size:
.8 μm (submicron grade)

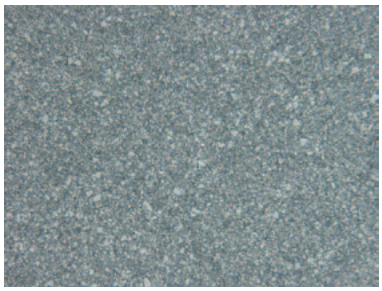
Hardness:
HV 1850

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

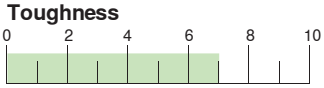
H216T

HW-K15





Toughness



Wear resistance

Composition:
Co 6.0%; WC balance

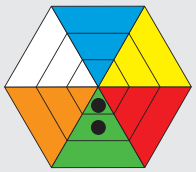
Grain size:
1 μm

Hardness:
HV_{30} 1630

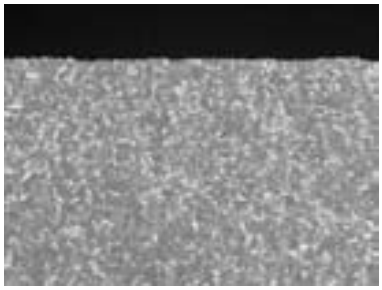
Properties, application:
- Optimally suitable for aluminium
- High wear resistance
- High heat resistance
- Low tendency to adhesion

CTD4110

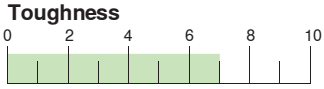
DP-K05



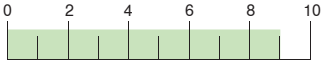
For abrasive non ferrous metals, plastic, graphite



Toughness



Wear resistance



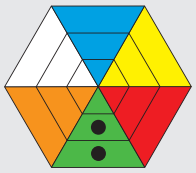
Composition:
Polycrystalline diamond (PCD)

Polycrystalline diamond:
~ 5 μm

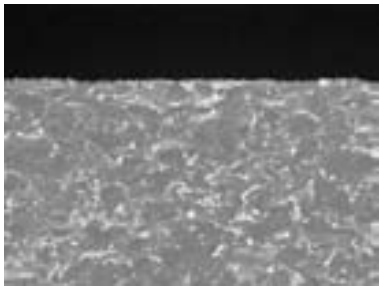
Properties, application:
- Maximum wear resistance and hardness
- Low toughness

CTD4125

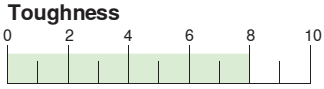
DP-K01



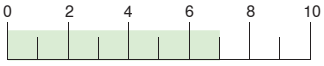
For non ferrous metals, plastic



Toughness



Wear resistance



Composition:
Polycrystalline diamond (PCD)

Grain size:
~ 25 μm

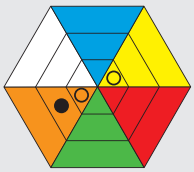
Properties, application:
- High wear resistance
- Good toughness
- Suitable for interrupted cut

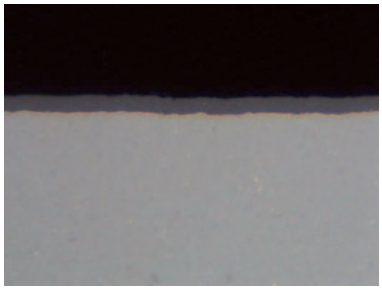
Grade description

Heat resistant alloys / titanium

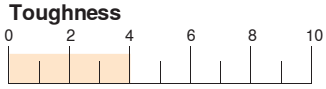
CTP5110

HC-M15
HC-S15

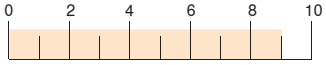




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

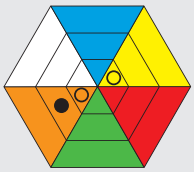
Grain size:
.8 µm

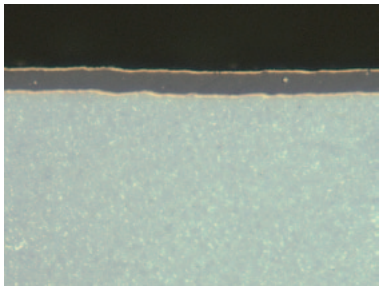
Hardness:
HV 1820

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

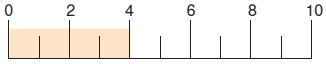
CTP5115

HC-M15
HC-S15

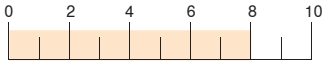




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

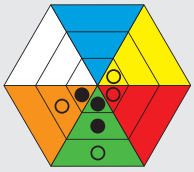
Grain size:
.8 µm

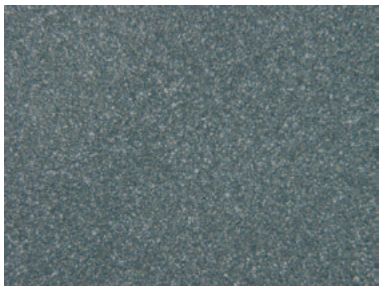
Hardness:
HV 1820

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

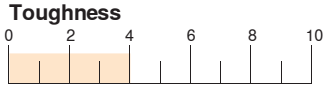
H210T

HW-M10
HW-K10

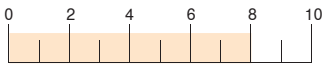




Toughness



Wear resistance



Composition:
Co 6.0%; WC balance

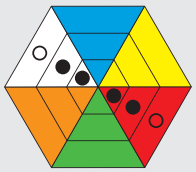
Grain size:
.8 µm (submicron grade)

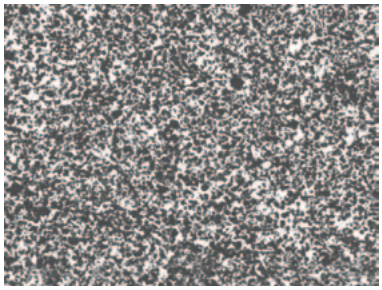
Hardness:
HV 1850

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

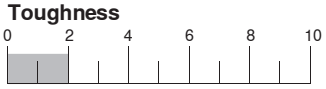
CTS3105

CM-K05

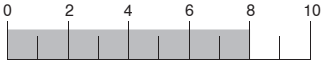




Toughness



Wear resistance



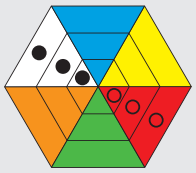
Composition:
Al_2O_3; TiC

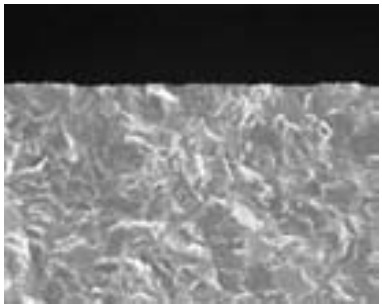
Grain size:
> 1 μm

Hardness:
HV 2100

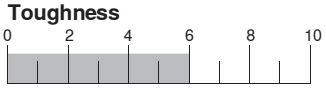
TA100

BN-K03

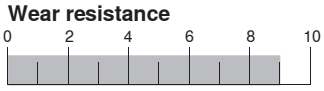




Toughness



Wear resistance



All tempered materials, sintered metals

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

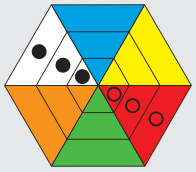
Grain size:
~ 20 μm

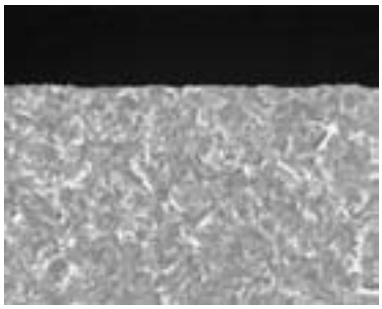
Insert form:
Solid CBN

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

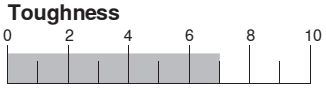
TA120

BN-K05

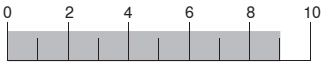




Toughness



Wear resistance



Particularly suitable for chilled castings

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

Grain size:
~ 15 μm

Insert form:
Solid CBN

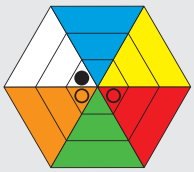
Properties, application:
- Very good suitability for dry machining

Grade description

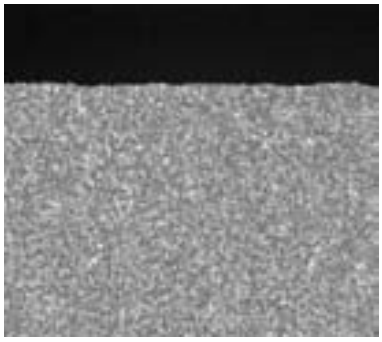
Hard materials

TA201

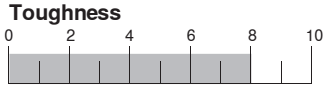
BN-K10



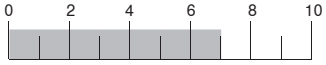
Particularly suitable for tempered steels



Toughness



Wear resistance

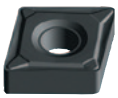
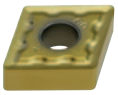
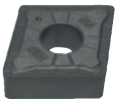


Composition:
Cubic boron nitride (CBN), 65 vol.% + binder (TiN)

Grain size:
~ 2 μm

Insert type:
Brazed segment

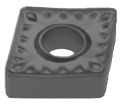
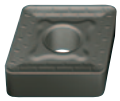
Properties, application:
- Very good suitability for dry machining
- For finishing

Chip groove (R / M / F)		Machining type	Material	Consistent cutting depth	Inconsistent cutting depth	Interrupted cut
-CF			●	TCC410	2	2
			●	TCM10	2	2
			●	TCC410	2	2
				2	2	2
				2	2	2
-F30			○	CTPM125	CTPM125	2
			●	CTPM125	CTPM125	2
				2	2	2
				2	2	2
				2	2	2
-F32				2	2	2
			●	CTP2120	CTP2120	2
			○	CTP2120	2	2
			○	CTP2120	CTP2120	2
			●	CTP2120	2	2
-TF			●	CTCP115	CTCP125	CTC1135
			●	CTCP125	CTC1135	CTC1135
			○	CTCP125	CTCP125	CTCP125
				2	2	2
			○	CTCP125	CTC1135	2
-M30			○	CTPM125	CTPM125	CTPM125
			●	CTPM125	CTPM125	CTPM125
				2	2	2
				2	2	2
			○	2	CTPM125	2
-M34				2	2	2
			●	CTP5110/CTP5115	CTP5115	2
				2	2	2
				2	2	2
			●	CTP5110/CTP5115	CTP5110/CTP5115	2
-TFQ			●	TCC410	CTCP115	2
			○	TCC410	CTCP125	2
			○	TCC410	2	2
				2	2	2
				2	2	2
-TMQ			●	CTCP115	CTCP125	2
			○	CTCP115	CTCP125	2
			○	CTCP115	CTCP125	2
				2	2	2
				2	2	2
-TMF			●	CTCP115	CTCP125	CTC1135
			●	CTCP125	CTC1135	CTC1135
				2	2	2
				2	2	2
			○	CTC1135	2	2

The easy way to success

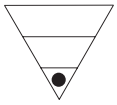
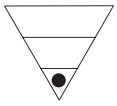
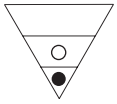
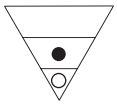
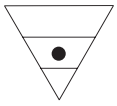
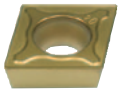
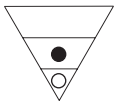
Inserts for the MaxiLock D / N system

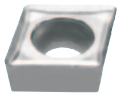
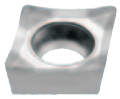
Chip groove (R / M / F)	Machining type	Material	Consistent cutting depth	Inconsistent cutting depth	Interrupted cut
-TMM		●	CTCP115	CTCP115	2
		○	CTCP115	2	2
			2	2	2
			2	2	2
			2	2	2
-M42			2	2	2
		●	CTP2120	CTP2135	CTP2135
			2	2	2
			2	2	2
			2	2	2
-TM		●	CTCP115	CTCP125	CTC1135
		●	CTCP125	CTC1135	CTP2135
			2	2	2
			2	2	2
		○	CTC2135	CTP2135	2
-M52			2	2	2
		●	CTP2120	CTP2120	2
		○	CTP2120	CTP2120	CTP2120
			2	2	2
		●	CTP2120	2	2
-M50		●	CTCP125	CTCP125	CTCP125
		○	CTCP125	CTCP125	2
		●	2	CTCP125	CTCP125
			2	2	2
			2	2	2
-M60		○	CTPM125	CTPM125	CTPM125
		●	CTPM125	CTPM125	CTPM125
			2	2	2
			2	2	2
		○	2	CTPM125	CTPM125
-TRM		●	CTCP115	CTCP125	CTC1135
		●	CTCP125	CTC1135	CTC1135
			2	2	2
			2	2	2
		○	CTCP125	CTC1135	2
-TMR		●	CTCP115	CTCP125	CTC1135
		●	CTCP125	CTC2135	CTC2135
		●	CTC3110/CTCP115	CTC3110	CTCP125
			2	2	2
		○	CTCP125	CTC2135	2
-TRR		●	CTCP125/CTCP115	CTC1135	CTC1135
		●	CTCP125	CTC1135	CTC1135
			2	2	2
			2	2	2
		○	CTCP125	CTC1135	2

Chip groove		Machining type	Material	Consistent cutting depth	Inconsistent cutting depth	Interrupted cut
-TR		●	●	CTCP125/CTCP115	CTCP125	CTC1135
			●	CTCP125	CTC1135	CTC2135
			●	CTCP125	CTCP125	2
				2	2	2
			○	CTC1135	CTC2135	2
-R80		●	●	CTCP125	CTCP125	CTCP125
			●	CTCP125	CTCP125	CTCP125
				2	2	2
				2	2	2
				2	2	2
-R28		● ○	●	CTCP115	CTCP115/CTCP125	CTCP125
			○	CTCP115	CTCP115/CTCP125	CTCP125
			●	CTCP115	CTCP115/CTCP125	CTCP125
				2	2	2
				2	2	2
-R58		●	●	CTCP115	CTCP115/CTCP125	CTCP125
			○	CTCP115	CTCP115/CTCP125	CTCP125
			●	CTCP115	CTCP115/CTCP125	CTCP125
				2	2	2
				2	2	2
-R88		●	●	CTCP115	CTCP115/CTCP125	CTCP125
			○	CTCP115	CTCP115/CTCP125	CTCP125
			●	CTCP115	CTCP115/CTCP125	CTCP125
				2	2	2
				2	2	2

The easy way to success

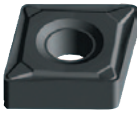
Inserts for the MaxiLock S system

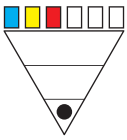
Chip groove		Machining type	Material	Consistent cutting depth	Inconsistent cutting depth	Interrupted cut
-F23			○	2	2	2
			●	CTP2120	CTP2120	2
			○	CTP2120	2	2
			○	CTP2120	2	2
			○	CTP2120	2	2
-SF			●	TCM407	TCM10	CTC1135
			●	CTCP125	CTC2135	CTC2135
			●	TCM410	CTCP125	CTCP125
				2	2	2
			○	CTCP125	CTC2135	2
-SMF			●	TCC410/CTCP115	CTC1135	CTC1135
			●	CTCP125	CTC1135	CTC1135
			○	TCC410/CTCP115	2	2
				2	2	2
				2	2	2
-F43				2	2	2
			●	CTC2135	CTC2135	CTC2135
				2	2	2
				2	2	2
				2	2	2
-SM			●	CTCP115	CTCP125	CTC1135
			●	CTCP125	CTC2135	CTC2135
			●	CTC3110	CTC3110	CTC3110
				2	2	2
			○	CTCP125	CTC2135	2
-SMQ			●	CTCP115	CTCP125	2
			○	CTCP115	CTCP125	2
			○	CTCP115	CTCP125	2
				2	2	2
				2	2	2

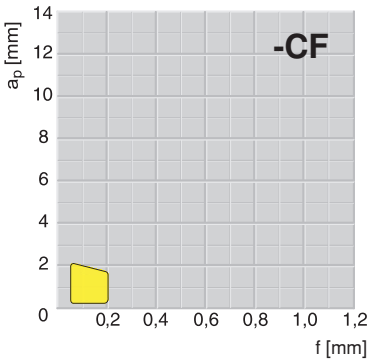
Chip groove (R / M / F)		Machining type	Material	Consistent cutting depth	Inconsistent cutting depth	Interrupted cut
-23P		●		2	2	2
				2	2	2
				2	2	2
			●	H216T	2	2
				2	2	2
-25Q		● ●	○	H210T	2	2
			○	H210T	H210T	2
			●	H210T	H210T	2
			●	H210T	H210T	H210T
			●	H210T	H210T	2
-25P		● ●		AMZ	AMZ	2
			○	AMZ	AMZ	2
			●	AMZ	AMZ	2
			●	H210T	H210T	H210T
			●	AMZ	AMZ	2
-27		● ● ○	○	AMZ	AMZ	2
			○	AMZ	AMZ	2
			●	AMZ	AMZ	H10T
			●	H10T	H10T	H10T
				2	2	2
-29		● ●	○	AMZ	AMZ	2
			○	AMZ	AMZ	2
			●	AMZ	AMZ	2
			●	H216T	H216T	H216T
			○	AMZ	AMZ	2

Chip grooves

-CF / -F30 / -F32 / -TF





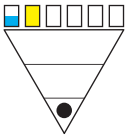


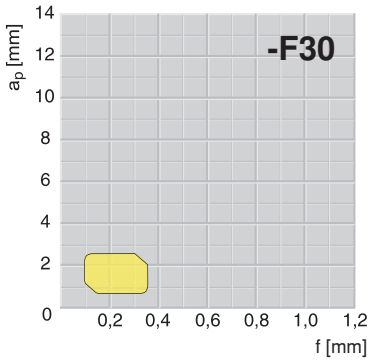
Application range:

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

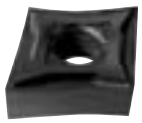


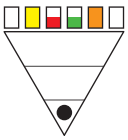


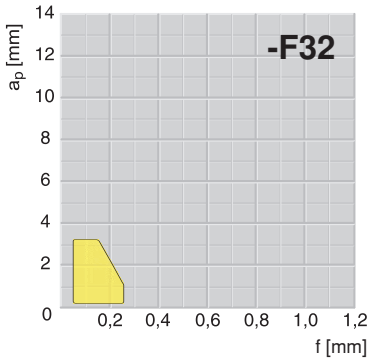
Application range:

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

- **Stainless steels**
- Steel in general



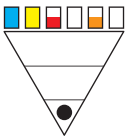


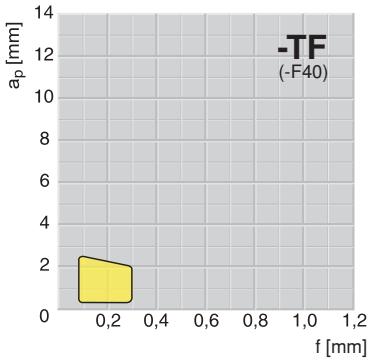


Application range:

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

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

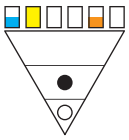


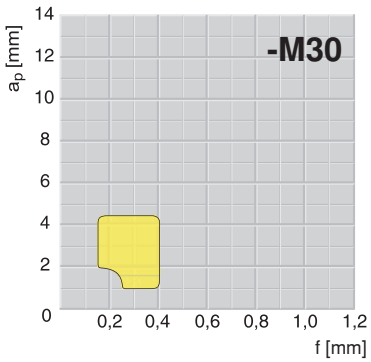


Application range:

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

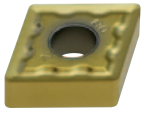


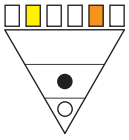


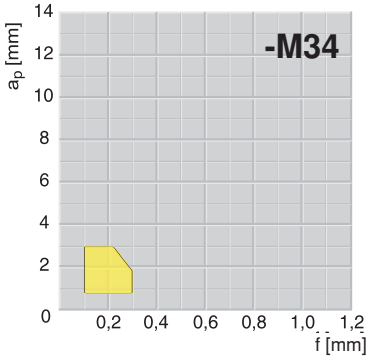
Application range:

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

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



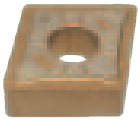


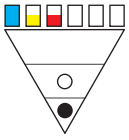


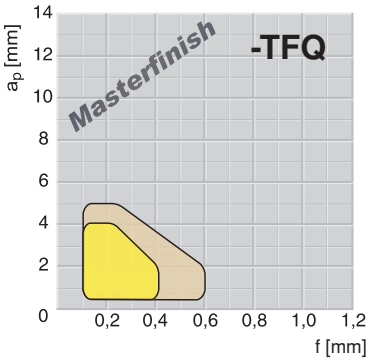
Application range:

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

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







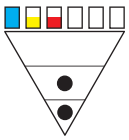
Application range:

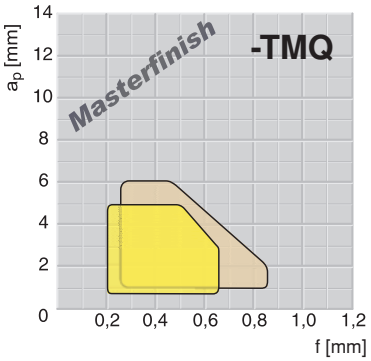
CNMG 120408EN-TFQ
a_p: 0,5 - 4,0 mm
f: 0,1 - 0,4 mm

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





Application range:

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

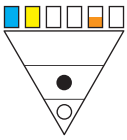
CNMG 120412EN-TMQ
a_p: 1,0 - 6,0 mm
f: 0,25 - 0,85 mm

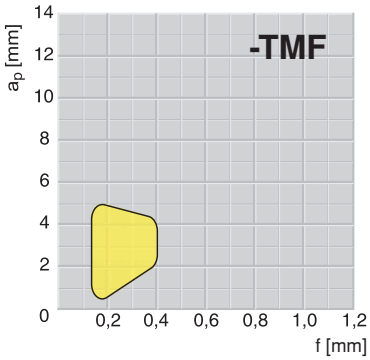
- **Steel in general**
- Stainless steel
- Grey cast iron (GG)

For more detailed information on
MASTERFINISH

Chip grooves

-TMF / -TMM / -M42 / -TM



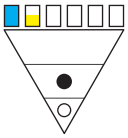


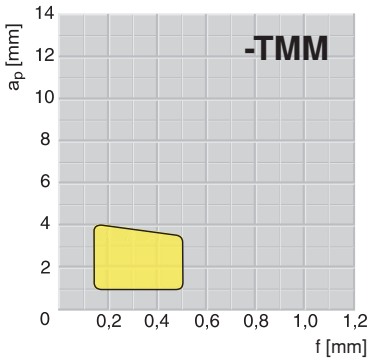
Application range:

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



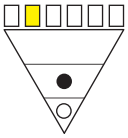


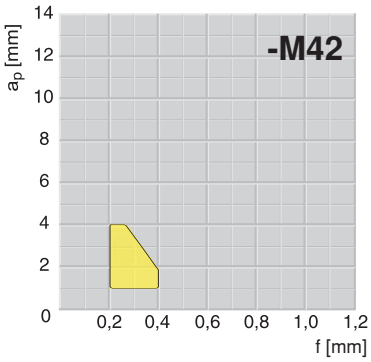
Application range:

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



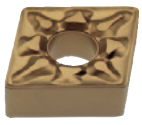


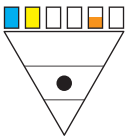
Application range:

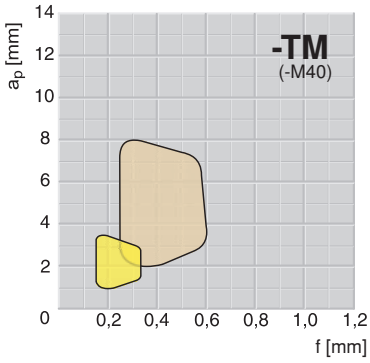
CNMG 120408EN-M42
a_p: 1,0 - 4,0 mm
f: 0,2 - 0,4 mm

- **Stainless steels**

For stainless steels





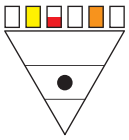


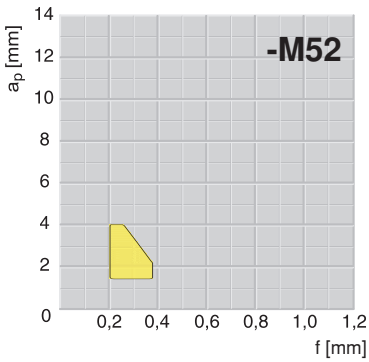
Application range:

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

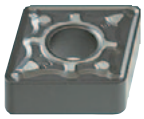


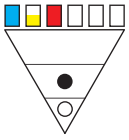


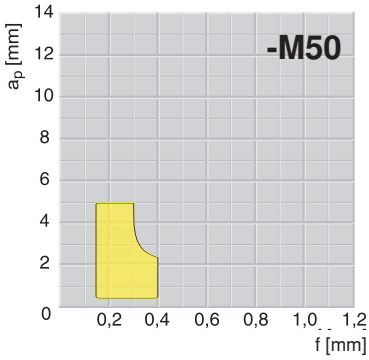
Application range:

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

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



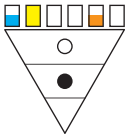


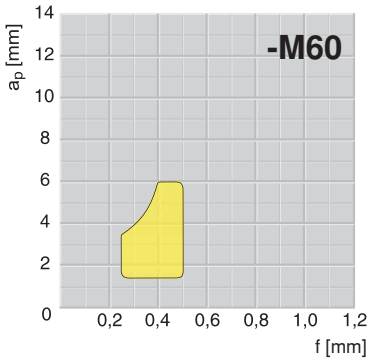


Application range:

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

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

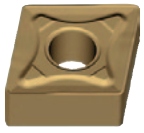


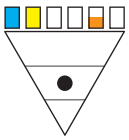


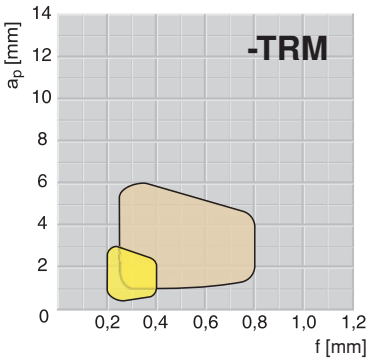
Application range:

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

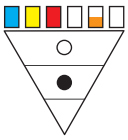
CNMG 160616EN-TRM
a_p: 1,0 - 6,0 mm
f: 0,25 - 0,8 mm

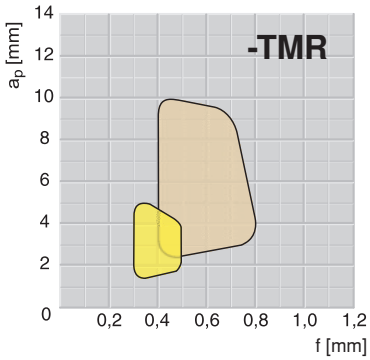
- **Bearing steel**
- **Steel in general**
- **Stainless steels**
- Super alloys

⚠ For roller bearing steels

Chip grooves

-TMR / -TRR / -TR / -R80





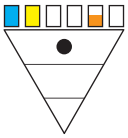
Application range:

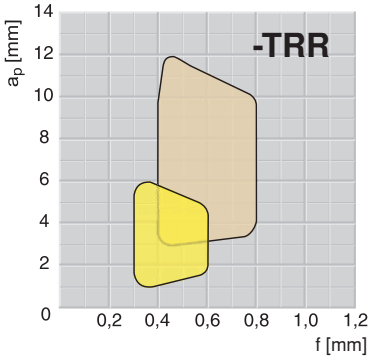
CNMG 120408EN-TMR
a_p: 1,5 - 5,0 mm
f: 0,3 - 0,5 mm

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





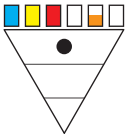
Application range:

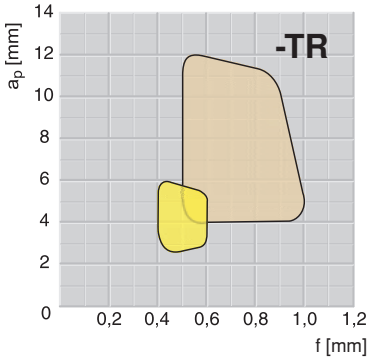
CNMM 120412SN-TRR
a_p: 1,0 - 6,0 mm
f: 0,3 - 0,6 mm

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



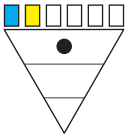


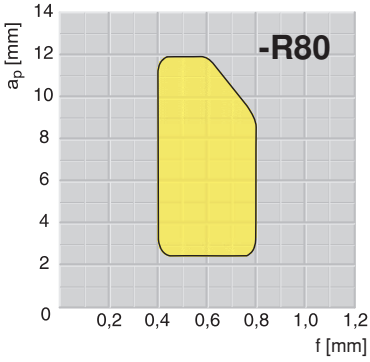
Application range:

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



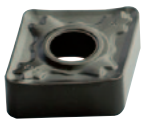


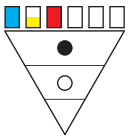
Application range:

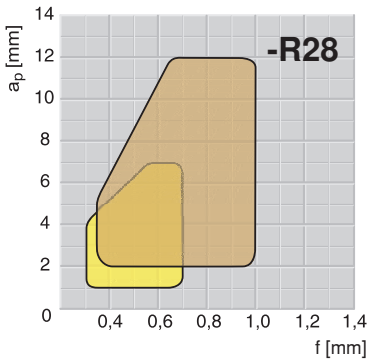
CNMM 190624SN-R80
a_p: 2,5 - 12 mm
f: 0,4 - 0,80 mm

For stainless steels

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





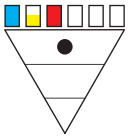


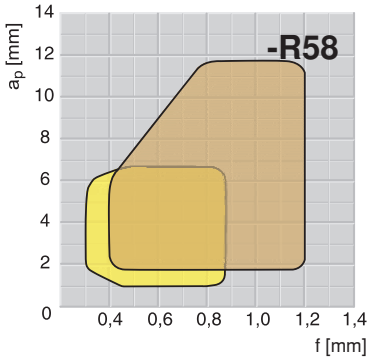
Application range:

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



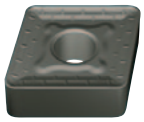


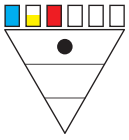
Application range:

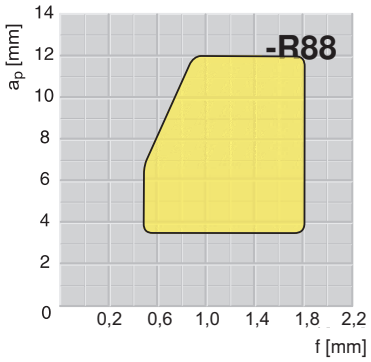
CNMM 120412EN-R58
a_p: 1,0 - 7,0 mm
f: 0,3 - 0,7 mm

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

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







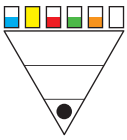
Application range:

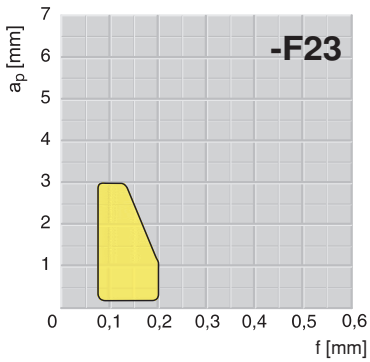
CNMM 190624SN-R88
a_p: 3,5 - 12,0 mm
f: 0,5 - 1,5 mm

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

Chip grooves

-F23 / -SF / -SMF / -F43

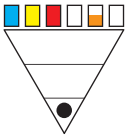


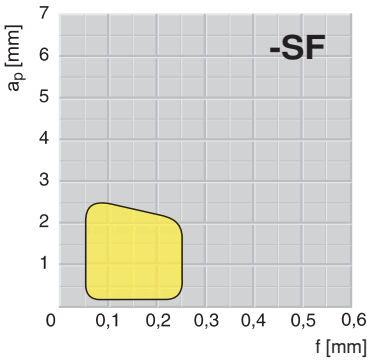


Application range:

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

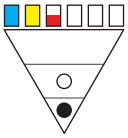


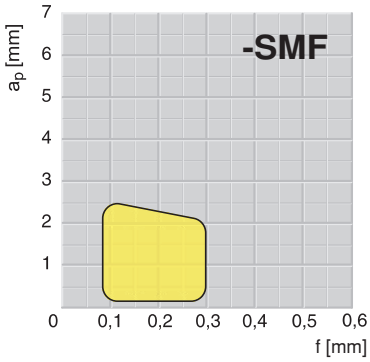


Application range:

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

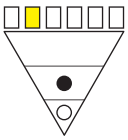


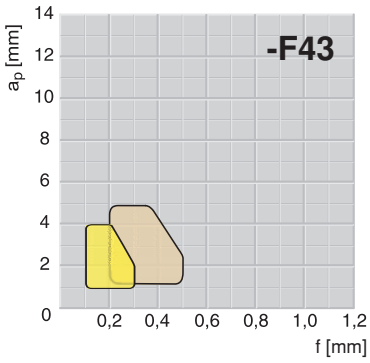


Application range:

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

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



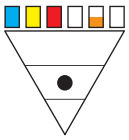


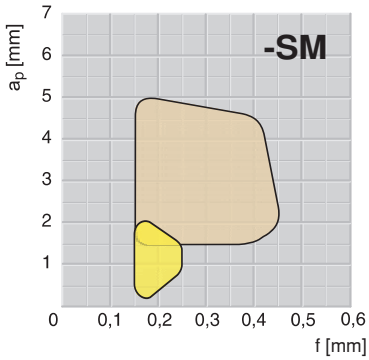
Application range:

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**



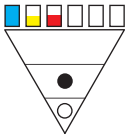


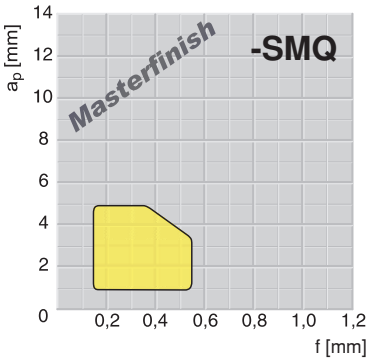
Application range:

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:

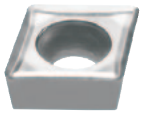
CCMT 120408EN-SMQ
a_p: 1,0 - 5,0 mm
f: 0,15 - 0,55 mm

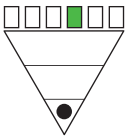
- **Steel in general**
- Stainless steel
- Grey cast iron (GG)

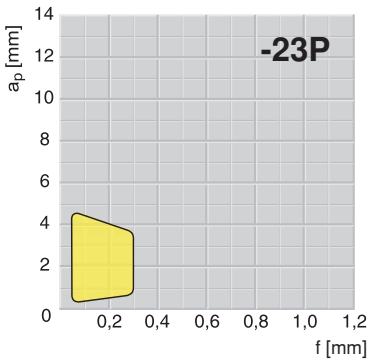
For more detailed information on
MASTERFINISH

Chip grooves

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





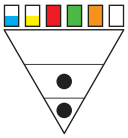


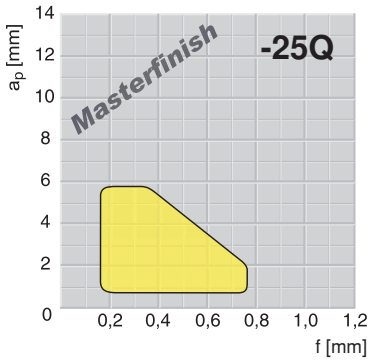
Application range:

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



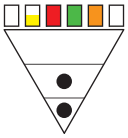


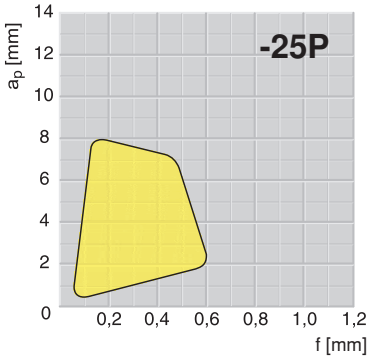
Application range:

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**



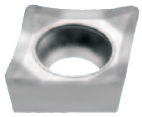


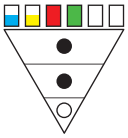
Application range:

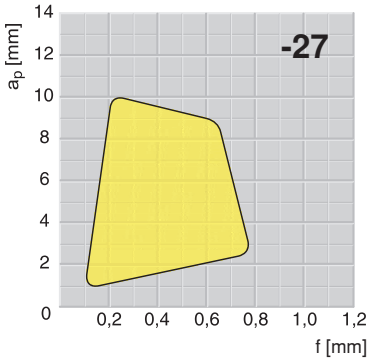
CCGT 120408FN-25P
a_p: 0,5 - 8,0 mm
f: 0,05 - 0,6 mm

- **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





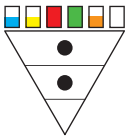


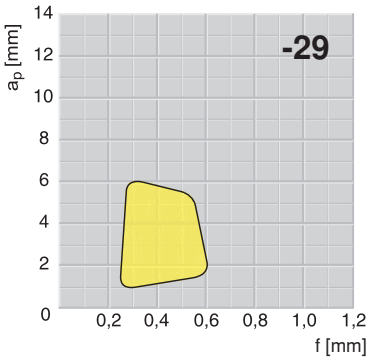
Application range:

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





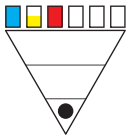
Application range:

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

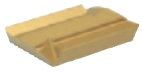
-11

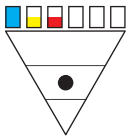


Application range:

- Profile boring
- Small feed rates

-12

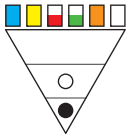




Application range

- Profile boring
- Medium feed rates

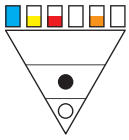
-42



Application range:

- Super alloys
- Titanium
- Aluminium
- Stainless steels

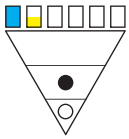
-57



Application range:

- Steel and cast iron in general

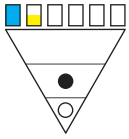
-ER/-EL



Application range:

- Steel
- Stainless steels

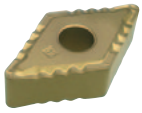
-EN

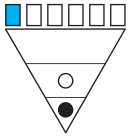


Application range:

- Steel in general

-M36



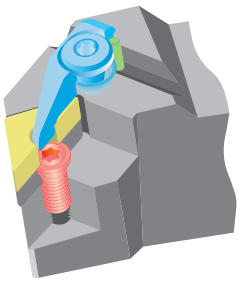


Application range:

- Steel in general

MaxiLock D

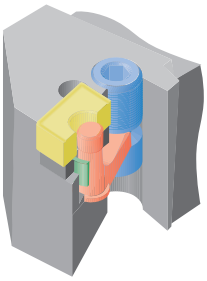
First choice for cutting with negative inserts with hole.
Safe and **precise positioning** of the insert through **double clamping effect**.



- Clamping element
- Insert
- Shim
- Pin
- Screw

MaxiLock N

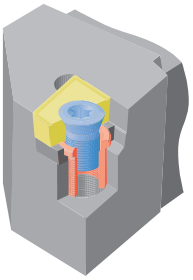
This clamping system is suitable for all negative form inserts with holes. The actuation screw can easily be reached from the upper and the lower side of the holder. In the unlocked position constituent parts remain intact.



- Clamping screw
- Insert
- Shim
- Wedge
- Lever

MaxiLock S

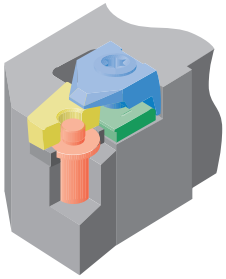
The form lock screw guarantees a safe connection of the insert and the tool holder. Chip evacuation is not hindered by obstructive clamping elements. Due to the neutral insert position the effective rake angle is identical to that of the insert form and geometry.



- Clamping screw
- Insert
- Shim
- Threaded shim screw

MaxiLock P

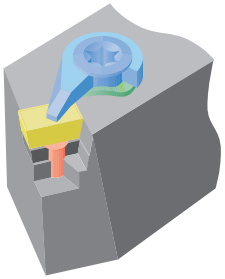
7KH LQVHUW LV DFFXUDWHOB FHQWHUHG &DQG D cylindrical bore is fixed with a wedge and claw lock against a fix pin. Up to three cutting edges can be used (1 support face).



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

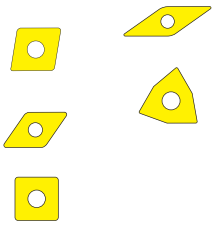
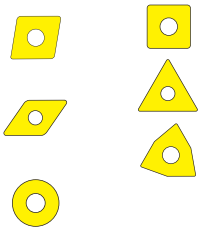
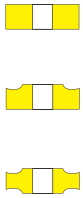
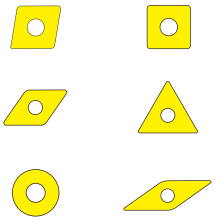
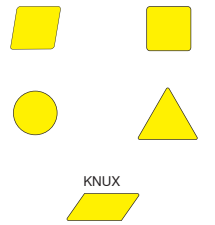
Simplex N / P

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			✓					
Simplex P	✓		✓					

CTCP125 inserts show unbeatable performance.

HYPERCOAT

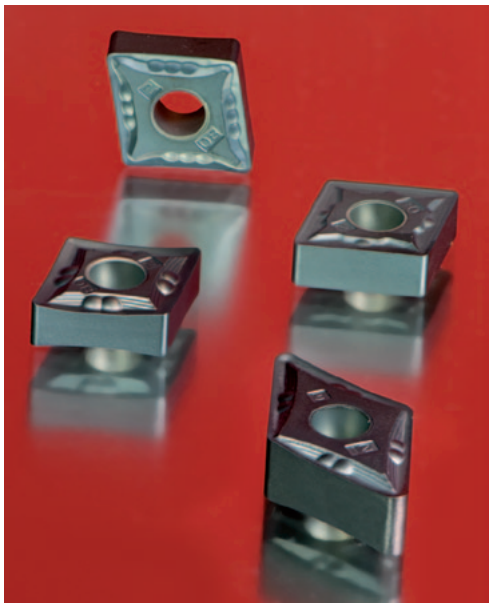
Product advantages

> + LJK FXWQJ HGJH VWDEOW² FRQVLVWQW 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

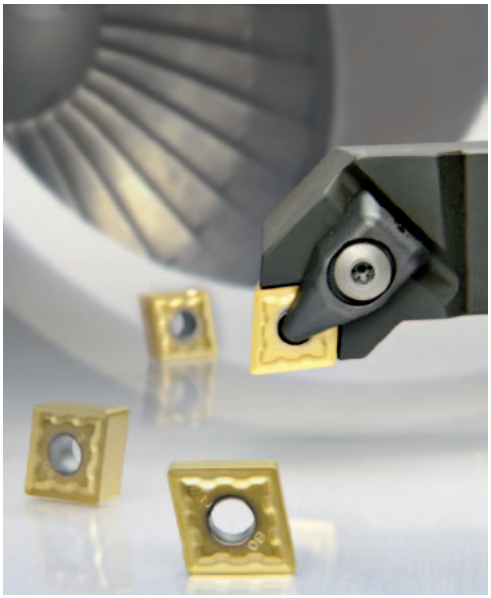
%HVWLQ FODVV IRU VXSHUDOOR V

HYPER COAT

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



CTP5115 /-M34 /-F34

%HVWLQ FODVV IRU WWDQLXP alloys

HYPER COAT

Product advantages

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

CTP5110/-M34

Ti **CTP5110 /-M34**

Easy milling of high-tech materials!

CTC5240

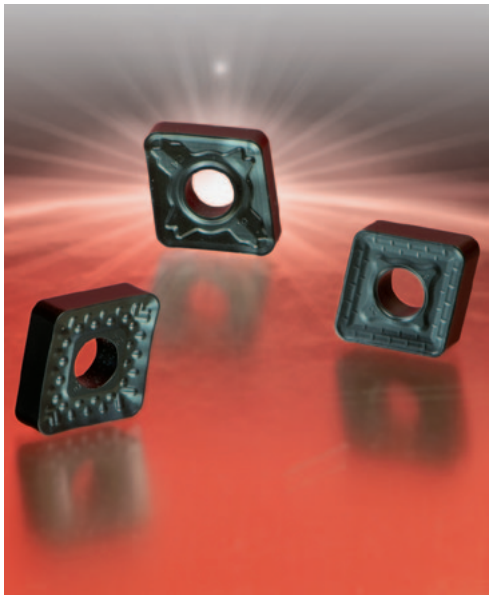
Product advantages

> 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)

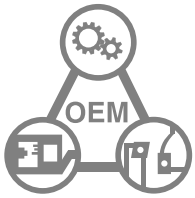
CTCP125, CTCP115

CTCP125, CTCP115

Complete tooling program for complete machining

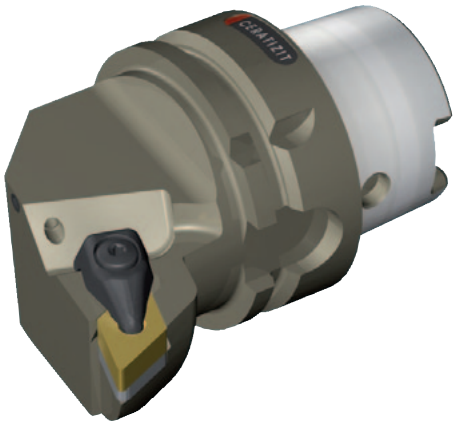
HSK-T

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.



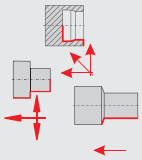
Product advantages

> 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.

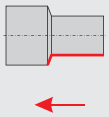
Overview of machining operations



A58-A59

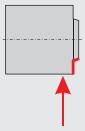
External machining CERATIZIT MaxiLock & Simplex

Longitudinal turning



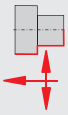
A60-A61

Face turning



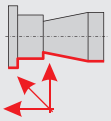
A62

Longitudinal and face turning



A63

Profiling



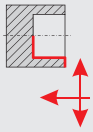
A64-A65

Internal machining CERATIZIT MaxiLock & Simplex

Boring

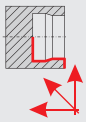
A66

Boring and face turning



A67

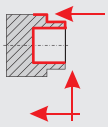
Profiling



A68

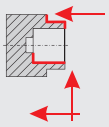
Drilling, external and internal machining with CERATIZIT multi-function tools

EcoCut



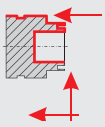
A69

EcoCut Rebore



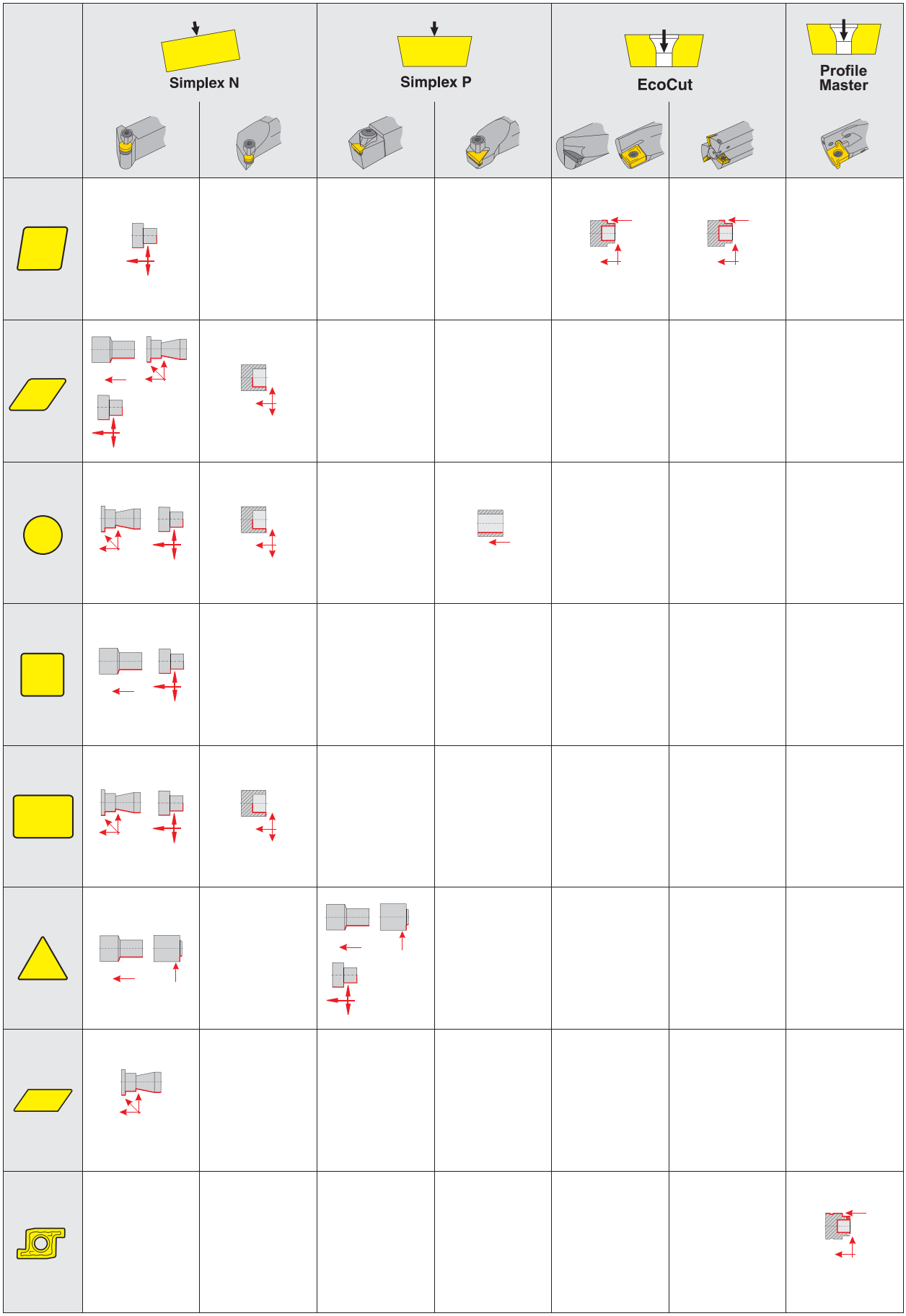
A69

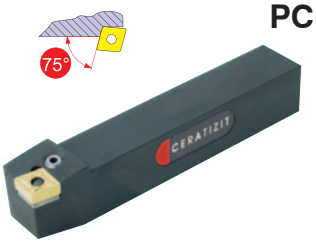
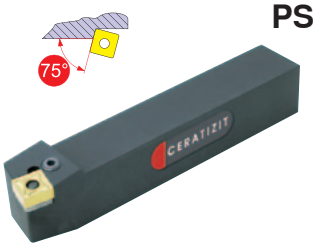
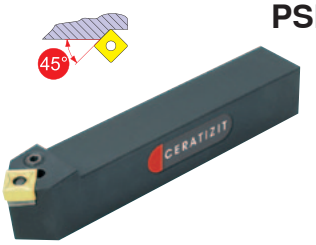
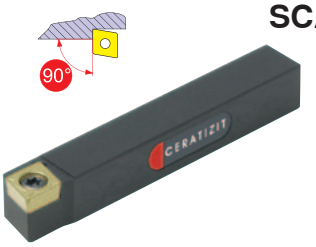
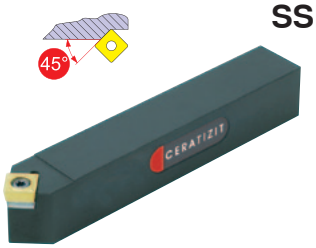
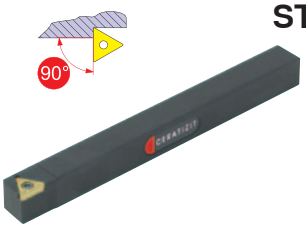
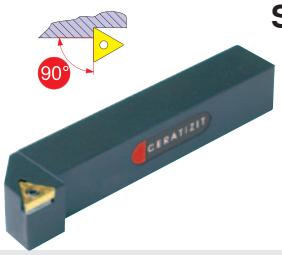
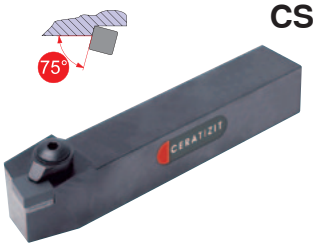
ProfileMaster

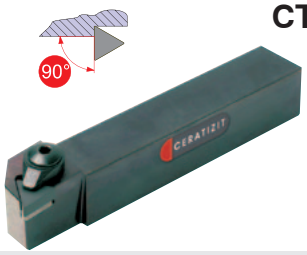


A69

Overview of machining operations


Simplex N
Simplex P
EcoCut
Profile Master

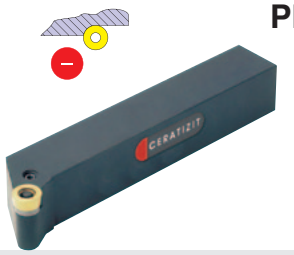
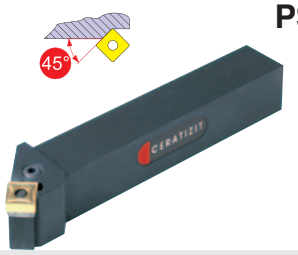
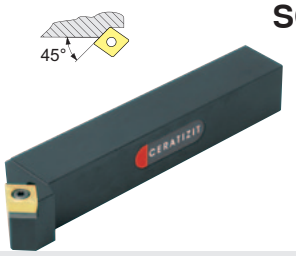
DCBN...	**DCLN...**	**DSBN...**
⌀ = 25 mm A116	⌀ = 16 - 40 mm A118	⌀ = 20 - 40 mm A120
DSDN...	**PCBN...** 	**PSBN...** 
⌀ = 20 - 25 mm A121	⌀ = 25 - 32 mm A128	⌀ = 20 - 40 mm A135
PSDN... 	**PTGN...**	**PTTN...**
⌀ = 16 - 40 mm A136	⌀ = 16 - 32 mm A140	⌀ = 20 - 25 mm A141
SCAC... 	**SCDC...**	**SCMC...**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

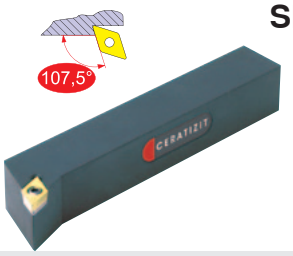
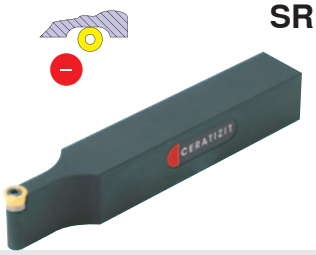
CSDN...	**CTAN...** 	**CTGN...**
⌀ = 25 - 32 mm A179	⌀ = 20 - 25 mm A180	⌀ = 12 - 25 mm A182
CTRN...	**CTAP...**	**CTGP...**
⌀ = 12 mm A183	⌀ = 20 - 25 mm A184	⌀ = 10 - 12 mm A186

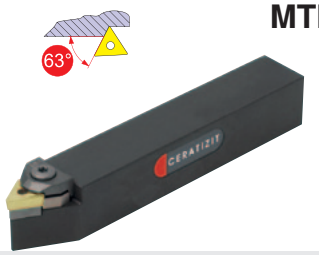
External machining

Face turning

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

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

‘ ℓ$_A$ = 32 mm
Ø D ≥ 40 mm

A190

PSKN...

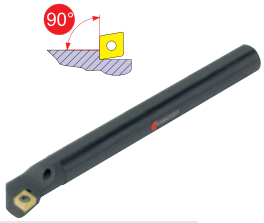
‘ ℓ$_A$ = 25 - 40 mm
Ø D ≥ 32 mm

A194

PTFN...

‘ ℓ$_A$ = 16 - 50 mm
Ø D ≥ 21 mm

A195



SCFC...

‘ ℓ$_A$ = 8 - 12 mm
Ø D ≥ 11 mm

A197

SSKC...

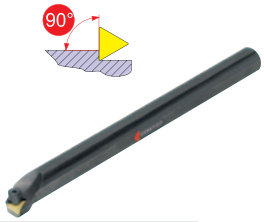
‘ ℓ$_A$ = 16 - 25 mm
Ø D ≥ 20 mm

A206

STFC...

‘ ℓ$_A$ = 10 - 40 mm
Ø D ≥ 13 mm

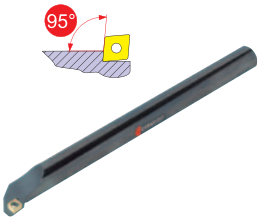
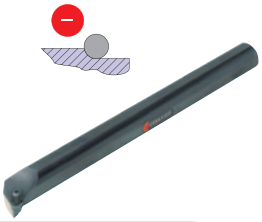
A208



CTFP...

‘ ℓ$_A$ = 12 - 32 mm
Ø D ≥ 16 mm

A216

DCLN... ‘ ℓ$_A$ = 20 - 50 mm Ø D ≥ 40 mm A188	**DWLN...** ‘ ℓ$_A$ = 25 - 40 mm Ø D ≥ 32 mm A191	**PCLN...** ‘ ℓ$_A$ = 25 - 50 mm Ø D ≥ 32 mm A192
PWLN... ‘ ℓ$_A$ = 16 - 40 mm Ø D ≥ 21 mm A196	 **SCLC...** ‘ ℓ$_A$ = 8 - 40 mm Ø D ≥ 11 mm A198-A200	**SSSC...** ‘ ℓ$_A$ = 16 - 40 mm Ø D ≥ 20 mm A207
MSSC... ‘ ℓ$_A$ = 32 mm Ø D ≥ 40 mm A213	 **CRSN...** ‘ ℓ$_A$ = 32 mm Ø D ≥ 40 mm A215	

Internal machining

Profiling

DDUN...

‘ G$_A$ = 25 - 40 mm
Ø D ≥ 32 mm

A189

PDUN...

‘ G$_A$ = 20 - 50 mm
‘ P P

A193

SDQC...

‘ G$_A$ = 12 - 40 mm
Ø D ≥ 16 mm

A201

SDUC...

‘ G$_A$ = 12 - 40 mm
Ø D ≥ 16 mm

A202-A204

SDXC...

‘ G$_A$ = 12 - 25 mm
Ø D ≥ 16 mm

A205

SVQC...

‘ G$_A$ = 16 - 40 mm
Ø D ≥ 20 mm

A209

SVUC...

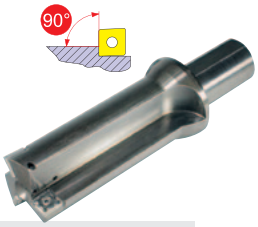
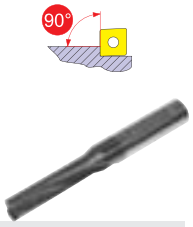
‘ G$_A$ = 16 - 40 mm
Ø D ≥ 20 mm

A210-A211

MTUC...

‘ G$_A$ = 32 - 40 mm
Ø D ≥ 40 mm

A214

EC... ‘ ⌀ = 10 - 40 mm ‘ P P A218-A222	**ECR...**  ‘ ⌀ = 40 mm ‘ P P A223	**EC...**  ‘ ⌀ = 6 - 8 mm ‘ P P A217

hard material matters
CERATIZIT

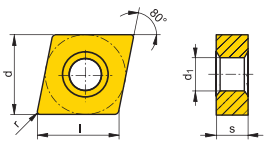
MaxiLock D/N	MaxiLock S	MaxiLock P	Simplex N	Simplex P	EcoCut	ProfileMaster
A72-A75	A88	A98	A99	A105	A109-A110	A112
A76-A78	A88-A89	A98	A100	A106		
A79	A92	A98	A100	A107		
A81-A82	A93		A100	A108		
A83	A94		A101			
A84-A85	A95-A97		A102-A103			
-	-					
A86-A87	A97		A104			

CERATIZIT hard material matters

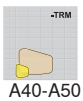
MaxiLock D/N

CN..

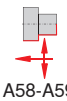
		H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P					○	●		●		●	●	●	○	●	●					
M				○			○	○	●	○	●	○	●	○	●					
K		●			●	●		●	○	●				●	○					
N		●	○						○											
S			●	●			●		○		○	○	○							
H																				
-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

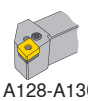


A40-A50


A58-A59

A248-A257

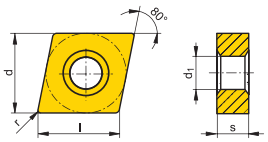
A116-A118


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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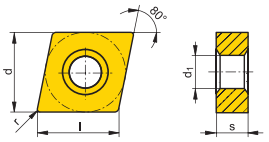
CN..

		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					○	●		●		●	●	●	○	●	●					
M				○			○	○	●	○	●	○	●	○	●					
K		●			●	●		●	○	●				●	○					
N		●	○						○											
S			●	●			●		○		○	○	○							
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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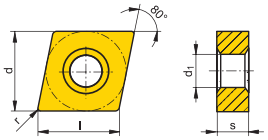
	H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10
P				○	●		●		●	●	●	○	●	●
M			○			○	○	●	○	●	○	●	○	●
K	●			●	●		●	○	●				●	○
N	●	○						○						
S		●	●			●		○		○	○	○		
H														

			d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
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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CERATIZIT hard material matters

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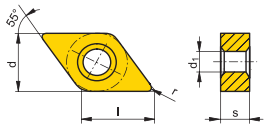
DN..

	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				○	●		●		●	●	●	○	●	●					
M			○			○	○	●	○	●	○	●	○	●					
K	●			●	●		●	○	●				●	○					
N	●	○						○											
S		●	●			●		○		○	○	○							
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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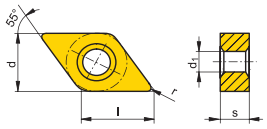
		H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P					○	●		●		●	●	●	○	●	●					
M				○			○	○	●	○	●	○	●	○	●					
K		●			●	●		●	○	●				●	○					
N		●	○						○											
S			●	●			●		○		○	○	○							
H																				
-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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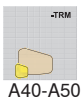

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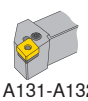
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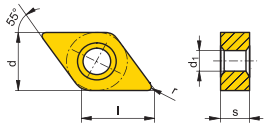
		H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P					○	●		●		●	●	●	○	●	●					
M				○			○	○	●	○	●	○	●	○	●					
K		●			●	●		●	○	●				●	○					
N		●	○						○											
S			●	●			●		○		○	○	○							
H																				
-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



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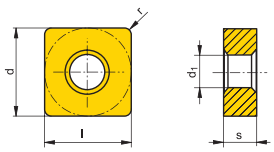
		H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P					○	●		●		●	●	●	○	●	●					
M				○			○	○	●	○	●	○	●	○	●					
K		●			●	●		●	○	●				●	○					
N		●	○						○											
S			●	●			●		○		○	○	○							
H																				
-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



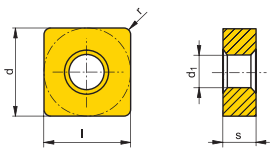
A16-A33 A40-A50 A58-A59 A248-A257 A120-A123 A135-A138 A190

CERATIZIT hard material matters

MaxiLock D/N

SN..

		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																				
-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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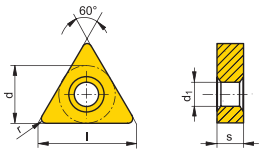
		H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P					○	●		●		●	●	●	○	●	●					
M				○			○	○	●	○	●	○	●	○	●					
K		●			●	●		●	○	●				●	○					
N		●	○						○											
S			●	●			●		○		○	○	○							
H																				
-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



A16-A33 A40-A50 A58-A59 A248-A257 A124 A139-A141 A195

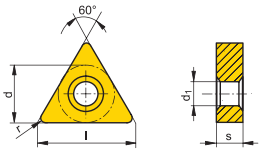
CERATIZIT hard material matters

MaxiLock D/N

TN..

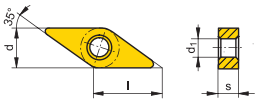
	H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10
P				○	●		●		●	●	●	○	●	●
M			○			○	○	●	○	●	○	●	○	●
K	●			●	●		●	○	●				●	○
N	●	○						○						
S		●	●			●		○		○	○	○		
H														

			d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
-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



A16-A33 A40-A50 A58-A59 A248-A257 A124 A139-A141 A195

		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



CERATIZIT hard material matters

MaxiLock D/N

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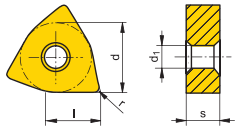
	H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10													
P				○	●		●		●	●	●	○	●	●													
M			○			○	○	●	○	●	○	●	○	●													
K	●			●	●		●	○	●				●	○													
N	●	○						○																			
S		●	●			●		○		○	○	○															
H																											

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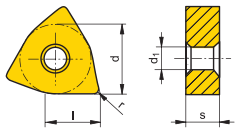
	H10T	TSM20	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTPM125	CTC1135	CTC2135	TCC410	TCM10	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P				○	●		●		●	●	●	○	●	●					
M			○			○	○	●	○	●	○	●	○	●					
K	●			●	●		●	○	●				●	○					
N	●	○						○											
S		●	●			●		○		○	○	○							
H																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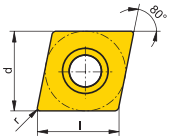
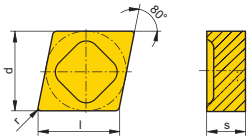
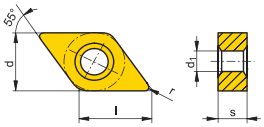
MaxiLock D/N

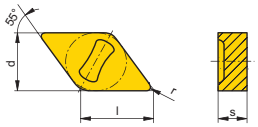
CN.. - DN.. (other cutting materials)

		TA100	TA201	CTI3105	CTN3105	CTS3105	CTN3110	CTM3110	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P													
M													
K		●	O	●	●	●	●	●					
N													
S			O	O									
H		●	●			●							
CN..A		CNGA 120408SN-025C					●		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
			TA100	TA201	CTI3105	CTN3105	CTS3105	CTN3110	CTM3110	d	l	s	r	d_1









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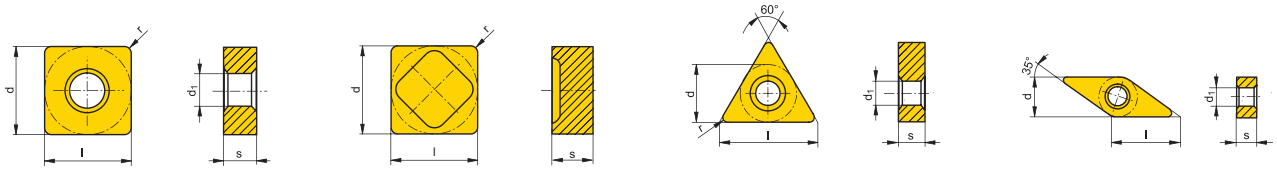
		TA100	TA201	CTI3105	CTN3105	CTS3105	CTN3110	CTM3110	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
	P												
	M												
	K	●	O	●	●	●	●	●					
	N												
	S		O	O									
	H	●	●			●							
SN..A	SNGA 120408SN-025C							●	12.70	12.70	4.76	0.80	5.16
SN..X	SNGX 120712TN-020D			●	●				12.70	12.70	7.94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



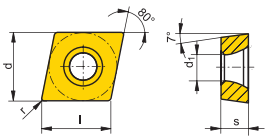
A16-A33 A58-A59 A248-A257 A120-A124 A125-A126 A135-A141 A190 A194-A195

CERATIZIT hard material matters

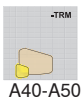
MaxiLock S

CC..

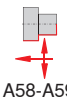
		H210T	H10T	H216T	U17T	CTW7120	S40T	AMZ	CTP4115	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTC1135	CTC2135	TCC410	TCM407	TCM10					d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P							●	○		○	●		●		●	●	○	●	●	●									
M		○				○	●	○				○	○	●	○	○	●	○	○	●									
K		○	●	●				○		●	●		●	○	●			●	○	○									
N		●	●	●		●		●	●					○															
S		●				○		○				●		○		○	○												
H																													
-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

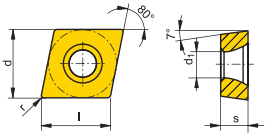

A58-A59

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

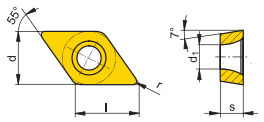


A16-A33 A40-A50 A58-A59 A248-A257 A143-A149 A197-A200

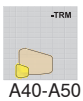
MaxiLock S

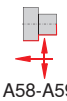
DC..

		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																													
-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

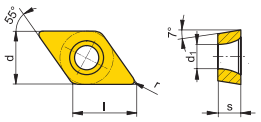

A58-A59

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

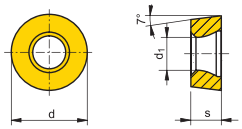


CERATIZIT hard material matters

MaxiLock S

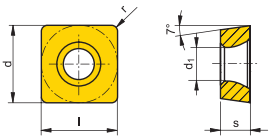
RC..

	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						●	○		○	●		●		●	●	○	●	●	●											
M	○				○	●	○				○	○	●	○	○	●	○	○	●											
K	○	●	●				○		●	●		●	○	●			●	○	○											
N	●	●	●		●		●	●					○																	
S	●				○		○				●		○		○	○														
H																														
	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]
-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



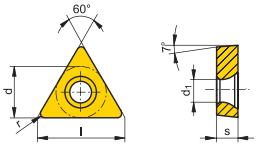
A16-A33 A40-A50 A58-A59 A248-A257 A156-A159 A206-A207

CERATIZIT hard material matters

MaxiLock S

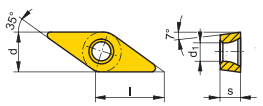
TC..

		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							●	○		○	●		●		●	●	○	●	●	●									
M		○				○	●	○				○	○	●	○	○	●	○	○	●									
K		○	●	●				○		●	●		●	○	●			●	○	○									
N		●	●	●		●		●	●					○															
S		●				○		○				●		○		○	○												
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



A16-A33 A40-A50 A58-A59 A248-A257 A160-A163 A208

		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

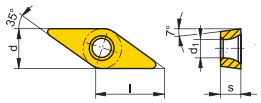


A16-A33 A40-A50 A58-A59 A248-A257 A164-A167 A209-A212

MaxiLock S

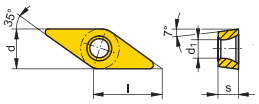
VC..

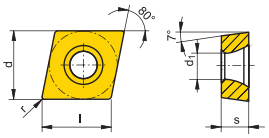
		H210T	H10T	H216T	U17T	CTW7120	S40T	AMZ	CTP4115	CTC3110	CTCK120	CTP5115	CTCP115	CTP2120	CTCP125	CTC1135	CTC2135	TCC410	TCM407	TCM10					d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P							●	○		○	●		●		●	●	○	●	●	●									
M		○				○	●	○				○	○	●	○	○	●	○	○	●									
K		○	●	●				○		●	●		●	○	●			●	○	○									
N		●	●	●		●		●	●					○															
S		●				○		○				●		○		○	○												
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

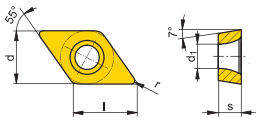


A16-A33 A40-A50 A58-A59 A248-A257 A164-A167 A209-A212

			TA201	CTD4110	CTD4125	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
		P								
		M								
		K	O							
		N		●	●					
		S	O							
		H	●							
-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



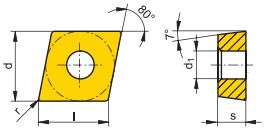


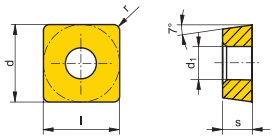


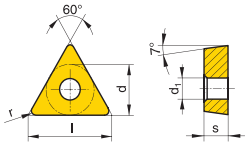
MaxiLock P

CC.. SC.. TC..

		CTCP115	CTCP125	CTC1135	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P		●	●	●					
M		O	O	O					
K		●	●						
N									
S				O					
H									
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

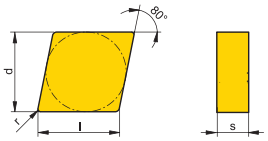






A16-A33 A50 A58-A59 A248-A257 A168-A173 A213-A214

		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
		S40T	CTC3110	CTCK120	TA100	TA120	CTN3105	CTS3105	CTN3110	CTM3110	CTS3110	d	l	s	r

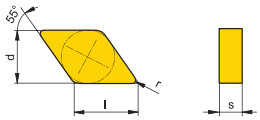


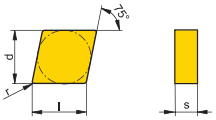
A16-A33 A58-A59 A248-A257 A174

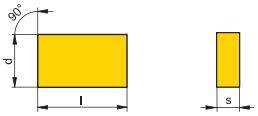
Simplex N

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

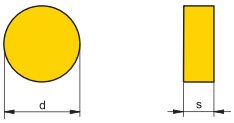






A16-A33 A58-A59 A248-A257

		S40T	CTC3110	CTCK120	TA100	TA120	CTN3105	CTS3105	CTN3110	CTM3110	CTS3110	d [mm]	s [mm]
P		●	○	●									
M		●											
K			●	●	●	○	●	●	●	●	●		
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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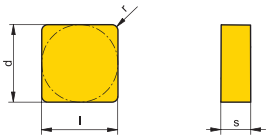
CERATIZIT hard material matters

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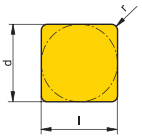
		S40T	CTC3110	CTCK120	TA100	TA120	CTN3105	CTS3105	CTN3110	CTM3110	CTS3110	d [mm]	l [mm]	s [mm]	r [mm]
P		●	○	●											
M		●													
K			●	●	●	○	●	●	●	●	●				
N															
S															
H					●	●		●			●				
-FN															
	SNMN 090308FN				●							9.52	9.52	3.18	0.80
	SNMN 090312FN	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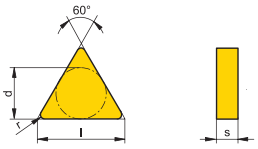
Simplex N

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



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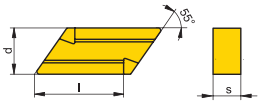
	H10T	S26T	S40T	CTC3110	CTCP125	CTC1135	CTD4110	CTD4125	CTS3105	CTN3110
P		●	●	O	●	●				
M			●		O	O				
K	●			●	●				●	●
N	●						●	●		
S						O				
H									●	

			H10T	S26T	S40T	CTC3110	CTCP125	CTC1135	CTD4110	CTD4125	CTS3105	CTN3110	d [mm]	l [mm]	s [mm]	r [mm]
-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



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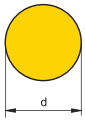
CERATIZIT hard material matters

Simplex P

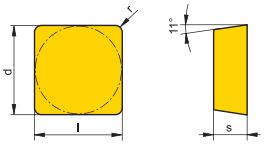
RC..

	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
	H10T	S26T	S40T	CTC3110	CTCP125	CTC1135	CTD4110	CTD4125	CTS3105	CTN3110	d	s



A16-A33 A58-A59 A248-A257

		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
		H10T	S26T	S40T	CTC3110	CTCP125	CTC1135	CTD4110	CTD4125	CTS3105	CTN3110	d	l	s	r

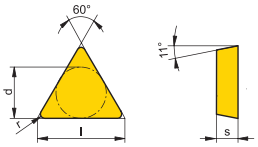


CERATIZIT hard material matters

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



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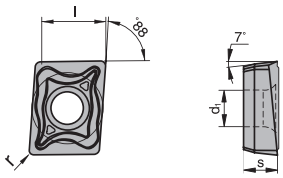
		H210T	H216T	CTC1425	CTC1435	CTP2440	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P			●	●	●						
M		O		O	O	●					
K		O	●	●	O						
N		●	●			O					
S		●				O					
H											
-27P	XCET 040102FL-27P		●				4.50	4.00	1.80	0.20	2.10
	XCET 040102FR-27P		●				4.50	4.00	1.80	0.20	2.10
	XCET 040104FL-27P		●				4.50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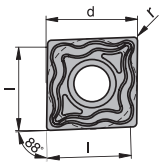
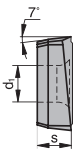
EcoCut

XC..

		H210T	H216T	CTC1425	CTC1435	CTP2440	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P				●	●	●					
M		○		○	○	●					
K		○	●	●	○						
N		●	●			○					
S		●				○					
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

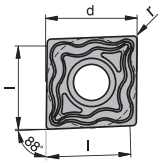




A16-A33 A58-A59 A258-A259 A218-A222 A223

	H210T	H216T	CTC1425	CTC1435	CTP2440
P			●	●	●
M	O		O	O	●
K	O	●	●	O	
N	●	●			O
S	●				O
H					

			d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
-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

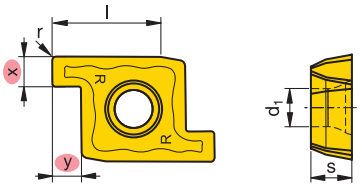


A16-A33 A58-A59 A258-A259 A218-A222 A223

ProfileMaster

PM..

			CTC1435	CTP2440	x [mm]	y [mm]	l [mm]	s [mm]	d_1 [mm]	[mm]
		P	●	●						
		M	O	●						
		K	O							
		N		O						
		S		O						
		H								
-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	



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

CERATIZIT

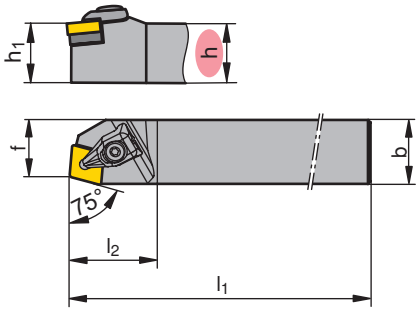
hard material matters

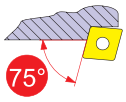
CERATIZIT

hard material matters

External machining	Innternal machining	EcoCut Mini	EcoCut	ProfileMaster
Maxilock D A116-A127	Maxilock D A188-A191	A217	A218	A224-A225
Maxilock N A128-A142	Maxilock N A192-A196		A219	
Maxilock S A143-A167	Maxilock S A197-A212		A220	
Maxilock P A168-A173	Maxilock P A213-A214		A221	
Simplex N A174-A183	Simplex N A215		A222	
Simplex P A184-A187	Simplex P A216		A223	

DCBN...





Picture shows right-hand version

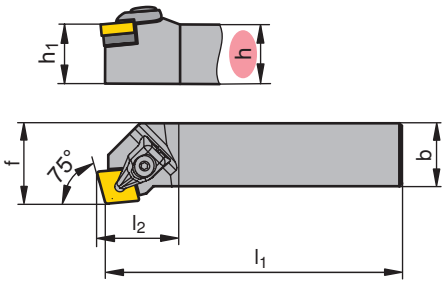
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	DCBNR 2525 M12	R	25	25	150	32	22	CN.. 1204..
	DCBNL 2525 M12	L	25	25	150	32	22	

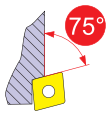
Ordering example: 1 piece DCBNR 2525 M12

	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

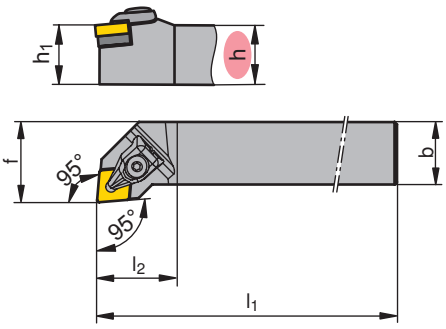
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	DCKNR 2525 M12	R	25	25	150	29.1	32	CN.. 1204..
	DCKNL 2525 M12	L	25	25	150	29.1	32	

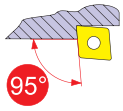
Ordering example: 1 piece DCKNR 2525 M12

	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

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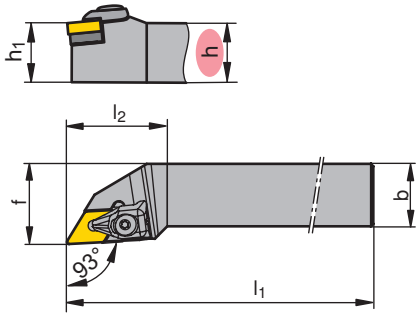
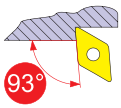
DDJN...



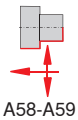


Picture shows right-hand version

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

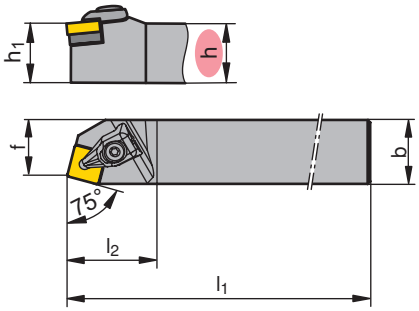

A58-A59

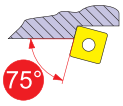
A76-A78

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..

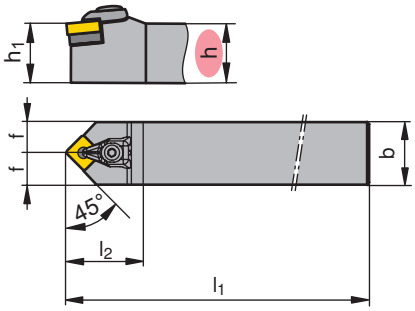
Ordering example: 1 piece DSBNR 2020 K12

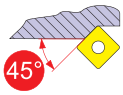
	h	1	2	3	4
SN.. 1204..	20 - 25	M4,5x12-15IP/10002887	U-SN12T3-D	S-15IP-T	SET-02-D
SN.. 1506..	25 - 32	M5x14-20IP/10003023	U-SN1504-D	S-20IP-T	SET-03-D
SN.. 1906..	32 - 40	M5x14-20IP/10003023	U-SN1905-D	S-20IP-T	SET-04-D
SN.. 2507..	40	M6x16-25IP/10003048	U-SN2506-D	S-25IP-T	SET-05-D

A58-A59 A79-A80 A87

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

DSDN...





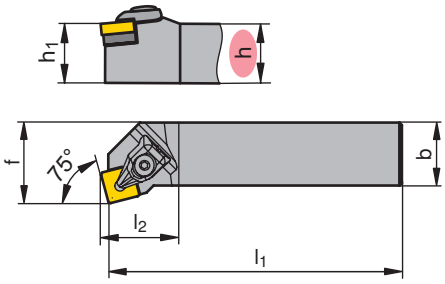
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
20	DSDNN 2020 K12	N	20	20	125	38	10	SN.. 1204..
25	DSDNN 2525 M12		25	25	150	38	12.5	

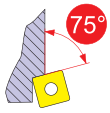
Ordering example: 1 piece DSDNN 2020 K12

	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

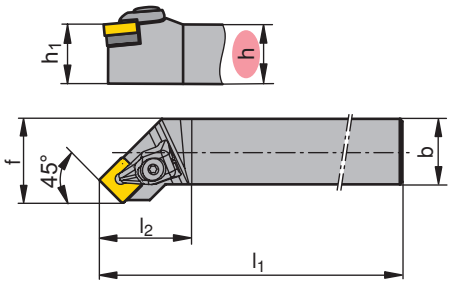
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	DSKNR 2525 M12	R	25	25	150	31.0	32	SN.. 1204..
	DSKNL 2525 M12	L	25	25	150	31.0	32	

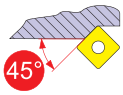
Ordering example: 1 piece DSKNR 2525 M12

	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

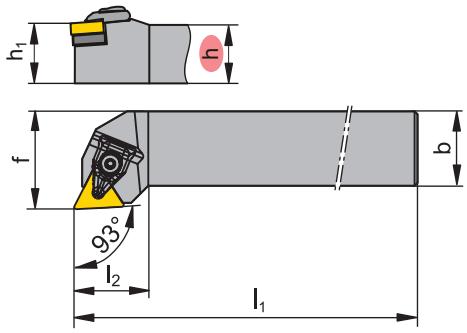
	h	1	2	3	4
SN.. 1204..	20 - 32	M4,5x12-15IP/10002887	U-SN12T3-D	S-15IP-T	SET-02-D

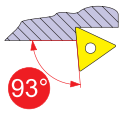
A58-A59 A79-A80 A87

External machining

MaxiLock D

DTJN...





Picture shows right-hand version

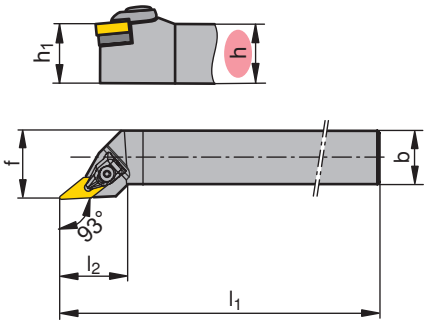
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
20	DTJNR 2020 K16	R	20	20	125	23	25	TN.. 1604..
25	DTJNR 2525 M16		25	25	150	24	32	
20	DTJNL 2020 K16	L	20	20	125	23	25	
25	DTJNL 2525 M16		25	25	150	24	32	

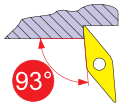
Ordering example: 1 piece DTJNR 2020 K16

	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

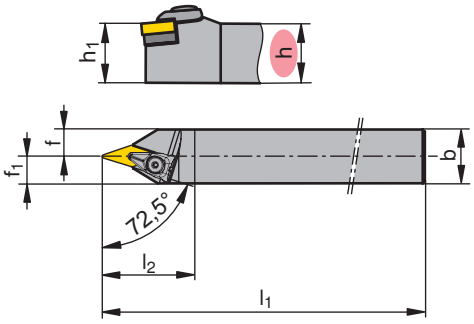
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
20	DVJNR 2020 K16	R	20	20	125	39	25	VN.. 1604..
25	DVJNR 2525 M16		25	25	150	39	32	
20	DVJNL 2020 K16	L	20	20	125	39	25	
25	DVJNL 2525 M16		25	25	150	39	32	

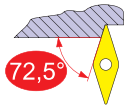
Ordering example: 1 piece DVJNR 2020 K16

	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...



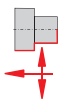


Picture shows right-hand version

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

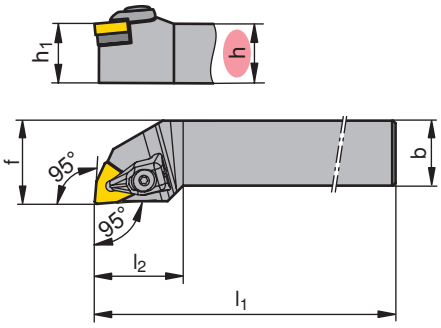
	h	1	2	3	4
VN.. 1604..	20 - 25	M3x7-09IP/10003007	U-VN1603-D	S-09IP-T	SET-01L-D

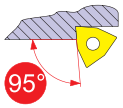


A58-A59

A83+A87

DWLN...





Picture shows right-hand version

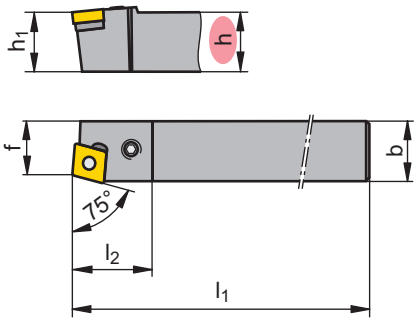
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	DWLNR 1616 H06	R	16	16	100	25	20	WN.. 0604..
20	DWLNR 2020 K06		20	20	125	27	25	WN.. 0604..
	DWLNR 2020 K08		20	20	125	34	25	WN.. 0804..
25	DWLNR 2525 M06		25	25	150	27	32	WN.. 0604..
	DWLNR 2525 M08		25	25	150	34	32	WN.. 0804..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

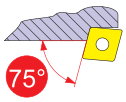
Ordering example: 1 piece DWLNR 1616 H06

	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

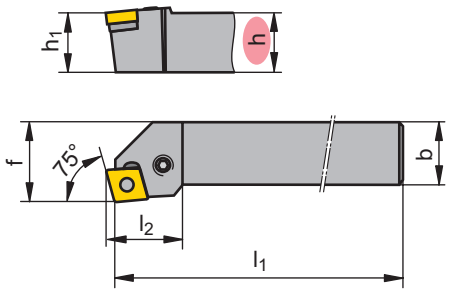
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	PCBNR 2525 M12-T	R	25	25	150	27.7	22	CN.. 1204..
25	PCBNR 2525 M16-T		25	25	150	31.8	22	CN.. 1606..
32	PCBNR 3232 P19-T		32	32	170	38.0	27	CN.. 1906..
25	PCBNL 2525 M12-T	L	25	25	150	27.7	22	CN.. 1204..
25	PCBNL 2525 M16-T		25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

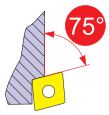
Ordering example: 1 piece PCBNR 2525 M12-T

	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

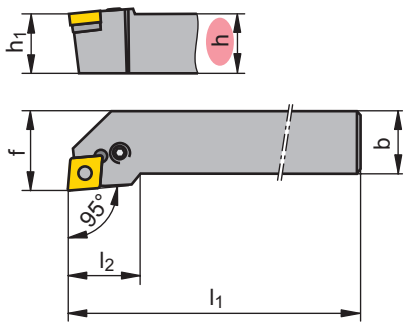
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	PCKNR 2525 M12-T	R	25	25	150	31.4	32	CN.. 1204..
	PCKNL 2525 M12-T	L	25	25	150	31.4	32	

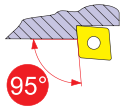
Ordering example: 1 piece PCKNR 2525 M12-T

	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

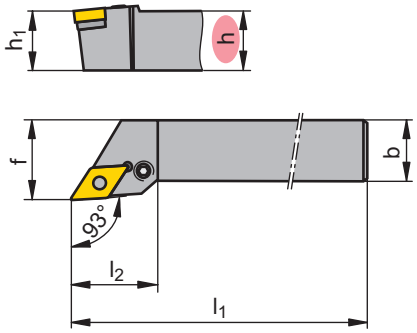
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	PCLNR 1616 H12-T	R	16	16	100	26.2	20	CN.. 1204..
20	PCLNR 2020 K12-T		20	20	125	27.4	25	CN.. 1204..
25	PCLNR 2525 M12-T		25	25	150	28	32	CN.. 1204..
	PCLNR 2525 M16-T		25	25	150	32.7	32	CN.. 1606..
32	PCLNR 3225 P12-T		32	25	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..

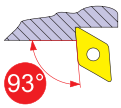
Ordering example: 1 piece PCLNR 1616 H12-T

	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

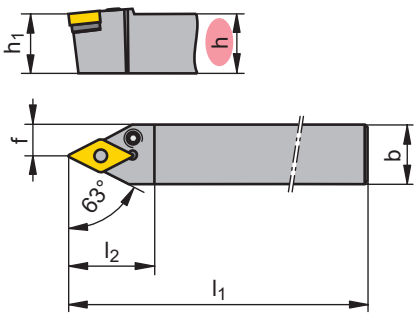
	h	1	2	3	4	5	6	Set 1-4
DN.. 1104..	16 - 25	7853521/HM-U	7853610/H	S 018420/S ISK 2,5MM	7853806/R	M 018470/MO	7882201/SW 2,5	7853426/SORT
DN.. 1506..	20 - 32	U 153150/HM-U	H 024447/H	S 000831/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853404/SORT

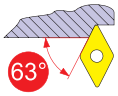
A58-A59 A76-A78 A86

External machining

MaxiLock N

PDNN...





Picture shows right-hand version

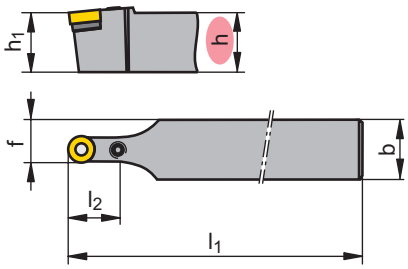
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	PDNNR 2525 M11	R	25	25	150	30	12.5	DN.. 1104..
	PDNNR 2525 M15-T		25	25	150	37.4	12.5	DN.. 1506..
	PDNNL 2525 M11	L	25	25	150	30	12.5	DN.. 1104..
	PDNNL 2525 M15-T		25	25	150	37.4	12.5	DN.. 1506..

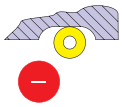
Ordering example: 1 piece PDNNR 2525 M11

	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...





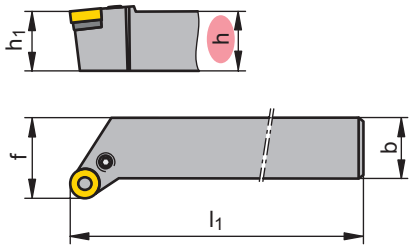
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	PRDCN 2525 M12-T		25	25	150	24	18.5	RC.. 1204..
32	PRDCN 3225 P12-T		32	25	170	24	18.5	RC.. 1204..
32	PRDCN 3225 P16-T	N	32	25	170	28	20.5	RC.. 1606..
32	PRDCN 3232 P20-T		32	32	170	32	26	RC.. 2006..
40	PRDCN 4040 S25-T		40	40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

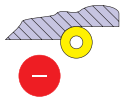
Ordering example: 1 piece PRDCN 2525 M12-T

	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

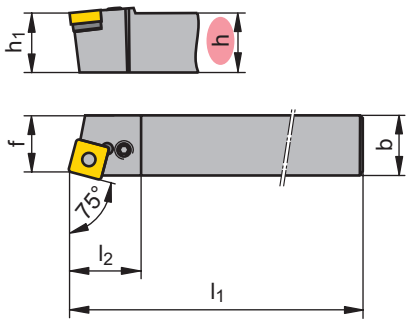
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	f [mm]	
25	PRGCR 2525 M12-T	R	25	25	150	32	RC.. 1204..
32	PRGCR 3225 P12-T		32	25	170	32	RC.. 1204..
	PRGCR 3225 P16-T		32	25	170	32	RC.. 1606..
	PRGCR 3232 P20-T		32	32	170	40	RC.. 2006..
40	PRGCR 4040 S25-T		40	40	250	50	RC.. 2507..
25	PRGCL 2525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

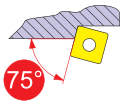
Ordering example: 1 piece PRGCR 2525 M12-T

	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..

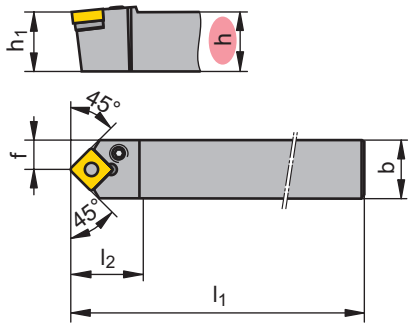
Ordering example: 1 piece PSBNR 2020 K12-T

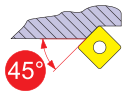
	h	1	2	3	4	5	6	Set 1-4
SN.. 1204..	20 - 32	U 063451/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853408/SORT
SN.. 1506..	25 - 32	U 000457/HM-U	H 000840/H	S 000831/S ISK 3MM	R 025464/R	M 022473/MO	7882202/SW 3	7853409/SORT
SN.. 1906..	32 - 40	U 083452/HM-U	H 033442/H	S 033422/S 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	N	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		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..

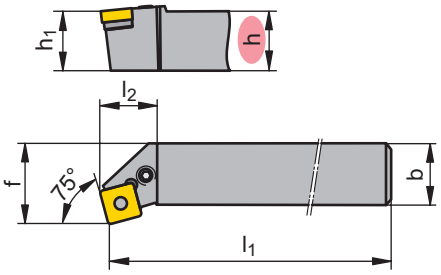
Ordering example: 1 piece PSDNN 1616 H09-T

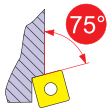
	h	1	2	3	4	5	6	Set 1-4
SN.. 0903..	16	U 053450/HM-U	H 018440/H	S 018420/S ISK 2,5MM	R 018463/R	M 018470/MO	7882201/SW 2,5	7853421/SORT
SN.. 1204..	20 - 25	U 063451/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853408/SORT
SN.. 1906..	32	U 083452/HM-U	H 033442/H	S 033422/S ISK 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..

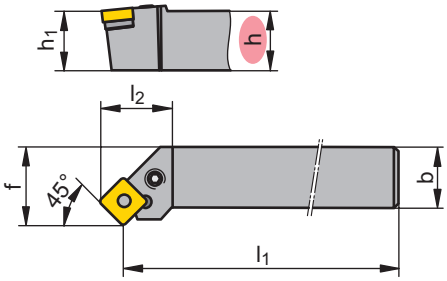
Ordering example: 1 piece PSKNR 1616 H09-T

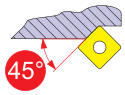
	h	1	2	3	4	5	6	Set 1-4
SN.. 0903..	16	U 053450/HM-U	H 018440/H	S 018420/S ISK 2,5MM	R 018463/R	M 018470/MO	7882201/SW 2,5	7853421/SORT
SN.. 1204..	20 - 32	U 063451/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853408/SORT
SN.. 1906..	40	U 083452/HM-U	H 033442/H	S 033422/S ISK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

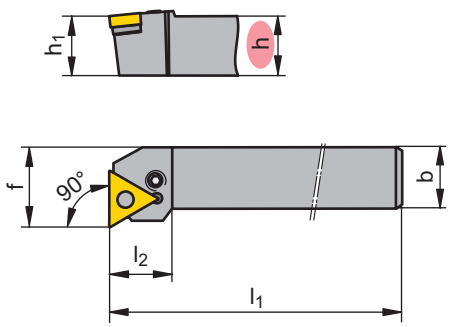
Ordering example: 1 piece PSSNR 1616 H09-T

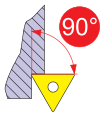
	h	1	2	3	4	5	6	Set 1-4
SN.. 0903..	16	U 053450/HM-U	H 018440/H	S 018420/S ISK 2,5MM	R 018463/R	M 018470/MO	7882201/SW 2,5	7853421/SORT
SN.. 1204..	20 - 32	U 063451/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW 3	7853408/SORT
SN.. 1506..	25 - 32	U 000457/HM-U	H 000840/H	S 000831/S 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

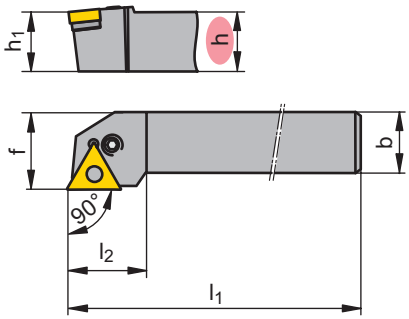
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	PTFNR 1616 H16-T	R	16	16	100	20.2	20	TN.. 1604..
20	PTFNR 2020 K16-T		20	20	125	20.5	25	TN.. 1604..
25	PTFNR 2525 M16-T		25	25	150	25	32	TN.. 1604..
	PTFNR 2525 M22-T		25	25	150	25.2	32	TN.. 2204..
32	PTFNR 3225 P22-T		32	25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

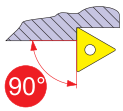
Ordering example: 1 piece PTFNR 1616 H16-T

	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

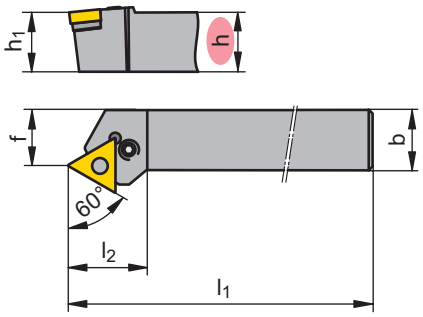
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	PTGNR 1616 H16-T	R	16	16	100	20	20	TN.. 1604..
20	PTGNR 2020 K16-T		20	20	125	20	25	TN.. 1604..
25	PTGNR 2525 M16-T		25	25	150	22.2	32	TN.. 1604..
	PTGNR 2525 M22-T		25	25	150	29	32	TN.. 2204..
32	PTGNR 3225 P16-T		32	25	170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

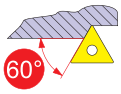
Ordering example: 1 piece PTGNR 1616 H16-T

	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

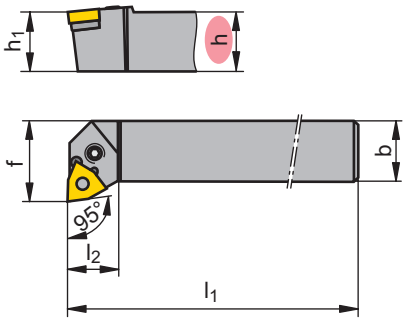
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
20	PTTNR 2020 K16-T	R	20	20	125	25.9	17	TN.. 1604..
25	PTTNR 2525 M22-T		25	25	150	32.7	22	TN.. 2204..
20	PTTNL 2020 K16-T	L	20	20	125	25.9	17	TN.. 1604..
25	PTTNL 2525 M22-T		25	25	150	32.7	22	TN.. 2204..

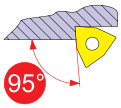
Ordering example: 1 piece PTTNR 2020 K16-T

	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

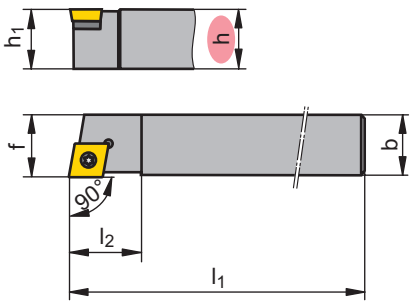
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	PWLNR 1616 H06	R	16	16	100	20	20	WN.. 0604..
20	PWLNR 2020 K06		20	20	125	25	25	WN.. 0604..
	PWLNR 2020 K08		20	20	125	22	25	WN.. 0804..
25	PWLNR 2525 M06		25	25	150	25	32	WN.. 0604..
	PWLNR 2525 M08		25	25	150	22	32	WN.. 0804..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

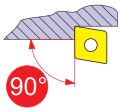
Ordering example: 1 piece PWLNR 1616 H06

	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

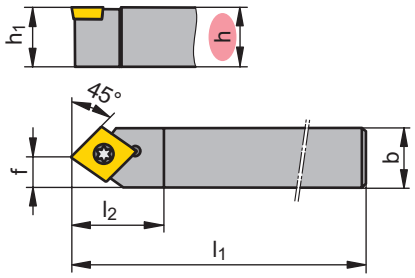
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
8	SCACR 0808 D06	R	8	8	60	9	8	CC.. 0602..
	SCACR 0808 K06		8	8	125	9	8	CC.. 0602..
10	SCACR 1010 E06		10	10	70	9	10	CC.. 0602..
	SCACR 1010 M06		10	10	150	9	10	CC.. 0602..
12	SCACR 1212 F09		12	12	80	13	12	CC.. 09T3..
	SCACR 1212 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..

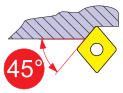
Ordering example: 1 piece SCACR 0808 D06

	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

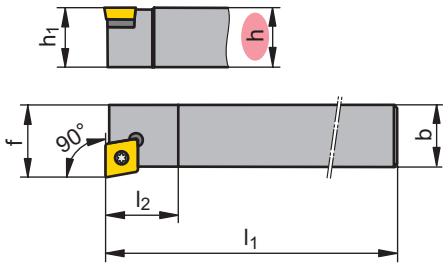
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
8	SCDCL 0808 K06	L	8	8	125	13	4	CC.. 0602..
10	SCDCL 1010 M06		10	10	150	13	5	
12	SCDCL 1212 M09		12	12	150	18	6	CC.. 09T3..
14	SCDCL 1414 M09		14	14	150	18	7	

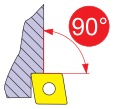
Ordering example: 1 piece SCDCL 0808 K06

	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

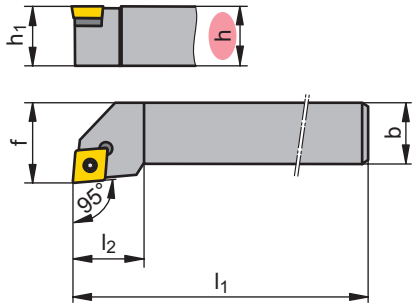
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
8	SCFCR 0808 D06	R	8	8	60	10	10	CC.. 0602..
10	SCFCR 1010 E06		10	10	70	10	12	CC.. 0602..
12	SCFCR 1212 F09		12	12	80	13	16	CC.. 09T3..
16	SCFCR 1616 H09		16	16	100	13	20	CC.. 09T3..
20	SCFCR 2020 K12		20	20	125	17	25	CC.. 1204..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

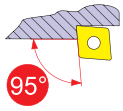
Ordering example: 1 piece SCFCR 0808 D06

	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

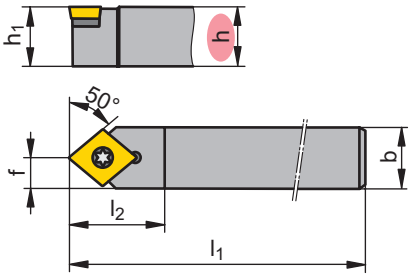
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
8	SCLCR 0808 D06	R	8	8	60	9	10	CC.. 0602..
10	SCLCR 1010 E06		10	10	70	9	12	CC.. 0602..
12	SCLCR 1212 F09		12	12	80	15	16	CC.. 09T3..
16	SCLCR 1616 H09		16	16	100	17	20	CC.. 09T3..
	SCLCR 1616 H12		16	16	100	20	20	CC.. 1204..
20	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..

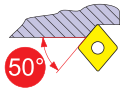
Ordering example: 1 piece SCLCR 0808 D06

	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...

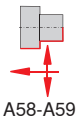




h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
16	SCMCN 1616 H12	N	16	16	100	25	8	CC.. 1204..
20	SCMCN 2020 K12		20	20	125	25	10	
25	SCMCN 2525 M12		25	25	150	25	12.5	
32	SCMCN 3225 P12		32	25	170	25	12.5	

Ordering example: 1 piece SCMCN 1616 H12

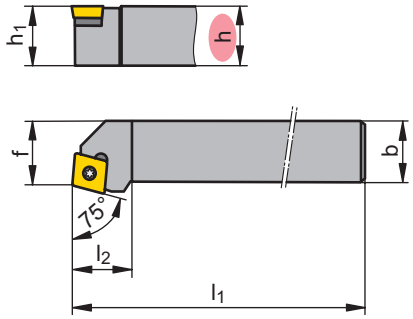
	h	1	2	3	4	Set 1-4
CC.. 1204..	16 - 32	7883202/M4,5X12/T15	7883301/KOMBI T15	7883002/HM-U	7883101/B M 4,5	7883901/SORT

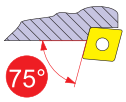

A58-A59

A88

A97

SCRC...





Picture shows right-hand version

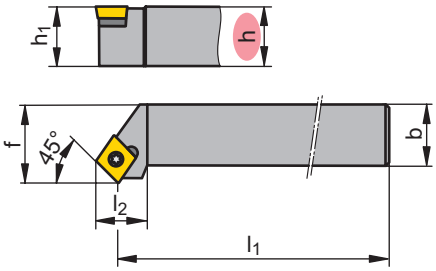
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
10	SCRCR 1010 E06	R	10	10	70	10	11	CC.. 0602..
12	SCRCR 1212 F09		12	12	80	16	13	CC.. 09T3..
16	SCRCR 1616 H09		16	16	100	17	17	CC.. 09T3..
	SCRCR 1616 H12		16	16	100	20	17	CC.. 1204..
20	SCRCR 2020 K09		20	20	125	17	22	CC.. 09T3..
	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..

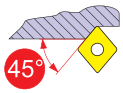
Ordering example: 1 piece SCRCR 1010 E06

	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

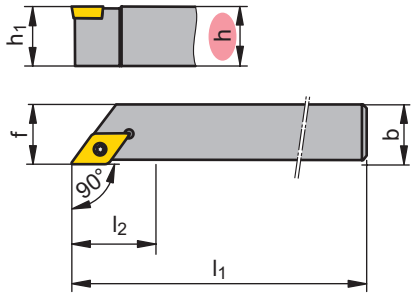
	h	1	2	3	4	Set 1-4
CC.. 1204..	16 - 25	7883202/M4,5X12/T15	7883301/KOMBI T15	7883002/HM-U	7883101/B M 4,5	7883901/SORT

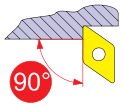
A58-A59 A88 A97

External machining

MaxiLock S

SDAC...





Picture shows right-hand version

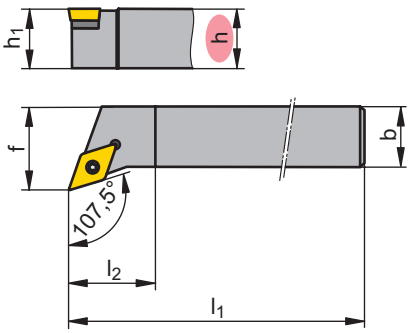
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
8	SDACR 0808 K07	R	8	8	125	14	8	DC.. 0702..
10	SDACR 1010 M07		10	10	150	14	10	DC.. 0702..
12	SDACR 1212 M07		12	12	150	14	12	DC.. 0702..
	SDACR 1212 M11		12	12	150	21	12	DC.. 11T3..
14	SDACR 1414 M11		14	14	150	21	14	DC.. 11T3..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

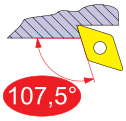
Ordering example: 1 piece SDACR 0808 K07

	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

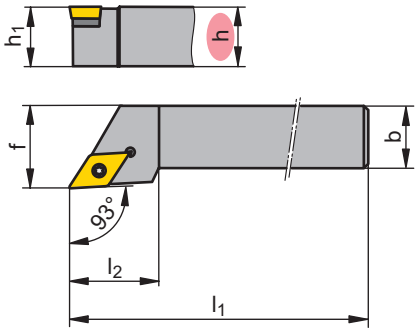
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
10	SDHCR 1010 E07	R	10	10	70	7.6	12	DC.. 0702..
12	SDHCR 1212 F07		12	12	80	12.2	16	DC.. 0702..
16	SDHCR 1616 H11		16	16	100	11.6	20	DC.. 11T3..
20	SDHCR 2020 K11		20	20	125	14.1	25	DC.. 11T3..
25	SDHCR 2525 M11		25	25	150	20.5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

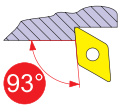
Ordering example: 1 piece SDHCR 1010 E07

	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

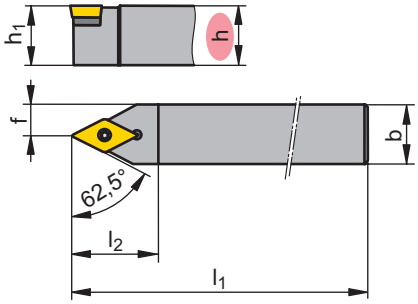
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
8	SDJCR 0808 D07	R	8	8	60	13	10	DC.. 0702..
10	SDJCR 1010 E07		10	10	70	13	12	DC.. 0702..
12	SDJCR 1212 F07		12	12	80	14.3	16	DC.. 0702..
16	SDJCR 1616 H11		16	16	100	19.3	20	DC.. 11T3..
20	SDJCR 2020 K11		20	20	125	19.9	25	DC..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

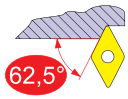
Ordering example: 1 piece SDJCR 0808 D07

	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 A97 A90-A91

SDNC...





h [mm]	Type, description	LNR	h_1 [mm]	b [mm]	l_1 [mm]	f [mm]	
8	SDNCN 0808 D07	N	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		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

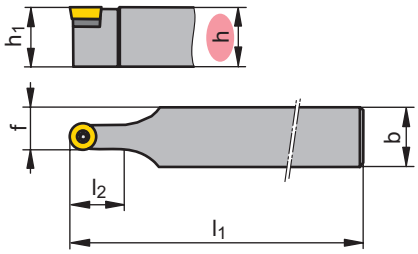
	h	1	2	2	3	4	Set 1-4
DC.. 0702..	8 - 12	7815101/M2,5X6,0/T08	7724106/TORX T08				7815902/SORT
DC.. 11T3..	12 - 14	7815102/M3,5X11,0/T15	7724103/TORX T15				7883906/SORT
DC.. 11T3..	16 - 25	7815102/M3,5X11,0/T15		7883301/KOMBI T15	7815000/HM-U	7883102/B M 3,5	7815900/SORT

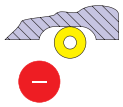
A58-A59 A97 A90-A91

External machining

MaxiLock S

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	N	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		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

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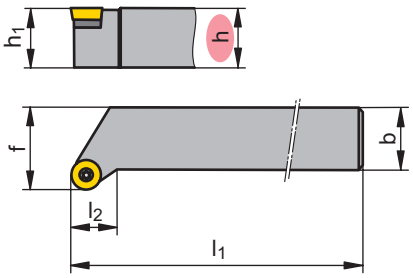
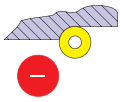
SRGC...



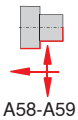


Picture shows right-hand version

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

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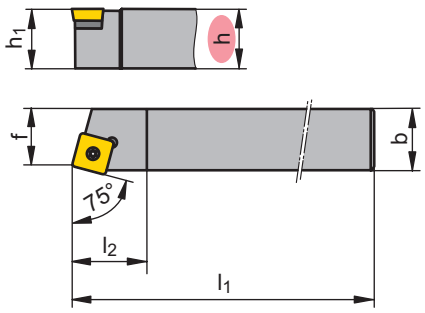
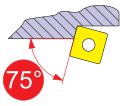
SSBC...





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

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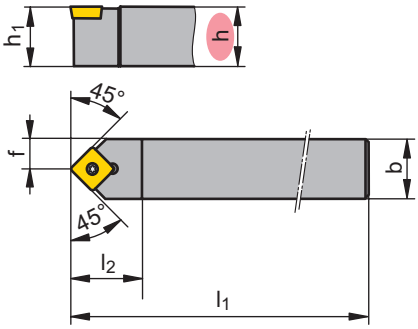
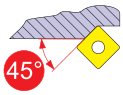
SSDC...





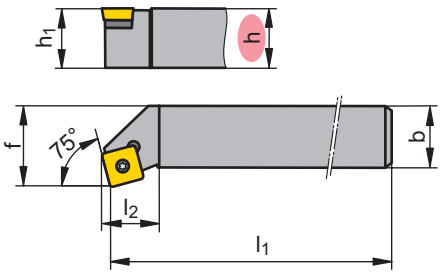
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
12	SSDCN 1212 F09	N	12	12	80	16	6	SC.. 09T3..
16	SSDCN 1616 H09		16	16	100	20	8	SC.. 09T3..
	SSDCN 1616 H12		16	16	100	25	8	SC.. 1204..
20	SSDCN 2020 K09		20	20	125	20	10	SC.. 09T3..
	SSDCN 2020 K12		20	20	125	25	10	SC.. 1204..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

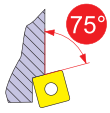
Ordering example: 1 piece SSDCN 1212 F09

	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

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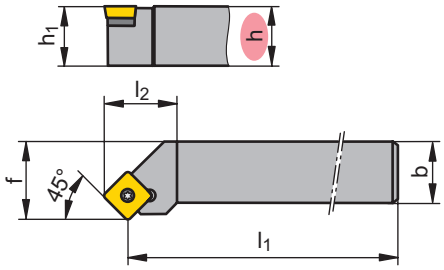
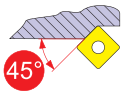
SSSC...





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

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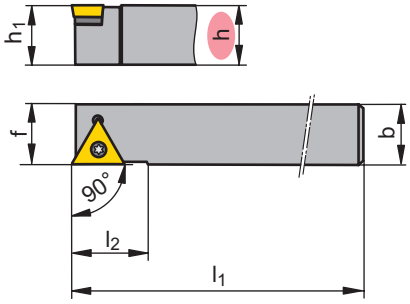
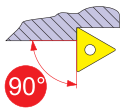
STAC...





Picture shows right-hand version

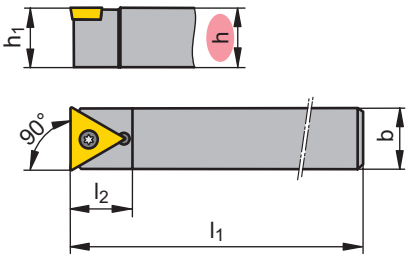
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
10	STACR 1010 K09	R	10	10	125	12	10	TC.. 0902..
12	STACR 1212 K11		12	12	125	15	12	TC.. 1102..
14	STACR 1414 K11		14	14	125	15	14	TC.. 1102..
10	STACL 1010 K09	L	10	10	125	12	10	TC.. 0902..
12	STACL 1212 K11		12	12	125	15	12	TC..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

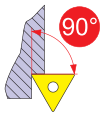
Ordering example: 1 piece STACR 1010 K09

	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
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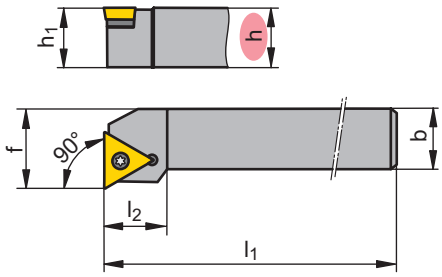
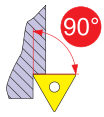
STFC...





Picture shows right-hand version

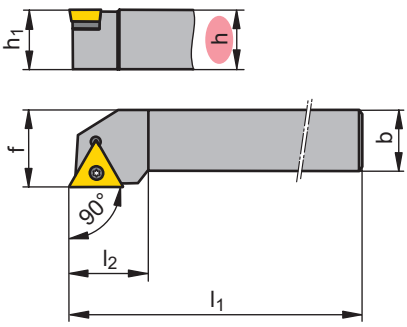
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
12	STFCR 1212 F11	R	12	12	80	15	16	TC.. 1102..
16	STFCR 1616 H16		16	16	100	20	20	TC.. 16T3..
20	STFCR 2020 K16		20	20	125	20	25	TC.. 16T3..
25	STFCR 2525 M16		25	25	150	20	32	TC.. 16T3..
12	STFCL 1212 F11	L	12	12	80	15	16	TC..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

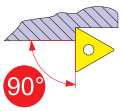
Ordering example: 1 piece STFCR 1212 F11

	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

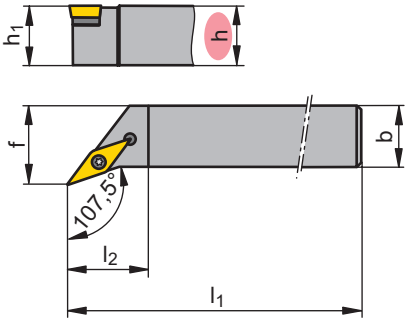
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
10	STGCR 1010 E09	R	10	10	70	12	12	TC.. 0902..
12	STGCR 1212 F11		12	12	80	15	16	TC.. 1102..
16	STGCR 1616 H16		16	16	100	22	20	TC.. 16T3..
20	STGCR 2020 K16		20	20	125	22	25	TC.. 16T3..
25	STGCR 2525 M16		25	25	150	22	32	TC.. 16T3..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

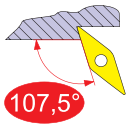
Ordering example: 1 piece STGCR 1010 E09

	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..

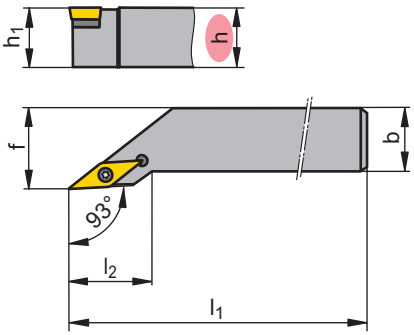
Ordering example: 1 piece SVHCR 1212 F11

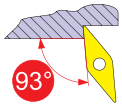
	h	1	2	2	3	4	Set 1-4
VC.. 1103..	12 - 25	7815101/M2,5X6,0/T08	7724106/TORX T08				7815902/SORT
VC.. 1604..	20 - 32	7815102/M3,5X11,0/T15		7883301/KOMBI T15	7815002/HM-U	7883102/B M 3,5	7815901/SORT
VC.. 2205..	25 - 32	7883202/M4,5X12/T15		7883301/KOMBI T15	7815004/HM-U	7883101/B M 4,5	7883911/SORT

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..

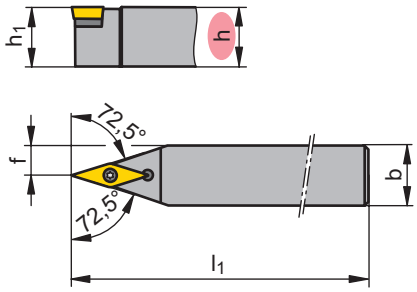
Ordering example: 1 piece SVJCR 1212 F11

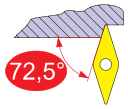
	h	1	2	2	3	4	Set 1-4
VC.. 1103..	12 - 25	7815101/M2,5X6,0/T08	7724106/TORX T08				7815902/SORT
VC.. 1604..	20 - 32	7815102/M3,5X11,0/T15		7883301/KOMBI T15	7815002/HM-U	7883102/B M 3,5	7815901/SORT

A58-A59 A95-A96 A97

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

SVVC...

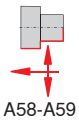




h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	f [mm]	
12	SVVCN 1212 F11	N	12	12	80	6	VC.. 1103..
16	SVVCN 1616 H11		16	16	100	8	VC.. 1103..
20	SVVCN 2020 K11		20	20	125	10	VC.. 1103..
	SVVCN 2020 K16		20	20	125	10	VC.. 1604..
25	SVVCN 2525 M11		25	25	150	12.5	VC.. 1103..
	SVVCN 2525 M16		25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

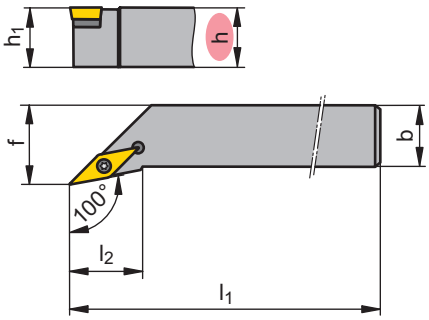

A58-A59

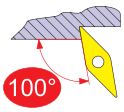
A95-A96

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..

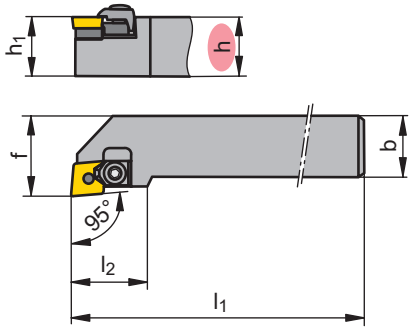
Ordering example: 1 piece SVZCR 2525 M16

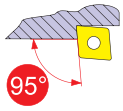
	h	1	2	3	4	Set 1-4
VC.. 1604..	25	7815102/M3,5X11,0/T15	7883301/KOMBI T15	7815002/HM-U	7883102/B M 3,5	7815901/SORT
VP.. 2205..	25	7883202/M4,5X12/T15	7883301/KOMBI T15	7815005/HM-U	7883101/B M 4,5	7883912/SORT

A58-A59 A95-A96 A97

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

MCLC...





Picture shows right-hand version

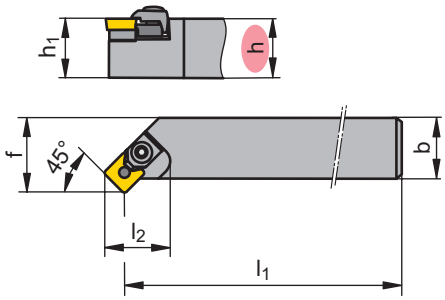
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
20	MCLCR 2020 K12	R	20	20	125	35	25	CC.. 1204..
25	MCLCR 2525 M12		25	25	150	35	32	
20	MCLCL 2020 K12	L	20	20	125	35	25	
25	MCLCL 2525 M12		25	25	150	35	32	

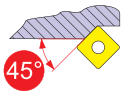
Ordering example: 1 piece MCLCR 2020 K12

	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

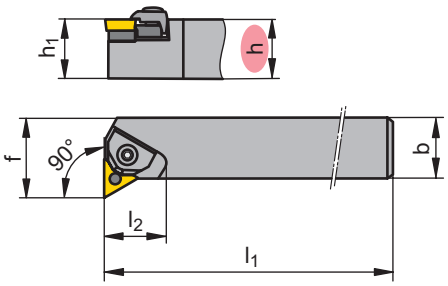
	h	1	2	3	4	5	Set 1-4
SC.. 1204..	20 - 32	7880003/HM-U	7880402/PS	7880603/KE	7880103/K	7724104/TORX T20	7880903/SORT

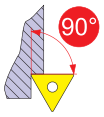
A58-A59
A98

External machining

MaxiLock P

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	

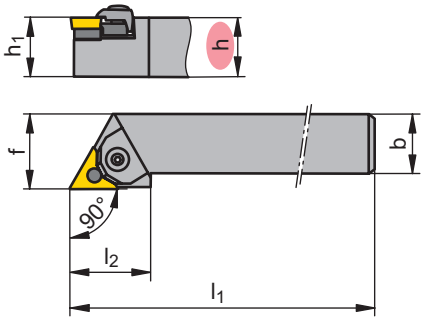
Ordering example: 1 piece MTFCR 2020 K16

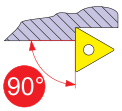
	h	1	2	3	4	5	Set 1-4
TC.. 1604..	20 - 25	7880001/HM-U	7880401/PS	7880601/KE	7880101/K	7724104/TORX T20	7880901/SORT

A58-A59

A98

MTGC...





Picture shows right-hand version

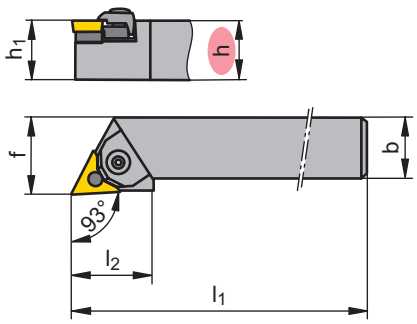
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
20	MTGCR 2020 K16	R	20	20	125	32	25	TC.. 1604..
25	MTGCR 2525 M16		25	25	150	32	32	TC.. 1604..
	MTGCR 2525 M22		25	25	150	35	32	TC.. 2204..
20	MTGCL 2020 K16	L	20	20	125	32	25	TC.. 1604..
25	MTGCL 2525 M16		25	25	150	32	32	TC..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

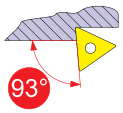
Ordering example: 1 piece MTGCR 2020 K16

	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..

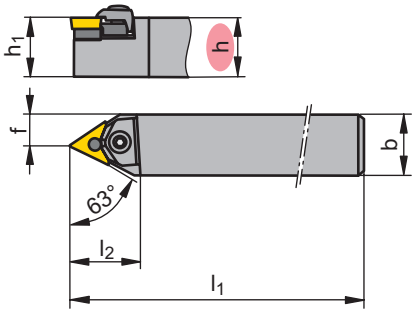
Ordering example: 1 piece MTJCR 2020 K16

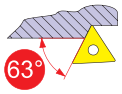
	h	1	2	3	4	5	Set 1-4
TC.. 1604..	20 - 32	7880001/HM-U	7880401/PS	7880601/KE	7880101/K	7724104/TORX T20	7880901/SORT
TC.. 2204..	25	7880002/HM-U	7880402/PS	7880602/KE	7880102/K	7724104/TORX T20	7880902/SORT

A58-A59

A98

MTNC...





Picture shows right-hand version

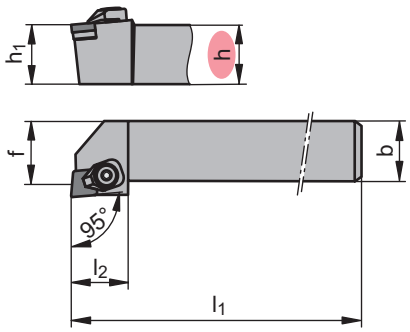
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
20	MTNCR 2020 K16	R	20	20	125	26	10	TC.. 1604..
25	MTNCR 2525 M16		25	25	150	26	12.5	
25	MTNCL 2525 M16	L	25	25	150	26	12.5	

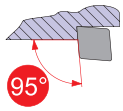
Ordering example: 1 piece MTNCR 2020 K16

	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

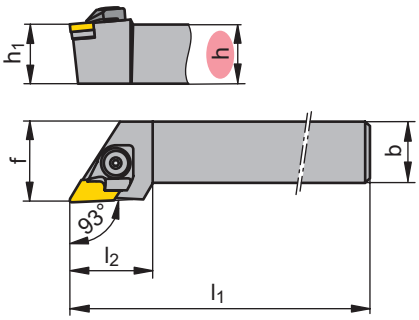
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	CCLNR 2525 M09	R	25	25	150	26	32	CN.. 0903..

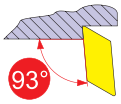
Ordering example: 1 piece CCLNR 2525 M09

	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

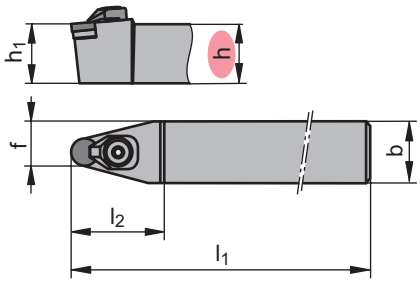
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
25	CKJNR 2525 M16	R	25	25	150	35	32	KN.. 1604R..
	CKJNL 2525 M16	L	25	25	150	35	32	KN.. 1604L..

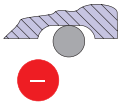
Ordering example: 1 piece CKJNR 2525 M16

	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..

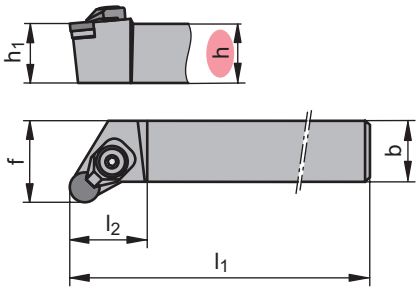
Ordering example: 1 piece CRDNN 2525 M09

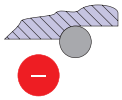
	h	1	2	3	4	5	Set 1-4
RN.. 0903..	25 - 32	7485865/SP	7817008/HM-U	7480902/KN 2,6x10	7485860/M6,0X16,2/T20	7724104/TORX T20	7817911/SORT
RN.. 1203..	25 - 40	7485865/SP	7817009/HM-U	7480901/KN 3x10	7485860/M6,0X16,2/T20	7724104/TORX T20	7817912/SORT

A58-A59

A101

CRGN...



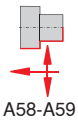


Picture shows right-hand version

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



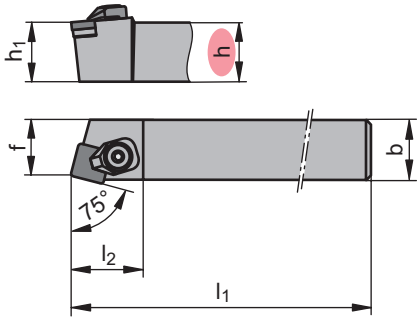
A58-A59

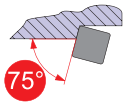
A101

External machining

Simplex N

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..

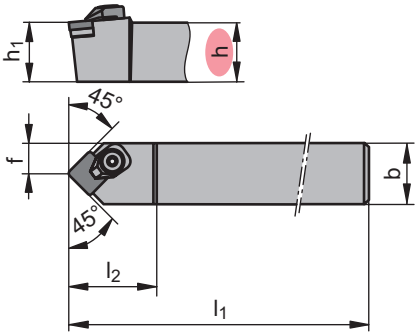
Ordering example: 1 piece CSBNR 2525 M12

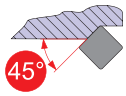
	h	1	2	3	4	5	6	Set 1-5
SN.. 1204..	25	7485869/SP	7480312/HM-U	7480901/KN 3x10	7480210/M8X20	7480910/FS	7480412/SW 4	7485901/SORT

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..

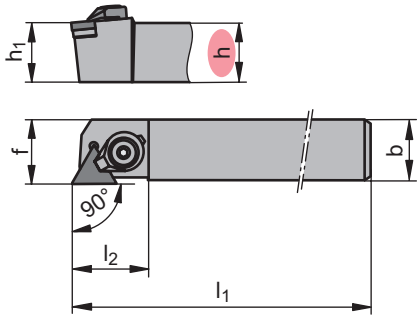
Ordering example: 1 piece CSDNN 2525 M09

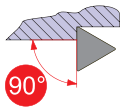
	h	1	2	3	4	
SN.. 0903..	25	7485865/SP	7485940/HM-U	7480902/KN 2,6x10	7485860/M6,0X16,2/T20	
SN.. 1204..	25	7485869/SP	7480312/HM-U	7480901/KN 3x10		
SN.. 1203..	32	7485865/SP	7480312/HM-U	7480901/KN 3x10	7485860/M6,0X16,2/T20	

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	

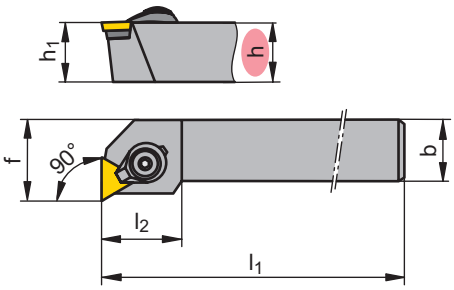
Ordering example: 1 piece CTANR 2020 K16

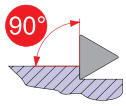
	h	1	2	3	4	5	6	Set 1-5
TN.. 1604..	20 - 25	7485869/SP	7480313/HM-U	7480901/KN 3x10	7480210/M8X20	7480910/FS	7480412/SW 4	7485906/SORT

A58-A59

A104

CTFN...



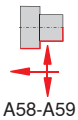


Picture shows right-hand version

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..

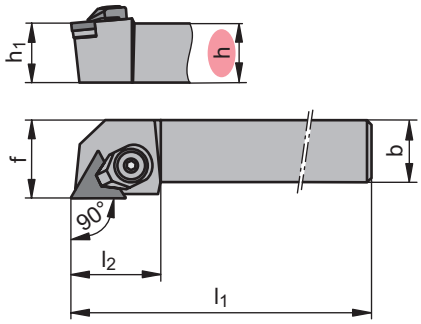
Ordering example: 1 piece CTFNR 1212 F11

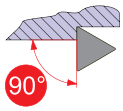
	h	1	2	3	
TN.. 1103..	12	7830001/SP	7830002/M4,0X10/T15	7724103/TORX T15	


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	

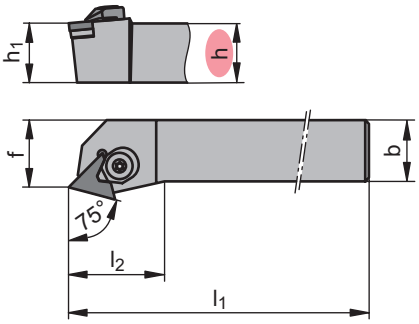
Ordering example: 1 piece CTGNR 1212 F11

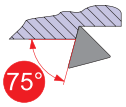
	h	1	2	3	4	5	Set 1-5
TN.. 1103..	12	7830001/SP			7830002/M4,0X10/T15	7724103/TORX T15	
TN.. 1103..	25	7485865/SP	7485941/HM-U	7480902/KN 2,6x10	7485860/M6,0X16,2/T20	7724104/TORX T20	7485907/SORT

A58-A59

A104

CTRN...





Picture shows right-hand version

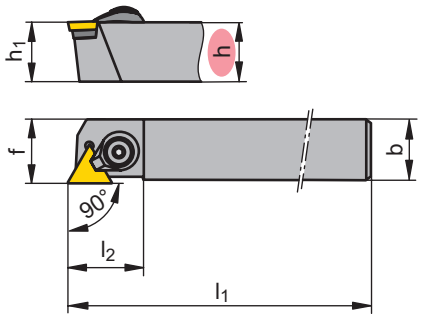
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
12	CTRNR 1212 F11	R	12	12	80	17.5	13	TN.. 1103..

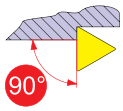
Ordering example: 1 piece CTRNR 1212 F11

	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	

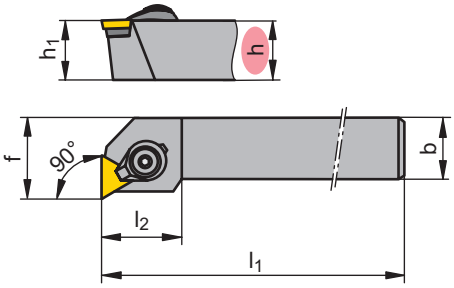
Ordering example: 1 piece CTAPR 2020 K16

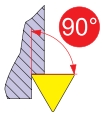
	h	1	2	3	4	5	6	Set 1-5
TP.. 1603..	20 - 25	7485869/SP	7480316/HM-U	7480901/KN 3x10	7480210/M8X20	7480910/FS	7480412/SW 4	7485911/SORT

A58-A59

A108

CTFP...





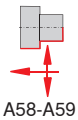
Picture shows right-hand version

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	

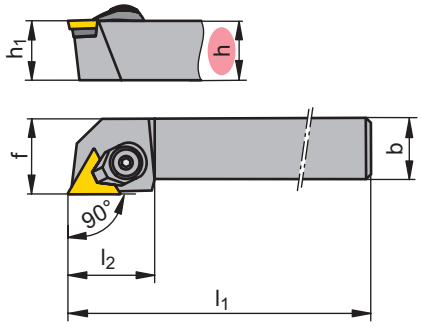
5	6	7	8	Set 1-5
		7724103/TORX T15	7830002/M4,0X10/T15	
7480910/FS	7480412/SW 4			7485911/SORT

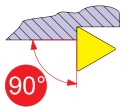


A58-A59

A108

CTGP...





Picture shows right-hand version

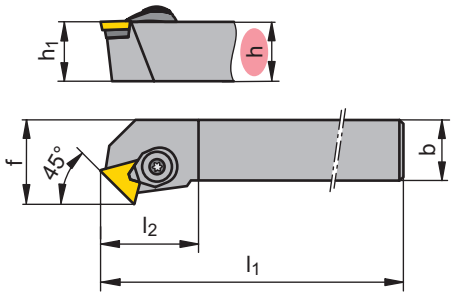
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
10	CTGPR 1010 E11	R	10	10	70	16.5	12	TP.. 1103..
12	CTGPR 1212 F11	R	12	12	80	16.5	16	
	CTGPL 1212 F11	L	12	12	80	16.5	16	

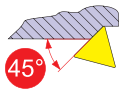
Ordering example: 1 piece CTGPR 1010 E11

	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

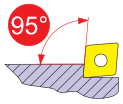
h [mm]	Type, description	L N R	h_1 [mm]	b [mm]	l_1 [mm]	l_2 [mm]	f [mm]	
12	CTSPR 1212 F11	R	12	12	80	16	16	TP.. 1103..

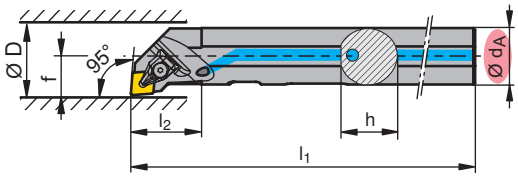
Ordering example: 1 piece CTSPR 1212 F11

	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

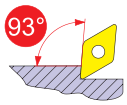
d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
20	A20Q DCLNR 09	R	19	180	35	13	25	CN.. 0903..
25	A25R DCLNR 12		24	200	36	17	32	CN.. 1204..
32	A32S DCLNR 12		31	250	40	22	40	CN.. 1204..
40	A40T DCLNR 12		39	300	45	27	50	CN.. 1204..
20	A20Q DCLNL 09	L	19	180	35	13	25	CN..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

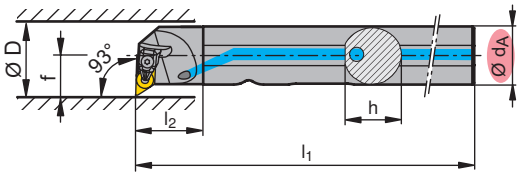
Ordering example: 1 piece A20Q DCLNR 09

	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...



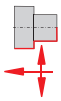


Picture shows right-hand version

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

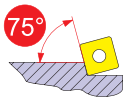

A58-A59

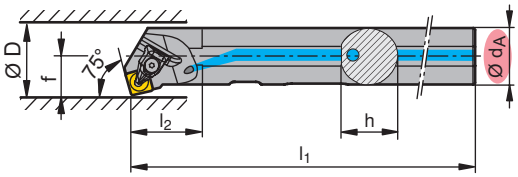
A76-A78

A86

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

DSKN...





Picture shows right-hand version

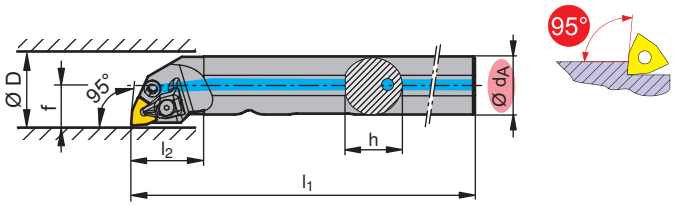
d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
32	A32S DSKNR 12	R	31	250	44.2	22	40	SN.. 1204..
	A32S DSKNL 12	L	31	250	44.2	22	40	

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..

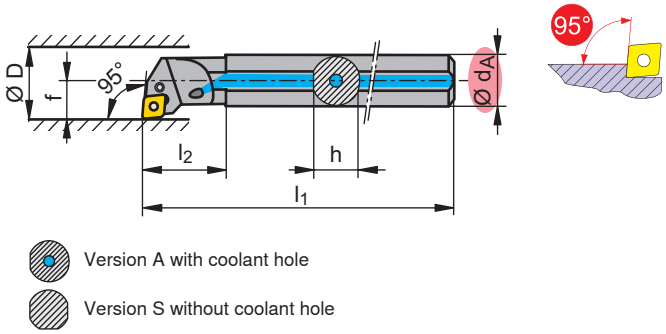
Ordering example: 1 piece A25R DWLNR 06

		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...



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..

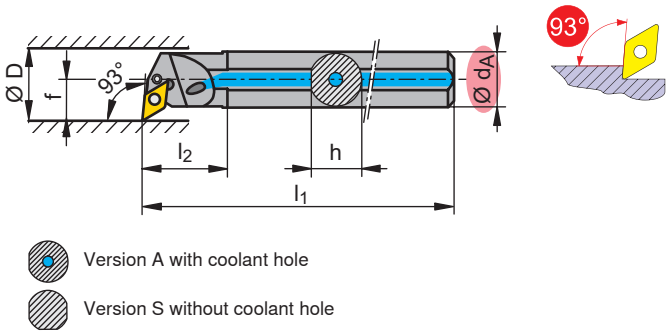
Ordering example: 1 piece A25R PCLNR 12

		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...



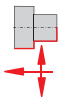
Picture shows right-hand version

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

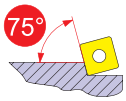
		Version S						
	d_A	1	2	3	4	5	6	Set 1-4
DN.. 1506..	50	7853404/SORT	H 024447/H	R 023461/R	S 000831/S ISK 3MM	U 153150/HM-U	7882202/SW 3	M 018471/MO

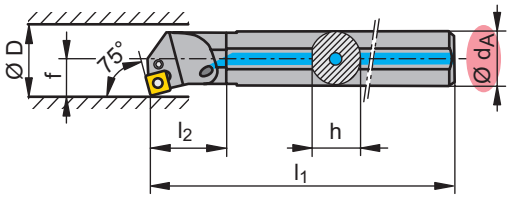

A58-A59

A76-A78

A86

PSKN...





Picture shows right-hand version

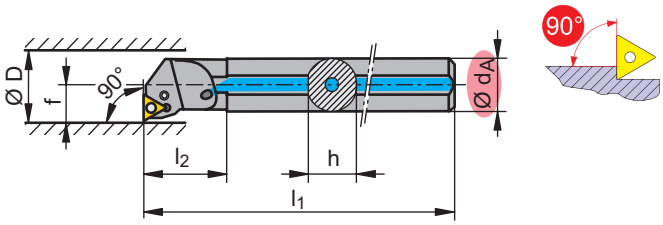
d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
25	A25R PSKNR 12	R	23	200	36	17	32	SN.. 1204..
32	A32S PSKNR 12		30	250	50	22	40	
40	A40T PSKNR 12		38	300	60	27	50	
25	A25R PSKNL 12	L	23	200	36	17	32	
32	A32S PSKNL 12		30	250	50	22	40	
40	A40T PSKNL 12		38	300	60	27	50	

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..

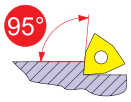
Ordering example: 1 piece A16M PTFNR 11

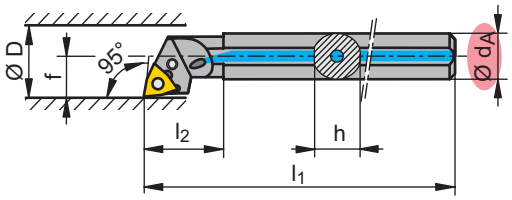
		Version A						
	d_A	1	2	3	4	5	6	Set 1-4
TN.. 1103..	16 - 20		H 011446/H	S 011429/S ISK 2MM			7882301/SW 2	7853412/SORT
TN.. 1604..	25 - 32	U 013950/HM-U	H 018440/H	S 018420/S ISK 2,5MM	R 018463/R	M 018470/MO	7882201/SW 2,5	7853413/SORT
TN.. 2204..	40	U 021953/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R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

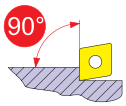
Ordering example: 1 piece A16M PWLNR 06

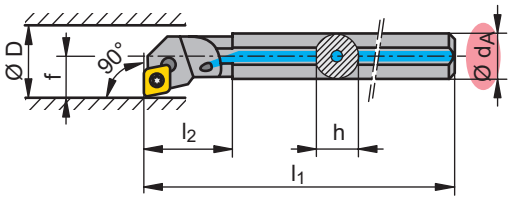
	d_A	1	2	3	4	5	6	Set 1-4
WN.. 0604..	16 - 20		7853608/H	7853712/S			7882301/SW 2	7853425/SORT
WN.. 0604..	25 - 32	7853520/HM-U	H 018440/H	S 018420/S ISK 2,5MM	7853806/R	M 018470/MO	7882201/SW 2,5	7853423/SORT
WN.. 0804..	32 - 40	7853519/HM-U	H 023441/H	S 023421/S ISK 3MM	R 023461/R	M 018471/MO	7882202/SW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

A58-A59

A84-A85

SCFC...





Picture shows right-hand version

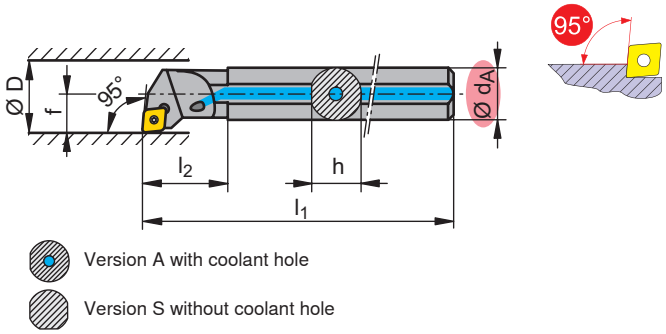
d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
8	A08F SCFCR 06	R	7.6	80	17	5	11	CC.. 0602..
10	A10H SCFCR 06		9.5	100	19	7	13	
12	A12K SCFCR 06		11.5	125	22	9	16	
8	A08F SCFCL 06	L	7.6	80	17	5	11	
10	A10H SCFCL 06		9.5	100	19	7	13	
12	A12K SCFCL 06		11.5	125	22	9	16	

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...



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..

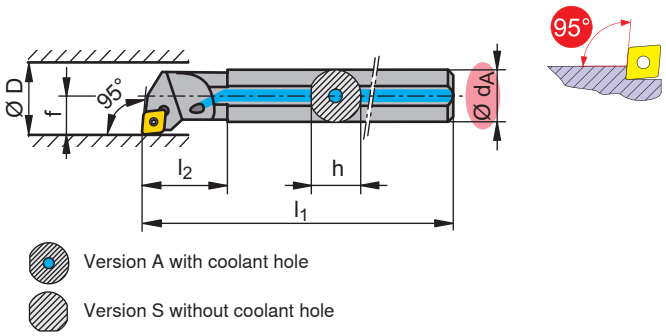
Ordering example: 1 piece A08F SCLCR 06

		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...



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 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..

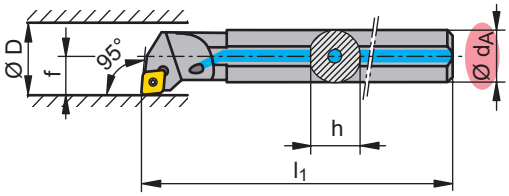
Ordering example: 1 piece A08F SCLCL 06

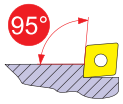
		Version A					
	d_A	1	2	3	4	5	Set 1-2
CC.. 0602..	**8 - 12**	7883204/M2,5X5/T08			7724106/TORX T08		7883909/SORT
CC.. 09T3..	**16**	7722111/M3,5X7,2/T15			7724103/TORX T15		7883910/SORT
CC.. 09T3..	**25**	7883209/M3,5X8,6/T15			7724103/TORX T15		7883914/SORT
CC.. 1204..	**32 - 40**	7883202/M4,5X12/T15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



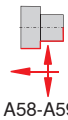


Picture shows right-hand version

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

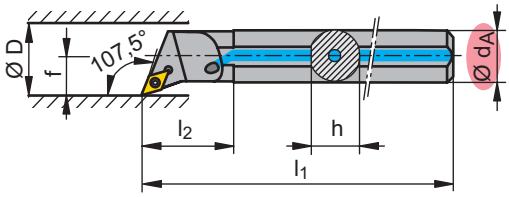
	d_A	1	2	Set 1-2
CC.. 0602..	8 - 12	7883204/M2,5X5/T08	7724106/TORX T08	7883909/SORT
CC.. 09T3..	16	7722111/M3,5X7,2/T15	7724103/TORX T15	7883910/SORT
CC.. 09T3..	20	7883209/M3,5X8,6/T15	7724103/TORX T15	7883914/SORT
CC.. 09T3..	25	7815102/M3,5X11,0/T15	7724103/TORX T15	7883906/SORT

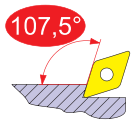

A58-A59

A88-A89

A97

SDQC...





Picture shows right-hand version

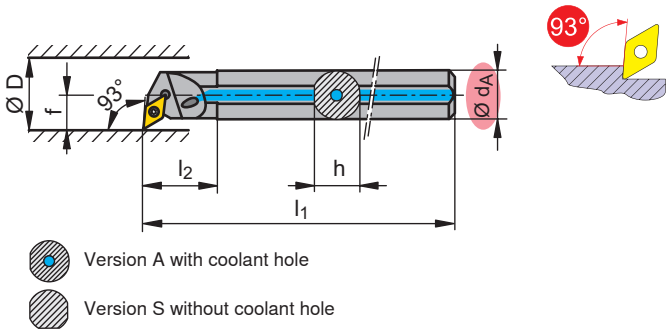
d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
12	A12K SDQCR 07	R	11.5	125	22	9	16	DC.. 0702..
16	A16M SDQCR 07		15	150	29	11	20	DC.. 0702..
20	A20Q SDQCR 07		18.5	180	32	13	25	DC.. 0702..
25	A25R SDQCR 11		23	200	36	17	32	DC.. 11T3..
32	A32S SDQCR 11		30	250	50	22	40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



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	R	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		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..

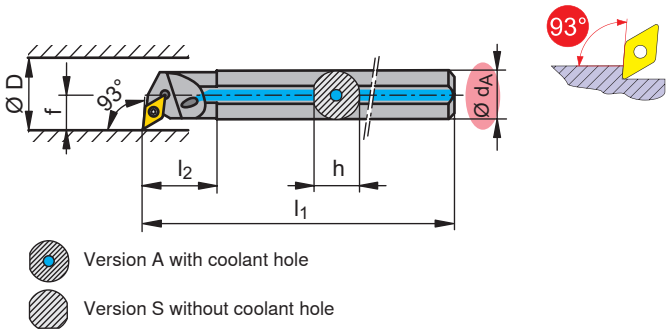
Ordering example: 1 piece A12K SDUCR 07

		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...



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..

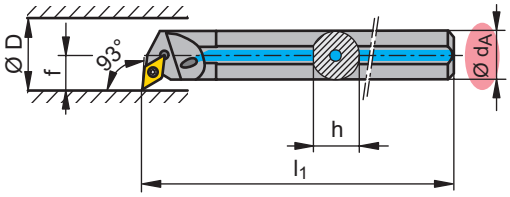
Ordering example: 1 piece A12K SDUCL 07

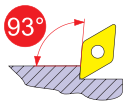
		Version A					
	d_A	1	2	3	4	5	Set 1-5
DC.. 0702..	**12 - 20**	7815101/M2,5X6,0/T08			7724106/TORX T08		7815902/SORT
DC.. 11T3..	**20**	7722111/M3,5X7,2/T15			7724103/TORX T15		7883914/SORT
DC.. 11T3..	**25**	7883209/M3,5X8,6/T15			7724103/TORX T15		7815900/SORT
DC.. 11T3..	**32 - 40**	7815102/M3,5X11,0/T15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

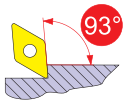
d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	f [mm]	D_{min} [mm]	
12	E12Q SDUCR 07	R	11.5	180	9	16	DC.. 0702..
16	E16R SDUCR 07		15	200	11	20	DC.. 0702..
20	E20S SDUCR 11		18.5	250	13	25	DC.. 11T3..
25	E25T SDUCR 11		23	300	17	32	DC.. 11T3..
12	E12Q SDUCL 07	L	11.5	180	9	16	DC.. 0702..
16	E16R SDUCL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

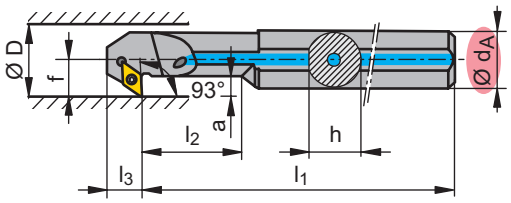
Ordering example: 1 piece E12Q SDUCR 07

	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

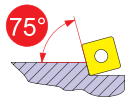
d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	D_{min} [mm]	a [mm]	
12	A12K SDXCR 07	R	11.5	125	24	12.0	9	16	4.00	DC.. 0702..
16	A16M SDXCR 07		15	150	36	12.0	11	20	4.00	DC.. 0702..
20	A20Q SDXCR 11		18.5	180	40	16.5	13	25	6.20	DC.. 11T3..
25	A25R SDXCR 11		23	200	50	16.8	17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

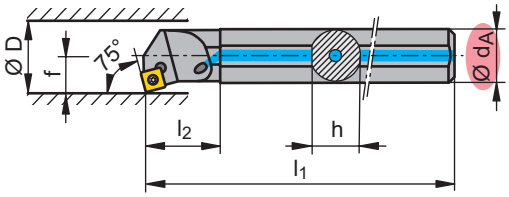
Ordering example: 1 piece A12K SDXCR 07

	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	

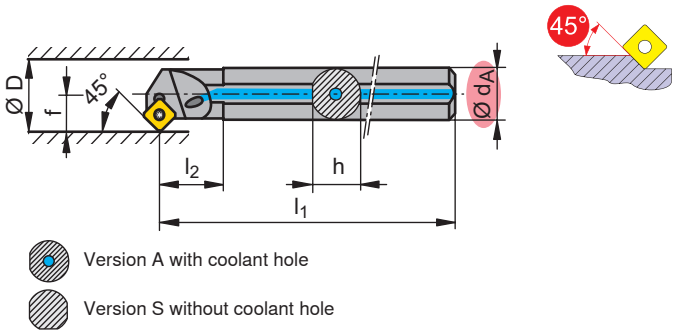
Ordering example: 1 piece A16M SSKCR 09

	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...



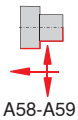
Picture shows right-hand version

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

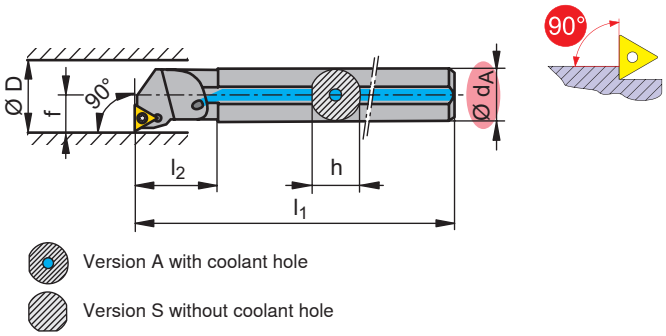
		Version A					
	d_A	1	2	3	4	5	Set 1-5
SC.. 09T3..	16	7722111/M3,5X7,2/T15			7724103/TORX T15		7883910/SORT
SC.. 09T3..	20 - 25	7883209/M3,5X8,6/T15			7724103/TORX T15		7883914/SORT
SC.. 1204..	32 - 40	7883202/M4,5X12/T15	7883004/HM-U	7883101/B M 4,5		7883301/KOMBI T15	7883902/SORT

		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..

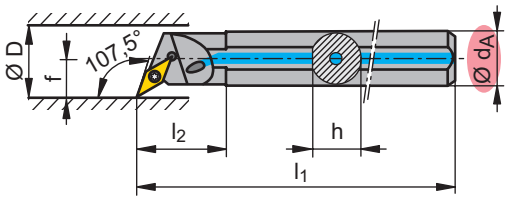
Ordering example: 1 piece A10H STFCR 09

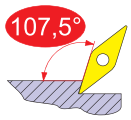
		Versions A + S					
	d_A	1	2	3	4	5	Set 1-5
TC.. 0902..	10	7722113/M2,2X5/T07			7724105/TORX T07		7883908/SORT
TC.. 1102..	12 - 20	7815101/M2,5X6,0/T08			7724106/TORX T08		7815902/SORT
TC.. 16T3..	25 - 40	7815102/M3,5X11,0/T15	7883005/HM-U	7883102/B M 3,5		7883301/KOMBI T15	7883905/SORT

A58-A59

A94

SVQC...





Picture shows right-hand version

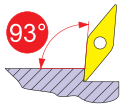
d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
16	A16M SVQCR 11	R	15	150	29	11	20	VC.. 1103..
20	A20Q SVQCR 11		18.5	180	32	13	25	VC.. 1103..
25	A25R SVQCR 11		23	200	36	17	32	VC.. 1103..
32	A32S SVQCR 16		30	250	50	22	40	VC.. 1604..
40	A40T SVQCR 16		38	300	60	27	50	VC..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

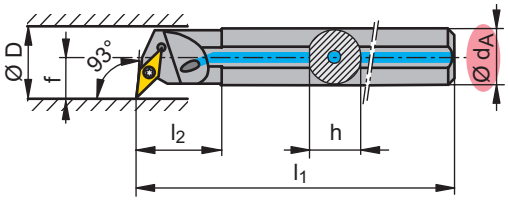
Ordering example: 1 piece A16M SVQCR 11

	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

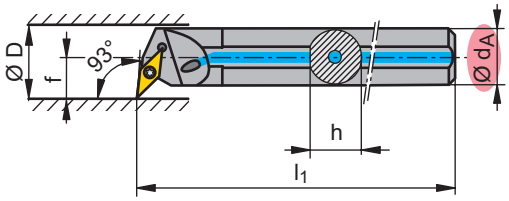
d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
16	A16M SVUCR 11	R	15	150	29	11	20	VC.. 1103..
20	A20Q SVUCR 11		18.5	180	32	13	25	VC.. 1103..
25	A25R SVUCR 11		23	200	36	17	32	VC.. 1103..
32	A32S SVUCR 16		30	250	50	22	40	VC.. 1604..
40	A40T SVUCR 16		38	300	60	27	50	VC..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

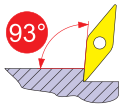
Ordering example: 1 piece A16M SVUCR 11

	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

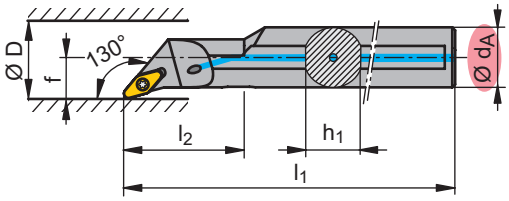
d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	f [mm]	D_{min} [mm]	
16	E16R SVUCR 11	R	15	200	11	20	VC.. 1103..
20	E20S SVUCR 11		18.5	250	13	25	
25	E25T SVUCR 11		23	300	17	32	
16	E16R SVUCL 11	L	15	200	11	20	
20	E20S SVUCL 11		18.5	250	13	25	
25	E25T SVUCL 11		23	300	17	32	

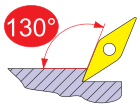
Ordering example: 1 piece E16R SVUCR 11

	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

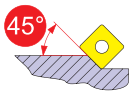
d_A [mm]	Type, description	L N R	h [mm]	l_1 [mm]	l_2 [mm]	f [mm]	D_{min} [mm]	
40	A40S SVXCR 22	R	37	250	80	27	45	VC.. 2205..
	A40S SVXPR 22-16		37	250	80	27	45	VP.. 2205..
	A40S SVXCL 22	L	37	250	80	27	45	VC.. 2205..
	A40S SVXPL 22-16		37	250	80	27	45	VP.. 2205..

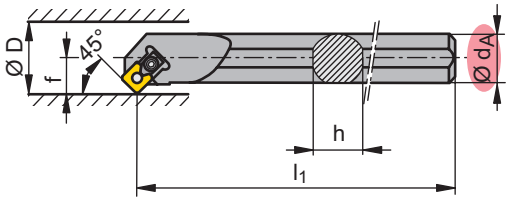
Ordering example: 1 piece A40S SVXCR 22

	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...



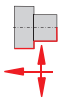


Picture shows right-hand version

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		

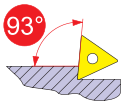
Ordering example: 1 piece S32S MSSCR 12

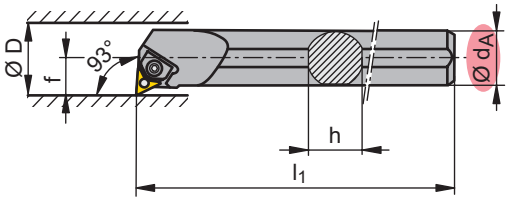
	d_A	1	2	3	4	5	Set 1-4
SC.. 1204..	32	7880010/HM-U	7880407/PS	7880608/KE	7880103/K	7724104/TORX T20	7880914/SORT


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		38	300	27	50		
32	S32S MTUCL 16	L	30	250	22	40		

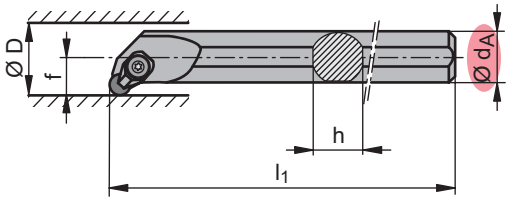
Ordering example: 1 piece S32S MTUCR 16

	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	L N R	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

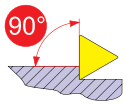
	d_A	1	2	3	4	5	Set 1-4
RN.. 09T3..	32	7485860/M6,0X16,2/T20	7485865/SP	7817008/HM-U	7480902/KN 2,6x10	7724104/TORX T20	7817911/SORT

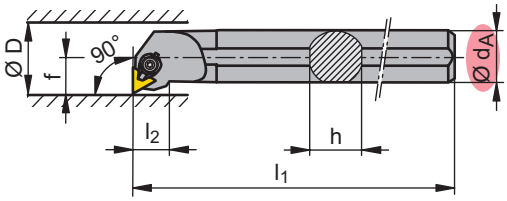
A58-A59
A101

Internal machining

Simplex P

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..

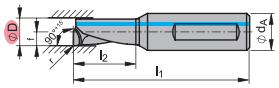
Ordering example: 1 piece S12Q CTFPR 11

	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

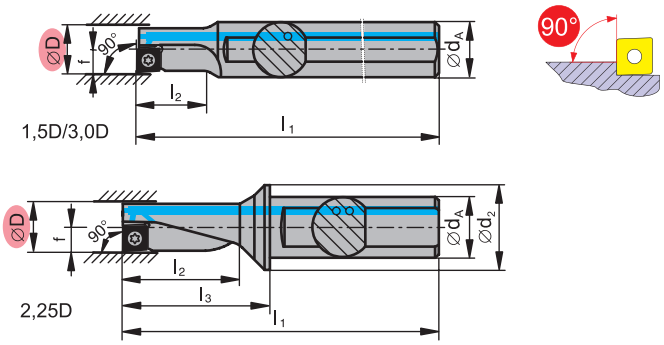
A108

			TSM30	CM45	RL	D [mm]	d_A [mm]	l_1 [mm]	l_2 [mm]	r [mm]	f [mm]
		P		●							
		M		●							
		K	O	O							
		N	●	O							
		S	O	O							
		H									
-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

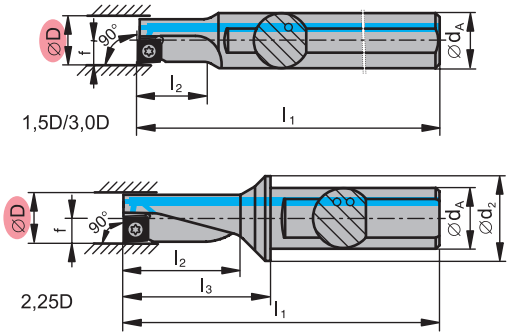
D [mm]	Type, description	L R	d_A [mm]	d_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	
8	EC 08R-1.5D 04	R	12		80	12		4	XC.. 0401..
	EC 08R-2.25D 04		10	12	60	18	22.0	4	
	EC 08R-3.0D 04 H		12		80	24		4	
	EC 08L-1.5D 04	L	12		80	12		4	
	EC 08L-2.25D 04		10	12	60	18	22.0	4	
	EC 08L-3.0D 04 H		12		80	24		4	
10	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	

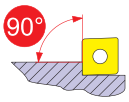
Ordering example: 1 piece EC 08R-1.5D 04

	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...



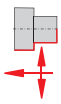


Picture shows right-hand version

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	

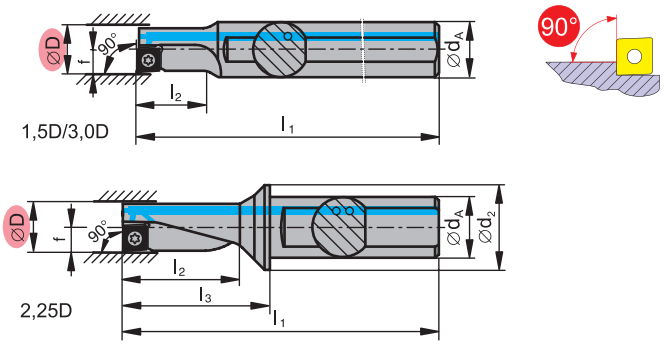
Ordering example: 1 piece EC 12R-1.5D 06

	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...



Picture shows right-hand version

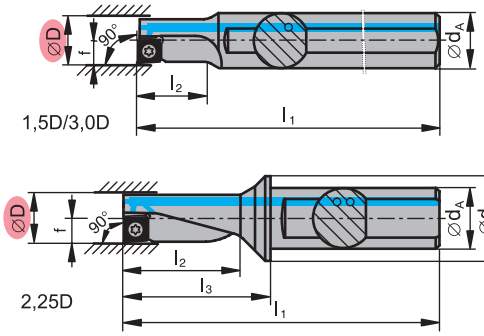
D [mm]	Type, description	L R	d_A [mm]	d_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	
16	EC 16R-1.5D 08	R	20		125	24		8	XC.. 0803..
	EC 16R-2.25D 08		20	25	94	36	44.0	8	
	EC 16R-3.0D 08 H		20		110	48		8	
	EC 16L-1.5D 08	L	20		125	24		8	
	EC 16L-2.25D 08		20	25	94	36	44.0	8	
	EC 16L-3.0D 08 H		20		110	48		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	

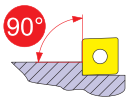
Ordering example: 1 piece EC 16R-1.5D 08

	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

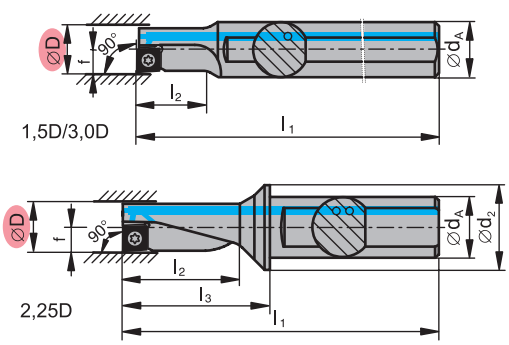
D [mm]	Type, description	L R	d_A [mm]	d_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	
20	EC 20R-1.5D 10	R	25		150	30		10	XC.. 10T3..
	EC 20R-2.25D 10		25	32	111	45	55.0	10	
	EC 20R-3.0D 10 H		25		130	60		10	
	EC 20L-1.5D 10	L	25		150	30		10	
	EC 20L-2.25D 10		25	32	111	45	55.0	10	
	EC 20L-3.0D 10 H		25		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	

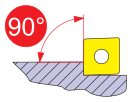
Ordering example: 1 piece EC 20R-1.5D 10

	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...



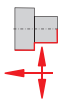


Picture shows right-hand version

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

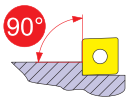
	D [mm]	10 pieces	1 piece	
XC.. 1705..	32	7822114/M4,5X10,5/T20	7724104/TORX T20	

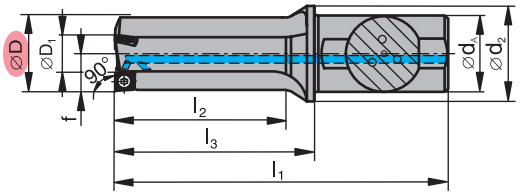


A58-A59

A110-A111

ECR...





Picture shows right-hand version

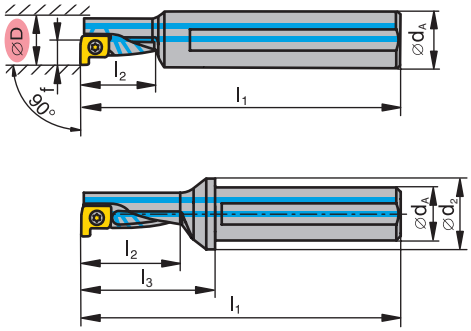
D [mm]	Type, description	L R	D_1 [mm]	d_A [mm]	d_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	
40	ECR 4020R03-2.25D 10	R	20	40	50	175	90	105.0	20	XC.. 10T3..
	ECR 4020L03-2.25D 10	L	20	40	50	175	90	105.0	20	
60	ECR 6032R03-2.25D 17	R	32	40	70	232	135	162.0	30	XC.. 1705..
	ECR 6032L03-2.25D 17	L	32	40	70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

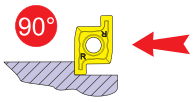
Ordering example: 1 piece ECR 4020R03-2.25D 10

	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

ProfileMaster





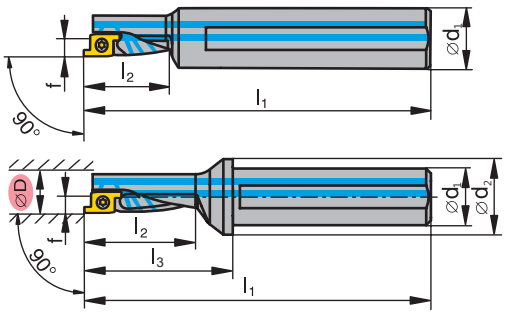
Picture shows right-hand version

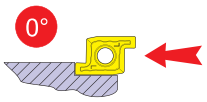
D [mm]	Type, description	L N R	d_A [mm]	d_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	
10	PM 10R-1.5D	R	12		80	15		5	PM 10..
	PM 10R-2.25D		12	16	72.4	22.5	30.4	5	
	PM 10L-1.5D	L	12		80	15		5	
	PM 10L-2.25D		12	16	72.4	22.5	30.4	5	
12	PM 12R-1.5D	R	16		90	18		6	PM 12..
	PM 12R-2.25D		16	20	78	27	33.0	6	
	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





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

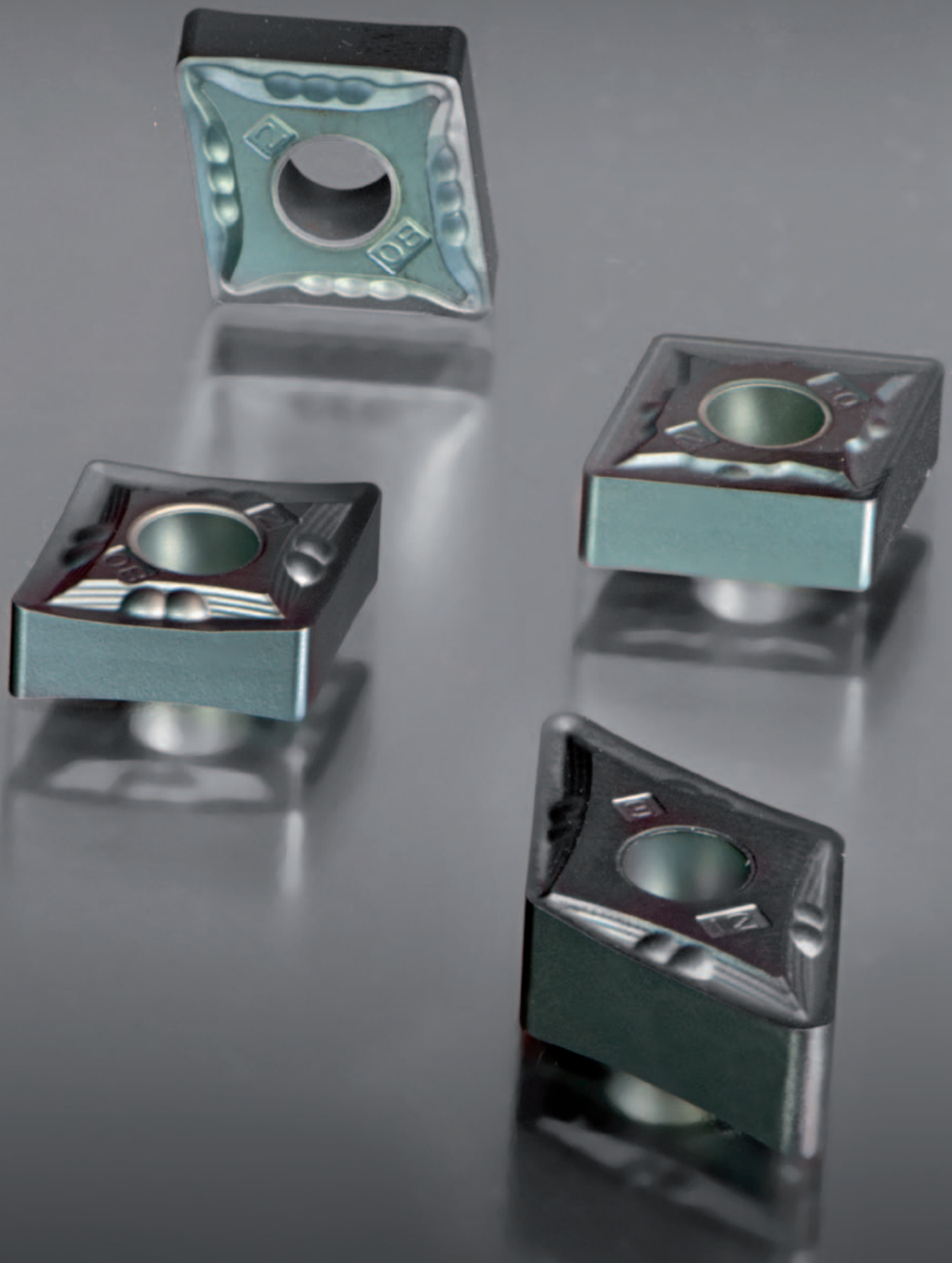
	D [mm]	1	2	
PM 16..	**16**	7883214/M3,0X5,7/T08	7724106/TORX T08	
PM 20..	**20**	7722111/M3,5X7,2/T15	7724103/TORX T15	
PM 25..	**25**	7883209/M3,5X8,6/T15	7724103/TORX T15	
PM 32..	**32**	10001785/M5,0X10,8/T20	7724104/TORX T20	

A58-A59

A112

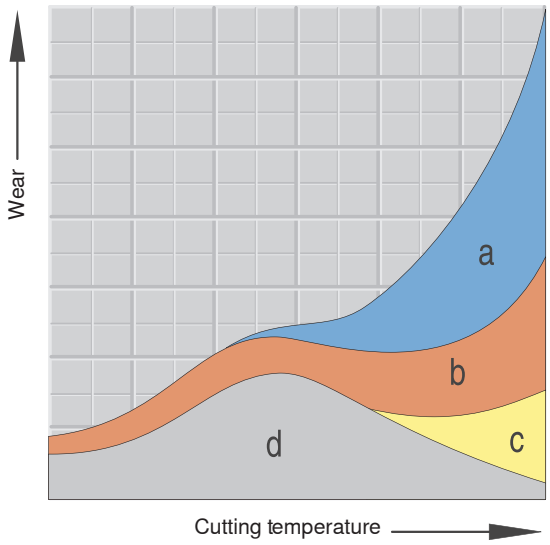
CERATIZIT

hard material matters



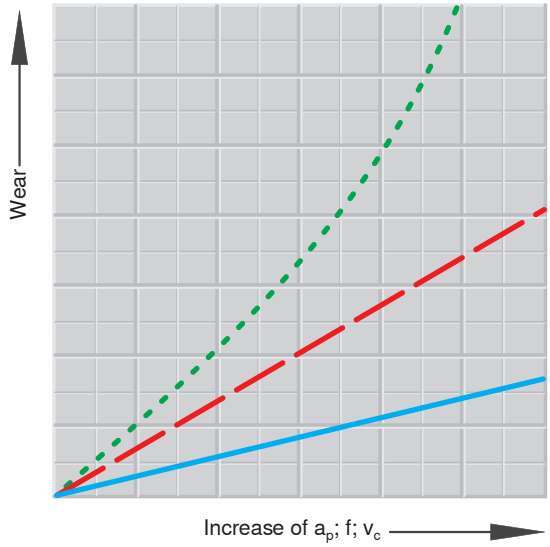
Wear is caused through simultaneous mechanical and thermal stress of the cutting edge.
The most common causes are:

> 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 speed
Feed rate
Cutting depth

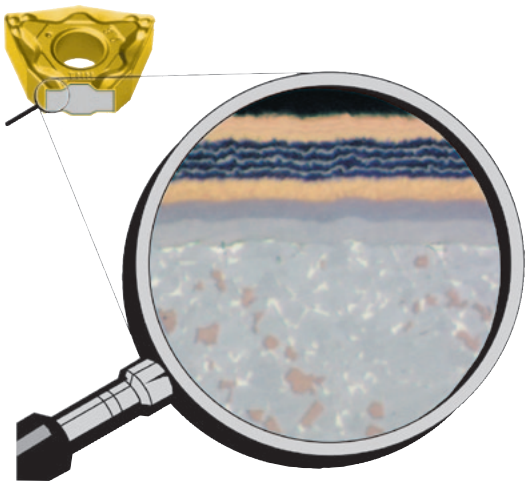
Cutting temperature and wear depend decisively upon the machining conditions.

Benefits of hard material coatings

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

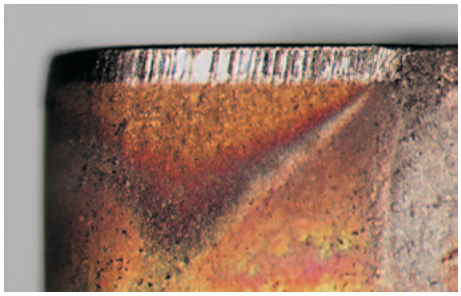
The advantages of hard material layers consist in the reduction of:

> Friction
> Temperature changes
> Oxidation
> Diffusion



Types of wear

Flank wear

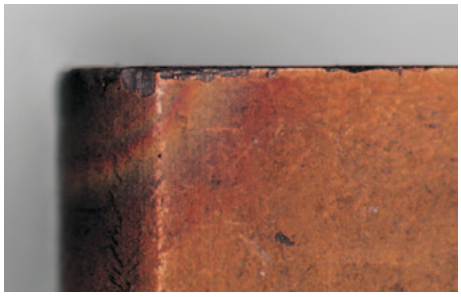


Abrasion on flank, normal wear after a certain machining time.

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)

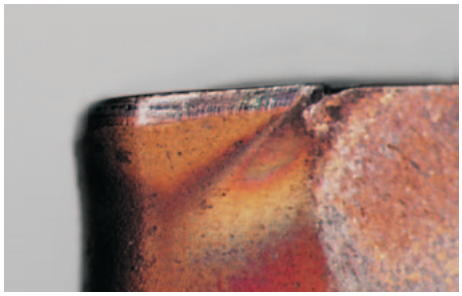
Cratering

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

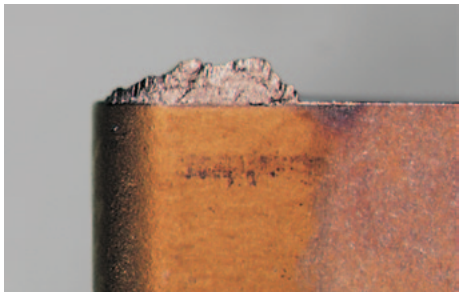


High machining temperature and simultaneous mechanical stress can lead to plastic deformation.

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

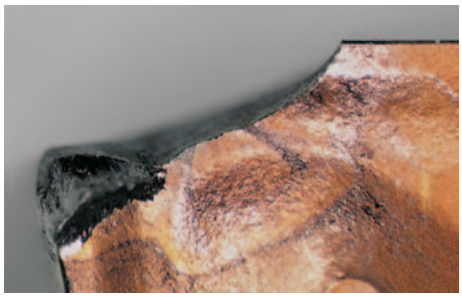


Built-up edge occurs when the chip is not evacuated properly due to insufficient cutting temperature.

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

CERATIZIT hard material matters

Corrective measures for turning problems

Type of problem													
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)	Corrective measures	
↓	↓		↓		↑	↓			↑	↓		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

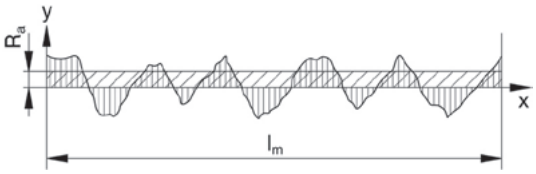
↓ avoid, reduce large influence

↓ avoid, reduce low influence

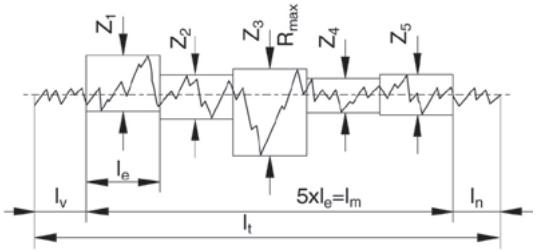
~ check, optimize

● use

ISO-DIN measured surface roughness

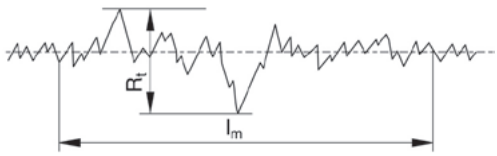


Average roughness value R_a (DIN 4768)
This is defined as the arithmetical mean of the absolute sums of the roughness profile R within the entire measured length l_m.



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)

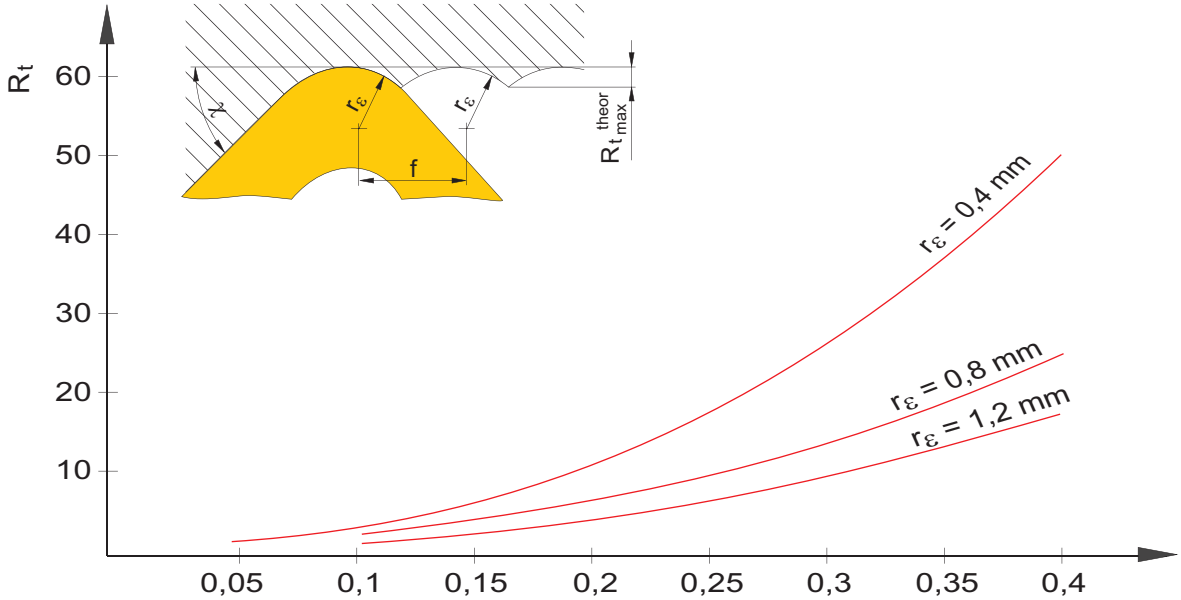
Theoretical surface finish

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

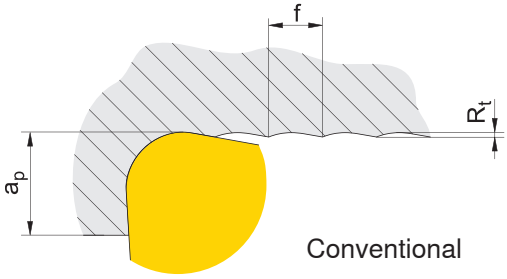
Cutting data for feed rate

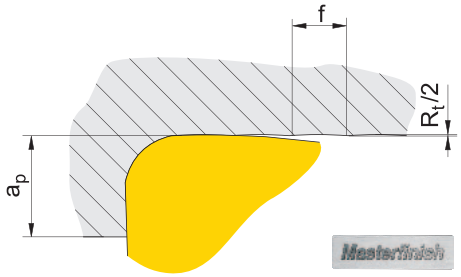
Roughness range R_z in µm	$R_{t\,max}$	corresponds to R_a-value	Roughness index	ISO 1302	Corner radius r_ε (mm) and feed rate f (mm/rev.)			
					r_ε = 0,4	r_ε = 0,8	r_ε = 1,2	r_ε = 1,6
63 - 100	$\sqrt{R_t\,100}$	12,5 - 25	N 11	25	2	0,51	0,69	0,18
40 - 63	$\sqrt{R_t\,63}$	6,3 - 25	N 10	12,5	0,27	0,43	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

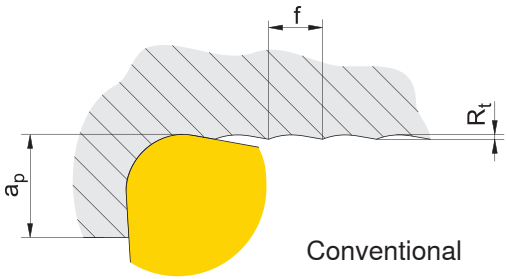
: LWWH VDP HIHHGUDWDQLQVHUWZLW0 DVWULQLVK FXWQJHGJHUHDFKHVDURXJKQHVVYDXH5 $_a$ which is many times higher than the one of a conventional insert.

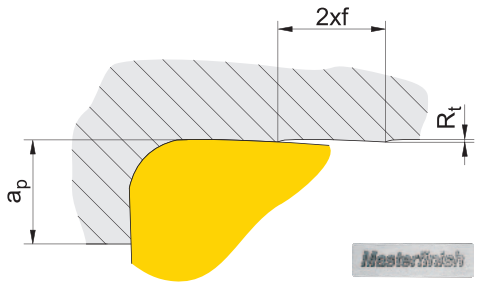


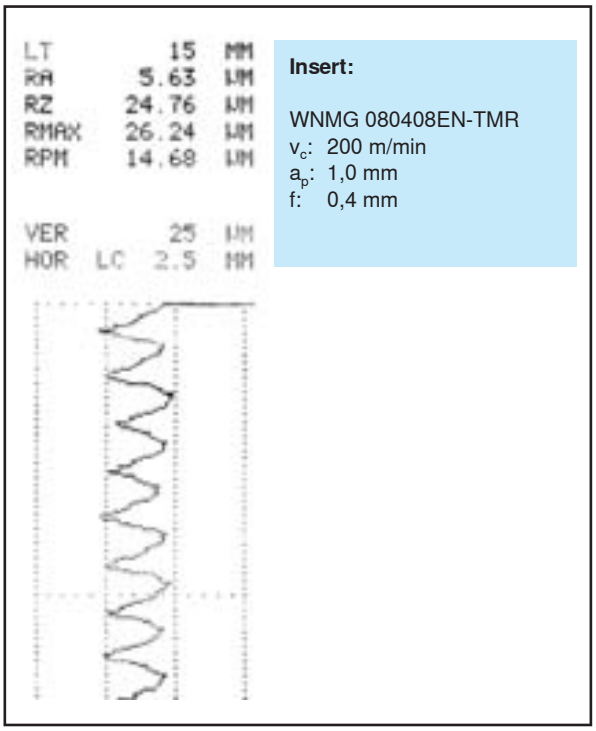


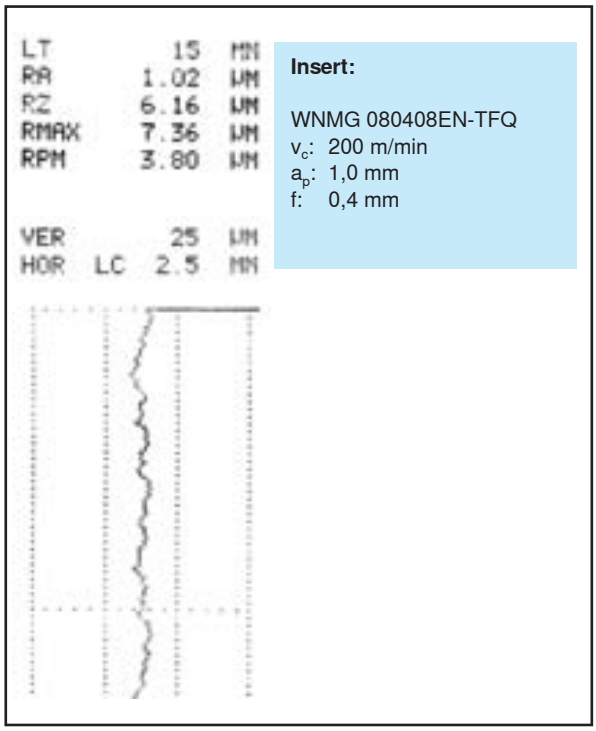
Shorter machining time

If you want to reach the same R_a-value as with a standard insert, a twice as high feed rate can be DSSOLHGIRUWKHLQVHUWZLW0 DVWULQLVK FXWQJHGJH VKRUWXUSURGXFWDQWP HSHUFFP SRQHQWW



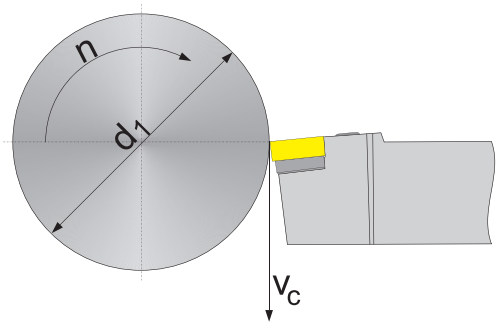






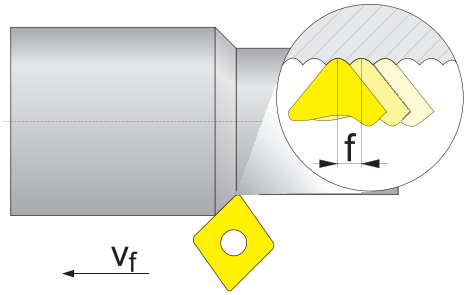
Cutting speed (v_c)

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



Revolutions per minute (n)

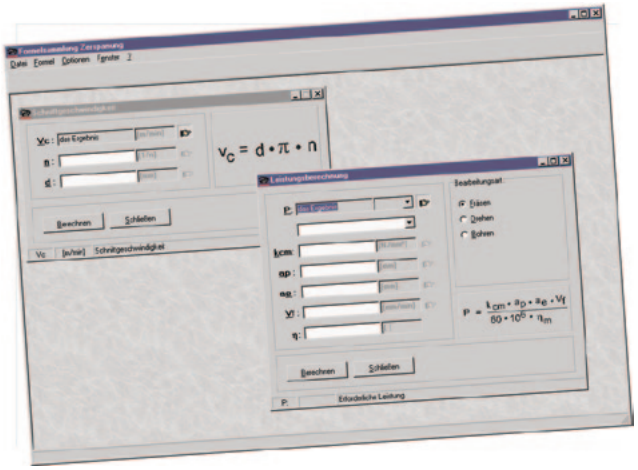
$$n = \frac{v_c \cdot 1000}{d_1 \cdot \pi} \quad [rev./min]$$



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 1 P P	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 1 P P	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
CCGW	CCGW 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	

	ISO	ANSI
	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	2
	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	2
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	2
			fibre-reinforced plastics	29	2
			hard rubber	30	2
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	2
		cast	1 LRU& RIEDVHI 1 P P	35	2
	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	H210T	H216T	CTW7120
v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2
120 - 160	140 - 200	120 - 160	2
90 - 140	100 - 160	90 - 140	2
130 - 170	160 - 200	130 - 170	2
90 - 130	110 - 150	90 - 130	2
140 - 200	160 - 220	140 - 200	2
120 - 160	140 - 180	120 - 160	2
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
2	35 - 50	2	2
2	25 - 40	2	2
2	25 - 40	2	2
2	20 - 30	2	2
2	15 - 25	2	2
2	80 - 140	2	50 - 120
2	40 - 100	2	30 - 50
2	2	2	2
2	2	2	2
2	2	2	2
2	2	2	2

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	2
	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	2
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	2
			fibre-reinforced plastics	29	2
			hard rubber	30	2
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	2
		cast	1 LRU& RIEDVH 1 P P	35	2
	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	CTP4115	CTP5110	CTC3110	CTCK120	CTP5115	CTCP115
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]
110 - 160	2	2	2	230 - 450	2	250 - 500
90 - 140	2	2	2	200 - 340	2	220 - 400
80 - 120	2	2	2	160 - 270	2	180 - 300
90 - 130	2	2	2	200 - 360	2	250 - 400
80 - 120	2	2	2	150 - 290	2	200 - 320
70 - 90	2	2	2	130 - 260	2	150 - 280
90 - 110	2	2	2	150 - 290	2	180 - 320
70 - 90	2	2	2	100 - 260	2	120 - 280
160 - 220	2	2	2	160 - 290	2	200 - 320
70 - 110	2	2	2	130 - 250	2	150 - 280
2	2	150 - 230	2	2	130 - 220	220 - 300
90 - 140	2	140 - 190	2	2	120 - 180	2
2	2	60 - 100	2	2	50 - 90	2
2	2	2	2	2	2	2
180 - 220	2	2	250 - 450	150 - 400	2	140 - 370
140 - 180	2	2	220 - 350	180 - 350	2	140 - 330
160 - 220	2	2	220 - 380	200 - 450	2	190 - 430
120 - 180	2	2	200 - 350	160 - 300	2	140 - 270
180 - 240	2	2	200 - 400	200 - 550	2	180 - 520
160 - 200	2	2	180 - 320	160 - 350	2	150 - 330
300 - 3200	300 - 3500	2	2	2	2	2
200 - 2800	200 - 2800	2	2	2	2	2
400 - 2000	400 - 3000	2	2	2	2	2
400 - 2000	400 - 3000	2	2	2	2	2
200 - 1200	200 - 2000	2	2	2	2	2
250 - 1000	250 - 1000	2	2	2	2	2
200 - 1000	200 - 1000	2	2	2	2	2
150 - 800	150 - 800	2	2	2	2	2
150 - 500	150 - 500	2	2	2	2	2
80 - 200	80 - 200	2	2	2	2	2
80 - 220	80 - 220	2	2	2	2	2
100 - 320	100 - 320	2	2	2	2	2
30 - 50	2	80 - 120	2	2	80 - 120	2
20 - 40	2	60 - 100	2	2	60 - 100	2
20 - 40	2	35 - 90	2	2	35 - 90	2
18 - 30	2	30 - 50	2	2	30 - 50	2
15 - 25	2	30 - 45	2	2	30 - 45	2
80 - 140	2	70 - 120	2	2	70 - 120	2
40 - 100	2	40 - 70	2	2	40 - 70	2
2	2	2	2	2	2	2
2	2	2	2	2	2	2
2	2	2	2	2	2	2
2	2	2	2	2	2	2

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	2
	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	2
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	2
			fibre-reinforced plastics	29	2
			hard rubber	30	2
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	2
		cast	1 LRU& RIEDVHI 1 P P	35	2
	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	CTCP125	CTPM125	CTC1135	CTC2135
v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]
2	190 - 290	120 - 280	180 - 230	180 - 230
2	170 - 240	130 - 250	170 - 190	170 - 190
2	130 - 200	100 - 180	130 - 150	130 - 150
2	170 - 250	130 - 200	170 - 190	170 - 190
2	100 - 190	60 - 180	90 - 150	90 - 150
2	80 - 170	50 - 150	70 - 130	70 - 130
2	130 - 210	80 - 200	120 - 200	120 - 200
2	80 - 160	40 - 140	50 - 100	50 - 100
2	130 - 220	100 - 200	140 - 180	140 - 180
2	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	2	60 - 160	80 - 150	80 - 150
60 - 80	70 - 100	40 - 100	55 - 75	55 - 75
120 - 160	130 - 210	2	2	2
90 - 130	120 - 200	2	2	2
120 - 160	120 - 240	2	2	2
120 - 180	120 - 200	2	2	2
140 - 220	150 - 250	2	2	2
110 - 160	120 - 200	2	2	2
100 - 600	2	2	2	2
100 - 400	2	2	2	2
100 - 600	2	2	2	2
100 - 400	2	2	2	2
100 - 400	2	2	2	2
100 - 600	2	2	2	2
100 - 600	2	2	2	2
100 - 400	2	2	2	2
100 - 400	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
20 - 50	2	2	2	20 - 40
20 - 50	2	2	2	15 - 35
15 - 40	2	2	2	8 - 25
20 - 35	2	2	2	4 - 15
10 - 25	2	2	2	4 - 15
80 - 140	2	2	2	80 - 130
25 - 45	2	2	2	15 - 35
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2

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	2
	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	2
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	2
			fibre-reinforced plastics	29	2
			hard rubber	30	2
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	2
		cast	1 LRU& RIEDVH 1 P P	35	2
	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	TCM407	TCM10	TA100	TA120	TA201	CTD4110	CTD4125
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]
400 - 520	340 - 430	280 - 350	2	2	2	2	2
350 - 400	290 - 340	230 - 270	2	2	2	2	2
300 - 350	240 - 290	190 - 240	2	2	2	2	2
400 - 440	320 - 360	260 - 300	2	2	2	2	2
300 - 360	230 - 280	180 - 230	2	2	2	2	2
250 - 300	200 - 250	140 - 220	2	2	2	2	2
310 - 380	250 - 310	160 - 200	2	2	2	2	2
280 - 400	230 - 330	160 - 200	2	2	2	2	2
350 - 400	280 - 340	230 - 270	2	2	2	2	2
260 - 310	210 - 250	170 - 250	2	2	2	2	2
250 - 320	200 - 260	170 - 240	2	2	2	2	2
300 - 350	250 - 280	200 - 240	2	2	2	2	2
2	2	2	2	2	2	2	2
210 - 250	160 - 200	130 - 160	2	2	2	2	2
340 - 480	2	2	2	2	2	2	2
260 - 360	2	2	500 - 1500	500 - 1500	2	2	2
360 - 520	280 - 430	220 - 300	2	2	2	2	2
300 - 400	250 - 380	180 - 250	**200 - 700	**200 - 700	**200 - 700	2	2
330 - 500	250 - 400	250 - 350	2	2	2	2	2
180 - 320	180 - 320	160 - 250	2	2	2	2	2
2	2	2	2	2	2	300 - 4000	300 - 4000
2	2	2	2	2	2	300 - 1500	300 - 1500
2	2	2	2	2	2	300 - 4000	300 - 4000
2	2	2	2	2	2	300 - 2000	300 - 2000
2	2	2	2	2	2	200 - 700	200 - 700
2	2	2	2	2	2	2	2
2	2	2	2	2	2	100 - 700	100 - 700
2	2	2	2	2	2	100 - 1500	100 - 1500
2	2	2	2	2	2	300 - 3000	300 - 3000
2	2	2	2	2	2	80 - 300	80 - 300
2	2	2	2	2	2	80 - 300	80 - 300
2	2	2	2	2	2	50 - 200	50 - 200
2	2	2	2	2	2	2	2
2	2	2	2	2	2	2	2
2	2	2	2	2	2	2	2
2	2	2	2	2	100 - 250	2	2
2	2	2	2	2	100 - 250	2	2
2	2	2	2	2	2	2	2
2	2	2	2	2	2	2	2
2	2	2	2	2	70 - 250	2	2
2	2	2	2	2	70 - 150	2	2
2	2	2	2	2	2	2	2
2	2	2	40 - 120	40 - 120	2	2	2

** 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	2
	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	2
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	2
			fibre-reinforced plastics	29	2
			hard rubber	30	2
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	2
		cast	1 LRU& RIEDVHI 1 P P	35	2
	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	CTN3110	CTM3110	CTI3105	CTS3105
v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
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	2	2
300 - 1000	300 - 800	300 - 800	2	2
250 - 700	250 - 600	250 - 600	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	2
2	2	2	2	40 - 200
2	2	2	2	30 - 180
2	2	2	2	70 - 200
2	2	2	2	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	2
	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	2
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	2
			fibre-reinforced plastics	29	2
			hard rubber	30	2
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	2
		cast	1 LRU& REDVH 1 P P	35	2
	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	H216T	TSM30	CTC1425	CTC1435	CTP2440	CM45
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]
2	2	2	150 - 300	140 - 280	120 - 250	60 - 230
2	2	2	120 - 220	100 - 200	80 - 180	60 - 160
2	2	2	100 - 200	80 - 180	60 - 150	50 - 130
2	2	2	120 - 220	100 - 200	80 - 180	60 - 160
2	2	2	100 - 180	80 - 160	60 - 150	50 - 130
2	2	2	80 - 150	70 - 140	60 - 120	50 - 100
2	2	2	110 - 190	100 - 180	80 - 160	60 - 140
2	2	2	70 - 150	60 - 140	50 - 120	40 - 100
2	2	2	110 - 220	100 - 200	50 - 200	40 - 200
2	2	2	100 - 180	80 - 150	50 - 150	40 - 150
2	2		120 - 220	100 - 200	50 - 200	40 - 200
2	2		100 - 200	100 - 180	50 - 180	40 - 180
2	2		2	2	50 - 100	40 - 100
2	2		2	2	50 - 80	40 - 80
140 - 200	120 - 160	80 - 140	130 - 280	120 - 250	2	100 - 180
100 - 160	90 - 140	60 - 120	130 - 280	120 - 250	2	80 - 160
160 - 200	130 - 170	90 - 150	120 - 280	110 - 250	2	100 - 180
110 - 150	90 - 130	60 - 110	120 - 280	110 - 250	2	80 - 160
160 - 220	140 - 200	100 - 180	110 - 280	100 - 250	2	100 - 200
140 - 180	120 - 160	80 - 140	110 - 280	100 - 250	2	90 - 160
120 - 3000	100 - 2500	80 - 2000	2	2	80 - 2000	80 - 2000
120 - 2500	100 - 2000	80 - 1500	2	2	80 - 1500	80 - 1500
120 - 2000	100 - 1500	80 - 1500	2	2	80 - 1500	80 - 1500
120 - 1800	100 - 1500	80 - 1300	2	2	80 - 1300	80 - 1300
120 - 1000	100 - 800	80 - 600	2	2	80 - 600	80 - 600
120 - 800	100 - 600	80 - 400	2	2	80 - 400	80 - 400
120 - 800	100 - 600	80 - 400	2	2	80 - 400	80 - 400
120 - 600	100 - 400	80 - 300	2	2	80 - 300	80 - 300
120 - 400	100 - 300	80 - 200	2	2	80 - 200	80 - 200
90 - 220	80 - 180	60 - 160	2	2	60 - 160	60 - 160
80 - 200	60 - 150	50 - 140	2	2	50 - 140	50 - 140
120 - 300	100 - 250	80 - 200	2	2	80 - 200	80 - 200
35 - 50	30 - 45	25 - 40	2	2	20 - 50	20 - 50
25 - 40	20 - 35	20 - 30	2	2	20 - 40	20 - 40
25 - 40	20 - 35	20 - 30	2	2	15 - 20	15 - 20
20 - 30	18 - 30	15 - 25	2	2	10 - 20	10 - 20
15 - 25	15 - 25	15 - 25	2	2	10 - 20	10 - 20
80 - 140	60 - 120	30 - 100	2	2	50 - 120	50 - 120
40 - 100	30 - 80	25 - 60	2	2	30 - 50	30 - 50
2	2	2	2	2	2	2
2	2	2	2	2	2	2
2	2	2	2	2	2	2
2	2	2	2	2	2	2