

DORMER PRAMET

NEW PRODUCTS

2021



 **DORMER**

 **PRAMET**

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- ECONOMICAL MILLING CUTTERS AND INSERTS



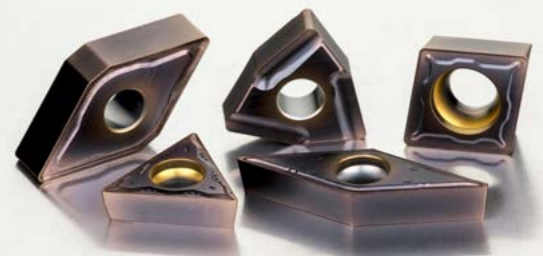
52 GL

- PARTING-OFF & GROOVING TOOLS AND INSERTS



66 T8430

- NEW GENERATION PVD GRADE



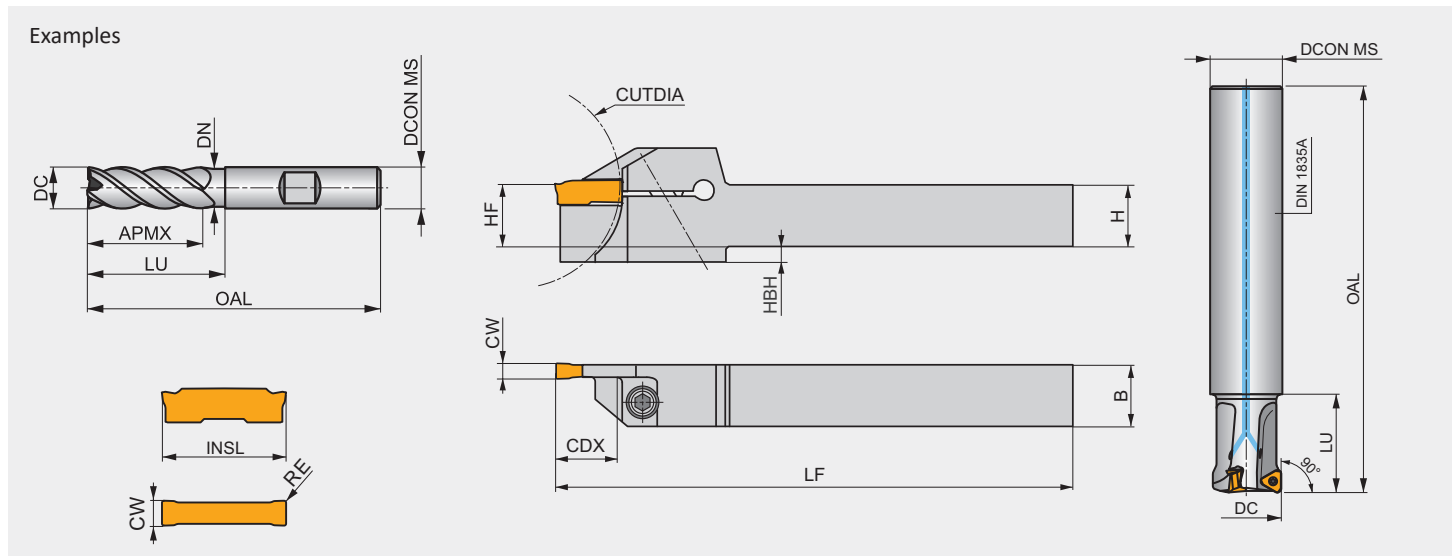
ISO group	WMG (Work Material Group)			Hardness (HB or HRC)	Ultimate Tensile Strength (MPa)	Examples of material (AISI, EN, DIN, SS, STN, BS, UNE, CN, AFNOR, GOST, UNI...)	
P	P1	P1.1	sulfurized	< 240 HB	≤ 830	AISI 1108, EN 15522, DIN 1.0723, SS 1922, ČSN 11120, BS 210A15, UNE F.210F, GB Y15, AFNOR 10F1, GOST A30, UNI CF10S20	
		P1.2	Free machining steel (carbon steels with increased machinability)	sulfurized and phosphorized	< 180 HB	≤ 620	AISI 1211, EN 115Mn30, DIN 1.0715, SS 1912, ČSN 11109, BS 230M7, UNE F.2111, GB Y15, AFNOR S250, GOST A40G, UNI CF95Mn28
		P1.3	sulfurized/phosphorized and leaded	< 180 HB	≤ 620	AISI 12L13, EN 115MnPb30, DIN 1.0718, SS 1914, ČSN 12110, BS 210M16, UNE F.2114, GB Y15Pb, AFNOR S250Pb, GOST A535G2, UNI CF10SPb20	
	P2	P2.1	Plain carbon steel (steels comprised of mainly iron and carbon)	containing <0.25%C	< 180 HB	≤ 620	AISI 1015, EN C15, DIN 1.0401, SS 1350, ČSN 11301, BS 080A15, UNE F.111, GB 15, AFNOR C18RR, GOST St2ps, UNI Fe360
		P2.2	containing <0.55%C	< 240 HB	≤ 830	AISI 1030, EN C30, DIN 1.0528, SS 1550, ČSN 12031, BS 080M32, UNE F.1130, GB 30, AFNOR AF50C30, GOST 30G, UNI FeS90	
		P2.3	containing >0.55%C	< 300 HB	≤ 1030	AISI 1060, EN C60, DIN 1.0601, SS 1655, ČSN 12061, BS 080A62, UNE F513, GB 60, AFNOR 1C60, GOST 60G, UNI C60	
	P3	P3.1	Alloy steel (carbon steels with an alloying content ≤ 10%)	annealed	< 180 HB	≤ 620	AISI 5015, EN 16Mo3, DIN 1.5415, SS 2912, ČSN 15020, BS 1501-240, UNE F.2601, GB 16Mo, AFNOR 15D3, GOST 15M, UNI 16Mo3KW
		P3.2	hardened and tempered	180 - 260 HB	> 620 ≤ 900	AISI 4140, EN 42CrMo4, DIN 1.7225, SS 2244, ČSN 15142, BS 708M40, UNE F.8232, GB 42CrMo, AFNOR 42CD4, GOST 40ChFA, UNI 42CrMo4	
		P3.3		260 - 360 HB	> 900 ≤ 1240	AISI 4140, EN 42CrMo4, DIN 1.7225, SS 2244, ČSN 15142, BS 708M40, UNE F.8232, GB 42CrMo, AFNOR 42CD4, GOST 40ChFA, UNI 42CrMo4	
	P4	P4.1		annealed	< 26 HRC	≤ 900	AISI D2, EN X155CrVMo12-1, DIN 1.2370, SS 2736, ČSN 19573, BS BD2, UNE F.520A, GB Cr12Mo1V1, AFNOR Z160CDV12, GOST Ch12MF, UNI X155CrVMo121KU
		P4.2	Tool steel (special alloy steel for tools, dies and molds)	hardened and tempered	26 - 39 HRC	> 900 ≤ 1240	AISI D2, EN X155CrVMo12-1, DIN 1.2370, SS 2736, ČSN 19573, BS BD2, UNE F.520A, GB Cr12Mo1V1, AFNOR Z160CDV12, GOST Ch12MF, UNI X155CrVMo121KU
		P4.3			39 - 45 HRC	> 1240 ≤ 1450	AISI D2, EN X155CrVMo12-1, DIN 1.2370, SS 2736, ČSN 19573, BS BD2, UNE F.520A, GB Cr12Mo1V1, AFNOR Z160CDV12, GOST Ch12MF, UNI X155CrVMo121KU
M	M1	M1.1	Ferritic stainless steel (straight chromium non-hardenable alloys)	< 160 HB	≤ 520	AISI 5429, EN X7Cr14, DIN 1.4001, SS 2326, BS 434517, UNE F.3401, AFNOR Z8C12, GOST 08Ch13, UNI X6GtTi12	
		M1.2		160 - 220 HB	> 520 ≤ 700	AISI 446, EN X10CrAl24, DIN 1.4762, SS 2322, ČSN 17113, BS 430517, UNE F.3154, GB 10Cr17, AFNOR Z10CA524, GOST 12Ch17, UNI X16Cr26	
	M2	M2.1	Martensitic stainless steel (straight chromium hardenable alloys)	annealed	< 200 HB	≤ 670	AISI 430F, EN X14CrMoS17, DIN 1.4104, SS 2383, ČSN 17140, BS 410521, UNE F.3117, AFNOR Z10CF17, UNI X10CrS17
		M2.2	quenched and tempered	200 - 280 HB	> 670 ≤ 950	AISI 440C, EN X105CrMo17, DIN 1.4125, SS 2385, ČSN 17023, BS 425C11, UNE F.3402, GB 102Cr17Mo, AFNOR Z100CD17, GOST 95Ch18, UNI GX6CrNi 13 04	
		M2.3	precipitation-hardened	280 - 380 HB	> 950 ≤ 1300	AISI 420, EN X45Cr13, DIN 1.4034, ČSN 17029, BS 425C11, UNE F.3405, AFNOR Z44C14, GOST 20X17H12, UNI X30Cr13	
	M3	M3.1	Austenitic stainless steel (chromium-nickel and chromium-nickel-manganese alloys)		< 200 HB	≤ 750	AISI 308, EN X5CrNi18-12, DIN 1.4303, SS 2352, ČSN 17249, BS 305S17, UNE F.3513, GB 10Cr18Ni12, AFNOR Z8CN18.12, UNI X7CrNi18 10
		M3.2		200 - 260 HB	> 750 ≤ 870	AISI 309, EN X15CrNiSi20-12, DIN 1.4828, ČSN 17251, BS 309S24, UNE F.3312, GB 1Cr23Ni13, AFNOR Z15CN520.12, GOST 20Ch20N14S2, UNI 16CrNi23 14	
		M3.3		260 - 300 HB	> 870 ≤ 1040	AISI 5848, EN X45CrNiW18-9, DIN 1.4873, BS 331540, UNE F.3211, AFNOR Z35CNWS14-4, UNI X45CrNiW 18 9	
	M4	M4.1	Austenitic-ferritic (DUPLEX) or super-austenitic stainless steel		< 300 HB	≤ 990	AISI 329, EN X1-NiCrMoCu25-20-5, DIN 1.4539, SS 2562, ČSN 17265, BS 318S13, UNE F.3552, GB 022Cr25NiMo2N, AFNOR Z1NCDU25.20
		M4.2	Precipitation hardening austenitic stainless steel		300 - 380 HB	≤ 1320	AISI 631 (17-7PH), EN X7CrNiAl17-7, DIN 1.4568, SS 2388, ČSN 17465, BS 301S13, UNE F.3217, GB 07Cr17Ni7Al, AFNOR Z9CNA17-07, GOST 09Ch17N7Ju1, UNI X53CrMnNiN21
K	K1	K1.1	ferritic or ferritic-pearlitic	< 180 HB	≤ 190	ASTM A48 Grade 20 (F11401), EN-JL-100, DIN GG-10 (0.6010), SS 0110, STN 422410, BS Grade 150, UNE FG10, GB HAT 100, AFNOR F100, GOST SC 10, UNI G10	
		K1.2	Gray iron (ASTM A48) or Automotive Gray iron (ASTM A159) (iron-carbon castings with a lamellar graphite microstructure)	ferritic-pearlitic or pearlitic	180 - 240 HB	> 190 ≤ 310	ASTM A48 Grade 30 (F12101), EN-JL-1030, DIN GG-20 (0.6020), SS 0120, STN 422420, BS Grade 220, UNE FG20, GB HT200, AFNOR F200, GOST C420, UNI G20
		K1.3	pearlitic	240 - 280 HB	> 310 ≤ 390	ASTM A48 Grade 50 (F13501), EN-JL-1060, DIN GG-35 (0.6035), SS 0135, STN 422435, BS Grade 350, UNE FG35, GB HAT300, AFNOR F1350, GOST SC35, UNI G35	
	K2	K2.1	Malleable iron (ASTM A602) (iron-carbon castings with a graphite-free microstructure)	ferritic	< 160 HB	≤ 400	ASTM A602 Grade M3210 (F20000), EN-JM-1130, DIN GTS-35 (0.8135), SS 0815, BS B340/12, UNE Type A, AFNOR MN 35-10, GOST K435-10
		K2.2		ferritic or pearlitic	160 - 200 HB	> 400 ≤ 550	ASTM A602 Grade M4504 (F20001), EN-JM-1040, DIN GTS-50-05 (0.8045), BS P50-05, AFNOR MB 45-7
		K2.3		pearlitic	200 - 240 HB	> 550 ≤ 660	ASTM A602 Grade M7002 (F20004), EN-JM-1140, DIN GTS-45 (0.8145), SS 0854, STN 422540, BS P 45-06, UNE Typ B, AFNOR MP 50-5, GOST K445-7, UNI G45
	K3	K3.1	Ductile iron (ASTM A536) (iron-carbon castings with a nodular graphite microstructure)	ferritic	< 180 HB	≤ 560	ASTM A536 Grade 60-40-18 (F32800), EN-JS-1030, DIN GGG-40 (0.7040), SS 0717, STN 422304, BS 420/12, UNE FGE 42-12, GB QT 400, AFNOR FGS 400-12, GOST B440
		K3.2		ferritic or pearlitic	180 - 220 HB	> 560 ≤ 680	ASTM A536 Grade 80-55-06 (F33800), EN-JS-1050, DIN GGG-50 (0.7050), SS 0727, STN 422305, BS 500/7, UNE FGE 50-7, GB QT 500-7, AFNOR FGS 500-7, GOST B450
		K3.3		pearlitic	220 - 260 HB	> 680 ≤ 800	ASTM A536 Grade 100-70-03 (F34800), EN-JS-1060, DIN GGG-60 (0.7060), SS 0732, STN 422306, BS 600/3, UNE FG70-2, GB QT 600-3, AFNOR FGS 600-3, GOST B460
	K4	K4.1	Austenitic gray iron (ASTM A436) (iron-carbon alloy castings with an austenitic lamellar graphite microstructure)		< 180 HB	≤ 190	ASTM A436 Type 1 (L-NiCuCr 15 6 2, F41000), EN-JL-3011, DIN GGL-NiMn 13 7 (0.6652), SS 0523, BS Grade F1, AFNOR FGL-Ni13Mn7, GOST S-NiMn 13 7
		K4.2	Austenitic ductile iron (ASTM A439 or ASTM A571) (iron-carbon alloy castings with an austenitic nodular graphite microstructure)		< 240 HB	≤ 740	ASTM A439 Type D-2B (S-NiCr 20 3, F43001), EN-JS-3021, DIN GGG-NiMn 23 4, SS 0776, BS Grade 52M, AFNOR FGS Ni23 Mn4, GOST 4H19X3U
		K4.3	Autempered ductile iron (ASTM A897)		< 280 HB	> 840 ≤ 980	ASTM A897 Grade 110-70-11
		K4.4		280 - 320 HB	> 980 ≤ 1130	ASTM A897 Grade 125-80-10, EN-JS-1100, DIN GGG-90 (5.3400)	
	K5	K4.5	(iron-carbon alloy castings with an ausferrite microstructure)		320 - 360 HB	> 1130 ≤ 1280	ASTM A897 Grade 2 (150-110-07), EN-JS-1110, DIN GGG-100 (5.3403)
		K5.1	Compacted graphite iron CGI (ASTM A842)	ferritic	< 180 HB	≤ 400	ASTM A842 Grade 300, EN-GJV-300, DIN GGV 30, GOST 4BF30
		K5.2	(iron-carbon castings with a vermicular graphite structure)	ferritic-pearlitic	180 - 220 HB	> 400 ≤ 450	ASTM A842 Grade 350, EN-GJV-350, DIN GGV 35 (5.2200), GOST 4BF30
		K5.3		pearlitic	220 - 260 HB	> 450 ≤ 500	ASTM A842 Grade 450, EN-GJV-450, DIN GGV 45, GOST 4BF45
N	N1	N1.1	Commercially pure wrought aluminum	< 60 HB	≤ 240	UNS A91200, EN AL99.0, DIN 3.0205, SS 4010, STN 424009, BS 1C, UNE L-3001, GB L5, AFNOR A4, GOST ALC, UNI 3567	
		N1.2		half hard tempered	60 - 100 HB	> 240 ≤ 400	UNS A93004, EN AlMn0.5Mg0.5, DIN 3.0505, SS 4054, STN 424432, BS N31, UNE L-3831, GB LF2, AFNOR A-M1, GOST AMu, UNI 3568
		N1.3	Wrought aluminum alloys	full hard tempered	100 - 150 HB	> 400 ≤ 590	UNS A95083, EN AlMg4.5Mn0.7, DIN 3.3547, SS 4140, STN 424415, BS N8, UNE L-3327, GB AlMg4.5Mn, AFNOR A-G4.5Mn, GOST Amg 4.5, UNI P-AlMg4.4
	N2	N2.1	Cast aluminum alloys		< 75 HB	≤ 240	UNS A02080, EN AlCu45, BS LM11, STN 424331, UNE Al Si1Cu, GOST AMg5K, UNI G-A1Si7Mg
		N2.2			75 - 90 HB	> 240 ≤ 270	UNS A02420, EN AlCu4Ni2Mg2, SS AlSi7MgFe, BS LM6, STN 424519, UNE Al-Si7Mg, AFNOR A-S7G, GOST AK7, UNI G-A1Si7Mg
		N2.3			90 - 140 HB	> 270 ≤ 440	UNS A03360, EN G-AlCu4NiMg2, SS AlSi10Mg, STN 424336, BS LM 30, AFNOR A-S10G, UNI G-A1Si9Mg
	N3	N3.1	Free-cutting copper-alloys materials with excellent machining properties				UNS C14700, EN CuPb1P, DIN 2.1498, STN 423214, BS C111, AFNOR CuZn35Pb2, GOST L63-3, UNI Cu5(P0.01)
		N3.2	Short-chip copper-alloys with good to moderate machining properties				UNS C81540, EN CuNi25Cr, DIN 2.0857, STN 423220, BS NS113, UNE CuSn12, AFNOR CuZn40, GOST L60, UNI P-CuZn-40
		N3.3	Electrolytic copper and long-chip copper-alloys with moderate to poor machining properties				UNS C10100, EN CuAg0.1, DIN 2.1203, SS 5010, UNE CuSi3Mn1, AFNOR Cu-C2, GOST M1E, UNI Cu-OF
	N4	N4.1	Thermoplastic polymers				ABS, Acryl, Duraplast, Elastomer, EP Epoxid, FEP, Fluor, Gummi, Kautschuk, Latex, MF, MPF, PA, PAI, PC, PE, PEEK, PEI, PES, PET, PF, Phenolharze, PI, PMMA, Polyamide, Polyester, Polyolefine, Polysulfon, POM, PP, PPE, PPS, PS, PSU, PTFE, PU, PUR, PVDF, SAN, SI, Styrol, UF, Ureol
		N4.2	Thermosetting polymers				Aramid, Epoxy, Fluoropolymer, Mehacrylate, Melamine, Phenolic, Polyester, Polyimide, Polymethacrylimide, Polyurethane
		N4.3	Reinforced polymers or composites				CFK, GFK, GMT, Honeycomb, Kevlar, LFT, Organo, SMC
N5	N5.1	Graphite				CGM-1, CM-00, GM-10, GM-11, GR030, GR030PI, GR060, GR060PI, GR125, MC-01, MC-01R0, MC-03, MC-03M	
S	S1	S1.1	Titanium or titanium alloys	< 200 HB	≤ 660	UNS R50250 (Grade 1), EN Ti 99.6, DIN 3.7035, BS TA.2, UNE Ti-Po2, AFNOR T-40, GOST BT1-00	
		S1.2		200 - 280 HB	> 660 ≤ 950	UNS R56404 (Grade 29), EN Ti2Cu, DIN 3.7124, BS TA.21, UNE Ti-P11, AFNOR T-42	
		S1.3		280 - 360 HB	> 950 ≤ 1200	UNS R54250 (Grade 38), EN TiAl6V4, DIN 3.7165, ČSN TiAl6VELI, BSA TA. 13, UNE Ti-P63, AFNOR T-A6V, GOST BT6	
	S2	S2.1	Fe-based high-temperature alloys	< 200 HB	≤ 690	UNS N08801 (Incoloy 801), EN X8 NiCrAlTi31-21, DIN 1.4959, BS NA 15, AFNOR Z8NC33-21	
		S2.2		200 - 280 HB	> 690 ≤ 970	UNS N19907, EN X6NiCrTiMoVB25-15-2, DIN 1.4980, SS 2570, BS HR52, AFNOR Z6NCTDV25.15B, GOST 36HX10	
	S3	S3.1	Ni-based high-temperature alloys		< 280 HB	≤ 940	UNS A09706 (Inconel 706), EN NiCr25FeAl, DIN 2.4856, BS HR 6, ČSN Inconel 625, UNE F.3313, GB 1Cr16Ni35, AFNOR NC22FeDNB, GOST XH38BT
		S3.2		280 - 360 HB	> 940 ≤ 1200	UNS N07001, EN NiCr20Co13Mo4Ti3Al, DIN 2.4654, BS HR 2, ČSN Waspaloy, AFNOR NCKD 20ATV, GOST XH80TB0	
S4	S4.1	Co-based high-temperature alloys	< 240 HB	≤ 800	UNS R30016 (Stellite 6b), EN CoCr20W15Ni, DIN 2.4964, AFNOR KC 20 WN, GOST NK52		
	S4.2		240 - 320 HB	> 800 ≤ 1070	UNS R30016 (Stellite 6b), EN CoCr20W15Ni, DIN 2.4964, AFNOR KC 20 WN, GOST NK52		
H	H1	H1.1	Chilled cast iron	< 440 HB		UNS F45001, EN-GJS-1050-6, DIN 5.3406, SS 0512, BS Grade 2A	
		H2	H2.1	Hardened cast iron	< 55 HRC		UNS F45003, EN-GJS-1400-1, DIN 5.3405, SS 0457, BS Grade 3D
			H2.2		> 55 HRC		UNS F45003, EN-GJS-1400-1, DIN 5.3405, SS 0457, BS Grade 3D
	H3	H3.1	Hardened steel <55HRC		< 51 HRC		UNS F45003, EN-GJS-1400-1, DIN 5.3405, SS 0457, BS Grade 3D
		H3.2			51 - 55 HRC		UNS F45003, EN-GJS-1400-1, DIN 5.3405, SS 0457, BS Grade 3D
	H4	H4.1	Hardened steel >55HRC		55 - 59 HRC		UNS F45003, EN-GJS-1400-1, DIN 5.3405, SS 0457, BS Grade 3D
		H4.2			> 59 HRC		UNS F45003, EN-GJS-1400-1, DIN 5.3405, SS 0457, BS Grade 3D

CUTTING TOOL PARAMETERS ACCORDING TO ISO 13399

All cutting tools are defined by a number of parameters according to the standard ISO 13399. This list contains all the parameters used in this catalogue and their definitions.

ISO 13399 is an international cutting tool information standard. It provides dimensions and parameters in a neutral format that is independent of any particular system or company nomenclature. When cutting tools are clearly defined according to a global standard, all types of software can process the electronic data more quickly, improving the quality of communication and helping to make the exchange of information run

smoothly. By supporting a common language in our cutting tool descriptions will assist this system to system communication. It will save you significant amount of time, providing an easier gathering of high-quality data across our 40,000 solid and indexable tools. By using a ISO 13399 compliant system, there will be no need to manually interpret data and key-enter it into your system.



ISO 13399	Description
APMX	Depth of cut maximum
B	Shank width
CDX	Cutting depth maximum
CUTDIA	Work piece parting diameter maximum
CW	Cutting width
D1	Fixing hole diameter
DBC1	Diameter bolt circle
DC	Cutting diameter
DCCB	Counterbore diameter connection bore
DCON MS	Connection diameter
DN	Neck diameter
GAMF	Radial rake angle
GAMP	Axial rake angle
H	Shank height
HBH	Head bottom offset height

ISO 13399	Description
HF	Corner chamfer width
CHW	Functional height
IC	Inscribed circle diameter
INSL	Insert length
KWD	Keyway depth
KWW	Keyway width
L	Cutting edge length
LF	Functional length
LU	Usable length
NOF	Number of flutes
OAL	Overall length
PRFRAD(2)	Profile radius
RE	Corner radius
S	Insert thickness
TDZ	Thread diameter size

ICONS OVERVIEW

General features of tools

	Primary use		Finishing – very good surface quality		Suitable for stable working conditions
	Possible use		Medium machining – good surface quality		Suitable for unstable working conditions
			Roughing – unlimited surface roughness		Suitable for very unstable working conditions

Possible applications

	Contoured Surfaces (copy milling)		Plunge Milling		Copy turning (multi directional machining)
	Deep shoulder milling		Progressive Plunging		Deep radial groove
	Deep slot milling		Ramping		Parting off
	Drilling		Shallow shoulder milling		Shallow radial groove
	Face milling		Shallow slot milling		Tube parting off
	Helical interpolation		Trochoidal Milling		Wide radial groove (with following expansion)
	Helical interpolation in a pre-drilled hole		Turn-milling		

Shank type

	DIN 6535 HB Weldon Shank		DIN 1835B Weldon Shank
	DIN 6535 HA Cylindrical Shank		Threaded coupling
	DIN 1835A Cylindrical Shank		Arbor DIN 8030

Direction of cut

	Direction of cut - left
	Direction of cut - right

Basic standard group (BSG)

	Dormer Standards
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Material code (BMC)

	Hard Material (Solid Carbide)
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Cooling

	Through Tool Coolant
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ICONS OVERVIEW

Flute Helix (FHA)

	40° Helix Angle (Flute)
	Unequal (Variable) Helix
	30° Helix Angle (Flute)

Radial rake angle (GAMF)

	10° Radial Rake Angle (cutting)		-6° Radial Rake Angle (cutting)
	20° Radial Rake Angle (cutting)		8° Radial Rake Angle (cutting)
	15° Radial Rake Angle (cutting)		13° Radial Rake Angle (cutting)
	7° Radial Rake Angle (cutting)		

Cutting diameter tolerance class (TCDC)

	h9 - Industry Standard Tool Tolerance Zone (based on diameter range)
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Milling Direction

	Plunging, Ramping, Side Cutting		Side Cutting
	Ramping, Side Cutting		

Cut length

	Extra short		Medium		Extra long
	Short		Long		

Mill Profile

	General Purpose Cutter Type for Low to High Resistance Materials		Coarse Pitch Asymmetrical Rounded Profile Chipbreaker		Non-ferrous Cutter Type with Coarse Pitch Asymmetrical Rounded Profile Chipbreaker
	Semi-finishing Profile Chipbreaker		Non-ferrous Cutter Type for Soft Malleable Materials		

Number of flutes

	Number of Flutes = 2 (teeth)		Number of Flutes = 3 (differential pitch)		Number of Flutes = 4 (differential pitch)
	Number of Flutes = 3 (teeth)		Number of Flutes = 3-4 (teeth)		Number of Flutes = 5 (teeth)



SOLID MILLING CUTTERS

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INTRODUCTION

We have launched a new generation of solid carbide five-flute end mills, specifically for dynamic milling applications in general machining and die and mold. The S7 assortment covers a wide range of operations, including profiling, trochoidal slotting, semi-finishing and narrow pocketing in a variety of materials, including stainless steels and super-alloys.

SEE TOOL
IN ACTION

S770HB / S772HB FEATURES & BENEFITS

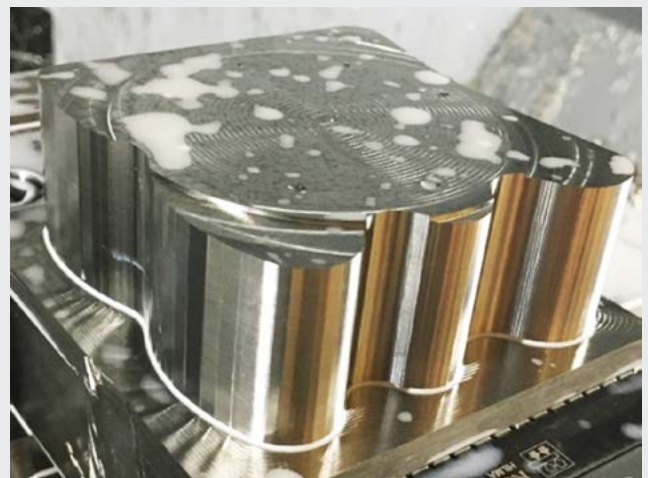
- Suitable for profiling, trochoidal slotting, and semi-finishing applications.
- A five-flute design for **increased feed rates up to 25%**, compared with four-flute tools.
- Positive rake angle for **smooth cutting action** in stainless steel and super-alloys, reducing the risk of work-hardening.
- Small corner radius and a specific cutting edge design
- to provide a **stable performance**, reduce chipping and prolong tool life.
- Unequal helix for **chatter free machining and excellent surface finishing**.
- AlCrN coating for thermal stability, reduced friction, excellent wear resistance and **prolonged durability**.
- **Maximum productivity** due to optimal metal removal rate and reduced machining time.

Specific cutting
edge design

S772HB MACHINING EXAMPLE

Workpiece material: Ti4Al6V (WMG S1.3)
 Tool: S772HB10.0
 Operation: Outside contouring
 Coolant: External coolant (emulsion)

Cutting speed	SFM	ft/min.	197
Feed	IPM	in/min.	26.3
Axial depth of cut	a_p	inch	1.378
Radial depth of cut	a_e	inch	.028
Time in cut		min.	13



S771HB / S773HB FEATURES & BENEFITS

- Suitable for narrow pocketing, trochoidal slotting and profiling applications.
- A five-flute design for **increased feed rates** up to 25%, compared with four-flute tools.
- Through coolant to **improve welding resistance** and enable a wide range of processes, especially for difficult-to-machine materials.
- FS chip divider to break swarf into manageable smaller pieces, helping to **reduce spindle load and increase metal removal rates**. Also, this provides a 50% bigger width of cut compared to tools without a chip divider.
- Positive rake angle for **smooth cutting action** in stainless steel and super-alloys, reducing the risk of work-hardening.
- AlCrN coating for thermal stability, reduced friction, excellent wear resistance and **prolonged durability**.
- Neck recess feature to **avoid contact with the wall** in shoulder operations.
- Unequal helix for **chatter free machining and excellent surface finishing**.
- Small corner radius and a specific cutting edge design to provide a **stable performance, reduce chipping and prolong tool life**.
- **Maximum productivity** due to optimal metal removal rate and reduced machining time.

NEW ASSORTMENT – FIVE-FLUTE END MILLS

	 S770HB	 S771HB	 S772HB	 S773HB
Feature				
Cutting Length	Short	Short	Long	Long
FS Chip Divider	-	Yes	-	Yes
Through Coolant	-	Yes	-	Yes
Neck Recess	-	Yes	-	Yes
Unequal Helix	35° / 36° / 37°			

S771HB MACHINING EXAMPLE

Workpiece material: Inconel 718 (WMG S3.1)
 Tool: S771HB10.0
 Operation: Trochoidal slotting
 Coolant: Internal coolant (emulsion)

Cutting speed	SFM	ft/min.	115
Feed	IPM	in/min.	6.3
Axial depth of cut	a_p	inch	.787
Radial depth of cut	a_e	inch	.020
Time in cut		min.	60



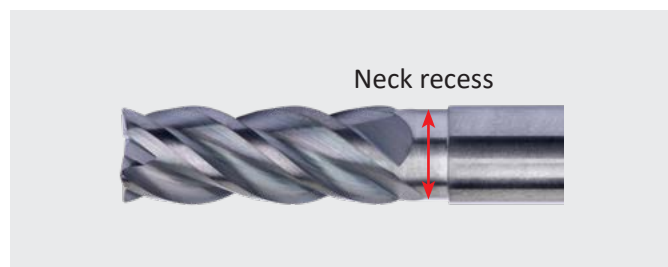


INTRODUCTION

We have expanded our S7 assortment of multi-application high performance cutters for use on both CNC and conventional machine tools. The new additions support most common operations, such as slotting, plunging, contour milling, ramping and copy milling in various materials, including medium strength steels, stainless steels and super alloys.

FEATURES & BENEFITS

- The four-flute cutters have a specific tooth design for **improved chip evacuation**.
- An unequal helix option for **chatter free machining and excellent surface finishing**.
- Positive rake angle for a **smooth cutting action**, reducing the risk of work-hardening.
- AlCrN and Titanium Silicon Nitride (TiSiN) coatings for **longer tool life**; enabling higher cutting speeds and increased heat resistance, making them ideal for dry machining.
- A long version for **higher depth of cut**.
- NRA profile to break swarf into manageable smaller pieces, helping to **reduce spindle load and increase metal removal rates**.
- Neck recess feature to **avoid contact with the wall** in shoulder operations.



NEW FAMILIES

	 S722HB	 S765HB	 S768
Feature			
Unequal Helix	-	-	Yes
Positive Rake Angle	7°	10°	10°
NRA Profile	-	Yes	-
Cutting Length	Medium	Short	Long
Coating	AlCrN	AlCrN	TiSiN
Neck Recess	Yes	-	Yes
Shank Design	DIN 6535 HB	DIN 6535 HB	DIN 6535 HA



S791 BARREL END MILL

SOLID MILLING CUTTERS

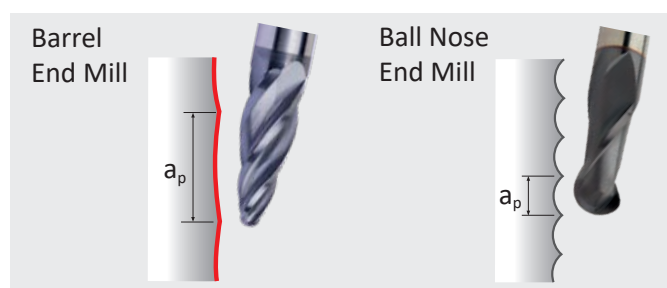
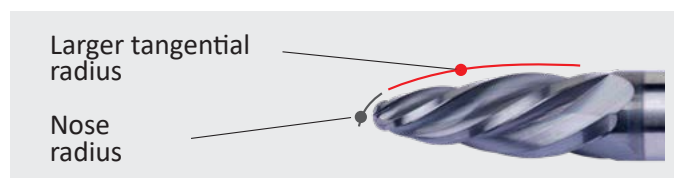
INTRODUCTION

We have launched an advanced barrel-shaped end mill for efficient five-axis machining in die and mold and aerospace applications. The new S791 cutter provides excellent surface quality and is suitable for semi-finishing and finishing in steels, stainless steels, cast iron and super-alloys. Its design includes a nose radius for fillet milling and a tangential form radius for curved and deep wall surface machining.



FEATURES & BENEFITS

- A larger tangential radius with more overlap compared with conventional ball nose end mills. This enables:
 - A greater area of contact with the workpiece, **increasing tool life and reducing cycle time.**
 - Fewer passes, leading to more than 50% **time savings.**
- Better surface quality and characteristics, minimizing the time spent polishing.
- All the benefits usually associated with a robust ball nose end mill.



- An AlCrN coating for thermal stability, reduced friction, excellent wear resistance and **prolonged durability.**
- Positive rake angle for **smooth cutting action** in stainless steels and super-alloys, reducing the risk of work-hardening.
- Several three or four-flutes options for **more productivity** (compared to common two-flute ball nose cutters).

MACHINING EXAMPLE

Workpiece material: DIN 1.2311 (WGM P3.3), 300-320 HB
 Tool diameter: 10 mm
 Operation: Finishing angled wall 10°
 Coolant: Air

			S791 Barrel End Mill	Ballnose End Mill
Tool radius		mm	85	5
No.of flutes			4	2
Cutting speed	SFM	ft/min	492	394
Feed	f_z	in/tooth	.002	.002
Depth of cut	a_p	inch	.098	.020
Width of cut	a_e	inch	.020	.020
No.of passes			33	165
Time in cut		min.	4:30	21:10





INTRODUCTION

We have launched a range of S6 solid carbide end mills for aluminum and non-ferrous materials. The additions include new three-flute and four-flutes cutters, along with several smaller diameters in our existing two-flutes.

The S6 assortment is particularly suited for precision and high-speed machining of aluminum parts in air frame assembly, automotive applications and die and mold, particularly for prototyping.

FEATURES & BENEFITS

- A three-flute design for **smooth cutting action** and **reduced stress on the spindle**.
- A four-flute option with various corner radius designs, **reinforcing the end teeth for a stronger performance**.
- Differential pitch to reduce vibration and **maximize productivity and tool life**.
- Positive rake angle for a **smooth cutting action**, reducing the risk of work-hardening.
- All geometries specifically designed to provide a **high performance and quality surface finish** on aluminum and its alloys.
- Neck recess feature to **avoid contact with the wall** in shoulder operations.
- NRA profile to break swarf into manageable smaller pieces, helping to **reduce spindle load and increase metal removal rates**.

NEW FAMILIES

	 S650	 S614	 S654	 S662
Feature				
Number of Flutes	3	3	3	4
Differential Pitch	Yes	-	Yes	Yes
Neck Recess	-	-	Yes	-
Corner Radius	-	-	-	Yes
NRA Profile	-	-	Yes	-
Cutting edge chipbreaker	Yes	-	-	-



S561 HARD MILLING CUTTER

SOLID MILLING CUTTERS

INTRODUCTION

We have launched a new solid carbide cutter to enhance our assortment of end mills for hardened steel above 49HRC. The S561 is specifically for high performance milling in a variety of applications, including die and mold machining.



S561

FEATURES & BENEFITS

- The four-flute end mills feature a specific tooth design for **improved chip evacuation**.
- A differential pitch design provides **chatter free machining and an excellent surface finish**.
- Titanium Silicon Nitride (TiSiN) coatings for **longer tool life**; enabling higher cutting speeds and increased heat resistance, making them ideal for dry machining.
- **Robust cutting geometry** due to negative rake angle.
- A sharp cutter for hardened steel (52-70HRC), providing **excellent finishing** in die and mold applications.
- Cutting edge preparation for excellent surface finish.
- Gash land design to **improve strength and better chipping resistance**.

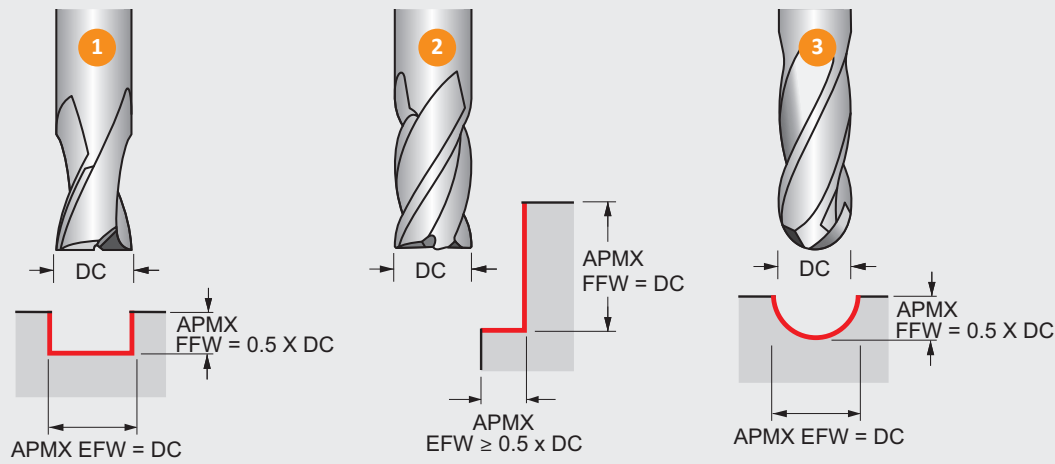
Gash land design



Material code (BMC)	HM	HM	HM	HM	HM	HM	HM	HM	HM	HM	HM	HM	HM	
	N	NRA	N	N	FS	N	FS	N	N	W	W	W	W	
	NOF 4≠	NOF 4≠	NOF 4≠	NOF 5	NOF 5	NOF 5	NOF 5	NOF 3-4	NOF 4≠	NOF 2	NOF 2	NOF 3	NOF 2	
	λ 40°	λ 40°	λ ≠	λ ≠	λ ≠	λ ≠	λ ≠	λ 30°	λ 40°	λ 30°	λ 30°	λ 40°	λ 30°	
	γ 7°	γ 10°	γ 10°	γ 10°	γ 10°	γ 10°	γ 10°	γ 8°	γ -6°	γ 20°	γ 20°	γ 13°	γ 15°	
	 DIN 6535HB	 DIN 6535HB	 DIN 6535HA	 DIN 6535HB	 DIN 6535HB	 DIN 6535HB	 DIN 6535HB	 DIN 6535HA	 DIN 6535HA	 DIN 6535HA	 DIN 6535HA	 DIN 6535HA	 DIN 6535HA	
	AlCrN	AlCrN	TSiN	AlCrN	AlCrN	AlCrN	AlCrN	AlCrN	TSiN	Hi	Hi			
	DC h9	DC h9	DC h9	DC h9	DC h9	DC h9	DC h9		DC h9	DC h9	DC h9	DC h9	DC h9	
Basic standard group (BSG)														
Cooling (CSP)														
Product Family Code		S722HB	S765HB	S768	S770HB	S771HB	S772HB	S773HB	S791	S561	S610	S611	S614	S629
		3.00 - 20.00	6.00 - 20.00	4.00 - 20.00	10.00 - 20.00	10.00 - 20.00	10.00 - 20.00	10.00 - 20.00	6.00 - 16.00	1.00 - 20.00	2.00 - 20.00	3.00 - 20.00	3.00 - 16.00	1.00 - 20.00
		26	27	28	29	30	31	32	33	34	35	36	37	38
P	P1	■	■	■	■	■	■	■	■					
	P2	■	■	■	■	■	■	■	■					
	P3	■	■	■	■	■	■	■	■					
	P4	■	■	■	■	■	■	■	■					
M	M1	■	■	■	■	■	■	■	■					
	M2	■	■	■	■	■	■	■	■					
	M3	■	■	■	■	■	■	■	■					
	M4								■					
K	K1	■	■	■	■	■	■	■	■					
	K2	■	■	■	■	■	■	■	■					
	K3	■	■	■	■	■	■	■	■					
	K4	■	■	■	■	■	■	■	■					
	K5	■	■	■	■	■	■	■	■					
N	N1								■		■	■	■	■
	N2								■		■	■	■	■
	N3								■		■	■	■	■
	N4								■		■	■	■	■
	N5													
S	S1	■	■	■	■	■	■	■	■					
	S2	■	■	■	■	■	■	■	■					
	S3	■	■	■	■	■	■	■	■					
	S4	■	■	■	■	■	■	■	■					
H	H1									■				
	H2									■				
	H3									■				
	H4									■				

■ Primary use ▣ Possible use 23

SOLID MILLING CUTTERS



Feed per tooth (IPT or inch/tooth)
Depending on the working conditions it might be necessary to adjust these values $\pm 25\%$
ONLY if plunging into solid material with a center cutting end mill the values in this table should be considered as IPR (feed in inch per revolution)

How to use this table to find the feed per tooth (IPT):

1. Find your Alpha Code on the product page (example: 653K, "K" is the Alpha Code).
2. Find the closest diameter for your cutting application in the top row of the table.
3. Find your Alpha Code in the left column of the table.
4. The intersection (cell) of the Diameter and Alpha Code is the feed per tooth (IPT).

**FOR SOLID
CARBIDE
MILLING
CUTTERS ONLY**

		ø DC [inch]															
Feed rates		1/16	3/32	1/8	5/32	3/16	7/32	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
		.0625	.0938	.1250	.1563	.1875	.2188	.2500	.3125	.3750	.4375	.5000	.5625	.6250	.7500	.8750	1,0000
	A	.0001	.0001	.0002	.0002	.0002	.0002	.0003	.0003	.0004	.0005	.0005	.0006	.0007	.0008	.0010	.0011
	B	.0001	.0001	.0002	.0002	.0002	.0002	.0003	.0003	.0004	.0005	.0005	.0006	.0007	.0008	.0010	.0011
	C	.0001	.0001	.0002	.0002	.0002	.0002	.0003	.0003	.0004	.0005	.0005	.0006	.0007	.0008	.0010	.0011
	D	.0001	.0001	.0002	.0002	.0002	.0003	.0004	.0004	.0004	.0005	.0006	.0006	.0007	.0008	.0010	.0011
	E	.0001	.0001	.0002	.0003	.0004	.0004	.0005	.0006	.0006	.0007	.0007	.0009	.0009	.0011	.0012	.0013
	F	.0001	.0002	.0002	.0004	.0005	.0006	.0006	.0007	.0009	.0009	.0011	.0012	.0013	.0015	.0017	.0019
	G	.0002	.0002	.0004	.0006	.0007	.0007	.0009	.0010	.0012	.0013	.0015	.0016	.0017	.0020	.0023	.0025
	I	.0002	.0003	.0005	.0007	.0009	.0011	.0012	.0014	.0016	.0018	.0020	.0022	.0024	.0028	.0031	.0035
	J	.0003	.0004	.0007	.0010	.0012	.0014	.0017	.0019	.0022	.0024	.0027	.0030	.0032	.0037	.0043	.0047
	K	.0004	.0006	.0009	.0014	.0016	.0019	.0022	.0025	.0029	.0032	.0036	.0040	.0043	.0050	.0056	.0063
	N	.0005	.0007	.0011	.0019	.0022	.0025	.0029	.0034	.0038	.0043	.0048	.0053	.0057	.0066	.0075	.0083
	O	.0006	.0010	.0015	.0024	.0029	.0034	.0039	.0045	.0051	.0057	.0063	.0070	.0076	.0088	.0100	.0111
	P	.0008	.0014	.0020	.0033	.0038	.0045	.0052	.0060	.0068	.0076	.0084	.0094	.0100	.0117	.0133	.0148
R	.0011	.0018	.0027	.0043	.0051	.0060	.0069	.0080	.0091	.0101	.0112	.0125	.0134	.0156	.0177	.0197	
S	.0015	.0024	.0036	.0058	.0067	.0080	.0091	.0106	.0120	.0135	.0149	.0166	.0178	.0207	.0236	.0263	

SOLID MILLING CUTTERS

1 Slot Milling

Correction factors for cutting speed V_c and feed per tooth f_z for slot milling operations at different depths of cut

APMX FFW / DC	25%	50%	100%	150%				
	1.25	1.00	.75	.50				
	1.25	1.00	.75	.50				

2 Shoulder Milling

Correction factors for cutting speed V_c and feed per tooth f_z for square shoulder milling with <50% radial immersion

APMX EFW / DC	5%	10%	15%	20%	25%	30%	40%	≥ 50%
	1.48	1.35	1.27	1.22	1.19	1.16	1.11	1.00
	2.29	1.67	1.40	1.25	1.15	1.09	1.02	1.00

We recommend to avoid milling with 50% radial immersion

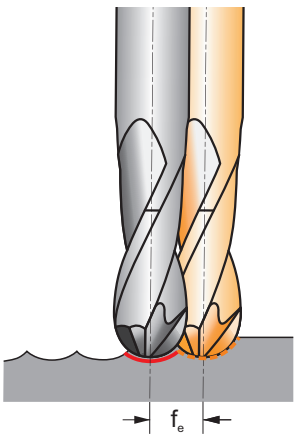
3a Plain Copy Milling (with Ball Nose Cutters)

Correction factors for cutting speed V_c for plain copy milling at different depths of cut

APMX FFW / DC	5%	10%	15%	20%	25%	30%	40%	50%
	2.29	1.67	1.40	1.25	1.15	1.09	1.02	1.00

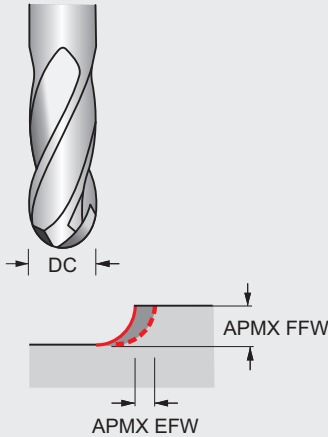
3b

Line offset f_e (step-over distance) for achieving a theoretical surface roughness R_z

Ø DC		2	4	8	16	32	63	125	250
2		.13	.18	.25	.36	.50	.70	.97	1.32
3		.15	.22	.31	.44	.62	.86	1.20	1.66
4		.18	.25	.36	.50	.71	1.00	1.39	1.94
5		.20	.28	.40	.56	.80	1.12	1.56	2.18
6		.22	.31	.44	.62	.87	1.22	1.71	2.40
8		.25	.36	.51	.71	1.01	1.41	1.98	2.78
10		.28	.40	.57	.80	1.13	1.58	2.22	3.12
12		.31	.44	.62	.88	1.24	1.73	2.44	3.43
14		.33	.47	.67	.95	1.34	1.87	2.63	3.71
16		.36	.51	.72	1.01	1.43	2.00	2.82	3.97
18		.38	.54	.76	1.07	1.52	2.13	2.99	4.21
20		.40	.57	.80	1.13	1.60	2.24	3.15	4.44
22		.42	.59	.84	1.19	1.68	2.35	3.31	4.66
25		.45	.63	.89	1.26	1.79	2.51	3.53	4.97
28		.47	.67	.95	1.34	1.89	2.65	3.73	5.27

Line offset dimensions shown are Metric (mm) only

3c


How to use this table to find the correction factor for the feed per tooth (f_z or IPT) for plain copy milling:

1. Find the closest radial immersion (APMX EFW / DC) for your cutting application in the top row of the table.
3. Find your closest immersion (APMX FFW / DC) for your cutting application in the left column of the table.
3. The intersection (cell) of the radial and axial immersions is the correction factor for the feed per tooth.

Example for plain copy milling:

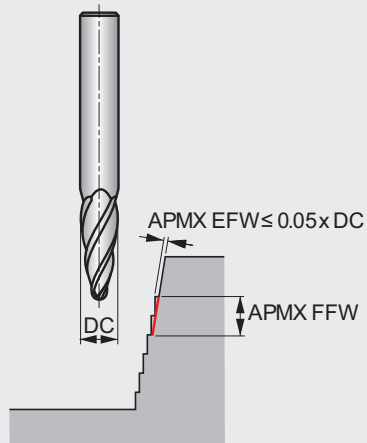
1. Applying an 8mm ball nose cutter with a depth of cut of 0,8mm (APMX FFW), the aim is to achieve a theoretical surface roughness of 32 μm .
2. The correction factor for cutting speed with an axial immersion of 10% = 1,67 can be found in table 3a.
3. The step-over distance for a R_z of 32 μm = 1,01mm can be found in table 3b.
4. The correction factor for feed per tooth with an axial immersion of 10% and a radial immersion of 1,01 / 8 = 12.6% can be found in table 3c and is in this case 2,33.

Correction factors for feed per tooth f_z for plain copy milling with a line offset < 50%xD at different depths of cut

APMX FFW	APMX EFW	5%	10%	15%	20%	25%	30%	35%	40%	50%
5%	$\times f_z$ 	5.26	3.82	3.21	2.87	2.65	2.50	2.40	2.34	2.29
10%		3.82	2.78	2.33	2.08	1.92	1.82	1.75	1.70	1.67
15%		3.21	2.33	1.96	1.75	1.62	1.53	1.47	1.43	1.40
20%		2.87	2.08	1.75	1.56	1.44	1.36	1.31	1.28	1.25
25%		2.65	1.92	1.62	1.44	1.33	1.26	1.21	1.18	1.15
30%		2.50	1.82	1.53	1.36	1.26	1.19	1.14	1.11	1.09
35%		2.40	1.75	1.47	1.31	1.21	1.14	1.10	1.07	1.05
40%		2.34	1.70	1.43	1.28	1.18	1.11	1.07	1.04	1.02
45%		2.31	1.68	1.41	1.26	1.16	1.10	1.05	1.03	1.01
50%		2.29	1.67	1.40	1.25	1.15	1.09	1.05	1.02	1.00

To increase the surface quality, the tool or surface should be included with a tilt angle off 10-15°

BARREL END MILLS



Feed per tooth
(f_z in mm/rev)
Depended of the working conditions it might be needed to adjust these values $\pm 25\%$

How to use this table to find the feed per tooth (f_z):

1. Find your Alpha Code on the product page (example: 121F, "F" is the Alpha Code).
2. Find the closest diameter for your cutting application in the top row of the table.
3. Find your Alpha Code in the left column of the table.
4. The intersection (cell) of the Diameter and Alpha Code is the feed per tooth (f_z).

**FOR SOLID CARBIDE
BARREL CUTTERS ONLY**

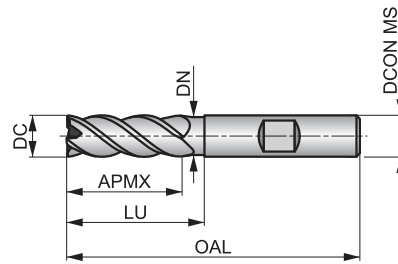
		ø DC [mm]				
		6.00	8.00	10.00	12.00	16.00
Feed rates	E	.0012	.0015	.0021	.0026	.0038
	F	.0015	.0020	.0025	.0033	.0046
	I	.0024	.0033	.0044	.0055	.0080

S722HB



4-Flute Solid Carbide End Mill

Medium cut length 4-flute design with 40° helix, differential pitch and weldon shank provides high rigidity for profile milling deep walls. Neck recess to avoid work contact with the wall and extend reach. AlCrN coating improves performance and extends the tool life.



HM	N	NOF 4#
	λ 40°	γ 7°
DIN 6535HB	AlCrN	DC h9
	DORMER	



Workpiece material group suitability and starting values for cutting speed (ft/min). Letter code feed table can be found on page 22.

P1.1 ■ 653 J	P1.2 ■ 732 J	P1.3 ■ 755 J	P2.1 ■ 558 J	P2.2 ■ 492 J	P2.3 ■ 436 I	P3.1 ■ 453 J	P3.2 ■ 364 I	P3.3 ■ 308 I	P4.1 ■ 269 I	P4.2 ■ 230 I	M1.1 ■ 377 J	M1.2 ■ 318 J	M2.1 ■ 335 J
M2.2 ■ 276 I	M3.1 ■ 308 I	M3.2 ■ 266 I	K1.1 ■ 643 J	K1.2 ■ 476 J	K1.3 ■ 358 J	K2.1 ■ 663 J	K2.2 ■ 538 J	K2.3 ■ 430 I	K3.1 ■ 584 J	K3.2 ■ 446 J	K3.3 ■ 361 I	K4.1 ■ 541 I	K4.2 ■ 410 I
K4.3 ■ 299 I	K4.4 ■ 256 I	K4.5 ■ 213 I	K5.1 ■ 614 I	K5.2 ■ 463 I	K5.3 ■ 358 I	S1.2 ■ 226 I	S2.1 ■ 174 I	S3.1 ■ 131 I	S4.1 ■ 102 I				

DCON MS tolerance h6; RE ±0.02 mm.

Product	DC	RE	DCON MS	APMX	OAL	NOF	LU	DN	EDP number
	[mm]	[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	
S722HB3.0	3.00	.10	6.00	9.00	50.0	4	15.00	2.80	8030351
S722HB4.0	4.00	.10	6.00	11.00	57.0	4	20.00	3.70	8030352
S722HB5.0	5.00	.10	6.00	13.00	57.0	4	20.00	4.60	8030353
S722HB6.0	6.00	.10	6.00	20.00	60.0	4	25.00	5.50	8030354
S722HB8.0	8.00	.20	8.00	20.00	64.0	4	26.00	7.40	8030355
S722HB10.0	10.00	.20	10.00	27.00	70.0	4	32.00	9.20	8030356
S722HB12.0	12.00	.20	12.00	26.00	83.0	4	37.00	11.00	8030357
S722HB14.0	14.00	.20	14.00	26.00	83.0	4	37.00	13.00	8030358
S722HB16.0	16.00	.20	16.00	32.00	92.0	4	42.00	15.00	8030359
S722HB18.0	18.00	.20	18.00	32.00	92.0	4	42.00	17.00	8030360
S722HB20.0	20.00	.20	20.00	38.00	104.0	4	50.00	19.00	8030361

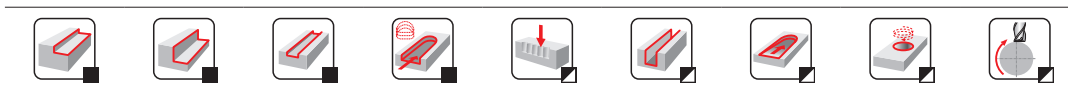
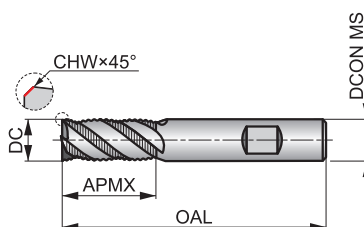
S765HB



4-Flute Solid Carbide Roughing End Mill, DIN 6535 HB Shank

Short cut length 4-flute design with 40° helix and differential pitch to reduce vibrations. The NRA profile is designed to break chips for efficient roughing applications. The Weldon shank prevents spinning from the end mill in the tool holder. AlCrN coating. Also suited for slotting and trochoidal roughing operation.

HM	NRA	NOF 4±
	λ 40°	γ 10°
DIN 6535HB	AlCrN	DC h9
	DORMER	



Workpiece material group suitability and starting values for cutting speed (ft/min). Letter code feed table can be found on page 22.

P1.1 ■ 692 J	P1.2 ■ 774 J	P1.3 ■ 797 J	P2.1 ■ 591 J	P2.2 ■ 518 J	P2.3 ■ 459 J	P3.1 ■ 479 J	P3.2 ■ 384 J	P3.3 ■ 325 J	P4.1 ■ 282 J	P4.2 ■ 243 J	M1.1 ■ 400 J	M1.2 ■ 338 J	M2.1 ■ 354 J
M2.2 ■ 292 J	M3.1 ■ 328 J	M3.2 ■ 282 J	K1.1 ■ 682 J	K1.2 ■ 505 J	K1.3 ■ 381 J	K2.1 ■ 702 J	K2.2 ■ 571 J	K2.3 ■ 456 J	K3.1 ■ 620 J	K3.2 ■ 476 J	K3.3 ■ 384 J	K4.1 ■ 577 J	K4.2 ■ 433 J
K4.3 ■ 318 J	K4.4 ■ 272 J	K4.5 ■ 226 J	K5.1 ■ 653 J	K5.2 ■ 489 J	K5.3 ■ 381 J	S1.2 ■ 236 J	S2.1 ■ 184 J	S3.1 ■ 138 J	S4.1 ■ 108 J				

DCON MS tolerance h6; CHW ± 0.02X45° mm.

Product	DC	CHW	DCON MS	APMX	OAL	NOF	EDP number
	[mm]	[mm]	[mm]	[mm]	[mm]		
S765HB6.0	6.00	.10	6.00	16.00	50.0	4	8030362
S765HB8.0	8.00	.20	8.00	20.00	64.0	4	8030363
S765HB10.0	10.00	.20	10.00	22.00	70.0	4	8030364
S765HB12.0	12.00	.20	12.00	26.00	75.0	4	8030365
S765HB14.0	14.00	.30	14.00	32.00	90.0	4	8030366
S765HB16.0	16.00	.30	16.00	32.00	90.0	4	8030367
S765HB18.0	18.00	.30	18.00	38.00	100.0	4	8030368
S765HB20.0	20.00	.40	20.00	38.00	100.0	4	8030369

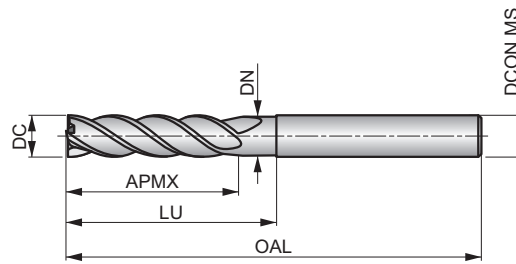
S768

DORMER



4-Flute Solid Carbide End Mill, Long Series

Long cut length 4-flute design with unequal helix and differential pitch to reduce vibrations and improve surface finish when milling deep walls in profile milling. Neck recess to avoid work contact with the wall and extend reach. TiSiN coating increases tool life and improves performance.



HM	N	NOF 4#
	λ ≠	γ 10°
DIN 6535HA	TiSiN	DC h9
	DORMER	



Workpiece material group suitability and starting values for cutting speed (ft/min). Letter code feed table can be found on page 22.

P1.1 ■ 486 I	P1.2 ■ 541 I	P1.3 ■ 558 I	P2.1 ■ 413 I	P2.2 ■ 364 I	P2.3 ■ 322 G	P3.1 ■ 335 I	P3.2 ■ 269 G	P3.3 ■ 226 G	P4.1 ■ 197 G	P4.2 ■ 171 G	M1.1 ■ 279 I	M1.2 ■ 236 I	M2.1 ■ 249 I
M2.2 ■ 203 I	M3.1 ■ 230 I	M3.2 ■ 197 I	K1.1 ■ 479 I	K1.2 ■ 354 I	K1.3 ■ 266 I	K2.1 ■ 492 I	K2.2 ■ 400 I	K2.3 ■ 318 G	K3.1 ■ 433 I	K3.2 ■ 335 I	K3.3 ■ 269 G	K4.1 ■ 404 G	K4.2 ■ 302 G
K4.3 ■ 223 G	K4.4 ■ 190 I	K4.5 ■ 157 I	K5.1 ■ 456 G	K5.2 ■ 341 G	K5.3 ■ 266 G	S1.2 ■ 164 I	S2.1 ■ 128 G	S3.1 ■ 95 G	S4.1 ■ 75 G				

DCON MS tolerance h6; RE ±0.01 mm.

Product	DC	RE	DCON MS	APMX	OAL	NOF	LU	DN	EDP number
	[mm]	[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	
S7684.0	4.00	.10	6.00	19.00	75.0	4	32.00	3.70	8030343
S7685.0	5.00	.10	6.00	19.00	75.0	4	32.00	4.60	8030344
S7686.0	6.00	.10	6.00	25.00	75.0	4	32.00	5.50	8030345
S7688.0	8.00	.20	8.00	30.00	75.0	4	38.00	7.40	8030346
S76810.0	10.00	.20	10.00	40.00	100.0	4	50.00	9.20	8030347
S76812.0	12.00	.30	12.00	45.00	100.0	4	55.00	11.00	8030348
S76816.0	16.00	.30	16.00	65.00	125.0	4	75.00	15.00	8030349
S76820.0	20.00	.30	20.00	65.00	125.0	4	75.00	19.00	8030350

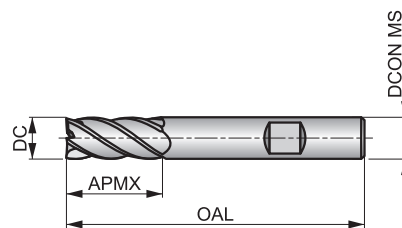
S770HB



5-Flute Solid Carbide End Mill

Short cut length 5-flute design with unequal helix to reduce vibration specially when using the cutter in dynamic milling strategies. AlCrN coating improves performance and extends the tool life. Suited for trochoidal and shoulder milling, ramping and helicoidal interpolation milling.

HM	N	NOF 5
	λ	γ 10°
DIN 6535HB	AlCrN	DC h9
	DORMER	



Workpiece material group suitability and starting values for cutting speed (ft/min). Letter code feed table can be found on page 22.

P1.1 ■ 692 l	P1.2 ■ 774 l	P1.3 ■ 797 l	P2.1 ■ 591 l	P2.2 ■ 518 l	P2.3 ■ 459 l	P3.1 ■ 479 l	P3.2 ■ 384 l	P3.3 ■ 325 l	P4.1 ■ 282 l	P4.2 ■ 243 l	M1.1 ■ 400 l	M1.2 ■ 338 l	M2.1 ■ 354 l
M2.2 ■ 292 l	M3.1 ■ 328 l	M3.2 ■ 282 l	K1.1 ■ 682 l	K1.2 ■ 505 l	K1.3 ■ 381 l	K2.1 ■ 702 l	K2.2 ■ 571 l	K2.3 ■ 456 l	K3.1 ■ 620 l	K3.2 ■ 476 l	K3.3 ■ 384 l	K4.1 ■ 577 l	K4.2 ■ 433 l
K4.3 ■ 318 l	K4.4 ■ 272 G	K4.5 ■ 226 G	K5.1 ■ 653 l	K5.2 ■ 489 l	K5.3 ■ 381 l	S1.2 ■ 236 l	S2.1 ■ 184 G	S3.1 ■ 138 G	S4.1 ■ 108 G				

DCON MS tolerance h6; RE ±0.01 mm.

Product	DC	RE	DCON MS	APMX	OAL	NOF	EDP number
	[mm]	[mm]	[mm]	[mm]	[mm]		
S770HB10.0	10.00	.20	10.00	22.00	72.0	5	8030386
S770HB12.0	12.00	.30	12.00	26.00	83.0	5	8030387
S770HB16.0	16.00	.30	16.00	32.00	92.0	5	8030388
S770HB20.0	20.00	.30	20.00	38.00	104.0	5	8030389

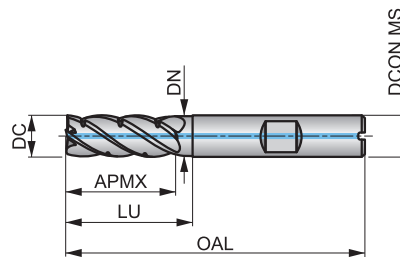
S771HB



5-Flute Solid Carbide End Mill, Chip Dividers and Trough Coolant

Short cut length 5-flute design with neck recess and unequal helix helps to reduce vibration specially when using the cutter in dynamic milling strategies. AlCrN coating improves performance and extends the tool life. Chip divider and trough coolant improve chip evacuation in pocketing operation.

HM	FS	NOF 5
	$\lambda \neq$	$\gamma 10^\circ$
DIN 6535HB	AlCrN	DC h9
	DORMER	



Workpiece material group suitability and starting values for cutting speed (ft/min). Letter code feed table can be found on page 22.

P1.1 ■ 728 J	P1.2 ■ 814 J	P1.3 ■ 837 J	P2.1 ■ 620 J	P2.2 ■ 545 J	P2.3 ■ 482 I	P3.1 ■ 502 J	P3.2 ■ 404 I	P3.3 ■ 341 I	P4.1 ■ 295 I	P4.2 ■ 256 I	M1.1 ■ 420 I	M1.2 ■ 354 I	M2.1 ■ 371 I
M2.2 ■ 305 I	M3.1 ■ 344 I	M3.2 ■ 295 I	K1.1 ■ 715 J	K1.2 ■ 531 J	K1.3 ■ 400 J	K2.1 ■ 738 J	K2.2 ■ 600 J	K2.3 ■ 479 I	K3.1 ■ 650 J	K3.2 ■ 499 I	K3.3 ■ 404 I	K4.1 ■ 607 I	K4.2 ■ 456 I
K4.3 ■ 335 I	K4.4 ■ 285 I	K4.5 ■ 236 I	K5.1 ■ 686 I	K5.2 ■ 512 I	K5.3 ■ 400 I	S1.2 ■ 249 I	S2.1 ■ 194 I	S3.1 ■ 144 G	S4.1 ■ 115 G				

DCON MS tolerance h6; RE ± 0.01 mm.

Product	DC	RE	DCON MS	APMX	OAL	NOF	LU	DN	EDP number
	[mm]	[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	
S771HB10.0	10.00	.20	10.00	25.00	72.0	5	30.00	9.70	8030394
S771HB12.0	12.00	.20	12.00	30.00	83.0	5	38.00	11.70	8030395
S771HB16.0	16.00	.30	16.00	39.00	92.0	5	44.00	15.70	8030396
S771HB20.0	20.00	.30	20.00	48.00	104.0	5	54.00	19.70	8030397

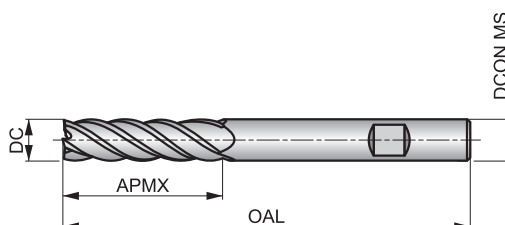
S772HB



5-Flute Solid Carbide End Mill, Long Series

Long cut length 5-flute design with unequal helix to reduce vibration specially when using the cutter in dynamic milling strategies. AlCrN coating improves performance and extends the tool life. Suited for trochoidal and shoulder milling, ramping and helicoidal interpolation milling.

HM	N	NOF 5
	λ	γ 10°
DIN 6535HB	AlCrN	DC h9



Workpiece material group suitability and starting values for cutting speed (ft/min). Letter code feed table can be found on page 22.

P1.1 ■ 486 G	P1.2 ■ 541 G	P1.3 ■ 558 G	P2.1 ■ 413 G	P2.2 ■ 364 G	P2.3 ■ 322 F	P3.1 ■ 335 G	P3.2 ■ 269 F	P3.3 ■ 226 F	P4.1 ■ 197 F	P4.2 ■ 171 F	M1.1 ■ 279 G	M1.2 ■ 236 G	M2.1 ■ 249 G
M2.2 ■ 203 G	M3.1 ■ 230 G	M3.2 ■ 197 G	K1.1 ■ 479 G	K1.2 ■ 354 G	K1.3 ■ 266 G	K2.1 ■ 492 G	K2.2 ■ 400 G	K2.3 ■ 318 F	K3.1 ■ 433 G	K3.2 ■ 335 G	K3.3 ■ 269 F	K4.1 ■ 404 F	K4.2 ■ 302 F
K4.3 ■ 223 F	K4.4 ■ 190 G	K4.5 ■ 157 G	K5.1 ■ 456 F	K5.2 ■ 341 F	K5.3 ■ 266 F	S1.2 ■ 164 F	S2.1 ■ 128 F	S3.1 ■ 95 F	S4.1 ■ 75 F				

DCON MS tolerance h6; RE ±0.01 mm.

Product	DC	RE	DCON MS	APMX	OAL	NOF	EDP number
	[mm]	[mm]	[mm]	[mm]	[mm]		
S772HB10.0	10.00	.20	10.00	38.00	100.0	5	8030390
S772HB12.0	12.00	.30	12.00	45.00	100.0	5	8030391
S772HB16.0	16.00	.30	16.00	55.00	125.0	5	8030392
S772HB20.0	20.00	.30	20.00	65.00	125.0	5	8030393

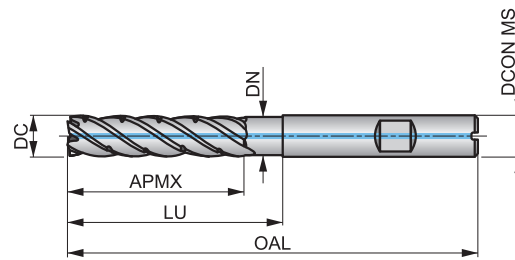
S773HB

DORMER



5-Flute Solid Carbide End Mill, Chip Dividers and Trough Coolant, Long Series

Long cut length 5-flute design with neck recess and unequal helix helps to reduce vibration specially when using the cutter in dynamic milling strategies. AlCrN coating improves performance and extends the tool life. Chip divider and trough coolant improve chip evacuation in pocketing operation.



HM	FS	NOF 5
	$\lambda \neq$	$\gamma 10^\circ$
DIN 6535HB	AlCrN	DC h9



Workpiece material group suitability and starting values for cutting speed (ft/min). Letter code feed table can be found on page 22.

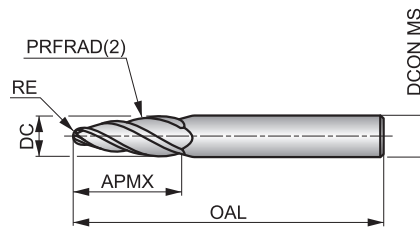
P1.1	P1.2	P1.3	P2.1	P2.2	P2.3	P3.1	P3.2	P3.3	P4.1	P4.2	M1.1	M1.2	M2.1
■ 509 G	■ 568 G	■ 587 G	■ 433 G	■ 384 G	■ 338 F	■ 351 G	■ 282 F	■ 236 F	■ 207 F	■ 180 F	■ 292 F	■ 249 F	■ 262 F
M2.2	M3.1	M3.2	K1.1	K1.2	K1.3	K2.1	K2.2	K2.3	K3.1	K3.2	K3.3	K4.1	K4.2
■ 213 F	■ 243 F	■ 207 F	■ 502 G	■ 371 G	■ 279 G	■ 518 G	■ 420 G	■ 335 F	■ 456 G	■ 351 G	■ 282 F	■ 423 F	■ 318 F
K4.3	K4.4	K4.5	K5.1	K5.2	K5.3	S1.2	S2.1	S3.1	S4.1				
■ 233 F	■ 200 F	■ 164 F	■ 479 F	■ 358 F	■ 279 F	■ 174 F	■ 135 F	■ 98 F	■ 79 F				

DCON MS tolerance h6; RE ± 0.01 mm.

Product	DC	RE	DCON MS	APMX	OAL	NOF	LU	DN	EDP number
	[mm]	[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	
S773HB10.0	10.00	0.20	10.00	42.00	100.0	5	52.00	9.70	8030398
S773HB12.0	12.00	0.20	12.00	42.00	100.0	5	54.00	11.70	8030399
S773HB16.0	16.00	0.30	16.00	60.00	125.0	5	68.00	15.70	8030400
S773HB20.0	20.00	0.30	20.00	67.00	125.0	5	75.00	19.70	8030401

S791**DORMER****3-4 Flute Solid Carbide Barrel-Shape End Mill**

Medium cut length 3 or 4 flute design with large tangential radius and ball nosed to increase contact with workpiece to reduce cycle time and improve surface finish of steep walls. AlCrN coating improves performance and extends the tool life. For semi-finishing and finishing operation.



HM	N	NOF 3-4
	λ 30°	γ 8°
 DIN 6535HA	AlCrN	



Workpiece material group suitability and starting values for cutting speed (ft/min). Letter code feed table can be found on page 22.

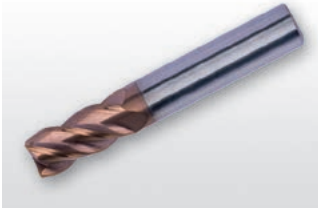
P1.1 ■ 528 F	P1.2 ■ 594 F	P1.3 ■ 610 F	P2.1 ■ 453 F	P2.2 ■ 397 F	P2.3 ■ 354 E	P3.1 ■ 367 F	P3.2 ■ 295 E	P3.3 ■ 249 E	P4.1 ■ 217 E	P4.2 ■ 187 E	P4.3 ▧ 151 E	M1.1 ■ 308 F	M1.2 ■ 259 F
M2.1 ■ 272 F	M2.2 ■ 226 E	M3.1 ▧ 253 E	M3.2 ▧ 217 E	M3.3 ▧ 194 E	M4.1 ▧ 190 E	K1.1 ■ 528 F	K1.2 ■ 390 F	K1.3 ■ 292 F	K2.1 ■ 541 F	K2.2 ■ 440 F	K2.3 ■ 351 E	K3.1 ■ 479 F	K3.2 ■ 367 F
K3.3 ■ 295 E	K4.1 ■ 446 E	K4.2 ■ 335 E	K4.3 ■ 246 E	K4.4 ■ 210 E	K4.5 ■ 177 E	K5.1 ■ 505 E	K5.2 ■ 377 E	K5.3 ■ 292 E	N1.1 ▧ 1165 I	N1.2 ▧ 876 I	N1.3 ▧ 587 I	N2.1 ▧ 587 F	N2.2 ▧ 525 F
N2.3 ▧ 377 F	N3.1 ■ 614 F	N3.2 ■ 358 F	N3.3 ▧ 184 F	N4.1 ▧ 614 F	N4.2 ▧ 236 F	S1.1 ▧ 190 E	S1.2 ▧ 184 E	S2.1 ▧ 141 E	S3.1 ▧ 108 E	S4.1 ▧ 85 E			

DCON MS tolerance h6; RE ±0.01 mm; PRFRAD(2) ±0.01 mm.

Product	DC	RE	PRFRAD(2)	DCON MS	APMX	OAL	NOF	EDP number
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		
S7916.0	6.00	1.00	95.0	6.00	22.00	67.0	3	8030338
S7918.0	8.00	1.00	90.0	8.00	25.00	75.0	3	8030339
S79110.0	10.00	2.00	85.0	10.00	26.00	75.0	4	8030340
S79112.0	12.00	2.00	80.0	12.00	28.00	83.0	4	8030341
S79116.0	16.00	3.00	75.0	16.00	31.00	90.0	4	8030342

S561

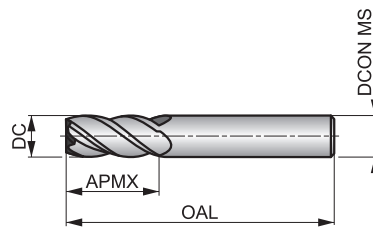
DORMER



4-Flute Solid Carbide End Mill

Medium cut length 4-flute design with 40° helix and gash-land to enable for hard milling materials up to 70HRC. TiSiN coating improves performance and the differential pitch reduces vibration, maximizing productivity and tool life. Square end design to produce sharp corners.

HM	N	NOF 4#
	λ 40°	γ -6°
DIN 6535HA	TiSiN	DC h9
	DORMER	



Workpiece material group suitability and starting values for cutting speed (ft/min). Letter code feed table can be found on page 22.

H1.1 ■ 390 I	H2.1 ■ 230 G	H2.2 ■ 197 E	H3.1 ■ 256 G	H3.2 ■ 210 G	H4.1 ■ 164 E	H4.2 ■ 138 B
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DCON MS tolerance h6.

Product	DC	DCON MS	APMX	OAL	NOF	EDP number
	[mm]	[mm]	[mm]	[mm]		
S5611.0	1.00	6.00	3.00	50.0	4	8030370
S5611.5	1.50	6.00	4.50	50.0	4	8030371
S5612.0	2.00	6.00	6.50	50.0	4	8030372
S5612.5	2.50	6.00	6.50	50.0	4	8030373
S5613.0	3.00	6.00	9.00	50.0	4	8030374
S5614.0	4.00	6.00	12.00	50.0	4	8030375
S5615.0	5.00	6.00	15.00	50.0	4	8030376
S5616.0	6.00	6.00	20.00	60.0	4	8030377
S5618.0	8.00	8.00	20.00	64.0	4	8030378
S56110.0	10.00	10.00	22.00	70.0	4	8030379
S56112.0	12.00	12.00	25.00	75.0	4	8030380
S56114.0	14.00	14.00	32.00	90.0	4	8030381
S56116.0	16.00	16.00	32.00	90.0	4	8030382
S56118.0	18.00	18.00	38.00	100.0	4	8030383
S56120.0	20.00	20.00	38.00	100.0	4	8030384

S610

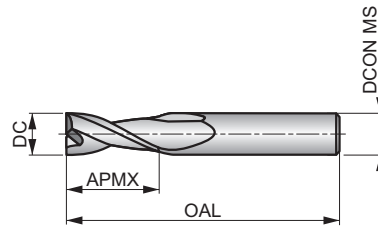
DORMER



2-Flute Solid Carbide End Mill

Short cut length 2-flute design provides high rigidity for milling standard slots and profiling. S610 with high hook geometry is designed for high performance machining in non-ferrous materials. Polished surface prevents work piece material from sticking to the cutting edge.

HM	W	NOF 2
	λ 30°	γ 20°
 DIN 6535HA	Hi	DC h9
	DORMER	



Workpiece material group suitability and starting values for cutting speed (ft/min). Letter code feed table can be found on page 22.

N1.1	N1.2	N1.3	N2.1	N2.2	N2.3	N3.1	N3.2	N3.3	N4.1	N4.2
■ 2326 P	■ 1749 P	■ 1171 P	■ 1171 O	■ 1050 O	■ 751 O	■ 1224 O	■ 719 O	■ 367 O	■ 1224 R	■ 472 R

DCON MS tolerance h6; RE ±0.02 mm.

Product	DC	RE	DCON MS	APMX	OAL	NOF	EDP number
	[mm]	[mm]	[mm]	[mm]	[mm]		
S6102.0	2.00	.10	4.00	6.50	40.0	2	8030270
S6103.0XD3	3.00	.10	3.00	9.00	40.0	2	46706592
S6103.0XD6	3.00	.10	6.00	9.00	50.0	2	46706593
S6104.0XD4	4.00	.10	4.00	12.00	50.0	2	46706594
S6104.0XD6	4.00	.10	6.00	12.00	50.0	2	46706595
S6105.0	5.00	.10	6.00	15.00	50.0	2	46706596
S6106.0	6.00	.10	6.00	20.00	50.0	2	46706597
S6108.0	8.00	.10	8.00	20.00	64.0	2	46706598
S61010.0	10.00	.10	10.00	22.00	75.0	2	46706599
S61012.0	12.00	.10	12.00	25.00	75.0	2	46706600
S61014.0	14.00	.10	14.00	32.00	90.0	2	46706601
S61016.0	16.00	.10	16.00	32.00	90.0	2	46706602
S61020.0	20.00	.10	20.00	38.00	100.0	2	46706604

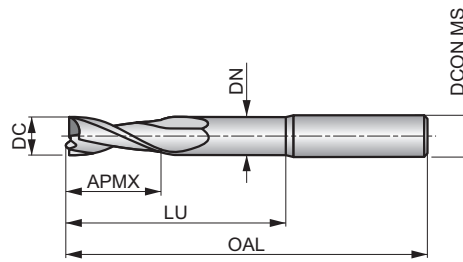
S611

DORMER

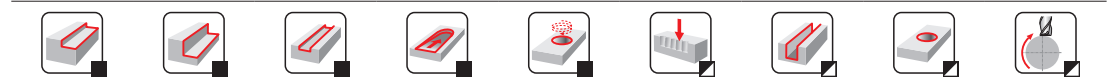


2-Flute Solid Carbide End Mill, Extra Long Reach

Short cut length 2-flute design with neck recess provides high rigidity for milling and profiling in hard to reach areas. S611 with high hook geometry is designed for high performance machining in non-ferrous materials. Polished surface prevents work piece material from sticking to the cutting edge.



HM	W	NOF 2
	λ 30°	γ 20°
DIN 6535HA	HI	DC h9
	DORMER	



Workpiece material group suitability and starting values for cutting speed (ft/min). Letter code feed table can be found on page 22.

N1.1	N1.2	N1.3	N2.1	N2.2	N2.3	N3.1	N3.2	N3.3	N4.1	N4.2
■ 2093 P	■ 1575 P	■ 1053 P	■ 1053 O	■ 945 O	■ 676 O	■ 1102 O	■ 646 O	■ 331 O	■ 1102 R	■ 427 R

DCON MS tolerance h6; RE ± 0.02 mm.

Product	DC	RE	DCON MS	APMX	OAL	NOF	LU	DN	EDP number
	[mm]	[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	
S6113.0XD3	3.00	.10	3.00	9.00	40.0	2	15.00	2.80	8030271
S6113.0XD6	3.00	.10	6.00	9.00	50.0	2	15.00	2.80	8030272
S6114.0XD4	4.00	.10	4.00	12.00	50.0	2	20.00	3.70	8030273
S6114.0XD6	4.00	.10	6.00	12.00	50.0	2	20.00	3.70	8030274
S6115.0	5.00	.10	6.00	15.00	50.0	2	20.00	4.60	8030275
S6116.0	6.00	.10	6.00	16.00	80.0	2	40.00	5.50	46706584
S6118.0	8.00	.10	8.00	20.00	80.0	2	40.00	7.40	46706585
S61110.0	10.00	.10	10.00	22.00	100.0	2	60.00	9.20	46706586
S61112.0	12.00	.10	12.00	25.00	100.0	2	60.00	11.00	46706587
S61114.0	14.00	.10	14.00	32.00	125.0	2	75.00	13.00	46706588
S61116.0	16.00	.10	16.00	32.00	125.0	2	75.00	15.00	46706589
S61120.0	20.00	.10	20.00	38.00	125.0	2	75.00	19.00	46706591

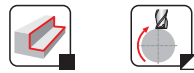
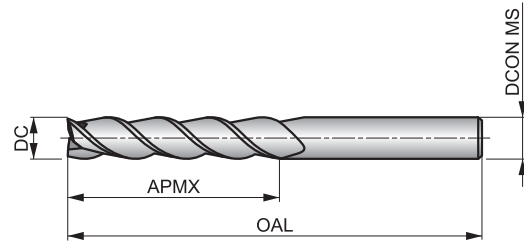
S614



3-Flute Solid Carbide End Mill, Extra Long Series

Extra long cut length 3-flute design for light profiling applications hard to reach areas. S614 with high hook geometry is designed for high performance machining in non-ferrous materials.

HM	W	NOF 3
	λ 40°	γ 13°
DIN 6535HA		DC h9
	DORMER	



Workpiece material group suitability and starting values for cutting speed (ft/min). Letter code feed table can be found on page 22.

N1.1	N1.2	N1.3	N2.1	N2.2	N2.3	N3.1	N3.2	N3.3	N4.1	N4.2
■ 2093 G	■ 1575 G	■ 1053 G	■ 1053 F	■ 945 F	■ 676 F	■ 1102 F	■ 646 F	■ 331 F	■ 1102 I	■ 427 I

DCON MS tolerance h6.

Product	DC	DCON MS	APMX	OAL	NOF	EDP number
	[mm]	[mm]	[mm]	[mm]		
S6143.0XD3	3.00	3.00	19.00	60.0	3	8030295
S6143.0XD6	3.00	6.00	19.00	75.0	3	8030296
S6144.0XD4	4.00	4.00	19.00	60.0	3	8030297
S6144.0XD6	4.00	6.00	19.00	75.0	3	8030298
S6145.0	5.00	6.00	19.00	75.0	3	8030299
S6146.0	6.00	6.00	31.00	75.0	3	8030300
S6148.0	8.00	8.00	41.00	100.0	3	8030301
S61410.0	10.00	10.00	50.00	100.0	3	8030302
S61412.0	12.00	12.00	50.00	100.0	3	8030303
S61414.0	14.00	14.00	57.00	125.0	3	8030304
S61416.0	16.00	16.00	57.00	125.0	3	8030305

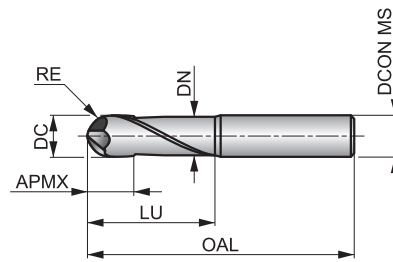
S629

DORMER



2-Flute Solid Carbide Ball-Nosed End Mill

Extra short cut length 2-flute design with neck recess reduces vibrations and provides high rigidity. Ball nosed geometry is designed for high performance contouring of complex surfaces in non-ferrous materials.



HM	W	NOF 2
	λ 30°	γ 15°
DIN 6535HA		DC h9
	DORMER	



Workpiece material group suitability and starting values for cutting speed (ft/min). Letter code feed table can be found on page 22.

N1.1	N1.2	N1.3	N2.1	N2.2	N2.3	N3.1	N3.2	N3.3	N4.1	N4.2
■ 2326 N	■ 1749 N	■ 1171 N	■ 1171 N	■ 1050 N	■ 751 N	■ 1224 N	■ 719 N	■ 367 N	■ 1224 O	■ 472 O

DCON MS tolerance h6; RE +0/-0.02 mm.

Product	DC	RE	DCON MS	APMX	OAL	NOF	LU	DN	EDP number
	[mm]	[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	
S6291.0 ¹⁾	1.00	.50	4.00	.80	50.0	2	10.00	.90	8030276
S6291.5 ¹⁾	1.50	.75	4.00	1.20	50.0	2	12.00	1.40	8030277
S6292.0 ¹⁾	2.00	1.00	4.00	1.60	60.0	2	18.00	1.90	8030278
S6293.0	3.00	1.50	6.00	5.00	57.0	2	20.00	2.80	46706530
S6294.0	4.00	2.00	6.00	6.00	57.0	2	20.00	3.70	46706531
S6295.0	5.00	2.50	6.00	7.00	57.0	2	20.00	4.60	46706532
S6296.0	6.00	3.00	6.00	8.00	57.0	2	20.00	5.50	46706533
S6298.0	8.00	4.00	8.00	10.00	64.0	2	25.00	7.40	46706534
S62910.0	10.00	5.00	10.00	12.00	75.0	2	35.00	9.20	46706535
S62912.0	12.00	6.00	12.00	14.00	75.0	2	35.00	11.00	46706536
S62916.0	16.00	8.00	16.00	18.00	90.0	2	45.00	15.00	46706537
S62920.0	20.00	10.00	20.00	22.00	100.0	2	50.00	19.00	46706538

¹⁾ rake angle 11°

S650

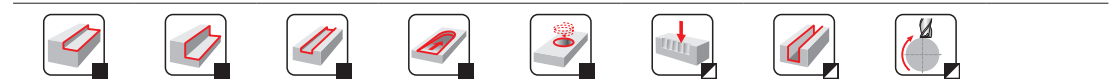
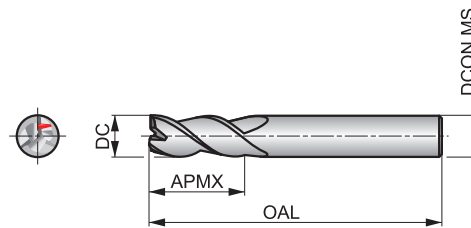
DORMER



3-Flute Solid Carbide End Mill

Short cut length 3-flute with differential pitch is designed to reduce vibrations, spindle load and improve surface finish when milling. The single chip divider, at one end teeth, helps to break swarfs into manageable pieces for a better evacuation in non-ferrous materials.

HM	W	NOF 3±
	λ 40°	γ 13°
 DIN 6535HA		DC h9
	DORMER	



Workpiece material group suitability and starting values for cutting speed (ft/min). Letter code feed table can be found on page 22.

N1.1	N1.2	N1.3	N2.1	N2.2	N2.3	N3.1	N3.2	N3.3	N4.1	N4.2
■ 2559 0	■ 1995 0	■ 1289 0	■ 1289 N	■ 1155 N	■ 827 N	■ 1345 N	■ 791 N	■ 404 N	■ 1345 P	■ 518 P

DCON MS tolerance h6.

Product	DC	DCON MS	APMX	OAL	NOF	EDP number
	[mm]	[mm]	[mm]	[mm]		
S6501.0	1.00	4.00	3.00	40.0	3	8030279
S6501.5	1.50	4.00	4.50	40.0	3	8030280
S6502.0	2.00	4.00	6.50	40.0	3	8030281
S6502.5	2.50	4.00	6.50	40.0	3	8030282
S6503.0XD3	3.00	3.00	9.00	40.0	3	8030283
S6503.0XD6	3.00	6.00	9.00	50.0	3	8030284
S6504.0XD4	4.00	4.00	12.00	50.0	3	8030285
S6504.0XD6	4.00	6.00	12.00	50.0	3	8030286
S6505.0	5.00	6.00	15.00	50.0	3	8030287
S6506.0	6.00	6.00	16.00	50.0	3	8030288
S6508.0	8.00	8.00	20.00	64.0	3	8030289
S65010.0	10.00	10.00	22.00	70.0	3	8030290
S65012.0	12.00	12.00	25.00	75.0	3	8030291
S65014.0	14.00	14.00	32.00	90.0	3	8030292
S65016.0	16.00	16.00	32.00	90.0	3	8030293
S65020.0¹⁾	20.00	20.00	38.00	100.0	3	8030294

¹⁾ No differential pitch

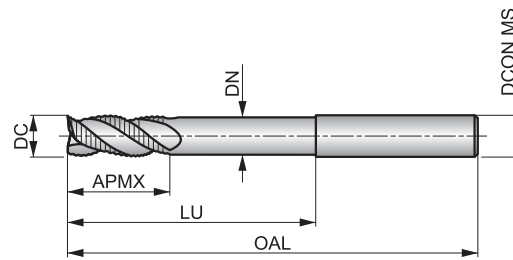
S654

DORMER



3-Flute Solid Carbide Roughing End Mill, Long Reach

Short cut length 3-flute roughing design with neck recess and differential pitch to reduce vibration and maximize productivity and tool life. S654 with NRA profile brakes the swarfs into small manageable pieces and it is designed for high performance roughing in non-ferrous materials.



HM	W NRA	NOF 3#
	λ 40°	γ 15°
DIN 6535HA		DC h9
	DORMER	



Workpiece material group suitability and starting values for cutting speed (ft/min). Letter code feed table can be found on page 22.

N1.1	N1.2	N1.3	N2.1	N2.2	N2.3	N3.1	N3.2	N3.3	N4.1	N4.2
■ 2326 O	■ 1749 O	■ 1171 O	■ 1171 N	■ 1050 N	■ 751 N	■ 1224 N	■ 719 N	■ 367 N	■ 1224 P	■ 472 P

DCON MS tolerance h6; RE ± 0.02 mm.

Product	DC	RE	DCON MS	APMX	OAL	NOF	LU	DN	EDP number
	[mm]	[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	
S6546.0	6.00	.10	6.00	13.00	75.0	3	40.00	5.50	8030306
S6548.0	8.00	.10	8.00	20.00	75.0	3	40.00	7.40	8030307
S65410.0	10.00	.10	10.00	22.00	100.0	3	60.00	9.20	8030308
S65412.0	12.00	.12	12.00	26.00	100.0	3	60.00	11.00	8030309
S65416.0	16.00	.16	16.00	32.00	125.0	3	75.00	15.00	8030310
S65420.0	20.00	.20	20.00	40.00	150.0	3	100.00	19.00	8030311

S662

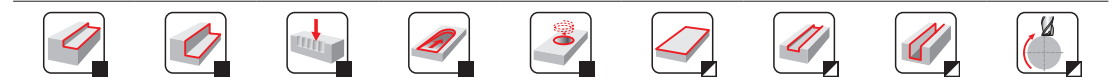
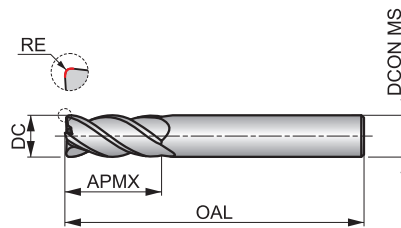
DORMER



4-Flute Solid Carbide Corner Radius End Mill

Short cut length 4-flute design with differential pitch and different corner radius available, for profile milling where a corner radius is required. S662 with high hook geometry is designed for high performance machining in non-ferrous materials.

HM	W	NOF 4±
	λ 40°	γ 10°
		DC h9



Workpiece material group suitability and starting values for cutting speed (ft/min). Letter code feed table can be found on page 22.

N1.1	N1.2	N1.3	N2.1	N2.2	N2.3	N3.1	N3.2	N3.3	N4.1	N4.2
■ 2326 0	■ 1749 0	■ 1171 0	■ 1171 N	■ 1050 N	■ 751 N	■ 1224 N	■ 719 N	■ 367 N	■ 1224 P	■ 472 P

DCON MS tolerance h6; RE ±0.01 mm.

Product	DC	RE	DCON MS	APMX	OAL	NOF	EDP number
	[mm]	[mm]	[mm]	[mm]	[mm]		
S6623.0XR0.3	3.00	.30	6.00	9.00	57.0	4	8030312
S6624.0XR0.3	4.00	.30	6.00	12.00	57.0	4	8030313
S6624.0XR0.5	4.00	.50	6.00	12.00	57.0	4	8030314
S6625.0XR0.3	5.00	.30	6.00	15.00	57.0	4	8030315
S6625.0XR0.5	5.00	.50	6.00	15.00	57.0	4	8030316
S6626.0XR0.5	6.00	.50	6.00	16.00	57.0	4	8030317
S6626.0XR1.0	6.00	1.00	6.00	16.00	57.0	4	8030318
S6626.0XR2.0	6.00	2.00	6.00	16.00	57.0	4	8030319
S6628.0XR0.5	8.00	.50	8.00	20.00	64.0	4	8030320
S6628.0XR1.0	8.00	1.00	8.00	20.00	64.0	4	8030321
S6628.0XR2.0	8.00	2.00	8.00	20.00	64.0	4	8030322
S66210.0XR0.5	10.00	.50	10.00	22.00	72.0	4	8030323
S66210.0XR1.0	10.00	1.00	10.00	22.00	72.0	4	8030324
S66210.0XR2.0	10.00	2.00	10.00	22.00	72.0	4	8030325
S66212.0XR1.0	12.00	1.00	12.00	26.00	83.0	4	8030326
S66212.0XR2.0	12.00	2.00	12.00	26.00	83.0	4	8030327
S66212.0XR2.5	12.00	2.50	12.00	26.00	83.0	4	8030328
S66212.0XR3.0	12.00	3.00	12.00	26.00	83.0	4	8030329
S66216.0XR1.0	16.00	1.00	16.00	32.00	92.0	4	8030330
S66216.0XR2.0	16.00	2.00	16.00	32.00	92.0	4	8030331
S66216.0XR3.0	16.00	3.00	16.00	32.00	92.0	4	8030332
S66216.0XR4.0	16.00	4.00	16.00	32.00	92.0	4	8030333
S66220.0XR2.0	20.00	2.00	20.00	38.00	104.0	4	8030334
S66220.0XR4.0	20.00	4.00	20.00	38.00	104.0	4	8030335





INTRODUCTION

We have expanded our offer for true 90° shoulder milling in various materials. This includes a range of TNGX16 inserts, with improved cost per edge, and an assortment of ISTN16 cutters. The larger inserts provide greater depths of cut (up to 10mm) and higher feed on the existing TNGX10 range.

SEE TOOL
IN ACTION



INSERTS FEATURES & BENEFITS

- Double-sided robust inserts with six-cutting edges offering **improved cost savings**.
- Reduced cutting forces, leading to smooth and quiet machining for **process security**.
- Low cutting resistance to improve the connection between passes for true 90° milling and creating an **excellent surface quality**.
- Positive geometry and through coolant for **improved chip evacuation**.
- Reduced **vibrations and lower power consumption**.
- Suitable for **various materials**, including steels, stainless steels, cast iron and non-ferrous, **and applications**: face, slot and shoulder milling.
- Radii from 0.4 to 1.6mm.
- Available alongside a wide range of grades.

INSERTS GEOMETRIES

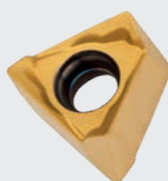


F

GEOMETRY F

First choice for low to medium carbon content steel.

- High positive geometry with narrow peripheral land.
- Particularly suited to light and medium machining.

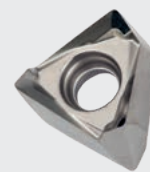


M

GEOMETRY M

Machining carbon steel, standard stainless steels and cast iron.

- High positive geometry with medium T-land.
- Particularly suited to light and medium machining.



FA

GEOMETRY FA

Particularly suited for non-ferrous metals.

- High positive geometry with a sharp cutting edge.
- Polished insert face to reduce sticking of the machined material.

ISTN16 CUTTERS FEATURES & BENEFITS

- Higher number of teeth for **greater productivity**, compared to original assortment.
- Differential pitch available for **smooth machining** of cutter (from 50mm diameter).
- **Through coolant** for all cutter diameters.
- Precision machined pocket design for **repeatability and security**.
- Coarse-tooth and fine-tooth cutter options available.
- Large and strong clamping screws for **easier handling and stability**.
- Manufactured from coated tool steel for better **resistance against corrosion** and helps to **reduce friction**.

CUTTERS RANGE

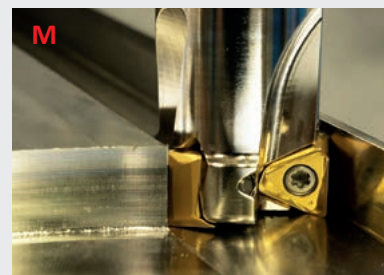


* 5.0 inch available on request only.

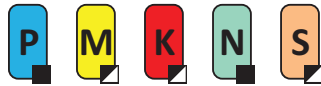
MACHINING EXAMPLE

Workpiece material: Rib (wall thickness 1mm)
Cuter: 125A3R165W125-ISTN16-C.
Coolant: Air

Insert geometry			M	FA
Material			DIN 1.2343 / X37CrMoV5-1	EN AW-2017A
Insert			TNGX 160608SR-M:M8330	TNGX 160608FR-FA:M0315
Cutting speed	SFM	ft/min	722	2132
Feed	f_z	in/tooth	.006	.004
Depth of cut	a_p	mm	3 x .197	3 x .197



ISTN16



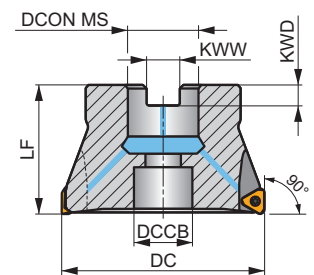
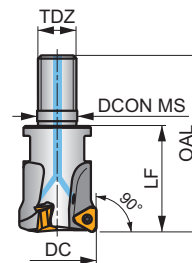
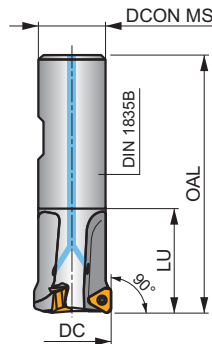
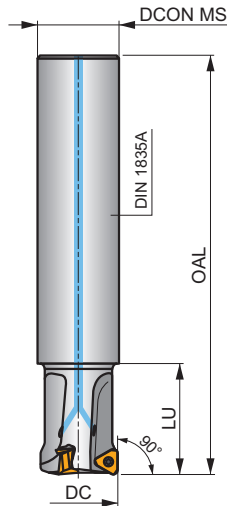
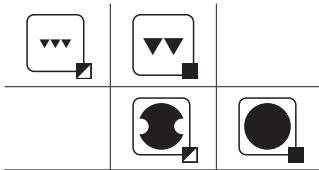
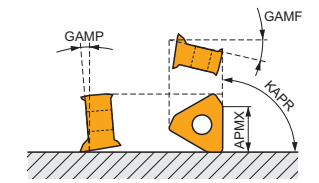
S

ECON TN Square Shoulder Mill for TNGX 16 Insert with Internal Coolant

90° end or shell mill for double sided TNGX 16 inserts with 6 cutting edges and APMX of 10 mm. Suited for wide range of applications. Available in cylindrical, weldon, modular and arbor style, in Ø1.00 up to Ø5.00 inch. Differential tooth setting. Body treated for longer tool life.



KAPR	90°
------	-----



	.001 - .006
	.001 - .005



Product	DC	OAL	DCON MS	DCCB	DBC1	LU	LF	TDZ	KWW	KWD	GAMF	GAMP								EDP
	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]		[inch]	[inch]	[°]	[°]								
 100A2R130C100-ISTN16-C	1.000	6.693	1.000	–	–	1.339	–	–	–	–	-18.5	-9.5	2	–	–	✓	.54	GI340 IC0334	8052333	
125A2R130C125-ISTN16-C	1.250	7.677	1.250	–	–	1.339	–	–	–	–	-16	-9.5	2	–	–	✓	1.03	GI340 IC0334	8021685	
 125A3R130C125-ISTN16-C	1.250	7.677	1.250	–	–	1.339	–	–	–	–	-16	-9.5	3	–	–	✓	1.02	GI340 IC0334	8021687	
125A2R315C125-ISTN16-C	1.250	7.677	1.250	–	–	3.150	–	–	–	–	-16	-9.5	2	–	–	✓	.94	GI340 IC0334	8021686	
 100A2R165W100-ISTN16-C	1.000	3.937	1.000	–	–	1.654	–	–	–	–	-18.5	-9.5	2	–	–	✓	.30	GI340 IC0334	8052334	
125A3R165W125-ISTN16-C	1.250	4.331	1.250	–	–	1.654	–	–	–	–	-16	-9.5	3	–	–	✓	.51	GI340 IC0334	8021689	
150A4R200W125-ISTN16-C	1.500	4.724	1.250	–	–	1.969	–	–	–	–	-16	-9.5	4	–	–	✓	.62	GI340 IC0334	8021720	
100A2R130M12-ISTN16-C	1.000	2.165	.492	–	–	–	1.299	M12	–	–	-16	-9.5	2	–	–	✓	.08	GI340 IC0334	8052338	
125A2R169M16-ISTN16-C	1.250	2.598	.669	–	–	–	1.693	M16	–	–	-16	-9.5	2	–	–	✓	.17	GI340 IC0334	8021721	
 125A3R169M16-ISTN16-C	1.250	2.598	.669	–	–	–	1.693	M16	–	–	-16	-9.5	3	–	–	✓	.17	GI340 IC0334	8021722	
150A3R169M16-ISTN16-C	1.500	2.598	.669	–	–	–	1.693	M16	–	–	-16	-9.5	3	–	–	✓	.19	GI340 IC0334	8021723	
150A4R169M16-ISTN16-C	1.500	2.598	.669	–	–	–	1.693	M16	–	–	-16	-9.5	4	–	–	✓	.19	GI340 IC0334	8021724	
150A04R-IS90TN16-C	1.500	–	.500	.409	–	–	1.575	–	.260	.165	-16	-9.5	4	–	–	✓	.19	GI340 IC0336	8021162	
200A04R-IS90TN16-C	2.000	–	.750	.630	–	–	1.575	–	.323	.193	-16	-9.5	4	✓	–	✓	.37	GI340 IC0338	8021163	
200A05R-IS90TN16-C	2.000	–	.750	.630	–	–	1.575	–	.323	.193	-16	-9.5	5	✓	–	✓	.36	GI340 IC0338	8021164	
250A04R-IS90TN16-C	2.500	–	.750	.630	–	–	1.575	–	.323	.193	-16	-9.5	4	✓	–	✓	.49	GI340 IC0338	8021165	
250A06R-IS90TN16-C	2.500	–	.750	.630	–	–	1.575	–	.323	.193	-16	-9.5	6	✓	–	✓	.62	GI340 IC0338	8021166	
300A05R-IS90TN16-C	3.000	–	1.000	.827	–	–	1.969	–	.382	.224	-16	-9.5	5	✓	–	✓	1.00	GI340 IC0340	8021167	
300A07R-IS90TN16-C	3.000	–	1.000	.827	–	–	1.969	–	.382	.224	-16	-9.5	7	✓	–	✓	1.03	GI340 IC0340	8021168	
400A06R-IS90TN16-C	4.000	–	1.500	1.417	–	–	1.969	–	.634	.382	-16	-9.5	6	✓	–	✓	1.93	GI340 IC0342	8021169	
400A08R-IS90TN16-C	4.000	–	1.500	1.417	–	–	1.969	–	.634	.382	-16	-9.5	8	✓	–	✓	1.99	GI340 IC0342	8021180	
500A09R-IS90TN16-C *	5.000	–	1.500	1.417	–	–	2.480	–	.634	.382	-16	-9.5	9	✓	–	✓	3.51	GI340 IC0390	8021181	

* available on request only



GI340

TNGX1606..

IC0334	US 44010-T15P	3,5	M 4	.394	-	-	Flag T15P	-
IC0336	US 44010-T15P	3,5	M 4	.394	D-T08P/T15P	FG-15	-	HCS025150C
IC0338	US 44010-T15P	3,5	M 4	.394	D-T08P/T15P	FG-15	-	HS037100C
IC0340	US 44010-T15P	3,5	M 4	.394	D-T08P/T15P	FG-15	-	HS050125
IC0342	US 44010-T15P	3,5	M 4	.394	D-T08P/T15P	FG-15	-	HSC075175
IC0390	US 44010-T15P	3,5	M 4	.394	D-T08P/T15P	FG-15		

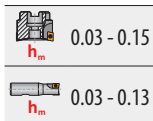
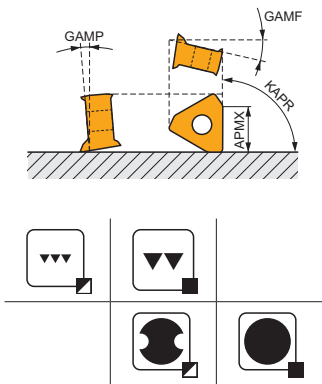
STN16



S

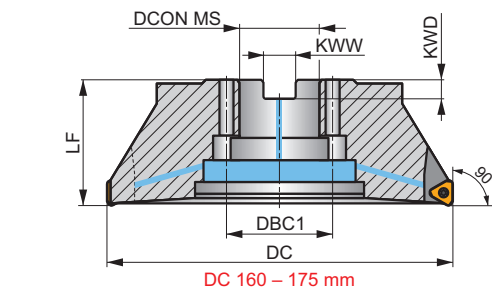
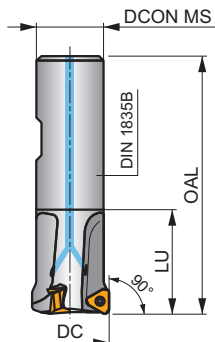
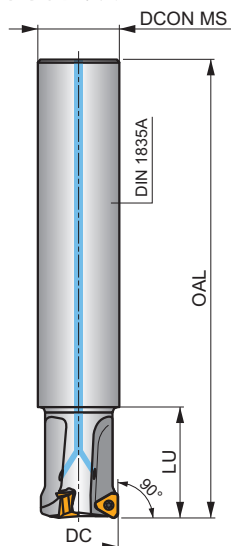


KAPR	90°
APMX	10.0 mm

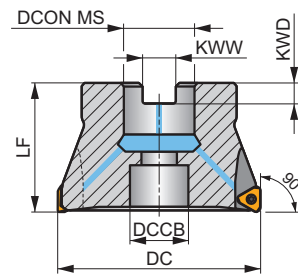
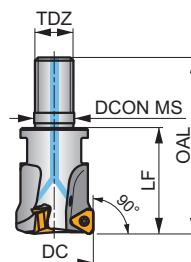


ECON TN Square Shoulder End Mill for TNGX 16 Insert with Coolant Through

90° end-, or shell mill for double sided TNGX 16 inserts with 6 cutting edges APMX of 10mm. Suited for wide range of applications. Available in cylindrical, weldon, modular and arbor mounting, in Ø25 up to 175mm. Available with differential tooth setting. Body treated for longer tool life.



DC 160 – 175 mm



DC 40 – 140 mm

Product	DC	OAL	DCON MS	DCCB	DBC	LU	LF	TDZ	KWW	KWD	GAMF	GAMP								
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	[°]	[°]								
 DIN 18354	25A2R034A25-STN16-C	25	170	25	–	–	34	–	–	–	–	-18.5	-9.5	2	–	20000	✓	0.54	GI340	C0382
	32A2R034A32-STN16-C	32	195	32	–	–	34	–	–	–	–	-16	-9.5	2	–	17500	✓	1.05	GI340	C0382
	25A2R080A25-STN16-C	25	170	25	–	–	80	–	–	–	–	-18.5	-9.5	2	–	20000	✓	0.48	GI340	C0382
	32A2R080A32-STN16-C	32	195	32	–	–	80	–	–	–	–	-16	-9.5	2	–	17500	✓	0.96	GI340	C0382
	32A3R034A32-STN16-C	32	195	32	–	–	34	–	–	–	–	-16	-9.5	3	–	17500	✓	1.04	GI340	C0382
 DIN 18358	35A3R034A32-STN16-C	32	195	32	–	–	34	–	–	–	–	-16	-9.5	3	–	17000	✓	1.07	GI340	C0382
	25A2R042B25-STN16-C	25	55	25	–	–	42	–	–	–	–	-18.5	-9.5	2	–	20000	✓	0.30	GI340	C0382
	32A3R042B32-STN16-C	32	110	32	–	–	42	–	–	–	–	-16	-9.5	3	–	17500	✓	0.52	GI340	C0382
 MODULAR	40A4R050B32-STN16-C	40	120	32	–	–	50	–	–	–	–	-16	-9.5	4	–	16000	✓	0.67	GI340	C0382
	25A2R033M12-STN16-C	25	55	12.5	–	–	33	–	M12	–	–	-18.5	-9.5	2	–	20000	✓	0.08	GI340	C0382
	32A2R043M16-STN16-C	32	66	17	–	–	43	–	M16	–	–	-16	-9.5	2	–	17500	✓	0.18	GI340	C0382
	32A3R043M16-STN16-C	32	66	17	–	–	43	–	M16	–	–	-16	-9.5	3	–	17500	✓	0.17	GI340	C0382
	40A3R043M16-STN16-C	40	66	17	–	–	43	–	M16	–	–	-16	-9.5	3	–	16000	✓	0.20	GI340	C0382
	40A4R043M16-STN16-C	40	66	17	–	–	43	–	M16	–	–	-16	-9.5	4	–	16000	✓	0.21	GI340	C0382
	40A03R-S90TN16-C	40	40	16	12.4	–	–	–	–	8.4	5.6	-16	-9.5	3	–	16000	✓	0.20	GI340	C0384
	40A04R-S90TN16-C	40	40	16	12.4	–	–	–	–	8.4	5.6	-16	-9.5	4	–	16000	✓	0.20	GI340	C0384
	50A04R-S90TN16-C	50	40	22	18.1	–	–	–	–	10.4	6.3	-16	-9.5	4	✓	14000	✓	0.34	GI340	C0386
	50A05R-S90TN16-C	50	40	22	18.1	–	–	–	–	10.4	6.3	-16	-9.5	5	✓	14000	✓	0.32	GI340	C0386
 ISO 6462 DIN 8030	63A04R-S90TN16-C	63	40	22	18.1	–	–	–	–	10.4	6.3	-16	-9.5	4	✓	18200	✓	0.47	GI340	C0386
	63A06R-S90TN16-C	63	40	22	18.1	–	–	–	–	10.4	6.3	-16	-9.5	6	✓	18200	✓	0.48	GI340	C0386
	80A05R-S90TN16-C	80	50	27	22.1	–	–	–	–	12.4	7	-16	-9.5	5	✓	11000	✓	1.02	GI340	C0388
	80A07R-S90TN16-C	80	50	27	22.1	–	–	–	–	12.4	7	-16	-9.5	7	✓	11000	✓	1.05	GI340	C0388
	100A06R-S90TN16-C	100	50	32	45.1	–	–	–	–	14.4	8	-16	-9.5	6	✓	10000	✓	1.79	GI340	C0390
	100A08R-S90TN16-C	100	50	32	45.1	–	–	–	–	14.4	8	-16	-9.5	8	✓	10000	✓	1.66	GI340	C0390
	115A06R-S90TN16-C	115	50	32	45.1	–	–	–	–	14.4	8	-16	-9.5	6	✓	9500	✓	2.04	GI340	C0390
	125A07R-S90TN16-C	125	63	40	56.1	–	–	–	–	16.4	9	-16	-9.5	7	✓	9000	✓	1.185	GI340	C0390
125A09R-S90TN16-C	125	63	40	56.1	–	–	–	–	16.4	9	-16	-9.5	9	✓	9000	✓	3.14	GI340	C0390	

Product	DC	OAL	DCON MS	DCCB	DBC	LU	LF	TDZ	KWW	KWD	GAMF	GAMP					
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	[°]	[°]					
140A08R-S90TN16-C	140	63	40	56.1	–	–	–	–	16.4	9	-16	-9.5	8	✓	8500	✓	3.69 GI340 C0390
160C10R-S90TN16-C	160	63	40	–	66.7	–	–	–	16.4	9.2	-16	-9.5	10	✓	8000	✓	5.16 GI340 C0394
175C10R-S90TN16-C	175	63	40	–	66.7	–	–	–	16.4	9.2	-16	-9.5	10	✓	7500	✓	5.99 GI340 C0394

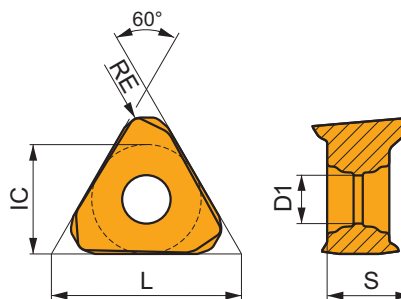
GI340	TNGX1606..

C0382	US 44010-T15P	3.5	M 4	10	–	–	Flag T15P	–	–	–	–	–	–
C0384	US 44010-T15P	3.5	M 4	10	D-T08P/T15P	FG-15	–	HS 90835	–	–	–	–	–
C0386	US 44010-T15P	3.5	M 4	10	D-T08P/T15P	FG-15	–	HS 1030C	–	–	–	–	–
C0388	US 44010-T15P	3.5	M 4	10	D-T08P/T15P	FG-15	–	HS 1230C	–	–	–	–	–
C0390	US 44010-T15P	3.5	M 4	10	D-T08P/T15P	FG-15	–	–	–	–	–	–	–
C0394	US 44010-T15P	3.5	M 4	10	D-T08P/T15P	FG-15	–	HS 1240C	HSD 0825C	CAC 160C	–	–	–

TNGX 16

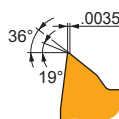
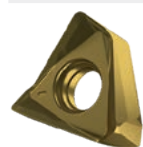
PRAMET

	IC	D1	L	S
	[mm]	[mm]	[mm]	[mm]
1606	.375	.173	.650	.259



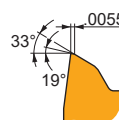
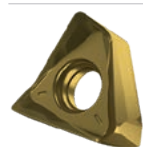
Suitability and starting values for cutting speed (vc), feed (f) and depth of cut (ap). Refer to our Machining Calculator app for further calculations.

Product		RE	P			M			K			N			S			H			EDP number
			SFM	IPT	ap	SFM	IPT	ap	SFM	IPT	ap	SFM	IPT	ap	SFM	IPT	ap	SFM	IPT	ap	
		[inch]	[ft/min]	[inch/tooth]	[inch]	[ft/min]	[inch/tooth]	[inch]	[ft/min]	[inch/tooth]	[inch]	[ft/min]	[inch/tooth]	[inch]	[ft/min]	[inch/tooth]	[inch]	[ft/min]	[inch/tooth]	[inch]	



F geometry with highly positive design for light machining.

TNGX 160604SR-F	M8330	.016	673	.004	.118	394	0.09	.118	623	.004	.118	–	–	–	–	–	–	–	–	–	8020443
	M8340	.016	623	.004	.118	361	0.09	.118	591	.004	.118	–	–	–	–	–	–	–	–	–	8020444
TNGX 160608SR-F	8215	.031	820	.004	.118	492	0.09	.118	771	.004	.118	–	–	–	–	–	–	–	–	–	8020446
	M6330	.031	705	.004	.118	492	0.09	.118	–	–	–	–	–	–	–	–	–	–	–	–	8020449
	M8310	.031	919	.004	.118	459	0.09	.118	869	.004	.118	–	–	–	–	–	–	–	–	–	8020445
	M8330	.031	804	.004	.118	476	0.09	.118	755	.004	.118	–	–	–	–	–	–	–	–	–	8020447
	M8340	.031	738	.004	.118	443	0.09	.118	689	.004	.118	–	–	–	–	–	–	–	–	–	8020448

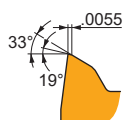
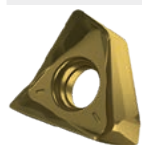


M geometry with positive design for light to medium machining.

TNGX 160604SR-M	8215	.016	623	.006	.118	361	.006	.118	591	.006	.118	–	–	–	148	.004	.094	–	–	–	8019943
	M6330	.016	541	.006	.118	377	.006	.118	–	–	–	–	–	–	148	.004	.094	–	–	–	8019947
	M8310	.016	673	.006	.118	328	.006	.118	623	.006	.118	–	–	–	–	–	–	–	–	–	8019944
	M8330	.016	623	.006	.118	361	.006	.118	525	.006	.118	–	–	–	148	.004	.094	–	–	–	8019945
	M8340	.016	558	.006	.118	328	.006	.118	705	.006	.118	–	–	–	131	.004	.094	–	–	–	8019946

Suitability and starting values for cutting speed (vc), feed (f) and depth of cut (ap). Refer to our Machining Calculator app for further calculations.

Product		RE [inch]	P			M			K			N			S			H			EDP number
			SFM [ft/min]	IPT [inch/tooth]	ap [inch]	SFM [ft/min]	IPT [inch/tooth]	ap [inch]	SFM [ft/min]	IPT [inch/tooth]	ap [inch]	SFM [ft/min]	IPT [inch/tooth]	ap [inch]	SFM [ft/min]	IPT [inch/tooth]	ap [inch]	SFM [ft/min]	IPT [inch/tooth]	ap [inch]	



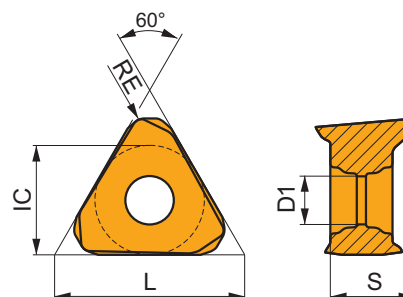
M geometry with positive design for light to medium machining.

TNGX 160608SR-M	8215	.031	755	.006	.118	443	.006	.118	705	.006	.118	—	—	—	180	.004	.004	—	—	—	8019794
	M6330	.031	640	.006	.118	443	.006	.118	—	—	—	—	—	—	180	.004	.004	—	—	—	8019797
	M8310	.031	804	.006	.118	394	.006	.118	755	.006	.118	—	—	—	—	—	—	—	—	—	8019793
	M8330	.031	738	.006	.118	443	.006	.118	689	.006	.118	—	—	—	180	.004	.004	—	—	—	8019795
	M8340	.031	673	.006	.118	394	.006	.118	623	.006	.118	—	—	—	164	.004	.004	—	—	—	8019796
	M8345	.031	525	.006	.118	312	.006	.118	—	—	—	—	—	—	131	.004	.004	—	—	—	8019798
	M9325	.031	935	.006	.118	—	—	—	886	.006	.118	—	—	—	—	—	—	—	—	—	8019799
	M9340	.031	853	.006	.118	509	.006	.118	—	—	—	—	—	—	213	.004	.004	—	—	—	8019820
TNGX 160612SR-M	M8330	.047	771	.006	.118	459	.006	.118	722	.006	.118	—	—	—	180	.004	.004	—	—	—	8020755
	M8340	.047	705	.006	.118	410	.006	.118	656	.006	.118	—	—	—	164	.004	.004	—	—	—	8020756
TNGX 160616SR-M	M8310	.063	902	.006	.118	459	.006	.118	853	.006	.118	—	—	—	—	—	—	—	—	—	8020757
	M8330	.063	820	.006	.118	492	.006	.118	771	.006	.118	—	—	—	197	.004	.004	—	—	—	8020758
	M8340	.063	738	.006	.118	443	.006	.118	689	.006	.118	—	—	—	180	.004	.004	—	—	—	8020759

TNGX 16-FA

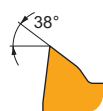
PRAMET

	IC [mm]	D1 [mm]	L [mm]	S [mm]
1606	.375	.173	.650	.259



Suitability and starting values for cutting speed (vc), feed (f) and depth of cut (ap). Refer to our Machining Calculator app for further calculations.

Product		RE [inch]	P			M			K			N			S			H			EDP number
			SFM [ft/min]	IPT [inch/tooth]	ap [inch]	SFM [ft/min]	IPT [inch/tooth]	ap [inch]	SFM [ft/min]	IPT [inch/tooth]	ap [inch]	SFM [ft/min]	IPT [inch/tooth]	ap [inch]	SFM [ft/min]	IPT [inch/tooth]	ap [inch]	SFM [ft/min]	IPT [inch/tooth]	ap [inch]	



FA geometry with highly positive design for fine finish to medium machining.

TNGX 160604FR-FA	HF7	.016	—	—	—	—	—	—	837	.006	.079	—	—	—	—	—	—	—	—	—	8020826
	M0315	.016	—	—	—	—	—	—	1919	.006	.079	—	—	—	—	—	—	—	—	—	8020825
TNGX 160608FR-FA	HF7	.031	—	—	—	—	—	—	984	.006	.079	—	—	—	—	—	—	—	—	—	8020828
	M0315	.031	—	—	—	—	—	—	2264	.006	.079	—	—	—	—	—	—	—	—	—	8020827



AP	.118	.177	.236
1 f	.007	.006	.004

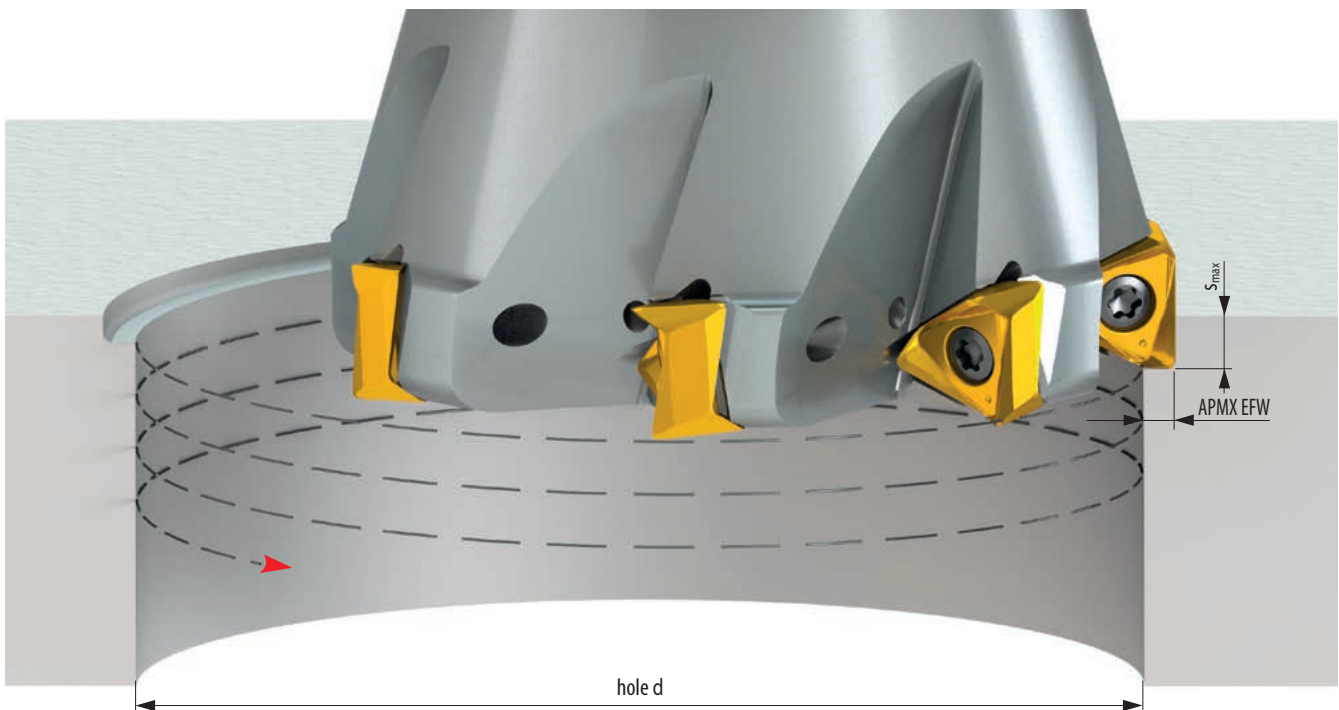
	TNGX 16-F		TNGX 16-M				TNGX 16-FA	
RE	.016	.031	.016	.031	.047	.063	.016	.031
BS	.083	.075	.083	.075	.068	.045	.083	.075



HELICAL INTERPOLATION INTO A PRE-DRILLED HOLE

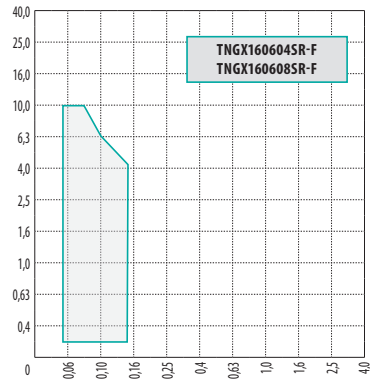
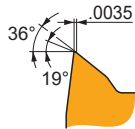
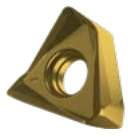
DC	hole d _{min}	d _{min} = DC *		hole d	d = 1.25 DC		hole d	d = 1.5 DC		hole d	d = 1.75 DC		hole d	d ≥ 2 DC	
		S _{max}	APMX EFW		S _{max}	APMX EFW		S _{max}	APMX EFW		S _{max}	APMX EFW		S _{max}	APMX EFW
1.00	1.00	.006	.051	1.220	.009	.087	1.496	.013	.118	1.732	.024	.157	1.969	.028	.197
1.25	1.25	.006	.059	1.575	.013	.110	1.890	.017	.157	2.205	.028	.197	2.520	.035	.256
1.50	1.50	.009	.079	1.969	.015	.138	2.362	.022	.197	2.756	.035	.256	3.150	.045	.315
2.00	2.00	.011	.098	2.480	.020	.177	2.953	.028	.256	3.465	.039	.315	3.937	.055	.394
2.50	2.50	.013	.126	3.150	.024	.217	3.740	.035	.315	4.331	.057	.394	4.921	.071	.492
3.00	3.00	.022	.157	3.937	.039	.276	4.724	.057	.394	5.512	.085	.512	6.299	.102	.630
4.00	4.00	.028	.197	4.921	.047	.354	5.906	.071	.492	6.890	.106	.650	7.874	.130	.787
4.50	4.50	.033	.236	5.709	.059	.394	6.890	.075	.571	7.874	.110	.748	9.055	.150	.906
5.00	5.00	.035	.256	6.102	.063	.433	7.480	.091	.610	8.661	.122	.787	9.843	.161	.984

* Check feed rate reduction when hole diameter is between d_{min} - 1.5 DC.



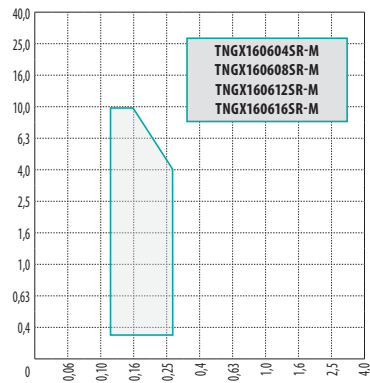
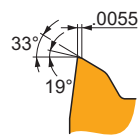
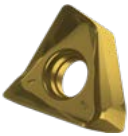
GEOMETRY OF CUTTING INSERTS

TNGX 16-F



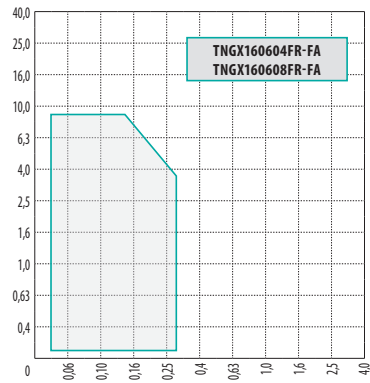
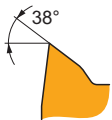
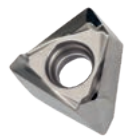
P	M	K	N	S	H
					
	.002 - .006				
	.008 - .394				
					
					
	TNGX 160604SR-F, TNGX 160608SR-F				

TNGX 16-M



P	M	K	N	S	H
					
	.005 - .011				
	.012 - .394				
					
					
	TNGX160604SR-M, TNGX160608SR-M, TNGX160612SR-M, TNGX160616SR-M				

TNGX 16-FA



P	M	K	N	S	H
	.012 - .394				
	.008 - .354				
					
					
	TNGX 160604FR-FA, TNGX 160608FR-FA				



INTRODUCTION

We have expanded our GL assortment for parting-off and deep grooving applications with a new range of tools, long double-edge inserts and geometries. The additions extend our offer for small part machining and grooving with a shorter overhang. These support copy profiling and longitudinal turning in a variety of materials.

SEE TOOL
IN ACTION

TOOLS FEATURES & BENEFITS

- New size (0.5 x 0.5 inch) of tool holders for additional **radial operations**.
- **Same pocket** can accommodate various insert widths.
- Multiple options for **depth of cut capability** in all widths of inserts.
- Reinforced brace design provides high rigidity and vibration resistance for **good quality surface finish**.
- **Set-up time saving** due to accessible clamping screw [30° angled] and easy one-hand insert replacement.

TOOLS NEW ASSORTMENT



IGLSF (RL) EXT

Universal tools

- Overhang
.94 - 1.26 inch



IGLSF (RL) EXT-G

Grooving tools

- Overhang
.39 - .47 inch

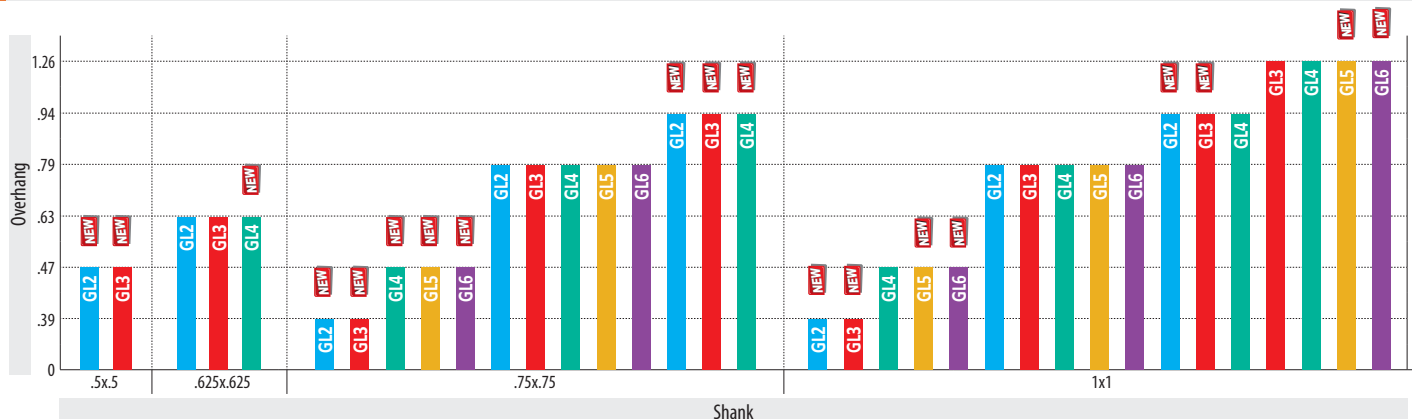


IGLSF (RL) EXT-S

Small shank tools

- Small parts machining and Swiss lathes
- Shank 0.5 x 0.5
- Insert GL4

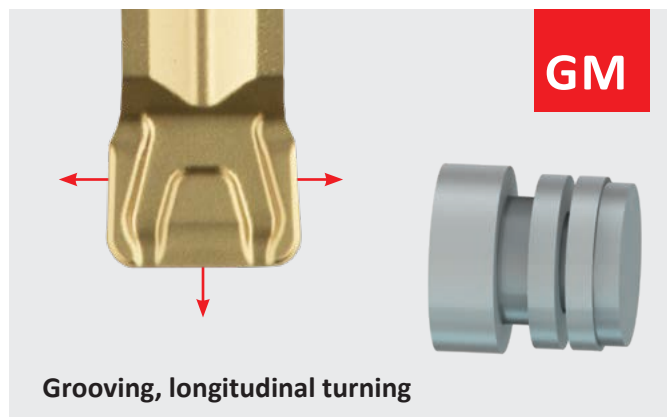
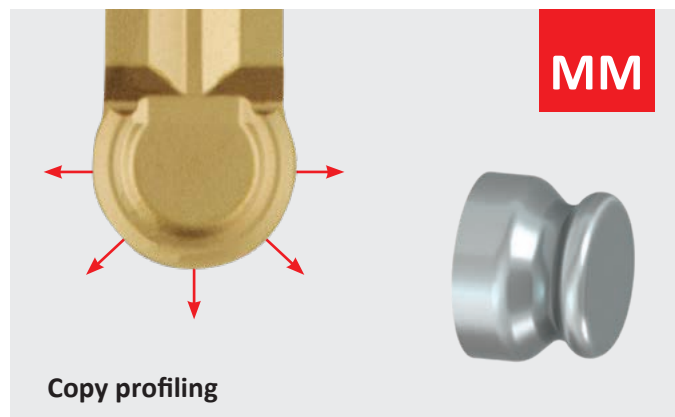
TOOLING CAPABILITIES / TOOL PERFORMANCE EXAMPLE



INSERTS FEATURES AND BENEFITS

- The .984 inch double-edged inserts offer up to 60% **deeper grooving capacity**, compared with original assortment.
- New MM and GM geometries with positive T-land for **prolonged tool life** due to **low cutting forces** and reduced risk of build-up edge.
- Design of .197 inch and .236 inch MM inserts requires no **tool modification** for deeper cuts.
- All new inserts available in both CVD T7325 and PVD G8330 to cover a **wide range of materials**.
- More radii options to **machine different profiles**.
- Wider inserts available (up to .236 inch) for small part machining.

INSERTS NEW ASSORTMENT

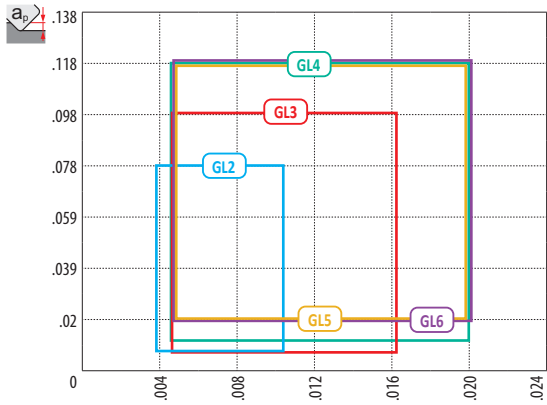


AREA OF APPLICATION

MACHINING EXAMPLES

TURNING

GM

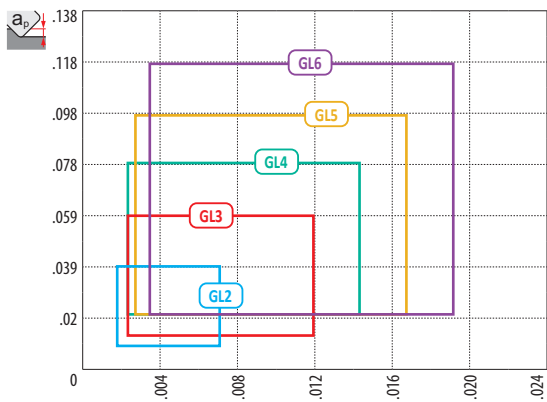


Workpiece: Bar
 Material: C45
 Material group: P2.2
 Operation: Longitudinal turning
 Tool: GL5-S16DFL-.47
 Insert: GL5-D500M08-GM; G8330
 Coolant: Yes

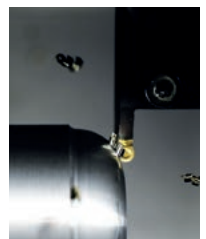


Insert Geometry			GM
Cutting speed	SFM	ft/min.	328
Feed	IPR	inch/rev.	.020
Depth of cut	a_p	DOC (inch)	.059

MM



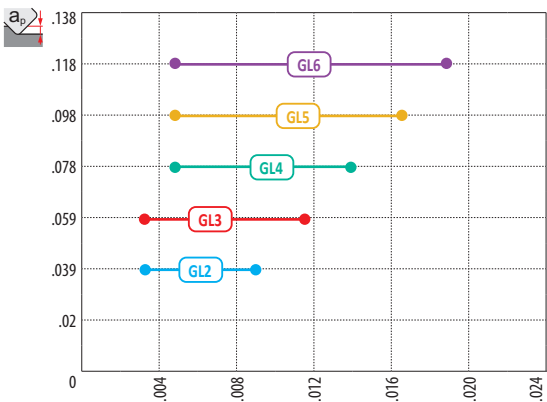
Workpiece: Bar
 Material: C45
 Material group: P2.2
 Operation: Copy profiling
 Tool: GL4-S16DFL-.47
 Insert: GL4-D400MMO-MM; G8330
 Coolant: Yes



Insert Geometry			MM
Cutting speed	SFM	ft/min.	328
Feed	IPR	inch/rev.	.016
Depth of cut	a_p	DOC (inch)	.039

GROOVING

GM

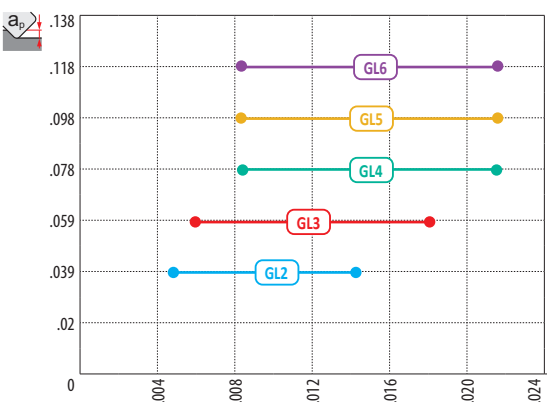


Workpiece: Bar
 Material: C45
 Material group: P2.2
 Operation: Grooving
 Tool: GL5-S16DFL-.47
 Insert: GL5-D500M08-GM; G8330
 Coolant: Yes



Insert Geometry			GM
Cutting speed	SFM	ft/min.	394
Feed	IPR	inch/rev.	.004
Depth of cut	a_p	DOC (inch)	.059

MM



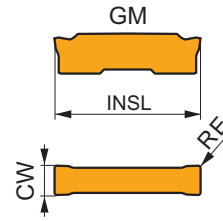
Workpiece: Bar
 Material: C45
 Material group: P2.2
 Operation: Grooving
 Tool: GL2-S16DFL-.39
 Insert: GL2-D200MMO-MM; G8330
 Coolant: Yes



Insert Geometry			MM
Cutting speed	SFM	ft/min.	394
Feed	IPR	inch/rev.	.004
Depth of cut	a_p	DOC (inch)	.039

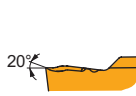
GL. D - GM

	CW	CWTOLL	CWTOLU	INSL
	[inch]	[inch]	[inch]	[inch]
200	.079	-.002	.002	.984
300	.118	-.002	.002	.984
400	.157	-.002	.002	.984
500	.197	-.002	.002	.984
600	.236	-.002	.002	.984



Suitability and starting values for cutting speed (vc), feed (f) and depth of cut (ap). Refer to our Machining Calculator app for further calculations.

Product	RE	P			M			K			N			S			H			EDP number
		SFM	IPR	ap	SFM	IPR	ap	SFM	IPR	ap	SFM	IPR	ap	SFM	IPR	ap	SFM	IPR	ap	
	[inch]	[ft/min]	[inch/rev]	[inch]	[ft/min]	[inch/rev]	[inch]	[ft/min]	[inch/rev]	[inch]	[ft/min]	[inch/rev]	[inch]	[ft/min]	[inch/rev]	[inch]	[ft/min]	[inch/rev]	[inch]	

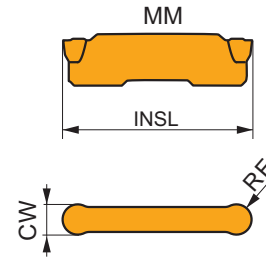


GM geometry for grooving and longitudinal turning, and continuous to interrupted cuts.

GL2-D200M02-GM	G8330	.008	623	.004	.031	361	.004	.031	591	.004	.031	—	—	—	148	.003	.024	—	—	—	8023038
	T7325	.008	722	.004	.031	558	.004	.031	—	—	—	—	—	—	230	.003	.024	—	—	—	8023039
GL3-D300M02-GM	G8330	.008	492	.008	.039	295	.007	.039	459	.008	.039	—	—	—	115	.006	.031	—	—	—	8022955
	T7325	.008	574	.008	.039	443	.007	.039	—	—	—	—	—	—	180	.006	.031	—	—	—	8022956
GL3-D300M04-GM	G8330	.016	525	.008	.039	312	.007	.039	492	.008	.039	—	—	—	131	.006	.031	—	—	—	7983471
	T7325	.016	607	.008	.039	459	.007	.039	—	—	—	—	—	—	197	.006	.031	—	—	—	7983472
GL4-D400M04-GM	G8330	.016	492	.010	.047	295	.009	.047	459	.010	.047	—	—	—	115	.007	.039	—	—	—	7983475
	T7325	.016	558	.010	.047	427	.009	.047	—	—	—	—	—	—	180	.007	.039	—	—	—	7983476
GL4-D400M08-GM	G8330	.031	591	.010	.047	344	.009	.047	558	.010	.047	—	—	—	148	.007	.039	—	—	—	8022957
	T7325	.031	656	.010	.047	509	.009	.047	—	—	—	—	—	—	213	.007	.039	—	—	—	8022958
GL5-D500M08-GM	G8330	.031	558	.012	.047	328	.011	.047	525	.012	.047	—	—	—	131	.008	.039	—	—	—	8023030
	T7325	.031	623	.012	.047	476	.011	.047	—	—	—	—	—	—	197	.008	.039	—	—	—	8023031
GL6-D600M08-GM	G8330	.031	558	.012	.047	328	.011	.047	525	.012	.047	—	—	—	131	.008	.039	—	—	—	8023034
	T7325	.031	623	.012	.047	476	.011	.047	—	—	—	—	—	—	197	.008	.039	—	—	—	8023035

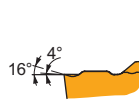
GL. D - MM

	CW	CWTOLL	CWTOLU	INSL
[inch]	[inch]	[inch]	[inch]	[inch]
200	.079	-.002	.002	.984
300	.118	-.002	.002	.984
400	.157	-.002	.002	.984
500	.197	-.002	.002	.984
600	.236	-.002	.002	.984



Suitability and starting values for cutting speed (vc), feed (f) and depth of cut (ap). Refer to our Machining Calculator app for further calculations.

Product		RE	P			M			K			N			S			H			EDP number
			SFM	IPR	ap	SFM	IPR	ap	SFM	IPR	ap	SFM	IPR	ap	SFM	IPR	ap	SFM	IPR	ap	
		[inch]	[ft/min]	[inch/rev]	[inch]	[ft/min]	[inch/rev]	[inch]	[ft/min]	[inch/rev]	[inch]	[ft/min]	[inch/rev]	[inch]	[ft/min]	[inch/rev]	[inch]	[ft/min]	[inch/rev]	[inch]	



MM geometry, with full radius shape for copy profiling and longitudinal turning, and continuous to interrupted cuts.

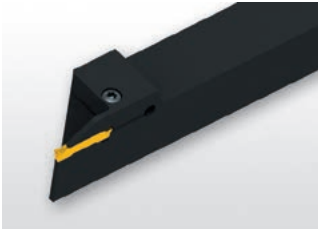
GL2-D200MM0-MM	G8330	.039	820	.004	.039	492	.004	.039	771	.004	.039	—	—	—	197	.003	.031	—	—	—	8023060
	T7325	.039	935	.004	.039	722	.004	.039	—	—	—	—	—	—	295	.003	.031	—	—	—	8023061
GL3-D300MM0-MM	G8330	.059	689	.008	.047	410	.007	.047	640	.008	.047	—	—	—	164	.006	.039	—	—	—	7983473
	T7325	.059	787	.008	.047	607	.007	.047	—	—	—	—	—	—	246	.006	.039	—	—	—	7983474
GL4-D400MM0-MM	G8330	.079	722	.008	.047	427	.007	.047	673	.008	.047	—	—	—	180	.006	.039	—	—	—	7983477
	T7325	.079	820	.008	.047	640	.007	.047	—	—	—	—	—	—	262	.006	.039	—	—	—	7983478
GL5-D500MM0-MM	G8330	.098	673	.010	.047	394	.009	.047	623	.010	.047	—	—	—	164	.007	.039	—	—	—	8023032
	T7325	.098	771	.010	.047	591	.009	.047	—	—	—	—	—	—	246	.007	.039	—	—	—	8023033
GL6-D600MM0-MM	G8330	.118	640	.012	.047	377	.011	.047	607	.012	.047	—	—	—	148	.008	.039	—	—	—	8023036
	T7325	.118	722	.012	.047	558	.011	.047	—	—	—	—	—	—	230	.008	.039	—	—	—	8023037

IGLSF(RL) EXT



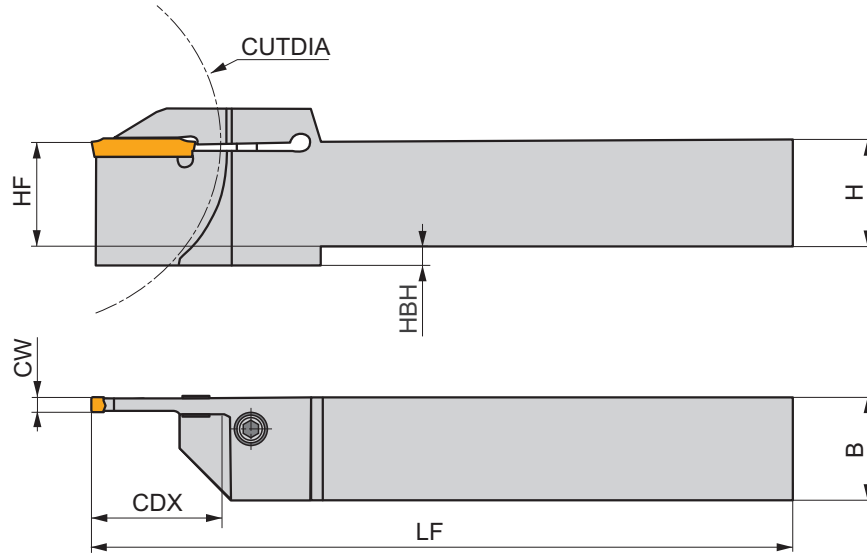
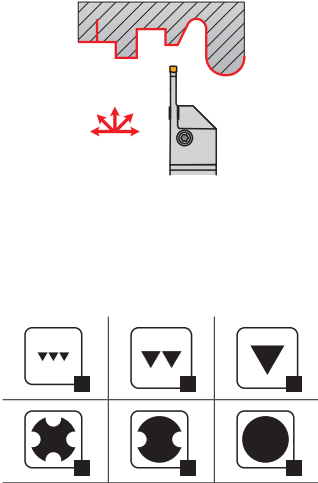
PRAMET

G



External V-Groove Top Clamp Grooving or Parting tool for GL Inserts

External R/L handed radial tool holder for grooving with double sided GL 2, 3, 4, 5, or 6 style inserts. Suited for radial grooving and parting-off applications up to 1.26 inch depth of cut. Available in shank size .75 x .75 or 1 x 1 inch. Reinforced body design for longer tool life and low vibrations.



	Product	HF	HBH	H	B	LF	CW	CDX	CUTDIA	lbs			EDP
		[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]				
R	GL2-S12CFR-.79-3.15	.750	—	.750	.750	5.000	.079	.790	3.150	.35	GI334	GL11	7804078
	GL2-S12CFR-.94-3.15	.750	.197	.750	.750	5.000	.079	.940	3.150	.33	GI334	GL11	8015986
	GL2-S16DFR-.79-3.15	1.000	—	1.000	1.000	6.000	.079	.790	3.150	.07	GI334	GL11	7804140
	GL2-S16DFR-.94-3.15	1.000	—	1.000	1.000	6.000	.079	.940	3.150	.68	GI334	GL11	8015990
	GL3-S12CFR-.79-3.15	.750	—	.750	.750	5.000	.118	.790	3.150	.35	GI335	GL11	7804144
	GL3-S12CFR-.94-3.15	.750	.197	.750	.750	5.000	.118	.940	3.150	.33	GI335	GL11	8015996
	GL3-S16DFR-.79-3.15	1.000	—	1.000	1.000	6.000	.118	.790	3.150	.68	GI335	GL11	7804146
	GL3-S16DFR-.94-3.15	1.000	—	1.000	1.000	6.000	.118	.940	3.150	.68	GI335	GL11	8016000
	GL3-S16EFR-1.26-3.15	1.000	.197	1.000	1.000	7.000	.118	1.260	3.150	.68	GI335	GL11	7804148
	GL4-S12CFR-.79-3.15	.750	—	.750	.750	5.000	.157	.790	3.150	.35	GI336	GL11	7804150
	GL4-S12CFR-.94-3.15	.750	.197	.750	.750	5.000	.157	.940	3.150	.33	GI336	GL11	8016007
	GL4-S16DFR-.79-3.15	1.000	—	1.000	1.000	6.000	.157	.790	3.150	.68	GI336	GL11	7804152
	GL4-S16DFR-.94-3.15	1.000	—	1.000	1.000	6.000	.157	.940	3.150	.68	GI336	GL11	8016041
	GL4-S16EFR-1.26-3.15	1.000	.197	1.000	1.000	7.000	.157	1.260	3.150	.68	GI336	GL11	7804154
	GL5-S12CFR-.79-3.15	.750	—	.750	.750	5.000	.197	.790	3.150	.36	GI337	GL11	7804156
	GL5-S16DFR-.79-3.15	1.000	—	1.000	1.000	6.000	.197	.790	3.150	.68	GI337	GL11	7804158
	GL5-S16EFR-1.26-3.94	1.000	.197	1.000	1.000	7.000	.197	1.260	3.940	.81	GI337	GL11	8016047
	GL6-S12CFR-.79-3.15	.750	—	.750	.750	5.000	.236	.790	3.150	.35	GI338	GL11	7804160
	GL6-S16DFR-.79-3.15	1.000	—	1.000	1.000	6.000	.236	.790	3.150	.68	GI338	GL11	7804162
	GL6-S16EFR-1.26-3.94	1.000	.197	1.000	1.000	7.000	.236	1.260	3.940	.82	GI338	GL11	8016053
L	GL2-S12CFL-.79-3.15	.750	—	.750	.750	5.000	.079	.790	3.150	.04	GI334	GL11	7804077
	GL2-S12CFL-.94-3.15	.750	.197	.750	.750	5.000	.079	.940	3.150	.33	GI334	GL11	8015985
	GL2-S16DFL-.79-3.15	1.000	—	1.000	1.000	6.000	.079	.790	3.150	.68	GI334	GL11	7804079
	GL2-S16DFL-.94-3.15	1.000	—	1.000	1.000	6.000	.079	.940	3.150	.68	GI334	GL11	8015989

Product	HF	HBH	H	B	LF	CW	CDX	CUTDIA				EDP
	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	lbs			
GL3-S12CFL-.79-3.15	.750	—	.750	.750	5.000	.118	.790	3.150	.35	GI335	GL11	7804143
GL3-S12CFL-.94-3.15	.750	.197	.750	.750	5.000	.118	.940	3.150	.33	GI335	GL11	8015995
GL3-S16DFL-.79-3.15	1.000	—	1.000	1.000	6.000	.118	.790	3.150	.68	GI335	GL11	7804145
GL3-S16DFL-.94-3.15	1.000	—	1.000	1.000	6.000	.118	.940	3.150	.68	GI335	GL11	8015999
GL3-S16EFL-1.26-3.15	1.000	.197	1.000	1.000	7.000	.118	1.260	3.150	.68	GI335	GL11	7804147
GL4-S12CFL-.79-3.15	.750	—	.750	.750	5.000	.157	.790	3.150	.36	GI336	GL11	7804149
GL4-S12CFL-.94-3.15	.750	.197	.750	.750	5.000	.157	.940	3.150	.33	GI336	GL11	8016006
GL4-S16DFL-.79-3.15	1.000	—	1.000	1.000	6.000	.157	.790	3.150	.68	GI336	GL11	7804151
GL4-S16DFL-.94-3.15	1.000	—	1.000	1.000	6.000	.157	.940	3.150	.68	GI336	GL11	8016040
GL4-S16EFL-1.26-3.15	1.000	.197	1.000	1.000	7.000	.157	1.260	3.150	.68	GI336	GL11	7804153
GL5-S12CFL-.79-3.15	.750	—	.750	.750	5.000	.197	.790	3.150	.36	GI337	GL11	7804155
GL5-S16DFL-.79-3.15	1.000	—	1.000	1.000	6.000	.197	.790	3.150	.68	GI337	GL11	7804157
GL5-S16EFL-1.26-3.94	1.000	.197	1.000	1.000	7.000	.197	1.260	3.940	.81	GI337	GL11	8016046
GL6-S12CFL-.79-3.15	.750	—	.750	.750	5.000	.236	.790	3.150	.36	GI338	GL11	7804159
GL6-S16DFL-.79-3.15	1.000	—	1.000	1.000	6.000	.236	.790	3.150	.68	GI338	GL11	7804161
GL6-S16EFL-1.26-3.94	1.000	.197	1.000	1.000	7.000	.236	1.260	3.940	.82	GI338	GL11	8016052

												
GI334	GL2..											
GI335	GL3..											
GI336	GL4..											
GI337	GL5..											
GI338	GL6..											

					
GL11	US 5018-T20P	5.0	M 5	18.2	LKT20P

IGLSF(RL) EXT-S



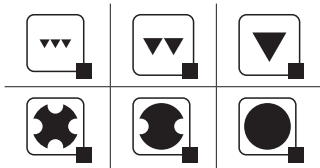
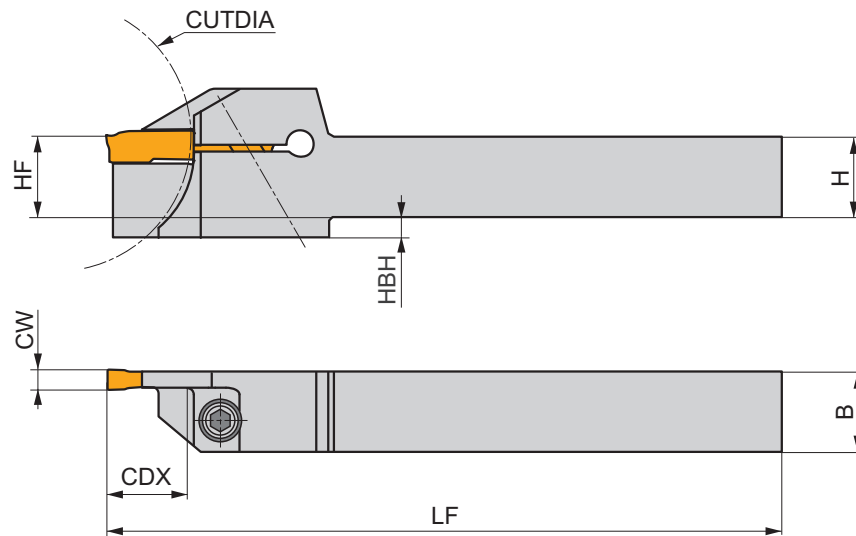
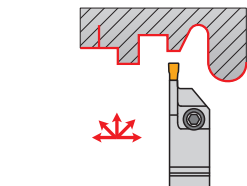
PRAMET

G



External Grooving or Parting tool for GL Inserts for Sliding head machines

External R/L handed radial tool holder for sliding head machines GL. 2, 3, 4 pocket widths. Suited for radial grooving, profiling and parting-off applications with .63 inch max. depth of cut. Available in shank size .5 x .5 or .625 x .625 inch. Reinforced body design for longer tool life and low vibrations, easy access clamping.



	Product												
		[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]				
R	GL2-S08AFR-.47-1.57	.500	.500	.500	4.000	.079	.470	.118	1.570	.12	GI334	GL13	8015982
	GL2-S10CFR-.63-1.78	.625	.625	.625	5.000	.079	.630	.118	1.780	.23	GI334	GL12	7804076
	GL3-S08AFR-.47-1.57	.500	.500	.500	4.000	.118	.470	.118	1.570	.13	GI335	GL13	8015992
	GL3-S10CFR-.63-1.78	.625	.625	.625	5.000	.118	.630	.118	1.780	.23	GI335	GL12	7804142
	GL4-S10CFR-.63-1.78	.625	.625	.625	5.000	.157	.630	.157	1.780	.24	GI336	GL12	8016003
L	GL2-S08AFL-.47-1.57	.500	.500	.500	4.000	.079	.470	.118	1.570	.12	GI334	GL13	8015981
	GL2-S10CFL-.63-1.78	.625	.625	.625	5.000	.079	.630	.118	1.780	.23	GI334	GL12	7804075
	GL3-S08AFL-.47-1.57	.500	.500	.500	4.000	.118	.470	.118	1.570	.13	GI335	GL13	8015991
	GL3-S10CFL-.63-1.78	.625	.625	.625	5.000	.118	.630	.118	1.780	.23	GI335	GL12	7804141
	GL4-S10CFL-.63-1.78	.625	.625	.625	5.000	.157	.630	.157	1.780	.24	GI336	GL12	8016002

GI334		GL2..
GI335		GL3..
GI336		GL4..

GL12	HS 0516	5.0	M 5	16	HXK 4
GL13	HS 0412	5.0	M 4	12	HXK 3

IGLSF(RL) EXT-G



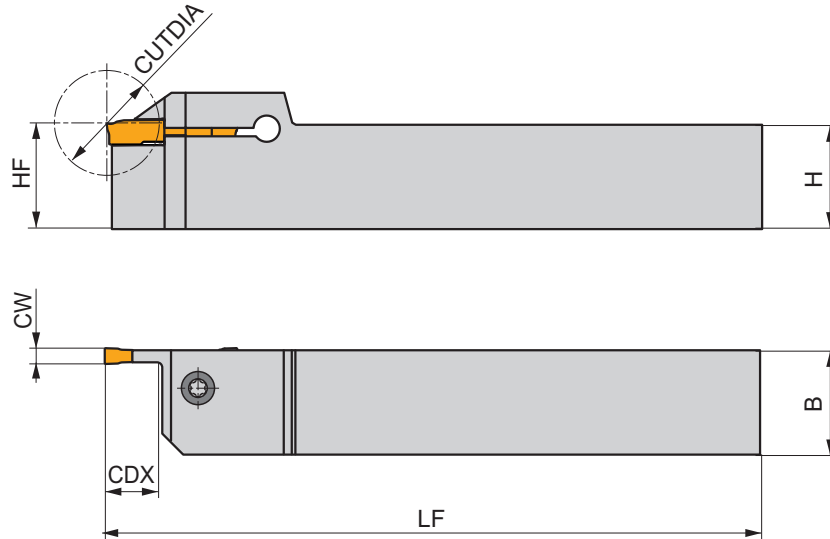
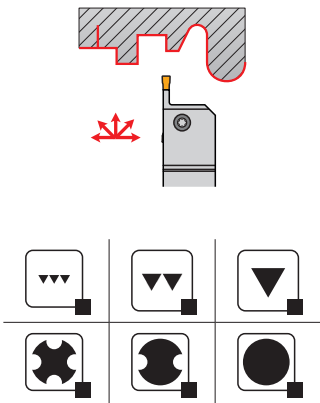
PRAMET

G



External V-Groove Top Clamp Grooving or Turning tool for GL Inserts

External R/L handed radial tool holder for grooving with double sided GL 2, 3, 4, 5, or 6 style inserts. Suited for radial grooving, longitudinal turning and profiling applications with .47 inch max. depth of cut. Available in shank size .75 x .75 or 1 x 1 inch. Body treated for longer tool life.



Product		HF	H	B	LF	CW	CDX	CUTDIA	lbs			EDP
		[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]				
R	GL2-S12CFR-.39	.750	.750	.750	5.000	.079	.390	.780	.33	GI334	GL11	8015984
	GL2-S16DFR-.39	1.000	1.000	1.000	6.000	.079	.390	.780	.72	GI334	GL11	8015988
	GL3-S12CFR-.39	.750	.750	.750	5.000	.118	.390	.780	.33	GI335	GL11	8015994
	GL3-S16DFR-.39	1.000	1.000	1.000	6.000	.118	.390	.780	.72	GI335	GL11	8015998
	GL4-S12CFR-.47	.750	.750	.750	5.000	.157	.470	.940	.33	GI336	GL11	8016005
	GL4-S16DFR-.47	1.000	1.000	1.000	6.000	.157	.470	.940	.71	GI336	GL11	8016009
	GL5-S12CFR-.47	.750	.750	.750	5.000	.197	.470	.940	.33	GI337	GL11	8016043
	GL5-S16DFR-.47	1.000	1.000	1.000	6.000	.197	.470	.940	.71	GI337	GL11	8016045
	GL6-S12CFR-.47	.750	.750	.750	5.000	.236	.470	.940	.33	GI338	GL11	8016049
	GL6-S16DFR-.47	1.000	1.000	1.000	6.000	.236	.470	.940	.71	GI338	GL11	8016051
L	GL2-S12CFL-.39	.750	.750	.750	5.000	.079	.390	.780	.33	GI334	GL11	8015983
	GL2-S16DFL-.39	1.000	1.000	1.000	6.000	.079	.390	.780	.72	GI334	GL11	8015987
	GL3-S12CFL-.39	.750	.750	.750	5.000	.118	.390	.780	.33	GI335	GL11	8015993
	GL3-S16DFL-.39	1.000	1.000	1.000	6.000	.118	.390	.780	.72	GI335	GL11	8015997
	GL4-S12CFL-.47	.750	.750	.750	5.000	.157	.470	.940	.33	GI336	GL11	8016004
	GL4-S16DFL-.47	1.000	1.000	1.000	6.000	.157	.470	.940	.71	GI336	GL11	8016008
	GL5-S12CFL-.47	.750	.750	.750	5.000	.197	.470	.940	.33	GI337	GL11	8016042
	GL5-S16DFL-.47	1.000	1.000	1.000	6.000	.197	.470	.940	.71	GI337	GL11	8016044
	GL6-S12CFL-.47	.750	.750	.750	5.000	.236	.470	.940	.33	GI338	GL11	8016048
	GL6-S16DFL-.47	1.000	1.000	1.000	6.000	.236	.470	.940	.71	GI338	GL11	8016050



GI334
GI335
GI336
GI337
GI338

GL2..
GL3..
GL4..
GL5..
GL6..



GL11

US 5018-T20P

5.0

M 5

18.2

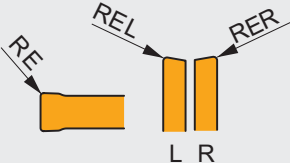
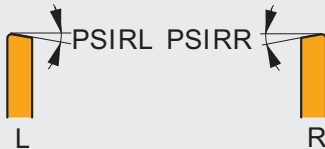
LKT20P

CODE DESIGNATION – PARTING-OFF AND GROOVING INSERTS - GL

1	2	3	4	5	6	7	8
GL	3	D	300	G	.	L06	PM

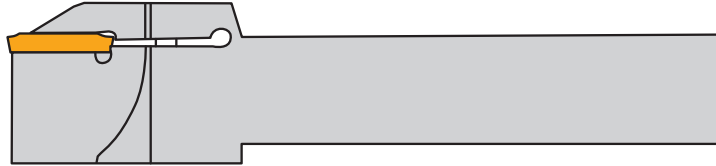


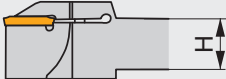
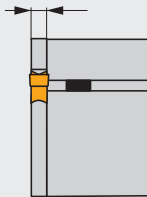
1	2	3	4																			
Tool group	Pocket size	Number of edges	Cutting width - CW																			
GL	1, 2, 3, 4, 5, 6																					
		<table><tr><td>S</td><td>One edge</td></tr><tr><td>D</td><td>Two edges</td></tr></table>	S	One edge	D	Two edges	<table><tr><td></td><td><table><tr><td></td><td>CW</td></tr><tr><td>200</td><td>.079</td></tr><tr><td>250</td><td>.098</td></tr><tr><td>300</td><td>.118</td></tr><tr><td>400</td><td>.157</td></tr><tr><td>500</td><td>.197</td></tr><tr><td>600</td><td>.236</td></tr></table></td></tr></table>		<table><tr><td></td><td>CW</td></tr><tr><td>200</td><td>.079</td></tr><tr><td>250</td><td>.098</td></tr><tr><td>300</td><td>.118</td></tr><tr><td>400</td><td>.157</td></tr><tr><td>500</td><td>.197</td></tr><tr><td>600</td><td>.236</td></tr></table>		CW	200	.079	250	.098	300	.118	400	.157	500	.197	600
S	One edge																					
D	Two edges																					
	<table><tr><td></td><td>CW</td></tr><tr><td>200</td><td>.079</td></tr><tr><td>250</td><td>.098</td></tr><tr><td>300</td><td>.118</td></tr><tr><td>400</td><td>.157</td></tr><tr><td>500</td><td>.197</td></tr><tr><td>600</td><td>.236</td></tr></table>		CW	200	.079	250	.098	300	.118	400	.157	500	.197	600	.236							
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200	.079																					
250	.098																					
300	.118																					
400	.157																					
500	.197																					
600	.236																					

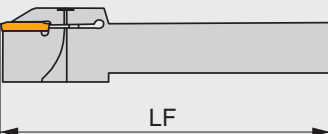
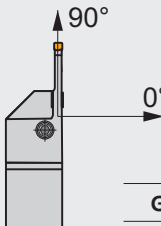
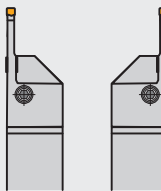
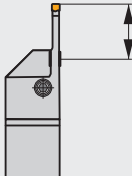
5	6	7	8																				
Edge design	Nose radius	Primary cutting edge angle	Chipbreaker designation																				
G			PM PR GM MM																				
M	<table><tr><td></td><td>RE, RER, REL [in]</td></tr><tr><td>.</td><td>.008</td></tr><tr><td>.</td><td>.012</td></tr><tr><td>.</td><td>.016</td></tr><tr><td>.</td><td>.118</td></tr></table>		RE, RER, REL [in]	.	.008	.	.012	.	.016	.	.118	<table><tr><td></td><td>RE [in]</td></tr><tr><td>MO</td><td>RE = CW/2</td></tr></table>		RE [in]	MO	RE = CW/2	<table><tr><td></td><td>[°]</td></tr><tr><td>.</td><td>6</td></tr><tr><td>12</td><td>12</td></tr></table>		[°]	.	6	12	12
	RE, RER, REL [in]																						
.	.008																						
.	.012																						
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.	.118																						
	RE [in]																						
MO	RE = CW/2																						
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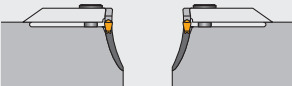
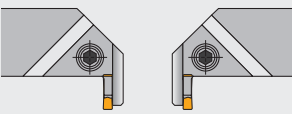
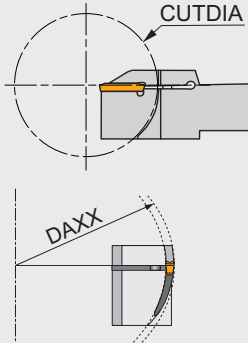
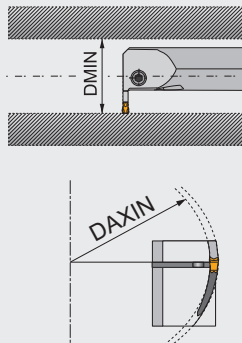
CODE DESIGNATION – PARTING-OFF AND GROOVING HOLDERS (EXTERNAL TURNING) - GL

1	2		3	4	5	6	7		8		9	10	11
GL	3	-	S	16	D	F	L	-	.79	-	R	4.72	3.54



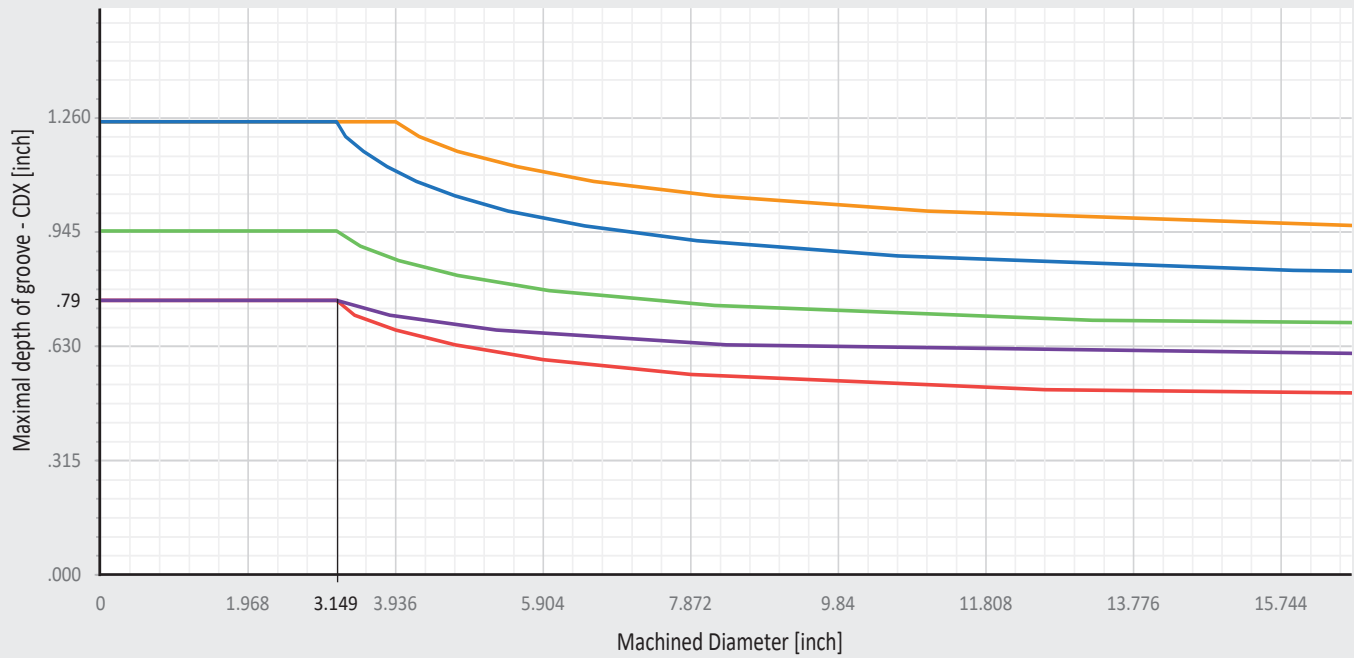
1	2	3	4															
Tool group	Pocket size	Shank type	Shank dimensions															
GL	1, 2, 3, 4, 5, 6	A steel shank with internal coolant	 <table><tr><td></td><td>H/B</td><td>[mm]/[mm]</td></tr><tr><td>08</td><td>-</td><td>.5/.5</td></tr><tr><td>10</td><td>-</td><td>.625/.625</td></tr><tr><td>12</td><td>-</td><td>.075/.075</td></tr><tr><td>16</td><td>-</td><td>1/1</td></tr></table>		H/B	[mm]/[mm]	08	-	.5/.5	10	-	.625/.625	12	-	.075/.075	16	-	1/1
		H/B	[mm]/[mm]															
08	-	.5/.5																
10	-	.625/.625																
12	-	.075/.075																
16	-	1/1																
		S steel shank without internal coolant																

5	6	7	8																
Holder total length - LF	Tool style - cutting edge angle	Version (right/left)	Cutting depth maximum - CDX																
 <table><tr><td></td><td>LF [in]</td></tr><tr><td>A</td><td>4</td></tr><tr><td>C</td><td>5</td></tr><tr><td>D</td><td>6</td></tr><tr><td>E</td><td>7</td></tr></table>		LF [in]	A	4	C	5	D	6	E	7	 <table><tr><td></td><td>[°]</td></tr><tr><td>G</td><td>0</td></tr><tr><td>F</td><td>90</td></tr></table>		[°]	G	0	F	90	 R L	
	LF [in]																		
A	4																		
C	5																		
D	6																		
E	7																		
	[°]																		
G	0																		
F	90																		

9	10	11
Blade curvature direction	Maximum diameter	Minimum diameter
 L R  Additional information for axial turning.	 CUTDIA DAXX	 DMIN DAXIN

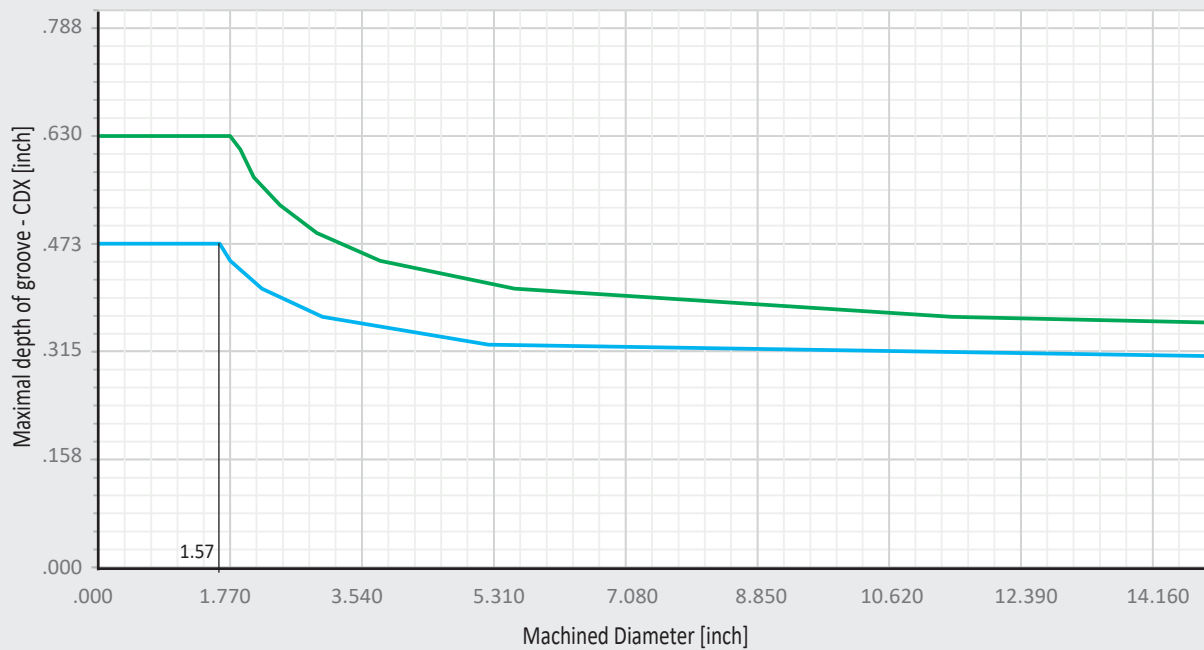
CUTTING DEPTHS DEPENDING ON MACHINED DIAMETER

IGLSF (RL) EXT



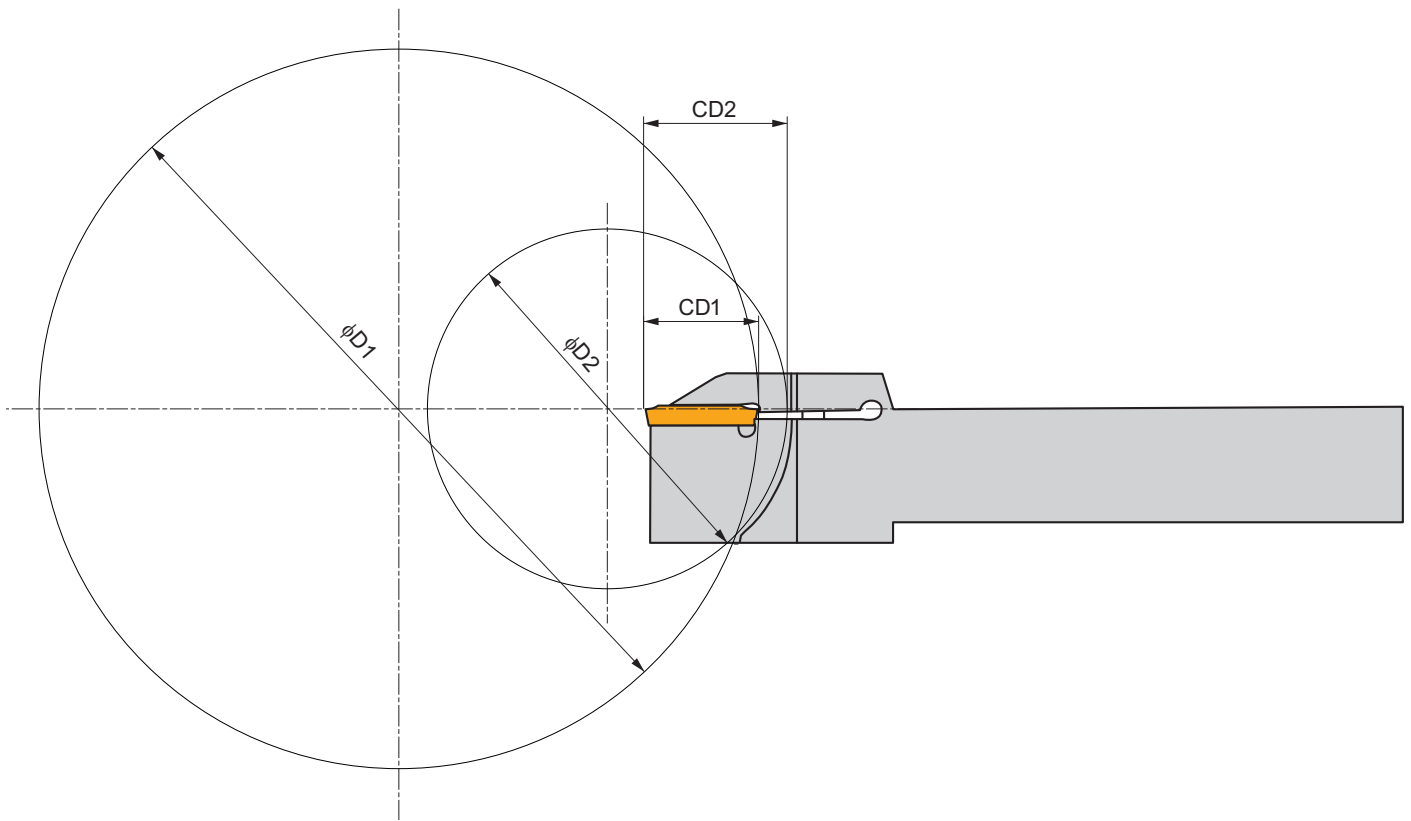
GL-16-1.26-3.94 GL-16-1.26-3.15 GL-16-.94-3.15 GL-12-.94-3.15 GL-16-.79-3.15 GL-12-.79-3.15

IGLSF (RL) EXT-S



GL-08-.47-1.57 GL-10-.63-1.78

CUTTING DEPTHS DEPENDING ON MACHINED DIAMETER





T8430 NEW GENERATION PVD GRADE

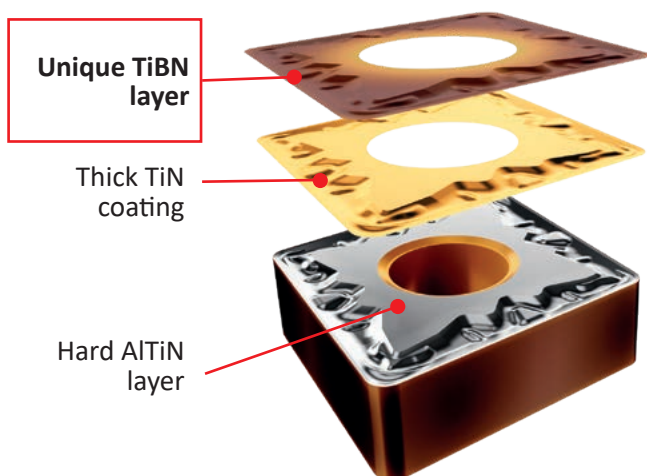
TURNING INSERTS

INTRODUCTION

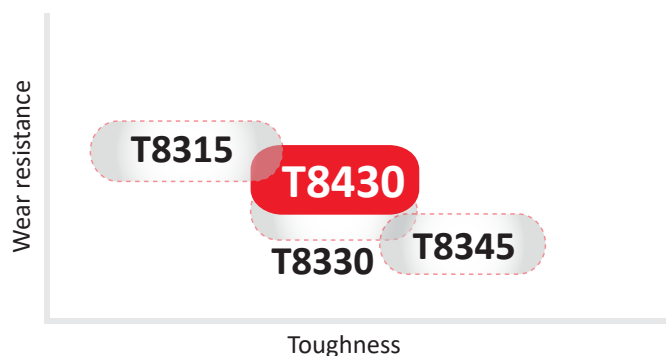
We have upgraded our flagship PVD grade T8330 with a new coating generation, providing increased durability and performance. The T8430 is the most versatile grade for general turning and heavy roughing, even in unfavourable conditions. Developed for steel and cast steel, the grade also performs well in stainless steel, cast-iron and super alloys. It offers a significant increase in durability compared with the existing grade, especially when machining raw steel blanks or difficult-to-machine materials, such as Inconel and Stellite.

FEATURES & BENEFITS

- A multi-layered PVD coating optimized for **increased productivity**, with up to 69% **more durability** compared to T8330.
- Unique Titanium-Boron-Nitride (TiBN) top layer for build-up edge reduction and **improved performance**.
- Thick TiN coating
- Hard AlTiN layer
- Thick TiN coating with low compressive stress for **crater wear resistance**.
- Hard AlTiN layer for **flank wear resistance**.
- A bright gold TiN layer to support wear detection.



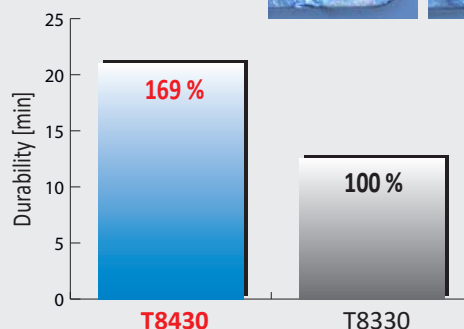
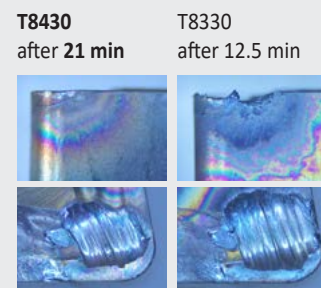
AREA OF APPLICATION PVD TURNING GRADES



MACHINING EXAMPLE

Material: C45
Material group: P2.2
Insert: CNMG 432-FM
Coolant: No

Grade			T8430	T8330
Cutting speed	SFM	ft/min.	558	558
Feed tooth	f_z	in/tooth	.014	.014
Axial length of cut	a_p	inch	.079	.079
Durability	T	min.	21.0	12.5



T8430**NEW GENERATION PVD GRADE****TURNING INSERTS**

Insert	EDP#
CCGT 21.50.5L-SI	7977179
CCGT 21.50.5R-SI	7977180
CCGT 21.51L-SI	7973793
CCGT 21.51R-SI	7977181
CCGT 32.51L-SI	7973794
CCGT 32.51R-SI	7973795
CCGT 432L-SI	7977182
CCGT 432R-SI	7977183
CCMT 21.50.5-FF	7977184
CCMT 21.50.5-FF2	7977185
CCMT 21.50.5-FM	7973796
CCMT 21.50.5-NF2	7977186
CCMT 21.50.5-UR	7973797
CCMT 21.51-FF	7973798
CCMT 21.51-FF2	7977187
CCMT 21.51-FM	7973799
CCMT 21.51-NF2	7977188
CCMT 21.51-UR	7973810
CCMT 21.51W-FM	7977189
CCMT 21.52-FM	7973811
CCMT 21.52-UR	7973812
CCMT 2.520.5-FF2	7977190
CCMT 2.521-FF2	7977191
CCMT 2.521-FM2	7977192
CCMT 2.522-FF2	7977193
CCMT 2.522-FM2	7977194
CCMT 32.50.5-FM	7973813
CCMT 32.50.5-UR	7977195
CCMT 32.51-FF	7973814
CCMT 32.51-FF2	7977196
CCMT 32.51-FM	7973815
CCMT 32.51-FM2	7977197
CCMT 32.51-NF2	7977198
CCMT 32.51-RM	7973816
CCMT 32.51-UR	7973817
CCMT 32.51W-FM	7977199
CCMT 32.52-FF2	7977200
CCMT 32.52-FM	7973818
CCMT 32.52-FM2	7977201
CCMT 32.52-NF2	7973819
CCMT 32.52-RM	7973820
CCMT 32.52-UR	7973821
CCMT 32.52W-FM	7977202
CCMT 431-FM	7973822
CCMT 431-UR	7973823
CCMT 432-FM	7973824
CCMT 432-FM2	7973825
CCMT 432-RM	7973826
CCMT 432-UR	7973827
CCMT 433-FM	7977203
CCMT 433-RM	7977204
CCMT 433-UR	7977205

Insert	EDP#
CNMG 430.5-SF	7977289
CNMG 321-FM	7977310
CNMG 321-NF	7977311
CNMG 322-FM	7977312
CNMG 322-NF	7977313
CNMG 431-FM	7977057
CNMG 431L-SI	7977058
CNMG 431-NF	7977059
CNMG 431-NM	7977100
CNMG 431-NMR	7977314
CNMG 431R-SI	7977101
CNMG 431-SF	7977315
CNMG 431-SM	7977102
CNMG 432-FM	7977103
CNMG 432L-SI	7977104
CNMG 432-M	7977105
CNMG 432-NF	7977106
CNMG 432-NM	7977107
CNMG 432-NMR	7977108
CNMG 432-RM	7977109
CNMG 432R-SI	7977110
CNMG 432-SF	7977111
CNMG 432-SM	7977112
CNMG 433L-SI	7977316
CNMG 433-NF	7977317
CNMG 433-NM	7977113
CNMG 433-NMR	7977318
CNMG 433-RM	7977114
CNMG 433R-SI	7977319
CNMG 433-SF	7977320
CNMG 433-SM	7977115
CNMG 434-RM	7977321
CNMG 542-NM	7977322
CNMG 542-RM	7977323
CNMG 542-SM	7977324
CNMG 543-NMR	7977325
CNMG 543-RM	7977326
CNMG 544-NMR	7977327
CNMG 643-NM	7977116
CNMG 643-NMR	7977328
CNMG 643-RM	7977329
CNMM 432-NR	7977330
CNMM 432-NR2	7977331
CNMM 432-OR	7977332
CNMM 433-NR	7977333
CNMM 433-NR2	7977334
CNMM 542-NR2	7977335
CNMM 543-NR2	7977336
CNMM 543-OR	7977337
CNMM 643-NR2	7977338
CNMM 643-OR	7977339
CNMM 644-NR2	7977340

Insert	EDP#
CNMM 644-OR	7977341
CNMM 866-NR2	7977342
CNMM 866-OR	7977343
CNMM 866S-923	7977344
DCGT 32.50.5-FF2	7977206
DCGT 32.51L-SI	7977207
DCGT 32.51R-SI	7977208
DCGT 32.52L-SI	7977209
DCGT 32.52R-SI	7977210
DCMT 21.50.5-FF2	7977211
DCMT 21.50.5-FM	7973828
DCMT 21.50.5-UR	7977212
DCMT 21.51-FF2	7977213
DCMT 21.51-FM	7973829
DCMT 21.51-FM2	7977214
DCMT 21.51-UR	7973830
DCMT 21.52-FF2	7977215
DCMT 32.50.5-FF	7977216
DCMT 32.50.5-FM	7973831
DCMT 32.50.5-UR	7973832
DCMT 32.51-FF	7973833
DCMT 32.51-FF2	7977217
DCMT 32.51-FM	7973834
DCMT 32.51-FM2	7977218
DCMT 32.51-RM	7977219
DCMT 32.51-UR	7973835
DCMT 32.52-FF	7977220
DCMT 32.52-FF2	7977221
DCMT 32.52-FM	7973836
DCMT 32.52-FM2	7977222
DCMT 32.52-RM	7973837
DCMT 32.52-UR	7973838
DCMT 32.53-FM	7977223
DCMT 32.53-FM2	7977224
DCMT 32.53-RM	7977225
DCMT 432-RM	7973839
DCMX 32.51W-FM	7977226
DCMX 32.52W-FM	7977227
DNMG 331-FF	7977345
DNMG 331-FM	7977117
DNMG 331L-SI	7977346
DNMG 331-NF	7977347
DNMG 331-NM	7977348
DNMG 331R-SI	7977118
DNMG 331-SF	7977349
DNMG 331-SM	7977350
DNMG 332-FM	7977351
DNMG 332L-SI	7977352
DNMG 332-NF	7977353
DNMG 332-NM	7977354
DNMG 332R-SI	7977355
DNMG 332-SF	7977356

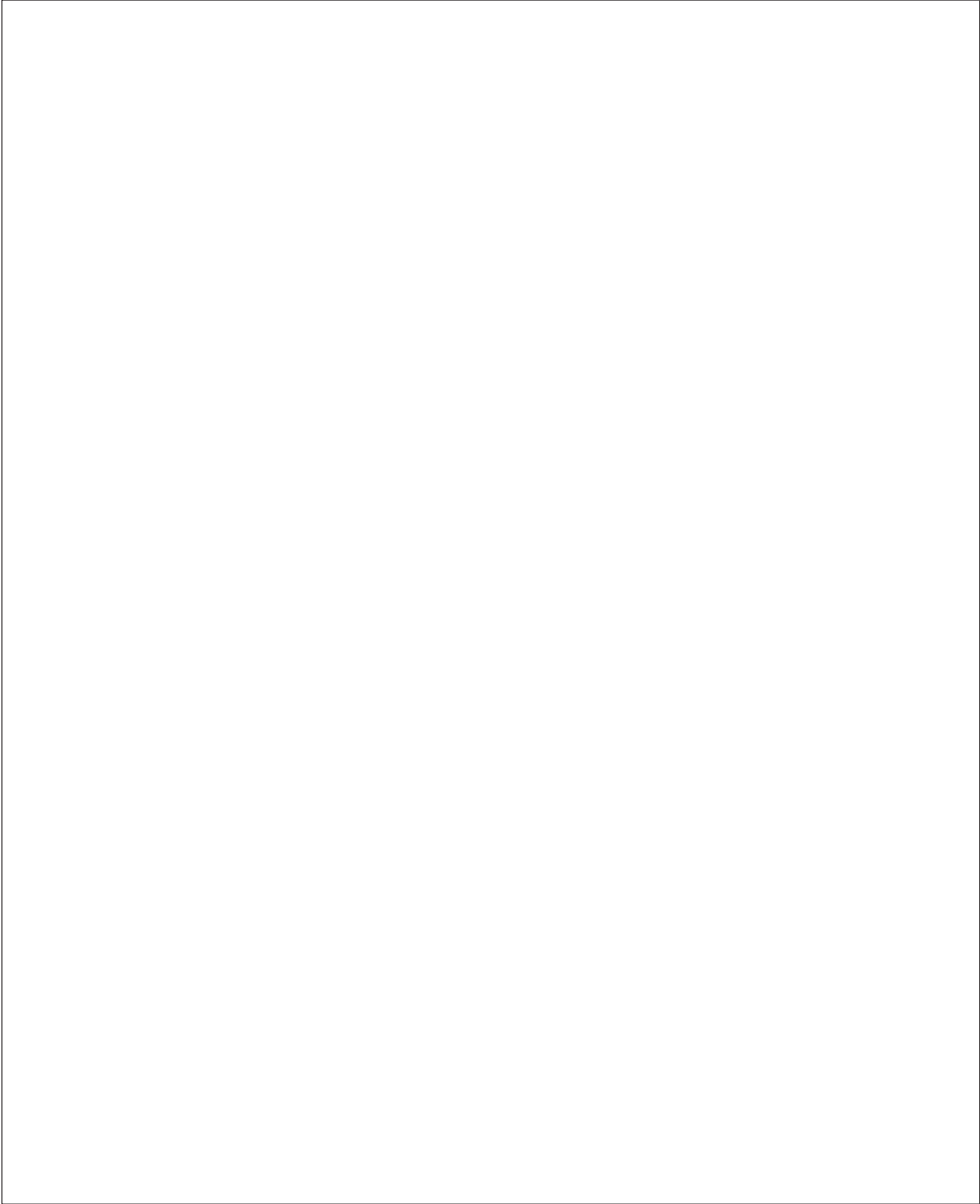
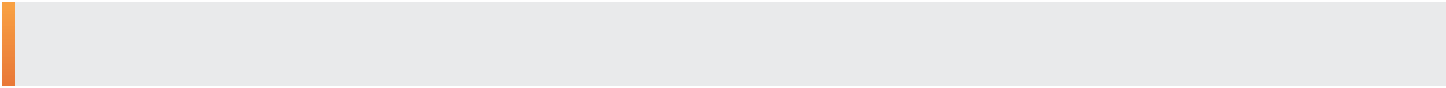
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DNMG 332-SM	7977357
DNMG 431-FM	7977358
DNMG 431L-SI	7977359
DNMG 431-NF	7977360
DNMG 431R-SI	7977361
DNMG 431-SF	7977362
DNMG 432-FM	7977363
DNMG 432L-SI	7977364
DNMG 432-NF	7977365
DNMG 432-NM	7977366
DNMG 432-NMR	7977367
DNMG 432R-SI	7977368
DNMG 432-SF	7977369
DNMG 441-FM	7977119
DNMG 441L-SI	7977120
DNMG 441-NF	7977121
DNMG 441-NM	7977370
DNMG 441-NMR	7977371
DNMG 441R-SI	7977122
DNMG 441-SF	7977372
DNMG 441-SM	7977373
DNMG 442-FM	7977123
DNMG 442L-SI	7977124
DNMG 442-NF	7977125
DNMG 442-NM	7977126
DNMG 442-NMR	7977374
DNMG 442-RM	7977127
DNMG 442R-SI	7977128
DNMG 442-SF	7977375
DNMG 442-SM	7977376
DNMG 443-FM	7977377
DNMG 443-NF	7977378
DNMG 443-NMR	7977379
DNMG 443-RM	7977380
DNMG 443-SM	7977381
DNMM 442-NR	7977382
ECMT 21.51-FM2	7977228
ECMT 2.521-FM2	7977229
ECMT 2.522-FM2	7977230
RCMT -1.5M0-FM	7977231
RCMT -1.5M0-UR	7977232
RCMT -2M0-FM	7973840
RCMT -2M0-UR	7973841
RCMT -2.5M0-FM	7977233
RCMT -2.5M0-UR	7973842
RCMT -3M0-FM	7977234
RCMT -3M0-RM3	7977235
RCMT -3M0-UR	7973843
RCMT -4M0-RM3	7977236
SCMT 32.51-FF2	7977237
SCMT 32.51-FM	7973844
SCMT 32.51-FM2	7977238

Insert	EDP#
SCMT 32.51-UR	7973845
SCMT 32.52-FF2	7977239
SCMT 32.52-FM	7973846
SCMT 32.52-FM2	7977240
SCMT 32.52-RM	7977241
SCMT 32.52-UR	7973847
SCMT 431-FM	7977242
SCMT 432-FM	7973848
SCMT 432-RM	7973849
SCMT 432-RM3	7977243
SCMT 432-UR	7973850
SCMT 433-FM	7977244
SCMT 433-UR	7977245
SNMG 431-FM	7977129
SNMG 431-NF	7977130
SNMG 432-FM	7977131
SNMG 432-NF	7977383
SNMG 432-NM	7977132
SNMG 432-NMR	7977133
SNMG 432-RM	7977384
SNMG 432-SF	7977385
SNMG 432-SM	7977386
SNMG 433-FM	7977387
SNMG 433-SF	7977388
SNMG 434-FM	7977389
SNMG 434-RM	7977390
SNMM 432-NR	7977134
SNMM 432-NR2	7977391
SNMM 433-NR2	7977392
SNMM 543-NR2	7977393
SNMM 643-OR	7977394
SNMM 644-NR2	7977395
SNMM 644-OR	7977396
SNMM 644S-923	7977397
SNMM 856-NR2	7977135
SNMM 856-OR	7977398
SNMM 856S-923	7977399
SNMM 866-OR	7977400
SNMM 866S-923	7977401
TCGT 1.21.20.5-FF2	7977246
TCGT 21.50.5L-SI	7973851
TCGT 21.50.5R-SI	7977247
TCGT 21.51L-SI	7977248
TCGT 21.51R-SI	7977249
TCMT 1.21.20.5-FF2	7977250
TCMT 1.21.21-FF2	7977251
TCMT 1.81.51-FF2	7973852
TCMT 21.50.5-FM	7973853
TCMT 21.51-FF2	7973854
TCMT 21.51-FM	7973855
TCMT 21.51-FM2	7973856
TCMT 21.51-UR	7973857

Insert	EDP#
TCMT 21.52-FF2	7977252
TCMT 21.52-FM	7973858
TCMT 21.52-FM2	7977253
TCMT 32.51-FF2	7977254
TCMT 32.51-FM	7973859
TCMT 32.51-RM3	7977255
TCMT 32.51-UR	7973860
TCMT 32.52-FF2	7977256
TCMT 32.52-FM	7973861
TCMT 32.52-FM2	7977257
TCMT 32.52-RM	7973862
TCMT 32.52-RM3	7977258
TCMT 32.52-UR	7973863
TCMT 32.53-RM	7977259
TNMG 331-FF	7977402
TNMG 331-FM	7977136
TNMG 331L-SI	7977137
TNMG 331-NF	7977138
TNMG 331-NM	7977403
TNMG 331-NMR	7977404
TNMG 331R-SI	7977139
TNMG 331-SF	7977405
TNMG 331-SM	7977406
TNMG 332-FM	7977140
TNMG 332L-SI	7977141
TNMG 332-NF	7977142
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TNMG 333-FM	7977408
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TNMG 431-FM	7977410
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TNMG 432-FM	7977147
TNMG 432-NM	7977148
TNMG 432-NMR	7977149
TNMG 432-SF	7977412
TNMG 432-SM	7977150
TNMM 433-NR2	7977151
VBMT 21.51-UR	7977260
VBMT 220.5-FM	7973864
VBMT 221-FM	7973865
VBMT 222-FM	7973866
VBMT 330.5-FM	7973867
VBMT 330.5-UR	7973868
VBMT 331-FF2	7977261
VBMT 331-FM	7973869
VBMT 331-FM2	7977262
VBMT 331-RM	7977263
VBMT 331-UR	7973870

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VBMT 332-FM	7973871
VBMT 332-FM2	7977264
VBMT 332-RM	7977265
VBMT 332-UR	7973872
VBMT 333-FM	7977266
VBMT 333-FM2	7977267
VBMT 333-RM	7977268
VBMT 333-UR	7977269
VCGT 1.21.50.5-FF2	7977270
VCGT 1.21.51-FF2	7977271
VCGT 2.520.5-FF2	7977272
VCGT 2.521-FF2	7977273
VCGT 2.522-FM2	7977274
VCMT 221-UR	7973873
VCMT 222-UR	7973874
VCMT 331-FM	7973875
VCMT 331-UR	7977275
VCMT 332-FM	7973876
VCMT 332-UR	7977276
VNMG 331-FF	7977152
VNMG 331-FM	7977153
VNMG 331-NF	7977413
VNMG 331-NM	7977154
VNMG 331-SF	7977414
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VNMG 332-FM	7977155
VNMG 332-NF	7977156
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VNMG 332-NMR	7977417
VNMG 332-SF	7977418
VNMG 332-SM	7977419
VNMG 333-FM	7977420
VNMG 333-NMR	7977421
WCGT 1.210.5-FF2	7977277
WCGT 1.211-FF2	7977278
WCMT 32.51-FM	7977279
WCMT 32.52-FM	7977280
WCMT 431-FM	7977281
WCMT 432-FM	7977282
WCMT 433-FM	7977283
WNMG 331-FM	7977422
WNMG 331L-SI	7977423
WNMG 331-NF	7977424
WNMG 331-NM	7977425
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WNMG 331R-SI	7977427
WNMG 331-SF	7977428
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WNMG 332-SF	7977430

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WNMG 32.51-FM	7977433
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WNMG 431L-SI	7977161
WNMG 431-NF	7977162
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WNMG 431-NMR	7977436
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WNMG 431-SF	7977164
WNMG 431-SM	7977437
WNMG 432-FM	7977165
WNMG 432L-SI	7977166
WNMG 432-M	7977167
WNMG 432-NF	7977168
WNMG 432-NM	7977169
WNMG 432-NMR	7977170
WNMG 432-RM	7977171
WNMG 432R-SI	7977172
WNMG 432-SF	7977438
WNMG 432-SM	7977173
WNMG 433-FM	7977439
WNMG 433L-SI	7977440
WNMG 433-NF	7977441
WNMG 433-NMR	7977442
WNMG 433R-SI	7977443
WNMG 433-SM	7977444
WNMG 434-RM	7977445
WNMM 432-NR	7977446
WNMM 432-OR	7977447



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