

sutton*tools*
world class cutting tools

TOOLS FOR MOULD & DIE



- High performing precision tools
- For milling, reaming, tapping and drilling applications
- Process reliability



Cutting Tools for Mould & Die

The mould & die industry demands precision and process reliability. Sutton Tools range outlined in this brochure, are considered the highest quality and performance, to tackle the various tool steel materials in the annealed and hardened states. The right tool selection can really provide an improvement to your final product and your productivity, this brochure aims to make the right tool selection easy for the mould and die industry. In addition to this range of tools, we also offer made-to-order items to your exact requirements.

MILLING HIGHLIGHTS

Harmony UNI – R35/38 Variable helix endmills offers very versatile solution for universal milling applications, such as shoulder milling, roughing and finishing as well as high efficiency milling (eg. Trochoidal). Ideal for pre-hardened steels, although machining upto 48 HRC is possible.

Harmony Duo XH – (eXtra-Hard) the R50 XH variable pitch endmill series is the best solution for pocketing upto 48HRC, the 50 deg helix provides excellent transport of the chips to eliminate overcutting of the chips already produced, and the dual-stepped core offers the strength to provide stable cutting of the material for the ideal opportunity to maximise the metal removal rate.

Harmony Duo VH – (Very Hard) designed specifically for post-heat-treated steels 52–63 HRC, with the optimised coating, Aldura, the longest tool life is realised.

Micro series & Hi-Feed – extensive range on offer for the smallest applications and with the highest feedrate.

You'll find various other endmills such as ball nose and torus for profile and 3D applications, as well as corner radius and chamfering tools.

ISO	VDI^3323	Material		Condition	HB	N/mm ²
P	1	Steel - Non-alloy, cast and free cutting	~ 0.15 %C	A	125	440
	2		~ 0.45 %C	A	190	640
	3			QT	250	840
	4		~ 0.75 %C	A	270	910
	5			QT	300	1010
	6	Steel - Low alloy and cast < 5% of alloying elements		A	180	610
	7			QT	275	930
	8			QT	300	1010
	9			QT	350	1180
	10	Steel - High alloy, cast and tool		A	200	680
	11			HT	325	1100
	12	Steel - Corrosion resistant and cast	Ferritic / Martensitic	A	200	680
	13		Martensitic	QT	240	810
H	38.1	Hardened steel		HT	45 HRC	
	38.2			HT	55 HRC	
	39.1			HT	58 HRC	
	39.2			HT	62 HRC	
	40	Cast Iron	Chilled	C	400	1350
	41			HT	55 HRC	

DRILLING HIGHLIGHTS

R30 UNI series – our widest carbide range for precision drilling with or without through coolant, from 3xd to 12xd, upto 52 HRC. 1mm–20mm and inch sizes available.

Various other deep hole HSS Co drills available for economical solutions, as well hard machining carbide drills, reamers and NC spot drills.

TAPPING HIGHLIGHTS

Complete range of taps for the various hardness ranges.

NH – Normal to Hard materials, upto 38HRC

H – Hard materials, 38–43 HRC

XH – eXtra Hard, 43–52 HRC

VH – Very Hard, 52–63 HRC

	Item Code	Tool	Designation	Tool Material	Coating	Standard	Shank Type	P		H		
								NH	H	H	XH	VH
								upto 38 HRC	38-43 HRC	43-48 HRC	48-52 HRC	52-63HRC
HARMONY ENDMILLS	E533		R35/38 UNI SE	VHM	AlCrN	DIN6527K	DIN6535 HA	●	●	○		
	E534		R35/38 UNI SE	VHM	AlCrN	DIN6527K	DIN6535 HB	●	●	○		
	E535		R35/38 UNI SE	VHM	AlCrN	DIN6527L	DIN6535 HA	●	●	○		
	E536		R35/38 UNI SE	VHM	AlCrN	DIN6527L	DIN6535 HB	●	●	○		
	E559		R35/38 UNI CR	VHM	AlCrN	DIN6527L	DIN6535 HA	●	●	○		
	E560		R35/38 UNI CR	VHM	AlCrN	DIN6527L	DIN6535 HB	●	●	○		
	E430		R44/45 UNI CR	VHM	AlCrN	Long Reach	DIN6535 HA	●	●	○		
	E431		R44/45 UNI CR	VHM	AlCrN	Long Reach	DIN6535 HB	●	●	○		

HARMONY ENDMILLS

The Harmony range of endmills represents world's latest technologies to provide increases in both performance and tool life. Harmony Endmills overcomes vibration, through a combination of tool design, micro geometry, material and coating, without the need to sacrifice productivity.

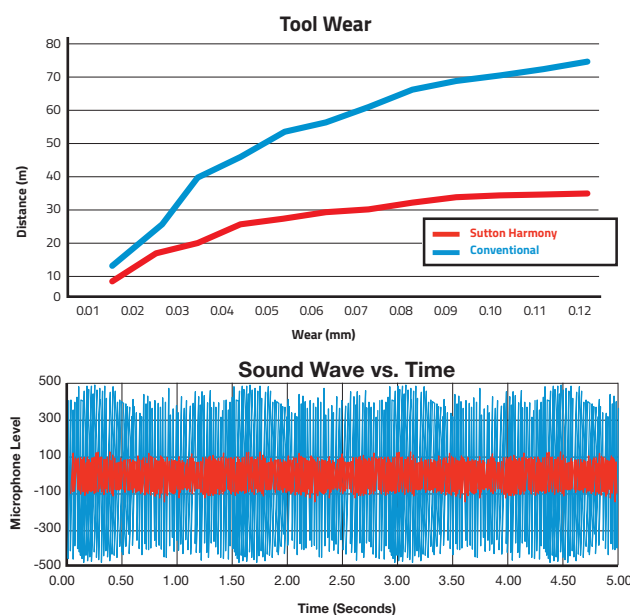
VHM-ULTRA Harmony Endmills are made from VHM-ULTRA, an ultra fine grain type (0.5µm) which offers the best wear resistance in high performance milling applications.









AlCrN The carbide Harmony range is paired with AlCrN coating, which exhibits an unmatched degree of oxidation resistance and hot hardness. These properties have triggered a quantum leap in tool wear resistance, allowing for significantly higher cutting speeds.

Case Study – Performance Comparison

A recent study was conducted comparing the harmonics produced in the workpiece, between the Harmony & a conventional endmill. The graph clearly indicates the smoother cutting action of the Harmony.

Tool	Harmony Endmill	Conventional Endmill
Machine	Haas VF2-SS Vertical Machining Centre	
Holder	Hydraulic Chuck	
Size	10mm	
Material	AISI 1045/ 1.0503 / C45	AISI 1045/ 1.0503 / C45
V _c	200 m/min	200 m/min
n	6360 RPM	6360 RPM
F _z	0.07 mm/tooth	0.058 mm/tooth
V _f	1781 mm/min	1463 mm/min
Z	4 flutes	4 flutes
Ae	2 mm	2 mm
Ap	15 mm	15 mm



								P		H		
							NH	H	H	XH	VH	
	Item Code	Tool	Designation	Tool Material	Coating	Standard	Shank Type	upto 38 HRC	38-43 HRC	43-48 HRC	48-52 HRC	52-63HRC
HARMONY DUO ENDMILLS	E562		R50 DUO-XH SE	VHM	AlCrN	DIN6527L	DIN6535 HA	○	●	●		
	E563		R50 DUO-XH SE	VHM	AlCrN	DIN6527L	DIN6535 HB	○	●	●		
	E564		R50 DUO-XH CR	VHM	AlCrN	DIN6527L	DIN6535 HA	○	●	●		
	E565		R50 DUO-XH CR	VHM	AlCrN	DIN6527L	DIN6535 HB	○	●	●		
	E566		R50 DUO-VH SE	VHM	AlDura	DIN6527L	DIN6535 HA				○	●
	E567		R50 DUO-VH SE	VHM	AlDura	DIN6527L	DIN6535 HB				○	●
	E568		R50 DUO-VH CR	VHM	AlDura	DIN6527L	DIN6535 HA				○	●
	E569		R50 DUO-VH CR	VHM	AlDura	DIN6527L	DIN6535 HB				○	●
PRE-HARDEN												
POST-HARDEN												

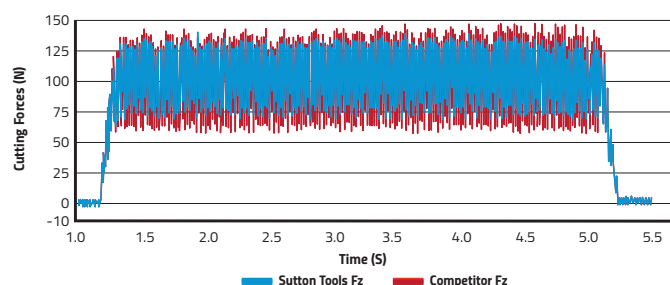
HARMONY DUO






Sutton Tools has conducted a series of internal benchmarking tests to compare the performance of its Harmony DUO Endmill against a leading German brand under identical operating conditions. The results of these tests indicate that Harmony DUO delivers comparable or better performance than the competition. Furthermore, with measurably less vibration exhibited, longer tool life can be expected.

Case Study – Vibration Comparison

Machining conditions	
Machine	Haas VF2-SS Vertical Machining Centre
Holder	Shrinkfit
Size	10mm
Material	Tool Steel P20 of 34 HRC
V_c	120 m/min
n	3816 RPM
F_z	0.077 mm/tooth
V_f	1175 mm/min
Z	4 flutes
A_e	1.0 mm
A_p	15 mm

Comparison of Vibration in Fz



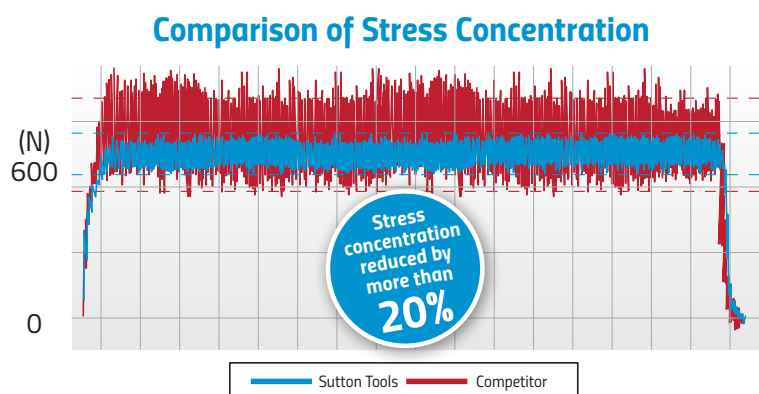
	Item Code	Tool	Designation	Tool Material	Coating	Standard	Shank Type	P		H		
								NH	H	H	XH	VH
								upto 38 HRC	38-43 HRC	43-48 HRC	48-52 HRC	52-63HRC
MICRO	E580		MICRO SE	VHM	TiSiN	Sutton	DIN6535 HA	●	●	●	●	
	E581		MICRO CR	VHM	TiSiN	Sutton	DIN6535 HA	●	●	●	●	
	E582		MICRO BN	VHM	TiSiN	Sutton	DIN6535 HA	●	●	●	●	
	E598		MICRO HI FEED	VHM	TiSiN	Sutton	DIN6535 HA	●	●	●	●	●
	E650		HI FEED	VHM	TiSiN	Sutton	DIN6535 HA	●	●	●	●	●

HI-FEED MICRO SERIES ENDMILLS

Sutton Tools New Hi-Feed series of endmills is designed to bring you premium features with much higher wear resistance and feed rates, due to the 4 & 6 flutes construction that enables the wear to be distributed across more cutting edges. Together with the TiSiN PVD coating, which is renowned for extremely good wear resistance due to the silicon base, it prolongs tool life, enables higher cutting speeds with increased heat resistance making ideal for dry machining.

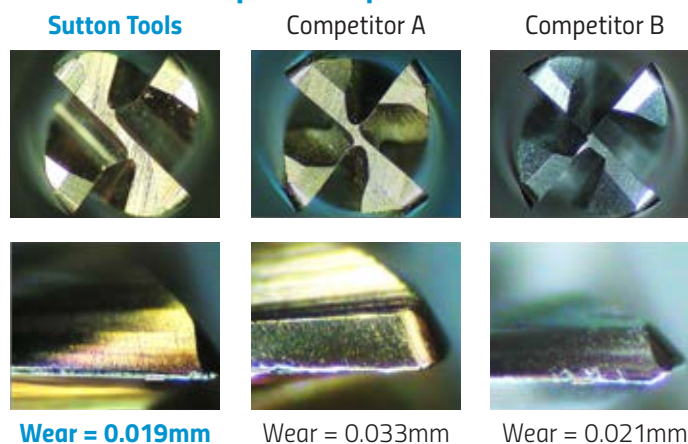
Case Study - Side Milling comparison

Tool	Sutton Tools E598 Vs Competitor A & B
Machine	Jing Diao
Coolant Size	
Material	SKD 58 HRC
V_c	62.8 m/min
n	20000 RPM
F_z	0.07 mm/tooth
V_f	600 mm/min
Z	4 flutes
A_e	0.02mm
A_p	3mm



Comparison of Wear Rate

Tool condition and average wear after 38.4 metres of machining



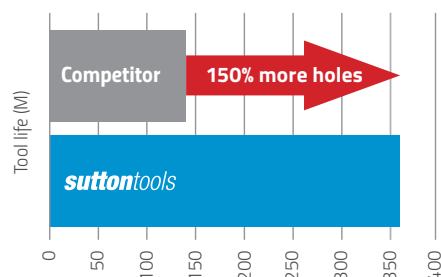
	Item Code	Tool	Designation	Tool Material	Coating	Standard	Shank Type	P		H		
								NH	H	H	XH	VH
ROUGH	E549		R45 UNI-HRS	VHM	AlCrN	DIN6527L	DIN6535 HA	●	○			
	E550		R45 UNI-HRS	VHM	AlCrN	DIN6527L	DIN6535 HB	●	○			
PROFILE	E440		R30 UNI BN	VHM	AlCrN	Sutton	DIN6535 HA	○	●	●	○	
	E441		R30 UNI BN	VHM	AlCrN	Sutton	DIN6535 HB	○	●	●	○	
	E442		R30 UNI BN	VHM	AlCrN	Sutton	DIN6535 HA	○	●	●	○	
	E443		R30 UNI BN	VHM	AlCrN	Sutton	DIN6535 HB	○	●	●	○	
EDGE	E456			VHM	TiAlN	Sutton	DIN6535 HA	●	●	●	○	
	E457			VHM	TiAlN	Sutton	DIN6535 HA	●	●	●	○	
	E458		RADIUS	VHM	TiAlN	Sutton	DIN6535 HA	●	●	●	○	
REAMING	R102		Chucking	HSSCo	-	DIN212	Straight	●				
	R101		Chucking	HSS	-	DIN208	Morse taper	●				


ROUGHING APPLICATIONS

- Suitable for materials up to 1600N/mm²
- AlCrN for longer tool life
- R45-HRS Geometry ideal for heavy cutting

Case Study - Tool life comparison

Tool	E549 1600 (5 Flute)
Material	ISO P S355 25 HRC
V _c	150 m/min
F _z	0.06 mm/tooth
A _e	8mm
A _p	30mm



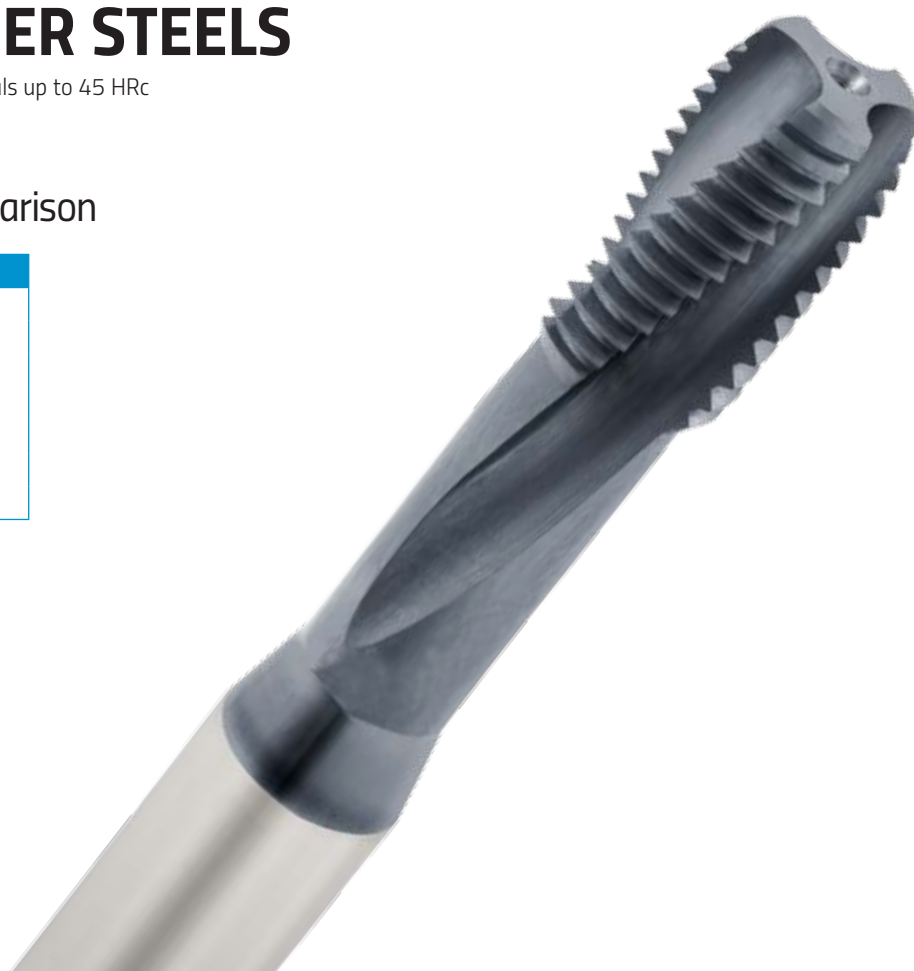
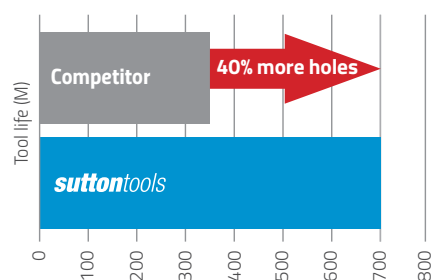
	Item Code	Tool	Designation	Tool Material	Coating	Standard	Shank Type	P		H		
								NH	H	H	XH	VH
								upto 38 HRC	38-43 HRC	43-48 HRC	48-52 HRC	52-63HRC
TAPPING	T140		GUN NH	PM-HSSE	TiAlN	DIN371	-	●	○			
	T141		GUN NH	PM-HSSE	TiAlN	DIN376	-	●	○			
	T227		R40 NH	PM-HSSE	TiAlN	DIN371	-	●	○			
	T228		R40 NH	PM-HSSE	TiAlN	DIN376	-	●	○			
	T211		R15 H	PM-HSSE	TiCN	DIN371	-	○	●	○		
	T212		R15 H	PM-HSSE	TiCN	DIN376	-	○	●	○		
	T308		NPT	HSSE	-	~DIN2184-1	-	●	○			





TAPPING HARDER STEELS

- Suitable for harder short chipping materials up to 45 HRC
- Blind holes
- Depths up to 1.5 x d1

Case Study - Tool life comparison

Tool	T211 0800
Material	132344 / SKD61 / H13
Hardness	43-45HRC
Hole Type	Blind
Size	M8 x 1.25
Depth	12mm
Vc (m/min)	10
RPM	400



	Item Code	Tool	Designation	Tool Material	Coating	Standard	Shank Type	P		H		
								NH	H	H	XH	VH
								upto 38 HRC	38-43 HRC	43-48 HRC	48-52 HRC	52-63HRC
TAPPING	T294		XH Form C	PM-HSSE	TiCN	DIN352	-		○	●	●	
	T295		XH Form D	PM-HSSE	TiCN	DIN352	-		○	●	●	
	T296		VH Form C	VHM	TiCN	DIN371/6	-				○	●
	T297		VH Form D	VHM	TiCN	DIN371/6	-				○	●

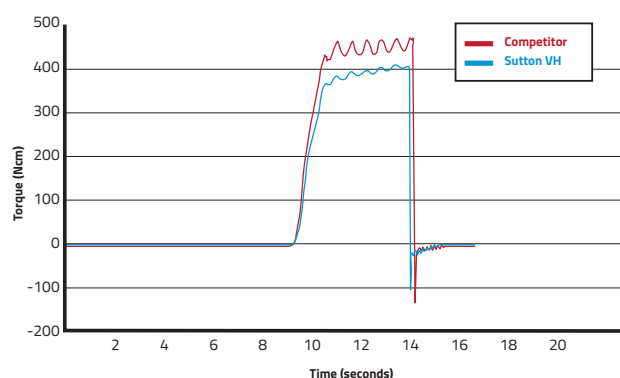
TAPPING HARDER STEELS

- Specially developed carbide for extra toughness
- Optimised hard coating
- Specific geometry for hardened steel

Case Study - Torque comparison

Material:	D2 (60HRC)
Vc:	2m/min
Coating:	TiCN
Lubrication:	7% water soluble
Drill Size:	5.1mm
Depth:	9mm

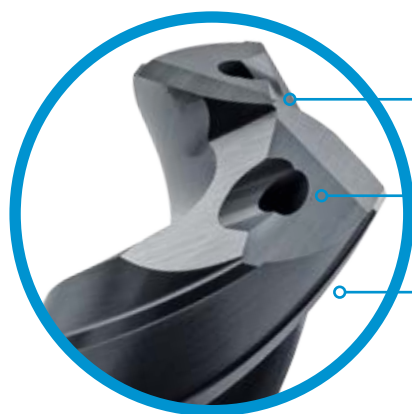
Holder Type	Average Torque (Ncm)	Average Down Cut Torque (Ncm) Entering Hole	Average Reverse Torque (Ncm) Exiting Hole
Sutton VH (T296)	340	414	103
Competitor	397	472	134



	Item Code	Tool	Designation	Tool Material	Coating	Standard	Shank Type	P		H		
								NH	H	H	XH	VH
DRILLING	D323		R30 UNI 3xD	VHM	AlCrN	DIN6537K	HA	●	●	○		
	D326		R30 UNI 5xD	VHM	AlCrN	DIN6537L	HA	●	●	○		
	D329		R30 UNI-IK 3xD	VHM	AlCrN	DIN6537K	HA	●	●	○		
	D332		R30 UNI 5xD	VHM	AlCrN	DIN6537L	HA	●	●	○		
	D335		R30 UNI-IK 8xD	VHM	AlCrN	Sutton	HA	●	●	○		
	D371		R30 UNI-IK 12xD	VHM	AlCrN	Sutton	HA	●	●	○		

DRILLING UP TO 12xD

- Suitable for materials up to 1200N/mm²
- Strong core with internal coolant supply
- Micro geometry and surface conditioning for optimal chip control
- AlCrN for maximum tool life









Self-centring
point design

Improved coolant
channels

4 guidance
lands



	Item Code	Tool	Designation	Tool Material	Coating	Standard	Shank Type	P		H		
								NH	H	H	XH	VH
								upto 38 HRC	38-43 HRC	43-48 HRC	48-52 HRC	52-63HRC
DRILLING	D151		DH	HSSCo	TiAlN	DIN1897	Straight	●	○			
	D163		DH	HSSCo	TiAlN	DIN338	Straight	●	○			
	D171		DH	HSSCo	TiAlN	DIN340	Straight	●	○			
	D194		DH	HSSCo	TiAlN	DIN1869-1	Straight	●	○			
	D195		DH	HSSCo	TiAlN	DIN1869-2	Straight	●	○			
	D196		DH	HSSCo	TiAlN	DIN1869-3	Straight	●	○			

DEEPER DRILLING WITH LESS PECKING

Sutton Tools Deep Hole (DH) Series provides a highly productive solution for deep hole drilling in tough materials. Geometry, material and coating optimised for high quality drilling from 3 to 12 x Ø. in depth, on small to medium batch sizes.

Features

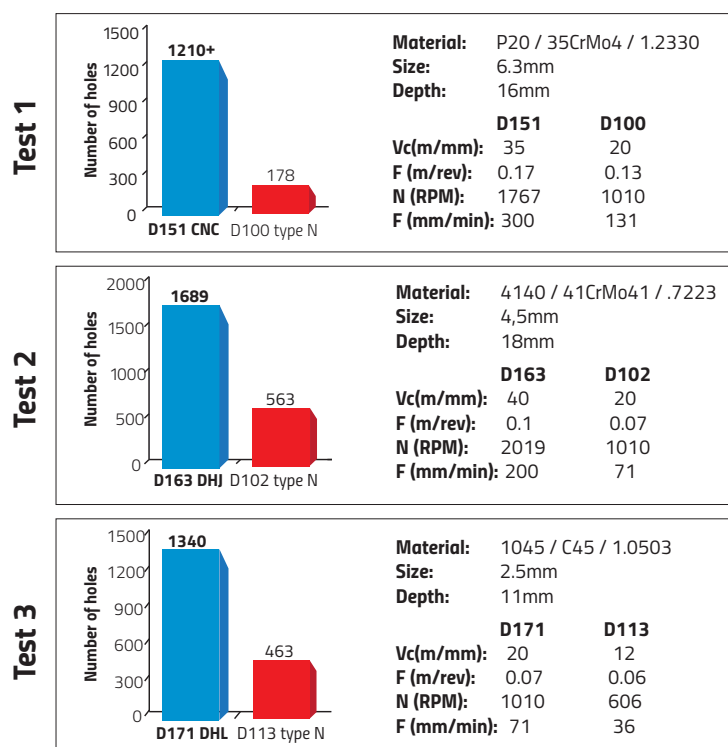
- 130° profile web thinned U-point geometry ensures high strength
- Fast 40° Helix
- Parabolic flute design for optimal chip transportation
- Cobalt grade high speed steel (HSS Co)
- TiAlN coating for longer tool life

Benefits

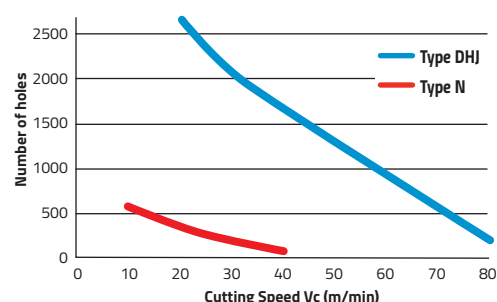
- Controlled centering & chip breakage
- Increased stability
- Fast chip evacuation
- Less pecking required
- Improved heat dissipation

Case Study – Performance Comparison


A recent study was conducted comparing the tool life between the DH series and a conventional drill. The graph clearly indicates the longer tool life at higher cutting speeds of the DH series



Tool Life Comparison : Cutting Speed Vs Number of Holes



Tool	Type DHJ	Type N
Material	4140 / 41CrMo4 / 1.7223	
Diameter (mm)	4.5	
Depth (mm)	18	
Soluble Oil	7%	
Feed (mm/rev)	0.1	0.07
Vc	Number of holes	
10	-	563
20	2680	342
30	2090	178
40	1689	43
80	194	-

	Item Code	Tool	Designation	Tool Material	Coating	Standard	Shank Type	P		H		
								NH	H	H	XH	VH
								upto 38 HRC	38-43 HRC	43-48 HRC	48-52 HRC	52-63HRC
DRILLING	D300		VH	VHM	-	Sutton	HA			○	○	○
	D306		VH	VHM	AlCrN	Sutton	HA			○	○	○
	D175			HSSCo	TiN	~DIN1897	Straight	●	○			
	D176			HSSCo	TiN	~DIN1897	Straight	●	○			
	D355			VHM	-	~DIN1897	HA	●	●	○	○	
	D364			VHM	AlCrN	~DIN1897	HA	●	●	○	○	
	D366			VHM	AlCrN	~DIN1897	HA	●	●	○	○	

PERFECT HOLE LOCATION

- Precision drill for machine use with rigid design for "seat" position accuracy
- 90° offers hole chamfering and spotting with the one tool
- 120° for spotting, matching a typical drill point

Features

- VHM / HSS Co material
- AlCrN / TiN coated
- Precise point geometry

Benefits

- Perfect hole location
- Only drill to the depth of the point



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