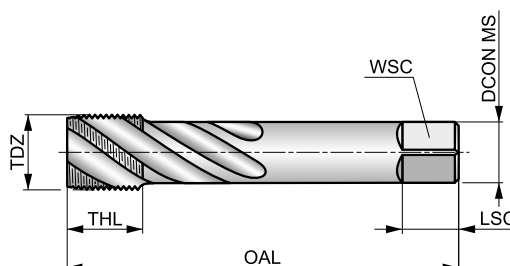


EX41



HSS-E-PM Spiral Flute Machine Tap, G(BSP), DIN Standard

Machine tap with spiral flute suited for blind holes. Steam tempered surface acts to retain cutting fluid and prevent chip to tool welding. The reduced shank increases the reach of the tap.



G	DIN 5156	Normal
	2.5×D	HSS-E PM
C 2-3		λ 45°
R		ST

Workpiece material group suitability and starting values for cutting speed (m/min).

P1.1 ▣21	P2.2 ▣15	P2.3 ▣13	P3.2 ▣9	P3.3 ▣8	P4.1 ▣7	P4.2 ▣5	M1.1 ▣8	M1.2 ▣6	M2.1 ▣7	M2.2 ▣5	M3.1 ▣5	M3.2 ▣4	M3.3 ▣3
M4.1 ▣3													

Product	TDZ	TPI	TD	OAL	THL	DCON MS	WSC	LSC	NOF	PHD
			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		[mm]
EX411/8	1/8	28	9.728	90.0	13	7.00	5.50	8	3	8.80
EX411/4	1/4	19	13.157	100.0	15	11.00	9.00	12	3	11.80
EX413/8	3/8	19	16.662	100.0	15	12.00	9.00	12	4	15.25
EX411/2	1/2	14	20.955	125.0	18	16.00	12.00	15	4	19.00
EX415/8	5/8	14	22.911	125.0	18	18.00	14.50	17	4	21.00
EX413/4	3/4	14	26.441	140.0	20	20.00	16.00	19	4	24.50
EX417/8	7/8	14	30.201	150.0	20	22.00	18.00	21	4	28.25
EX411	1"	11	33.249	160.0	22	25.00	20.00	23	4	30.75
EX411.1/8	1.1/8	11	37.897	170.0	22	28.00	22.00	25	4	35.00
EX411.1/4 ¹⁾	1.1/4	11	41.910	170.0	22	32.00	24.00	27	4	39.50
EX411.1/2 ¹⁾	1.1/2	11	47.803	190.0	23	36.00	29.00	32	4	45.00

¹⁾ HSS-E.



WMG (WORK MATERIAL GROUP)

ISO group	WMG (Work Material Group)			Hardness (HB or HRC)	Ultimate Tensile Strength (MPa)
P	P1	P1.1	Sulfurized	< 240 HB	≤ 830
		P1.2	Sulfurized and phosphorized	< 180 HB	≤ 620
		P1.3	Sulfurized/phosphorized and leaded	< 180 HB	≤ 620
	P2	P2.1	Containing <0.25 % C	< 180 HB	≤ 620
		P2.2	Containing <0.55 % C	< 240 HB	≤ 830
		P2.3	Containing >0.55 % C	< 300 HB	≤ 1030
	P3	P3.1	Annealed	< 180 HB	≤ 620
		P3.2	Hardened and tempered	180 – 260 HB	> 620 ≤ 900
		P3.3		260 – 360 HB	> 900 ≤ 1240
M	M1	M1.1	Ferritic stainless steel	< 160 HB	≤ 520
		M1.2	(straight chromium non-hardenable alloys)	160 – 220 HB	> 520 ≤ 700
		M2.1	Annealed	< 200 HB	≤ 670
	M2	M2.2	Quenched and tempered	200 – 280 HB	> 670 ≤ 950
		M2.3	Precipitation-hardened	280 – 380 HB	> 950 ≤ 1300
	M3	M3.1	Austenitic stainless steel (chromium-nickel and chromium-nickel-manganese alloys)	< 200 HB	≤ 750
		M3.2		200 – 260 HB	> 750 ≤ 870
		M3.3		260 – 300 HB	> 870 ≤ 1040
	M4	M4.1	Austenitic-ferritic (DUPLEX) or super-austenitic stainless steel	< 300 HB	≤ 990
		M4.2	Precipitation hardening austenitic stainless steel	300 – 380 HB	≤ 1320
K	K1	K1.1	Ferritic or ferritic-pearlitic	< 180 HB	≤ 190
		K1.2	Ferritic-pearlitic or pearlitic	180 – 240 HB	> 190 ≤ 310
		K1.3	Pearlitic	240 – 280 HB	> 310 ≤ 390
	K2	K2.1	Ferritic	< 160 HB	≤ 400
		K2.2	Ferritic or pearlitic	160 – 200 HB	> 400 ≤ 550
		K2.3	Pearlitic	200 – 240 HB	> 550 ≤ 660
	K3	K3.1	Ferritic	< 180 HB	≤ 560
		K3.2	Ferritic or pearlitic	180 – 220 HB	> 560 ≤ 680
		K3.3	Pearlitic	220 – 260 HB	> 680 ≤ 800
	K4	K4.1	Austenitic gray iron (ASTM A436) (iron-carbon alloy castings with an austenitic lamellar graphite microstructure)	< 180 HB	≤ 190
		K4.2	Austenitic ductile iron (ASTM A439 or ASTM A571) (iron-carbon alloy castings with an austenitic nodular graphite microstructure)	< 240 HB	≤ 740
		K4.3	Austempered ductile iron (ASTM A897) (iron-carbon alloy castings with an ausferrite microstructure)	< 280 HB	> 840 ≤ 980
		K4.4		280 – 320 HB	> 980 ≤ 1130
		K4.5		320 – 360 HB	> 1130 ≤ 1280
	K5	K5.1	Ferritic	< 180 HB	≤ 400
		K5.2	Ferritic-pearlitic	180 – 220 HB	> 400 ≤ 450
		K5.3	Pearlitic	220 – 260 HB	> 450 ≤ 500
N	N1	N1.1	Commercially pure wrought aluminium	< 60 HB	≤ 240
		N1.2	Wrought aluminium alloys	60 – 100 HB	> 240 ≤ 400
		N1.3		100 – 150 HB	> 400 ≤ 590
	N2	N2.1	Cast aluminium alloys	< 75 HB	≤ 240
		N2.2		75 – 90 HB	> 240 ≤ 270
		N2.3		90 – 140 HB	> 270 ≤ 440
	N3	N3.1	Free-cutting copper-alloys materials with excellent machining properties	–	–
		N3.2	Short-chip copper-alloys with good to moderate machining properties	–	–
		N3.3	Electrolytic copper and long-chip copper-alloys with moderate to poor machining properties	–	–
	N4	N4.1	Thermoplastic polymers	–	–
		N4.2	Thermosetting polymers	–	–
		N4.3	Reinforced polymers or composites	–	–
S	S1	S1.1	Titanium or titanium alloys	< 200 HB	≤ 660
		S1.2		200 – 280 HB	> 660 ≤ 950
		S1.3		280 – 360 HB	> 950 ≤ 1200
	S2	S2.1	Fe-based high-temperature alloys	< 200 HB	≤ 690
		S2.2		200 – 280 HB	> 690 ≤ 970
		S2.3		< 280 HB	≤ 940
	S3	S3.1	Ni-based high-temperature alloys	280 – 360 HB	> 940 ≤ 1200
		S3.2		< 240 HB	≤ 800
		S3.3		240 – 320 HB	> 800 ≤ 1070
H	H1	H1.1	Chilled cast iron	< 440 HB	–
		H1.2	Hardened cast iron	< 55 HRC	–
	H2	H2.1		> 55 HRC	–
		H2.2	Hardened steel <55 HRC	< 51 HRC	–
	H3	H3.1		51 – 55 HRC	–
		H3.2	Hardened steel >55 HRC	55 – 59 HRC	–
	H4	H4.1		> 59 HRC	–
		H4.2			