HIGH PERFORMANCE CATALOGUE 2020

suttontools

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ISO	VDI	Material Group	Sutton	
P	A	Steel	N	UNI
M	R	Stainless Steel	VA	
K	F	Cast Iron	GG	
N	N	Non-Ferrous Metals, Aluminiums & Coppers	Al	W
S	S	Titaniums & Super Alloys	Ti	Ni
H	H	Hard Materials (≥ 45 HRC)	H	

^ VDI 3323 material groups can also be determined by referring to the workpiece material cross reference listing. Refer to our full catalogue.

ISO	VDI^ 3323	Material		Condition	HB	N/mm²	General purpose N	Universal materials UNI	Aluminiums Al	Soft materials W	Copper materials Cu	Tough materials VA	Cast iron materials GG	Hard materials H	Extra hard materials XH	Very hard materials VH	Titaniums Ti	Nickels Ni
P	1	Steel - Non-alloy, cast & 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 & 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 & tool		A	200	680	○	●				○		○				
	11			HT	325	1100		○						●	●	○		
	12	Steel - Corrosion resistant & cast	Ferritic / Martensitic	A	200	680		●				●		○				
	13		Martensitic	QT	240	810		○				○		○	●	○		
M	14.1	Stainless Steel	Austenitic	AH	180	610		○				●						●
	14.2		Duplex		250	840		○				●					○	●
	14.3		Precipitation Hardening		250	840		●				●		○			○	●
K	15	Cast Iron - Grey (GG)	Ferritic / Pearlitic		180	610	○	●					●	○				
	16		Pearlitic		260	880		●					●	●	●			
	17	Cast Iron - Nodular (GGG)	Ferritic		160	570	○	●					●	○				
	18		Pearlitic		250	840		●					●	●	●			
	19	Cast Iron - Malleable	Ferritic		130	460	○	●					○	○				
	20		Pearlitic		230	780	○	●					○	●				
N	21	Aluminum & Magnesium - wrought alloy	Non Heat Treatable		60	210	●	○	●	●	●	○						
	22		Heat Treatable	AH	100	360	●	○	●	●	●	○						
	23	Aluminum & Magnesium - cast alloy ≤12% Si	Non Heat Treatable		75	270	○	●	●	○	●	○						
	24		Heat Treatable	AH	90	320	○	●	●	○	●	○						
	25	Al & Mg - cast alloy >12% Si	Non Heat Treatable		130	460			○	○	○	○	●	○				
	26	Copper & Cu alloys (Brass/Bronze)	Free cutting, Pb > 1%		110	390	○	○	○	○	●	○						
	27		Brass (CuZn, CuSnZn)		90	320	○	●		○	○		●	●	○	○		
	28		Bronze (CuSn)		100	360		○	○	○	●	○						
	29	Non-metallic - Thermosetting & fiber-reinforced plastics						○										
	30	Non-metallic - Hard rubber, wood etc.																
S	31	High temp. alloys	Fe based	A	200	680						●						●
	32			AH	280	950						○						●
	33		Ni / Co based	A	250	840		○				○						●
	34			AH	350	1180												●
	35			C	320	1080												●
	36	Titanium & Ti alloys	CP Titanium		400 MPa												●	
	37.1		Alpha alloys		860 MPa			○									●	
	37.2		Alpha / Beta alloys	A	960 MPa												●	
	37.3			AH	1170 MPa												●	
	37.4		Beta alloys	A	830 MPa												●	
	37.5			AH	1400 MPa												●	
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											●		

Condition: **A** (Annealed), **AH** (Age Hardened), **C** (Cast), **HT** (Hardened & Tempered), **QT** (Quenched & Tempered)

● Optimal ○ Effective

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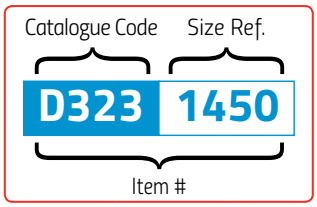
Sutton Tools Code System – explained

Sutton Tools item # system makes it easier to identify a product.
The codes are based on a universal prefix and suffix system.

Prefix (Catalogue Code) – is alpha numeric, and is unique to a specific product range.
The letter is relevant to the type of tool, and the number refers to a product range.

- **C** – Countersinks
- **D** – Drills
- **E** – Endmills
- **L** – Literature
- **R** – Reamers
- **T** – Taps
- **Z** – Tool Holders / Chucks



D3231450 = D(Drill) **323**(Carbide 3xd) **1450**(14.5mm)

Suffix (Size Ref.) – in most cases is relevant to the diameter or size reference of an item and is based on a metric value.

For example 5mm = 0500, and 1/4" = 0635 (inch converted to decimal).

Suffix can also refer to set code or number of pieces in a set.

Benefits of the coding system

- Range identification simplified.
- Search online 'Expert Tool Selector' by range.

Understanding your Sutton Tools High Performance Catalogue

We have combined the most common high performance products from our range to bring you this quick reference catalogue, simplifying the tool selection process.

Material

This highlights what the product is made of. (e.g. VHM = Carbide, HSS = High Speed Steel)
For the full list of explanation, refer to page 76 of the technical information section.

Surface Coatings

Many of our products have various surface coatings to improve the performance. Surface coatings improve productivity by increasing speeds and feeds and reducing friction related problems.

Symbols

For all of our product pages you will find symbols which depict what specifications these products were made to. Symbols have been used to simplify product identification. A full list of symbols can be found at the start of this catalogue.

Some common examples are:

Standard | Regular length | 5 x D max. working depth | 60° Metric thread form

Contents

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Drills

Catalogue Code	Page No.	Product Group	Description	Point Type	Tool Material	Surface Finish	Standard
D151	25	A1006	Drill, Stub, CNC	130° Form B	HSS Co	TiAlN	DIN1897
D153	25	A1502	Drill, Stub, R40 VA, Black Magic	4 Facet	HSS Co	TiAlN	DIN1897
D155	25	A1502	Drill, Stub, R40 UNI	130° 4 Facet Form B	SPM	TiAlN	DIN1897
D163	28	A0418	Drill, Jobber, DHJ	130° Form B	HSS Co	TiAlN	DIN338
D165	28	A0418	Drill, Jobber, DXJ	130° Form A	HSS Co	TiAlN	DIN338
D168	28	A1502	Drill, Jobber, R40 UNI	130° 4 Facet Form B	SPM	TiAlN	DIN338
D169	28	A1502	Drill, Jobber, R40 VA, Black Magic	4 Facet Form C	HSS Co	TiAlN	DIN338
D171	31	A0508	Drill, Long Series, DHL	130° Form B	HSS Co	TiAlN	DIN340
D177	25	A1006	Drill, Stub, DXS	130° Form A	HSS Co	TiAlN	DIN1897
D194	32	A0508	Drill, Extra Long, DHXL-1	130° Form B	HSS Co	TiAlN	DIN1869-1
D195	32	A0508	Drill, Extra Long, DHXL-2	130° Form B	HSS Co	TiAlN	DIN1869-2
D196	32	A0508	Drill, Extra Long, DHXL-3	130° Form B	HSS Co	TiAlN	DIN1869-3
D323	16	A0210	Drill, 3xD, R30 N, Shank Form HA	140° Form C	VHM	AlCrN	DIN6537
D326	20	A0210	Drill, 5xD, R30 N, Shank Form HA	140° Form C	VHM	AlCrN	DIN6537
D329	16	A0210	Drill, 3xD, R30 N, Shank Form HA, IK	140° Form C	VHM	AlCrN	DIN6537
D332	20	A0210	Drill, 5xD, R30 N, Shank Form HA, IK	140° Form C	VHM	AlCrN	DIN6537
D335	23	A0210	Drill, 8xD, R30 N, Shank Form HA, IK	140° Form C	VHM	AlCrN	DIN6537
D356	16	A0210	Drill, 3xD, R30 VA, Shank Form HA, Black Magic	140° 4 Facet Form C	VHM	Helica	DIN6537
D358	20	A0210	Drill, 5xD, R30 VA, Shank Form HA, Black Magic	140° 4 Facet Form C	VHM	Helica	DIN6537
D364	33	A0210	Drill, NC Spotting	90°	VHM	AlCrN	~DIN1897
D366	33	A0210	Drill, NC Spotting	142°	VHM	AlCrN	~DIN1897
D371	24	A0210	Drill, 12xD, Shank Form HA, IK	135° Form C	VHM	AlCrN Tip	-

Endmills

Catalogue Code	Page No.	Product Group	Description	Shank Form	Tool Material	Surface Finish	Standard
E151	57	B0408	Rougher, HRS (fine), R45 UNI, Regular	DIN 1835-B	SPM	TiAlN	DIN844K
E251	57	B0408	Rougher, HR (fine) R30 VA-R, Regular	DIN 1835-B	SPM	AlCrN	DIN844K
E252	57	B0408	Rougher, HR (fine) R30 VA-R, Long	DIN 1835-B	SPM	AlCrN	DIN844L
E255	57	B0408	Rougher, HR (fine) R30 VA-R, Regular, Corner Rad	DIN 1835-B	SPM	AlCrN	DIN844K
E310	48	B0208	Slot Drill, Long, 2 Flute, R40 Al, AlCarb	DIN 6535-HA	VHM	Brt	DIN6527L
E400	49	B0210	Endmill, Long, 3 Flute, R45/46/44 Al, Harmony	DIN 6535-HA	VHM-Ultra	CrN	DIN6527L
E402	49	B0210	Endmill, Long Reach, 3 Flute, R45/46/44 Al, Harmony	DIN 6535-HA	VHM-Ultra	CrN	-
E408	49	B0210	Endmill, Long Reach, Ballnose, 3 Flute, R45/46/44 Al, Harmony	DIN 6535-HA	VHM-Ultra	CrN	-
E410	39	B0210	Endmill, Long, 3 Flute, R55/54/56 VA, Harmony	DIN 6535-HA	VHM-Ultra	Helica	DIN6527L
E422	34	B0210	Endmill, Short, 3 Flute, R38/37/39 UNI, Harmony	DIN 6535-HA	VHM-Ultra	AlCrN	DIN6527K
E424	34	B0210	Endmill, Long, 3 Flute, R38/37/39 UNI, Harmony	DIN 6535-HA	VHM-Ultra	AlCrN	DIN6527L
E430	46	B0210	Endmill, Long Reach, 4 Flute, R45/44 UNI, Harmony	DIN 6535-HA	VHM-Ultra	AlCrN	-
E432	44	B0210	Endmill, Long, 6-8 Flute, R50/35 NH, Harmony	DIN 6535-HA	VHM-Ultra	AlCrN	DIN6527L
E434	44	B0210	Endmill, Extra Long, 6-8 Flute, R50/35 NH, Harmony	DIN 6535-HA	VHM-Ultra	AlCrN	-
E436	44	B0210	Endmill, Long Reach, 6-8 Flute, R50/35 NH, Harmony	DIN 6535-HA	VHM-Ultra	AlCrN	-
E440	47	B0210	Slot Drill, Ballnose, 2 Flute, R30 UNI, Long Reach	DIN 6535-HA	VHM Ultra	AlCrN	-
E442	47	B0210	Endmill, Ballnose, 4 Flute, R30 UNI, Long Reach	DIN 6535-HA	VHM Ultra	AlCrN	-
E456	33	B0210	Endmill Chamfer, 4 Flute, 90°	DIN 6535-HA	VHM	TiAlN	-
E457	33	B0210	Endmill Chamfer, 4 Flute, 60°	DIN 6535-HA	VHM	TiAlN	-
E458	33	B0210	Endmill Chamfer, 4 Flute, Corner Rad	DIN 6535-HA	VHM	TiAlN	-
E459	40	B0210	Endmill, Long, 4 Flute, R40/42 VA, Harmony	DIN 6535-HA	VHM-Ultra	Helica	DIN6527L
E460	40	B0210	Endmill, Long, 4 Flute, R40/42 VA, Harmony	DIN 6535-HB	VHM Ultra	Helica	DIN6527L

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Endmills

Catalogue Code	Page No.	Product Group	Description	Shank Form	Tool Material	Surface Finish	Standard
E462	40	B0210	Endmill, Long, 4 Flute, R40/42 VA, Corner Rad, Harmony	DIN 6535-HA	VHM-Ultra	Helica	DIN6527L
E463	40	B0210	Endmill, Long, 4 Flute, R40/42 VA, Corner Rad, Harmony	DIN 6535-HB	VHM Ultra	AlNova	DIN6527L
E464	41	B0210	Endmill, 5 Flute, R40/42 Ti, DIN6527L, Harmony	DIN 6535-HA	VHM Ultra	AlNova	DIN6527L
E465	41	B0210	Endmill, 5 Flute, R40/42 Ti, DIN6527L, Harmony	DIN 6535-HB	VHM Ultra	AlNova	DIN6527L
E466	41	B0210	Endmill, 5 Flute, R40/42 Ti, Cnr Rad, DIN6527L, Harmony	DIN 6535-HA	VHM Ultra	AlNova	DIN6527L
E467	41	B0210	Endmill, 5 Flute, R40/42 Ti, Cnr Rad, DIN6527L, Harmony	DIN 6535-HB	VHM Ultra	AlNova	DIN6527L
E468	43	B0210	Endmill, 6 Flute, R40/42 Ti, DIN6527L, Harmony	DIN 6535-HA	VHM Ultra	AlNova	DIN6527L
E469	43	B0210	Endmill, 6 Flute, R40/42 Ti, DIN6527L, Harmony	DIN 6535-HB	VHM Ultra	AlNova	DIN6527L
E470	43	B0210	Endmill, 6 Flute, R40/42 Ti, Cnr Rad, DIN6527L, Harmony	DIN 6535-HA	VHM Ultra	AlNova	DIN6527L
E471	43	B0210	Endmill, 6 Flute, R40/42 Ti, Cnr Rad, DIN6527L, Harmony	DIN 6535-HB	VHM Ultra	AlNova	DIN6527L
E472	45	B0210	Endmill, 5 Flute, R40/42 Ni, DIN6527L, Harmony	DIN 6535-HA	VHM Ultra	Xceed	DIN6527L
E473	45	B0210	Endmill, 5 Flute, R40/42 Ni, DIN6527L, Harmony	DIN 6535-HB	VHM Ultra	Xceed	DIN6527L
E474	45	B0210	Endmill, 5 Flute, R40/42 Ni, Cnr Rad, DIN6527L, Harmony	DIN 6535-HA	VHM Ultra	Xceed	DIN6527L
E475	45	B0210	Endmill, 5 Flute, R40/42 Ni, Cnr Rad, DIN6527L, Harmony	DIN 6535-HB	VHM Ultra	Xceed	DIN6527L
E476	42	B0210	Endmill, 5 Flute, R40/42 Ti-3XL, Cnr Rad, DIN6527L, Harmony	DIN 6535-HA	VHM Ultra	AlNova	DIN6527L
E477	42	B0210	Endmill, 5 Flute, R40/42 Ti-4XL, Cnr Rad, DIN6527L, Harmony	DIN 6535-HA	VHM Ultra	AlNova	DIN6527L
E533	35	B0210	Endmill, Short, 4 Flute, R35/38 UNI, Harmony	DIN 6535-HA	VHM-Ultra	AlCrN	DIN6527K
E535	35	B0210	Endmill, Long, 4 Flute, R35/38 UNI, Harmony	DIN 1835-HA	VHM Ultra	AlCrN	DIN6527L
E543	44	B0210	Endmill, Long, 6-8 Flute, R45 VH, Harmony	DIN 6535-HA	VHM-Ultra	AlCrN	DIN6527L
E545	37	B0210	Endmill, Long, 4 Flute, R45 STF, Harmony	DIN 1835-HA	VHM Ultra	AlCrN	DIN6527L
E549	37	B0210	Rougher, Long, HRS (fine), 3-6 Flute, R45 UNI, Harmony	DIN 1835-HA	VHM Ultra	AlCrN	DIN6527L
E559	36	B0210	Endmill, 4 Flute, R35/38 UNI Corner Rad, Harmony	DIN 6535-HA	VHM-Ultra	AlCrN	-
E562	38	B0210	Endmill, Long, 4 Flute, R50 NH, Harmony DUO	DIN 6535-HA	VHM-Ultra	AlCrN	DIN6527L
E564	38	B0210	Endmill, Long, 4 Flute, R50 NH Corner Rad, Harmony DUO	DIN 6535-HA	VHM-Ultra	AlCrN	DIN6527L
E566	38	B0210	Endmill, Long, 4 Flute, R50 VH, Harmony DUO	DIN 6535-HA	VHM-Ultra	Aldura	DIN6527L
E568	38	B0210	Endmill, Long, 4 Flute, R50 VH Corner Rad, Harmony DUO	DIN 6535-HA	VHM-Ultra	Aldura	DIN6527L
E580	50	B0218	Endmill, Micro, 2 Flute, Long Reach	DIN 6535-HA	VHM	TiSiN	-
E581	52	B0218	Endmill, Micro, 2 Flute, Long Reach, Corner Radius	DIN 6535-HA	VHM	TiSiN	-
E582	53	B0218	Endmill, Micro, Ballnose, 2 Flute, Long Reach	DIN 6535-HA	VHM	TiSiN	-
E598	54	B0218	Endmill, Micro, 4 Flute, Corner Rad, Long Reach	DIN 6535-HA	VHM	TiSiN	-
E650	56	B0218	Endmill, Micro, 4/6 Flute, Corner Rad	DIN 6535-HA	VHM	TiSiN	-

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Taps

Catalogue Code	Page No.	Product Group	Description	Thread	Geometry Type	Tool Material	Surface Finish	Standard
T104	11	D0406	Tap, Gun, N	M	N	HSSE	TiN	DIN371
T105	11	D0406	Tap, Gun, N	M	N	HSSE	TiN	DIN376
T116	10	D0408	Tap, Gun, VA PM	M	VA PM	PM-HSSE V3	TiCN	DIN371
T117	10	D0408	Tap, Gun, VA PM	M	VA PM	PM-HSSE V3	TiCN	DIN376
T122	11	D0402	Tap, Gun, W	M	W	HSSE	Ni	DIN371
T123	11	D0402	Tap, Gun, W	M	W	HSSE	Ni	DIN376
T128	11	D0402	Tap, Gun, W-AZ	M	W - AZ	HSSE	Brt	DIN371
T129	11	D0402	Tap, Gun, W-AZ	M	W - AZ	HSSE	Brt	DIN376
T140	10	D0410	Tap, Gun, NH	M	NH	PM-HSSE V3	TiAlN	DIN371
T141	10	D0410	Tap, Gun, NH	M	NH	PM-HSSE V3	TiAlN	DIN376
T146	11	D0408	Tap, Gun, H	M	H	PM-HSS Co	TiCN	DIN371
T147	11	D0408	Tap, Gun, H	M	H	PM-HSS Co	TiCN	DIN376
T152	11	D0408	Tap, Spiral Flute, L12 Ti	M	Ti	PM-HSS Co	TiCN	DIN371
T153	11	D0408	Tap, Spiral Flute, L12 Ti	M	Ti	PM-HSS Co	TiCN	DIN376
T157	11	D0406	Tap, Gun, N	MF	N	HSSE	TiN	DIN374
T160	10	D0408	Tap, Gun, VA PM	MF	VA PM	PM-HSSE V3	TiCN	DIN374
T163	10	D0410	Tap, Gun, NH	MF	NH	PM-HSSE V3	TiAlN	DIN374
T205	8	D0408	Tap, Spiral Flute, R50 VA PM	M	VA PM	PM-HSSE V3	TiCN	DIN371
T206	8	D0408	Tap, Spiral Flute, R50 VA PM	M	VA PM	PM-HSSE V3	TiCN	DIN376
T211	9	D0408	Tap, Spiral Flute, R15 H	M	H	PM-HSS Co	TiCN	DIN371
T212	9	D0408	Tap, Spiral Flute, R15 H	M	H	PM-HSS Co	TiCN	DIN376
T215	9	D0408	Tap, Spiral Flute, R15 Ti	M	Ti	PM-HSS Co	TiCN	DIN371
T216	9	D0408	Tap, Spiral Flute, R15 Ti	M	Ti	PM-HSS Co	TiCN	DIN376
T217	9	D0408	Tap, Spiral Flute, R10 Ni	M	Ni	PM-HSS Co	TiCN	DIN371
T218	9	D0408	Tap, Spiral Flute, R10 Ni	M	Ni	PM-HSS Co	TiCN	DIN376
T227	8	D0410	Tap, Spiral Flute, R40 NH	M	NH	PM-HSSE V3	TiAlN	DIN371
T228	8	D0410	Tap, Spiral Flute, R40 NH	M	NH	PM-HSSE V3	TiAlN	DIN376
T231	9	D0402	Tap, Spiral Flute, R45 Al	M	Al	HSSE	Brt	DIN371
T232	9	D0402	Tap, Spiral Flute, R45 Al	M	Al	HSSE	Brt	DIN376
T235	9	D0402	Tap, Spiral Flute, R45 W	M	W	HSSE	Ni	DIN371
T236	9	D0402	Tap, Spiral Flute, R45 W	M	W	HSSE	Ni	DIN376
T239	9	D0404	Tap, Spiral Flute, R45 Cu	M	Cu	HSSE	CrN	DIN371
T240	9	D0404	Tap, Spiral Flute, R45 Cu	M	Cu	HSSE	CrN	DIN376
T241	9	D0406	Tap, Spiral Flute, R45 W	M	W	HSSE	TiN	DIN371
T242	9	D0406	Tap, Spiral Flute, R45 W	M	W	HSSE	TiN	DIN376
T252	8	D0408	Tap, Spiral Flute, R50 VA PM	MF	VA PM	PM-HSSE V3	TiCN	DIN374
T254	8	D0410	Tap, Spiral Flute, R40 NH	MF	NH	PM-HSSE V3	TiAlN	DIN374
T292	12	D0408	Tap, Straight Flute, GG	M	GG	HSSE	TiCN	DIN371
T293	12	D0408	Tap, Straight Flute, GG	M	GG	HSSE	TiCN	DIN376
T294	13	D0408	Tap, Straight Flute, XH, Form C	M	XH	SPM	TiCN	-
T295	13	D0408	Tap, Straight Flute, XH, Form D	M	XH	SPM	TiCN	-
T296	13	D0414	Tap, Straight Flute, VH, Form C	M	VH	VHM	TiCN	-
T297	13	D0414	Tap, Straight Flute, VH, Form D	M	VH	VHM	TiCN	-
T301	12	D0408	Tap, Straight Flute, GG	MF	GG	HSSE	TiCN	DIN374
T313	14	D0406	Tap, Forming, with no groove	M	N	HSSE	TiN	DIN2174
T319	14	D0408	Tap, Forming, with multi coolant groove	M	N	HSSE	TiCN	DIN2174
T320	14	D0408	Tap, Forming, with multi coolant groove	M	N	HSSE	TiCN	DIN2174
T325	15	D0410	Tap, Forming, with multi coolant groove, UNI	M	UNI	SPM	TiAlN	DIN2174
T326	15	D0410	Tap, Forming, with multi coolant groove, UNI	M	UNI	SPM	TiAlN	DIN2174

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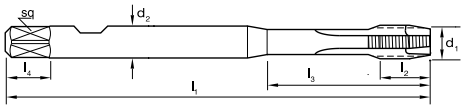
Taps

Catalogue Code	Page No.	Product Group	Description	Thread	Geometry Type	Tool Material	Surface Finish	Standard
T327	15	D0410	Tap, Forming, with multi coolant groove, UNI, IK	M	UNI - IK	SPM	TiAlN	DIN2174
T328	15	D0410	Tap, Forming, with multi coolant groove, UNI, IK	M	UNI - IK	SPM	TiAlN	DIN2174
T329	14	D0404	Tap, Forming, with single coolant groove, Cu	M	Cu	HSSE	CrN	DIN2174
T330	14	D0404	Tap, Forming, with single coolant groove, Cu	M	Cu	HSSE	CrN	DIN2174
T335	12	D0408	Tap, Straight Flute, DC	M	DC	PM-HSS Co	TiCN	DIN371
T336	12	D0408	Tap, Straight Flute, DC	M	DC	PM-HSS Co	TiCN	DIN376
T343	13	D0408	Tap, Straight Flute, XH	MF	XH	SPM	TiCN	-
T344	13	D0408	Tap, Straight Flute, XH	MF	XH	SPM	TiCN	-
T345	13	D0414	Tap, Straight Flute, VH	MF	VH	VHM	TiCN	-
T346	13	D0414	Tap, Straight Flute, VH	MF	VH	VHM	TiCN	-
T357	12	D0408	Tap, Straight Flute, DC, IK	M	DC - IK	PM-HSS Co	TiCN	DIN371
T358	12	D0408	Tap, Straight Flute, DC, IK	M	DC - IK	PM-HSS Co	TiCN	DIN376
T365	7	D0412	Tap, Spiral Flute, Synchro, L20	M	~DIN1835-B /HSC	PM-HSSE V3	TiCN	-
T367	7	D0412	Tap, Spiral Flute, Synchro, L20, IK	M	~DIN1835-B /HSC	PM-HSSE V3	TiCN	-
T369	7	D0412	Tap, Spiral Flute, Synchro, R45 Al	M	~DIN1835-B /HSC	PM-HSSE V3	CrN	-
T371	7	D0412	Tap, Spiral Flute, Synchro, R45 Al, IK	M	~DIN1835-B /HSC	PM-HSSE V3	CrN	-
T373	6	D0412	Tap, Spiral Flute, Synchro, R50	M	~DIN1835-B /HSC	PM-HSSE V3	TiCN	-
T375	6	D0412	Tap, Spiral Flute, Synchro, R50, IK	M	~DIN1835-B /HSC	PM-HSSE V3	TiCN	-
T377	6	D0412	Tap, Gun, Synchro	M	~DIN1835-B /HSC	PM-HSSE V3	TiCN	-
T379	6	D0412	Tap, Gun, Synchro, IK	M	~DIN1835-B /HSC	PM-HSSE V3	TiCN	-
T381*	7	D0412	Tap, Forming, Synchro	M	~DIN1835-B /HSC	PM-HSSE V3	TiN	-
T383*	7	D0412	Tap, Forming, Synchro, IK	M	~DIN1835-B /HSC	PM-HSSE V3	TiN	-
T668	12	D0408	Tap, Straight Flute, DC	MF	DC	PM-HSS Co	TiCN	DIN374
T669	12	D0408	Tap, Straight Flute, DC, IK	MF	DC	PM-HSS Co	TiCN	DIN374
T670	12	D0414	Tap, Straight Flute, GG	M	GG	VHM	TiCN	DIN371
T671	12	D0414	Tap, Straight Flute, GG	M	GG	VHM	TiCN	DIN376
T682	15	D0414	Tap, Forming, VH, with multi coolant groove	M	VH	VHM	TiCN	DIN2174
T683	15	D0414	Tap, Forming, VH, with multi coolant groove	M	VH	VHM	TiCN	DIN2174
T684	8	D0410	Tap, Spiral Flute, R50 Black Magic	M	UNI	PM-HSSE V3	Hardlube	DIN371
T685	8	D0410	Tap, Spiral Flute, R50 Black Magic	M	UNI	PM-HSSE V3	Hardlube	DIN376
T686	8	D0410	Tap, Spiral Flute, R50 Black Magic	MF	UNI	PM-HSSE V3	Hardlube	DIN374
T687	10	D0410	Tap, Gun, Black Magic	M	UNI	PM-HSSE V3	Hardlube	DIN371
T688	10	D0410	Tap, Gun, Black Magic	M	UNI	PM-HSSE V3	Hardlube	DIN376
T689	10	D0410	Tap, Gun, Black Magic	MF	UNI	PM-HSSE V3	Hardlube	DIN374
T743	12	D0414	Tap, Straight Flute, GG	MF	GG	VHM	TiCN	DIN374
T747	15	D0414	Tap, Forming, VH-IK, with multi coolant groove	M	VH	VHM	TiCN	DIN2174
T748	15	D0414	Tap, Forming, VH-IK, with multi coolant groove	M	VH	VHM	TiCN	DIN2174
T773	14	D0408	Tap, Forming, with multi coolant groove	MF	N	HSSE	TiCN	DIN2174

suttontools

- For high speed and precision tapping
- For rigid tapping in CNC machines with synchronised feed
- With and without internal coolant
- h6 endmill shank

For speed and feeds, refer page 65



Product Name	Synchro	Synchro	Synchro	Synchro
Product Group	D0412	D0412	D0412	D0412
Material	PM-HSSE V3	PM-HSSE V3	PM-HSSE V3	PM-HSSE V3
Surface Finish	*TiCN*	*TiCN*	*TiCN*	*TiCN*
Application	HSC	HSC	HSC	HSC
Geometry	Gun	Gun - IK	R50	R50 IK
Chamfer	Form B / 4.5 x P	Form B / 4.5 x P	Form C / 2.5 x P	Form C / 2.5 x P
Limit	6HX	6HX	6HX	6HX
ISO Materials	P M K N S	P M K N S	P M K N S	P M K N S

Size Ref.	d_1	Pitch	l_1	l_2	l_3	d_2	sq	z	Drill Ø	Item #	Item #	Item #	Item #
	SUTTON STD									T377	T379	T373	T375
0200	M 2	x 0.4	70	4	13	6.0	4.9	3	1.6	T377 0200		T373 0200	
0250	M 2.5	x 0.45	70	4.5	14	6.0	4.9	3	2.1	T377 0250		T373 0250	
0300	M 3	x 0.5	70	5	18	6.0	4.9	3	2.5	T377 0300		T373 0300	
0400	M 4	x 0.7	70	7	21	6.0	4.9	3	3.3	T377 0400		T373 0400	
0500	M 5	x 0.8	70	8	25	6.0	4.9	3	4.2	T377 0500	T379 0500	T373 0500	T375 0500
0600	M 6	x 1.0	80	10	30	6.0	4.9	3	5.0	T377 0600	T379 0600	T373 0600	T375 0600
0800	M 8	x 1.25	90	13	35	8.0	6.2	3	6.8	T377 0800	T379 0800	T373 0800	T375 0800
1000	M 10	x 1.5	100	15	39	10.0	8.0	3	8.5	T377 1000	T379 1000	T373 1000	T375 1000
1200	M 12	x 1.75	110	18	42	12.0	9.0	3	10.3	T377 1200	T379 1200	T373 1200	T375 1200
1400	M 14	x 2.0	110	20	49	14.0	11.0	3	12.0	T377 1400	T379 1400	T373 1400	T375 1400
1600	M 16	x 2.0	110	20	55	16.0	12.0	4	14.0	T377 1600	T379 1600	T373 1600	T375 1600
1800	M 18	x 2.5	125	25	-	16.0	12.0	4	15.5	T377 1800	T379 1800	T373 1800	T375 1800
2000	M 20	x 2.5	140	25	-	16.0	12.0	4	17.5	T377 2000	T379 2000	T373 2000	T375 2000

Recommended Tapping Drill

D153 / D356	D153 / D356	D153 / D356	D153 / D356

Synchro Taps

watch the video

ISO Materials: P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials






Synchro	Synchro	Synchro	Synchro	Synchro	Synchro
D0412	D0412	D0412	D0412	D0412	D0412
PM-HSSE V3	PM-HSSE V3	PM-HSSE V3	PM-HSSE V3	PM-HSSE V3	PM-HSSE V3
TiCN	*TiCN*	*CrN*	*CrN*	*TiN*	*TiN*
HSC	**HSC**	**HSC**	**HSC**	**HSC**	**HSC**
L20	L20-IK	R45 Al	R45 Al - IK	Forming	Forming - IK
Form D / 4 x P	Form D / 4 x P	Form C / 2.5 x P	Form C / 2.5 x P	Form C / 2.5 x P	Form C / 2.5 x P
6HX	6HX	6HX	6HX	6HX	6HX
P M K N S	P M K N S	N	N	P M N	P M N
Item #	**Item #**	**Item #**	**Item #**	**Item #**	**Item #**
T365	**T367**	**T369**	**T371**	**T381***	**T383***
T365 0200		T369 0200		T381 0200	
T365 0250		T369 0250		T381 0250	
T365 0300		T369 0300		T381 0300	
T365 0400		T369 0400		T381 0400	
T365 0500	T367 0500	T369 0500	T371 0500	T381 0500	T383 0500
T365 0600	T367 0600	T369 0600	T371 0600	T381 0600	T383 0600
T365 0800	T367 0800	T369 0800	T371 0800	T381 0800	T383 0800
T365 1000	T367 1000	T369 1000	T371 1000	T381 1000	T383 1000
T365 1200	T367 1200	T369 1200	T371 1200	T381 1200	T383 1200
T365 1400	T367 1400	T369 1400	T371 1400	T381 1400	T383 1400
T365 1600	T367 1600	T369 1600	T371 1600	T381 1600	T383 1600
T365 1800	T367 1800	T369 1800	T371 1800	T381 1800	T383 1800
T365 2000	T367 2000	T369 2000	T371 2000	T381 2000	T383 2000

D153 / D356	D153 / D356	D153 / D356	D153 / D356	D153 / D356	D153 / D356






Refer page 14 for forming tap drill sizes

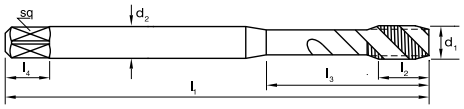
Taps Metric - For Blind Holes

suttontools

- For tapping blind holes
- PM-HSSE V3 offers superior tool life
- HSSE for most tapping application
- PM-HSS Co for heavy duty tapping in nickel and titanium alloys

For speed and feeds, refer page 64

DIN 371 | DIN 376 | DIN 374 | 60° M | 60° MF



	Black Magic	R50 VA	R40 NH
Product Name	Black Magic	R50 VA	R40 NH
Product Group	D0410	D0408	D0410
Material	PM-HSSE V3	PM-HSSE V3	PM-HSSE V3
Surface Finish	*HARDLUBE*	*TiCN*	*TiAlN*
Application	UNI	VA PM	NH
Geometry	R50	R50	R40
Chamfer	Form C / 2.5 x P	Form C / 2.5 x P	Form C / 2.5 x P
Limit & Nut Tolerance	6HX	6HX	ISO 2 / 6H
ISO Materials	P M K N	P M S	P M K

Size Ref.	d_1	Pitch	l_1	l_2	l_3	d_2	sq	z	Drill Ø	Item # T684	Item # T205	Item # T227
	DIN 371 REINFORCED SHANK									T684	T205	T227
0300	M 3	x 0.5	56	5	18	3.5	2.7	3	2.5	T684 0300	T205 0300	T227 0300
0400	M 4	x 0.7	63	7	21	4.5	3.4	3	3.3	T684 0400	T205 0400	T227 0400
0500	M 5	x 0.8	70	8	25	6.0	4.9	3	4.2	T684 0500	T205 0500	T227 0500
0600	M 6	x 1.0	80	10	30	6.0	4.9	3	5.0	T684 0600	T205 0600	T227 0600
0800	M 8	x 1.25	90	12.5	35	8.0	6.2	3	6.8	T684 0800	T205 0800	T227 0800
1000	M 10	x 1.5	100	15	39	10.0	8.0	3	8.5	T684 1000	T205 1000	T227 1000
	DIN 376 REDUCED SHANK									T685	T206	T228
0600	M 6	x 1.0	80	10	-	4.5	3.4	3	5.0	•	•	•
0800	M 8	x 1.25	90	12.5	-	6.0	4.9	3	6.8	•	•	•
1000	M 10	x 1.5	100	15	-	7.0	5.5	3	8.5	•	•	•
1200	M 12	x 1.75	110	17.5	-	9.0	7.0	3	10.2	T685 1200	T206 1200	T228 1200
1400	M 14	x 2.0	110	20	-	11.0	9.0	3	12.0	T685 1400	T206 1400	T228 1400
1600	M 16	x 2.0	110	20	-	12.0	9.0	3	14.0	T685 1600	T206 1600	T228 1600
1800	M 18	x 2.5	125	25	-	14.0	11.0	4	15.5	T685 1800	T206 1800	T228 1800
2000	M 20	x 2.5	140	25	-	16.0	12.0	4	17.5	T685 2000	T206 2000	T228 2000
	DIN 374 FINE PITCH - REDUCED SHANK									T686	T252	T254
0604	MF 6	x 0.75	80	8	-	4.5	3.4	3	5.3	T686 0604	T252 0604	T254 0604
0805	MF 8	x 1.0	90	8	-	6.0	4.9	3	7.0	T686 0805	•	T254 0805
1005	MF 10	x 1.0	90	10	-	7.0	5.5	3	9.0	T686 1005	T252 1005	T254 1005
1006	MF 10	x 1.25	100	13	-	7.0	5.5	3	8.8	T686 1006	•	T254 1006
1205	MF 12	x 1.0	100	14	-	9.0	7.0	3	11.0	T686 1205	T252 1205	T254 1205
1206	MF 12	x 1.25	100	14	-	9.0	7.0	3	10.8	T686 1206	T252 1206	T254 1206
1207	MF 12	x 1.5	100	14	-	9.0	7.0	3	10.5	T686 1207	T252 1207	T254 1207
1406	MF 14	x 1.25	100	16	-	11.0	9.0	3	12.8	T686 1406	T252 1406	T254 1406
1407	MF 14	x 1.5	100	16	-	11.0	9.0	3	12.5	•	T252 1407	T254 1407
1607	MF 16	x 1.5	100	16	-	12.0	9.0	3	16.5	•		T254 1607
	Other Available Thread Forms									UNC, UNF, G(BSPF)		

Recommended Tapping Drill

D155 / D323	D153 / D356	D155 / D323

Black Magic Taps

watch the video

•Available on request as special manufacture. Subject to lead time.

Refer to our complete catalogue online for entire range

ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials







R45 Al	R45 Cu	R45 W	R45 W	R15 H	R15 Ti	R10 Ni
D0402	D0404	D0406	D0402	D0408	D0408	D0408
HSSE	HSSE	HSSE	HSSE	PM-HSS Co	PM-HSS Co	PM-HSS Co
Brt	*CrN*	*TiN*	*Ni*	*TiCN*	*TiCN*	*TiCN*
Al	Cu	W	W	H	Ti	Ni
R45 2 Flute	R45	R45	R45	R15	R15	R10
Form C / 2.5 x P	Form C / 2.5 x P	Form C / 2.5 x P	Form C / 2.5 x P	Form C / 3 x P	Form C / 3 x P	Form C / 3 x P
ISO 2 / 6H	ISO 2 / 6H	ISO 2 / 6H	ISO 2 / 6H	ISO 2 / 6HX	6HX	6HX
N	P N	P N	P N	P K S H	P S	S
Item #	**Item #**	**Item #**	**Item #**	**Item #**	**Item #**	**Item #**
T231	**T239**	**T241**	**T235**	**T211**	**T215**	**T217**
T231 0300	T239 0300	T241 0300	T235 0300	T211 0300	T215 0300	T217 0300
T231 0400	T239 0400	T241 0400	T235 0400	T211 0400	T215 0400	T217 0400
T231 0500	T239 0500	T241 0500	T235 0500	T211 0500	T215 0500	T217 0500
T231 0600	T239 0600	T241 0600	T235 0600	T211 0600	T215 0600	T217 0600
T231 0800	T239 0800	T241 0800	T235 0800	T211 0800	T215 0800	T217 0800
T231 1000	T239 1000	T241 1000	T235 1000	T211 1000	T215 1000	T217 1000
T232	**T240**	**T242**	**T236**	**T212**	**T216**	**T218**
•	T240 0600	T242 0600	T236 0600	•		
•	•	T242 0800	T236 0800	•		
•	•	T242 1000	T236 1000	•		
T232 1200	T240 1200	T242 1200	T236 1200	T212 1200	T216 1200	T218 1200
	T240 1400	T242 1400	T236 1400	T212 1400	T216 1400	T218 1400
	T240 1600	T242 1600	T236 1600	T212 1600	T216 1600	T218 1600
	T240 1800	T242 1800	T236 1800	T212 1800	T216 1800	•
	T240 2000	T242 2000	T236 2000	T212 2000	T216 2000	T218 2000
		UNC, UNF, G(BSPF)	UNC	UNC		
D153	D177	D153	D153	D155 / D323	D155 / D356	D155 / D356







•Available on request as special manufacture. Subject to lead time.

ISO Materials: P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

Refer to our complete catalogue online for entire range

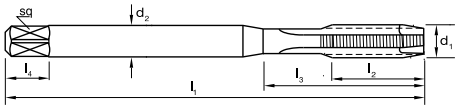
Taps Metric - For Through Holes

suttontools

- For tapping through holes
- PM-HSSE V3 offers superior tool life
- HSSE for most tapping application
- PM-HSS Co for heavy duty tapping in nickel and titanium alloys

For speed and feeds, refer page 64

DIN 371 | DIN 376 | DIN 374 | 60° M | 60° MF



Product Name	Black Magic	Gun VA PM	Gun NH
Product Group	D0410	D0408	D0410
Material	PM-HSSE V3	PM-HSSE V3	PM-HSSE V3
Surface Finish	*HARDLUBE*	*TiCN*	*TiAlN*
Application	UNI	VA PM	NH
Geometry	Special Relief	Special Relief	
Chamfer	Form B / 4.5 x P	Form B / 4.5 x P	Form B / 4.5 x P
Limit & Nut Tolerance	6HX	6HX	ISO 2 / 6H
ISO Materials	P M K N	P M S	P M K

Size Ref.	d_1	Pitch	l_1	l_2	l_3	d_2	sq	z	Drill Ø	Item #	Item #	Item #
	DIN 371 REINFORCED SHANK									T687	T116	T140
0300	M 3	x 0.5	56	11	18	3.5	2.7	3	2.5	T687 0300	T116 0300	T140 0300
0400	M 4	x 0.7	63	13	21	4.5	3.4	3	3.3	T687 0400	T116 0400	T140 0400
0500	M 5	x 0.8	70	16	25	6.0	4.9	3	4.2	T687 0500	T116 0500	T140 0500
0600	M 6	x 1.0	80	19	30	6.0	4.9	3	5.0	T687 0600	T116 0600	T140 0600
0800	M 8	x 1.25	90	22	35	8.0	6.2	3	6.8	T687 0800	T116 0800	T140 0800
1000	M 10	x 1.5	100	24	39	10.0	8.0	3	8.5	T687 1000	T116 1000	T140 1000
	DIN 376 REDUCED SHANK									T688	T117	T141
0600	M 6	x 1.0	80	19	-	4.5	3.4	3	5.0		•	•
0800	M 8	x 1.25	90	22	-	6.0	4.9	3	6.8		•	•
1000	M 10	x 1.5	100	24	-	7.0	5.5	3	8.5		•	•
1200	M 12	x 1.75	110	28	-	9.0	7.0	3	10.2	T688 1200	T117 1200	T141 1200
1400	M 14	x 2.0	110	30	-	11.0	9.0	3	12.0	T688 1400	T117 1400	T141 1400
1600	M 16	x 2.0	110	32	-	12.0	9.0	4	14.0	T688 1600	T117 1600	T141 1600
1800	M 18	x 2.5	125	34	-	14.0	11.0	4	15.5	T688 1800	T117 1800	T141 1800
2000	M 20	x 2.5	140	34	-	16.0	12.0	4	17.5	T688 2000	T117 2000	T141 2000
	DIN 374 FINE PITCH - REDUCED SHANK									T689	T160	T163
0604	MF 6	x 0.75	80	14	-	4.5	3.4	3	5.3	T689 0604	T160 0604	T163 0604
0805	MF 8	x 1.0	90	22	-	6.0	4.9	3	7.0	T689 0805	•	T163 0805
1005	MF 10	x 1.0	90	20	-	7.0	5.5	3	9.0	T689 1005	T160 1005	T163 1005
1006	MF 10	x 1.25	100	24	-	7.0	5.5	3	8.8	T689 1006	•	T163 1006
1205	MF 12	x 1.0	100	22	-	9.0	7.0	3	11.0	T689 1205	T160 1205	T163 1205
1206	MF 12	x 1.25	100	22	-	9.0	7.0	3	10.8	T689 1206	T160 1206	T163 1206
1207	MF 12	x 1.5	100	22	-	9.0	7.0	3	10.5	T689 1207	T160 1207	T163 1207
1406	MF 14	x 1.25	100	22	-	11.0	9.0	3	12.8	T689 1406	T160 1406	T163 1406
1407	MF 14	x 1.5	100	22	-	11.0	9.0	3	12.5		•	T163 1407
1607	MF 16	x 1.5	100	22	-	12.0	9.0	3	14.5		•	T163 1607
										Other Available Thread Forms	UNC, UNF, G(BSPF)	UNC, UNF, G(BSPF)	UNC

Recommended Tapping Drill

D155 / D323	D153 / D356	D155 / D323

Black Magic Taps

watch the video

•Available on request as special manufacture. Subject to lead time.

Refer to our complete catalogue online for entire range

ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials





Gun W AZ	Gun N	Gun W	Gun H	Spiral Ti
D0402	D0406	D0402	D0408	D0408
HSSE	HSSE	HSSE	PM-HSS Co	PM-HSS Co
Brt	*TiN*	*Ni*	*TiCN*	*TiCN*
Sticky Material	**N**	**W**	**H**	**Ti**
Interrupted Threads	Normal		Low Relief	L12
Form B / 4.5 x P	Form B / 4.5 x P	Form B / 4.5 x P	Form B / 4.5 x P	Form B / 4.5 x P
ISO 2 / 6H	ISO 2 / 6H	ISO 2 / 6H	6HX	6HX
P N	P N	P N	P K S H	P S
Item #	Item #	Item #	Item #	Item #
T128	**T104**	**T122**	**T146**	**T152**
T128 0300	T104 0300	T122 0300	T146 0300	T152 0300
T128 0400	T104 0400	T122 0400	T146 0400	T152 0400
T128 0500	T104 0500	T122 0500	T146 0500	T152 0500
T128 0600	T104 0600	T122 0600	T146 0600	T152 0600
T128 0800	T104 0800	T122 0800	T146 0800	T152 0800
T128 1000	T104 1000	T122 1000	T146 1000	T152 1000
T129	**T105**	**T123**	**T147**	**T153**
•	T105 0600		•	
•	T105 0800		•	
•	T105 1000		•	
T129 1200	T105 1200	T123 1200	T147 1200	T153 1200
T129 1400	T105 1400		T147 1400	T153 1400
T129 1600	T105 1600	T123 1600	T147 1600	T153 1600
	T105 1800		T147 1800	T153 1800
	T105 2000	T123 2000	T147 2000	T153 2000
	T157			
	T157 0604			
	T157 0805			
	T157 1005			
	T157 1006			
	T157 1205			
	T157 1206			
	T157 1207			
	T157 1406			
	T157 1407			
	T157 1607			
	UNC, UNF, G(BSPF)		UNC	

D153	D153	D153	D155 / D323	D155 / D356





•Available on request as special manufacture. Subject to lead time.

ISO Materials: P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

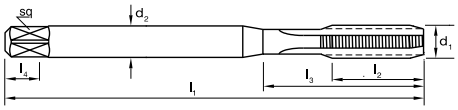
Refer to our complete catalogue online for entire range

suttontools

- For through and blind holes
T292 - For use in grey cast iron (GG)
T670 - For use in Al >10% Si and cast iron (GGG)
T335/T357 - For production tapping in die cast materials

For speed and feeds, refer page 65

DIN 371 | DIN 376 | DIN 374 | 60° M | 60° MF



Product Name	Straight GG	Straight GG	Straight DC	Straight DC
Product Group	D0408	D0414	D0408	D0408
Material	HSSE	VHM	PM-HSS Co	PM-HSS Co
Surface Finish	TiCN	TiCN	TiCN	TiCN
Application	GG	GG	Die Cast	Die Cast
Geometry	Low Relief	Low Relief		IK
Chamfer	Form C / 2.5 x P	Form C / 2.5 x P	Form E / 1.5 x P	Form E / 1.5 x P
Limit	6HX	6H	6HX	6HX
ISO Materials	K	K H	N	N

Size Ref.	d_1	Pitch	l_1	l_2	l_3	d_2	sq	z	Drill Ø	Item #	Item #	Item #	Item #
DIN 371 REINFORCED SHANK										T292	T670	T335	T357
0300	M 3	x 0.5	56	11	18	3.5	2.7	4	2.5	T292 0300	•		
0400	M 4	x 0.7	63	13	21	4.5	3.4	4	3.3	T292 0400	•		
0500	M 5	x 0.8	70	16	25	6.0	4.9	4	4.2	T292 0500	•		
0600	M 6	x 1.0	80	19	30	6.0	4.9	4	5.0	T292 0600	T670 0600	T335 0600	T357 0600
0800	M 8	x 1.25	90	22	35	8.0	6.2	4	6.8	T292 0800	T670 0800	T335 0800	T357 0800
1000	M 10	x 1.5	100	24	39	10.0	8.0	4	8.5	T292 1000	T670 1000	T335 1000	T357 1000
DIN 376 REDUCED SHANK										T293	T671	T336	T358
0600	M 6	x 1.0	80	19	-	4.5	3.4	4	5.0	T293 0600	•		
0800	M 8	x 1.25	90	22	-	6.0	4.9	4	6.8	T293 0800	•		
1000	M 10	x 1.5	100	24	-	7.0	5.5	4	8.5	T293 1000	•		
1200	M 12	x 1.75	110	28	-	9.0	7.0	4	10.2	T293 1200	T671 1200	T336 1200	T358 1200
1400	M 14	x 2.0	110	30	-	11.0	9.0	4	12.0	T293 1400	•	T336 1400	T358 1400
1600	M 16	x 2.0	110	32	-	12.0	9.0	4	14.0	T293 1600	T671 1600	T336 1600	T358 1600
2000	M 20	x 2.5	140	34	-	16.0	12.0	4	17.5	T293 2000	•	T336 2000	T358 2000
DIN 374 FINE PITCH - REDUCED SHANK										T301	T743	T668	T669
0403	MF 4	x 0.5	63	10	-	2.8	2.1	4	3.5	T301 0403	•		
0503	MF 5	x 0.5	70	12	-	3.5	2.7	4	4.5	T301 0503	•		
0604	MF 6	x 0.75	80	14	-	4.5	3.4	4	5.3	T301 0604	•		
0805	MF 8	x 1.0	90	22	-	6.0	4.9	4	7.0	T301 0805	•		
1005	MF 10	x 1.0	90	20	-	7.0	5.5	4	9.0	T301 1005	•		
1006	MF 10	x 1.25	100	24	-	7.0	5.5	4	8.8	T301 1006	•	T668 1006	T669 1006
1206	MF 12	x 1.25	100	22	-	9.0	7.0	4	10.8	T301 1206	•		
1207	MF 12	x 1.5	100	22	-	9.0	7.0	4	10.5	T301 1207	•	T668 1207	T669 1207
1406	MF 14	x 1.25	100	22	-	11.0	9.0	4	12.8	T301 1406	•		
1407	MF 14	x 1.5	100	22	-	11.0	9.0	4	12.5	T301 1407	•	T668 1407	T669 1407
1607	MF 16	x 1.5	100	22	-	12.0	9.0	4	14.5	T301 1607	•	T668 1607	T669 1607
1807	MF 18	x 1.5	110	25	-	14.0	11.0	4	16.5	T301 1807	•		
2007	MF 20	x 1.5	125	25	-	16.0	12.0	4	18.5	T301 2007	•		

Recommended Tapping Drill

D155 / D323	D155 / D323	D356	D356

• Available on request as special manufacture. Subject to lead time.

ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

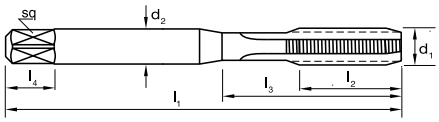
Taps Metric, For Blind/Through Holes

suttontools

- Suitable for machine operations
- Depths up to approximately. 1.5 x d_1

T294-T295 - Use in hardened steels 42-52 HRc
T296-T297 - Use in hardened steels 50-60 HRc

For speed and feeds, refer page 65



Product Name	Straight XH	Straight XH	Straight VH	Straight VH
Product Group	D0408	D0408	D0414	D0414
Material	SPM	SPM	VHM	VHM
Surface Finish	TiCN	TiCN	TiCN	TiCN
Application	XH	XH	VH	VH
Geometry	Special Relief	Special Relief	Special Relief	Special Relief
Chamfer	Form C / 3 x P	Form D / 5 x P	Form C / 3 x P	Form D / 5 x P
Limit	6HX	6HX	6HX	6HX
ISO Materials	K H	K H	H	H

Size Ref.	d_1	Pitch	l_1	l_2	l_3	d_2	sq	z	Drill Ø	Item #	Item #	Item #	Item #
SUTTON STD REINFORCED SHANK										T294	T295	T296	T297
0300	**M 3**	x 0.5	46	11	18	3.5	2.7	4	2.55	T294 0300	T295 0300	T296 0300	•
0400	**M 4**	x 0.7	52	13	21	4.5	3.4	4	3.4	T294 0400	T295 0400	T296 0400	•
0500	**M 5**	x 0.8	60	16	25	6.0	4.9	4	4.3	T294 0500	T295 0500	T296 0500	•
0600	**M 6**	x 1.0	62	19	30	6.0	4.9	4	5.1	T294 0600	T295 0600	T296 0600*	•*
SUTTON STD REDUCED SHANK													
0800	**M 8**	x 1.25	70	22	-	6.0	4.9	5	6.9	T294 0800	T295 0800	T296 0800	•
1000	**M 10**	x 1.5	75	24	-	7.0	5.5	5	8.6	T294 1000	T295 1000	T296 1000	•
1200	**M 12**	x 1.75	82	29	-	9.0	7.0	5	10.3	T294 1200	T295 1200	T296 1200	•
1600	**M 16**	x 2.0	95	32	-	12.0	9.0	5	14.1	T294 1600	T295 1600	T296 1600†	•†
2000	**M 20**	x 2.5	105	37	-	16.0	12.0	5	17.7	T294 2000	T295 2000	T296 2000†	•†
SUTTON STD FINE PITCH - REDUCED SHANK										T343	T344	T345	T346
0805	**8**	x 1.0	70	22	-	6.0	4.9	5	7.1	•	•	T345 0805	T346 0805
1005	**10**	x 1.0	75	24	-	7.0	5.5	5	9.1	•	•	T345 1005	T346 1005
1006	**10**	x 1.25	75	24	-	7.0	5.5	5	8.9	•	•	T345 1006	T346 1006
1205	**12**	x 1.0	82	29	-	9.0	7.0	5	11.1	•	•	•	•
1206	**12**	x 1.25	82	29	-	9.0	7.0	5	10.9	•	•	T345 1206	T346 1206
1207	**12**	x 1.5	82	29	-	9.0	7.0	5	10.6	•	•	T345 1207	T346 1207
1407	**14**	x 1.5	88	30	-	11.0	9.0	6	12.6	•	•	•	•
1607	**16**	x 1.5	95	32	-	12.0	9.0	6	14.6	•	•	•	•
2007	**20**	x 1.5	105	37	-	16.0	12.0	6	18.6	•	•	•	•

Recommended Tapping Drill

D323	D323	D323 / D310	D323 / D310

• Available on request as special manufacture. Subject to lead time.
***5 Flute †6 Flute**

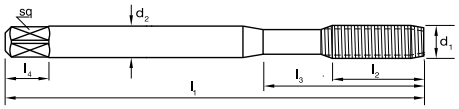
ISO Materials: P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

Refer to our complete catalogue online for entire range

suttontools

- Suitable for materials with >10% elongation
- For through and blind holes
- Depths up to 3 x d_1

For speed and feeds, refer page 65



Product Name	RL	RLC	RLC
Product Group	D0406	D0408	D0404
Material	HSSE	HSSE	HSSE
Surface Finish	*TiN*	*TiCN*	*CrN*
Application	N	N	Cu
Geometry	No Groove	Multi Coolant Groove	Single Coolant Groove
Chamfer	Form C / 2.5 x P	Form C / 2.5 x P	Form C / 2.5 x P
Limit	6HX	6HX	6HX
ISO Materials	P M N	P M N	N

Size Ref.	d_1	Pitch	l_1	l_2	l_3	d_2	sq	z	drill Ø	Item #	Item #	Item #
DIN 2174 REINFORCED SHANK										T313	T319	T329
0300	M 3	x 0.5	56	11	18	3.5	2.7		2.8	T313 0300	T319 0300	T329 0300
0400	M 4	x 0.7	63	13	21	4.5	3.4		3.7	T313 0400	T319 0400	T329 0400
0500	M 5	x 0.8	70	16	25	6.0	4.9		4.6	T313 0500	T319 0500	T329 0500
0600	M 6	x 1.0	80	19	30	6.0	4.9		5.5	T313 0600	T319 0600	T329 0600
0800	M 8	x 1.25	90	22	35	8.0	6.2		7.4	T313 0800	T319 0800	T329 0800
1000	M 10	x 1.5	100	24	39	10.0	8.0		9.3	T313 1000	T319 1000	T329 1000
DIN 2174 REDUCED SHANK											T320	T330
0600	M 6	x 1.0	80	19	-	4.5	3.4		5.5		T320 0600	•
0800	M 8	x 1.25	90	22	-	6.0	4.9		7.4		T320 0800	•
1000	M 10	x 1.5	100	24	-	7.0	5.5		9.3		T320 1000	•
1200	M 12	x 1.75	110	29	-	9.0	7.0		11.2		T320 1200	T330 1200
1400	M 14	x 2.0	110	30	-	11.0	9.0		13.1		T320 1400	•
1600	M 16	x 2.0	110	32	-	12.0	9.0		15.1		T320 1600	•
2000	M 20	x 2.5	140	34	-	16.0	12.0		18.9		T320 2000	
DIN 2174 FINE PITCH - REDUCED SHANK											T773	
0503	MF 5	x 0.5	70	12	-	3.5	2.7	6	4.75		T773 0503	
0604	MF 6	x 0.75	80	14	-	4.5	3.4	6	5.65		T773 0604	
0805	MF 8	x 1.0	90	22	-	6.0	4.9	8	7.65		T773 0805	
1005	MF 10	x 1.0	90	20	-	7.0	5.5	8	9.55		T773 1005	
1006	MF 10	x 1.25	100	24	-	7.0	5.5	8	9.4		T773 1006	
1206	MF 12	x 1.25	100	22	-	9.0	7.0	10	11.4		T773 1206	
1207	MF 12	x 1.5	100	22	-	9.0	7.0	10	11.3		T773 1207	
1406	MF 14	x 1.25	100	22	-	11.0	9.0	12	13.4		T773 1406	
1407	MF 14	x 1.5	100	22	-	11.0	9.0	12	13.3		T773 1407	
1607	MF 16	x 1.5	100	22	-	12.0	9.0	12	15.3		T773 1607	
1807	MF 18	x 1.5	110	25	-	14.0	11.0	14	17.3		T773 1807	
2007	MF 20	x 1.5	125	25	-	16.0	12.0	15	19.3		T773 2007	

Recommended Tapping Drill

D151	D151	D153

• **Available on request as special manufacture. Subject to lead time.**

Refer to our complete catalogue online for entire range

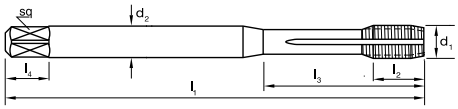
ISO Materials: P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

suttontools

- SPM for superior performance
- Suitable for materials with >10% elongation
- Through or blind holes
- Depths up to 3 x d_1

For speed and feeds, refer page 65

DIN 2174 | 60° M



Product Name	RLC	RLC	RLC	RLC
Product Group	D0410	D0410	D0414	D0414
Material	SPM	SPM	VHM	VHM
Surface Finish	*TiAlN*	*TiAlN*	*TiCN*	*TiCN*
Application	UNI	UNI	VH	VH
Geometry	Multi Coolant Groove	IK	Multi Coolant Groove	Multi Coolant Groove IK
Chamfer	Form C / 2.5 x P	Form C / 2.5 x P	Form C / 2.5 x P	Form C / 2.5 x P
Limit	6HX	6HX	6HX	6HX
ISO Materials	P M N	P M N	P M N	P M N

Size Ref.	d_1	Pitch	l_1	l_2	l_3	d_2	sq	z	drill Ø	Item #	Item #	Item #	Item #
	DIN 2174 REINFORCED SHANK									T325	T327	T682	T747
0200	**M 2**	x 0.4	45	6	-	2.8	2.1		1.8	T325 0200			
0220	**M 2.2**	x 0.45	45	7	-	2.8	2.1		2.0	•			
0230	**M 2.3**	x 0.4	45	7	-	2.8	2.1		2.1	•			
0250	**M 2.5**	x 0.45	50	8	-	2.8	2.1		2.3	T325 0250			
0260	**M 2.6**	x 0.45	50	8	-	2.8	2.1		2.4	•			
0300	**M 3**	x 0.5	56	9	18	3.5	2.7		2.8	T325 0300		T682 0300	
0350	**M 3.5**	x 0.6	56	11	20	4.0	3.0		3.2	•			
0400	**M 4**	x 0.7	63	12	21	4.5	3.4		3.7	T325 0400		T682 0400	
0500	**M 5**	x 0.8	70	13	25	6.0	4.9		4.6	T325 0500	T327 0500	T682 0500	
0600	**M 6**	x 1.0	80	15	30	6.0	4.9		5.5	T325 0600	T327 0600	T682 0600	T747 0600
0700	**M 7**	x 1.0	80	15	30	7.0	5.5		6.5	•	•		
0800	**M 8**	x 1.25	90	18	35	8.0	6.2		7.4	T325 0800	T327 0800	T682 0800	T747 0800
1000	**M 10**	x 1.5	100	20	39	10.0	8.0		9.3	T325 1000	T327 1000	T682 1000	T747 1000
	DIN 2174 REDUCED SHANK									T326	T328	T683	T748
1200	**M 12**	x 1.75	110	23	-	9.0	7.0		11.2	T326 1200	T328 1200	T683 1200	T748 1200
1400	**M 14**	x 2.0	110	25	-	11.0	9.0		13.1	T326 1400	•	T683 1400	T748 1400
1600	**M 16**	x 2.0	110	25	-	12.0	9.0		15.1	T326 1600	•	T683 1600	T748 1600
1800	**M 18**	x 2.5	125	30	-	14.0	11.0		16.9	•	•		
2000	**M 20**	x 2.5	140	30	-	16.0	12.0		18.9	•	•		

Recommended Tapping Drill

D153	D153	D356	D356

• Available on request as special manufacture. Subject to lead time.

ISO Materials: P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

Refer to our complete catalogue online for entire range

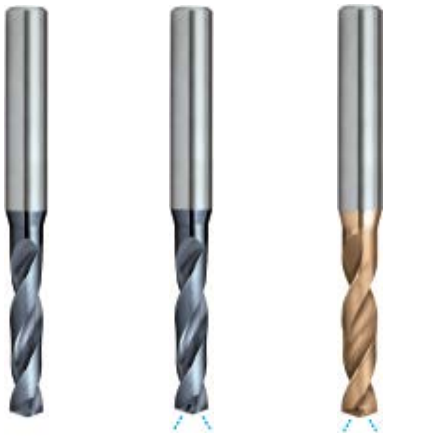
suttontools

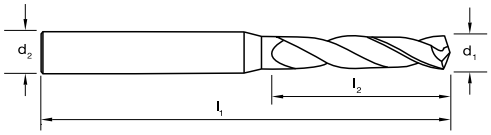
D323/D329 - Suitable for materials up to 1400N/mm²
- Micro geometry and surface conditioning for optimal chip control
- AlCrN for maximum tool life

D356 - Excellent solution for stainless steels and difficult super alloy type materials
- Optimised geometry ensures no work hardening and high productivity
- HELICA for outstanding oxidation resistance and hot hardness

For speed and feeds, refer page 62

DIN 6537 | 3xd1 | DIN 6535-HA





	D323	D329	D356
Catalogue Code	D323	D329	D356
Product Group	A0210	A0210	A0210
Material	VHM	VHM	VHM
Surface Finish	AlCrN	AlCrN	HELICA
Application	N	N	VA
Geometry	R30	R30 - IK	R30 - IK
Point Type	140° Form C	140° Form C	140° 4 Facet Form C
Shank Form (DIN 6535)	HA	HA	HA
ISO Materials	P K H	P M K H	M N S

Size Ref.	d_1 (m7)		l_1	l_2	d_2 (h6)	Item #	Item #	Item #
0100	1.0		55	7	4	D323 0100		
0110	1.1		55	7	4	D323 0110		
0120	1.2		55	7	4	D323 0120		
0130	1.3		55	7	4	D323 0130		
0140	1.4		55	7	4	D323 0140		
0150	1.5		55	14	4	D323 0150		
0160	1.6		55	14	4	D323 0160		
0170	1.7		55	14	4	D323 0170		
0180	1.8		55	14	4	D323 0180		
0190	1.9		55	14	4	D323 0190		
0200	2.0		55	20	4	D323 0200		
0210	2.1		55	20	4	D323 0210		
0220	2.2		55	20	4	D323 0220		
0230	2.3		55	20	4	D323 0230		
0240	2.4		55	20	4	D323 0240		
0250	2.5		55	20	4	D323 0250		
0260	2.6		55	20	4	D323 0260		
0270	2.7		55	20	4	D323 0270		
0280	2.8		55	20	4	D323 0280		
0290	2.9		55	20	4	D323 0290		
0300	3.0		62	20	6	D323 0300	D329 0300	D356 0300
0310	3.1		62	20	6	D323 0310	D329 0310	D356 0310
0318	3.18	1/8	62	20	6	D323 0318	D329 0318	D356 0318
0320	3.2		62	20	6	D323 0320	D329 0320	D356 0320
0330	3.3		62	20	6	D323 0330	D329 0330	D356 0330
0340	3.4		62	20	6	D323 0340	D329 0340	D356 0340
0350	3.5		62	20	6	D323 0350	D329 0350	D356 0350
0357	3.57	9/64	62	20	6	D323 0357	D329 0357	D356 0357
0360	3.6		62	20	6	D323 0360	D329 0360	D356 0360
0370	3.7		62	20	6	D323 0370	D329 0370	D356 0370
0380	3.8		66	24	6	D323 0380	D329 0380	D356 0380
0390	3.9		66	24	6	D323 0390	D329 0390	D356 0390
0397	3.97	5/32	66	24	6	D323 0397	D329 0397	D356 0397
0400	4.0		66	24	6	D323 0400	D329 0400	D356 0400
0410	4.1		66	24	6	D323 0410	D329 0410	D356 0410
0420	4.2		66	24	6	D323 0420	D329 0420	D356 0420
0430	4.3		66	24	6	D323 0430	D329 0430	D356 0430
0437	4.37	11/64	66	24	6	D323 0437	D329 0437	D356 0437
0440	4.4		66	24	6	D323 0440	D329 0440	D356 0440
0450	4.5		66	24	6	D323 0450	D329 0450	D356 0450
0460	4.6		66	24	6	D323 0460	D329 0460	D356 0460
0470	4.7		66	24	6	D323 0470	D329 0470	D356 0470
0476	4.76	3/16	66	24	6	D323 0476	D329 0476	D356 0476
0480	4.8		66	28	6	D323 0480	D329 0480	D356 0480

*** HB & HE Shank styles available**

Refer to our complete catalogue online for entire range

ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

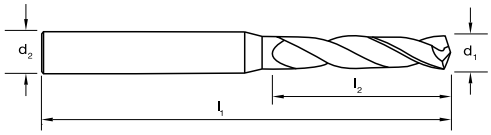
suttontools

D323/D329 - Suitable for materials up to 1400N/mm²
- Micro geometry and surface conditioning for optimal chip control
- AlCrN for maximum tool life

D356 - Excellent solution for stainless steels and difficult super alloy type materials
- Optimised geometry ensures no work hardening and high productivity
- HELICA for outstanding oxidation resistance and hot hardness

For speed and feeds, refer page 62

DIN 6537 | 3xd$_1$ | DIN 6535-HA



	D323	D329	D356
Catalogue Code	D323	D329	D356
Product Group	A0210	A0210	A0210
Material	VHM	VHM	VHM
Surface Finish	AlCrN	AlCrN	HELICA
Application	N	N	VA
Geometry	R30	R30 - IK	R30 - IK
Point Type	140° Form C	140° Form C	140° 4 Facet Form C
Shank Form (DIN 6535)	HA	HA	HA
ISO Materials	P K H	P M K H	M N S

Size Ref.	d_1 (m7)		l_1	l_2	d_2 (h6)	Item #	Item #	Item #
0490	**4.9**		66	28	6	D323 0490	D329 0490	D356 0490
0500	**5.0**		66	28	6	D323 0500	D329 0500	D356 0500
0510	**5.1**		66	28	6	D323 0510	D329 0510	D356 0510
0516	5.16	**13/64**	66	28	6	D323 0516	D329 0516	D356 0516
0520	**5.2**		66	28	6	D323 0520	D329 0520	D356 0520
0530	**5.3**		66	28	6	D323 0530	D329 0530	D356 0530
0540	**5.4**		66	28	6	D323 0540	D329 0540	D356 0540
0550	**5.5**		66	28	6	D323 0550	D329 0550	D356 0550
0556	5.56	**7/32**	66	28	6	D323 0556	D329 0556	D356 0556
0560	**5.6**		66	28	6	D323 0560	D329 0560	D356 0560
0570	**5.7**		66	28	6	D323 0570	D329 0570	D356 0570
0580	**5.8**		66	28	6	D323 0580	D329 0580	D356 0580
0590	**5.9**		66	28	6	D323 0590	D329 0590	D356 0590
0595	5.95	**15/64**	66	28	6	D323 0595	D329 0595	D356 0595
0600	**6.0**		66	28	6	D323 0600	D329 0600	D356 0600
0610	**6.1**		79	34	8	D323 0610	D329 0610	D356 0610
0620	**6.2**		79	34	8	D323 0620	D329 0620	D356 0620
0630	**6.3**		79	34	8	D323 0630	D329 0630	D356 0630
0635	6.35	**1/4**	79	34	8	D323 0635	D329 0635	D356 0635
0640	**6.4**		79	34	8	D323 0640	D329 0640	D356 0640
0650	**6.5**		79	34	8	D323 0650	D329 0650	D356 0650
0660	**6.6**		79	34	8	D323 0660	D329 0660	D356 0660
0670	**6.7**		79	34	8	D323 0670	D329 0670	D356 0670
0676	6.76	**17/64**	79	34	8	D323 0676	D329 0676	D356 0676
0680	**6.8**		79	34	8	D323 0680	D329 0680	D356 0680
0690	**6.9**		79	34	8	D323 0690	D329 0690	D356 0690
0700	**7.0**		79	34	8	D323 0700	D329 0700	D356 0700
0710	**7.1**		79	41	8	D323 0710	D329 0710	D356 0710
0714	7.14	**9/32**	79	41	8	D323 0714	D329 0714	D356 0714
0720	**7.2**		79	41	8	D323 0720	D329 0720	D356 0720
0730	**7.3**		79	41	8	D323 0730	D329 0730	D356 0730
0740	**7.4**		79	41	8	D323 0740	D329 0740	D356 0740
0750	**7.5**		79	41	8	D323 0750	D329 0750	D356 0750
0754	7.54	**19/64**	79	41	8	D323 0754	D329 0754	D356 0754
0760	**7.6**		79	41	8	D323 0760	D329 0760	D356 0760
0770	**7.7**		79	41	8	D323 0770	D329 0770	D356 0770
0780	**7.8**		79	41	8	D323 0780	D329 0780	D356 0780
0790	**7.9**		79	41	8	D323 0790	D329 0790	D356 0790
0794	7.94	**5/16**	79	41	8	D323 0794	D329 0794	D356 0794
0800	**8.0**		79	41	8	D323 0800	D329 0800	D356 0800
0810	**8.1**		89	47	10	D323 0810	D329 0810	D356 0810
0820	**8.2**		89	47	10	D323 0820	D329 0820	D356 0820
0830	**8.3**		89	47	10	D323 0830	D329 0830	D356 0830
0833	8.33	**21/64**	89	47	10	D323 0833	D329 0833	D356 0833

*** HB & HE Shank styles available**

ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

Refer to our complete catalogue online for entire range

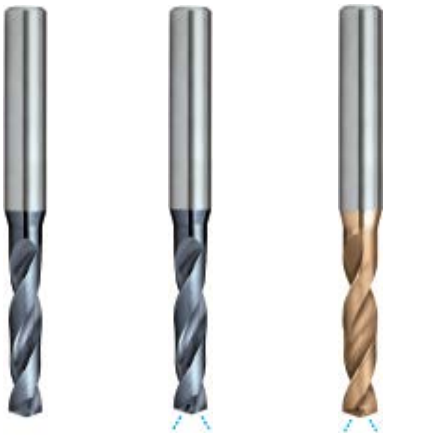
suttontools

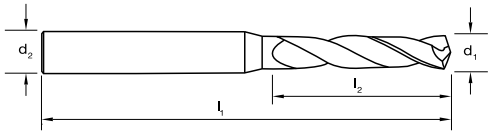
D323/D329 - Suitable for materials up to 1400N/mm²
- Micro geometry and surface conditioning for optimal chip control
- AlCrN for maximum tool life

D356 - Excellent solution for stainless steels and difficult super alloy type materials
- Optimised geometry ensures no work hardening and high productivity
- HELICA for outstanding oxidation resistance and hot hardness

For speed and feeds, refer page 62

DIN 6537 | 3xd1 | DIN 6535-HA





	D323	D329	D356
Catalogue Code	D323	D329	D356
Product Group	A0210	A0210	A0210
Material	VHM	VHM	VHM
Surface Finish	AlCrN	AlCrN	HELICA
Application	N	N	VA
Geometry	R30	R30 - IK	R30 - IK
Point Type	140° Form C	140° Form C	140° 4 Facet Form C
Shank Form (DIN 6535)	HA	HA	HA
ISO Materials	P K H	P M K H	M N S

Size Ref.	d_1 (m7)	l_1	l_2	d_2 (h6)	Item #	Item #	Item #
0840	**8.4**	89	47	10	D323 0840	D329 0840	D356 0840
0850	**8.5**	89	47	10	D323 0850	D329 0850	D356 0850
0860	**8.6**	89	47	10	D323 0860	D329 0860	D356 0860
0870	**8.7**	89	47	10	D323 0870	D329 0870	D356 0870
0873	8.73 **11/32**	89	47	10	D323 0873	D329 0873	D356 0873
0880	**8.8**	89	47	10	D323 0880	D329 0880	D356 0880
0890	**8.9**	89	47	10	D323 0890	D329 0890	D356 0890
0900	**9.0**	89	47	10	D323 0900	D329 0900	D356 0900
0910	**9.1**	89	47	10	D323 0910	D329 0910	D356 0910
0913	9.13 **23/64**	89	47	10	D323 0913	D329 0913	D356 0913
0920	**9.2**	89	47	10	D323 0920	D329 0920	D356 0920
0930	**9.3**	89	47	10	D323 0930	D329 0930	D356 0930
0940	**9.4**	89	47	10	D323 0940	D329 0940	D356 0940
0950	**9.5**	89	47	10	D323 0950	D329 0950	D356 0950
0953	9.53 **3/8**	89	47	10	D323 0953	D329 0953	D356 0953
0960	**9.6**	89	47	10	D323 0960	D329 0960	D356 0960
0970	**9.7**	89	47	10	D323 0970	D329 0970	D356 0970
0980	**9.8**	89	47	10	D323 0980	D329 0980	D356 0980
0990	**9.9**	89	47	10	D323 0990	D329 0990	D356 0990
0992	9.92 **25/64**	89	47	10	D323 0992	D329 0992	D356 0992
1000	**10.0**	89	47	10	D323 1000	D329 1000	D356 1000
1010	**10.1**	102	55	12	D323 1010	D329 1010	D356 1010
1020	**10.2**	102	55	12	D323 1020	D329 1020	D356 1020
1030	**10.3**	102	55	12	D323 1030	D329 1030	D356 1030
1032	10.32 **13/32**	102	55	12	D323 1032	D329 1032	D356 1032
1040	**10.4**	102	55	12	D323 1040	D329 1040	D356 1040
1050	**10.5**	102	55	12	D323 1050	D329 1050	D356 1050
1060	**10.6**	102	55	12	D323 1060	D329 1060	D356 1060
1070	**10.7**	102	55	12	D323 1070	D329 1070	D356 1070
1072	10.72 **27/64**	102	55	12			D356 1072
1080	**10.8**	102	55	12	D323 1080	D329 1080	D356 1080
1090	**10.9**	102	55	12	D323 1090	D329 1090	D356 1090
1100	**11.0**	102	55	12	D323 1100	D329 1100	D356 1100
1110	**11.1**	102	55	12	D323 1110	D329 1110	D356 1110
1111	11.11 **7/16**	102	55	12	D323 1111	D329 1111	D356 1111
1120	**11.2**	102	55	12	D323 1120	D329 1120	D356 1120
1130	**11.3**	102	55	12	D323 1130	D329 1130	D356 1130
1140	**11.4**	102	55	12	D323 1140	D329 1140	D356 1140
1150	**11.5**	102	55	12	D323 1150	D329 1150	D356 1150
1151	11.51 **29/64**	102	55	12			D356 1151
1160	**11.6**	102	55	12	D323 1160	D329 1160	D356 1160
1170	**11.7**	102	55	12	D323 1170	D329 1170	D356 1170
1180	**11.8**	102	55	12	D323 1180	D329 1180	D356 1180
1190	**11.9**	102	55	12	D323 1190	D329 1190	D356 1190

*** HB & HE Shank styles available**

Refer to our complete catalogue online for entire range

ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

suttontools

D323/D329 - Suitable for materials up to 1400N/mm²
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- AlCrN for maximum tool life

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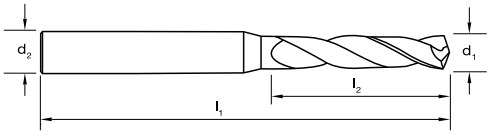
- Optimised geometry ensures no work hardening and high productivity
- HELICA for outstanding oxidation resistance and hot hardness

For speed and feeds, refer page 62

DIN 6537 | 3xd$_1$ | DIN 6535-HA



	D323	D329	D356
Catalogue Code	D323	D329	D356
Product Group	A0210	A0210	A0210
Material	VHM	VHM	VHM
Surface Finish	AlCrN	AlCrN	HELICA
Application	N	N	VA
Geometry	R30	R30 - IK	R30 - IK
Point Type	140° Form C	140° Form C	140° 4 Facet Form C
Shank Form (DIN 6535)	HA	HA	HA
ISO Materials	P K H	P M K H	M N S

Size Ref.	d_1 (m7)	l_1	l_2	d_2 (h6)	Item #	Item #	Item #
1191	11.91 **15/32**	102	55	12	D323 1191	D329 1191	D356 1191
1200	**12.0**	102	55	12	D323 1200	D329 1200	D356 1200
1231	12.30 **31/64**	107	60	14			D356 1231
1250	**12.5**	107	60	14	D323 1250	D329 1250	D356 1250
1269	12.69 **1/2**	107	60	14	D323 1269	D329 1269	D356 1269
1280	**12.8**	107	60	14	D323 1280	D329 1280	D356 1280
1300	**13.0**	107	60	14	D323 1300	D329 1300	D356 1300
1310	13.10 **33/64**	107	60	14			D356 1310
1349	13.49 **17/32**	107	60	14	D323 1349	D329 1349	D356 1349
1350	**13.5**	107	60	14	D323 1350	D329 1350	D356 1350
1380	**13.8**	107	60	14	D323 1380	•	
1389	13.89 **35/64**	107	60	14			D356 1389
1400	**14.0**	107	60	14	D323 1400	D329 1400	D356 1400
1429	14.29 **9/16**	115	65	16	D323 1429	D329 1429	D356 1429
1450	**14.5**	115	65	16	D323 1450	D329 1450	D356 1450
1468	14.68 **37/64**	115	65	16			D356 1468
1480	**14.8**	115	65	16	D323 1480	•	
1500	**15.0**	115	65	16	D323 1500	D329 1500	D356 1500
1508	15.08 **19/32**	115	65	16			D356 1508
1548	15.48 **39/64**	115	65	16			D356 1548
1550	**15.5**	115	65	16	D323 1550	D329 1550	D356 1550
1580	**15.8**	115	65	16	D323 1580	•	
1588	15.88 **5/8**	115	65	16	D323 1588	D329 1588	D356 1588
1600	**16.0**	115	65	16	D323 1600	D329 1600	D356 1600
1650	**16.5**	123	73	18	D323 1650	D329 1650	D356 1650
1667	16.67 **21/32**	123	73	18			D356 1667
1680	**16.8**	123	73	18	D323 1680		
1700	**17.0**	123	73	18	D323 1700	D329 1700	D356 1700
1746	17.46 **11/16**	123	73	18	D323 1746	D329 1746	D356 1746
1750	**17.5**	123	73	18	D323 1750	D329 1750	D356 1750
1780	**17.8**	123	73	18	D323 1780		
1800	**18.0**	123	73	18	D323 1800	D329 1800	D356 1800
1826	18.26 **23/32**	131	79	20			D356 1826
1850	**18.5**	131	79	20	D323 1850	D329 1850	D356 1850
1900	**19.0**	131	79	20	D323 1900	D329 1900	D356 1900
1905	19.05 **3/4**	131	79	20	D323 1905	D329 1905	D356 1905
1950	**19.5**	131	79	20	D323 1950	D329 1950	D356 1950
2000	**20.0**	131	79	20	D323 2000	D329 2000	D356 2000

• Available on request as special manufacture. Subject to lead time.
*** HB & HE Shank styles available**

ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

Refer to our complete catalogue online for entire range

suttontools

D326/D332 - Suitable for materials up to 1400N/mm²
- Micro geometry and surface conditioning for optimal chip control
- AlCrN for maximum tool life

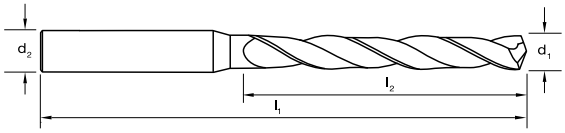
D358 - Excellent solution for stainless steels and difficult super alloy type materials
- Optimised geometry ensures no work hardening and high productivity
- HELICA for outstanding oxidation resistance and hot hardness

D358 Black Magic

watch the video

For speed and feeds, refer page 62

DIN 6537 | 5xd$_1$ | DIN 6535-HA



	D326	D332	D358
Catalogue Code	D326	D332	D358
Product Group	A0210	A0210	A0210
Material	VHM	VHM	VHM
Surface Finish	AlCrN	AlCrN	HELICA
Application	N	N	VA
Geometry	R30	R30 - IK	R30 - IK
Point Type	140° Form C	140° Form C	140° 4 Facet Form C
Shank Form (DIN 6535)	HA	HA	HA
ISO Materials	P K H	P M K H	M N S

Size Ref.	d_1 (m7)		l_1	l_2	d_2 (h6)	Item #	Item #	Item #
0300	**3.0**		66	28	6	D326 0300	D332 0300	D358 0300
0310	**3.1**		66	28	6	D326 0310	D332 0310	D358 0310
0318	3.18	**1/8**	66	28	6	D326 0318	D332 0318	D358 0318
0320	**3.2**		66	28	6	D326 0320	D332 0320	D358 0320
0330	**3.3**		66	28	6	D326 0330	D332 0330	D358 0330
0340	**3.4**		66	28	6	D326 0340	D332 0340	D358 0340
0350	**3.5**		66	28	6	D326 0350	D332 0350	D358 0350
0357	3.57	**9/64**	66	28	6	D326 0357	D332 0357	D358 0357
0360	**3.6**		66	28	6	D326 0360	D332 0360	D358 0360
0370	**3.7**		66	28	6	D326 0370	D332 0370	D358 0370
0380	**3.8**		74	36	6	D326 0380	D332 0380	D358 0380
0390	**3.9**		74	36	6	D326 0390	D332 0390	D358 0390
0397	3.97	**5/32**	74	36	6	D326 0397	D332 0397	D358 0397
0400	**4.0**		74	36	6	D326 0400	D332 0400	D358 0400
0410	**4.1**		74	36	6	D326 0410	D332 0410	D358 0410
0420	**4.2**		74	36	6	D326 0420	D332 0420	D358 0420
0430	**4.3**		74	36	6	D326 0430	D332 0430	D358 0430
0437	4.37	**11/64**	74	36	6	D326 0437	D332 0437	D358 0437
0440	**4.4**		74	36	6	D326 0440	D332 0440	D358 0440
0450	**4.5**		74	36	6	D326 0450	D332 0450	D358 0450
0460	**4.6**		74	36	6	D326 0460	D332 0460	D358 0460
0470	**4.7**		74	36	6	D326 0470	D332 0470	D358 0470
0476	4.76	**3/16**	74	36	6	D326 0476	D332 0476	D358 0476
0480	**4.8**		82	44	6	D326 0480	D332 0480	D358 0480
0490	**4.9**		82	44	6	D326 0490	D332 0490	D358 0490
0500	**5.0**		82	44	6	D326 0500	D332 0500	D358 0500
0510	**5.1**		82	44	6	D326 0510	D332 0510	D358 0510
0516	5.16	**13/64**	82	44	6	D326 0516	D332 0516	D358 0516
0520	**5.2**		82	44	6	D326 0520	D332 0520	D358 0520
0530	**5.3**		82	44	6	D326 0530	D332 0530	D358 0530
0540	**5.4**		82	44	6	D326 0540	D332 0540	D358 0540
0550	**5.5**		82	44	6	D326 0550	D332 0550	D358 0550
0556	5.56	**7/32**	82	44	6	D326 0556	D332 0556	D358 0556
0560	**5.6**		82	44	6	D326 0560	D332 0560	D358 0560
0570	**5.7**		82	44	6	D326 0570	D332 0570	D358 0570
0580	**5.8**		82	44	6	D326 0580	D332 0580	D358 0580
0590	**5.9**		82	44	6	D326 0590	D332 0590	D358 0590
0595	5.95	**15/64**	82	44	6	D326 0595	D332 0595	D358 0595
0600	**6.0**		82	44	6	D326 0600	D332 0600	D358 0600
0610	**6.1**		91	53	8	D326 0610	D332 0610	D358 0610
0620	**6.2**		91	53	8	D326 0620	D332 0620	D358 0620
0630	**6.3**		91	53	8	D326 0630	D332 0630	D358 0630
0635	6.35	**1/4**	91	53	8	D326 0635	D332 0635	D358 0635
0640	**6.4**		91	53	8	D326 0640	D332 0640	D358 0640
0650	**6.5**		91	53	8	D326 0650	D332 0650	D358 0650
0660	**6.6**		91	53	8	D326 0660	D332 0660	D358 0660
0670	**6.7**		91	53	8	D326 0670	D332 0670	D358 0670
0676	6.76	**17/64**	91	53	8	D326 0676	D332 0676	D358 0676
0680	**6.8**		91	53	8	D326 0680	D332 0680	D358 0680
0690	**6.9**		91	53	8	D326 0690	D332 0690	D358 0690

*** HB & HE Shank styles available**

Refer to our complete catalogue online for entire range

ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

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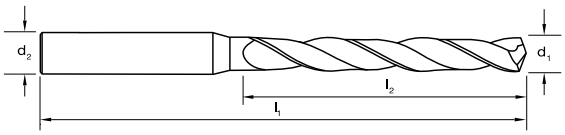
- HELICA for outstanding oxidation resistance and hot hardness

D358 Black Magic

watch the video

For speed and feeds, refer page 62

DIN 6537 | 5xd$_1$ | DIN 6535-HA



Catalogue Code	D326	D332	D358
Product Group	A0210	A0210	A0210
Material	VHM	VHM	VHM
Surface Finish	AlCrN	AlCrN	HELICA
Application	N	N	VA
Geometry	R30	R30 - IK	R30 - IK
Point Type	140° Form C	140° Form C	140° 4 Facet Form C
Shank Form (DIN 6535)	HA	HA	HA
ISO Materials	P K H	P M K H	M N S

Size Ref.	d_1 (m7)	l_1	l_2	d_2 (h6)	Item #	Item #	Item #
0700	**7.0**	91	53	8	D326 0700	D332 0700	D358 0700
0710	**7.1**	91	53	8	D326 0710	D332 0710	D358 0710
0714	7.14 **9/32**	91	53	8	D326 0714	D332 0714	D358 0714
0720	**7.2**	91	53	8	D326 0720	D332 0720	D358 0720
0730	**7.3**	91	53	8	D326 0730	D332 0730	D358 0730
0740	**7.4**	91	53	8	D326 0740	D332 0740	D358 0740
0750	**7.5**	91	53	8	D326 0750	D332 0750	D358 0750
0754	7.54 **19/64**	91	53	8	D326 0754	D332 0754	D358 0754
0760	**7.6**	91	53	8	D326 0760	D332 0760	D358 0760
0770	**7.7**	91	53	8	D326 0770	D332 0770	D358 0770
0780	**7.8**	91	53	8	D326 0780	D332 0780	D358 0780
0790	**7.9**	91	53	8	D326 0790	D332 0790	D358 0790
0794	7.94 **5/16**	91	53	8	D326 0794	D332 0794	D358 0794
0800	**8.0**	91	53	8	D326 0800	D332 0800	D358 0800
0810	**8.1**	103	61	10	D326 0810	D332 0810	D358 0810
0820	**8.2**	103	61	10	D326 0820	D332 0820	D358 0820
0830	**8.3**	103	61	10	D326 0830	D332 0830	D358 0830
0833	8.33 **21/64**	103	61	10	D326 0833	D332 0833	D358 0833
0840	**8.4**	103	61	10	D326 0840	D332 0840	D358 0840
0850	**8.5**	103	61	10	D326 0850	D332 0850	D358 0850
0860	**8.6**	103	61	10	D326 0860	D332 0860	D358 0860
0870	**8.7**	103	61	10	D326 0870	D332 0870	D358 0870
0873	8.73 **11/32**	103	61	10	D326 0873	D332 0873	D358 0873
0880	**8.8**	103	61	10	D326 0880	D332 0880	D358 0880
0890	**8.9**	103	61	10	D326 0890	D332 0890	D358 0890
0900	**9.0**	103	61	10	D326 0900	D332 0900	D358 0900
0910	**9.1**	103	61	10	D326 0910	D332 0910	D358 0910
0913	9.13 **23/64**	103	61	10	D326 0913	D332 0913	D358 0913
0920	**9.2**	103	61	10	D326 0920	D332 0920	D358 0920
0930	**9.3**	103	61	10	D326 0930	D332 0930	D358 0930
0940	**9.4**	103	61	10	D326 0940	D332 0940	D358 0940
0950	**9.5**	103	61	10	D326 0950	D332 0950	D358 0950
0953	9.53 **3/8**	103	61	10	D326 0953	D332 0953	D358 0953
0960	**9.6**	103	61	10	D326 0960	D332 0960	D358 0960
0970	**9.7**	103	61	10	D326 0970	D332 0970	D358 0970
0980	**9.8**	103	61	10	D326 0980	D332 0980	D358 0980
0990	**9.9**	103	61	10	D326 0990	D332 0990	D358 0990
0992	9.92 **25/64**	103	61	10	D326 0992	D332 0992	D358 0992
1000	**10.0**	103	61	10	D326 1000	D332 1000	D358 1000
1010	**10.1**	118	71	12	D326 1010	D332 1010	D358 1010
1020	**10.2**	118	71	12	D326 1020	D332 1020	D358 1020
1030	**10.3**	118	71	12	D326 1030	D332 1030	D358 1030
1032	10.32 **13/32**	118	71	12	D326 1032	D332 1032	D358 1032
1040	**10.4**	118	71	12	D326 1040	D332 1040	D358 1040
1050	**10.5**	118	71	12	D326 1050	D332 1050	D358 1050
1060	**10.6**	118	71	12	D326 1060	D332 1060	D358 1060
1070	**10.7**	118	71	12	D326 1070	D332 1070	D358 1070
1072	10.72 **27/64**	118	71	12			D358 1072
1080	**10.8**	118	71	12	D326 1080	D332 1080	D358 1080
1090	**10.9**	118	71	12	D326 1090	D332 1090	D358 1090

*** HB & HE Shank styles available**

ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

Refer to our complete catalogue online for entire range

suttontools

D326/D332 - Suitable for materials up to 1400N/mm²
- Micro geometry and surface conditioning for optimal chip control
- AlCrN for maximum tool life

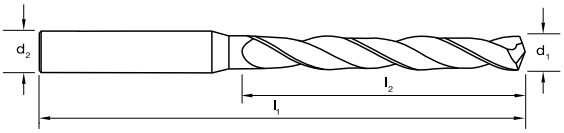
D358 - Excellent solution for stainless steels and difficult super alloy type materials
- Optimised geometry ensures no work hardening and high productivity
- HELICA for outstanding oxidation resistance and hot hardness

D358 Black Magic

watch the video

For speed and feeds, refer page 62

DIN 6537 | 5xd$_1$ | DIN 6535-HA



	D326	D332	D358
Catalogue Code	D326	D332	D358
Product Group	A0210	A0210	A0210
Material	VHM	VHM	VHM
Surface Finish	AlCrN	AlCrN	HELICA
Application	N	N	VA
Geometry	R30	R30 - IK	R30 - IK
Point Type	140° Form C	140° Form C	140° 4 Facet Form C
Shank Form (DIN 6535)	HA	HA	HA
ISO Materials	P K H	P K H	M N S

Size Ref.	d_1 (m7)	l_1	l_2	d_2 (h6)	Item #	Item #	Item #
1100	**11.0**	118	71	12	D326 1100	D332 1100	D358 1100
1110	**11.1**	118	71	12	D326 1110	D332 1110	D358 1110
1111	11.11 **7/16**	118	71	12	D326 1111	D332 1111	D358 1111
1120	**11.2**	118	71	12	D326 1120	D332 1120	D358 1120
1130	**11.3**	118	71	12	D326 1130	D332 1130	D358 1130
1140	**11.4**	118	71	12	D326 1140	D332 1140	D358 1140
1150	**11.5**	118	71	12	D326 1150	D332 1150	D358 1150
1151	11.51 **29/64**	118	71	12			D358 1151
1160	**11.6**	118	71	12	D326 1160	D332 1160	D358 1160
1170	**11.7**	118	71	12	D326 1170	D332 1170	D358 1170
1180	**11.8**	118	71	12	D326 1180	D332 1180	D358 1180
1190	**11.9**	118	71	12	D326 1190	D332 1190	D358 1190
1191	11.91 **15/32**	118	71	12	D326 1191	D332 1191	D358 1191
1200	**12.0**	118	71	12	D326 1200	D332 1200	D358 1200
1231	12.31 **31/64**	124	77	14			D358 1231
1250	**12.5**	124	77	14	D326 1250	D332 1250	D358 1250
1269	12.69 **1/2**	124	77	14	D326 1269	D332 1269	D358 1269
1280	**12.8**	124	77	14	D326 1280	D332 1280	D358 1280
1300	**13.0**	124	77	14	D326 1300	D332 1300	D358 1300
1310	13.10 **33/64**	124	77	14			D358 1310
1349	13.49 **17/32**	124	77	14	D326 1349	D332 1349	D358 1349
1350	**13.5**	124	77	14	D326 1350	D332 1350	D358 1350
1380	**13.8**	124	77	14	D326 1380	•	
1389	13.89 **35/64**	124	77	14			D358 1389
1400	**14.0**	124	77	14	D326 1400	D332 1400	D358 1400
1429	14.29 **9/16**	133	83	16	D326 1429	D332 1429	D358 1429
1450	**14.5**	133	83	16	D326 1450	D332 1450	D358 1450
1468	14.68 **37/64**	133	83	16			D358 1468
1480	**14.8**	133	83	16	D326 1480	•	
1500	**15.0**	133	83	16	D326 1500	D332 1500	D358 1500
1508	15.08 **19/32**	133	83	16			D358 1508
1548	15.48 **39/64**	133	83	16			D358 1548
1550	**15.5**	133	83	16	D326 1550	D332 1550	D358 1550
1580	**15.8**	133	83	16	D326 1580	•	
1588	15.88 **5/8**	133	83	16	D326 1588	D332 1588	D358 1588
1600	**16.0**	133	83	16	D326 1600	D332 1600	D358 1600
1650	**16.5**	143	93	18	D326 1650	D332 1650	D358 1650
1667	16.67 **21/32**	143	93	18			D358 1667
1680	**16.8**	143	93	18	D326 1680	•	
1700	**17.0**	143	93	18	D326 1700	D332 1700	D358 1700
1746	17.46 **11/16**	143	93	18	D326 1746	D332 1746	D358 1746
1750	**17.5**	143	93	18	D326 1750	D332 1750	D358 1750
1780	**17.8**	143	93	18	D326 1780	•	
1800	**18.0**	143	93	18	D326 1800	D332 1800	D358 1800
1826	18.26 **23/32**	153	101	20			D358 1826
1850	**18.5**	153	101	20	D326 1850	D332 1850	D358 1850
1900	**19.0**	153	101	20	D326 1900	D332 1900	D358 1900
1905	19.05 **3/4**	153	101	20	D326 1905	D332 1905	D358 1905
1950	**19.5**	153	101	20	D326 1950	D332 1950	D358 1950
1980	**19.8**	153	101	20		•	
2000	**20.0**	153	101	20	D326 2000	D332 2000	D358 2000

• Available on request as special manufacture. Subject to lead time.
*** HB & HE Shank styles available**

Refer to our complete catalogue online for entire range

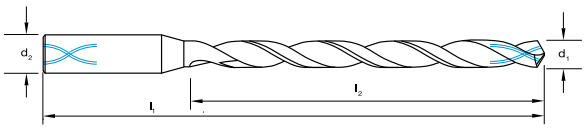
ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

suttontools

- Suitable for materials up to 1400N/mm²
- Strong core with internal coolant supply
- Micro geometry and surface conditioning for optimal chip control
- AlCrN for maximum tool life

For speed and feeds, refer page 62

DIN 6537 | 8xd_1 | DIN 6535-HA



Catalogue Code	D335
Product Group	A0210
Material	VHM
Surface Finish	AlCrN
Application	N
Geometry	R30 - IK
Point Type	140° Form C
Shank Form	HA
ISO Materials	P M K

Size Ref.	d_1 (m7)		l_1	l_2	d_2 (h6)	Item #
0500	**5.0**		95	57	6	D335 0500
0510	**5.1**		95	57	6	D335 0510
0516	5.16	**13/64**	95	57	6	D335 0516
0520	**5.2**		95	57	6	D335 0520
0530	**5.3**		95	57	6	D335 0530
0540	**5.4**		95	57	6	D335 0540
0550	**5.5**		95	57	6	D335 0550
0556	5.56	**7/32**	95	57	6	D335 0556
0560	**5.6**		95	57	6	D335 0560
0570	**5.7**		95	57	6	D335 0570
0580	**5.8**		95	57	6	D335 0580
0590	**5.9**		95	57	6	D335 0590
0595	5.95	**15/64**	95	57	6	D335 0595
0600	**6.0**		95	57	6	D335 0600
0610	**6.1**		114	76	8	D335 0610
0620	**6.2**		114	76	8	D335 0620
0630	**6.3**		114	76	8	D335 0630
0635	6.35	**1/4**	114	76	8	D335 0635
0640	**6.4**		114	76	8	D335 0640
0650	**6.5**		114	76	8	D335 0650
0660	**6.6**		114	76	8	D335 0660
0670	**6.7**		114	76	8	D335 0670
0676	6.76	**17/64**	114	76	8	D335 0676
0680	**6.8**		114	76	8	D335 0680
0690	**6.9**		114	76	8	D335 0690
0700	**7.0**		114	76	8	D335 0700
0710	**7.1**		114	76	8	D335 0710
0714	7.14	**9/32**	114	76	8	D335 0714
0720	**7.2**		114	76	8	D335 0720
0730	**7.3**		114	76	8	D335 0730
0740	**7.4**		114	76	8	D335 0740
0750	**7.5**		114	76	8	D335 0750
0754	7.54	**19/64**	114	76	8	D335 0754
0760	**7.6**		114	76	8	D335 0760
0770	**7.7**		114	76	8	D335 0770
0780	**7.8**		114	76	8	D335 0780
0790	**7.9**		114	76	8	D335 0790
0794	7.94	**5/16**	114	76	8	D335 0794
0800	**8.0**		114	76	8	D335 0800
0810	**8.1**		142	95	10	D335 0810
0820	**8.2**		142	95	10	D335 0820
0830	**8.3**		142	95	10	D335 0830
0833	8.33	**21/64**	142	95	10	D335 0833
0840	**8.4**		142	95	10	D335 0840

Size Ref.	d_1		l_1	l_2	d_2 (h6)	Item #
0850	**8.5**		142	95	10	D335 0850
0860	**8.6**		142	95	10	D335 0860
0870	**8.7**		142	95	10	D335 0870
0873	8.73	**11/32**	142	95	10	D335 0873
0880	**8.8**		142	95	10	D335 0880
0890	**8.9**		142	95	10	D335 0890
0900	**9.0**		142	95	10	D335 0900
0910	**9.1**		142	95	10	D335 0910
0913	9.13	**23/64**	142	95	10	D335 0913
0920	**9.2**		142	95	10	D335 0920
0930	**9.3**		142	95	10	D335 0930
0940	**9.4**		142	95	10	D335 0940
0950	**9.5**		142	95	10	D335 0950
0953	9.53	**3/8**	142	95	10	D335 0953
0960	**9.6**		142	95	10	D335 0960
0970	**9.7**		142	95	10	D335 0970
0980	**9.8**		142	95	10	D335 0980
0990	**9.9**		142	95	10	D335 0990
0992	9.92	**25/64**	142	95	10	D335 0992
1000	**10.0**		142	95	10	D335 1000
1010	**10.1**		162	114	12	D335 1010
1020	**10.2**		162	114	12	D335 1020
1030	**10.3**		162	114	12	D335 1030
1032	10.32	**13/32**	162	114	12	D335 1032
1040	**10.4**		162	114	12	D335 1040
1050	**10.5**		162	114	12	D335 1050
1060	**10.6**		162	114	12	D335 1060
1070	**10.7**		162	114	12	D335 1070
1080	**10.8**		162	114	12	D335 1080
1090	**10.9**		162	114	12	D335 1090
1100	**11.0**		162	114	12	D335 1100
1110	**11.1**		162	114	12	D335 1110
1111	11.11	**7/16**	162	114	12	D335 1111
1120	**11.2**		162	114	12	D335 1120
1130	**11.3**		162	114	12	D335 1130
1140	**11.4**		162	114	12	D335 1140
1150	**11.5**		162	114	12	D335 1150
1160	**11.6**		162	114	12	D335 1160
1170	**11.7**		162	114	12	D335 1170
1180	**11.8**		162	114	12	D335 1180
1190	**11.9**		162	114	12	D335 1190
1191	11.91	**15/32**	162	114	12	D335 1191
1200	**12.0**		162	114	12	D335 1200

*** HB & HE Shank styles available**

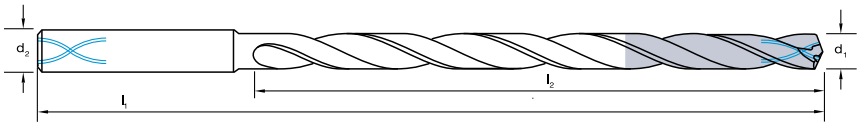
ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

Refer to our complete catalogue online for entire range

suttontools

- 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

For speed and feeds, refer page 62



Catalogue Code	D371
Product Group	A0210
Material	VHM
Surface Finish	AlCrN Tip
Application	Up to 1200N/mm²
Geometry	R30 - IK
Point Type	135° Form C
Shank Form	HA
ISO Materials	P K

Size Ref.	d_1 (h7)		l_1	l_2	d_2 (h6)	Item #
0300	3.0		90	50	6	D371 0300
0310	3.1		90	50	6	D371 0310
0318	3.18	1/8	90	50	6	D371 0318
0320	3.2		90	50	6	D371 0320
0330	3.3		90	50	6	D371 0330
0340	3.4		90	50	6	D371 0340
0350	3.5		90	50	6	D371 0350
0357	3.57	9/64	90	50	6	D371 0357
0360	3.6		90	50	6	D371 0360
0370	3.7		90	50	6	D371 0370
0380	3.8		102	64	6	D371 0380
0390	3.9		102	64	6	D371 0390
0397	3.97	5/32	102	64	6	D371 0397
0400	4.0		102	64	6	D371 0400
0410	4.1		102	64	6	D371 0410
0420	4.2		102	64	6	D371 0420
0430	4.3		102	64	6	D371 0430
0437	4.37	9/64	102	64	6	D371 0437
0440	4.4		102	64	6	D371 0440
0450	4.5		102	64	6	D371 0450
0460	4.6		102	64	6	D371 0460
0470	4.7		102	64	6	D371 0470
0476	4.76	3/16	102	64	6	D371 0476
0480	4.8		116	78	6	D371 0480
0490	4.9		116	78	6	D371 0490
0500	5.0		116	78	6	D371 0500
0510	5.1		116	78	6	D371 0510
0516	5.16	13/64	116	78	6	D371 0516
0520	5.2		116	78	6	D371 0520
0530	5.3		116	78	6	D371 0530
0540	5.4		116	78	6	D371 0540
0550	5.5		116	78	6	D371 0550
0556	5.56	7/32	116	78	6	D371 0556
0560	5.6		116	78	6	D371 0560
0570	5.7		116	78	6	D371 0570
0580	5.8		116	78	6	D371 0580
0590	5.9		116	78	6	D371 0590
0595	5.95	15/64	116	78	6	D371 0595
0600	6.0		116	78	6	D371 0600
0610	6.1		146	108	8	D371 0610
0620	6.2		146	108	8	D371 0620
0630	6.3		146	108	8	D371 0630
0635	6.35	1/4	146	108	8	D371 0635
0640	6.4		146	108	8	D371 0640
0650	6.5		146	108	8	D371 0650
0660	6.6		146	108	8	D371 0660
0670	6.7		146	108	8	D371 0670
0676	6.76	17/64	146	108	8	D371 0676
0680	6.8		146	108	8	D371 0680
0690	6.9		146	108	8	D371 0690
0700	7.0		146	108	8	D371 0700
0710	7.1		146	108	8	D371 0710
0714	7.14	9/32	146	108	8	D371 0714
0720	7.2		146	108	8	D371 0720
0730	7.3		146	108	8	D371 0730
0740	7.4		146	108	8	D371 0740

Size Ref.	d_1 (h7)		l_1	l_2	d_2 (h6)	Item #
0750	7.5		146	108	8	D371 0750
0754	7.54	19/64	146	108	8	D371 0754
0760	7.6		146	108	8	D371 0760
0770	7.7		146	108	8	D371 0770
0780	7.8		146	108	8	D371 0780
0790	7.9		146	108	8	D371 0790
0794	7.94	5/16	146	108	8	D371 0794
0800	8.0		146	108	8	D371 0800
0810	8.1		162	120	10	D371 0810
0820	8.2		162	120	10	D371 0820
0830	8.3		162	120	10	D371 0830
0833	8.33	21/64	162	120	10	D371 0833
0840	8.4		162	120	10	D371 0840
0850	8.5		162	120	10	D371 0850
0860	8.6		162	120	10	D371 0860
0870	8.7		162	120	10	D371 0870
0873	8.73	11/32	162	120	10	D371 0873
0880	8.8		162	120	10	D371 0880
0890	8.9		162	120	10	D371 0890
0900	9.0		162	120	10	D371 0900
0910	9.1		162	120	10	D371 0910
0913	9.13	23/64	162	120	10	D371 0913
0920	9.2		162	120	10	D371 0920
0930	9.3		162	120	10	D371 0930
0940	9.4		162	120	10	D371 0940
0950	9.5		162	120	10	D371 0950
0952	9.52	3/8	162	120	10	D371 0952
0960	9.6		162	120	10	D371 0960
0970	9.7		162	120	10	D371 0970
0980	9.8		162	120	10	D371 0980
0990	9.9		162	120	10	D371 0990
0992	9.92	25/64	162	120	10	D371 0992
1000	10.0		162	120	10	D371 1000
1010	10.1		204	156	12	D371 1010
1020	10.2		204	156	12	D371 1020
1030	10.3		204	156	12	D371 1030
1032	10.32	13/32	204	156	12	D371 1032
1040	10.4		204	156	12	D371 1040
1050	10.5		204	156	12	D371 1050
1060	10.6		204	156	12	D371 1060
1070	10.7		204	156	12	D371 1070
1080	10.8		204	156	12	D371 1080
1090	10.9		204	156	12	D371 1090
1100	11.0		204	156	12	D371 1100
1110	11.1		204	156	12	D371 1110
1111	11.11	7/16	204	156	12	D371 1111
1120	11.2		204	156	12	D371 1120
1130	11.3		204	156	12	D371 1130
1140	11.4		204	156	12	D371 1140
1150	11.5		204	156	12	D371 1150
1160	11.6		204	156	12	D371 1160
1170	11.7		204	156	12	D371 1170
1180	11.8		204	156	12	D371 1180
1190	11.9		204	156	12	D371 1190
1191	11.91	15/32	204	156	12	D371 1191
1200	12.0		204	156	12	D371 1200

*** HB & HE Shank styles available**

Refer to our complete catalogue online for entire range

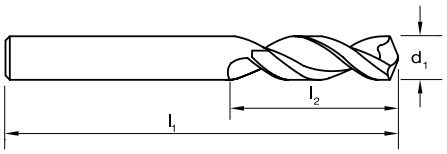
ISO Materials: P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

suttontools

D177 - For soft materials up to 850N/mm^2
D151 - For materials up to 1200N/mm^2
D155 - Production drilling in materials up to 1500N/mm^2
D153 - For austenitic stainless steels and most long chipping materials

For speed and feeds, refer page 63

DIN 1897 | 3xd$_1$



	D177	D151	D155	D153
Catalogue Code	D177	D151	D155	D153
Product Name	DXS	CNC	UNI	Black Magic
Product Group	A1006	A1006	A1502	A1502
Material	HSS Co	HSS Co	SPM	HSS Co
Surface Finish	*TiAlN*	*TiAlN*	*TiAlN*	*TiAlN*
Application	R35 WN	R40 NH	R40 UNI	R40 VA
Point Type	130° Radius	130° Form B	130° 4 Facet Form B	4 Facet
Shank Tolerance	h9	h9	h7	h7
ISO Materials	P N	P M K	P M K H	P M N

Size Ref.	d$_1$		l$_1$	l$_2$	d$_2$*	Item #	Item #	Item #	Item #
0100	**1.0**		26	6	3	D177 0100	D151 0100	D155 0100	D153 0100
0110	**1.1**		28	7	3	D177 0110	D151 0110	D155 0110	D153 0110
0120	**1.2**		30	8	3	D177 0120	D151 0120	D155 0120	D153 0120
0130	**1.3**		30	8	3	D177 0130	D151 0130	D155 0130	D153 0130
0140	**1.4**		32	9	3	D177 0140	D151 0140	D155 0140	D153 0140
0150	**1.5**		32	9	3	D177 0150	D151 0150	D155 0150	D153 0150
0160	**1.6**		34	10	3	D177 0160	D151 0160	D155 0160	D153 0160
0170	**1.7**		34	10	3	D177 0170	D151 0170	D155 0170	D153 0170
0180	**1.8**		36	11	3	D177 0180	D151 0180	D155 0180	D153 0180
0190	**1.9**		36	11	3	D177 0190	D151 0190	D155 0190	D153 0190
0200	**2.0**		38	12	3	D177 0200	D151 0200	D155 0200	D153 0200
0210	**2.1**		40	13	3	D177 0210	D151 0210	D155 0210	D153 0210
0220	**2.2**		40	13	3	D177 0220	D151 0220	D155 0220	D153 0220
0230	**2.3**		40	13	3	D177 0230	D151 0230	D155 0230	D153 0230
0240	**2.4**		43	14	3	D177 0240	D151 0240	D155 0240	D153 0240
0250	**2.5**		43	14	3	D177 0250	D151 0250	D155 0250	D153 0250
0260	**2.6**		43	14	3	D177 0260	D151 0260	D155 0260	D153 0260
0270	**2.7**		46	16	3	D177 0270	D151 0270	D155 0270	D153 0270
0280	**2.8**		46	16	3	D177 0280	D151 0280	D155 0280	D153 0280
0290	**2.9**		46	16	3	D177 0290	D151 0290	D155 0290	D153 0290
0300	**3.0**		46	16	3	D177 0300	D151 0300	D155 0300	D153 0300
0310	**3.1**		49	18	4	D177 0310	D151 0310	D155 0310	D153 0310
0318	3.18	**1/8**	49	18	4	D177 0318	D151 0318		D153 0318
0320	**3.2**		49	18	4	D177 0320	D151 0320	D155 0320	D153 0320
0330	**3.3**		49	18	4	D177 0330	D151 0330	D155 0330	D153 0330
0340	**3.4**		52	20	4	D177 0340	D151 0340	D155 0340	D153 0340
0350	**3.5**		52	20	4	D177 0350	D151 0350	D155 0350	D153 0350
0357	3.57	**9/64**	52	20	4	D177 0357	D151 0357		D153 0357
0360	**3.6**		52	20	4	D177 0360	D151 0360	D155 0360	D153 0360
0370	**3.7**		52	20	4	D177 0370	D151 0370	D155 0370	D153 0370
0380	**3.8**		55	22	4	D177 0380	D151 0380	D155 0380	D153 0380
0390	**3.9**		55	22	4	D177 0390	D151 0390	D155 0390	D153 0390
0397	3.97	**5/32**	55	22	4	D177 0397	D151 0397		D151 0397
0400	**4.0**		55	22	4	D177 0400	D151 0400	D155 0400	D153 0400
0410	**4.1**		55	22	6	D177 0410	D151 0410	D155 0410	D153 0410
0420	**4.2**		55	22	6	D177 0420	D151 0420	D155 0420	D153 0420
0430	**4.3**		58	24	6	D177 0430	D151 0430	D155 0430	D153 0430
0437	4.37	**11/64**	58	24	6	D177 0437	D151 0437		D153 0437
0440	**4.4**		58	24	6	D177 0440	D151 0440	D155 0440	D153 0440
0450	**4.5**		58	24	6	D177 0450	D151 0450	D155 0450	D153 0450
0460	**4.6**		58	24	6	D177 0460	D151 0460	D155 0460	D153 0460
0470	**4.7**		58	24	6	D177 0470	D151 0470	D155 0470	D153 0470
0476	4.76	**3/16**	62	26	6	D177 0476	D151 0476		D153 0476
0480	**4.8**		62	26	6	D177 0480	D151 0480	D155 0480	D153 0480
0490	**4.9**		62	26	6	D177 0490	D151 0490	D155 0490	D153 0490
0500	**5.0**		62	26	6	D177 0500	D151 0500	D155 0500	D153 0500
0510	**5.1**		62	26	6	D177 0510	D151 0510	D155 0510	D153 0510
0516	5.16	**13/64**	62	26	6	D177 0516	D151 0516		D153 0516
0520	**5.2**		62	26	6	D177 0520	D151 0520	D155 0520	D153 0520
0530	**5.3**		62	26	6	D177 0530	D151 0530	D155 0530	D153 0530
0540	**5.4**		66	28	6	D177 0540	D151 0540	D155 0540	D153 0540
0550	**5.5**		66	28	6	D177 0550	D151 0550	D155 0550	D153 0550
0556	5.56	**7/32**	66	28	6	D177 0556	D151 0556		D153 0556
0560	**5.6**		66	28	6	D177 0560	D151 0560	D155 0560	D153 0560
0570	**5.7**		66	28	6	D177 0570	D151 0570	D155 0570	D153 0570
0580	**5.8**		66	28	6	D177 0580	D151 0580	D155 0580	D153 0580

***d$_2$ applies to D155 and D153**

ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

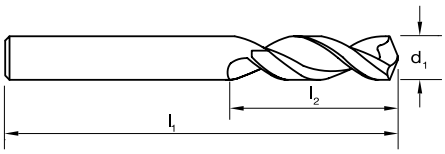
Refer to our complete catalogue online for entire range

suttontools

D177 - For soft materials up to 850N/mm^2
D151 - For materials up to 1200N/mm^2
D155 - Production drilling in materials up to 1500N/mm^2
D153 - For austenitic stainless steels and most long chipping materials

For speed and feeds, refer page 63

DIN 1897 | 3xd$_1$



	D177	D151	D155	D153
Catalogue Code	D177	D151	D155	D153
Product Name	DXS	CNC	UNI	Black Magic
Product Group	A1006	A1006	A1502	A1502
Material	HSS Co	HSS Co	SPM	HSS Co
Surface Finish	TiAlN	TiAlN	TiAlN	TiAlN
Application	R35 WN	R40 NH	R40 UNI	R40 VA
Point Type	130° Radius	130° Form B	130° 4 Facet Form B	4 Facet
Shank Tolerance	h9	h9	h7	h7
ISO Materials	P N	P M K	P M K H	P M N

Size Ref.	d_1		l_1	l_2	d_2*	Item #	Item #	Item #	Item #
0590	**5.9**		66	28	6	D177 0590	D151 0590	D155 0590	D153 0590
0595	5.95	**15/64**	66	28	6	D177 0595	D151 0595		D153 0595
0600	**6.0**		66	28	6	D177 0600	D151 0600	D155 0600	D153 0600
0610	**6.1**		70	31	8	D177 0610	D151 0610	•	D153 0610
0620	**6.2**		70	31	8	D177 0620	D151 0620	D155 0620	D153 0620
0630	**6.3**		70	31	8	D177 0630	D151 0630	D155 0630	D153 0630
0635	6.35	**1/4**	70	31	8	D177 0635	D151 0635		D153 0635
0640	**6.4**		70	31	8	D177 0640	D151 0640	D155 0640	D153 0640
0650	**6.5**		70	31	8	D177 0650	D151 0650	D155 0650	D153 0650
0660	**6.6**		70	31	8	D177 0660	D151 0660	D155 0660	D153 0660
0670	**6.7**		70	31	8	D177 0670	D151 0670	D155 0670	D153 0670
0676	6.76	**17/64**	74	34	8	D177 0676	D151 0676		D153 0676
0680	**6.8**		74	34	8	D177 0680	D151 0680	D155 0680	D153 0680
0690	**6.9**		74	34	8	D177 0690	D151 0690	D155 0690	D153 0690
0700	**7.0**		74	34	8	D177 0700	D151 0700	D155 0700	D153 0700
0710	**7.1**		74	34	8	D177 0710	D151 0710	D155 0710	D153 0710
0714	7.14	**9/32**	74	34	8	D177 0714	D151 0714		D153 0714
0720	**7.2**		74	34	8	D177 0720	D151 0720	D155 0720	D153 0720
0730	**7.3**		74	34	8	D177 0730	D151 0730	D155 0730	D153 0730
0740	**7.4**		74	34	8	D177 0740	D151 0740	D155 0740	D153 0740
0750	**7.5**		74	34	8	D177 0750	D151 0750	D155 0750	D153 0750
0754	7.54	**19/64**	79	37	8	D177 0754	D151 0754		D153 0754
0760	**7.6**		79	37	8	D177 0760	D151 0760	D155 0760	D153 0760
0770	**7.7**		79	37	8	D177 0770	D151 0770	D155 0770	D153 0770
0780	**7.8**		79	37	8	D177 0780	D151 0780	D155 0780	D153 0780
0790	**7.9**		79	37	8	D177 0790	D151 0790	D155 0790	D153 0790
0794	7.94	**5/16**	79	37	8	D177 0794	D151 0794		D153 0794
0800	**8.0**		79	37	8	D177 0800	D151 0800	D155 0800	D153 0800
0810	**8.1**		79	37	10	D177 0810	D151 0810	D155 0810	D153 0810
0820	**8.2**		79	37	10	D177 0820	D151 0820	D155 0820	D153 0820
0830	**8.3**		79	37	10	D177 0830	D151 0830	D155 0830	D153 0830
0833	8.33	**21/64**	79	37	10	D177 0833	D151 0833		D153 0833
0840	**8.4**		79	37	10	D177 0840	D151 0840	D155 0840	D153 0840
0850	**8.5**		79	37	10	D177 0850	D151 0850	D155 0850	D153 0850
0860	**8.6**		84	40	10	D177 0860	D151 0860	D155 0860	D153 0860
0870	**8.7**		84	40	10	D177 0870	D151 0870	D155 0870	D153 0870
0873	8.73	**11/32**	84	40	10	D177 0873	D151 0873		D153 0873
0880	**8.8**		84	40	10	D177 0880	D151 0880	D155 0880	D153 0880
0890	**8.9**		84	40	10	D177 0890	D151 0890	D155 0890	D153 0890
0900	**9.0**		84	40	10	D177 0900	D151 0900	D155 0900	D153 0900
0910	**9.1**		84	40	10	D177 0910	D151 0910	D155 0910	D153 0910
0913	9.13	**23/64**	84	40	10	D177 0913	D151 0913		D153 0913
0920	**9.2**		84	40	10	D177 0920	D151 0920	D155 0920	D153 0920
0930	**9.3**		84	40	10	D177 0930	D151 0930	D155 0930	D153 0930
0940	**9.4**		84	40	10	D177 0940	D151 0940	D155 0940	D153 0940
0950	**9.5**		84	40	10	D177 0950	D151 0950	D155 0950	D153 0950
0953	9.53	**3/8**	89	43	10	D177 0953	D151 0953		D153 0953
0960	**9.6**		89	43	10	D177 0960	D151 0960	D155 0960	D153 0960
0970	**9.7**		89	43	10	D177 0970	D151 0970	D155 0970	D153 0970
0980	**9.8**		89	43	10	D177 0980	D151 0980	D155 0980	D153 0980
0990	**9.9**		89	43	10	D177 0990	D151 0990	D155 0990	D153 0990
0992	9.92	**25/64**	89	43	10	D177 0992	D151 0992		D153 0992
1000	**10.0**		89	43	10	D177 1000	D151 1000	D155 1000	D153 1000
1010	**10.1**		89	43	10	D177 1010	D151 1010	D155 1010	D153 1010

• Available on request as special manufacture. Subject to lead time.
***d_2 applies to D155 and D153**

Refer to our complete catalogue online for entire range

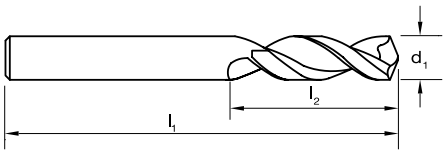
ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

suttontools

D177 - For soft materials up to 850N/mm^2
D151 - For materials up to 1200N/mm^2
D155 - Production drilling in materials up to 1500N/mm^2
D153 - For austenitic stainless steels and most long chipping materials

For speed and feeds, refer page 63

DIN 1897 | 3xd$_1$



	D177	D151	D155	D153
Catalogue Code	D177	D151	D155	D153
Product Name	DXS	CNC	UNI	Black Magic
Product Group	A1006	A1006	A1502	A1502
Material	HSS Co	HSS Co	SPM	HSS Co
Surface Finish	TiAlN	TiAlN	TiAlN	TiAlN
Application	R35 WN	R40 NH	R40 UNI	R40 VA
Point Type	130° Radius	130° Form B	130° 4 Facet Form B	4 Facet
Shank Tolerance	h9	h9	h7	h7
ISO Materials	P N	P M K	P M K H	P M N

Size Ref.	d$_1$	l$_1$	l$_2$	d$_2$*	Item #	Item #	Item #	Item #
1020	**10.2**	89	43	10	D177 1020	D151 1020	D155 1020	D153 1020
1030	**10.3**	89	43	10		D151 1030	D155 1030	D153 1030
1032	10.32 **13/32**	89	43	10	D177 1032	D151 1032		D153 1032
1040	**10.4**	89	43	10		D151 1040	D155 1040	D153 1040
1050	**10.5**	89	43	10	D177 1050	D151 1050	D155 1050	D153 1050
1060	**10.6**	89	43	12		D151 1060	D155 1060	D153 1060
1070	**10.7**	95	47	12		D151 1070	D155 1070	D153 1070
1072	10.72 **27/64**	95	47	12	D177 1072	D151 1072		D153 1072
1080	**10.8**	95	47	12	D177 1080	D151 1080	D155 1080	D153 1080
1090	**10.9**	95	47	12		D151 1090	D155 1090	D153 1090
1100	**11.0**	95	47	12	D177 1100	D151 1100	D155 1100	D153 1100
1110	**11.1**	95	47	12		D151 1110	D155 1110	D153 1110
1111	11.11 **7/16**	95	47	12	D177 1111	D151 1111		D153 1111
1120	**11.2**	95	47	12	D177 1120	D151 1120	D155 1120	D153 1120
1130	**11.3**	95	47	12		D151 1130	D155 1130	D153 1130
1140	**11.4**	95	47	12		D151 1140	D155 1140	D153 1140
1150	**11.5**	95	47	12	D177 1150	D151 1150	D155 1150	D153 1150
1151	11.51 **29/64**	95	47	12	D177 1151	D151 1151		D153 1151
1160	**11.6**	95	47	12		D151 1160	D155 1160	D153 1160
1170	**11.7**	95	47	12		D151 1170	D155 1170	D153 1170
1180	**11.8**	95	47	12	D177 1180	D151 1180	D155 1180	D153 1180
1190	**11.9**	102	51	12		D151 1190	D155 1190	D153 1190
1191	11.91 **15/32**	102	51	12	D177 1191	D151 1191		D153 1191
1200	**12.0**	102	51	12	D177 1200	D151 1200	D155 1200	D153 1200
1210	**12.1**	102	51	12		D151 1210	D155 1210	D153 1210
1220	**12.2**	102	51	12	D177 1220	D151 1220	D155 1220	D153 1220
1230	**12.3**	102	51	12		D151 1230	D155 1230	D153 1230
1231	12.31 **31/64**	102	51	12	D177 1231	D151 1231		D153 1231
1240	**12.4**	102	51	12		D151 1240	D155 1240	D153 1240
1250	**12.5**	102	51	12	D177 1250	D151 1250	D155 1250	D153 1250
1260	**12.6**	102	51	12		D151 1260	D155 1260	D153 1260
1269	12.69 **1/2**	102	51	12	D177 1269	D151 1269		D153 1269
1270	**12.7**	102	51	12		D151 1270	D155 1270	
1280	**12.8**	102	51	12	D177 1280	D151 1280	D155 1280	D153 1280
1290	**12.9**	102	51	12		D151 1290	D155 1290	D153 1290
1300	**13.0**	102	51	12	D177 1300	D151 1300	D155 1300	D153 1300
1350	**13.5**	107	54	16	D177 1350	D151 1350	D155 1350	D153 1350
1400	**14.0**	107	54	16	D177 1400	D151 1400	D155 1400	D153 1400
1450	**14.5**	111	56	16	D177 1450	D151 1450	D155 1450	D153 1450
1500	**15.0**	111	56	16	D177 1500	D151 1500	D155 1500	D153 1500
1550	**15.5**	115	58	16	D177 1550	D151 1550	D155 1550	D153 1550
1600	**16.0**	115	58	16	D177 1600	D151 1600	D155 1600	D153 1600
1650	**16.5**	119	60	20	D177 1650	D151 1650	D155 1650	D153 1650
1700	**17.0**	119	60	20	D177 1700	D151 1700	D155 1700	D153 1700
1750	**17.5**	123	62	20	D177 1750	D151 1750	D155 1750	D153 1750
1800	**18.0**	123	62	20	D177 1800	D151 1800	D155 1800	D153 1800
1850	**18.5**	127	64	20	D177 1850	D151 1850	D155 1850	D153 1850
1900	**19.0**	127	64	20	D177 1900	D151 1900	D155 1900	D153 1900
1950	**19.5**	131	66	20	D177 1950	D151 1950	D155 1950	D153 1950
2000	**20.0**	131	66	20	D177 2000	D151 2000	D155 2000	D153 2000

***d2 applies to D155 and D153**

ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

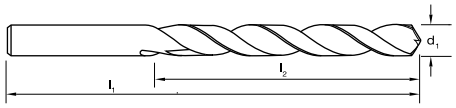
Refer to our complete catalogue online for entire range

suttontools

D165 - For soft materials up to 850N/mm^2
D163 - For materials up to 1200N/mm^2
D168 - Production drilling in materials up to 1500N/mm^2
D169 - For austenitic stainless steels and most long chipping materials

For speed and feeds, refer page 63

DIN 338 | 5xd$_1$



	D165	D163	D168	D169
Catalogue Code	D165	D163	D168	D169
Product Name	DXJ	DHJ	UNI	Black Magic
Product Group	A0418	A0418	A1502	A1502
Material	HSS Co	HSS Co	SPM	HSS Co
Surface Finish	TiAlN	TiAlN	TiAlN	TiAlN
Application	R35 WN	R40 NH	R40 UNI	R40 VA
Point Type	130° Radius	130° Form B	130° 4 Facet Form B	4 Facet Form C
Shank Tolerance	h9	h9	h7	h7
ISO Materials	P N	P K	P K H	P M N

Size Ref.	d_1		l_1	l_2	d_2*	Item #	Item #	Item #	Item #
0100	**1.0**		34	13	3	•	D163 0100	D168 0100	
0110	**1.1**		36	15	3	•	D163 0110	D168 0110	
0120	**1.2**		38	17	3	•	D163 0120	D168 0120	
0130	**1.3**		38	17	3	•	D163 0130	D168 0130	
0140	**1.4**		40	19	3	•	D163 0140	D168 0140	
0150	**1.5**		40	19	3	•	D163 0150	D168 0150	
0159	1.59	**1/16**	43	21	3	•	•		
0160	**1.6**		43	21	3	•	D163 0160	D168 0160	
0170	**1.7**		43	21	3	•	D163 0170	D168 0170	
0180	**1.8**		46	23	3	•	D163 0180	D168 0180	
0190	**1.9**		46	23	3	•	D163 0190	D168 0190	
0198	1.98	**5/64**	49	24	3	•	•		
0200	**2.0**		49	24	3	•	D163 0200	D168 0200	D169 0200
0210	**2.1**		49	24	3	•	D163 0210	D168 0210	D169 0210
0220	**2.2**		53	28	3	•	D163 0220	D168 0220	D169 0220
0230	**2.3**		53	28	3	•	D163 0230	D168 0230	D169 0230
0238	2.38	**3/32**	57	31	3		•		
0240	**2.4**		57	31	3		D163 0240	D168 0240	D169 0240
0250	**2.5**		57	31	3		D163 0250	D168 0250	D169 0250
0260	**2.6**		57	31	3		D163 0260	D168 0260	D169 0260
0270	**2.7**		61	34	3		D163 0270	D168 0270	D169 0270
0278	2.78	**7/64**	61	34	3		•		
0280	**2.8**		61	34	3		D163 0280	D168 0280	D169 0280
0290	**2.9**		61	34	3		D163 0290	D168 0290	D169 0290
0300	**3.0**		61	33	3	D165 0300	D163 0300	D168 0300	D169 0300
0310	**3.1**		65	36	4	D165 0310	D163 0310	D168 0310	D169 0310
0318	3.18	**1/8**	65	36	4	D165 0318	D163 0318		D169 0318
0320	**3.2**		65	36	4	D165 0320	D163 0320	D168 0320	D169 0320
0330	**3.3**		65	36	4	D165 0330	D163 0330	D168 0330	D169 0330
0340	**3.4**		70	39	4	D165 0340	D163 0340	D168 0340	D169 0340
0350	**3.5**		70	39	4	D165 0350	D163 0350	D168 0350	D169 0350
0357	3.57	**9/64**	70	39	4	D165 0357	D163 0357		D169 0357
0360	**3.6**		70	39	4	D165 0360	D163 0360	D168 0360	D169 0360
0370	**3.7**		70	39	4	D165 0370	D163 0370	D168 0370	D169 0370
0380	**3.8**		75	43	4	D165 0380	D163 0380	D168 0380	D169 0380
0390	**3.9**		75	43	4	D165 0390	D163 0390	D168 0390	D169 0390
0397	3.97	**5/32**	75	43	4	D165 0397	D163 0397		D169 0397
0400	**4.0**		75	43	4	D165 0400	D163 0400	D168 0400	D169 0400
0410	**4.1**		75	43	6	D165 0410	D163 0410	D168 0410	D169 0410
0420	**4.2**		75	43	6	D165 0420	D163 0420	D168 0420	D169 0420
0430	**4.3**		80	47	6	D165 0430	D163 0430	D168 0430	D169 0430
0437	4.37	**11/64**	80	47	6	D165 0437	D163 0437		D169 0437
0440	**4.4**		80	47	6	D165 0440	D163 0440	D168 0440	D169 0440
0450	**4.5**		80	47	6	D165 0450	D163 0450	D168 0450	D169 0450
0460	**4.6**		80	47	6	D165 0460	D163 0460	D168 0460	D169 0460
0470	**4.7**		80	47	6	D165 0470	D163 0470	D168 0470	D169 0470
0476	4.76	**3/16**	80	47	6	D165 0476	D163 0476		D169 0476
0480	**4.8**		86	52	6	D165 0480	D163 0480	D168 0480	D169 0480
0490	**4.9**		86	52	6	D165 0490	D163 0490	D168 0490	D169 0490
0500	**5.0**		86	52	6	D165 0500	D163 0500	D168 0500	D169 0500
0510	**5.1**		86	52	6	D165 0510	D163 0510	D168 0510	D169 0510
0516	5.16	**13/64**	86	52	6	D165 0516	D163 0516		D169 0516
0520	**5.2**		86	52	6	D165 0520	D163 0520	D168 0520	D169 0520
0530	**5.3**		86	52	6	D165 0530	D163 0530	D168 0530	D169 0530

• **Available on request as special manufacture. Subject to lead time.**
*d_2 **applies to D168 and D169**

Refer to our complete catalogue online for entire range

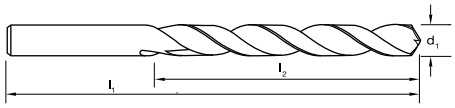
ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

suttontools

D165 - For soft materials up to 850N/mm^2
D163 - For materials up to 1200N/mm^2
D168 - Production drilling in materials up to 1500N/mm^2
D169 - For austenitic stainless steels and most long chipping materials

For speed and feeds, refer page 63

DIN 338 | 5xd$_1$



	D165	D163	D168	D169
Catalogue Code	D165	D163	D168	D169
Product Name	DXJ	DHJ	UNI	Black Magic
Product Group	A0418	A0418	A1502	A1502
Material	HSS Co	HSS Co	SPM	HSS Co
Surface Finish	TiAlN	TiAlN	TiAlN	TiAlN
Application	R35 WN	R40 NH	R40 UNI	R40 VA
Point Type	130° Radius	130° Form B	130° 4 Facet Form B	4 Facet Form C
Shank Tolerance	h9	h9	h7	h7
ISO Materials	P N	P K	P K H	P M N

Size Ref.	d$_1$		l$_1$	l$_2$	d$_2$*	Item #	Item #	Item #	Item #
0540	**5.4**		93	57	6	D165 0540	D163 0540	D168 0540	D169 0540
0550	**5.5**		93	57	6	D165 0550	D163 0550	D168 0550	D169 0550
0556	5.56	**7/32**	93	57	6	D165 0556	D163 0556		D169 0556
0560	**5.6**		93	57	6	D165 0560	D163 0560	D168 0560	D169 0560
0570	**5.7**		93	57	6	D165 0570	D163 0570	D168 0570	D169 0570
0580	**5.8**		93	57	6	D165 0580	D163 0580	D168 0580	D169 0580
0590	**5.9**		93	57	6	D165 0590	D163 0590	D168 0590	D169 0590
0595	5.95	**15/64**	93	57	6	D165 0595	D163 0595		D169 0595
0600	**6.0**		93	57	6	D165 0600	D163 0600	D168 0600	D169 0600
0610	**6.1**		101	63	8	D165 0610	D163 0610	D168 0610	D169 0610
0620	**6.2**		101	63	8	D165 0620	D163 0620	D168 0620	D169 0620
0630	**6.3**		101	63	8	D165 0630	D163 0630	D168 0630	D169 0630
0635	6.35	**1/4**	101	63	8	D165 0635	D163 0635		D169 0635
0640	**6.4**		101	63	8	D165 0640	D163 0640	D168 0640	D169 0640
0650	**6.5**		101	63	8	D165 0650	D163 0650	D168 0650	D169 0650
0660	**6.6**		101	63	8	D165 0660	D163 0660	D168 0660	D169 0660
0670	**6.7**		101	63	8	D165 0670	D163 0670	D168 0670	D169 0670
0676	6.75	**17/64**	109	69	8	D165 0676	D163 0676		D169 0676
0680	**6.8**		109	69	8	D165 0680	D163 0680	D168 0680	D169 0680
0690	**6.9**		109	69	8	D165 0690	D163 0690	D168 0690	D169 0690
0700	**7.0**		109	69	8	D165 0700	D163 0700	D168 0700	D169 0700
0710	**7.1**		109	69	8	D165 0710	D163 0710	D168 0710	D169 0710
0714	7.14	**9/32**	109	69	8	D165 0714	D163 0714		D169 0714
0720	**7.2**		109	69	8	D165 0720	D163 0720	D168 0720	D169 0720
0730	**7.3**		109	69	8	D165 0730	D163 0730	D168 0730	D169 0730
0740	**7.4**		109	69	8	D165 0740	D163 0740	D168 0740	D169 0740
0750	**7.5**		109	69	8	D165 0750	D163 0750	D168 0750	D169 0750
0754	7.54	**19/64**	117	75	8	D165 0754	D163 0754		D169 0754
0760	**7.6**		117	75	8	D165 0760	D163 0760	D168 0760	D169 0760
0770	**7.7**		117	75	8	D165 0770	D163 0770	D168 0770	D169 0770
0780	**7.8**		117	75	8	D165 0780	D163 0780	D168 0780	D169 0780
0790	**7.9**		117	75	8	D165 0790	D163 0790	D168 0790	D169 0790
0794	7.94	**5/16**	117	75	8	D165 0794	D163 0794		D169 0794
0800	**8.0**		117	75	8	D165 0800	D163 0800	D168 0800	D169 0800
0810	**8.1**		117	75	10	D165 0810	D163 0810	D168 0810	D169 0810
0820	**8.2**		117	75	10	D165 0820	D163 0820	D168 0820	D169 0820
0830	**8.3**		117	75	10	D165 0830	D163 0830	D168 0830	D169 0830
0833	8.33	**21/64**	117	75	10	D165 0833	D163 0833		D169 0833
0840	**8.4**		117	75	10	D165 0840	D163 0840	D168 0840	D169 0840
0850	**8.5**		117	75	10	D165 0850	D163 0850	D168 0850	D169 0850
0860	**8.6**		125	81	10	D165 0860	D163 0860	D168 0860	D169 0860
0870	**8.7**		125	81	10	D165 0870	D163 0870	D168 0870	D169 0870
0873	8.73	**11/32**	125	81	10	D165 0873	D163 0873		D169 0873
0880	**8.8**		125	81	10	D165 0880	D163 0880	D168 0880	D169 0880
0890	**8.9**		125	81	10	D165 0890	D163 0890	D168 0890	D169 0890
0900	**9.0**		125	81	10	D165 0900	D163 0900	D168 0900	D169 0900
0910	**9.1**		125	81	10	D165 0910	D163 0910	D168 0910	D169 0910
0913	9.13	**23/64**	125	81	10	D165 0913	D163 0913		D169 0913
0920	**9.2**		125	81	10	D165 0920	D163 0920	D168 0920	D169 0920
0930	**9.3**		125	81	10	D165 0930	D163 0930	D168 0930	D169 0930
0940	**9.4**		125	81	10	D165 0940	D163 0940	D168 0940	D169 0940
0950	**9.5**		125	81	10	D165 0950	D163 0950	D168 0950	D169 0950
0953	9.52	**3/8**	133	87	10	D165 0953	D163 0953		D169 0953
0960	**9.6**		133	87	10	D165 0960	D163 0960	D168 0960	D169 0960
0970	**9.7**		133	87	10	D165 0970	D163 0970	D168 0970	D169 0970
0980	**9.8**		133	87	10	D165 0980	D163 0980	D168 0980	D169 0980

***d$_2$ applies to D168 and D169**

ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

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suttontools

D165 - For soft materials up to 850N/mm^2
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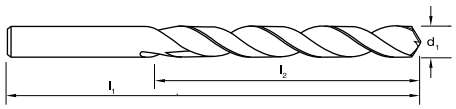
For speed and feeds, refer page 63

DIN 338 | 5xd$_1$



	D165	D163	D168	D169
Catalogue Code	D165	D163	D168	D169
Product Name	DXJ	DHJ	UNI	Black Magic
Product Group	A0418	A0418	A1502	A1502
Material	HSS Co	HSS Co	SPM	HSS Co
Surface Finish	TiAlN	TiAlN	TiAlN	TiAlN
Application	R35 WN	R40 NH	R40 UNI	R40 VA
Point Type	130° Radius	130° Form B	130° 4 Facet Form B	4 Facet Form C
Shank Tolerance	h9	h9	h7	h7
ISO Materials	P N	P K	P K H	P M N

Size Ref.	d_1	l_1	l_2	d_2*	Item #	Item #	Item #	Item #
0990	**9.9**	133	87	10	D165 0990	D163 0990	D168 0990	D169 0990
0992	9.92 **25/64**	133	87	10	D165 0992	D163 0992	•	D169 0992
1000	**10.0**	133	87	10	D165 1000	D163 1000	D168 1000	D169 1000
1010	**10.1**	133	87	10	D165 1010	•	D168 1010	D169 1010
1020	**10.2**	133	87	10	D165 1020	D163 1020	D168 1020	D169 1020
1030	**10.3**	133	87	10	•	•	D168 1030	D169 1030
1032	10.32 **13/32**	133	87	10	D165 1032	D163 1032	•	D169 1032
1040	**10.4**	133	87	10	•	•	D168 1040	D169 1040
1050	**10.5**	133	87	10	D165 1050	D163 1050	D168 1050	D169 1050
1060	**10.6**	133	87	12	•	•	D168 1060	D169 1060
1070	**10.7**	142	94	12	•	•	D168 1070	D169 1070
1072	10.72 **27/64**	142	94	12	D165 1072	D163 1072	•	D169 1072
1080	**10.8**	142	94	12	D165 1080	D163 1080	D168 1080	D169 1080
1090	**10.9**	142	94	12	•	•	D168 1090	D169 1090
1100	**11.0**	142	94	12	D165 1100	D163 1100	D168 1100	D169 1100
1110	**11.1**	142	94	12	D165 1110	D163 1110	D168 1110	D169 1110
1111	11.11 **7/16**	142	94	12	D165 1111	D163 1111	•	D169 1111
1120	**11.2**	142	94	12	D165 1120	•	D168 1120	D169 1120
1130	**11.3**	142	94	12	•	•	D168 1130	D169 1130
1140	**11.4**	142	94	12	•	•	D168 1140	D169 1140
1150	**11.5**	142	94	12	D165 1150	D163 1150	D168 1150	D169 1150
1151	11.51 **29/64**	142	94	12	D165 1151	D163 1151	•	D169 1151
1160	**11.6**	142	94	12	•	•	D168 1160	D169 1160
1170	**11.7**	142	94	12	•	•	D168 1170	D169 1170
1180	**11.8**	142	94	12	D165 1180	D163 1180	D168 1180	D169 1180
1190	**11.9**	151	94	12	•	•	D168 1190	D169 1190
1191	11.91 **15/32**	151	101	12	D165 1191	D163 1191	•	D169 1191
1200	**12.0**	151	101	12	D165 1200	D163 1200	D168 1200	D169 1200
1210	**12.1**	151	101	12	•	•	D168 1210	D169 1210
1220	**12.2**	151	101	12	D165 1220	D163 1220	D168 1220	D169 1220
1230	**12.3**	151	101	12	•	•	D168 1230	D169 1230
1231	12.3 **31/64**	151	101	12	D165 1231	D163 1231	•	D169 1231
1240	**12.4**	151	101	12	•	•	D168 1240	D169 1240
1250	**12.5**	151	101	12	D165 1250	D163 1250	D168 1250	D169 1250
1260	**12.6**	151	101	12	•	•	D168 1260	D169 1260
1269	12.7 **1/2**	151	101	12	D165 1269	D163 1269	•	D169 1269
1270	**12.7**	151	101	12	•	D163 1270	D168 1270	D169 1270
1280	**12.8**	151	101	12	D165 1280	•	D168 1280	D169 1280
1290	**12.9**	151	101	12	•	•	D168 1290	D169 1290
1300	**13.0**	151	101	12	D165 1300	D163 1300	D168 1300	D169 1300
1350	**13.5**	160	108	16	•	D163 1350	D168 1350	D169 1350
1400	**14.0**	160	108	16	•	D163 1400	D168 1400	D169 1400
1450	**14.5**	169	114	16	•	D163 1450	D168 1450	D169 1450
1500	**15.0**	169	114	16	•	D163 1500	D168 1500	D169 1500
1550	**15.5**	178	120	16	•	D163 1550	D168 1550	D169 1550
1600	**16.0**	178	120	16	•	D163 1600	D168 1600	D169 1600
1650	**16.5**	184	125	20	•	•	D168 1650	D169 1650
1700	**17.0**	184	125	20	•	•	D168 1700	D169 1700
1750	**17.5**	191	130	20	•	•	D168 1750	D169 1750
1800	**18.0**	191	130	20	•	•	D168 1800	D169 1800
1850	**18.5**	198	135	20	•	•	D168 1850	D169 1850
1900	**19.0**	198	135	20	•	•	D168 1900	D169 1900
1950	**19.5**	205	140	20	•	•	D168 1950	D169 1950
2000	**20.0**	205	140	20	•	•	D168 2000	D169 2000

• Available on request as special manufacture. Subject to lead time.
***d_2 applies to D168 and D169**

Refer to our complete catalogue online for entire range

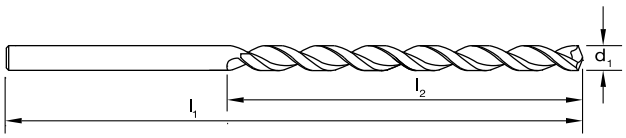
ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

suttontools

- High performance drill
- Suitable for materials up to 1200N/mm^2
- Point geometry ensures high strength
- Parabolic flute design for optimal chip transportation
- Less pecking required over standard drills
- TiAlN for longer tool life

For speed and feeds, refer page 63

DIN 340 | 8xd$_1$



Catalogue Code	D171
Product Name	DHL
Product Group	A0508
Material	HSS Co
Surface Finish	TiAlN
Application	R40 NH
Point Type	130° Form B
Shank Tolerance	h9
ISO Materials	P K N

Size Ref.	d$_1$	l$_1$	l$_2$	Item #
0100	1.0	56	33	D171 0100
0110	1.1	60	37	D171 0110
0120	1.2	65	41	D171 0120
0130	1.3	65	41	D171 0130
0140	1.4	70	45	D171 0140
0150	1.5	70	45	D171 0150
0160	1.6	76	50	D171 0160
0170	1.7	76	50	D171 0170
0180	1.8	80	53	D171 0180
0190	1.9	80	53	D171 0190
0200	2.0	85	56	D171 0200
0210	2.1	85	56	D171 0210
0220	2.2	90	59	D171 0220
0230	2.3	90	59	D171 0230
0240	2.4	95	62	D171 0240
0250	2.5	95	62	D171 0250
0260	2.6	95	62	D171 0260
0270	2.7	100	66	D171 0270
0280	2.8	100	66	D171 0280
0290	2.9	100	66	D171 0290
0300	3.0	100	66	D171 0300
0310	3.1	106	69	D171 0310
0320	3.2	106	69	D171 0320
0330	3.3	106	69	D171 0330
0340	3.4	112	73	D171 0340
0350	3.5	112	73	D171 0350
0360	3.6	112	73	D171 0360
0370	3.7	112	73	D171 0370
0380	3.8	119	78	D171 0380
0390	3.9	119	78	D171 0390
0400	4.0	119	78	D171 0400
0410	4.1	119	78	D171 0410
0420	4.2	119	78	D171 0420
0430	4.3	126	82	D171 0430
0440	4.4	126	82	D171 0440
0450	4.5	126	82	D171 0450
0460	4.6	126	82	D171 0460
0470	4.7	126	82	D171 0470
0480	4.8	132	87	D171 0480
0490	4.9	132	87	D171 0490
0500	5.0	132	87	D171 0500
0510	5.1	132	87	D171 0510
0520	5.2	132	87	D171 0520
0530	5.3	132	87	D171 0530
0540	5.4	139	91	D171 0540
0550	5.5	139	91	D171 0550
0560	5.6	139	91	D171 0560
0570	5.7	139	91	D171 0570

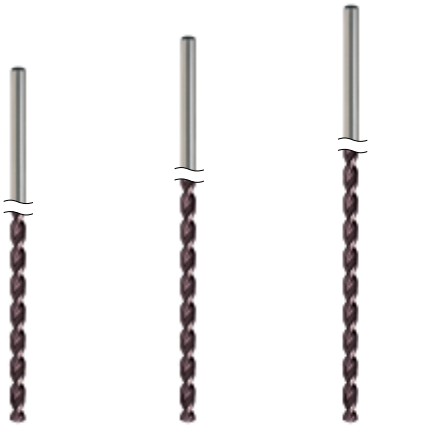
Size Ref.	d$_1$	l$_1$	l$_2$	Item #
0580	5.8	139	91	D171 0580
0590	5.9	139	91	D171 0590
0600	6.0	139	91	D171 0600
0610	6.1	148	97	D171 0610
0620	6.2	148	97	D171 0620
0630	6.3	148	97	D171 0630
0640	6.4	148	97	D171 0640
0650	6.5	148	97	D171 0650
0660	6.6	148	97	D171 0660
0670	6.7	148	97	D171 0670
0680	6.8	156	102	D171 0680
0690	6.9	156	102	D171 0690
0700	7.0	156	102	D171 0700
0710	7.1	156	102	D171 0710
0720	7.2	156	102	D171 0720
0730	7.3	156	102	D171 0730
0740	7.4	156	102	D171 0740
0750	7.5	156	102	D171 0750
0760	7.6	165	109	D171 0760
0770	7.7	165	109	D171 0770
0780	7.8	165	109	D171 0780
0790	7.9	165	109	D171 0790
0800	8.0	165	109	D171 0800
0810	8.1	165	109	D171 0810
0820	8.2	165	109	D171 0820
0830	8.3	165	109	D171 0830
0840	8.4	165	109	D171 0840
0850	8.5	165	109	D171 0850
0860	8.6	175	115	D171 0860
0870	8.7	175	115	D171 0870
0880	8.8	175	115	D171 0880
0890	8.9	175	115	D171 0890
0900	9.0	175	115	D171 0900
0910	9.1	175	115	D171 0910
0920	9.2	175	115	D171 0920
0930	9.3	175	115	D171 0930
0940	9.4	175	115	D171 0940
0950	9.5	175	115	D171 0950
0980	9.8	184	121	D171 0980
1000	10.0	184	121	D171 1000
1020	10.2	184	121	D171 1020
1050	10.5	184	121	D171 1050
1100	11.0	195	128	D171 1100
1150	11.5	195	128	D171 1150
1200	12.0	205	134	D171 1200
1250	12.5	205	134	D171 1250
1300	13.0	205	134	D171 1300

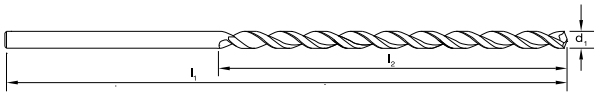
suttontools

- High performance drill
- Suitable for materials up to 1200N/mm²
- Point geometry ensures high strength
- Parabolic flute design for optimal chip transportation
- Less pecking required over standard drills
- TiAlN for longer tool life

For speed and feeds, refer page 63

DIN 1869-1 10xd1 | DIN 1869-2 12xd1 | DIN 1869-3 14xd1





Catalogue Code	D194	D195	D196
Product Name	DHXL-1	DHXL-2	DHXL-3
Product Group	A0508	A0508	A0508
Material	HSS Co	HSS Co	HSS Co
Surface Finish	TiAlN	TiAlN	TiAlN
Application	R40 NH	R40 NH	R40 NH
Point Type	130° Form B	130° Form B	130° Form B
ISO Materials	P K N	P K N	P K N
Shank Tolerance	h9	h9	h9

Size Ref.	d_1	DIN1869-1 l_1	DIN1869-1 l_2	DIN1869-2 l_1	DIN1869-2 l_2	DIN1869-3 l_1	DIN1869-3 l_2	Item #	Item #	Item #
0200	2.0	125	85					D194 0200		
0250	2.5	135	90					D194 0250		
0300	3.0	155	105	200	135	240	160	D194 0300	D195 0300	
0350	3.5	165	115	210	145	265	180	D194 0350	D195 0350	D196 0350
0400	4.0	175	120	220	150	280	190	D194 0400	D195 0400	D196 0400
0450	4.5	185	125	235	160	295	200	D194 0450	D195 0450	D196 0450
0500	5.0	195	135	245	170	315	210	D194 0500	D195 0500	D196 0500
0550	5.5	205	140	260	180	330	225	D194 0550	D195 0550	D196 0550
0600	6.0	205	140	260	180	330	225	D194 0600	D195 0600	D196 0600
0650	6.5	215	150	275	190	350	235	D194 0650	D195 0650	D196 0650
0700	7.0	225	155	290	200	370	250	D194 0700	D195 0700	D196 0700
0750	7.5	225	155	290	200	370	250	D194 0750	D195 0750	D196 0750
0800	8.0	240	165	305	210	390	265	D194 0800	D195 0800	D196 0800
0850	8.5	240	165	305	210	390	265	D194 0850	D195 0850	D196 0850
0900	9.0	250	175	320	220	410	280	D194 0900	D195 0900	D196 0900
0950	9.5	250	175	320	220	410	280	D194 0950	D195 0950	D196 0950
1000	10.0	265	185	340	235	430	295	D194 1000	D195 1000	D196 1000

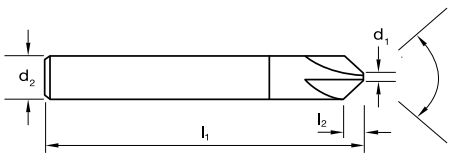
suttontools

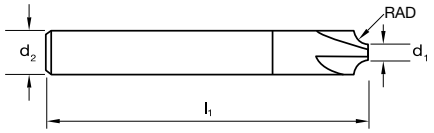
- For chamfering and deburring component edges
- Straight flute for smooth cutting
- TiAlN for longer tool life
- 90º offers hole chamfering and spotting with the one tool
- 142º designed to match drill point

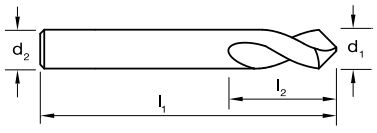
For speed and feeds, refer page 62 and 66

Type	90°	60°	Corner Rounding	90°	142°
Product Group	B0210	B0210	B0210	A0210	A0210
Material	VHM	VHM	VHM	VHM	VHM
Surface Finish	TiAlN	TiAlN	TiAlN	AlCrN	AlCrN
Application	N	N	N	NC	NC
Geometry	90°	60°	Rad	-	-
Point Type	HA	HA	HA	90° Form A	142° Form A
Shank Tolerance	h6	h6	h6	h9	h9
ISO Materials	P M K N S H	P M K N S H	P M K N S H	P M K N H	P M K N H

Size Ref.	d_1	l_1	l_2	d_2	z	rad	Item #	Item #	Item #	Item #	Item #
	SUTTON STD						E456				
0600	1.2	57	2.4	6	4		E456 0600				
0800	1.6	63	3.2	8	4		E456 0800				
1000	2.0	72	4.0	10	4		E456 1000				
1200	2.4	83	4.8	12	4		E456 1200				
								E457			
0600	1.2	57	3.8	6	4			E457 0600			
0800	1.6	63	5.5	8	4			E457 0800			
1000	2.0	72	6.9	10	4			E457 1000			
1200	2.4	83	8.3	12	4			E457 1200			
									E458		
0605	5.0	57		6	4	0.5			E458 0605		
0610	4.0	57		6	4	1.0			E458 0610		
0815	5.0	63		8	4	1.5			E458 0815		
0820	4.0	63		8	4	2.0			E458 0820		
1025	5.0	72		10	4	2.5			E458 1025		
1030	4.0	72		10	4	3.0			E458 1030		
1235	5.0	83		12	4	3.5			E458 1235		
1240	4.0	83		12	4	4.0			E458 1240		
										D364	D366
0300	3.0	46	9	3.0						D364 0300	D366 0300
0400	4.0	55	12	4.0						D364 0400	D366 0400
0500	5.0	62	15	5.0						D364 0500	D366 0500
0600	6.0	66	18	6.0						D364 0600	D366 0600
0800	8.0	79	23	8.0						D364 0800	D366 0800
1000	10.0	89	24	10.0						D364 1000	D366 1000
1200	12.0	102	24	12.0						D364 1200	D366 1200
1600	16.0	115	26	16.0						D364 1600	D366 1600
2000	20.0	131	35	20.0						D364 2000	D366 2000





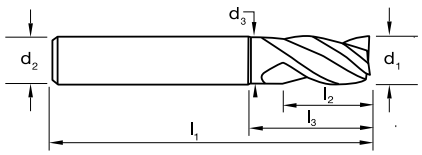


suttontools HARMONY

- VHM-ULTRA grade of carbide for high performance
- For universal application in materials up to 1600N/mm²
- AlCrN for longer tool life

For speed and feeds, refer page 67

DIN 6527K | DIN 6527L | 45° | MICRO



Type	3 Flute	3 Flute
Product Group	B0210	B0210
Material	VHM-ULTRA	VHM-ULTRA
Surface Finish	AlCrN	AlCrN
Application	UNI	UNI
Geometry	R38/37/39	R38/37/39
Shank Form (DIN 6535)	HA	HA
Shank Tolerance	h6	h6
ISO Materials	P K S	P K S

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	z	Item #	Item #
	DIN 6527K							E422	
0300	**3.0**	50	5	14	6	2.8	3	E422 0300	
0350	**3.5**	50	6	14	6	3.8	3	E422 0350	
0400	**4.0**	54	8	18	6	3.8	3	E422 0400	
0450	**4.5**	54	8	18	6	4.3	3	E422 0450	
0500	**5.0**	54	9	18	6	4.8	3	E422 0500	
0550	**5.5**	54	9	18	6	5.3	3	E422 0550	
0600	**6.0**	54	10	18	6	5.7	3	E422 0600	
0800	**8.0**	58	12	22	8	7.6	3	E422 0800	
1000	**10.0**	66	14	26	10	9.5	3	E422 1000	
1200	**12.0**	73	16	28	12	11.5	3	E422 1200	
1400	**14.0**	73	18	28	14	13.5	3	E422 1400	
1600	**16.0**	82	22	34	16	15.5	3	E422 1600	
1800	**18.0**	82	24	34	18	17.5	3	E422 1800	
2000	**20.0**	92	26	42	20	19.5	3	E422 2000	
	DIN 6527L								E424
0300	**3.0**	57	8	21	6	2.8	3		E424 0300
0350	**3.5**	57	10	21	6	3.3	3		E424 0350
0400	**4.0**	57	11	21	6	3.8	3		E424 0400
0450	**4.5**	57	11	21	6	4.3	3		E424 0450
0500	**5.0**	57	13	21	6	4.8	3		E424 0500
0550	**5.5**	57	13	21	6	5.3	3		E424 0550
0600	**6.0**	57	13	21	6	5.7	3		E424 0600
0800	**8.0**	63	19	27	8	7.6	3		E424 0800
1000	**10.0**	72	22	32	10	9.5	3		E424 1000
1200	**12.0**	83	26	38	12	11.5	3		E424 1200
1400	**14.0**	83	26	38	14	13.5	3		E424 1400
1600	**16.0**	92	32	44	16	15.5	3		E424 1600
1800	**18.0**	92	32	44	18	17.5	3		E424 1800
2000	**20.0**	104	38	54	20	19.5	3		E424 2000

ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

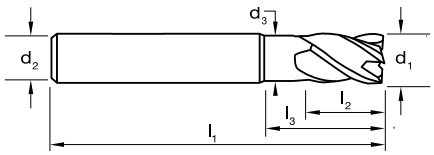
suttontools HARMONY

- VHM-ULTRA grade of carbide for high performance
- For universal application in materials up to 1600N/mm²
- AlCrN for longer tool life

E535 Harmony
watch the video

For speed and feeds, refer page 67

DIN 6527K | DIN 6527L | 45° | MICRO



Type	4 Flute	4 Flute
Product Group	B0210	B0210
Material	VHM-ULTRA	VHM-ULTRA
Surface Finish	AlCrN	AlCrN
Application	UNI	UNI
Geometry	R35/38	R35/38
Shank Form (DIN 6535)	HA	HA
Shank Tolerance	h6	h6
ISO Materials	P K H	P K H

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	z	Item #	Item #
	DIN 6527K							E533	
0600	**6.0**	54	10	18	6	5.7	4	E533 0600	
0800	**8.0**	58	12	22	8	7.6	4	E533 0800	
1000	**10.0**	66	14	26	10	9.5	4	E533 1000	
1200	**12.0**	73	16	28	12	11.5	4	E533 1200	
1600	**16.0**	82	22	34	16	15.5	4	E533 1600	
2000	**20.0**	92	26	42	20	19.5	4	E533 2000	
	DIN 6527L								E535
0300	**3.0**	57	8	21	6	2.8	4		E535 0300
0400	**4.0**	57	11	21	6	3.8	4		E535 0400
0500	**5.0**	57	13	21	6	4.8	4		E535 0500
0600	**6.0**	57	13	21	6	5.7	4		E535 0600
0800	**8.0**	63	19	27	8	7.6	4		E535 0800
1000	**10.0**	72	22	32	10	9.5	4		E535 1000
1200	**12.0**	83	26	38	12	11.5	4		E535 1200
1400	**14.0**	83	26	38	14	13.5	4		E535 1400
1600	**16.0**	92	32	44	16	15.5	4		E535 1600
1800	**18.0**	92	32	44	18	17.5	4		E535 1800
2000	**20.0**	104	38	54	20	19.5	4		E535 2000
2500	**25.0**	120	45	64	25	24.5	4		E535 2500

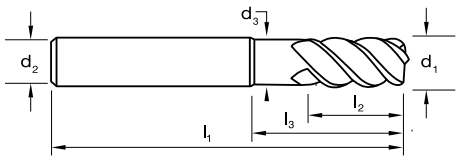
suttontools HARMONY

E559 - For precision finishing applications
- Ideally suited to materials up to 1300N/mm²
- AlCrN for longer tool life

E462 - Optimised geometry for soft stainless steels
- Helica for superior wear resistance in stainless steel

For speed and feeds, refer page 67

DIN 6527L | MICRO



Type	4 Flute - Rad
Product Group	B0210
Material	VHM-ULTRA
Surface Finish	AlCrN
Application	UNI
Geometry	R35/38
Shank Form (DIN 6535)	HA
Shank Tolerance	h6
ISO Materials	P K S H

Size Ref.	d_1	l_1	l_2	l_3	d_2	d_3	z	rad	Item #
	DIN 6527L								E559
0303	3.0	57	8	14	6	2.8	4	0.3	E559 0303
0305		57	8	14	6	2.8	4	0.5	E559 0305
0403	4.0	57	11	16	6	3.8	4	0.3	E559 0403
0405		57	11	16	6	3.8	4	0.5	E559 0405
0410		57	11	16	6	3.8	4	1.0	E559 0410
0503	5.0	57	13	18	6	4.8	4	0.3	E559 0503
0505		57	13	18	6	4.8	4	0.5	E559 0505
0510		57	13	18	6	4.8	4	1.0	E559 0510
0603	6.0	57	13	21	6	5.7	4	0.3	E559 0603
0605		57	13	21	6	5.7	4	0.5	E559 0605
0610		57	13	21	6	5.7	4	1.0	E559 0610
0803	8.0	63	19	27	8	7.6	4	0.3	E559 0803
0805		63	19	27	8	7.6	4	0.5	E559 0805
0810		63	19	27	8	7.6	4	1.0	E559 0810
0815		63	19	27	8	7.6	4	1.5	E559 0815
0820		63	19	27	8	7.6	4	2.0	E559 0820
1003	10.0	72	22	32	10	9.5	4	0.3	E559 1003
1005		72	22	32	10	9.5	4	0.5	E559 1005
1010		72	22	32	10	9.5	4	1.0	E559 1010
1015		72	22	32	10	9.5	4	1.5	E559 1015
1020		72	22	32	10	9.5	4	2.0	E559 1020
1203	12.0	83	26	38	12	11.2	4	0.3	E559 1203
1205		83	26	38	12	11.2	4	0.5	E559 1205
1210		83	26	38	12	11.2	4	1.0	E559 1210
1215		83	26	38	12	11.2	4	1.5	E559 1215
1220		83	26	38	12	11.2	4	2.0	E559 1220
1230		83	26	38	12	11.2	4	3.0	E559 1230
1605	16.0	92	32	44	16	15.0	4	0.5	E559 1605
1610		92	32	44	16	15.0	4	1.0	E559 1610
1615		92	32	44	16	15.0	4	1.5	E559 1615
1620		92	32	44	16	15.0	4	2.0	E559 1620
1630		92	32	44	16	15.0	4	3.0	E559 1630
2005	20.0	104	38	54	20	19.0	4	0.5	E559 2005
2010		104	38	54	20	19.0	4	1.0	E559 2010
2015		104	38	54	20	19.0	4	1.5	E559 2015
2020		104	38	54	20	19.0	4	2.0	E559 2020
2030		104	38	54	20	19.0	4	3.0	E559 2030

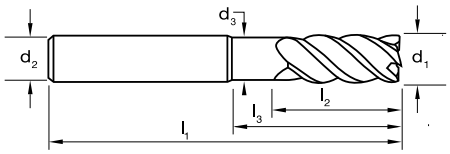
ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

suttontools

- VHM-ULTRA grade of carbide for high performance
- For universal application in materials up to 1600N/mm²
- AlCrN for longer tool life

For speed and feeds, refer page 67

DIN 6527L | 45° | MICRO



	Universal	Roughing
Type	Universal	Roughing
Product Group	B0210	B0210
Material	VHM-ULTRA	VHM-ULTRA
Surface Finish	AlCrN	AlCrN
Application	UNI	UNI
Geometry	R45 STF	R45 HRS
Shank Form (DIN 6535)	HA	HA
Shank Tolerance	h6	h6
ISO Materials	P M K	P M K

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	z	Item #	Item #
	DIN 6527L							E545	
0400	4.0	57	11	19	6	3.7	4	E545 0400	
0500	5.0	57	13	20	6	4.6	4	E545 0500	
0600	6.0	57	13	21	6	5.5	4	E545 0600	
0800	8.0	63	19	27	8	7.5	4	E545 0800	
1000	10.0	72	22	32	10	9.5	4	E545 1000	
1200	12.0	83	26	38	12	11.2	4	E545 1200	
1600	16.0	92	32	44	16	15.0	4	E545 1600	
2000	20.0	104	38	54	20	19.0	4	E545 2000	
	DIN 6527L								E549
0400	4.0	57	11	16	6	3.7	3		E549 0400
0500	5.0	57	13	18	6	4.6	4		E549 0500
0600	6.0	57	16	21	6	5.5	4		E549 0600
0800	8.0	63	19	27	8	7.5	4		E549 0800
1000	10.0	72	22	32	10	9.5	4		E549 1000
1200	12.0	83	26	38	12	11.2	4		E549 1200
1600	16.0	92	32	44	16	15.0	5		E549 1600
2000	20.0	104	38	54	20	19.0	6		E549 2000

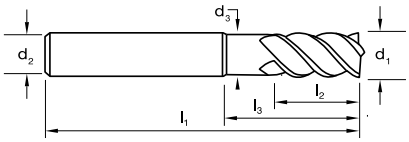
suttontools HARMONY

- VHM-ULTRA grade of carbide for high performance
- Dual stepped core for optimal strength

E562-E564 - Ideal design for pocket milling in materials up to 48HRc
E566-E568 - For hard machining in materials up to 63HRc

For speed and feeds, refer page 70

DIN 6527L | MICRO | 45º | r



Type	4 Flute	4 Flute - Rad	4 Flute	4 Flute - Rad
Product Group	B0210	B0210	B0210	B0210
Material	VHM-ULTRA	VHM-ULTRA	VHM-ULTRA	VHM-ULTRA
Surface Finish	*AlCrN*	*AlCrN*	*Aldura*	*Aldura*
Application	NH	NH	VH	VH
Geometry	R50	R50	R50	R50
Shank Form (DIN 6535)	HA	HA	HA	HA
Shank Tolerance	h6	h6	h6	h6
ISO Materials	P K	P K	H	H

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	z	rad	Item #	Item #	Item #	Item #
	DIN 6527L								E562		E566	
0600	6.0	57	13	21	6	5.5	4		E562 0600		E566 0600	
0800	8.0	63	19	27	8	7.6	4		E562 0800		E566 0800	
1000	10.0	72	22	32	10	9.5	4		E562 1000		E566 1000	
1200	12.0	83	26	38	12	11.2	4		E562 1200		E566 1200	
1400	14.0	83	26	38	14	13.0	4		E562 1400		E566 1400	
1600	16.0	92	32	44	16	15.0	4		E562 1600		E566 1600	
2000	20.0	104	38	54	20	19.0	4		E562 2000		E566 2000	
	DIN 6527L									E564		E568
0603	6.0	57	13	21	6	5.5	4	0.3		E564 0603		
0605		57	13	21	6	5.5	4	0.5		E564 0605		
0610		57	13	21	6	5.5	4	1.0		E564 0610		E568 0610
0803	8.0	63	19	27	8	7.6	4	0.3		E564 0803		
0805		63	19	27	8	7.6	4	0.5		E564 0805		
0810		63	19	27	8	7.6	4	1.0		E564 0810		
0815		63	19	27	8	7.6	4	1.5		E564 0815		
0820		63	19	27	8	7.6	4	2.0		E564 0820		E568 0820
1003	10.0	72	22	32	10	9.5	4	0.3		E564 1003		
1005		72	22	32	10	9.5	4	0.5		E564 1005		
1010		72	22	32	10	9.5	4	1.0		E564 1010		
1015		72	22	32	10	9.5	4	1.5		E564 1015		
1020		72	22	32	10	9.5	4	2.0		E564 1020		E568 1020
1203	12.0	83	26	38	12	11.2	4	0.3		E564 1203		
1205		83	26	38	12	11.2	4	0.5		E564 1205		
1210		83	26	38	12	11.2	4	1.0		E564 1210		
1215		83	26	38	12	11.2	4	1.5		E564 1215		
1220		83	26	38	12	11.2	4	2.0		E564 1220		
1230		83	26	38	12	11.2	4	3.0		E564 1230		E568 1230
1430	14.0	83	26	38	14	13.0	4	0.3		E564 1403		
1405		83	26	38	14	13.0	4	0.5		E564 1405		
1410		83	26	38	14	13.0	4	1.0		E564 1410		
1415		83	26	38	14	13.0	4	1.5		E564 1415		
1420		83	26	38	14	13.0	4	2.0		E564 1420		
1430		83	26	38	14	13.0	4	3.0		E564 1430		E568 1430
1605	16.0	92	32	44	16	15.0	4	0.5		E564 1605		
1610		92	32	44	16	15.0	4	1.0		E564 1610		
1615		92	32	44	16	15.0	4	1.5		E564 1615		
1620		92	32	44	16	15.0	4	2.0		E564 1620		
1630		92	32	44	16	15.0	4	3.0		E564 1630		
1630		92	32	44	16	15.0	4	4.0		E564 1640		E568 1640
2005	20.0	104	38	54	20	19.0	4	0.5		E564 2005		
2010		104	38	54	20	19.0	4	1.0		E564 2010		
2015		104	38	54	20	19.0	4	1.5		E564 2015		
2020		104	38	54	20	19.0	4	2.0		E564 2020		
2030		104	38	54	20	19.0	4	3.0		E564 2030		
2040		104	38	54	20	19.0	4	4.0		E564 2040		E568 2040

ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

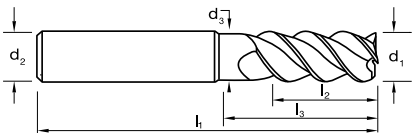
Endmills Carbide, 3 Flute, Harmony VA

suttontools HARMONY

- VHM-ULTRA grade of carbide for high performance
- Optimised geometry for soft stainless steels
- Helica for superior wear resistance in stainless steel

For speed and feeds, refer page 69

DIN 6527L | 45° | MICRO



Type	3 Flute
Product Group	B0210
Material	VHM-ULTRA
Surface Finish	HELICA
Application	VA
Geometry	R55/54/56
Shank Form (DIN 6535)	HA
Shank Tolerance	h5
ISO Materials	M S

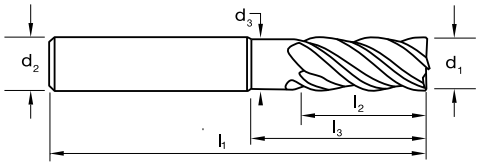
Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	z	Item #
	DIN6527L							E410
0300	3.0	57	8	14	6	2.8	3	E410 0300
0400	4.0	57	11	16	6	3.8	3	E410 0400
0500	5.0	57	13	18	6	4.8	3	E410 0500
0600	6.0	57	13	21	6	5.7	3	E410 0600
0800	8.0	63	19	27	8	7.6	3	E410 0800
1000	10.0	72	22	32	10	9.5	3	E410 1000
1200	12.0	83	26	38	12	11.5	3	E410 1200
1400	14.0	83	26	38	14	13.5	3	E410 1400
1600	16.0	92	32	44	16	15.5	3	E410 1600
1800	18.0	92	32	44	18	17.5	3	E410 1800
2000	20.0	104	38	54	20	19.5	3	E410 2000

suttontools HARMONY

- Excellent solution for stainless steels and super alloy type materials
- Optimised geometry with variable helix design ensures high productivity
- Suitable for slotting, side cutting and finishing applications with the one tool
- HELICA for outstanding oxidation resistance and hot hardness
- VHM-ULTRA grade of carbide for high performance

For speed and feeds, refer page 69

DIN 6527L | r | MICRO | 45°



Corner Rad

Type	4 Flute	4 Flute
Product Group	B0210	B0210
Material	VHM-ULTRA	VHM-ULTRA
Surface Finish	*HELICA*	*HELICA*
Sutton Designation	VA	VA
Geometry	R40/42	R40/42
Shank Form (DIN 6535)	HA	HB
Shank Tolerance	h6	h6
ISO Materials	M S	M S

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	z	chf	rad	Item #	Item #
DIN6527L - Square End										E459	E460
0300	**3.0**	57	8	14	6	2.8	4	0.08	-	E459 0300	E460 0300
0400	**4.0**	57	11	16	6	3.8	4	0.08	-	E459 0400	E460 0400
0500	**5.0**	57	13	18	6	4.8	4	0.20	-	E459 0500	E460 0500
0600	**6.0**	57	13	21	6	5.7	4	0.20	-	E459 0600	E460 0600
0800	**8.0**	63	19	27	8	7.6	4	0.20	-	E459 0800	E460 0800
1000	**10.0**	72	22	32	10	9.5	4	0.25	-	E459 1000	E460 1000
1200	**12.0**	83	26	38	12	11.5	4	0.25	-	E459 1200	E460 1200
1400	**14.0**	83	26	38	14	13.5	4	0.35	-	E459 1400	E460 1400
1600	**16.0**	92	32	44	16	15.5	4	0.35	-	E459 1600	E460 1600
1800	**18.0**	92	32	44	18	17.5	4	0.35	-	E459 1800	E460 1800
2000	**20.0**	104	38	54	20	19.5	4	0.35	-	E459 2000	E460 2000
DIN6527L - Corner Rad										E462	E463
0603	**6.0**	57	13	21	6	5.7	4	-	0.3	E462 0603	E463 0603
0605		57	13	21	6	5.7	4	-	0.5	E462 0605	E463 0605
0610		57	13	21	6	5.7	4	-	1.0	E462 0610	E463 0610
0803	**8.0**	63	19	27	8	7.6	4	-	0.3	E462 0803	E463 0803
0805		63	19	27	8	7.6	4	-	0.5	E462 0805	E463 0805
0810		63	19	27	8	7.6	4	-	1.0	E462 0810	E463 0810
0815		63	19	27	8	7.6	4	-	1.5	E462 0815	E463 0815
0820		63	19	27	8	7.6	4	-	2.0	E462 0820	E463 0820
1003	**10.0**	72	22	32	10	9.5	4	-	0.3	E462 1003	E463 1003
1005		72	22	32	10	9.5	4	-	0.5	E462 1005	E463 1005
1010		72	22	32	10	9.5	4	-	1.0	E462 1010	E463 1010
1015		72	22	32	10	9.5	4	-	1.5	E462 1015	E463 1015
1020		72	22	32	10	9.5	4	-	2.0	E462 1020	E463 1020
1203	**12.0**	83	26	38	12	11.5	4	-	0.3	E462 1203	E463 1203
1205		83	26	38	12	11.5	4	-	0.5	E462 1205	E463 1205
1210		83	26	38	12	11.5	4	-	1.0	E462 1210	E463 1210
1215		83	26	38	12	11.5	4	-	1.5	E462 1215	E463 1215
1220		83	26	38	12	11.5	4	-	2.0	E462 1220	E463 1220
1230		83	26	38	12	11.5	4	-	3.0	E462 1230	E463 1230
1605	**16.0**	92	32	44	16	15.5	4	-	0.5	E462 1605	E463 1605
1610		92	32	44	16	15.5	4	-	1.0	E462 1610	E463 1610
1615		92	32	44	16	15.5	4	-	1.5	E462 1615	E463 1615
1620		92	32	44	16	15.5	4	-	2.0	E462 1620	E463 1620
1630		92	32	44	16	15.5	4	-	3.0	E462 1630	E463 1630
1640		92	32	44	16	15.5	4	-	4.0	E462 1640	E463 1640
2005	**20.0**	104	38	54	20	19.5	4	-	0.5	E462 2005	E463 2005
2010		104	38	54	20	19.5	4	-	1.0	E462 2010	E463 2010
2015		104	38	54	20	19.5	4	-	1.5	E462 2015	E463 2015
2020		104	38	54	20	19.5	4	-	2.0	E462 2020	E463 2020
2030		104	38	54	20	19.5	4	-	3.0	E462 2030	E463 2030
2040		104	38	54	20	19.5	4	-	4.0	E462 2040	E463 2040

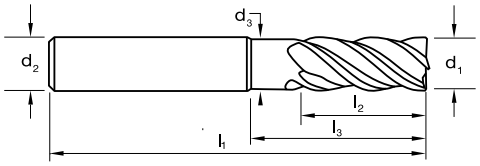
ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

suttontools HARMONY

- Square end for finishing applications. Corner radius grind for added strength
- Optimised for longer tool life in Titanium Alloys
- Variable helix design to suppress vibration
- Web taper to increase rigidity
- AlNova optimised coating for Ti Machining applications
- VHM-ULTRA grade of carbide for high performance

For speed and feeds, refer page 71

DIN 6527L | r | MICRO | 2°



Type	5 Flute	5 Flute
Product Group	B0210	B0210
Material	VHM-ULTRA	VHM-ULTRA
Surface Finish	AlNova	AlNova
Sutton Designation	Ti	Ti
Geometry	R40/42	R40/42
Shank Form (DIN 6535)	HA	HB
Shank Tolerance	h6	h6
ISO Materials	S	S

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	z	chf	rad	Item #	Item #
DIN6527L - Square End										E464	E465
1200	**12.0**	83	26	38	12	11.5	5			E464 1200	E465 1200
1600	**16.0**	92	32	44	16	15.5	5			E464 1600	E465 1600
2000	**20.0**	104	38	54	20	19.5	5			E464 2000	E465 2000
DIN6527L - Corner Rad										E466	E467
1210	**12.0**	83	26	38	12	11.5	5	-	1.0	E466 1210	E467 1210
1225		83	26	38	12	11.5	5	-	2.5	E466 1225	E467 1225
1240		83	26	38	12	11.5	5	-	4.0	E466 1240	E467 1240
1610	**16.0**	92	32	44	16	15.5	5	-	1.0	E466 1610	E467 1610
1625		92	32	44	16	15.5	5	-	2.5	E466 1625	E467 1625
1630		92	32	44	16	15.5	5	-	3.0	E466 1630	E467 1630
1640		92	32	44	16	15.5	5	-	4.0	E466 1640	E467 1640
2010	**20.0**	104	38	54	20	19.5	5	-	1.0	E466 2010	E467 2010
2025		104	38	54	20	19.5	5	-	2.5	E466 2025	E467 2025
2040		104	38	54	20	19.5	5	-	4.0	E466 2040	E467 2040
2050		104	38	54	20	19.5	5	-	5.0	E466 2050	E467 2050
2060		104	38	54	20	19.5	5	-	6.0	E466 2060	E467 2060

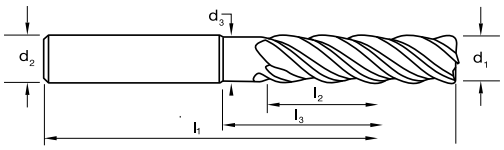
ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

Endmills Carbide, 5 Flute, Extra Long, Harmony Ti

suttontools HARMONY

- Optimised design for trochoidal and HSM milling strategies in titanium alloys
- For extra deep pocket milling in typically thin wall components
- Variable helix design to suppress vibration
- AlNova for outstanding oxidation resistance and hot hardness

For speed and feeds, refer page 71



Type	5 Flute	5 Flute
Product Group	B0210	B0210
Material	VHM-ULTRA	VHM-ULTRA
Surface Finish	*AlNova*	*AlNova*
Sutton Designation	Ti-3XL	Ti-4XL
Geometry	R40/42	R40/42
Shank Form (DIN 6535)	HA	HA
Shank Tolerance	h6	h6
ISO Materials	S	S

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	z	rad	Item #	Item #
	SUTTON STD - 3XL								E476	
1200	**12**	96	40	51	12	11.5	5	-	E4761200	
1210	**12**	96	40	51	12	11.5	5	1	E4761210	
1215	**12**	96	40	51	12	11.5	5	1.5	E4761215	
1220	**12**	96	40	51	12	11.5	5	2	E4761220	
1225	**12**	96	40	51	12	11.5	5	2.5	E4761225	
1230	**12**	96	40	51	12	11.5	5	3	E4761230	
1240	**12**	96	40	51	12	11.5	5	4	E4761240	
1600	**16**	105	52	57	16	15.5	5	-	E4761600	
1610	**16**	105	52	57	16	15.5	5	1	E4761610	
1615	**16**	105	52	57	16	15.5	5	1.5	E4761615	
1620	**16**	105	52	57	16	15.5	5	2	E4761620	
1625	**16**	105	52	57	16	15.5	5	2.5	E4761625	
1630	**16**	105	52	57	16	15.5	5	3	E4761630	
1640	**16**	105	52	57	16	15.5	5	4	E4761640	
2000	**20**	140	64	80	20	19.5	5	-	E4762000	
2010	**20**	140	64	80	20	19.5	5	1	E4762010	
2015	**20**	140	64	80	20	19.5	5	1.5	E4762015	
2020	**20**	140	64	80	20	19.5	5	2	E4762020	
2025	**20**	140	64	80	20	19.5	5	2.5	E4762025	
2030	**20**	140	64	80	20	19.5	5	3	E4762030	
2040	**20**	140	64	80	20	19.5	5	4	E4762040	
2050	**20**	140	64	80	20	19.5	5	5	E4762050	
	SUTTON STD - 4XL									E477
1200	**12**	110	50	65	12	11.5	5	-		E4771200
1210	**12**	110	50	65	12	11.5	5	1		E4771210
1215	**12**	110	50	65	12	11.5	5	1.5		E4771215
1220	**12**	110	50	65	12	11.5	5	2		E4771220
1225	**12**	110	50	65	12	11.5	5	2.5		E4771225
1230	**12**	110	50	65	12	11.5	5	3		E4771230
1240	**12**	110	50	65	12	11.5	5	4		E4771240
1600	**16**	130	66	82	16	15.5	5	-		E4771600
1610	**16**	130	66	82	16	15.5	5	1		E4771610
1615	**16**	130	66	82	16	15.5	5	1.5		E4771615
1620	**16**	130	66	82	16	15.5	5	2		E4771620
1625	**16**	130	66	82	16	15.5	5	2.5		E4771625
1630	**16**	130	66	82	16	15.5	5	3		E4771630
1640	**16**	130	66	82	16	15.5	5	4		E4771640
2000	**20**	160	82	100	20	19.5	5	-		E4772000
2010	**20**	160	82	100	20	19.5	5	1		E4772010
2015	**20**	160	82	100	20	19.5	5	1.5		E4772015
2020	**20**	160	82	100	20	19.5	5	2		E4772020
2025	**20**	160	82	100	20	19.5	5	2.5		E4772025
2030	**20**	160	82	100	20	19.5	5	3		E4772030
2040	**20**	160	82	100	20	19.5	5	4		E4772040
2050	**20**	160	82	100	20	19.5	5	5		E4772050

ISO Materials: P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

Endmills Carbide, 6 Flute, Harmony Ti

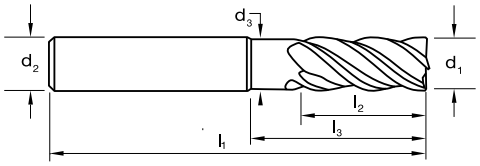
suttontools HARMONY

- Optimised design for finishing in titanium alloys
- Variable helix design to suppress vibration
- Ideal for smaller step overs (ae) in smaller spindle machines
- AlNova for outstanding oxidation resistance and hot hardness
- Carefully selected carbide grade for Ti machining

For speed and feeds, refer page 71

DIN 6527L | r | MICRO | 2°

Corner Rad



Type	6 Flute	6 Flute
Product Group	B0210	B0210
Material	VHM-ULTRA	VHM-ULTRA
Surface Finish	*AlNova*	*AlNova*
Sutton Designation	Ti	Ti
Geometry	R40/42	R40/42
Shank Form (DIN 6535)	HA	HB
Shank Tolerance	h6	h6
ISO Materials	S	S

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	z	chf	rad	Item #	Item #
DIN6527L - Square End										E468	E469
1200	**12.0**	83	26	38	12	11.5	6			E468 1200	E469 1200
1600	**16.0**	92	32	44	16	15.5	6			E468 1600	E469 1600
2000	**20.0**	104	38	54	20	19.5	6			E468 2000	E469 2000
DIN6527L - Corner Rad										E470	E471
1210	**12.0**	83	26	38	12	11.5	6	-	1.0	E470 1210	E471 1210
1225		83	26	38	12	11.5	6	-	2.5	E470 1225	E471 1225
1240		83	26	38	12	11.5	6	-	4.0	E470 1240	E471 1240
1610	**16.0**	92	32	44	16	15.5	6	-	1.0	E470 1610	E471 1610
1625		92	32	44	16	15.5	6	-	2.5	E470 1625	E471 1625
1640		92	32	44	16	15.5	6	-	4.0	E470 1640	E471 1640
2010	**20.0**	104	38	54	20	19.5	6	-	1.0	E470 2010	E471 2010
2025		104	38	54	20	19.5	6	-	2.5	E470 2025	E471 2025
2040		104	38	54	20	19.5	6	-	4.0	E470 2040	E471 2040
2050		104	38	54	20	19.5	6	-	5.0	E470 2050	E471 2050
2060		104	38	54	20	19.5	6	-	6.0	E470 2060	E471 2060

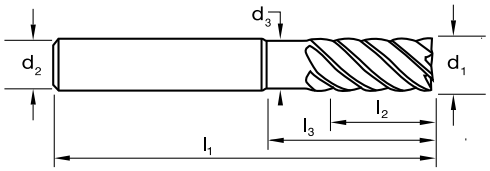
ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

suttontools HARMONY

- For super fine finishing applications
- Suitable for hard, short chipping materials

NH - For materials up to 48HRc

For speed and feeds, refer page 69



Type	6–8 Flute	6-8 Flute	6-8 Flute
Product Group	B0210	B0210	B0210
Material	VHM-ULTRA	VHM-ULTRA	VHM-ULTRA
Surface Finish	AlCrN	AlCrN	AlCrN
Application	UNI	NH	NH
Geometry	R45/44	R50/35	R50/35
Shank Form (DIN 6535)	HA	HA	HA
Shank Tolerance	h5	h5	h5
ISO Materials	P M K S H	P K S H	P K S H

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	z	rad	Item #	Item #	Item #
	DIN 6527L								E543		
0600	**6.0**	57	13	21	6	5.5	6		E543 0600		
0800	**8.0**	63	19	27	8	7.5	6		E543 0800		
1000	**10.0**	72	22	32	10	9.5	6		E543 1000		
1200	**12.0**	83	26	38	12	11.2	6		E543 1200		
1600	**16.0**	92	32	44	16	15.0	8		E543 1600		
2000	**20.0**	104	38	54	20	19.0	8		E543 2000		
	DIN 6527L									E432	
0600	**6.0**	57	13		6		6			E432 0600	
0800	**8.0**	63	19		8		6			E432 0800	
1000	**10.0**	72	22		10		6			E432 1000	
1200	**12.0**	83	26		12		6			E432 1200	
1400	**14.0**	83	26		14		6			E432 1400	
1600	**16.0**	92	32		16		6			E432 1600	
1800	**18.0**	92	32		18		8			E432 1800	
2000	**20.0**	104	38		20		8			E432 2000	
2500	**25.0**	120	45		25		8			E432 2500	
	SUTTON STD									E434	
0600	**6.0**	62	18		6		6			E434 0600	
0800	**8.0**	68	24		8		6			E434 0800	
1000	**10.0**	80	30		10		6			E434 1000	
1200	**12.0**	93	36		12		6			E434 1200	
1600	**16.0**	108	48		16		6			E434 1600	
2000	**20.0**	126	60		20		8			E434 2000	
2500	**25.0**	150	85		25		8			E434 2500	
	SUTTON STD										E436
0605	**6.0**	62	13		6		6	0.5			E436 0605
0610	**6.0**	62	13		6		6	1.0			E436 0610
0805	**8.0**	68	19		8		6	0.5			E436 0805
0810	**8.0**	68	19		8		6	1.0			E436 0810
1005	**10.0**	80	22		10		6	0.5			E436 1005
1010	**10.0**	80	22		10		6	1.0			E436 1010
1015	**10.0**	80	22		10		6	1.5			E436 1015
1020	**10.0**	80	22		10		6	2.0			E436 1020
1205	**12.0**	93	26		12		6	0.5			E436 1205
1210	**12.0**	93	26		12		6	1.0			E436 1210
1215	**12.0**	93	26		12		6	1.5			E436 1215
1220	**12.0**	93	26		12		6	2.0			E436 1220
1605	**16.0**	108	32		16		6	0.5			E436 1605
1610	**16.0**	108	32		16		6	1.0			E436 1610
1615	**16.0**	108	32		16		6	1.5			E436 1615
1620	**16.0**	108	32		16		6	2.0			E436 1620
2005	**20.0**	126	38		20		8	0.5			E436 2005
2010	**20.0**	126	38		20		8	1.0			E436 2010
2015	**20.0**	126	38		20		8	1.5			E436 2015
2020	**20.0**	126	38		20		8	2.0			E436 2020

ISO Materials: P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

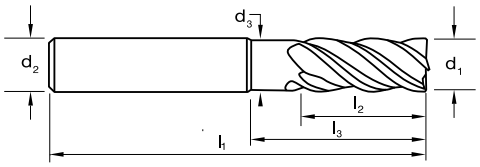
Endmills Carbide, 5 Flute, Harmony Ni

suttontools HARMONY

- Excellent solution for stainless steels and super alloy type materials
- Optimised geometry with variable helix design ensures high productivity
- Suitable for slotting, side cutting and finishing applications with the one tool
- XCeed for outstanding oxidation resistance and hot hardness
- VHM-ULTRA grade of carbide for high performance

For speed and feeds, refer page 71

DIN 6527L | r | MICRO | 12° | 45°



Type	5 Flute	5 Flute
Product Group	B0210	B0210
Material	VHM-ULTRA	VHM-ULTRA
Surface Finish	*Xceed*	*Xceed*
Sutton Designation	**Ni**	**Ni**
Geometry	R40/42 Ni	R40/42 Ni
Shank Form (DIN 6535)	HA	HB
Shank Tolerance	h6	h6
ISO Materials	M S	M S

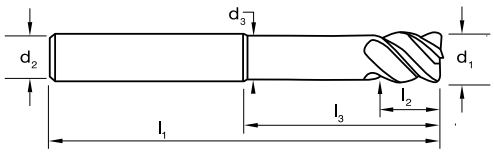
Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	z	chf	rad	Item #	Item #
DIN6527L - Square End										E472	E473
0600	**6.0**	57	13	21	6	5.7	5	0.20	-	E472 0600	E473 0600
0800	**8.0**	63	19	27	8	7.6	5	0.20	-	E472 0800	E473 0800
1000	**10.0**	72	22	32	10	9.5	5	0.25	-	E472 1000	E473 1000
1200	**12.0**	83	26	38	12	11.5	5	0.25	-	E472 1200	E473 1200
1600	**16.0**	92	32	44	16	15.5	5	0.35	-	E472 1600	E473 1600
2000	**20.0**	104	38	54	20	19.5	5	0.35	-	E472 2000	E473 2000
DIN6527L - Corner Rad										E474	E475
0605	**6.0**	57	13	21	6	5.7	5	-	0.5	E474 0605	E475 0605
0610		57	13	21	6	5.7	5	-	1.0	E474 0610	E475 0610
0805	**8.0**	63	19	27	8	7.6	5	-	0.5	E474 0805	E475 0805
0810		63	19	27	8	7.6	5	-	1.0	E474 0810	E475 0810
1005	**10.0**	72	22	32	10	9.5	5	-	0.5	E474 1005	E475 1005
1010		72	22	32	10	9.5	5	-	1.0	E474 1010	E475 1010
1210	**12.0**	83	26	38	12	11.5	5	-	1.0	E474 1210	E475 1210
1215		83	26	38	12	11.5	5	-	1.5	E474 1215	E475 1215
1225		83	26	38	12	11.5	5	-	2.5	E474 1225	E475 1225
1240		83	26	38	12	11.5	5	-	4.0	E474 1240	E475 1240
1610	**16.0**	92	32	44	16	15.5	5	-	1.0	E474 1610	E475 1610
1615		92	32	44	16	15.5	5	-	1.5	E474 1615	E475 1615
1625		92	32	44	16	15.5	5	-	2.5	E474 1625	E475 1625
1640		92	32	44	16	15.5	5	-	4.0	E474 1640	E475 1640
2010	**20.0**	104	38	54	20	19.5	5	-	1.0	E474 2010	E475 2010
2015		104	38	54	20	19.5	5	-	1.5	E474 2015	E475 2015
2025		104	38	54	20	19.5	5	-	2.5	E474 2025	E475 2025
2040		104	38	54	20	19.5	5	-	4.0	E474 2040	E475 2040

ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

suttontools HARMONY

- VHM-ULTRA grade of carbide for high performance
- 45/44° variable flute helix for chatter free milling
- Suitable for materials up to 1300N/mm²
- AlCrN for longer tool life

For speed and feeds, refer page 66



Type	4 Flute - Rad
Product Group	B0210
Material	VHM-ULTRA
Surface Finish	AlCrN
Application	UNI
Geometry	R45/44
Shank Form (DIN 6535)	HA
Shank Tolerance	h5
ISO Materials	P K S

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	z	rad	Item #
	SUTTON STD								E430
0403	4.0	57	5	16	6	3.6	4	0.3	E430 0403
0405		57	5	16	6	3.6	4	0.5	E430 0405
0603	6.0	62	7	24	6	5.4	4	0.3	E430 0603
0605		62	7	24	6	5.4	4	0.5	E430 0605
0610		62	7	24	6	5.4	4	1.0	E430 0610
0615		62	7	24	6	5.4	4	1.5	E430 0615
0803	8.0	68	9	30	8	7.2	4	0.3	E430 0803
0805		68	9	30	8	7.2	4	0.5	E430 0805
0810		68	9	30	8	7.2	4	1.0	E430 0810
0815		68	9	30	8	7.2	4	1.5	E430 0815
1005	10.0	80	11	38	10	9.0	4	0.5	E430 1005
1010		80	11	38	10	9.0	4	1.0	E430 1010
1015		80	11	38	10	9.0	4	1.5	E430 1015
1020		80	11	38	10	9.0	4	2.0	E430 1020
1205	12.0	93	13	46	12	11.0	4	0.5	E430 1205
1210		93	13	46	12	11.0	4	1.0	E430 1210
1215		93	13	46	12	11.0	4	1.5	E430 1215
1220		93	13	46	12	11.0	4	2.0	E430 1220
1610	16.0	108	17	58	16	15.0	4	1.0	E430 1610
1620		108	17	58	16	15.0	4	2.0	E430 1620
1630		108	17	58	16	15.0	4	3.0	E430 1630
1640		108	17	58	16	15.0	4	4.0	E430 1640

ISO Materials: P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

suttontools

- VHM-ULTRA grade of carbide for high performance
- For profile and contour milling in long reach applications
- Suitable for materials up to 1600 N/mm²
- AlCrN for longer tool life

For speed and feeds, refer page 66

	2 Flute	4 Flute
Type	2 Flute	4 Flute
Product Group	B0210	B0210
Material	VHM-ULTRA	VHM-ULTRA
Surface Finish	AlCrN	AlCrN
Application	UNI	UNI
Geometry	R30	R30
Shank Form (DIN 6535)	HA	HA
Shank Tolerance	h5	h5
ISO Materials	P K S H	P K S H

Size Ref.	d_1(e8)	l_1	l_2	l_3	d_2	d_3	z	Item #	Item #
	SUTTON STD							E440	
0200	**2.0**	62	3	7.0	6	1.9	2	E440 0200	
0300	**3.0**	62	4	9.5	6	2.8	2	E440 0300	
0400	**4.0**	62	5	12.0	6	4.8	2	E440 0400	
0500	**5.0**	80	6	14.5	6	4.8	2	E440 0500	
0600	**6.0**	80	7	17.0	6	5.7	2	E440 0600	
0800	**8.0**	90	9	22.0	8	7.6	2	E440 0800	
1000	**10.0**	100	11	27.0	10	9.5	2	E440 1000	
1200	**12.0**	120	13	32.0	12	11.5	2	E440 1200	
1400	**14.0**	120	15	37.0	14	13.5	2	E440 1400	
1600	**16.0**	140	17	42.0	16	15.5	2	E440 1600	
1800	**18.0**	140	19	47.0	18	17.5	2	E440 1800	
2000	**20.0**	160	21	52.0	20	19.5	2	E440 2000	
									E442
0200	**2.0**	62	3	7.0	6	1.9	4		E442 0200
0300	**3.0**	62	4	9.5	6	2.8	4		E442 0300
0400	**4.0**	62	5	12.0	6	4.8	4		E442 0400
0500	**5.0**	80	6	14.5	6	4.8	4		E442 0500
0600	**6.0**	80	7	17.0	6	5.7	4		E442 0600
0800	**8.0**	90	9	22.0	8	7.6	4		E442 0800
1000	**10.0**	100	11	27.0	10	9.5	4		E442 1000
1200	**12.0**	120	13	32.0	12	11.5	4		E442 1200
1400	**14.0**	120	15	37.0	14	13.5	4		E442 1400
1600	**16.0**	140	17	42.0	16	15.5	4		E442 1600
1800	**18.0**	140	19	47.0	18	17.5	4		E442 1800
2000	**20.0**	160	21	52.0	20	19.5	4		E442 2000

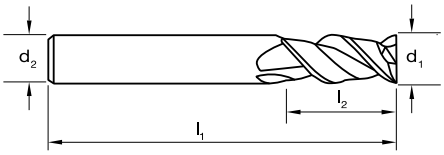
ISO Materials: P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

Endmills 2 Flute, Harmony Al

suttontools HARMONY

- For precision milling of slots and cavities
- Optimised geometry for aluminiums and non-ferrous materials
- High speed and high feed rates can be achieved
- Highly efficient chip disposal

For speed and feeds, refer page 68



Type	2 Flute
Product Group	B0208
Material	VHM
Surface Finish	*Brt*
Application	Al
Geometry	R40
Shank Form (DIN 6535)	HA
Shank Tolerance	h5
ISO Materials	N

Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	z	Item #
	DIN 6527L						E310
0200	**2.0**	57	7	10	6	2	E310 0200
0300	**3.0**	57	8	10	6	2	E310 0300
0400	**4.0**	57	11	10	6	2	E310 0400
0500	**5.0**	57	13	8	6	2	E310 0500
0600	**6.0**	57	13		6	2	E310 0600
0800	**8.0**	63	19		8	2	E310 0800
1000	**10.0**	72	22		10	2	E310 1000
1200	**12.0**	83	26		12	2	E310 1200
1600	**16.0**	92	32		16	2	E310 1600
2000	**20.0**	104	38		20	2	E310 2000

ISO Materials: P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

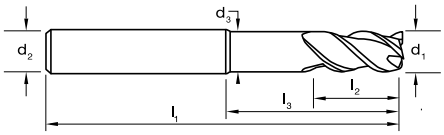
Endmills 3 Flute, Harmony Al

suttontools HARMONY

- VHM-ULTRA grade of carbide for high performance
- 45/46/44° variable flute helix for chatter free milling
- Optimised geometry for soft materials
- CrN for copper and non-ferrous materials

For speed and feeds, refer page 68

DIN 6527L | sutton | MICRO



Type	3 Flute	3 Flute	Ballnose
Product Group	B0210	B0210	B0210
Material	VHM-ULTRA	VHM-ULTRA	VHM-ULTRA
Surface Finish	*CrN*	*CrN*	*CrN*
Application	Al	Al	Al
Geometry	R45/46/44	R45/46/44	R45/46/44
Shank Form (DIN 6535)	HA	HA	HA
Shank Tolerance	h5	h5	h5
ISO Materials	N	N	N

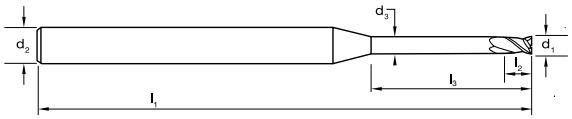
Size Ref.	d_1 (e8)	l_1	l_2	l_3	d_2	d_3	z	rad	Item #	Item #	Item #
	DIN 6527L								E400		
0600	**6.0**	57	13		6		3	0.2	E400 0600		
0800	**8.0**	63	19		8		3	0.2	E400 0800		
1000	**10.0**	72	24		10		3	0.3	E400 1000		
1200	**12.0**	83	28		12		3	0.4	E400 1200		
1400	**14.0**	83	30		14		3	0.4	E400 1400		
1600	**16.0**	92	35		16		3	0.5	E400 1600		
1800	**18.0**	92	38		18		3	0.5	E400 1800		
2000	**20.0**	104	42		20		3	0.6	E400 2000		
2500	**25.0**	120	50		25		3	0.6	E400 2500		
	SUTTON STD									E402	
0600	**6.0**	62	7	24	6	5.0	3	0.2		E402 0600	
0800	**8.0**	68	9	30	8	7.0	3	0.2		E402 0800	
1000	**10.0**	80	12	38	10	9.0	3	0.3		E402 1000	
1200	**12.0**	93	14	46	12	11.0	3	0.4		E402 1200	
1400	**14.0**	93	16	46	14	13.0	3	0.4		E402 1400	
1600	**16.0**	108	18	58	16	15.0	3	0.5		E402 1600	
1800	**18.0**	108	20	58	18	17.0	3	0.5		E402 1800	
2000	**20.0**	126	22	74	20	19.0	3	0.6		E402 2000	
2500	**25.0**	150	27	92	25	24.0	3	0.6		E402 2500	
	SUTTON STD										E408
0600	**6.0**	62	9	24	6		3				E408 0600
0800	**8.0**	68	12	30	8		3				E408 0800
1000	**10.0**	80	15	38	10		3				E408 1000
1200	**12.0**	93	18	46	12		3				E408 1200
1400	**14.0**	93	21	46	14		3				E408 1400
1600	**16.0**	108	24	58	16		3				E408 1600
1800	**18.0**	108	27	58	18		3				E408 1800
2000	**20.0**	126	30	74	20		3				E408 2000
2500	**25.0**	150	38	92	25		3				E408 2500

ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

suttontools

- For precision milling of cavities
- Suitable for materials up to 35–62 HRC
- TiSiN for longer tool life
- Positive rake angle (10°–12°)

For speed and feeds, refer page 74



Catalogue Code	E580
Product Group	B0218
Material	VHM
Surface Finish	TiSiN
Application	N
Geometry	R40
Shank Form (DIN 6535)	HA
Shank Tolerance	h6
ISO Materials	P M S H

Size Ref.	d_1	l_1	l_2	l_3	d_2	d_3	z	rad	Item #
0021	0.2	50	0.2	0.5	4	0.16	2		E580 0021
0022		50	0.2	1	4	0.16	2		E580 0022
0023		50	0.2	1.5	4	0.16	2		E580 0023
0031	0.3	50	0.4	1	4	0.26	2		E580 0031
0032		50	0.4	2	4	0.26	2		E580 0032
0033		50	0.4	3	4	0.26	2		E580 0033
0041	0.4	50	0.4	2	4	0.37	2		E580 0041
0042		50	0.4	4	4	0.37	2		E580 0042
0043		50	0.6	3	4	0.37	2		E580 0043
0044		50	0.6	5	4	0.37	2		E580 0044
0051	0.5	50	0.7	2	4	0.45	2		E580 0051
0052		50	0.7	4	4	0.45	2		E580 0052
0053		50	0.7	6	4	0.45	2		E580 0053
0054		50	0.7	8	4	0.45	2		E580 0054
0060	0.6	50	0.9	2	4	0.55	2		E580 0060
0061		50	0.9	4	4	0.55	2		E580 0061
0062		50	0.9	8	4	0.55	2		E580 0062
0063		50	0.9	8	4	0.55	2		E580 0063
0064		50	0.9	10	4	0.55	2		E580 0064
0070	0.7	50	1	2	4	0.65	2		E580 0070
0071		50	1	4	4	0.65	2		E580 0071
0072		50	1	6	4	0.65	2		E580 0072
0073		50	1	8	4	0.65	2		E580 0073
0074		50	1	10	4	0.65	2		E580 0074
0081	0.8	50	1.2	4	4	0.75	2		E580 0081
0082		50	1.2	6	4	0.75	2		E580 0082
0083		50	1.2	8	4	0.75	2		E580 0083

Size Ref.	d_1	l_1	l_2	l_3	d_2	d_3	z	rad	Item #
0084		50	1.2	10	4	0.75	2		E580 0084
0085		50	1.2	12	4	0.75	2		E580 0085
0092		50	1.4	6	4	0.75	2		E580 0092
0093		50	1.4	8	4	0.75	2		E580 0093
0094	0.9	50	1.4	10	4	0.85	2		E580 0094
0096		50	1.4	15	4	0.85	2		E580 0096
0101	1	50	1.5	6	4	0.95	2		E580 0101
0102		50	1.5	8	4	0.95	2		E580 0102
0103		50	1.5	10	4	0.95	2		E580 0103
0104		50	1.5	12	4	0.95	2		E580 0104
0105		50	1.5	16	4	0.95	2		E580 0105
0106		50	1.5	14	4	0.95	2		E580 0106
0121	1.2	50	1.8	6	4	1.15	2		E580 0121
0122		50	1.8	10	4	1.15	2		E580 0122
0123		50	1.8	12	4	1.15	2		E580 0123
0124		50	1.8	8	4	1.15	2		E580 0124
0141	1.4	50	2.1	6	4	1.35	2		E580 0141
0142		50	2.1	8	4	1.35	2		E580 0142
0143		50	2.1	10	4	1.35	2		E580 0143
0144		50	2.1	12	4	1.35	2		E580 0144
0145		50	2.1	14	4	1.35	2		E580 0145
0146		50	2.1	16	4	1.35	2		E580 0146
0151	1.5	50	2.3	6	4	1.45	2		E580 0151
0152		50	2.3	8	4	1.45	2		E580 0152
0153		50	2.3	12	4	1.45	2		E580 0153
0154		50	2.3	16	4	1.45	2		E580 0154
0155		60	2.3	20	4	1.45	2		E580 0155

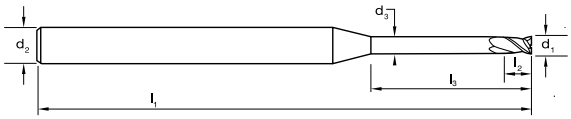
*Cutting Ø tolerance: d_1 < 0.7 = 0 / -0.012 d_1 > 0.7 = 0 / -0.020

ISO Materials: P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

suttontools

- For precision milling of cavities
- Suitable for materials up to 35–62 HRC
- TiSiN for longer tool life
- Positive rake angle (10°–12°)

For speed and feeds, refer page 74



Catalogue Code	E580
Product Group	B0218
Material	VHM
Surface Finish	TiSiN
Application	N
Geometry	R40
Shank Form (DIN 6535)	HA
Shank Tolerance	h6
ISO Materials	P M S H

Size Ref.	d_1	l_1	l_2	l_3	d_2	d_3	z	rad	Item #
0156		50	2.3	10	4	1.45	2		E580 0156
0157		50	2.3	14	4	1.45	2		E580 0157
0158		60	2.3	18	4	1.45	2		E580 0158
0161	1.6	50	2.4	6	4	1.55	2		E580 0161
0162		50	2.4	8	4	1.55	2		E580 0162
0163		50	2.4	10	4	1.55	2		E580 0163
0164		50	2.4	12	4	1.55	2		E580 0164
0165		50	2.4	14	4	1.55	2		E580 0165
0166		50	2.4	16	4	1.55	2		E580 0166
0167		60	2.4	18	4	1.55	2		E580 0167
0168		60	2.4	20	4	1.55	2		E580 0168
0181	1.8	50	2.7	6	4	1.75	2		E580 0181
0182		50	2.7	8	4	1.75	2		E580 0182
0183		50	2.7	10	4	1.75	2		E580 0183
0184		50	2.7	12	4	1.75	2		E580 0184
0185		50	2.7	14	4	1.75	2		E580 0185
0186		50	2.7	16	4	1.75	2		E580 0186
0187		60	2.7	18	4	1.75	2		E580 0187
0188		60	2.7	20	4	1.75	2		E580 0188
0201	2	50	3.0	6	4	1.95	2		E580 0201
0202		50	3.0	8	4	1.95	2		E580 0202
0203		50	3.0	10	4	1.95	2		E580 0203
0204		50	3.0	12	4	1.95	2		E580 0204
0205		50	3.0	16	4	1.95	2		E580 0205
0206		60	3.0	20	4	1.95	2		E580 0206
0207		75	3.0	25	4	1.95	2		E580 0207
0208	2	50	3	14	4	1.95	2		E580 0208

Size Ref.	d_1	l_1	l_2	l_3	d_2	d_3	z	rad	Item #
0209		60	3	18	4	1.95	2		E580 0209
0210		75	3	30	4	1.95	2		E580 0210
0251	2.5	50	3.7	8	4	2.40	2		E580 0251
0252		50	3.7	12	4	2.40	2		E580 0252
0253		50	3.7	10	4	2.40	2		E580 0253
0254		50	3.7	14	4	2.40	2		E580 0254
0255		50	3.7	16	4	2.40	2		E580 0255
0256		60	3.7	18	4	2.40	2		E580 0256
0257		60	3.7	20	4	2.40	2		E580 0257
0258		60	3.7	25	4	2.40	2		E580 0258
0259		75	3.7	30	4	2.40	2		E580 0259
0301	3	60	4.5	16	6	2.85	2		E580 0301
0302		60	4.5	20	6	2.85	2		E580 0302
0303		75	4.5	25	6	2.85	2		E580 0303
0304		50	4.5	8	6	2.85	2		E580 0304
0305		50	4.5	10	6	2.85	2		E580 0305
0306		50	4.5	12	6	2.85	2		E580 0306
0307		50	4.5	14	6	2.85	2		E580 0307
0308		60	4.5	18	6	2.85	2		E580 0308
0401	4	60	4.5	10	6	3.85	2		E580 0401
0402		60	4.5	15	6	3.85	2		E580 0402
0403		60	4.5	20	6	3.85	2		E580 0403
0404		75	4.5	25	6	3.85	2		E580 0404
0405		75	4.5	30	6	3.85	2		E580 0405
0406		75	4.5	40	6	3.85	2		E580 0406

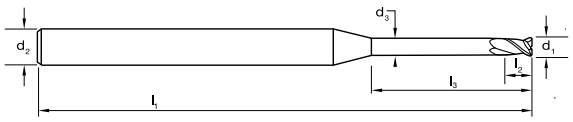
***Cutting Ø tolerance: d_1 < 0.7 = 0 / -0.012 d_1 > 0.7 = 0 / -0.020**

ISO Materials: P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

suttontools

- For precision milling of cavities
- Suitable for materials up to 35–62 HRC
- TiSiN for longer tool life
- Positive rake angle (10°–12°)

For speed and feeds, refer page 74



Catalogue Code	E581
Product Group	B0218
Material	VHM
Surface Finish	TiSiN
Application	N
Geometry	R40
Shank Form (DIN 6535)	HA
Shank Tolerance	h6
ISO Materials	P M S H

Size Ref.	d_1	l_1	l_2	l_3	d_2	d_3	z	rad	Item #
0021	0.2	50	0.3	0.5	4	0.16	2	0.02	E581 0021
0022		50	0.3	1	4	0.16	2	0.02	E581 0022
0023		50	0.3	1.5	4	0.16	2	0.02	E581 0023
0041	0.4	50	0.6	2	4	0.37	2	0.03	E581 0041
0042		50	0.6	4	4	0.37	2	0.03	E581 0042
0051	0.5	50	0.7	2	4	0.45	2	0.05	E581 0051
0052		50	0.7	4	4	0.45	2	0.05	E581 0052
0053		50	0.7	6	4	0.45	2	0.05	E581 0053
0061	0.6	50	0.9	4	4	0.55	2	0.05	E581 0061
0062		50	0.9	8	4	0.55	2	0.05	E581 0062
0081	0.8	50	1.2	6	4	0.75	2	0.08	E581 0081
0082		50	1.2	6	4	0.75	2	0.08	E581 0082
0083		50	1.2	8	4	0.75	2	0.08	E581 0083
0101	1	50	1.5	6	4	0.95	2	0.1	E581 0101
0102		50	1.5	8	4	0.95	2	0.1	E581 0102
0103		50	1.5	10	4	0.95	2	0.1	E581 0103
0104		50	1.5	12	4	0.95	2	0.1	E581 0104
0105		50	1.5	16	4	0.95	2	0.1	E581 0105
0121	1.2	50	1.8	6	4	1.15	2	0.1	E581 0121

Size Ref.	d_1	l_1	l_2	l_3	d_2	d_3	z	rad	Item #
0122		50	1.8	10	4	1.15	2	0.1	E581 0122
0123		50	1.8	12	4	1.15	2	0.1	E581 0123
0151	1.5	50	2.3	6	4	1.45	2	0.15	E581 0151
0152		50	2.3	8	4	1.45	2	0.15	E581 0152
0153		50	2.3	12	4	1.45	2	0.15	E581 0153
0154		50	2.3	16	4	1.45	2	0.15	E581 0154
0155		60	2.3	20	4	1.45	2	0.15	E581 0155
0201	2	50	3.0	6	4	1.95	2	0.2	E581 0201
0202		50	3.0	8	4	1.95	2	0.2	E581 0202
0203		50	3.0	10	4	1.95	2	0.2	E581 0203
0204		50	3.0	12	4	1.95	2	0.2	E581 0204
0205		50	3.0	16	4	1.95	2	0.2	E581 0205
0206		60	3.0	20	4	1.95	2	0.2	E581 0206
0207		75	3.0	25	4	1.95	2	0.2	E581 0207
0251	2.5	50	3.7	8	4	2.40	2	0.3	E581 0251
0252		50	3.7	12	4	2.40	2	0.3	E581 0252
0301	3	60	4.5	16	6	2.95	2	0.3	E581 0301
0302		60	4.5	20	6	2.95	2	0.3	E581 0302
0303		75	4.5	25	6	2.95	2	0.3	E581 0303

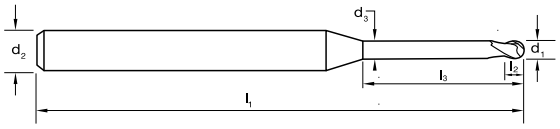
*Cutting Ø tolerance: d_1 < 0.7 = 0 / -0.012 d_1 > 0.7 = 0 / -0.020

ISO Materials: P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

suttontools

- For profile and contour milling in long reach applications
- Suitable for materials up to 35–62 HRC
- TiSiN for longer tool life
- Positive rake angle (10°–12°)

For speed and feeds, refer page 75



Catalogue Code	E582
Product Group	B0218
Material	VHM
Surface Finish	TiSiN
Application	N
Geometry	R30
Shank Form (DIN 6535)	HA
Shank Tolerance	h6
ISO Materials	P M S H

Size Ref.	d_1	l_1	l_2	l_3	d_2	d_3	z	rad†	Item #
0021	0.2	50	0.2	0.5	4	0.15	2	0.1	E582 0021
0022		50	0.2	1	4	0.15	2	0.1	E582 0022
0023		50	0.2	1.5	4	0.15	2	0.1	E582 0023
0031	0.3	50	0.3	1	4	0.25	2	0.15	E582 0031
0032		50	0.3	2	4	0.25	2	0.15	E582 0032
0033		50	0.3	3	4	0.25	2	0.15	E582 0033
0040	0.4	50	0.4	1	4	0.35	2	0.2	E582 0040
0041		50	0.4	2	4	0.35	2	0.2	E582 0041
0042		50	0.4	4	4	0.35	2	0.2	E582 0042
0043		50	0.4	3	4	0.35	2	0.2	E582 0043
0044		50	0.4	5	4	0.35	2	0.2	E582 0044
0051	0.5	50	0.4	2	4	0.45	2	0.25	E582 0051
0052		50	0.4	6	4	0.45	2	0.25	E582 0052
0053		50	0.4	3	4	0.45	2	0.25	E582 0053
0054		50	0.4	4	4	0.45	2	0.25	E582 0054
0055		50	0.4	5	4	0.45	2	0.25	E582 0055
0056		50	0.4	8	4	0.45	2	0.25	E582 0056
0061	0.6	50	0.5	2	4	0.55	2	0.3	E582 0061
0062		50	0.5	4	4	0.55	2	0.3	E582 0062
0063		50	0.5	6	4	0.55	2	0.3	E582 0063
0064		50	0.5	8	4	0.55	2	0.3	E582 0064
0065		50	0.5	3	4	0.55	2	0.3	E582 0065
0066		50	0.5	5	4	0.55	2	0.3	E582 0066
0081	0.8	50	0.6	4	4	0.75	2	0.4	E582 0081
0082		50	0.6	8	4	0.75	2	0.4	E582 0082

Size Ref.	d_1	l_1	l_2	l_3	d_2	d_3	z	rad†	Item #
0083		50	0.6	10	4	0.75	2	0.4	E582 0083
0101	1	50	0.8	4	4	0.95	2	0.5	E582 0101
0102		50	0.8	6	4	0.95	2	0.5	E582 0102
0103		50	0.8	8	4	0.95	2	0.5	E582 0103
0104		50	0.8	10	4	0.95	2	0.5	E582 0104
0105		50	0.8	12	4	0.95	2	0.5	E582 0105
0106		50	0.8	14	4	0.95	2	0.5	E582 0106
0107		60	0.8	20	4	0.95	2	0.5	E582 0107
0121	1.2	50	1.0	8	4	1.15	2	0.6	E582 0121
0123		50	1.0	10	4	1.15	2	0.6	E582 0123
0122		50	1.0	12	4	1.15	2	0.6	E582 0122
0151	1.5	50	1.2	8	4	1.45	2	0.75	E582 0151
0152		50	1.2	12	4	1.45	2	0.75	E582 0152
0153		50	1.2	16	4	1.45	2	0.75	E582 0153
0154		50	1.2	18	4	1.45	2	0.75	E582 0154
0201	2	50	1.6	6	4	1.95	2	1.0	E582 0201
0202		50	1.6	8	4	1.95	2	1.0	E582 0202
0203		50	1.6	12	4	1.95	2	1.0	E582 0203
0204		50	1.6	16	4	1.95	2	1.0	E582 0204
0205		60	1.6	20	4	1.95	2	1.0	E582 0205
0206		75	1.6	30	4	1.95	2	1.0	E582 0206
0301	3	50	2.4	10	6	2.85	2	1.5	E582 0301
0302		60	2.4	16	6	2.85	2	1.5	E582 0302
0303		75	2.4	25	6	2.85	2	1.5	E582 0303
0304		75	2.4	30	6	2.85	2	1.5	E582 0304

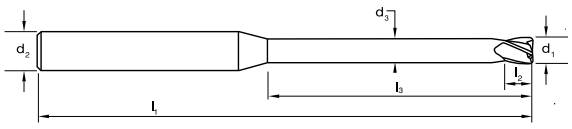
***Cutting Ø tolerance: d_1 < 0.7 = 0 / -0.012 d_1 > 0.7 = 0 / -0.020 †Radius tolerance: Rad = +-0.01**

ISO Materials: P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

suttontools

- Increased feedrates
- Tough coating for long tool life
- Variable helix design for chatter-free machining
- Machine Material 35 to 68HRC

For speed and feeds, refer page 73



Catalogue Code	E598
Product Group	B0218
Material	VHM
Surface Finish	TiSiN
Application	N
Geometry	R40
Shank Form (DIN 6535)	HA
Shank Tolerance	h6
ISO Materials	P M S H

Size Ref.	d_1	l_1	l_2	l_3	d_2	d_3	z	rad	Item #
0102	1	50	1	4	4		4	0.1	E598 0102
0103	1	50	1	6	4		4	0.1	E598 0103
0104	1	50	1	8	4		4	0.1	E598 0104
0105	1	50	1	10	4		4	0.1	E598 0105
0106	1	50	1	12	4		4	0.1	E598 0106
0107	1	50	1	14	4		4	0.1	E598 0107
0108	1	50	1	16	4		4	0.1	E598 0108
0110	1	75	1	20	4		4	0.1	E598 0110
0112	1	50	1	4	4		4	0.2	E598 0112
0113	1	50	1	6	4		4	0.2	E598 0113
0114	1	50	1	8	4		4	0.2	E598 0114
0115	1	50	1	10	4		4	0.2	E598 0115
0116	1	50	1	12	4		4	0.2	E598 0116
0117	1	50	1	14	4		4	0.2	E598 0117
0118	1	50	1	16	4		4	0.2	E598 0118
0120	1	60	1	20	4		4	0.2	E598 0120
0122	1	50	1	6	4		4	0.3	E598 0122
0123	1	50	1	10	4		4	0.3	E598 0123
0124	1	50	1	16	4		4	0.3	E598 0124
0126	1	60	1	20	4		4	0.3	E598 0126
0152	1.5	50	1.5	6	4		4	0.1	E598 0152
0153	1.5	50	1.5	8	4		4	0.1	E598 0153
0154	1.5	50	1.5	12	4		4	0.1	E598 0154
0155	1.5	50	1.5	16	4		4	0.1	E598 0155
0157	1.5	60	1.5	20	4		4	0.1	E598 0157
0159	1.5	50	1.5	6	4		4	0.2	E598 0159
0160	1.5	50	1.5	8	4		4	0.2	E598 0160

Size Ref.	d_1	l_1	l_2	l_3	d_2	d_3	z	rad	Item #
0161	1.5	50	1.5	10	4		4	0.2	E598 0161
0162	1.5	50	1.5	12	4		4	0.2	E598 0162
0163	1.5	50	1.5	14	4		4	0.2	E598 0163
0164	1.5	50	1.5	16	4		4	0.2	E598 0164
0166	1.5	60	1.5	18	4		4	0.2	E598 0166
0167	1.5	60	1.5	20	4		4	0.2	E598 0167
0169	1.5	50	1.5	8	4		4	0.3	E598 0169
0170	1.5	50	1.5	16	4		4	0.3	E598 0170
0172	1.5	60	1.5	20	4		4	0.3	E598 0172
0202	2	50	2	6	4		4	0.2	E598 0202
0203	2	50	2	8	4		4	0.2	E598 0203
0204	2	50	2	10	4		4	0.2	E598 0204
0205	2	50	2	12	4		4	0.2	E598 0205
0206	2	50	2	14	4		4	0.2	E598 0206
0207	2	50	2	16	4		4	0.2	E598 0207
0209	2	60	2	18	4		4	0.2	E598 0209
0210	2	60	2	20	4		4	0.2	E598 0210
0212	2	75	2	25	4		4	0.2	E598 0212
0213	2	75	2	30	4		4	0.2	E598 0213
0215	2	50	2	8	4		4	0.3	E598 0215
0216	2	50	2	16	4		4	0.3	E598 0216
0218	2	60	2	20	4		4	0.3	E598 0218
0220	2	50	2	6	4		4	0.5	E598 0220
0221	2	50	2	8	4		4	0.5	E598 0221
0222	2	50	2	12	4		4	0.5	E598 0222
0223	2	50	2	16	4		4	0.5	E598 0223
0225	2	60	2	20	4		4	0.5	E598 0225

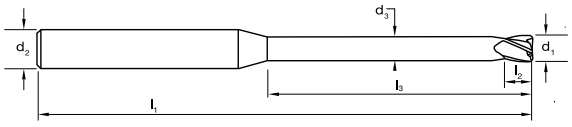
***Cutting Ø tolerance: d_1 < 0.7 = 0 / -0.012 d_1 > 0.7 = 0 / -0.020**

ISO Materials: P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

suttontools

- Increased feedrates
- Tough coating for long tool life
- Variable helix design for chatter-free machining
- Machine Material 35 to 68HRC

For speed and feeds, refer page 73



Catalogue Code	E598
Product Group	B0218
Material	VHM
Surface Finish	TiSiN
Application	N
Geometry	R40
Shank Form (DIN 6535)	HA
Shank Tolerance	h6
ISO Materials	P M S H

Size Ref.	d_1	l_1	l_2	l_3	d_2	d_3	z	rad	Item #
0227	2	75	2	25	4		4	0.5	E598 0227
0228	2	75	2	30	4		4	0.5	E598 0228
0252	2.5	50	2.5	8	4		4	0.3	E598 0252
0253	2.5	50	2.5	10	4		4	0.3	E598 0253
0254	2.5	50	2.5	12	4		4	0.3	E598 0254
0255	2.5	50	2.5	14	4		4	0.3	E598 0255
0256	2.5	50	2.5	16	4		4	0.3	E598 0256
0258	2.5	60	2.5	18	4		4	0.3	E598 0258
0259	2.5	60	2.5	20	4		4	0.3	E598 0259
0260	2.5	60	2.5	25	4		4	0.3	E598 0260
0262	2.5	75	2.5	30	4		4	0.3	E598 0262
0264	2.5	50	2.5	8	4		4	0.5	E598 0264
0265	2.5	50	2.5	12	4		4	0.5	E598 0265
0266	2.5	50	2.5	16	4		4	0.5	E598 0266
0268	2.5	60	2.5	20	4		4	0.5	E598 0268
0269	2.5	60	2.5	25	4		4	0.5	E598 0269
0271	2.5	75	2.5	30	4		4	0.5	E598 0271
0303	3	50	3	8	6		4	0.2	E598 0303
0304	3	50	3	10	6		4	0.2	E598 0304
0305	3	50	3	12	6		4	0.2	E598 0305
0306	3	50	3	14	6		4	0.2	E598 0306
0308	3	60	3	16	6		4	0.2	E598 0308
0309	3	60	3	18	6		4	0.2	E598 0309
0310	3	60	3	20	6		4	0.2	E598 0310
0312	3	75	3	25	6		4	0.2	E598 0312
0314	3	50	3	8	6		4	0.3	E598 0314
0315	3	60	3	10	6		4	0.3	E598 0315

Size Ref.	d_1	l_1	l_2	l_3	d_2	d_3	z	rad	Item #
0316	3	50	3	12	6		4	0.3	E598 0316
0317	3	50	3	14	6		4	0.3	E598 0317
0319	3	60	3	16	6		4	0.3	E598 0319
0320	3	60	3	18	6		4	0.3	E598 0320
0321	3	60	3	20	6		4	0.3	E598 0321
0323	3	75	3	30	6		4	0.3	E598 0323
0325	3	50	3	8	6		4	0.5	E598 0325
0326	3	50	3	10	6		4	0.5	E598 0326
0327	3	50	3	12	6		4	0.5	E598 0327
0328	3	50	3	14	6		4	0.5	E598 0328
0330	3	60	3	16	6		4	0.5	E598 0330
0331	3	60	3	18	6		4	0.5	E598 0331
0332	3	60	3	20	6		4	0.5	E598 0332
0334	3	75	3	30	6		4	0.5	E598 0334
0402	4	60	4	10	6		4	0.3	E598 0402
0403	4	60	4	15	6		4	0.3	E598 0403
0404	4	60	4	20	6		4	0.3	E598 0404
0406	4	75	4	25	6		4	0.3	E598 0406
0407	4	75	4	32	6		4	0.3	E598 0407
0408	4	75	4	40	6		4	0.3	E598 0408
0410	4	60	4	10	6		4	0.5	E598 0410
0411	4	60	4	15	6		4	0.5	E598 0411
0412	4	60	4	20	6		4	0.5	E598 0412
0414	4	75	4	25	6		4	0.5	E598 0414
0415	4	75	4	32	6		4	0.5	E598 0415
0416	4	75	4	40	6		4	0.5	E598 0416

***Cutting Ø tolerance: d_1 < 0.7 = 0 / -0.012 d_1 > 0.7 = 0 / -0.020**

ISO Materials: P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

Endmills Carbide, Hi-Feed, 4 Flute, Corner Rad

suttontools

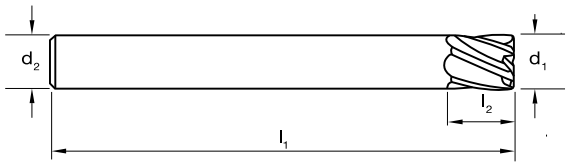
- Increased feedrates
- Tough coating for long tool life
- Variable helix design for chatter-free machining
- Machine Material 35 to 68HRC

For speed and feeds, refer page 72

Catalogue Code	E650
Discount Group	B0218
Material	VHM
Surface Finish	TiSiN
Application	N
Geometry	R40
Shank Form (DIN 6535)	HA
Shank Tolerance	h6
ISO Materials	P S H

Size Ref.	d_1*	l_1	l_2	l_3	d_2	z	rad	Item #
0201	**2**	60	2	**6**	6	4	0.3	E650 0201
0202	**2**	60	2	**6**	6	4	0.5	E650 0202
0301	**3**	60	3	**7**	6	4	0.3	E650 0301
0302	**3**	60	3	**7**	6	4	0.5	E650 0302
0401	**4**	60	4	**8**	6	4	0.3	E650 0401
0402	**4**	60	4	**8**	6	4	0.5	E650 0402
0601	**6**	60	6	-	6	4	0.3	E650 0601
0602	**6**	60	6	-	6	4	0.5	E650 0602
0603	**6**	60	6	-	6	4	1.0	E650 0603

Endmills Carbide, Hi-Feed, 6 Flute, Corner Rad



Catalogue Code	E650
Discount Group	B0218
Material	VHM
Surface Finish	TiSiN
Application	N
Geometry	R40
Shank Form (DIN 6535)	HA
Shank Tolerance	h6
ISO Materials	P S H

Size Ref.	d_1*	l_1	l_2	l_3	d_2	z	rad	Item #
0801	**8**	64	8		8	6	0.3	E650 0801
0802	**8**	64	8		8	6	0.5	E650 0802
0803	**8**	64	8		8	6	1.0	E650 0803
0804	**8**	64	8		8	6	2.0	E650 0804
1001	**10**	75	10		10	6	0.3	E650 1001
1002	**10**	75	10		10	6	0.5	E650 1002
1003	**10**	75	10		10	6	1.0	E650 1003
1004	**10**	75	10		10	6	2.0	E650 1004
1201	**12**	75	12		12	6	0.3	E650 1201
1202	**12**	75	12		12	6	0.5	E650 1202
1203	**12**	75	12		12	6	1.0	E650 1203
1204	**12**	75	12		12	6	2.0	E650 1204

***Cutting Ø tolerance: d_1 < 0.7 = 0 / -0.012 d_1 > 0.7 = 0 / -0.020**

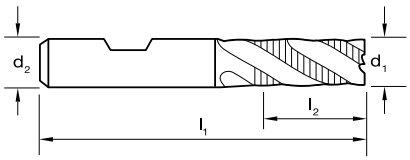
ISO Materials: P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metals S Titanium & Super Alloys H Hard Materials

suttontools

- HSS-SPM
- Unique HR geometry offers stable performance in difficult to machine materials for roughing applications
- Ideal for large volume metal removal

For speed and feeds, refer page 71

DIN 844K | B | 45° | r



Type	4-6 Flute	4 Flute	4 Flute	4 Flute
Product Group	B0408	B0408	B0408	B0408
Material	SPM	SPM	SPM	SPM
Surface Finish	*TiAlN*	*AlCrN*	*AlCrN*	*AlCrN*
Application	UNI	VA-R	VA-R	VA-R
Geometry	R45 HRS	R30 VA-R	R30 VA-R Corner Rad	R30 VA-R
Shank Form (DIN 1835)	B	B	B	B
Shank Tolerance	h6	h6	h6	h6
ISO Materials	P M K	P M S H	P M S H	P M S H

Size Ref.	d_1	l_1	l_2	d_2	z	rad	Item #	Item #	Item #	Item #
	DIN 844K						E151	E251	E255	E252
0400	4.0	55	11	6	4		E151 0400			
0500	5.0	57	13	6	4		E151 0500			
0600	6.0	57	13	6	4		E151 0600	E251 0600		
0800	8.0	69	19	10	4		E151 0800	E251 0800		
1000	10.0	72	22	10	4		E151 1000	E251 1000		
1025	10.0	72	22	10	4	2.5			E255 1025	
1040	10.0	72	22	10	4	4			E255 1040	
1200	12.0	83	26	12	4		E151 1200	E251 1200		
1225		83	26	12	4	2.5			E255 1225	
1240		83	26	12	4	4			E255 1240	
1400	14.0	83	26	12	5		E151 1400			
1600	16.0	92	32	16	5		E151 1600	E251 1600		
1605		92	32	16	5			E251 1605		
1625		92	32	16	5	2.5			E255 1625	
1640		92	32	16	5	4			E255 1640	
1800	18.0	92	32	16	6		E151 1800			
2000	20.0	104	38	20	6		E151 2000	E251 2000		
2005		104	38	20	5			E251 2005		
2025		104	38	20	5	2.5			E255 2025	
2040		104	38	20	5	4			E255 2040	
2050		104	38	20	5	5			E255 2050	
2060		104	38	20	5	6			E255 2060	
2500	25.0	121	45	25	6		E151 2500	E251 2500		
2525		121	45	25	5	2.5			E255 2525	
2540		121	45	25	5	4			E255 2540	
2550		121	45	25	5	5			E255 2550	
2560		121	45	25	5	6			E255 2560	
3040	30.0	121	45	25	6	4			E255 3040	
3200	32.0	133	53	32	6			E251 3200		
3240	32.0	133	53	32	6	4			E255 3240	
0600	6.0	68	24	6	3					E252 0600
0800	8.0	88	38	10	3					E252 0800
1000	10.0	95	45	10	4					E252 1000
1200	12.0	110	53	12	4					E252 1200
1600	16.0	123	63	16	4					E252 1600
2000	20.0	141	75	20	4					E252 2000
2500	25.0	166	90	25	5					E252 2500

†3 Flute ††4 Flute †††5 Flute * Not available once current stock is depleted.

ISO Materials: P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metals | S Titanium & Super Alloys | H Hard Materials

suttontools

Material Group		WKR	DIN	BS	EN	AFNOR	UNI	UNE	SS	JIS	AISI / SAE / UNS
ISO	VDI^ 3323	Germany	Germany	U.K.	U.K.	France	Italy	Spain	Sweden	Japan	USA
P	1	1.0402	C 22	050 A 20	2C	CC20	C 20 , C 21	F.112	1450		1020, G 10200
	1	1.0715	9 SMn 28	230 M 07		S250	CF 9 SMn 28	11SMn28	1912	SUM 22	1213, G 12130
	1	1.0722	10 SPb 20			10PbF2	CF 10 SPb 20	10SPb20			11 L 08
	1	1.0736	9 SMn 36	240 M 07	1B	S300	CF 9 SMn 36	12SMN35			1215, G 12150
	1	1.0737	9 SMnPb 36			S300Pb	CF 9 SMnPb 36	12SMnP35	1926		12 L 14, G 12144
	1	1.0401	C 15	080 M 15	CS	CC12	C16	F.111	1350	S 15 CK	1015, G 10170
	1	1.0718	9 SMnPb 28			S250Pb	CF 9 SMnPb 28	11SMnPb28	1914	SUM 22 L	12 L 13, G 12134
	1	1.1141	Ck 15	080 M 15	32C	XC12 , XC15 , XC18	C15		1370	S15C	1015, G 10170
	2	1.1170	28 Mn 6	150 M 28	14A	20M5	C 28 Mn			SCMn 1	1330
	2 / 3	1.0501	C 35	060 A 35		CC35	C 35	F.113	1550	S 35 C	1035, G 10350
	2 / 3	1.0503	C 45	080 M 46		CC45	C 45	F.114	1650	S45C	1045, G 10430
	2 / 3	1.1191	Ck 45	080 M 46			C 45	F.1140	1672	S48C	1045, G 10420
	2 / 3	1.0726	35 S 20	212 M 36	8M	35 MF 4		F.210.G	1957		1140, G 11400
	2 / 3	1.1157	40 Mn 4	150 M 36	15	35 M 5					1039, G10390
	2 / 3	1.1167	36 Mn 5	150 M 36		40 M 5		F.411	2120	SMn438(H)	1335, G 13350
	4 / 5	1.0535	C 55	070 M 55			C 55	F.1150	1655	S 55 C	1055
	4 / 5	1.0601	C 60	080 A 62	43D	CC 55	C 60			S 58 C	1060, G 10600
	4 / 5	1.1203	Ck 55	070 M 55		XC 55	C 50		1655	S 55 C	1055
	4 / 5	1.1221	Ck 60	080 A 62	43D	XC 60	C 60	F.1150	1665; 1678	S 58 C	1060, G 10640
	4 / 5	1.1545	C 105 W1	BW 1A			C 100 KU	F.5118	1880	SK 3	W 110, T 72301
	4 / 5	1.1274	Ck 101	060 A 96				F.5117	1870	SUP 4	1095, G 10950
	5 / 9	1.5120	38 MnSi 4								
	6 / 7	1.6657	10 NiCrMo 13-4	832 M 13	36C		15 NiCrMo 13	14NiCrMo131			
	6 / 7	1.5423	16 Mo 5	1503-245-420			16 Mo 5	16Mo5		SB 450 M	4520, G 45200
	6 / 7	1.7131	16 MnCr 5	527 M 17		16 MC 5	16 MnCr 5	F.1516	2511	SCR 415	5115, G 51170
	6 / 7	1.5622	14 Ni 6			16 N 6	14 Ni 6	15Ni6			A350LF5
	6 / 7	1.5415	15 Mo 3	1501-240		15 D 3	16 Mo 3	16Mo3	2912		A204GrA
	6 / 7	1.5752	14 NiCr 14	655 M 13	36A	12 NC 15				SNC 815 (H)	3310, 3415, 9314, G 33106
	6 / 7	1.6587	17 CrNiMo 6	820 A 16		18 NCD 6	18 NiCrMo 7				
	6 / 7	1.7262	15 CrMo 5			12 CD 4	12 CrMo 4	12CrMo4	2216		
	6 / 7	1.7335	13 CrMo 4-4	1501-620 Gr. 27		15 CD 3.5	14 CrMo 4 5	14CrMo45	2216		A 182-F11, F12
	6 / 7	1.7380	10 CrMo 9-10	1501-622 Gr. 31, 45		10 CD 9.10	12 CrMo 9 10	F.155	2218		A 182-F22, J 21890
	6 / 7	1.7715	14 MoV 6-3	1503-660-440							
	6 / 7	1.7015	10 Cr 3	523 M 15		12 C 3				SCr 415 (H)	5015, G 50150
	6 / 8	1.7033	34 Cr 4	530 A 32	18B	32 C 4	34 Cr 4 (KB)			SCr 430 (H)	5132, G 51320
	6 / 8	1.7218	25 CrMo 4	1717 CDS 110		25 CD 4 S	25 CrMo 4 (KB)	F.1251	2225	SCM 420, SCM 430	4130, G 41300
	6 / 8	1.6523	21 NiCrMo 2	805 M 20	362	20 NCD 2	20 NiCrMo 2	F.1522	2506	SNCM 220 (H)	8620, G 86170
	6 / 9	1.7220	34 CrMo 4	708 A 37		35 CD 4	35 CrMo 4		2234	SCM 432, SCCrM 3	4135, 4137, G 41350
	6 / 9	1.7225	42 CrMo 4	708 M 40		42 CD 4	42 CrMo 4		2244	SCM 440 (H)	4140, 4142, G 41400
	6 / 9	1.8509	41 CrAlMo 7	905 M 39	41B	40 CAD 6.12	41 CrAlMo 7			SACM 645	A355GrA, K 24065
	6 / 9	1.0961	60 SiCr 7			60 SC 7	60 SiCr 8				9262
	6 / 9	1.2067	100 Cr 6	BL 3							L 3, T 61203
	6 / 9	1.2419	105 WCr 6			105 WC 13	107 WCr 5 KU		2140	SKS 31	
	6 / 9	1.2542	45 WCrV 7	BS 1			45 WCrV 8 KU		2710		S 1, T 41901
	6 / 9	1.2713	55 NiCrMoV 6			55 NCDV 7		F.520.S		SKT 4	L 6, T 61206
	6 / 9	1.7035	41 Cr 4	530 M 40	18	42 C 4	41 Cr 4			SCr 440 (H)	5140, G 51400
	6 / 9	1.7176	55 Cr 3	527 A 60	48	55 C 3	55 Cr 3		2253	SUP 9 (A)	5155, G 51550
	6 / 9	1.6546	40 NiCrMo 2-2	311-Type 7		40 NCD 2	40 NiCrMo 2 (KB)			SNCM 240	8740, G 87400
	6 / 9	1.6511	36 CrNiMo 4	816 M 40	110	40 NCD 3	38 NiCrMo 4 (KB)				9840, G 98400
	6 / 9	1.6582	34 CrNiMo 6	817 M 40	24	35 NCD 6	35 NiCrMo 6 (KW)		2541	SNCM 447	4340
	6 / 9	1.7361	32 CrMo 12	722 M 24	40B	30 CD 12	32 CrMo 12		2240		
	6 / 9	1.8159	50 CrV 4	735 A 50	47	50 CV 4	51 CrV 4	51CrV4	2230	SUP 10	6145, 6150
	6 / 9	1.8523	39 CrMoV 13-9	897 M 39	40C		36 CrMoV 13 9				
	6 / 9	1.8161	58 CrV 4								
	10 /11	1.5680	12 Ni 19			Z 18 N 5					2515
	10 /11	1.2363	X100 CrMoV 5-1	BA 2		Z 100 CDV 5	X 100 CrMoV 5 1 KU	F.5227	2260	SKD 12	A 2, T 30102
	10 /11	1.2436	X210 CrW 12				X 215 CrW 12 1 KU	F.5213	2312	SKD 2	D 4
	10 /11	1.2601	X165 CrMoV 12				X 165 CrMoW 12 KU		2310		
	10 /11	1.3343	S 6-5-2	BM 2		Z 85 WDCV 06.05.04.02	HS 6-5-2		2722	SKH 51	M 2, T 11302
	10 /11	1.2344	X40 CrMoV 5-1	BH 13		Z 40 CDV 5	X 40 CrMo 5 1 1 KU	F.5318	2242	SKD 61	H 13, T 20813

Material Group		WKR	DIN	BS	EN	AFNOR	UNI	UNE	SS	JIS	AISI / SAE / UNS
ISO	VDI 3323	Germany	Germany	U.K.	U.K.	France	Italy	Spain	Sweden	Japan	USA
P	10 /11	1.2581	X30 WCrV 9-3	BH 21		Z 30 WCV 9	X 30 WCrV 9 3 KU			SKD 5	H 21, T 20821
	10 /11	1.2080	X210 Cr 12	BD 3		Z 200 C 12	X 210 Cr 13 KU			SKD 1	D 3, T 30403
	10 /11	1.3243	S 6-5-2-5	BM 35		Z 85 WDKCV 06.05.05.04.02	HS 6-5-2-5	HS 6-5-2-5	2723	SKH 55	M35
	10 /11	1.3348	S 2-9-2			Z 100 DCWV 09.04.02.02	HS 2-9-2	HS 2-9-2	2782		M 7, T 11307
	10 /11	1.3255	S 18-1-2-5	BT 4		Z 80 WKCV 18.05.04.0	HS 18-1-1-5	HS 18-1-1-5		SKH 3	T 4, T 12004
	10 /11	1.3355	S 18-0-1	BT 1		Z 80 WCV 18.04.01	HS 18-0-1	HS 18-0-1		SKH 2	T 1, T 12001
	10 /11	1.4718	X45 CrSi 9-3	401 S 45	52	Z 45 CS 9	X 45 CrSi 8			SUH 1	HNV 3, S 65007
	12 /13	1.4104	X12 CrMoS 17	420 S 37		Z 10 CF 17	X 10 CrS 17	F.3117	2383	SUS 430 F	430 F, S 43020
	12 /13	1.4000	X6 Cr 13	403 S 17		Z 6 C 13	X 6 Cr 13	F.3110	2301	SUS 403	403, S 40300
	12 /13	1.4016	X6 Cr 17	430 S 15	60	Z 8 C 17	X 8 Cr 17	F.3113	2320	SUS 430	430, S 43000
	12 /13	1.4113	X6 CrMo 17	434 S 17		Z 8 CD 17.01	X 8 CrMo 17			SUS 434	434, S 43400
	12 /13	1.4006	X12 Cr 13	410 S 21	56A	Z10 C 13	X 12 Cr 13	F.3401	2302	SUS 410	410 S, S 41000
	12 /13	1.4001	X7 Cr 14					F.8401		SUS 429	429
	12 /13	1.4871	X53 CrMnNiN 21-9	349 S 52		Z 52 CMN 21.09	X 53 CrMnNiN 21 9			SUH 35	EV 8, S 63008
	12 /13	1.4034	X46 Cr 13	420 S 45	56D	Z 40 C 14	X 40 Cr 14	F.3405	2304	SUS 420J2	
	12 /13	1.4057	X19 CrNi 17-2	431 S 29	57	Z 15 CN 16.02	X 16 CrNi 16	F.3427	2321	SUS 431	431, S 43100
	12 /13	1.4313	X3 CrNi 13-4	425 C 11		Z 5 CN 13.4	X 6 CrNi 13 04		2385	SCS 5	CA 6-NM, J 91540
	12 /13	1.4027	G-X20Cr14	420 C 24	56B	Z 20 C 13 M				SCS 2	
M	14.1	1.4436	X3 CrNiMo 17-13-3	316 S 33		Z 6 CND 18.12.03	X 5 CrNiMo 17 13 2		2343	SUS 316	316, S 31600
	14.1	1.4310	X10 CrNi 18-8	301 S 21		Z 12 CN 17.07	X2CrNi18 07	F.3517	2331	SUS 301	301, S 30100
	14.1	1.4401	X5 CrNiMo 17-12-2	316 S 31	58J	Z 6 CND 17.11	X 5 CrNiMo 17 12	F.3543	2347	SUS 316	316, S 31600
	14.1	1.4429	X2CrNiMoN 17-13-3	316 S 62		Z 2 CND 17.13 Az	X 2 CrNiMoN 17 13 3		2375	SUS 316 LN	316 LN, S 31653
	14.1	1.4583	X6 CrNiMoNb 18-12				X 6 CrNiMoNb 17 13				318
	14.1	1.4305	X10 CrNiS 18-10	303 S 21	58M	Z 10 CNF 18.09	X 10 CrNi 18 09	F.3508	2346	SUS 303	303, S 30300
	14.1	1.4301	X5 CrNi 18-10	304 S 15	58E	Z 6 CN 18.09	X 5 CrNi 18 11	F.3504	2332 , 2333	SUS 304	304 , 304 H, S 30400
	14.1	1.4571	X6 CrNiMoTi17-12-2	320 S 31	58J	Z 6 CNT 17.12	X 6 CrNiMoTi 17 12	F.3535	2350	SUS 316 Ti	316 Ti, S 31635
	14.1	1.4311	X2 CrNiN 18 10	304 S 62		Z 2 CN 18 .10	X2CrNiN18 10	F.3541	2371	SUS 304 LN	304 LN, S 30453
	14.1	1.4308	G-X6CrNi 18-9	304 C 15	58E	Z 6 CN 18.10 M			2333	SCS 13	CF-8, J 92590
	14.1	1.4408	G-X6CrNiMo 18-10	316 C 16					2343	SCS 14	CF-8M, J 92900
	14.1	1.4581	G-X5CrNiMoNb 18	318 C 17		Z 4 CNDNb 18.12	GX5CrNiMoNb19 11 2			SCS 22	
	14.2	1.4845	X12 CrNi 25-21	310 S 24		Z 12 CN 25.20	X 6 CrNi 25 20	F.331	2361	SUH 310; SUS 310 S	310 S
	14.2	1.4878	X12 CrNiTi 18-9	321 S 51	58B	Z6CNT18.12B		F.3523	2337	SUS 321	321
	14.2	1.4541	X14 CrNiTi 18-10	321 S 12		Z 6 CNT 18.10	X 6 CrNiTi 18 11	F.3523	2337	SUS 321	321 H, S 32100
	14.2	1.4550	X6 CrNiNb 18-10	347 S 17	58F	Z 6 CNNb 18.10	X 6 CrNiNb 18 11	F.3524	2338	SUS 347	347, S 34700
	14.3	1.4545	X5CrNiCuNb15-5-4			EZ5CNU15-05					S15500, 15-5 PH
	14.3	1.4542	X5CrNiCuNb16-4			Z6CNU17-04					S17400, 17-4 PH; 630
K	15 /16	0.6020	GG 20	180, 200/220, 220, Grade180, Grade260		FGL200, Ft20D	G 20	FG20	120	FC200	200/225, 25B, 30, 30B
	15	0.6010	GG-10		100	FT 10 D	G10		0110-00	FC100	
	15	0.6015	GG 15	Grade 150		FT 15 D	G 15	FG 15	0115-00	FC150	NO 25 B
	15	0.6660	GGL-NiCr202	L-NiCuCr202		L-NC 202			0523-00		A436 Type 2
	15	0.7040	GGG 40	SNG 420/12		FCS 400-12	GS400-12	FGE 38-17	0717-02	FCD400	60-40-18
	16	0.6030	GG30	Grade 300		Ft 30 D	G30	FG30	01 30-00	FC300	300/325, 40B, 45/50, 45B
	16	0.6035	GG-35	GRADE 350		Ft35D	G 35	FG 35	135	FC350	A48-50
	16	0.6040	GG40	GRADE400		Ft 40 D			140		A48-60 B
	16	0.7070	GGG-70	SNG700/2	EN-JS1070	FGS 700-2	GGG 70	GGG 70	07 37-01	FCD700, FCD700-2	100-70-03
	17	0.7033	GGG35.3						07 17-15		Ni-ResistD-5B, S-NiCr35-3
	17	0.7043	GGG-40.3	370/7	EN-JS1025	FGS 370/17			0717-15	FCD400-18L	60/40/18
	17	0.7050	GGG50	SNG500/7	EN-JS1050	FGS 500/7	GGG 50	FGE50-7	0727-02	FCD500, FCD500-7	65-45-12, 70-50-05, 80-55-06
	17	0.7652	GGG-NiMn 13 7	S-NiMn 137		S-Mn 137					
	17	0.7660	GGG-NiCr 20 2	Grade S6		S-NC 202			0772-00		A43D2, Ni-ResistD-2, S-NiCr20-2
	18	0.6025	GG25	Grade260		Ft 25 D	G25	FG25	0717-12		250/275, 35, 35B, 40
	18	0.7060	GGG60	SNG600/3	EN-JS1060	FGS600-3	G 25	FG 25	07 32-03	FC250	100-70-03, 80-55-06, 80-60-03
	18								0727-03	FCD600	A48 40 B
	19	0.8055	GTW55								
	19	0.8135	GTS-35-10	B 340/2		Mn 35-10		GTS 35	810		
	19	0.8145	GTS-45-06	P 440/7		Mn 450-6			0815-00		A220-40010
	19		GTS-35	B 340/12			0852-00	GMN 45			
	19			8 290/6		MN 32-8					
	19		GTS-35	B340/12		MN 35-10			0810-00		32510

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Material Group		WKR	DIN	BS	EN	AFNOR	UNI	UNE	SS	JIS	AISI / SAE / UNS
ISO	VDI^ 3323	Germany	Germany	U.K.	U.K.	France	Italy	Spain	Sweden	Japan	USA
K	20	0.8035	GTM-35	W340/3		MB35-7			814	AC4A	
	20	0.8040	GTW-40	W410/4		MB40-10			08 15	FCMW330	
	20	0.8045						GTM 35	852		
	20	0.8065	GTMW-65				GMB40	GTM 40			
	20	0.8155	GTS-55-04	P 510/4		Mn 550-4	GMB45	GTM 45			A220-50005
	20	0.8165	GTS-65-02	P 570/3		Mn 650-3			0854-00		70003
	20	0.8170	GTS-70-02	P 690/2		Mn 700-2	GMN 55, 65		0854-00	FCMP490	90001
	20		GTS-45	P440/7			20 Mn 7	F.1515-20 Mn 6		SMnC 420	400 10
	20		GTS-65	P 570/3		MP 60-3	C 36; C 38		1572	S 35 C	70003
N	21	3.0205							08 52		Al99
	21	3.0255	Al99.5	L31/34/36		A59050C	P-Al99.5		Al99.5	FCMP540	1000
	21	3.3315	AlMg1								
	21	3.0505	AlMn0.5Mg0.5								
	21	3.0275	Al99.7	4508, 9001-3, P-Al99.7		1070A	Al99.7			1070, A1070	1070A
	21	3.0285	Al99.8	1080A		1080A	4590, 9001-4, P-Al99.8			1080A, 1080A	1080A, 1080A
	22	3.1325	AlCuMg 1			2017A	P-AlCu4MgMnSi			2017	A92017
	22	3.1655	AlCuSiPb								
	22	3.2315	AlMgSi1								
	22	3.4345	AlZnMgCuO,5	L 86		AZ 4 GU/9051					7050
	22	3.1305	AlCuMgO.5	L86		A-U2G2117	P-AlCu2.5MgSi			2117	2117
	22	3.0517	AlMnCu								
	23	3.2381	G-AlSi 10 Mg	G-AlSi9Mg		A-S10G			AlSi10Mg	AC4A, ADC3	A03590
	23	3.2382	GD-AlSi10Mg						811-04	ADC3	
	23	3.2581	G-AlSi12	LM20		A-S12U	G-AlSi13CuMn		AlSi12Cu	AC3A	A04130
	23	3.3561	G-AlMg 5							AC7A, ADC5, Al-Mg6	
	23	3.5101	G-MgZn4sE1Zr1	MAG 5							ZE 41
	23	3.5103	MgSE3Zn27r1	MAG 6		G-TR3Z2					EZ 33
	23	3.5812	G-MgAl8Zn1	NMAG 1							AZ 81
	23	3.5912	G-MgAl9Zn1	MAG 7							AZ 91
	23	3.3549	AlMg5Mn								
	23	3.3555	AlMg5								
	23	3.3547	AlMg4.5, AlMg4.5Mn	5083		5183	P-AlMg4.4		AlMg4.5Mn	5082	A95083
	23-24	3.2383	G-AlSi0Mg(Cu)	LM9					4253		A360.2
	23-24			2789;1973		NF A32-201					A356-72
	23-24			LM25					4244	A5052	356.1
	23-24		G-AlSi12	LM 6					4261		A413.2
	23-24		G-AlSi 12 (Cu)	LM 20					4260	ADC12	A413.1
	23-24		GD-AlSi12						4247	A6061	A413.0
	23-24		GD-AlSi8Cu3	LM24					4250	A7075	A380.1
	24	2.1871	G-AlCu 4 TiMg								
	24	3.1754	G-AlCu5Ni1,5								
	24	3.2163	G-AlSi9Cu3							ADC10	
	24	3.2371	G-AlSi 7 Mg							AC4CH	4218 B
	24	3.2373	G-AlSI9MGWA			A-S7G			4251	C4BS	SC64D
	24	3.5106	G-MgAg3SE2Zr1	mag 12							QE 22
	24		G-ALMG5	LM5		A-SU12			4252		GD-AlSI12
	26	2.1090	G-CuSn 7 5 pb			U-E 7 Z 5 pb 4					C93200
	26	2.1096	G-CuSn5ZnPb	LG 2							c 83600
	26	2.1098	G-CuSn 2 Znpb								C 83600
	26	2.1182	G-CuPb15Sn	LB1		U-pb 15 E 8					C23000
	27	2.0240	CuZn 15								
	27	2.0321	CuZn 37	cz 108		CuZn 36, CuZn 37	C 2700				C27200
	27	2.0590	G-CuZn40Fe								
	27	2.0592	G-CuZn 35 Al 1	U-Z 36 N 3		HTB 1					C 86500
	27	2.1293	CuCrZr	CC 102		U-Cr 0.8 Zr					C 18200
	28	2.0060	E-Cu57								
	28	2.0375	CuZn36Pb3								
	28	2.0966	CuAl 10 Ni 5 Fe 4	Ca 104		U-A 10 N					C 63000
	28	2.0975	G-CuAl 10 Ni								B-148-52
	28	2.1050	G-CuSn 10	CT1							c 90700
	28	2.1052	G-CuSn 12	pb 2		UE 12 P					C 90800
	28	2.1292	G-CuCrF 35	CC1-FF							C 81500
	28	2.4764	CoCr20W15Ni								

Material Group		WKR	DIN	BS	EN	AFNOR	UNI	UNE	SS	JIS	AISI / SAE / UNS
ISO	VDI 3323	Germany	Germany	U.K.	U.K.	France	Italy	Spain	Sweden	Japan	USA
	31	1.4558	X 2 NiCrAlTi 32 20	NA 15							N 08800
	31	1.4562	X 1 NiCrMoCu 32 28 7								N 08031
	31	1.4563	X 1 NiCrMoCuN 31 27 4						2584		N 08028
	31	1.4864	X 12 NiCrSi 36 16	NA 17		Z 12 NCS 35.16				SUH 330	INCOLOY DS,, N08330
	31	1.4865	G-X40NiCrSi38 18	330 C 40			XG50NiCr39 19			SCH15	N 08004
	31	1.4958	X 5 NiCrAlTi 31 20								
	31	2.4668	NiCr19NbMo			NC20K14					AMS 5544
	32	1.4977	X 40 CoCrNi 20 20			Z 42 CNKDWNb					
	33	2.4360	NiCu30Fe	NA 13		NU 30					Monel 400
	33	2.4603				NC22FeD					5390A
	33	2.4610	NiMo16cR16Ti								Hastelloy C-4
	33	2.4630	NiCr20Ti	HR 5,203-4		NC 20 T					Nimonic 75
	33	2.4642	NiC29Fe			Nnc 30 Fe					Inconel 690
	33	2.4856	NiCr22Mo9Nb	NA 21		NC 22 FeDNb					INCONEL 625, N 26625
	33	2.4858	NiCr21Mo	NA 16		NC 21 Fe DU					Incoloy 825
	34	2.4375	NiCu30 Al	NA 18		NU 30 AT					Monel k-500
	34	2.4631	NiCr20TiAl	Hr40;601, NA 20		NC20TA					N 07080
	34	2.4668	NiCr19FeNbMo			NC 19 Fe Nb					Inconel 718
	34	2.4694	NiCr16fE7TiAl								Inconel
	34	2.4955	NiFe25Cr20NbTi								
	34	2.4668	NiCr19Fe19NbMo	HR8		NC19eNB					5383
S	34	2 4670	S-NiCr13A16MoNb	3146-3		NC12AD					5391
	34	2.4662	NiFe35Cr14MoTi			ZSNCDT42					5660
	34	2.4964	CoCr20W15Ni			KC20WN					5537C
	34		COCr22W14Ni			KC22WN					AMS 5772
	34										N07725, Inconel 725
	35	2.4669	NiCr15Fe7TiAl			NC 15 TNb A					Inconel X-750
	35	2.4685	G-NiMo28								Hastelloy B
	35	2.4810	G-NiMo30								Hastelloy C
	35	2.4973	NiCr19Co11MoTi			NC19KDT					AMS 5399
	35	3.7115	TiAl5Sn2								
	36	3.7025	Ti 1	2 TA 1							R 50250
	36	3.7225	Ti 1 pd	TP 1							R 52250
	36	2 4674	NiCo15Cr10MoAlTi								AMS 5397
	37	3.7124	TiCu2	2 TA 21-24							
	37	3.7145	TiAl6Sn2Zr4Mo2Si								R 54620
	37	3.7165	TiAl6V4	TA 10-13;TA 28		T-A 6 V					
	37	3.7185	TiAl4Mo4Sn2	TA 45-51; TA 57							
	37	3.7195	TiAl 3 V 2.5								
	37		TiAl4Mo4Sn4Si0.5								
	37		TiAl5Sn2.5	TA14/17		T-A5E					AMS R54520
	37		TiAl6V4	TA10-13/TA28		T-A6V					AMS R56400
	37		TiAl6V4ELI	TA11							AMS R56401
	38	1.1545	C 105 W1	BW 1A		Y1 105	C 100 KU	F-5118	1880	SK 3	W 1
	38	1.2762	75 CrMoNiW 6 7								
	38	1.4125	X105 CrMo 17			Z 100 CD 17					440C
	38	1.6746	32 nlcRmO 14 5	832 M 31		35 NCD 14					
	40	0.9620	G-X 260 NiCr 4 2	Grade 2 A			0512-00				Ni- Hard 2
	40	0.9625	G-X 330 Ni Cr 4 2	Grade 2 B							Ni- Hard 1
H	40	0.9630	G-X 300 CrNiSi 9 5 2				0513-00				Ni-Hard 4
	40	0.9640	G-X 300 CrMoNi 15 2 1								
	40	0.9650	G-X 260 Cr 27	Grade 3 D							A 532 III A 25% Cr
	40	0.9655	G-X 300 CrNMo 27 1	Grade 3 E							A 532 III A 25% Cr
	40	1.2419	105 WCr 6	105WC 13			0466-00				
	40	1.4841	X15 CrNiSi 25 20	314 S31		Z 15 CNS 25-20					310
	41	0.9635	G-X 300 CrMo 15 3								
	41	0.9645	G-X 260 CrMoNi 20 2 1					107 WCr 5 KU			

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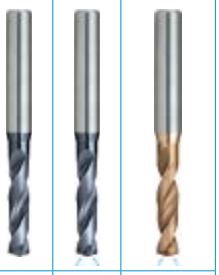
ISO	VDI	Material Group	Sutton	
P	A	Steel	N	UNI
M	R	Stainless Steel	VA	
K	F	Cast Iron	GG	
N	N	Non-Ferrous Metals, Aluminiums & Coppers	Al / W	
S	S	Titaniums & Super Alloys	Ti	Ni
H	H	Hard Materials (≥ 45 HRC)	H	

^ VDI 3323 material groups can also be determined by referring to the workpiece material cross reference listing. Refer to our full catalogue.



	STUB			JOBBER			LONG	EXTRA	SPOTTING	
Catalogue Code	D323	D329	D356	D326	D332	D358	D335	D371	D364	D366
Material	VHM			VHM			VHM	VHM	VHM	
Surface Finish	AlCrN		HELICA	AlCrN		HELICA	AlCrN	AlCrN	AlCrN	
Sutton Designation	N		VA	N		VA	N	N	N	
Geometry	R30	R30 - IK	R30 - IK	R30	R30 - IK	R30 - IK	R30 - IK	R30 - IK	90°	142°
Drilling Depth	≤ 3xØ			≤ 5xØ			≤ 8xØ	≤ 12xØ	-	

ISO	VDI^ 3323	Material		Condition	HB	N/mm²	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #
P	1	Steel - Non-alloy, cast & free cutting	~ 0.15 %C	A	125	440	90	8	130	8	130-180	7	90	8	130	8	130-180	7	100	8	80	8	96	6	96	6
	2		~ 0.45 %C	A	190	640	90	8	130	8	110-160	7	90	8	130	8	110-160	7	100	8	80	8	96	6	96	6
	3			QT	250	840	85	8	110	8	110-160	7	85	8	110	8	110-160	7	80	7	60	7	78	6	78	6
	4		~ 0.75 %C	A	270	910	85	8	110	8	110-160	7	85	8	110	8	110-160	7	80	7	60	7	78	6	78	6
	5			QT	300	1010	50	6	70	6	70-100	7	50	6	70	6	70-100	7	60	6	50	6	60	5	60	5
	6	Steel - Low alloy & cast < 5% of alloying elements		A	180	610	85	8	110	8	110-160	7	85	8	110	8	110-160	7	80	7	60	7	78	6	78	6
	7			QT	275	930	65	7	80	7	110-160	7	65	7	80	7	110-160	7	80	7	60	7	72	6	72	6
	8			QT	300	1010	50	6	70	6	70-100	7	50	6	70	6	110-160	7	60	6	50	6	60	5	60	5
	9			QT	350	1180	30	5	35	5	-	-	30	5	35	5	-	-	30	5	-	-	60	5	60	5
	10	Steel - High alloy, cast & tool		A	200	680	50	6	70	6	90-120	7	50	6	70	6	90-120	7	60	6	50	6	60	5	60	5
	11			HT	325	1100	30	5	35	5	-	-	30	5	35	5	-	-	30	5	-	-	60	5	60	5
	12	Steel - Corrosion resistant & cast	Ferritic / Martensitic	A	200	680	-	-	30	4	40-50	5	-	-	25	4	30-50	5	-	-	-	-	35	3	35	3
	13		Martensitic	QT	240	810	30	5	35	5	40-50	5	30	5	35	5	40-50	5	30	5	-	-	60	5	60	5
M	14.1	Stainless Steel	Austenitic	AH	180	610	-	-	50	5	50-70	5	-	-	40	5	50-70	5	45	5	40	5	50	4	50	4
	14.2		Duplex		250	840	-	-	40	4	40-60	5	-	-	35	4	40-60	5	-	-	30	4	40	3	40	3
	14.3		Precipitation Hardening		250	840	20	4	30	4	40-50	5	20	4	25	4	30-50	5	-	-	-	-	35	3	35	3
K	15	Cast Iron - Grey (GG)	Ferritic / Pearlitic		180	610	75	6	150	9	-	-	75	6	150	9	-	-	90	8	80	8	84	6	84	6
	16		Pearlitic		260	880	65	6	120	8	-	-	65	6	120	8	-	-	80	8	70	8	84	5	84	5
	17	Cast Iron - Nodular (GGG)	Ferritic		160	570	65	5	100	8	-	-	65	5	100	8	-	-	70	7	60	7	84	5	84	5
	18		Pearlitic		250	840	65	5	100	8	-	-	65	5	100	8	-	-	70	7	60	7	84	5	84	5
	19	Cast Iron - Malleable	Ferritic		130	460	65	5	100	8	-	-	65	5	100	8	-	-	70	7	60	7	84	5	84	5
	20		Pearlitic		230	780	65	5	100	8	-	-	65	5	100	8	-	-	70	7	60	7	84	5	84	5
N	21	Aluminum & Magnesium - wrought alloy	Non Heat Treatable		60	210	-	-	-	-	300-400	8	-	-	-	-	300-400	8	-	-	-	-	-	-	-	-
	22		Heat Treatable	AH	100	360	-	-	-	-	300-400	8	-	-	-	-	300-400	8	-	-	-	-	-	-	-	-
	23	Aluminum & Magnesium - cast alloy ≤12% Si	Non Heat Treatable		75	270	-	-	-	-	220-320	8	-	-	-	-	220-320	8	-	-	-	-	-	-	-	-
	24		Heat Treatable	AH	90	320	-	-	-	-	220-320	8	-	-	-	-	220-320	8	-	-	-	-	-	-	-	-
	25	Al & Mg - cast alloy >12% Si	Non Heat Treatable		130	460	-	-	200	7	200-280	7	-	-	250	7	200-280	7	-	-	-	-	-	-	-	-
	26	Copper & Cu alloys (Brass/Bronze)	Free cutting, Pb > 1%		110	390	-	-	200	7	-	-	-	-	250	7	-	-	-	-	-	-	-	-	-	-
	27		Brass (CuZn, CuSnZn)		90	320	-	-	200	7	-	-	-	-	250	7	-	-	-	-	-	-	-	-	-	-
	28		Bronze (CuSn)		100	360	-	-	200	7	-	-	-	-	250	7	-	-	-	-	-	-	-	-	-	-
	29	Non-metallic - Thermosetting & fiber-reinforced plastics					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	30	Non-metallic - Hard rubber, wood etc.					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	31	High temp. alloys	Fe based	A	200	680	-	-	35	4	30-40	4	-	-	35	4	30-40	4	-	-	-	-	40	5	40	3
	32			AH	280	950	-	-	30	4	30-40	4	-	-	30	4	30-40	4	-	-	-	-	35	5	35	3
	33		Ni / Co based	A	250	840	-	-	35	4	30-40	4	-	-	35	4	30-40	4	-	-	-	-	40	5	40	3
	34			AH	350	1180	-	-	30	4	25	3	-	-	30	4	25-35	3	-	-	-	-	30	4	30	3
	35			C	320	1080	-	-	30	4	30-40	4	-	-	30	4	30-40	4	-	-	-	-	35	5	35	3
	36	Titanium & Ti alloys	CP Titanium		400 MPa		40	4	45	5	50-70	4	40	4	45	5	50-70	4	-	-	-	-	50	3	50	3
	37.1		Alpha alloys		860 MPa		35	3	40	4	40-60	4	35	3	40	4	40-60	4	-	-	-	-	50	3	50	3
	37.2		Alpha / Beta alloys	A	960 MPa		35	3	40	4	40-60	4	35	3	40	4	40-60	4	-	-	-	-	50	3	50	3
	37.3			AH	1170 MPa		-	-	35	4	30-50	4	-	-	35	4	30-50	4	-	-	-	-	45	3	45	3
	37.4		Beta alloys	A	830 MPa		35	3	40	4	40-60	4	35	3	40	4	40-60	4	-	-	-	-	50	3	50	3
	37.5			AH	1400 MPa		-	-	35	4	30-50	4	-	-	35	4	30-50	4	-	-	-	-	45	3	45	3
H	38.1	Hardened steel		HT	45 HRC		20	4	25	4	-	-	20	4	25	4	-	-	-	-	-	-	48	3	48	3
	38.2			HT	55 HRC		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36	3	36	3
	39.1			HT	58 HRC		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36	3	36	3
	39.2			HT	62 HRC		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36	3	36	3
	40	Cast Iron	Chilled	C	400	1350	65	6	120	8	-	-	65	6	120	8	-	-	-	-	70	8	84	3	84	3
	41			HT	55 HRC		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36	3	36	3

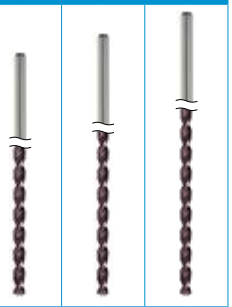
Condition: **A** (Annealed), **AH** (Age Hardened), **C** (Cast), **HT** (Hardened & Tempered), **QT** (Quenched & Tempered)
Bold = Optimal | Regular = Effective

Notes on Drilling

1. Step feeding or pecking is required for drilling greater than 3 x Ø.
2. When drilling cast surface and black (ie.not machined surface), reduce drilling speed by 20%.
3. For optimal positional accuracy and hole size, the use of spot drills is recommended prior to drilling desired hole, refer to our standard range (D175).
4. For hole depths greater than 7 x Ø, pre-drill initially to pilot start for more accurate hole position and eliminate drill wandering. The pilot can be drilled with short rigid drill, approximately. 3 x Ø in depth and reduced feed to ensure accurate pilot hole.

Feed Table (f) (mm/rev)										
Ø	Feed #									
	1	2	3	4	5	6	7	8	9	10
2.0	0.020	0.025	0.030	0.040	0.050	0.060	0.075	0.095	0.120	0.15
3.0	0.030	0.035	0.045	0.055	0.070	0.090	0.110	0.135	0.17	0.21
4.0	0.040	0.045	0.060	0.075	0.090	0.115	0.140	0.18	0.22	0.27
5.0	0.045	0.055	0.070	0.090	0.110	0.135	0.17	0.21	0.26	0.32
6.0	0.055	0.065	0.080	0.100	0.125	0.16	0.19	0.24	0.30	0.37
8.0	0.070	0.085	0.105	0.130	0.16	0.20	0.25	0.31	0.38	0.47
10.0	0.085	0.105	0.125	0.16	0.19	0.24	0.30	0.37	0.46	0.56
12.0	0.095	0.120	0.15	0.18	0.23	0.28	0.34	0.42	0.52	0.64
16.0	0.125	0.15	0.19	0.23	0.29	0.36	0.44	0.54	0.66	0.82
20.0	0.15	0.18	0.23	0.28	0.34	0.42	0.52	0.64	0.80	0.98
25.0	0.18	0.22	0.27	0.33	0.41	0.50	0.60	0.74	0.90	1.10

Application Guide Speeds & Feeds - HSS Drills

STUB				JOBBER				LONG	EXTRA LONG				
													
D151	D177	D155	D153	D163	D165	D168	D169	D171	D194	D195	D196		
HSS Co		SPM	HSS Co	HSS Co		SPM	HSS Co	HSS Co	HSS Co	HSS Co	HSS Co		
TiAlN				TiAlN				TiAlN	TiAlN	TiAlN	TiAlN		
NH	WN	UNI	VA	NH	WN	UNI	VA	NH	NH	NH	NH		
R40	R35	R40		R40				R40	R40	R40	R40		
≤ 3xØ				≤ 5xØ				≤ 8xØ	≤ 10xØ	≤ 12xØ	≤ 14xØ		

Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	VDI 3323	ISO
40	**6**	**35**	**4**	**65**	**6**	**64**	**6**	**24**	**5**	**29**	**4**	**60**	**7**	**58**	**6**	**30**	**5**	**25**	**5**	**20**	**5**	**20**	**5**	1	
30	**6**	**30**	**4**	**55**	**6**	64	6	**20**	**5**	**25**	**4**	**45**	**7**	58	6	**16**	**5**	**13**	**5**	**10**	**5**	**10**	**5**	2	
30	**6**	**30**	**4**	**50**	**6**	62	5	**20**	**5**	**25**	**4**	**45**	**7**	58	5	**16**	**5**	**13**	**5**	**10**	**5**	**10**	**5**	3	
30	**6**	**30**	**4**	**50**	**6**	62	5	**20**	**5**	**25**	**4**	**45**	**7**	58	5	**16**	**5**	**13**	**5**	**10**	**5**	**10**	**5**	4	
15	**4**	12	4	**25**	**6**	-	-	**12**	**4**	10	4	**20**	**6**	-	-	**10**	**4**	**10**	**4**	**10**	**4**	**10**	**4**	5	
30	**6**	**30**	**4**	**50**	**6**	62	5	**20**	**5**	**25**	**4**	**45**	**7**	58	5	**16**	**5**	**13**	**5**	**10**	**5**	**10**	**5**	6	
20	**5**	20	4	**35**	**6**	30	4	**20**	**4**	20	4	**30**	**7**	25	5	**16**	**4**	**13**	**4**	**10**	**4**	**10**	**4**	7	P
15	**4**	12	4	**25**	**6**	-	-	**12**	**4**	10	4	**20**	**6**	-	-	**10**	**4**	**10**	**4**	**10**	**4**	**10**	**4**	8	
12	4	-	-	15	5	-	-	10	4	-	-	12	6	-	-	8	4	8	4	10	4	10	4	9	
15	**4**	12	4	**25**	**6**	-	-	**12**	**4**	10	4	**20**	**6**	-	-	**10**	**4**	**10**	**4**	**10**	**4**	**10**	**4**	10	
12	4	-	-	15	5	-	-	10	4	-	-	12	6	-	-	8	4	8	4	10	4	10	4	11	
20	4	-	-	**14**	**4**	**12**	**4**	12	4	-	-	**10**	**3**	**12**	**5**	10	4	10	4	10	4	10	4	12	
12	4	-	-	15	5	12	5	10	4	-	-	**12**	**6**	12	5	8	4	8	4	10	4	10	4	13	
20	5	15	3	16	5	**30**	**5**	12	4	12	3	10	4	**25**	**5**	10	4	10	4	10	4	10	4	14.1	
15	5	10	4	12	5	**20**	**5**	-	-	10	4	8	4	**14**	**5**	-	-	-	-	-	-	-	-	14.2	M
20	**4**	15	4	**14**	**4**	**12**	**4**	12	4	-	-	**10**	**3**	**12**	**4**	10	4	10	4	10	4	10	4	14.3	
30	**6**	-	-	**44**	**6**	-	-	**24**	**6**	-	-	**40**	**6**	-	-	**19**	**6**	**15**	**6**	**12**	**6**	**12**	**6**	15	
25	**6**	-	-	**39**	**6**	-	-	**20**	**5**	-	-	**35**	**6**	-	-	**16**	**5**	**13**	**5**	**10**	**5**	**10**	**5**	16	
25	**6**	-	-	**44**	**5**	-	-	**20**	**6**	-	-	**40**	**5**	-	-	**16**	**6**	**13**	**6**	**10**	**6**	**10**	**6**	17	
25	**6**	-	-	**44**	**5**	-	-	**20**	**6**	-	-	**40**	**5**	-	-	**16**	**6**	**13**	**6**	**10**	**6**	**10**	**6**	18	K
25	**6**	-	-	**44**	**5**	-	-	**20**	**6**	-	-	**40**	**5**	-	-	**16**	**6**	**13**	**6**	**10**	**6**	**10**	**6**	19	
25	**6**	-	-	**44**	**5**	-	-	**20**	**6**	-	-	**40**	**5**	-	-	**16**	**6**	**13**	**6**	**10**	**6**	**10**	**6**	20	
-	-	**60**	**6**	88	5	**112**	**6**	-	-	**48**	**6**	80	5	112	8	-	-	-	-	-	-	-	-	21	
-	-	**60**	**6**	88	5	**112**	**6**	-	-	**48**	**6**	80	5	112	8	-	-	-	-	-	-	-	-	22	
40	**5**	**40**	**5**	**53**	**5**	**70**	**7**	32	5	**32**	**5**	**48**	**5**	70	6	26	5	20	5	16	5	16	5	23	
40	**5**	**40**	**5**	**53**	**5**	**70**	**7**	**32**	**5**	**32**	**5**	**48**	**5**	70	6	**26**	**5**	**20**	**5**	**16**	**5**	**16**	**5**	24	
30	**7**	30	8	-	-	-	-	**25**	**6**	25	7	**30**	**6**	-	-	**18**	**5**	**18**	**5**	**16**	**5**	**16**	**5**	25	
60	5	**50**	**5**	39	4	**50**	**5**	48	5	**48**	**5**	35	4	40	5	38	5	31	5	25	5	25	5	26	N
40	5	35	5	**44**	**5**	-	-	32	5	32	5	**40**	**5**	-	-	26	5	20	5	16	5	16	5	27	
30	5	**45**	**5**	33	4	**80**	**3**	-	-	**40**	**5**	**30**	**5**	70	3	-	-	-	-	-	-	-	-	28	
50	4	70	5	70	5	50	4	50	4	60	5	60	4	-	-	40	4	40	4	40	4	40	4	29	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30	
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-	-	-	-	8	4	-	-	-	-	-	-	8	4	-	-	-	-	-	-	-	-	-	-	33	
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-	-	-	-	9	4	10	3	-	-	-	-	9	4	10	3	-	-	-	-	-	-	-	-	37.1	
-	-	-	-	-	-	8	3	-	-	-	-	-	-	8	3	-	-	-	-	-	-	-	-	37.2	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37.3	
-	-	-	-	-	-	8	3	-	-	-	-	-	-	8	3	-	-	-	-	-	-	-	-	37.4	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37.5	
-	-	-	-	10	4	-	-	-	-	-	-	8	4	-	-	-	-	-	-	-	-	-	-	38.1	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38.2	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39.1	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39.2	
25	**6**	-	-	**39**	**6**	-	-	**20**	**5**	-	-	**35**	**6**	-	-	**16**	**5**	**13**	**5**	**10**	**5**	**10**	**5**	40	H
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	41	

METRIC DRILLS (mm size)

Ø	= nominal tap size (mm)
n	= spindle speed (RPM)
vc	= cutting speed (m/min)
f	= feed (mm/rev)
vf	= feed rate (mm/min)

$$n = \frac{Vc \times 1000}{Ø \times \pi} \simeq \frac{Vc}{Ø} \times 318$$

$$Vc = \frac{n \times Ø \times \pi}{1000} \simeq \frac{n \times Ø}{318}$$

$$Vf = f \times n$$

Ø	Feed Table (f) (mm/rev) Feed # 1	2	3	4	5	6	7	8	9	10
2.0	0.020	0.025	0.030	0.040	0.050	0.060	0.075	0.095	0.120	0.15
3.0	0.030	0.035	0.045	0.055	0.070	0.090	0.110	0.135	0.17	0.21
4.0	0.040	0.045	0.060	0.075	0.090	0.115	0.140	0.18	0.22	0.27
5.0	0.045	0.055	0.070	0.090	0.110	0.135	0.17	0.21	0.26	0.32
6.0	0.055	0.065	0.080	0.100	0.125	0.16	0.19	0.24	0.30	0.37
8.0	0.070	0.085	0.105	0.130	0.16	0.20	0.25	0.31	0.38	0.47
10.0	0.085	0.105	0.125	0.16	0.19	0.24	0.30	0.37	0.46	0.56
12.0	0.095	0.120	0.15	0.18	0.23	0.28	0.34	0.42	0.52	0.64
16.0	0.125	0.15	0.19	0.23	0.29	0.36	0.44	0.54	0.66	0.82
20.0	0.15	0.18	0.23	0.28	0.34	0.42	0.52	0.64	0.80	0.98
25.0	0.18	0.22	0.27	0.33	0.41	0.50	0.60	0.74	0.90	1.10
32.0	0.23	0.27	0.33	0.41	0.50	0.60	0.74	0.88	1.10	1.30
38.0	0.26	0.32	0.38	0.46	0.56	0.68	0.82	1.00	1.20	1.45
45.0	0.30	0.36	0.43	0.52	0.64	0.76	0.92	1.10	1.35	1.60
52.0	0.33	0.40	0.48	0.58	0.70	0.84	1.00	1.20	1.45	1.75
63.0	0.39	0.47	0.56	0.67	0.80	0.96	1.14	1.35	1.65	1.95

suttontools

ISO	VDI	Material Group	Sutton	
P	A	Steel	N	UNI
M	R	Stainless Steel	VA	
K	F	Cast Iron	GG	
N	N	Non-Ferrous Metals, Aluminiums & Coppers	Al / W	
S	S	Titaniums & Super Alloys	Ti	Ni
H	H	Hard Materials (≥ 45 HRC)	H	

^ VDI 3323 material groups can also be determined by referring to the workpiece material cross reference listing. Refer to our full catalogue.

	BLIND HOLE										THROUGH HOLE							
Catalogue Code M	T684	T205	T227	T231	T235	T241	T239	T211	T215	T217	T687	T116	T140	T104	T122	T128	T146	T152
MF	T686	T252	T254								T689	T160	T163	T157				
Material	PM-HSSE V3			HSSE				PM-HSS Co			PM-HSSE V3			HSSE			PM-HSS Co	
Surface Finish	Hardlube	TiCN	TiAlN	Brt	Ni	TiN	CrN	TiCN			Hardlube	TiCN	TiAlN	TiN	Ni	Brt	TiCN	
Sutton Designation	UNI	VA PM	NH	Al	W	W	Cu	H	Ti	Ni	UNI	VA PM	NH	N	W	W	H	Ti
Geometry	R50	R50	R40	R45 2F	R45	R45	R45	R15	R15	R10						Interrupted threads		L12
Thread Depth	≤ 3xØ		≤2.5xØ	≤ 3xØ				≤ 1.5xØ			≤ 3xØ							

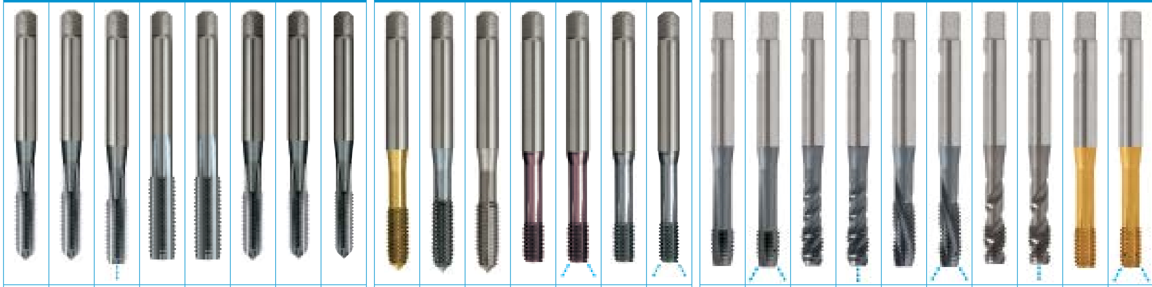
ISO	VDI 3323	Material		Condition	HB	N/mm²	Vc (m/min)									Vc (m/min)							
P	1	Steel - Non-alloy, cast & free cutting	~ 0.15 %C	A	125	440	**17**	**17**	-	-	**14**	**14**	-	-	-	-	**22**	**22**	-	**18**	**18**	12	-	-
	2		~ 0.45 %C	A	190	640	**17**	**17**	-	-	**14**	**14**	-	-	-	-	**22**	**22**	-	**18**	**18**	12	-	-
	3			QT	250	840	**14**	**14**	**14**	-	12	12	-	-	-	-	**18**	18	**18**	**15**	15	10	-	-
	4		~ 0.75 %C	A	270	910	16	16	**16**	-	13	**13**	-	-	-	-	20	20	**20**	**17**	17	11	-	-
	5			QT	300	1010	-	-	**13**	-	-	-	-	**13**	-	-	-	-	**16**	14	-	-	**16**	-
	6	Steel - Low alloy & cast < 5% of alloying elements		A	180	610	**17**	**17**	-	-	**14**	**14**	-	-	-	-	**22**	**22**	-	**18**	**18**	12	-	-
	7			QT	275	930	12	12	**12**	-	10	10	-	-	-	-	14	14	**14**	**12**	12	8	-	-
	8			QT	300	1010	-	9	**9**	-	-	-	-	**9**	-	-	-	-	**11**	9	-	-	**11**	-
	9			QT	350	1180	-	-	4	-	-	-	-	**4**	-	-	-	-	5	-	-	-	**5**	-
	10	Steel - High alloy, cast & tool		A	200	680	**12**	12	**12**	-	-	-	-	-	-	-	**14**	14	**14**	12	-	-	-	-
	11			HT	325	1100	-	-	9	-	-	-	-	**9**	-	-	-	-	11	-	-	-	**11**	-
	12	Steel - Corrosion resistant & cast	Ferritic / Martensitic	A	200	680	**7**	**7**	7	-	-	-	-	7	-	-	**9**	**9**	9	8	-	5	9	-
	13		Martensitic	QT	240	810	4	-	4	-	-	-	-	4	4	-	5	5	5	-	-	-	**5**	5
M	14.1	Stainless Steel	Austenitic	AH	180	610	**9**	**9**	9	-	-	-	-	-	-	-	**11**	**11**	11	9	-	6	-	-
	14.2		Duplex		250	840	**6**	**6**	6	-	-	-	-	-	-	-	**7**	**7**	7	6	-	4	-	-
	14.3		Precipitation Hardening		250	840	-	**4**	**4**	-	-	-	-	4	4	-	-	**5**	**5**	5	-	-	5	4
K	15	Cast Iron - Grey (GG)	Ferritic / Pearlitic		180	610	17	-	17	-	-	-	-	**17**	-	-	22	-	22	18	-	-	**22**	-
	16		Pearlitic		260	880	14	-	14	-	-	-	-	**14**	-	-	18	-	18	15	-	-	**18**	-
	17	Cast Iron - Nodular (GGG)	Ferritic		160	570	17	-	17	-	-	-	-	**17**	-	-	22	-	22	18	-	-	**22**	-
	18		Pearlitic		250	840	14	-	14	-	-	-	-	**14**	-	-	18	-	18	15	-	-	**18**	-
	19	Cast Iron - Malleable	Ferritic		130	460	22	-	22	-	-	-	-	**22**	-	-	27	-	**27**	23	-	-	**27**	-
	20		Pearlitic		230	780	17	-	17	-	-	-	-	**17**	-	-	22	-	22	18	-	-	**22**	-
N	21	Aluminum & Magnesium - wrought alloy	Non Heat Treatable		60	210	**17**	17	17	**10**	**14**	14	14	-	-	-	**22**	22	-	**18**	**18**	**12**	-	-
	22		Heat Treatable	AH	100	360	**22**	22	22	**12**	18	18	18	-	-	-	**27**	27	-	**23**	**23**	15	-	-
	23	Aluminum & Magnesium - cast alloy ≤12% Si	Non Heat Treatable		75	270	**22**	22	22	**12**	-	-	-	-	-	-	**27**	27	27	23	23	-	-	-
	24		Heat Treatable	AH	90	320	22	22	22	**12**	-	-	-	-	-	-	27	27	27	23	23	-	-	-
	25	Al & Mg - cast alloy >12% Si	Non Heat Treatable		130	460	14	14	**14**	-	-	-	-	14	-	-	18	18	18	-	-	-	18	-
	26	Copper & Cu alloys (Brass/Bronze)	Free cutting, Pb > 1%		110	390	12	12	12	6	10	10	**10**	-	-	-	14	14	**14**	**12**	12	**8**	-	-
	27		Brass (CuZn, CuSnZn)		90	320	26	-	26	-	-	-	-	**26**	-	-	32	-	32	27	27	18	**32**	-
	28		Bronze (CuSn)		100	360	-	20	20	11	17	**17**	**17**	-	-	-	-	25	25	-	21	**14**	-	-
	29	Non-metallic - Thermosetting & fiber-reinforced plastics					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	30	Non-metallic - Hard rubber, wood etc.					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	31	High temp. alloys	Fe based	A	200	680	-	**4**	-	-	-	-	-	-	-	**4**	-	**5**	-	-	-	-	-	-
	32			AH	280	950	-	-	-	-	-	-	-	-	-	**4**	-	**5**	-	-	-	-	-	-
	33		Ni / Co based	A	250	840	-	**4**	-	-	-	-	-	-	-	**3**	-	**5**	-	-	-	-	-	-
	34			AH	350	1180	-	-	-	-	-	-	-	-	-	**3**	-	-	-	-	-	-	-	-
	35			C	320	1080	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-
	36	Titanium & Ti alloys	CP Titanium		400 MPa		-	-	-	-	-	-	-	11	-	-	-	-	-	-	-	-	14	-
	37.1		Alpha alloys		860 MPa		-	-	-	-	-	-	-	**7**	**6**	-	-	-	-	-	-	-	**9**	**9**
	37.2		Alpha / Beta alloys	A	960 MPa		-	-	-	-	-	-	-	**7**	**6**	-	-	-	-	-	-	-	**9**	**9**
	37.3			AH	1170 MPa		-	-	-	-	-	-	-	**7**	6	-	-	-	-	-	-	-	**9**	9
	37.4		Beta alloys	A	830 MPa		-	-	-	-	-	-	-	**4**	**4**	-	-	-	-	-	-	-	**5**	**5**
	37.5			AH	1400 MPa		-	-	-	-	-	-	-	**3**	2	-	-	-	-	-	-	-	**4**	4
H	38.1	Hardened steel		HT	45 HRC		-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	**5**	-
	38.2			HT	55 HRC		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	39.1			HT	58 HRC		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	39.2			HT	62 HRC		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	40	Cast Iron	Chilled	C	400	1350	-	-	12	-	-	-	-	12	-	-	-	-	14	-	-	-	**14**	-
	41			HT	55 HRC		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Condition: **A** (Annealed), **AH** (Age Hardened), **C** (Cast), **HT** (Hardened & Tempered), **QT** (Quenched & Tempered)

Bold = Optimal | Regular = Effective

Notes on Tapping

1. The speeds listed above are a recommendation only, and are based on depth of thread listed, speeds can be adjusted on application.
   As a general rule;
   -If hole depth required is less than above mentioned = increase speed
   -If hole depth required is more than above mentioned = reduce speed
2. Taps must be driven by the square to eliminate slippage, eg, ER-GB collets (square drive).
3. When using spiral flute taps with length compensation tapping attachment, it is recommended to short pitch the feed 95%, to eliminate tap cutting oversize, eg. M6x1 @ 1000RPM, Feedrate= 950mm/min.
4. Forming taps are suitable for materials with >10% elongation



BLIND / THROUGH HOLE								THREAD FORMING							SYNCHRO TAPPING											
T292	T335	T357	T294	T295	T670	T296		T313	T319	T329	T325	T327	T682	T747	T377	T379	T373	T375	T365	T367	T369	T371	T381	T383		
T301	T668	T669	T343		T743	T345	T346		T773																	
HSSE			SPM		VHM			HSSE			SPM		VHM		PM-HSSE V3											
TiCN								TiN	TiCN	CrN	TiAlN		TiCN		TiCN						CrN		TiN			
GG	DC	DC	XH	XH	GG	VH	VH	N		Cu	UNI		VH	VH	High Speed Cutting											
Low Relief		IK	Special Relief		Low Relief	Special Relief		No Groove	Multi-Coolant Groove			IK	Multi-Coolant	IK		IK	R50	R50 IK	L20	L20 IK	R45	R45 IK		IK		
≤ 3xØ			≤ 1.5xØ					≤ 3xØ							≤ 2xØ											
Vc (m/min)								Vc (m/min)							Vc (m/min)										VDI 3323	ISO
-	-	-	-	-	-	-	-	18	18	-	23	28	36	40	39	47	31	31	31	37	-	-	25	30	1	
-	-	-	-	-	-	-	-	18	18	-	23	28	36	40	39	47	31	31	31	37	-	-	25	30	2	
-	-	-	-	-	-	-	-	15	15	-	20	23	30	35	32	39	26	26	26	31	-	-	21	25	3	
-	-	-	-	-	-	-	-	17	17	-	21	26	33	38	36	43	29	29	29	34	-	-	23	27	4	
-	-	-	11	11	-	-	-	-	-	-	-	-	27	30	29	35	23	23	23	28	-	-	-	-	5	
-	-	-	-	-	-	-	-	18	18	-	23	28	36	40	39	47	31	31	31	37	-	-	25	30	6	
-	-	-	-	-	-	-	-	-	-	-	16	19	24	28	26	31	21	21	21	25	-	-	17	20	7	P
-	-	-	7	7	-	-	-	-	-	-	-	-	18	20	19	23	16	16	16	19	-	-	-	-	8	
-	-	-	4	4	-	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	
-	-	-	-	-	-	-	-	-	-	-	16	19	24	28	26	31	21	21	21	25	-	-	17	20	10	
-	-	-	7	7	-	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	19	13	13	13	16	-	-	-	-	12	
-	-	-	4	4	-	5	5	-	-	-	-	-	-	-	10	12	8	8	8	9	-	-	-	-	13	
-	-	-	-	-	-	-	-	9	9	-	12	14	18	20	19	23	16	16	16	19	-	-	12	15	14.1	
-	-	-	-	-	-	-	-	6	6	-	8	9	12	14	13	16	10	10	10	12	-	-	8	10	14.2	M
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	12	8	8	8	9	-	-	-	-	14.3	
11	11	13	-	-	22	-	-	-	-	-	-	-	-	-	39	47	31	31	31	37	-	-	-	-	15	
9	9	11	12	12	18	-	-	-	-	-	-	-	-	-	32	39	26	26	26	31	-	-	-	-	16	
11	11	13	-	-	22	-	-	-	-	-	-	-	-	-	39	47	31	31	31	37	-	-	-	-	17	K
9	9	11	12	12	18	-	-	-	-	-	-	-	-	-	32	39	26	26	26	31	-	-	-	-	18	
14	14	16	-	-	27	-	-	-	-	-	-	-	-	-	49	58	39	39	39	47	-	-	-	-	19	
11	11	13	-	-	22	-	-	-	-	-	-	-	-	-	39	47	31	31	31	37	-	-	-	-	20	
-	-	-	-	-	-	-	-	18	18	18	23	28	36	40	39	47	31	31	31	37	31	31	25	30	21	
-	-	-	-	-	-	-	-	23	23	23	29	35	45	50	49	58	39	39	39	47	39	39	31	37	22	
-	14	16	-	-	-	-	-	23	23	23	29	35	45	50	49	58	39	39	39	47	39	39	31	37	23	
-	14	16	-	-	-	-	-	23	23	23	29	35	45	50	49	58	39	39	39	47	39	39	31	37	24	
9	9	11	-	-	18	-	-	-	-	-	-	-	-	-	32	39	26	26	26	31	-	-	-	-	25	
-	-	-	-	-	-	-	-	12	12	12	16	19	-	-	26	31	21	21	21	25	21	21	-	-	26	N
-	16	19	21	21	32	32	32	-	-	-	-	-	-	-	58	70	47	47	47	56	47	47	-	-	27	
-	-	-	-	-	-	-	-	21	21	21	27	33	42	46	45	54	36	36	36	44	36	36	29	35	28	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	12	8	8	-	-	-	-	-	-	31	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	10	6	6	-	-	-	-	-	-	33	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36	S
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	16	-	-	-	-	37.1	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	16	-	-	-	-	37.2	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37.3	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	9	-	-	-	-	37.4	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37.5	
-	-	-	4	4	-	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38.1	
-	-	-	-	-	-	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38.2	
-	-	-	-	-	-	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39.1	H
-	-	-	-	-	-	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39.2	
-	7	9	9	9	14	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	
-	-	-	-	-	-	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	41	

METRIC TAPS (mm size)

Ø = nominal tap size (mm)
P = thread pitch (mm)
n = spindle speed (RPM)
Vc = cutting speed (m/min)
Vf = feed rate (mm/min)
Vr = feed rate per rev (mm/rev)

$$n = \frac{V_c \times 1000}{Ø \times \pi} \simeq \frac{V_c}{Ø} \times 318$$

$$V_c = \frac{n \times Ø \times \pi}{1000} \simeq \frac{n \times Ø}{318}$$

$$V_f = n \times P$$

suttontools

ISO	VDI	Material Group	Sutton		
P	A	Steel	N		UNI
M	R	Stainless Steel	VA		
K	F	Cast Iron	GG		
N	N	Non-Ferrous Metals, Aluminiums & Coppers	Al	W	
S	S	Titaniums & Super Alloys	Ti		Ni
H	H	Hard Materials (≥ 45 HRC)	H		

^ VDI 3323 material groups can also be determined by referring to the workpiece material cross reference listing. Refer to our full catalogue.

Catalogue Code	E456	E457	E458	E430				E440	E442	
Material	VHM			VHM-ULTRA						
Surface Finish	TiAlN			AlCrN						
Sutton Designation	N			UNI						
Type of Cut: Slotting					●					
Finishing		●		●						
Universal						●				
Roughing							●			
Profiling									●	●
↕ap × Ø		-		-		-	0.25	1.0	1.0	0.1		0.1
↔ae × Ø		-		-		-	1.0	0.2	0.3	0.05		0.05

ISO	VDI^ 3323	Material		Condition	HB	N/mm²	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #			Vc	Feed #	Vc	Feed #
P	1	Steel - Non-alloy, cast & free cutting	~ 0.15 %C	A	125	440	180	16	180	15	180	16	210	7	11	15	-	-	-	-
	2		~ 0.45 %C	A	190	640	180	16	180	15	180	16	210	7	11	15	-	-	-	-
	3			QT	250	840	100	16	100	15	100	16	175	7	11	15	175	18	175	18
	4		~ 0.75 %C	A	270	910	100	16	100	15	100	16	175	7	11	15	175	18	175	18
	5			QT	300	1010	100	16	100	15	100	16	175	7	11	15	175	18	175	18
	6	Steel - Low alloy & cast < 5% of alloying elements		A	180	610	180	16	180	15	180	16	210	7	11	15	-	-	-	-
	7			QT	275	930	100	16	100	15	100	16	175	7	11	15	175	18	175	18
	8			QT	300	1010	100	16	100	15	100	16	175	7	11	15	175	18	175	18
	9			QT	350	1180	80	16	80	15	80	16	120	7	11	15	120	18	120	18
	10	Steel - High alloy, cast & tool		A	200	680	100	16	100	15	100	16	175	7	11	15	175	18	175	18
	11			HT	325	1100	80	16	80	15	80	16	120	7	11	15	120	18	120	18
	12	Steel - Corrosion resistant & cast	Ferritic / Martensitic	A	200	680	90	16	90	15	90	16	-	-	-	-	-	-	-	-
	13		Martensitic	QT	240	810	80	16	80	15	80	16	-	-	-	-	-	-	-	-
M	14.1	Stainless Steel	Austenitic	AH	180	610	90	16	90	15	90	16	-	-	-	-	-	-	-	-
	14.2		Duplex		250	840	90	16	90	15	90	16	-	-	-	-	-	-	-	-
	14.3		Precipitation Hardening		250	840	80	16	80	15	80	16	-	-	-	-	-	-	-	-
K	15	Cast Iron - Grey (GG)	Ferritic / Pearlitic		180	610	140	16	140	15	140	16	150	7	11	15	150	18	150	18
	16		Pearlitic		260	880	140	16	140	15	140	16	150	7	11	15	150	18	150	18
	17	Cast Iron - Nodular (GGG)	Ferritic		160	570	140	16	140	15	140	16	150	7	11	15	150	18	150	18
	18		Pearlitic		250	840	140	16	140	15	140	16	150	7	11	15	150	18	150	18
	19	Cast Iron - Malleable	Ferritic		130	460	100	16	100	15	100	16	110	7	11	15	110	18	110	18
	20		Pearlitic		230	780	100	16	100	15	100	16	110	7	11	15	110	18	110	18
N	21	Aluminum & Magnesium - wrought alloy	Non Heat Treatable		60	210	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	22		Heat Treatable	AH	100	360	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	23	Aluminum & Magnesium - cast alloy ≤12% Si	Non Heat Treatable		75	270	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	24		Heat Treatable	AH	90	320	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	25	Al & Mg - cast alloy >12% Si	Non Heat Treatable		130	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	26	Copper & Cu alloys (Brass/Bronze)	Free cutting, Pb > 1%		110	390	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	27		Brass (CuZn, CuSnZn)		90	320	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	28		Bronze (CuSn)		100	360	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	29	Non-metallic - Thermosetting & fiber-reinforced plastics					-	-	-	-	-	-	-	-	-	-	-	-	-	-
	30	Non-metallic - Hard rubber, wood etc.					-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	31	High temp. alloys	Fe based	A	200	680	50	16	50	15	50	16	50	7	11	15	50	18	50	18
	32			AH	280	950	50	16	50	15	50	16	50	7	11	15	50	18	50	18
	33		Ni / Co based	A	250	840	50	16	50	15	50	16	50	7	11	15	50	18	50	18
	34			AH	350	1180	50	16	50	15	50	16	50	7	11	15	50	18	50	18
	35			C	320	1080	50	16	50	15	50	16	50	7	11	15	50	18	50	18
	36	Titanium & Ti alloys	CP Titanium		400 MPa		70	16	70	15	70	16	70	7	11	15	70	18	70	18
	37.1		Alpha alloys		860 MPa		70	16	70	15	70	16	70	7	11	15	70	18	70	18
	37.2		Alpha / Beta alloys	A	960 MPa		70	16	70	15	70	16	70	7	11	15	70	18	70	18
	37.3			AH	1170 MPa		70	16	70	15	70	16	70	7	11	15	70	18	70	18
	37.4		Beta alloys	A	830 MPa		70	16	70	15	70	16	70	7	11	15	70	18	70	18
	37.5			AH	1400 MPa		70	16	70	15	70	16	70	7	11	15	70	18	70	18
H	38.1	Hardened steel		HT	45 HRC		80	16	80	15	80	16	120	7	11	15	120	18	120	18
	38.2			HT	55 HRC		60	16	60	15	60	16	120	7	11	15	120	18	120	18
	39.1			HT	58 HRC		-	-	-	-	-	-	100	7	11	15	100	18	100	18
	39.2			HT	62 HRC		-	-	-	-	-	-	-	-	-	-	-	-	-	-
	40	Cast Iron	Chilled	C	400	1350	60	16	60	15	60	16	120	7	11	15	-	-	-	-
	41			HT	55 HRC		-	-	-	-	-	-	100	7	11	15	100	18	100	18

Condition: **A** (Annealed), **AH** (Age Hardened), **C** (Cast), **HT** (Hardened & Tempered), **QT** (Quenched & Tempered)

Bold = Optimal | Regular = Effective

Feed Table (f_z) (mm/tooth)

Ø	Feed #																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	0.001	0.002	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.010	0.011	0.013	0.014	0.016	0.018	0.020	0.022	0.024	0.026	0.030
3	0.002	0.003	0.004	0.005	0.006	0.008	0.009	0.010	0.012	0.014	0.016	0.018	0.020	0.023	0.025	0.028	0.032	0.034	0.038	0.042
4	0.004	0.005	0.006	0.007	0.009	0.010	0.012	0.014	0.016	0.018	0.021	0.023	0.026	0.030	0.032	0.036	0.040	0.044	0.045	0.050
5	0.005	0.006	0.008	0.009	0.011	0.013	0.015	0.017	0.020	0.023	0.025	0.030	0.032	0.036	0.040	0.044	0.050	0.055	0.060	0.065
6	0.006	0.008	0.009	0.011	0.013	0.016	0.018	0.021	0.024	0.028	0.030	0.034	0.038	0.042	0.045	0.050	0.055	0.060	0.070	0.075
8	0.010	0.012	0.014	0.017	0.019	0.022	0.025	0.028	0.032	0.036	0.040	0.045	0.050	0.055	0.060	0.065	0.075	0.080	0.085	0.095
10	0.013	0.015	0.018	0.021	0.024	0.028	0.032	0.036	0.040	0.045	0.050	0.055	0.060	0.070	0.075	0.085	0.090	0.100	0.11	0.12
12	0.016	0.019	0.022	0.026	0.030	0.034	0.038	0.044	0.050	0.055	0.060	0.065	0.075	0.080	0.090	0.100	0.11	0.12	0.13	0.14
16	0.020	0.024	0.028	0.034	0.038	0.044	0.050	0.055	0.060	0.070	0.080	0.085	0.095	0.11	0.12	0.13	0.14	0.16	0.17	0.18
20	0.022	0.028	0.032	0.038	0.044	0.050	0.060	0.065	0.075	0.085	0.095	0.11	0.12	0.13	0.15	0.16	0.18	0.19	0.21	0.23
25	0.025	0.032	0.038	0.045	0.055	0.060	0.070	0.080	0.090	0.10	0.12	0.13	0.15	0.16	0.18	0.20	0.22	0.24	0.26	0.29

Notes on Milling

1. Above values are guidelines for the size and type of cut nominated.
2. For long series tools, reduce speed by 40% and feed by 20%.

E422/E424	E533/E535	E559	E545	E549

VHM-ULTRA

AlCrN

UNI

	●										●				●		
					●			●									
		●				●			●			●				●	
			●										●				●
	0.25	1.0	1.0		1.5	1.5		1.5	1.5		0.5	1.75	1.75		1.0	1.5	1.5
	1.0	0.1	0.4		0.1	0.4		0.1	0.4		1.0	0.3	0.3		1.0	0.4	0.4

Vc	Feed #			Vc	Feed #		Vc	Feed #		Vc	Feed #			Vc	Feed #			VDI^ 3323	ISO
210	**9**	**11**	**16**	**210**	**8**	**11**	**210**	**8**	**11**	**180**	**5**	**5**	**9**	**180**	**9**	**5**	**13**	1	
210	**9**	**11**	**16**	**210**	**8**	**11**	**210**	**8**	**11**	**180**	**5**	**5**	**9**	**180**	**9**	**5**	**13**	2	
175	**9**	**11**	**16**	**175**	**8**	**11**	**175**	**8**	**11**	**100**	**5**	**5**	**9**	**100**	**9**	**5**	**13**	3	
175	**9**	**11**	**16**	**175**	**8**	**11**	**175**	**8**	**11**	**100**	**5**	**5**	**9**	**100**	**9**	**5**	**13**	4	
175	**9**	**11**	**16**	**175**	**8**	**11**	**175**	**8**	**11**	**100**	**5**	**5**	**9**	**100**	**9**	**5**	**13**	5	
210	**9**	**11**	**16**	**210**	**8**	**11**	**210**	**8**	**11**	**180**	**5**	**5**	**9**	**180**	**9**	**5**	**13**	6	
175	**9**	**11**	**16**	**175**	**8**	**11**	**175**	**8**	**11**	**100**	**5**	**5**	**9**	**100**	**9**	**5**	**13**	7	**P**
175	**9**	**11**	**16**	**175**	**8**	**11**	**175**	**8**	**11**	**100**	**5**	**5**	**9**	**100**	**9**	**5**	**13**	8	
120	**9**	**11**	**16**	120	8	11	120	8	11	80	5	5	9	80	9	5	13	9	
175	**9**	**11**	**16**	**175**	**8**	**11**	**175**	**8**	**11**	**100**	**5**	**5**	**9**	**100**	**9**	**5**	**13**	10	
120	**9**	**11**	**16**	**120**	8	11	**120**	8	11	80	5	5	9	80	9	5	13	11	
-	-	-	-	90	8	11	90	8	11	**90**	**5**	**5**	**9**	**90**	**9**	**5**	**13**	12	
-	-	-	-	80	8	11	80	8	11	**80**	**5**	**5**	**9**	80	9	5	13	13	
-	-	-	-	-	8	11	-	8	11	**90**	**5**	**5**	**9**	**90**	**9**	**5**	**13**	14.1	
-	-	-	-	-	8	11	-	8	11	90	5	5	9	90	9	5	13	14.2	**M**
-	-	-	-	-	-	-	-	-	-	80	5	5	9	80	9	5	13	14.3	
150	**9**	**11**	**16**	**150**	**8**	**11**	**150**	**8**	**11**	**140**	**5**	**5**	**9**	**140**	**9**	**5**	**13**	15	
150	**9**	**11**	**16**	150	8	11	150	8	11	140	5	5	9	140	9	5	13	16	
150	**9**	**11**	**16**	**150**	**8**	**11**	**150**	**8**	**11**	**140**	**5**	**5**	**9**	**140**	**9**	**5**	**13**	17	
150	**9**	**11**	**16**	150	8	11	150	8	11	140	5	5	9	140	9	5	13	18	**K**
110	**9**	**11**	**16**	**110**	**8**	**11**	**110**	**8**	**11**	**100**	**5**	**5**	**9**	**100**	**9**	**5**	**13**	19	
110	**9**	**11**	**16**	**110**	**8**	**11**	**110**	**8**	**11**	**100**	**5**	**5**	**9**	**100**	**9**	**5**	**13**	20	
-	-	-	-	200	8	11	200	8	11	-	-	-	-	-	-	-	-	21	
-	-	-	-	200	8	11	200	8	11	-	-	-	-	-	-	-	-	22	
-	-	-	-	200	8	11	200	8	11	-	-	-	-	-	-	-	-	23	
-	-	-	-	200	8	11	200	8	11	-	-	-	-	-	-	-	-	24	
-	-	-	-	200	8	11	200	8	11	-	-	-	-	-	-	-	-	25	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26	**N**
-	-	-	-	200	8	11	200	8	11	-	-	-	-	-	-	-	-	27	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30	
50	9	11	16	50	8	11	50	8	11	50	5	5	9	50	9	5	13	31	
50	9	11	16	50	8	11	50	8	11	50	5	5	9	50	9	5	13	32	
50	9	11	16	50	8	11	50	8	11	50	5	5	9	50	9	5	13	33	
50	9	11	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34	
50	9	11	16	50	8	11	50	8	11	50	5	5	9	50	9	5	13	35	
70	**9**	**11**	**16**	**70**	8	11	**70**	8	11	70	5	5	9	70	9	5	13	36	**S**
70	**9**	**11**	**16**	**70**	8	11	**70**	8	11	70	5	5	9	70	9	5	13	37.1	
70	**9**	**11**	**16**	**70**	8	11	**70**	8	11	70	5	5	9	70	9	5	13	37.2	
70	**9**	**11**	**16**	**70**	8	11	**70**	8	11	70	5	5	9	70	9	5	13	37.3	
70	**9**	**11**	**16**	**70**	8	11	**70**	8	11	70	5	5	9	70	9	5	13	37.4	
70	**9**	**11**	**16**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37.5	
120	**9**	**11**	**16**	**120**	8	11	**120**	8	11	-	-	-	-	-	-	-	-	38.1	
120	**9**	**11**	**16**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38.2	
100	**9**	**11**	**16**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39.1	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39.2	**H**
120	**9**	**11**	**16**	**120**	**8**	**11**	**120**	**8**	**11**	-	-	-	-	-	-	-	-	40	
100	**9**	**11**	**16**	**100**	8	11	**100**	8	11	-	-	-	-	-	-	-	-	41	

METRIC ENDMILLS (mm size)

Ø = nominal tool diameter (mm)
n = Spindel speed (RPM)
vc = Cutting speed (m/min)
fz = Feed rate per tooth (mm/tooth)
vf = Feed rate (mm/min)
z = No. cutting edges
Q = Metal removal rate (cm^3/min)
ap = Cutting depth (mm)
ae = Cutting width (mm)

$$n = \frac{v_c \times 1000}{Ø \times \pi} \simeq \frac{v_c}{Ø} \times 318$$

$$v_c = \frac{n \times Ø \times \pi}{1000} \simeq \frac{n \times Ø}{318}$$

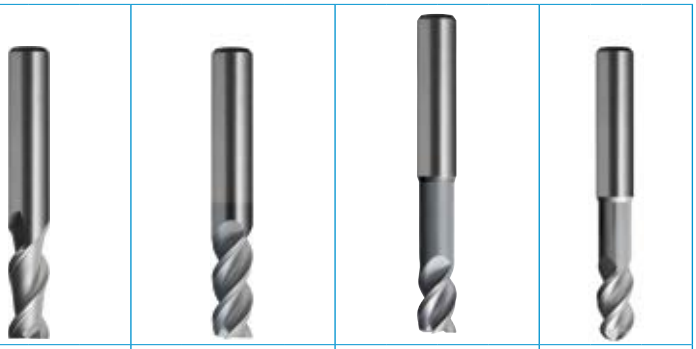
$$f_z = \frac{V_f}{z \times n} \qquad v_f = f_z \times z \times n$$

$$Q = \frac{a_p \times a_e \times v_f}{1000}$$

suttontools

ISO	VDI	Material Group	Sutton	
P	A	Steel	N	UNI
M	R	Stainless Steel	VA	
K	F	Cast Iron	GG	
N	N	Non-Ferrous Metals, Aluminiums & Coppers	Al | W	
S	S	Titaniums & Super Alloys	Ti	Ni
H	H	Hard Materials (≥ 45 HRC)	H	

^ VDI 3323 material groups can also be determined by referring to the workpiece material cross reference listing. Refer to our full catalogue.



Catalogue Code	E310	E400	E402	E408
Material	VHM	VHM-ULTRA		
Surface Finish	*Brt*	*CrN*		
Sutton Designation	Al	Al		
Type of Cut: *Slotting*	●	●	●	
Finishing				
Universal	●	●	●	
Roughing	●	●	●	●
Profiling				●
↕ap × Ø	1.0 1.5 1.5	1.5 2.0 2.0	0.25 0.5 0.5	0.1 0.1
↔ ae × Ø	1.0 0.2 0.2	1.0 0.4 0.6	1.0 0.2 0.3	0.1 0.05

ISO	VDI^ 3323	Material		Condition	HB	N/mm²	Vc	Feed #			Vc	Feed #			Vc	Feed #			Vc	Feed #	
P	1	Steel - Non-alloy, cast & 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 & 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 & tool		A	200	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	11			HT	325	1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12	Steel - Corrosion resistant & cast	Ferritic / Martensitic	A	200	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	13		Martensitic	QT	240	810	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M	14.1	Stainless Steel	Austenitic	AH	180	610	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14.2		Duplex		250	840	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14.3		Precipitation Hardening		250	840	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K	15	Cast Iron - Grey (GG)	Ferritic / Pearlitic		180	610	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16		Pearlitic		260	880	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17	Cast Iron - Nodular (GGG)	Ferritic		160	570	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18		Pearlitic		250	840	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	19	Cast Iron - Malleable	Ferritic		130	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20		Pearlitic		230	780	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	21	Aluminum & Magnesium - wrought alloy	Non Heat Treatable		60	210	**220**	**8**	**14**	**18**	**200**	**8**	**13**	**17**	**200**	**9**	**13**	**18**	**200**	**18**	**15**
	22		Heat Treatable	AH	100	360	**220**	**8**	**14**	**18**	**200**	**8**	**13**	**17**	**200**	**9**	**13**	**18**	**200**	**18**	**15**
	23	Aluminum & Magnesium - cast alloy ≤12% Si	Non Heat Treatable		75	270	**220**	**8**	**14**	**18**	**200**	**8**	**13**	**17**	**200**	**9**	**13**	**18**	**200**	**18**	**15**
	24		Heat Treatable	AH	90	320	**220**	**8**	**14**	**18**	**200**	**8**	**13**	**17**	**200**	**9**	**13**	**18**	**200**	**18**	**15**
	25	Al & Mg - cast alloy >12% Si	Non Heat Treatable		130	460	**220**	**8**	**14**	**18**	**200**	**8**	**13**	**17**	**200**	**9**	**13**	**18**	**200**	**18**	**15**
	26	Copper & Cu alloys (Brass/Bronze)	Free cutting, Pb > 1%		110	390	**160**	**8**	**14**	**18**	**500**	**8**	**13**	**17**	**500**	**9**	**13**	**18**	**500**	**18**	**15**
	27		Brass (CuZn, CuSnZn)		90	320	**160**	**8**	**14**	**18**	**500**	**8**	**13**	**17**	**500**	**9**	**13**	**18**	**500**	**18**	**15**
	28		Bronze (CuSn)		100	360	**160**	**8**	**14**	**18**	**500**	**8**	**13**	**17**	**500**	**9**	**13**	**18**	**500**	**18**	**15**
	29	Non-metallic - Thermosetting & fiber-reinforced plastics					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	30	Non-metallic - Hard rubber, wood etc.					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	31	High temp. alloys	Fe based	A	200	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	32			AH	280	950	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	33		Ni / Co based	A	250	840	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	34			AH	350	1180	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	35			C	320	1080	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	36	Titanium & Ti alloys	CP Titanium		400 MPa		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	37.1		Alpha alloys		860 MPa		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	37.2		Alpha / Beta alloys	A	960 MPa		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	37.3			AH	1170 MPa		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	37.4		Beta alloys	A	830 MPa		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	37.5			AH	1400 MPa		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Condition: **A** (Annealed), **AH** (Age Hardened), **C** (Cast), **HT** (Hardened & Tempered), **QT** (Quenched & Tempered)

Bold = Optimal | Regular = Effective

Feed Table (f_z) (mm/tooth)

Ø	Feed #																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	0.001	0.002	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.010	0.011	0.013	0.014	0.016	0.018	0.020	0.022	0.024	0.026	0.030
3	0.002	0.003	0.004	0.005	0.006	0.008	0.009	0.010	0.012	0.014	0.016	0.018	0.020	0.023	0.025	0.028	0.032	0.034	0.038	0.042
4	0.004	0.005	0.006	0.007	0.009	0.010	0.012	0.014	0.016	0.018	0.021	0.023	0.026	0.030	0.032	0.036	0.040	0.044	0.045	0.050
5	0.005	0.006	0.008	0.009	0.011	0.013	0.015	0.017	0.020	0.023	0.025	0.030	0.032	0.036	0.040	0.044	0.050	0.055	0.060	0.065
6	0.006	0.008	0.009	0.011	0.013	0.016	0.018	0.021	0.024	0.028	0.030	0.034	0.038	0.042	0.045	0.050	0.055	0.060	0.070	0.075
8	0.010	0.012	0.014	0.017	0.019	0.022	0.025	0.028	0.032	0.036	0.040	0.045	0.050	0.055	0.060	0.065	0.075	0.080	0.085	0.095
10	0.013	0.015	0.018	0.021	0.024	0.028	0.032	0.036	0.040	0.045	0.050	0.055	0.060	0.070	0.075	0.085	0.090	0.100	0.11	0.12
12	0.016	0.019	0.022	0.026	0.030	0.034	0.038	0.044	0.050	0.055	0.060	0.065	0.075	0.080	0.090	0.100	0.11	0.12	0.13	0.14
16	0.020	0.024	0.028	0.034	0.038	0.044	0.050	0.055	0.060	0.070	0.080	0.085	0.095	0.11	0.12	0.13	0.14	0.16	0.17	0.18
20	0.022	0.028	0.032	0.038	0.044	0.050	0.060	0.065	0.075	0.085	0.095	0.11	0.12	0.13	0.15	0.16	0.18	0.19	0.21	0.23
25	0.025	0.032	0.038	0.045	0.055	0.060	0.070	0.080	0.090	0.10	0.12	0.13	0.15	0.16	0.18	0.20	0.22	0.24	0.26	0.29

Notes on Milling

1. Above values are guidelines for the size and type of cut nominated.
2. For long series tools, reduce speed by 40% and feed by 20%.

E410	E459/E460	E462/E463	E543	E432	E436
VHM-ULTRA			VHM-ULTRA		
Helica			*AlCrN*		
VA			NH		

	●				●			●											
											●			●			●		
		●				●			●			●			●			●	
			●																
	0.25	2.3	2.3		1.0	1.0		1.0	1.0		1.75	1.75		2.0	2.0		2.0	2.0	
	1.0	0.2	0.4		1.0	0.3		1.0	0.3		0.05	0.025		0.05	0.025		0.06	0.05	

Vc	Feed #			Vc	Feed #		Vc	Feed #		Vc	Feed #		Vc	Feed #		Vc	Feed #		VDI^ 3323	ISO
-	-	-	-	-	-	-	-	-	-	-	-	-	210	11	15	210	11	14	1	P
-	-	-	-	-	-	-	-	-	-	-	-	-	210	11	15	210	11	14	2	
-	-	-	-	-	-	-	-	-	-	-	-	-	**175**	**11**	**15**	**175**	**11**	**14**	3	
-	-	-	-	-	-	-	-	-	-	-	-	-	**175**	**11**	**15**	**175**	**11**	**14**	4	
-	-	-	-	-	-	-	-	-	-	**100**	**11**	**14**	**175**	**11**	**15**	**175**	**11**	**14**	5	
-	-	-	-	-	-	-	-	-	-	-	-	-	210	11	15	210	11	14	6	
-	-	-	-	-	-	-	-	-	-	**100**	**11**	**14**	**175**	**11**	**15**	**175**	**11**	**14**	7	
-	-	-	-	-	-	-	-	-	-	**100**	**11**	**14**	**175**	**11**	**15**	**175**	**11**	**14**	8	
-	-	-	-	-	-	-	-	-	-	**80**	**11**	**14**	**120**	**11**	**15**	**120**	**11**	**14**	9	
-	-	-	-	-	-	-	-	-	-	**100**	**11**	**14**	**175**	**11**	**15**	**175**	**11**	**14**	10	
-	-	-	-	-	-	-	-	-	-	**80**	**11**	**14**	**120**	**11**	**15**	**120**	**11**	**14**	11	
120	11	16	18	120	9	12	120	9	12	90	11	14	120	11	15	120	11	14	12	
100	11	16	18	100	9	12	100	9	12	**80**	**11**	**14**	**100**	**11**	**15**	**100**	**11**	**14**	13	
120	**11**	**16**	**18**	**120**	**9**	**12**	**120**	**9**	**12**	90	11	14	-	-	-	-	-	-	14.1	M
120	**11**	**16**	**18**	**120**	**9**	**12**	**120**	**9**	**12**	**90**	**11**	**14**	-	-	-	-	-	-	14.2	
100	**11**	**16**	**18**	**100**	**9**	**12**	**100**	**9**	**12**	**80**	**11**	**14**	-	-	-	-	-	-	14.3	
-	-	-	-	-	-	-	-	-	-	**140**	**11**	**14**	**150**	**11**	**15**	**150**	**11**	**14**	15	K
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-	-	-	-	-	-	-	-	-	-	**140**	**11**	**14**	**150**	**11**	**15**	**150**	**11**	**14**	17	
-	-	-	-	-	-	-	-	-	-	**140**	**11**	**14**	**150**	**11**	**15**	**150**	**11**	**14**	18	
-	-	-	-	-	-	-	-	-	-	**100**	**11**	**14**	**110**	**11**	**15**	**110**	**11**	**14**	19	
-	-	-	-	-	-	-	-	-	-	**100**	**11**	**14**	**110**	**11**	**15**	**110**	**11**	**14**	20	
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-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30	
70	10	14	18	70	8	11	70	8	11	**50**	**11**	**14**	-	-	-	-	-	-	31	S
70	**10**	**14**	**18**	**70**	8	11	**70**	8	11	**50**	**11**	**14**	50	11	15	50	11	14	32	
70	10	14	18	70	8	11	70	8	11	**50**	**11**	**14**	-	-	-	-	-	-	33	
70	**10**	**14**	**18**	**70**	8	11	**70**	8	11	**50**	**11**	**14**	**50**	**11**	**15**	**50**	**11**	**14**	34	
70	**10**	**14**	**18**	**70**	8	11	**70**	8	11	50	-	-	50	11	15	50	11	14	35	
90	10	14	18	90	8	11	90	8	11	-	-	-	-	-	-	-	-	-	36	
90	**10**	**14**	**18**	**90**	8	11	**90**	8	11	**70**	**11**	**14**	-	-	-	-	-	-	37.1	
90	**10**	**14**	**18**	**90**	8	11	**90**	8	11	**70**	**11**	**14**	70	11	15	70	11	14	37.2	
-	-	-	-	-	-	-	-	-	-	**70**	**11**	**14**	**70**	**11**	**15**	**70**	**11**	**14**	37.3	
90	**10**	**14**	**18**	**90**	8	11	**90**	8	11	**70**	**11**	**14**	70	11	15	70	11	14	37.4	
90	10	14	18	90	8	11	90	8	11	-	-	-	**70**	**11**	**15**	**70**	**11**	**14**	37.5	
-	-	-	-	-	-	-	-	-	-	80	11	14	**120**	**11**	**15**	**120**	**11**	**14**	38.1	H
-	-	-	-	-	-	-	-	-	-	-	-	-	**120**	**11**	**15**	**120**	**11**	**14**	38.2	
-	-	-	-	-	-	-	-	-	-	-	-	-	100	11	15	100	11	14	39.1	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39.2	
-	-	-	-	-	-	-	-	-	-	**80**	**11**	**14**	**120**	**11**	**15**	**120**	**11**	**14**	40	
-	-	-	-	-	-	-	-	-	-	-	-	-	100	11	15	100	11	14	41	

METRIC ENDMILLS (mm size)

Ø	= nominal tool diameter (mm)
n	= Spindel speed (RPM)
v_c	= Cutting speed (m/min)
f_z	= Feed rate per tooth (mm/tooth)
v_f	= Feed rate (mm/min)
z	= No. cutting edges
Q	= Metal removal rate (cm^3/min)
a_p	= Cutting depth (mm)
a_e	= Cutting width (mm)

$$n = \frac{v_c \times 1000}{Ø \times \pi} \simeq \frac{v_c}{Ø} \times 318$$

$$v_c = \frac{n \times Ø \times \pi}{1000} \simeq \frac{n \times Ø}{318}$$

$$f_z = \frac{V_f}{z \times n} \qquad v_f = f_z \times z \times n$$

$$Q = \frac{a_p \times a_e \times v_f}{1000}$$

suttontools

ISO	VDI	Material Group	Sutton		
P	A	Steel	N	UNI	
M	R	Stainless Steel	VA	UNI	
K	F	Cast Iron	GG	UNI	
N	N	Non-Ferrous Metals, Aluminiums & Coppers	Al	W	UNI
S	S	Titaniums & Super Alloys	Ti		Ni
H	H	Hard Materials (≥ 45 HRC)	H		

^ VDI 3323 material groups can also be determined by referring to the workpiece material cross reference listing. Refer to our full catalogue.

Catalogue Code	E562			E564			E566		E568	
Material	VHM-ULTRA									
Surface Finish	*Aldura*									
Sutton Designation	NH						VH			
Type of Cut: *Slotting*		●			●					
Finishing										
Universal			●			●		●		●
Roughing										
Profiling										
↕ap × Ø		0.5	1.0		0.5	1.0		1.0		1.0
↔ ae × Ø		1.0	0.4		1.0	0.4		0.05		0.05

ISO	VDI^ 3323	Material		Condition	HB	N/mm²	Vc	Feed #		Vc	Feed #		Vc	Feed #	Vc	Feed #
P	1	Steel - Non-alloy, cast & 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	**175**	**9**	**10**	**175**	**9**	**10**	-	-	-	-
	6	Steel - Low alloy & cast < 5% of alloying elements		A	180	610	-	-	-	-	-	-	-	-	-	-
	7			QT	275	930	-	-	-	-	-	-	-	-	-	-
	8			QT	300	1010	**175**	**9**	**10**	**175**	**9**	**10**	-	-	-	-
	9			QT	350	1180	**120**	**9**	**10**	**120**	**9**	**10**	-	-	-	-
	10	Steel - High alloy, cast & tool		A	200	680	-	-	-	-	-	-	-	-	-	-
	11			HT	325	1100	**120**	**9**	**10**	**120**	**9**	**10**	-	-	-	-
	12	Steel - Corrosion resistant & cast	Ferritic / Martensitic	A	200	680	-	-	-	-	-	-	-	-	-	-
	13		Martensitic	QT	240	810	**100**	**9**	**10**	**100**	**9**	**10**	-	-	-	-
M	14.1	Stainless Steel	Austenitic	AH	180	610	-	-	-	-	-	-	-	-	-	-
	14.2		Duplex		250	840	**120**	**9**	**10**	**120**	**9**	**10**	-	-	-	-
	14.3		Precipitation Hardening		250	840	**100**	**9**	**10**	**100**	**9**	**10**	-	-	-	-
K	15	Cast Iron - Grey (GG)	Ferritic / Pearlitic		180	610	-	-	-	-	-	-	-	-	-	-
	16		Pearlitic		260	880	150	9	10	150	9	10	-	-	-	-
	17	Cast Iron - Nodular (GGG)	Ferritic		160	570	-	-	-	-	-	-	-	-	-	-
	18		Pearlitic		250	840	**150**	**9**	**10**	**150**	**9**	**10**	-	-	-	-
	19	Cast Iron - Malleable	Ferritic		130	460	-	-	-	-	-	-	-	-	-	-
	20		Pearlitic		230	780	-	-	-	-	-	-	-	-	-	-
N	21	Aluminum & Magnesium - wrought alloy	Non Heat Treatable		60	210	-	-	-	-	-	-	-	-	-	-
	22		Heat Treatable	AH	100	360	-	-	-	-	-	-	-	-	-	-
	23	Aluminum & Magnesium - cast alloy ≤12% Si	Non Heat Treatable		75	270	-	-	-	-	-	-	-	-	-	-
	24		Heat Treatable	AH	90	320	-	-	-	-	-	-	-	-	-	-
	25	Al & Mg - cast alloy >12% Si	Non Heat Treatable		130	460	-	-	-	-	-	-	-	-	-	-
	26	Copper & Cu alloys (Brass/Bronze)	Free cutting, Pb > 1%		110	390	-	-	-	-	-	-	-	-	-	-
	27		Brass (CuZn, CuSnZn)		90	320	-	-	-	-	-	-	-	-	-	-
	28		Bronze (CuSn)		100	360	-	-	-	-	-	-	-	-	-	-
	29	Non-metallic - Thermosetting & fiber-reinforced plastics					-	-	-	-	-	-	-	-	-	-
	30	Non-metallic - Hard rubber, wood etc.					-	-	-	-	-	-	-	-	-	-
S	31	High temp. alloys	Fe based	A	200	680	-	-	-	-	-	-	-	-	-	-
	32			AH	280	950	**50**	**9**	**10**	**50**	**9**	**10**	-	-	-	-
	33		Ni / Co based	A	250	840	-	-	-	-	-	-	-	-	-	-
	34			AH	350	1180	**50**	**9**	**10**	**50**	**9**	**10**	-	-	-	-
	35			C	320	1080	**50**	**9**	**10**	**50**	**9**	**10**	-	-	-	-
	36	Titanium & Ti alloys	CP Titanium		400 MPa		-	-	-	-	-	-	-	-	-	-
	37.1		Alpha alloys		860 MPa		-	**9**	**10**	-	**9**	**10**	-	-	-	-
	37.2		Alpha / Beta alloys	A	960 MPa		**70**	**9**	**10**	**70**	**9**	**10**	-	-	-	-
	37.3			AH	1170 MPa		-	-	-	-	-	-	-	-	-	-
	37.4		Beta alloys	A	830 MPa		**70**	**9**	**10**	**70**	**9**	**10**	-	-	-	-
	37.5			AH	1400 MPa		-	-	-	-	-	-	-	-	-	-
H	38.1	Hardened steel		HT	45 HRC		120	9	10	120	9	10	-	-	-	-
	38.2			HT	55 HRC		-	-	-	-	-	-	**60**	**12**	**60**	**12**
	39.1			HT	58 HRC		-	-	-	-	-	-	**50**	**12**	**50**	**12**
	39.2			HT	62 HRC		-	-	-	-	-	-	**30**	**12**	**30**	**12**
	40	Cast Iron	Chilled	C	400	1350	**120**	**9**	**10**	**120**	**9**	**10**	**-**	-	**-**	-
	41			HT	55 HRC		-	-	-	-	-	-	**140**	**12**	**140**	**12**

Condition: A (Annealed), **AH** (Age Hardened), **C** (Cast), **HT** (Hardened & Tempered), **QT** (Quenched & Tempered)

Bold = Optimal | Regular = Effective

Feed Table (f_z) (mm/tooth)

Ø	Feed #																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	0.001	0.002	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.010	0.011	0.013	0.014	0.016	0.018	0.020	0.022	0.024	0.026	0.030
3	0.002	0.003	0.004	0.005	0.006	0.008	0.009	0.010	0.012	0.014	0.016	0.018	0.020	0.023	0.025	0.028	0.032	0.034	0.038	0.042
4	0.004	0.005	0.006	0.007	0.009	0.010	0.012	0.014	0.016	0.018	0.021	0.023	0.026	0.030	0.032	0.036	0.040	0.044	0.045	0.050
5	0.005	0.006	0.008	0.009	0.011	0.013	0.015	0.017	0.020	0.023	0.025	0.030	0.032	0.036	0.040	0.044	0.050	0.055	0.060	0.065
6	0.006	0.008	0.009	0.011	0.013	0.016	0.018	0.021	0.024	0.028	0.030	0.034	0.038	0.042	0.045	0.050	0.055	0.060	0.070	0.075
8	0.010	0.012	0.014	0.017	0.019	0.022	0.025	0.028	0.032	0.036	0.040	0.045	0.050	0.055	0.060	0.065	0.075	0.080	0.085	0.095
10	0.013	0.015	0.018	0.021	0.024	0.028	0.032	0.036	0.040	0.045	0.050	0.055	0.060	0.070	0.075	0.085	0.090	0.100	0.11	0.12
12	0.016	0.019	0.022	0.026	0.030	0.034	0.038	0.044	0.050	0.055	0.060	0.065	0.075	0.080	0.090	0.100	0.11	0.12	0.13	0.14
16	0.020	0.024	0.028	0.034	0.038	0.044	0.050	0.055	0.060	0.070	0.080	0.085	0.095	0.11	0.12	0.13	0.14	0.16	0.17	0.18
20	0.022	0.028	0.032	0.038	0.044	0.050	0.060	0.065	0.075	0.085	0.095	0.11	0.12	0.13	0.15	0.16	0.18	0.19	0.21	0.23
25	0.025	0.032	0.038	0.045	0.055	0.060	0.070	0.080	0.090	0.10	0.12	0.13	0.15	0.16	0.18	0.20	0.22	0.24	0.26	0.29

Notes on Milling

1. Above values are guidelines for the size and type of cut nominated.
2. For long series tools, reduce speed by 40% and feed by 20%.

VDI 3323	E464/E465		E466/E467		E468/E469		E470/E471		E476				E477				E472/E474		E473/E475	
	VHM-ULTRA																			
	AlNova																Xceed			
	Ti								Ti-3XL				Ti-4XL				Ni			
										●				●				●		●
		●		●		●		●												
												●				●				
		1.0		1.0		1.0		1.0		3.0		3.0		4.0		4.0		1.5		1.5
		0.02		0.02		0.02		0.02		0.05		0.25		0.05		0.2		0.05		0.05
	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	120	14	120	14
14.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	120	14	120	14
14.3	-	-	-	-	-	-	-	-	80	11	60	13	-	-	-	-	100	14	100	14
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60	14	60	14
32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	14	50	14
33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	14	50	14
34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	13	40	13
35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30	11	30	11
36	-	-	-	-	-	-	-	-	70	7	70	10	65	7	65	10	-	-	-	-
37.1	70	14	70	14	80	9	80	9	65	7	55	10	60	7	50	10	-	-	-	-
37.2	70	14	70	14	80	9	80	9	65	7	50	10	60	7	45	10	-	-	-	-
37.3	70	14	70	14	80	9	80	9	50	7	40	10	45	7	35	10	-	-	-	-
37.4	70	14	70	14	80	9	80	9	65	7	55	10	60	7	50	10	-	-	-	-
37.5	70	14	70	14	80	9	80	9	50	7	40	10	45	7	35	10	-	-	-	-
38.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

VDI 3323	E151		E251		E255		E252		ISO
	SPM								
	TiAlN		AlCrN						
	UNI		VA						
		●		●		●		●	
		1.0		1.0		1.0		1.0	
		0.5		0.5		0.5		0.5	
	Vc	Feed #	Vc	Feed #	Vc	Feed #	Vc	Feed #	
1	70	6	40	4	40	4	40	4	P
2	70	6	40	4	40	4	40	4	
3	60	6	40	4	40	4	40	4	
4	60	6	40	4	40	4	40	4	
5	40	4	40	4	40	4	40	4	
6	60	6	40	4	40	4	40	4	
7	40	5	40	4	40	4	40	4	
8	40	4	40	4	40	4	40	4	
9	30	4	-	-	-	-	-	-	
10	40	4	40	4	40	4	40	4	
11	30	4	-	-	-	-	-	-	
12	15	3	25	6	25	6	25	6	
13	30	4	30	4	30	4	30	4	
14.1	25	4	40	10	40	10	40	10	M
14.2	15	2	40	10	40	10	40	10	
14.3	15	3	25	6	25	6	25	6	
15	60	8	-	-	-	-	-	-	K
16	40	8	-	-	-	-	-	-	
17	25	8	-	-	-	-	-	-	
18	25	8	-	-	-	-	-	-	
19	25	8	-	-	-	-	-	-	
20	25	8	-	-	-	-	-	-	
21	-	-	-	-	-	-	-	-	N
22	-	-	-	-	-	-	-	-	
23	80	8	-	-	-	-	-	-	
24	80	8	-	-	-	-	-	-	
25	-	-	-	-	-	-	-	-	
26	-	-	-	-	-	-	-	-	
27	-	-	-	-	-	-	-	-	
28	-	-	-	-	-	-	-	-	
29	-	-	-	-	-	-	-	-	
30	-	-	-	-	-	-	-	-	
31	-	-	25	4	25	4	25	4	S
32	-	-	15	4	15	4	15	4	
33	-	-	25	4	25	4	25	4	
34	-	-	10	4	10	4	10	4	
35	-	-	15	4	15	4	15	4	
36	-	-	30	5	30	5	30	5	
37.1	-	-	15	4	15	4	15	4	
37.2	-	-	15	4	15	4	15	4	
37.3	-	-	12	4	12	4	12	4	
37.4	-	-	15	4	15	4	15	4	
37.5	-	-	12	4	12	4	12	4	
38.1	-	-	20	3	20	3	20	3	H
38.2	-	-	-	-	-	-	-	-	
39.1	-	-	-	-	-	-	-	-	
39.2	-	-	-	-	-	-	-	-	
40	40	8	-	-	-	-	-	-	
41	-	-	-	-	-	-	-	-	

METRIC ENDMILLS (mm size)

- **Ø** = nominal tool diameter (mm)
- **n** = Spindel speed (RPM)
- **V_c** = Cutting speed (m/min)
- **f_z** = Feed rate per tooth (mm/tooth)
- **V_f** = Feed rate (mm/min)
- **z** = No. cutting edges
- **Q** = Metal removal rate (cm^3/min)
- **a_p** = Cutting depth (mm)
- **a_e** = Cutting width (mm)

$$n = \frac{V_c \times 1000}{\varnothing \times \pi} \simeq \frac{V_c}{\varnothing} \times 318$$

$$V_c = \frac{n \times \varnothing \times \pi}{1000} \simeq \frac{n \times \varnothing}{318}$$

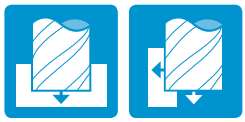
$$f_z = \frac{V_f}{z \times n} \qquad V_f = f_z \times z \times n$$

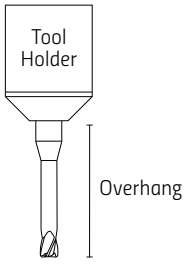
$$Q = \frac{a_p \times a_e \times V_f}{1000}$$

suttontools

E650 Carbide, 4 Flute, up to 6mm

E650 Carbide, 6 Flute, over 6mm





Application Notes:

- Above conditions based on 5xØ overhang
- For 6xØ overhang, reduce ap by 10%
- For 8xØ overhang, reduce ap by 25%
- For 10xØ overhang, reduce ap by 50%
- For plunge in Z-Axis direction or ramping at 1° incline, reduce feed rate between 60% to 70%

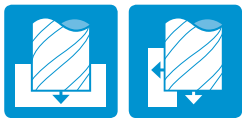
LEGEND

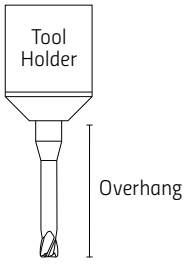
Ø	= nominal tool diameter (mm)
n	= Spindle speed (RPM^{-1})
v_c	= Cutting speed (m/min)
F_z	= Feed rate per tooth (mm/tooth)
v_f	= Feed rate (mm/min)
a_p	= Cutting depth (mm)
a_e	= Cutting width (mm)

ISO			P			H			H		
VDI			35 ≤ HRC ≤ 45			45 ≤ HRC ≤ 52			≥ 52 - 68 HRC		
Material			Pre-hardened Steel			Hardened Steel			Hardened Steel		
Ø	ae x Ø	ap x Ø	Vc	n	Vf	Vc	n	Vf	Vc	n	Vf
2	0.31	0.05	90	14300	2150	80	12700	1910	70	11100	1670
3	0.31	0.05	90	9500	2280	80	8500	2040	70	7400	1780
4	0.31	0.05	90	7200	2880	80	6400	2560	70	5600	2240
6	0.31	0.05	90	4800	2220	80	4200	1940	70	3700	1710
8	0.31	0.05	90	3600	4050	80	3200	3600	70	2800	3150
10	0.31	0.05	90	2900	3520	80	2500	3040	70	2200	2670
12	0.31	0.05	90	2400	3130	80	2100	2740	70	1900	2480

suttontools

E598 Carbide, Micro, 4 Flute, Long Reach, **Corner Rad**





Application Notes:

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- For 8xØ overhang, reduce ap by 25%
- For 10xØ overhang, reduce ap by 50%
- For plunge in Z-Axis direction or ramping at 1° incline, reduce feed rate between 60% to 70%

LEGEND

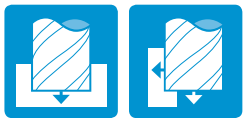
Ø	= nominal tool diameter (mm)
n	= Spindle speed (RPM^{-1})
v_c	= Cutting speed (m/min)
F_z	= Feed rate per tooth (mm/tooth)
v_f	= Feed rate (mm/min)
a_p	= Cutting depth (mm)
a_e	= Cutting width (mm)

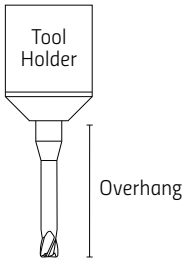
ISO	P					H					H				
VDI	35 ≤ HRC ≤ 45					45 ≤ HRC ≤ 52					≥ 52 - 68 HRC				
Material	Pre-hardened Steel					Hardened Steel					Hardened Steel				
Ø	ap	Vc	Fz	n	Vf	ap	Vc	Fz	n	Vf	ap	Vc	Fz	n	Vf
1	0.030	96	0.020	30600	2480	0.025	85	0.018	27000	1940	0.023	79	0.016	25200	1590
1	0.019	78	0.020	24800	2000	0.016	69	0.018	21900	1570	0.014	64	0.016	20400	1280
1	0.019	69	0.020	22000	1780	0.016	61	0.018	19400	1400	0.014	57	0.016	18100	1140
1	0.012	61	0.020	19300	1560	0.010	53	0.018	17000	1220	0.009	50	0.016	15900	1000
1	0.012	54	0.016	17100	1080	0.010	47	0.016	15100	950	0.009	44	0.013	14100	760
1	0.010	54	0.015	17100	1040	0.008	47	0.015	15100	880	0.007	44	0.012	14100	700
1	0.007	54	0.015	17100	1000	0.006	47	0.013	15100	810	0.005	44	0.011	14100	630
1	0.005	41	0.015	12900	750	0.004	36	0.013	11300	610	0.004	33	0.011	10600	480
1.5	0.052	106	0.022	22500	2000	0.042	94	0.019	20000	1550	0.039	87	0.017	18500	1270
1.5	0.048	101	0.022	21400	1900	0.039	89	0.019	18900	1470	0.036	83	0.017	17600	1210
1.5	0.048	81	0.022	17100	1520	0.039	71	0.019	15100	1170	0.036	66	0.017	14100	970
1.5	0.036	72	0.020	15200	1220	0.029	63	0.018	13400	990	0.027	59	0.016	12500	810
1.5	0.024	63	0.017	13300	920	0.020	56	0.017	11800	810	0.018	52	0.015	11000	640
2	0.064	123	0.042	19600	3310	0.052	109	0.034	17300	2340	0.048	102	0.029	16200	1910
2	0.056	112	0.042	17900	3010	0.046	99	0.034	15800	2120	0.042	92	0.029	14700	1730
2	0.044	102	0.040	16200	2600	0.036	90	0.034	14300	1920	0.033	84	0.03	13300	1570
2	0.032	91	0.038	14500	2190	0.026	80	0.034	12800	1720	0.024	75	0.029	11900	1400
2	0.032	86	0.038	13700	2070	0.026	75	0.034	12000	1620	0.024	70	0.03	11200	1330
2	0.032	81	0.038	12900	1950	0.026	71	0.034	11300	1530	0.024	67	0.029	10600	1250
2	0.030	75	0.038	12000	1830	0.025	67	0.032	10600	1370	0.023	62	0.028	9900	1110
2	0.028	70	0.038	11200	1710	0.023	62	0.030	9900	1200	0.021	58	0.026	9300	980
2	0.020	70	0.038	11200	1710	0.016	62	0.030	9900	1200	0.015	58	0.026	9300	980
2	0.014	67	0.038	10700	1620	0.011	59	0.030	9400	1140	0.010	55	0.026	8800	930
2.5	0.077	119	0.038	15100	2290	0.062	104	0.034	13300	1820	0.058	97	0.03	12400	1490
2.5	0.072	114	0.038	14500	2190	0.059	101	0.034	12800	1720	0.054	93	0.029	11900	1400
2.5	0.067	108	0.038	13800	2100	0.055	96	0.033	12200	1620	0.050	90	0.029	11400	1320
2.5	0.062	104	0.038	13200	2000	0.051	91	0.033	11600	1510	0.047	85	0.028	10800	1230
2.5	0.058	98	0.038	12500	1900	0.047	87	0.032	11100	1410	0.043	81	0.028	10300	1150
2.5	0.053	93	0.038	11900	1800	0.043	82	0.031	10500	1310	0.040	77	0.027	9800	1070
2.5	0.048	88	0.038	11200	1710	0.039	78	0.030	9900	1200	0.036	73	0.026	9300	980
2.5	0.036	86	0.038	11000	1660	0.029	76	0.030	9700	1170	0.027	71	0.027	9000	960
2.5	0.024	84	0.038	10700	1620	0.020	74	0.030	9400	1140	0.018	69	0.026	8800	930
3	0.072	128	0.053	13600	2860	0.059	113	0.042	12000	2020	0.054	106	0.037	11200	1650
3	0.064	128	0.053	13600	2860	0.052	113	0.042	12000	2020	0.048	106	0.037	11200	1650
3	0.056	128	0.053	13600	2860	0.046	113	0.042	12000	2020	0.042	106	0.037	11200	1650
3	0.048	128	0.053	13600	2860	0.039	113	0.042	12000	2020	0.036	106	0.037	11200	1650
3	0.040	128	0.053	13600	2860	0.033	113	0.042	12000	2020	0.030	106	0.037	11200	1650
3	0.040	115	0.053	12200	2570	0.033	100	0.042	10600	1790	0.030	95	0.037	10100	1490
3	0.040	104	0.053	11000	2320	0.033	91	0.042	9700	1640	0.030	86	0.037	9100	1340
3	0.036	92	0.050	9800	1970	0.029	81	0.041	8600	1400	0.027	76	0.035	8100	1140
3	0.032	81	0.047	8600	1620	0.026	72	0.038	7600	1160	0.024	67	0.033	7100	930
4	0.184	147	0.065	11700	3060	0.150	131	0.052	10400	2160	0.138	122	0.045	9700	1760
4	0.164	134	0.065	10700	2780	0.133	117	0.052	9300	1940	0.123	109	0.046	8700	1590
4	0.144	121	0.065	9600	2510	0.117	103	0.052	8200	1720	0.108	98	0.046	7800	1420
4	0.136	109	0.062	8700	2170	0.111	96	0.049	7600	1500	0.102	89	0.044	7100	1240
4	0.120	99	0.058	7900	1830	0.098	87	0.046	6900	1280	0.090	80	0.041	6400	1050
4	0.104	88	0.054	7000	1500	0.085	78	0.043	6200	1060	0.078	73	0.037	5800	860

suttontools

E580 Carbide, Micro, 2 Flute, Long Reach, **Sq End**

E581 Carbide, Micro, 2 Flute, **Corner Rad**





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LEGEND

Ø	= nominal tool diameter (mm)
n	= Spindle speed (RPM^{-1})
v_c	= Cutting speed (m/min)
F_z	= Feed rate per tooth (mm/tooth)
v_f	= Feed rate (mm/min)
a_p	= Cutting depth (mm)
a_e	= Cutting width (mm)

ISO			P					M					S					H				
VDI			5, 8, 9, 10, 11					14.2, 14.3					34, 35, 37.3, 37.5					38.1				
Material			Steel - Low alloy & cast Steel - High alloy, cast & tool					Stainless Steel					High temp. alloys Titanium & Ti alloys					Hardened Steel				
Ø	l_3	ae x Ø	ap	Vc	Fz	n	Vf	ap	Vc	Fz	n	Vf	ap	Vc	Fz	n	Vf	ap	Vc	Fz	n	Vf
0.2	0.5	1.0	0.028	25	0.003	40000	240	0.028	25	0.003	40000	240	0.028	25	0.003	40000	240	0.040	25	0.003	40000	240
0.2	1	1.0	0.011	23	0.003	37400	210	0.011	23	0.003	37400	210	0.011	23	0.003	37400	210	0.016	23	0.003	37400	210
0.2	1.5	1.0	0.008	22	0.003	34800	182	0.008	22	0.003	34800	182	0.008	22	0.003	34800	182	0.011	22	0.003	34800	182
0.4	2	1.0	0.022	47	0.004	37400	280	0.022	47	0.004	37400	280	0.022	47	0.004	37400	280	0.032	47	0.004	37400	280
0.4	4	1.0	0.011	37	0.003	29600	175	0.011	37	0.003	29600	175	0.011	37	0.003	29600	175	0.016	37	0.003	29600	175
0.5	2	1.0	0.035	62	0.007	39099	513	0.035	62	0.007	39099	513	0.035	62	0.007	39099	513	0.050	63	0.004	40000	320
0.5	4	1.0	0.018	50	0.005	31474	332	0.018	50	0.005	31474	332	0.018	50	0.005	31474	332	0.025	51	0.003	32200	207
0.5	6	1.0	0.012	42	0.004	26391	234	0.012	42	0.004	26391	234	0.012	42	0.004	26391	234	0.017	43	0.003	27000	146
0.6	4	1.0	0.028	59	0.007	31246	423	0.028	59	0.007	31246	423	0.028	59	0.007	31246	423	0.040	63	0.007	33554	443
0.6	6	1.0	0.017	50	0.006	26577	306	0.017	50	0.006	26577	306	0.017	50	0.006	26577	306	0.024	54	0.006	28540	321
0.8	4	1.0	0.045	65	0.007	26042	410	0.045	65	0.007	26042	410	0.045	65	0.007	26042	410	0.064	75	0.007	29762	466
0.8	6	1.0	0.032	61	0.007	24231	355	0.032	61	0.007	24231	355	0.032	61	0.007	24231	355	0.046	70	0.007	27693	404
0.8	8	1.0	0.022	52	0.006	20610	257	0.022	52	0.006	20610	257	0.022	52	0.006	20610	257	0.032	59	0.006	23555	292
1.0	6	1.0	0.047	61	0.008	19385	337	0.047	61	0.008	19385	337	0.047	61	0.008	19385	337	0.067	70	0.008	22155	383
1.0	8	1.0	0.035	56	0.008	17937	289	0.035	56	0.008	17937	289	0.035	56	0.008	17937	289	0.050	64	0.008	20499	328
1.0	10	1.0	0.028	52	0.007	16489	244	0.028	52	0.007	16489	244	0.028	52	0.007	16489	244	0.040	59	0.007	18844	277
1.0	12	1.0	0.023	47	0.006	15040	203	0.023	47	0.006	15040	203	0.023	47	0.006	15040	203	0.033	54	0.006	17189	231
1.0	16	1.0	0.018	38	0.005	12144	132	0.018	38	0.005	12144	132	0.018	38	0.005	12144	132	0.025	44	0.005	13878	150
1.2	6	1.0	0.067	65	0.010	17361	357	0.067	65	0.010	17361	357	0.067	65	0.010	17361	357	0.096	75	0.010	19841	406
1.2	10	1.0	0.042	56	0.008	14947	265	0.042	56	0.008	14947	265	0.042	56	0.008	14947	265	0.060	64	0.008	17083	301
1.2	12	1.0	0.034	52	0.008	13740	224	0.034	52	0.008	13740	224	0.034	52	0.008	13740	224	0.048	59	0.008	15703	254
1.5	6	1.0	0.105	70	0.013	14855	391	0.105	70	0.013	14855	391	0.105	70	0.013	14855	391	0.150	80	0.013	16977	444
1.5	8	1.0	0.084	65	0.012	13889	341	0.084	65	0.012	13889	341	0.084	65	0.012	13889	341	0.120	75	0.012	15873	388
1.5	12	1.0	0.053	56	0.010	11958	253	0.053	56	0.010	11958	253	0.053	56	0.010	11958	253	0.075	64	0.010	13666	287
1.5	16	1.0	0.042	52	0.009	10992	214	0.042	52	0.009	10992	214	0.042	52	0.009	10992	214	0.060	59	0.009	12563	243
1.5	20	1.0	0.032	47	0.008	10027	178	0.032	47	0.008	10027	178	0.032	47	0.008	10027	178	0.046	54	0.008	11459	202
2.0	6	1.0	0.187	70	0.015	11141	350	0.187	70	0.015	11141	350	0.187	70	0.015	11141	350	0.267	80	0.015	12733	398
2.0	8	1.0	0.140	70	0.015	11141	350	0.140	70	0.015	11141	350	0.140	70	0.015	11141	350	0.200	80	0.015	12733	398
2.0	10	1.0	0.112	65	0.014	10416	306	0.112	65	0.014	10416	306	0.112	65	0.014	10416	306	0.160	75	0.014	11905	348
2.0	12	1.0	0.093	61	0.013	9692	265	0.093	61	0.013	9692	265	0.093	61	0.013	9692	265	0.133	70	0.013	11077	301
2.0	16	1.0	0.070	56	0.012	8968	227	0.070	56	0.012	8968	227	0.070	56	0.012	8968	227	0.100	64	0.012	10250	258
2.0	20	1.0	0.056	52	0.011	8244	192	0.056	52	0.011	8244	192	0.056	52	0.011	8244	192	0.080	59	0.011	9422	218
2.0	25	1.0	0.047	47	0.010	7520	159	0.047	47	0.010	7520	159	0.047	47	0.010	7520	159	0.067	54	0.010	8594	181
2.5	8	1.0	0.233	70	0.018	8913	336	0.233	70	0.018	8913	336	0.233	70	0.018	8913	336	0.333	80	0.018	10186	382
2.5	12	1.0	0.175	70	0.018	8913	336	0.175	70	0.018	8913	336	0.175	70	0.018	8913	336	0.250	80	0.018	10186	382
3.0	16	1.0	0.168	65	0.020	6944	285	0.168	65	0.020	6944	285	0.168	65	0.020	6944	285	0.240	75	0.020	7936	325
3.0	20	1.0	0.140	61	0.018	6461	247	0.140	61	0.018	6461	247	0.140	61	0.018	6461	247	0.200	70	0.018	7385	281
3.0	25	1.0	0.105	56	0.017	5979	212	0.105	56	0.017	5979	212	0.105	56	0.017	5979	212	0.150	64	0.017	6833	241

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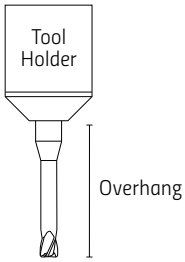
E582 Carbide, Micro, 2 Flute, Long Reach, **Ballnose**



Application Notes:

- Above conditions based on 5xØ overhang
- For 6xØ overhang, reduce ap by 10%
- For 8xØ overhang, reduce ap by 25%
- For 10xØ overhang, reduce ap by 50%
- For plunge in Z-Axis direction or ramping at 1° incline, reduce feed rate between 60% to 70%

LEGEND

Ø	= nominal tool diameter (mm)
n	= Spindle speed (RPM^{-1})
v_c	= Cutting speed (m/min)
F_z	= Feed rate per tooth (mm/tooth)
v_f	= Feed rate (mm/min)
a_p	= Cutting depth (mm)
a_e	= Cutting width (mm)

ISO				P				M				S				H			
VDI				5, 8, 9, 10, 11				14.2, 14.3				34, 35, 37.3, 37.5				38.1			
Material				Steel - Low alloy & cast Steel - High alloy, cast & tool				Stainless Steel				High temp. alloys Titanium & Ti alloys				Hardened Steel			
Ø	l_3	ae x Ø	ap x Ø	Vc	Fz	n	Vf	Vc	Fz	n	Vf	Vc	Fz	n	Vf	Vc	Fz	n	Vf
0.2	0.5	0.05	0.20	25	0.003	40000	240	25	0.003	40000	240	25	0.003	40000	240	25	0.003	40000	240
0.2	1	0.05	0.20	25	0.003	40000	240	25	0.003	40000	240	25	0.003	40000	240	25	0.003	40000	240
0.2	1.5	0.05	0.15	21	0.002	34000	144	21	0.002	34000	144	21	0.002	34000	144	21	0.002	34000	144
0.4	2	0.05	0.20	50	0.004	40000	320	50	0.004	40000	320	50	0.004	40000	320	50	0.004	40000	320
0.4	4	0.02	0.10	35	0.003	28000	160	35	0.003	28000	160	35	0.003	28000	160	35	0.003	28000	160
0.5	2	0.05	0.20	62	0.006	39099	433	62	0.006	39099	433	62	0.006	39099	433	63	0.004	40000	320
0.5	6	0.02	0.10	43	0.004	27369	217	43	0.004	27369	217	43	0.004	27369	217	44	0.003	28000	160
0.6	2	0.05	0.20	68	0.006	35916	448	68	0.006	35916	448	68	0.006	35916	448	73	0.006	38568	469
0.6	4	0.05	0.15	57	0.004	30528	269	57	0.004	30528	269	57	0.004	30528	269	62	0.004	32783	281
0.6	6	0.02	0.10	47	0.004	25141	224	47	0.004	25141	224	47	0.004	25141	224	51	0.004	26998	234
0.6	8	0.02	0.10	47	0.004	25141	224	47	0.004	25141	224	47	0.004	25141	224	51	0.004	26998	234
0.8	4	0.05	0.20	70	0.007	27852	406	70	0.007	27852	406	70	0.007	27852	406	80	0.007	31831	462
0.8	6	0.05	0.15	60	0.005	23674	244	60	0.005	23674	244	60	0.005	23674	244	68	0.005	27056	277
0.8	8	0.02	0.10	49	0.005	19496	203	49	0.005	19496	203	49	0.005	19496	203	56	0.005	22282	231
1.0	4	0.05	0.20	70	0.009	22282	395	70	0.009	22282	395	70	0.009	22282	395	80	0.009	25465	449
1.0	6	0.05	0.15	60	0.006	18940	237	60	0.006	18940	237	60	0.006	18940	237	68	0.006	21645	269
1.0	8	0.05	0.15	60	0.006	18940	237	60	0.006	18940	237	60	0.006	18940	237	68	0.006	21645	269
1.0	10	0.02	0.10	49	0.006	15597	197	49	0.006	15597	197	49	0.006	15597	197	56	0.006	17826	224
1.0	12	0.02	0.10	49	0.006	15597	197	49	0.006	15597	197	49	0.006	15597	197	56	0.006	17826	224
1.0	14	0.02	0.10	49	0.006	15597	197	49	0.006	15597	197	49	0.006	15597	197	56	0.006	17826	224
1.0	20	0.02	0.10	42	0.006	13369	158	42	0.006	13369	158	42	0.006	13369	158	48	0.006	15279	179
1.2	8	0.05	0.15	60	0.006	15783	210	60	0.006	15783	210	60	0.006	15783	210	68	0.006	18037	239
1.2	10	0.05	0.15	60	0.006	15783	210	60	0.006	15783	210	60	0.006	15783	210	68	0.006	18037	239
1.2	12	0.02	0.10	49	0.006	12998	175	49	0.006	12998	175	49	0.006	12998	175	56	0.006	14854	199
2.0	6	0.05	0.20	70	0.014	11141	315	70	0.014	11141	315	70	0.014	11141	315	80	0.014	12733	359
2.0	8	0.05	0.20	70	0.014	11141	315	70	0.014	11141	315	70	0.014	11141	315	80	0.014	12733	359
2.0	12	0.05	0.15	60	0.010	9469	189	60	0.010	9469	189	60	0.010	9469	189	68	0.010	10823	215
2.0	16	0.05	0.15	60	0.010	9469	189	60	0.010	9469	189	60	0.010	9469	189	68	0.010	10823	215
2.0	20	0.02	0.10	49	0.010	7798	158	49	0.010	7798	158	49	0.010	7798	158	56	0.010	8913	179
2.0	30	0.02	0.10	49	0.010	7798	158	49	0.010	7798	158	49	0.010	7798	158	56	0.010	8913	179
3.0	10	0.05	0.20	70	0.019	7427	289	70	0.019	7427	289	70	0.019	7427	289	80	0.019	8488	328
3.0	16	0.05	0.20	70	0.019	7427	289	70	0.019	7427	289	70	0.019	7427	289	80	0.019	8488	328
3.0	25	0.05	0.15	60	0.013	6313	173	60	0.013	6313	173	60	0.013	6313	173	68	0.013	7215	197
3.0	30	0.02	0.10	49	0.013	5199	144	49	0.013	5199	144	49	0.013	5199	144	56	0.013	5942	164

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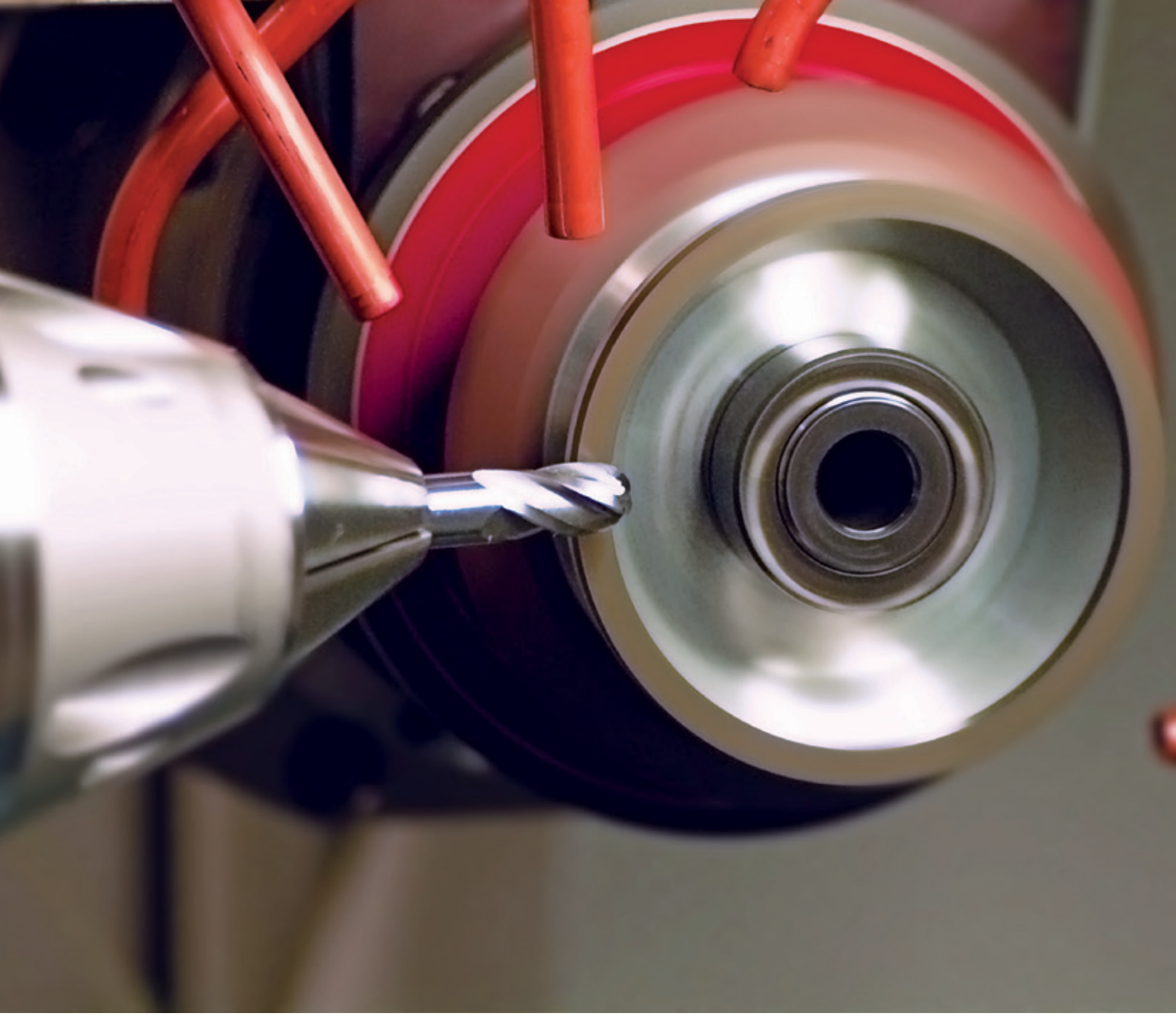
Trade Name	Coating	Coating Structure	Micro-hardness	Coeff. of Friction vs Steel	Thermal Stability	Colour	Application and Benefits
Alcrona (AlCrN)	Aluminium Chromium Nitride	Mono Layer	3200 HV	0.35	up to 2012°F	Blue - Grey	• Low alloy steels and high tensile steels • Hardened steels up to 54 HRC • Ideal for carbide tools
Aldura	TiAlN + AlCrN	Multi Layer	3300 HV	<0.4	>1100°C	Blue - Grey	• High speed machining • Suitable for minimum quantity lubrication (MQL) and dry machining • Machining of hardened steels (>60HRC) • Ideal for carbide tools
AlNova	Alcrona based	Multi Layer	3200 HV	0.35	>1100°C	Light Grey	• Even high thermal stresses hardly effect the superior hardness of the coating • Its high hot hardness results in excellent abrasion resistance even at high cutting speeds
Blu	Steam Oxide	-	-	0.8 – 1.0	-	Blue - Black	• For ferrous metals • Prevents chip build-up on the cutting edges, especially in low carbon steels • Oxide layer protects surface • Good carrier of lubricants
Brt	-	-	-	0.8 – 1.0	-	-	• For general purpose applications
CrN	Chromium Nitride	Gradient Coating	1750 HV	0.5	up to 1292°F	Silver - Grey	• Cutting and forming of copper, nickel, and monel metal • Enhanced thermal stability and oxidation resistance • Excellent corrosion resistance • Low internal stress of coating results in excellent adhesion under high loads
Futura Nano (TiAlN)	Titanium Aluminium Nitride	Nano Layer	3300 HV	0.3 – 0.35	up to 1652°F	Violet - Grey	• Abrasive materials – cast iron and heat treated steel • Difficult to machine materials, such as stainless steel • Higher speeds and feeds • Reduces or eliminates use of coolants
Hardlube	TiAlN + WC/C	Nano Layer	3000 HV	0.15 – 0.20	up to 1472°F	Dark Grey	• Excellent friction and lubricating properties of the coating provide optimal chip flow • Tapping and drilling of hard to machine materials • Suitable for minimum quantity lubrication (MQL) and dry machining
Helica	Alcrona based	Multi Layer	3000 HV	0.25	up to 1100°C	Copper	• Longer tool life • Higher cutting speeds and feeds • Superb chip evacuation • Greater number of regrinds • Improved drill hole quality • Excellent performance in abrasive material
Ni	Plasma Nitride	-	-	0.8 – 1.0	-	-	• Increases surface hardness • Better lubricant carrying properties • Abrasive materials – cast iron and aluminium alloys
TiCN	Titanium Carbonitride	Gradient Coating	3000 HV	0.4	up to 752°F	Blue - Grey	• High performance applications • Difficult to machine materials • Abrasive materials - cast iron and aluminium alloys • Adhesive materials - copper and copper based alloys
TiN	Titanium Nitride	Mono Layer	2300 HV	0.4	up to 1112°F	Gold - Yellow	• General purpose use • Wide range of materials • 3 to 8 times longer tool life than uncoated tools • Higher tool speeds and feeds than uncoated tools
TiSiN	TiSi based	Multi Layer	3600 HV	0.3	<1200°C	Copper	• Suitable for high speed (wet / dry) and hard machining for difficult materials above 52 HRC. • Suitable for high speed machining with hardened steels above 60 HRC to maximum of 63 HRC • Vc and Vf = +50%
Xceed	AlTiN	Nano Layer	3300 HV	0.4	up to 900°C	Blue - Grey	• Hard materials • Difficult to machine materials, eg. Ti alloys, Inconel • High speeds and feeds • Dry or MQL machining • Machining of hardened steels (>52HRC)

Abbreviations	Type	Application	Description
HSS	Conventional high speed steel	Standard tool material for most common applications	Used for the manufacturing of cutting tools such as twist drills, endmills and taps.
HSS Co	5% cobalt grade of high speed steel	High-heat resistance, especially suited for roughing or when coolant insufficient	Cobalt alloyed, tungsten-molybdenum high speed steel possessing high hardness, excellent cutting properties, high-red hardness and good toughness.
HSSE Co8%	8% cobalt grade of high speed steel	Increased heat resistance and hardness, suitable for difficult-to-machine materials	Available for applications that require a strong resistance to softening at elevated cutting temperatures. The ability of the steel to maintain its "red-hot hardness" is provided by the addition of cobalt. The high hot hardness is required for machining difficult materials such as nickel-base, titanium and highly alloyed steel.
HSSE	Premium grade of high speed steel	Wide range of machine taps.	Vanadium grade gives high wear resistance and toughness for most tapping applications.
PM-HSSE V3	Powdered metallurgy - vanadium grade of high speed steel	Materials with hardness up to 40HRC. Difficult to machine materials eg. stainless steels.	PM-HSS V3 for higher performance tools, incorporates very fine and uniform grain structure allowing a high hardness to be achieved, whilst maintaining good toughness.
PM-HSS Co	Powdered metallurgy - 8% Cobalt grade of high speed steel	Materials with hardness up to 45HRC	The addition of cobalt provides this material with the ability to maintain its strength and hardness level when exposed to extremely high cutting temperatures. This makes PM-HSS Co suitable for heavy duty tapping, in materials such as high alloyed steels to non-ferrous metals like Ni-base alloys and Ti-alloys.
SPM	Powdered metallurgy - 11% Cobalt grade of high speed steel	Special applications, requiring very high edge hardness. Cutting tools with the appropriate geometry can be applied to workpiece materials with hardness up to 55HRC	An excellent bridge material between high speed steel and carbide. SPM offers very high red hardness, wear resistance and the highest compressive strength of any high speed steel.
VHM	Sub-micron grade of solid carbide (ISO K15-K30)	Tapping hardened steel	Ultra fine grain type (0.8µm) with maximum toughness and high hardness, therefore especially recommended for rotating tools to machine hardened parts.
VHM	Sub-micron grade of solid carbide (ISO K40)	Sutton standard grade for endmills and drills	Ultra fine grain type (0.6µm) offers the ideal combination of hardness and toughness for high performance drilling and general milling applications.
VHM-ULTRA	Sub-micron grade of solid carbide (ISO K40-K50)	High performance grade for endmills	Ultra fine grain type (0.5µm) offers the best wear resistance for high performance milling applications.



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Australia (Head Office) 378 Settlement Road, Thomastown 3074, Victoria Australia
T +61 3 9280 0800 **F** +61 3 9464 0015 **E** cservice@sutton.com.au

The Netherlands (Europe Head Office) Bruijellestraat, 4 5048 AE Tilburg, Nederland
T +31 13 220 1480 **E** suttontools.eu@sutton.com.au

France **T** +33 788 557 404 **E** suttontools.fr@sutton.com.au
UK and Ireland **T** +44 (0) 7725 846 432 **E** suttontools.uk@sutton.com.au
Central and Eastern Europe **T** +421 948 520 246 **E** suttontools.ceu@sutton.com.au
Spain **T** +34 648 020 098 **E** suttontools.es@sutton.com.au

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