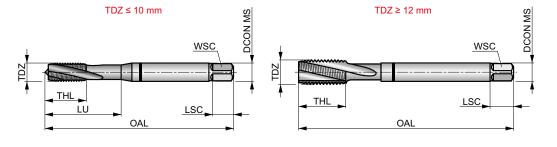
E335

High performance blind hole slightly upwards, yet withou for superior performance

Black SHARK 15° Spiral Flute Metric Machine Tap, DIN Standard

High performance blind hole tap for efficient tapping in high strength steels and titanium alloys. A 15° slow spiral allows the chips to be pulled slightly upwards, yet without weakening the cutting edge, as higher spiral taps would. Unique HSS-E-PM substrate along with TiAIN-Top coating for superior performance.

SHARK





							Workpiece material group suitability and starting values for cutting speed (m/n				
P3.3	P4.2	P4.3	S1.2	S1.3	S3.1 S3.2	H3.1					
1 6	12	9	12	■7	∎4 ■2	⊠6					
		TDZ	TP	OAL	THL	DCON MS	WSC	LSC	NOF	PHD	LU
Product											
			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		[mm]	[mm]
E335M3		3	0.50	63.0	12	4.50	3.40	6	3	2.50	12.00
E335M4		4	0.70	70.0	13	6.00	4.90	8	3	3.30	13.00
E335M5		5	0.80	80.0	15	6.00	4.90	8	3	4.20	15.00
E335M6		6	1.00	90.0	18	8.00	6.20	9	3	5.00	18.00
E335M8		8	1.25	100.0	20	10.00	8.00	11	3	6.80	20.00
E335M10		10	1.50	100.0	20	10.00	8.00	11	3	8.50	39.00
E335M12		12	1.75	110.0	23	9.00	7.00	10	4	10.30	_

WMG (WORK MATERIAL GROUP)

150 gi	roup	WM	G (Work Material Group)		Hardness (HB or HRC)	Ultimate Tensile Strength (MPa)
		P1.1		Sulfurized	< 240 HB	≤ 830
	P1	P1.2	Free machining steel	Sulfurized and phosphorized	< 180 HB	≤ 620
		P1.3	(carbon steels with increased machinability)	Sulfurized/phosphorized and leaded	< 180 HB	≤ 620
Р		P2.1				
			Plain carbon steel	Containing <0.25 % C	< 180 HB	≤ 620
	P2	P2.2	(steels comprised of mainly iron and carbon)	Containing <0.55 % C	< 240 HB	≤ 830
		P2.3		Containing >0.55 % C	< 300 HB	≤ 1030
Γ		P3.1		Annealed	< 180 HB	≤ 620
	P3	P3.2	Alloy steel		180 – 260 HB	> 620 ≤ 900
		P3.3	(carbon steels with an alloying content \leq 10%)	Hardened and tempered	260 - 360 HB	> 900 ≤ 1240
		P4.1		< 26 HRC	≤ 900	
	P4		Tool steel	26 – 39 HRC	> 900 ≤ 1240	
	r 4	P4.2	 (special alloy steel for tools, dies and molds) 	Hardened and tempered		
		P4.3			39 – 45 HRC	> 1240 ≤ 1450
	M1	M1.1	Ferritic stainless steel		< 160 HB	≤ 520
М	- Mil	M1.2	(straight chromium non-hardenable alloys)		160 – 220 HB	> 520 ≤ 700
		M2.1		Annealed	< 200 HB	≤ 670
	M2	M2.2	Martensitic stainless steel	200 – 280 HB	> 670 ≤ 950	
		M2.3	(straight chromium hardenable alloys)	Quenched and tempered Precipitation-hardened	280 – 380 HB	> 950 ≤ 1300
				recipitation nurdened	< 200 HB	≤ 750
		M3.1	Austenitic stainless steel			
	M3	M3.2	(chromium-nickel and chromium-nickel-manganese alloys)	200 – 260 HB	> 750 ≤ 870	
		M3.3		260 – 300 HB	> 870 ≤ 1040	
		M4.1	Austenitic-ferritic (DUPLEX) or super-austenitic stainless steel		< 300 HB	≤ 990
	M4	M4.2	Precipitation hardening austenitic stainless steel		300 – 380 HB	≤ 1320
		K1.1		Ferritic or ferritic-pearlitic	< 180 HB	≤ 190
	1/1		Gray iron or Automotive Gray iron (GG)	· · · · · · · · · · · · · · · · · · ·		
	K1	K1.2	(iron-carbon castings with a lamellar graphite microstructure)	Ferritic-pearlictic or pearlitic	180 – 240 HB	> 190 ≤ 310
		K1.3		Pearlitic	240 – 280 HB	> 310 ≤ 390
		K2.1	Malleable iron (GTS/GTW)	Ferritic	< 160 HB	≤ 400
	K2	K2.2	(iron-carbon castings with a graphite-free microstructure)	Ferritic or pearlitic	160 – 200 HB	> 400 ≤ 550
		K2.3	(non-carbon castings with a graphice-free microstructure)	Pearlitic	200 – 240 HB	> 550 ≤ 660
		K3.1		Ferritic	< 180 HB	≤ 560
	K3	K3.2	Ductile iron (GGG)	Ferritic or pearlitic	180 – 220 HB	> 560 ≤ 680
	K.S		(iron-carbon castings with a nodular graphite microstructure)			
		K3.3		Pearlitic	220 – 260 HB	> 680 ≤ 800
K		K4.1	Austenitic gray iron (ASTM A436) (iron-carbon alloy castings with an austenitic lamellar graphite microstructure)		< 180 HB	≤ 190
	K4	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		< 280 HB	> 840 ≤ 980	
		K4.4	Austempered ductile iron (ASTM A897)		280 – 320 HB	> 980 ≤ 1130
		K4.5	(iron-carbon alloy castings with an ausferrite microstructure)		320 – 360 HB	> 1130 ≤ 1280
				Ferritic		
		K5.1	Compacted graphite iron CGI (ASTM A842)		< 180 HB	≤ 400
	K5	K5.2	(iron-carbon castings with a vermicular graphite structure)	Ferritic-pearlitic	180 – 220 HB	> 400 ≤ 450
		K5.3		Pearlitic	220 – 260 HB	> 450 ≤ 500
		N1.1	Commercially pure wrought aluminium		< 60 HB	≤ 240
N	N1	N1.2	Weinstein Leither Heine	Half hard tempered	60 - 100 HB	> 240 ≤ 400
		N1.3	Wrought aluminium alloys	Full hard tempered	100 – 150 HB	> 400 ≤ 590
		N2.1			< 75 HB	≤ 240
	ND		Cast aluminium allour			
	N2	N2.2	Cast aluminium alloys	75 – 90 HB	> 240 ≤ 270	
		N2.3			90 – 140 HB	> 270 ≤ 440
		N3.1	Free-cutting copper-alloys materials with excellent machining properties	-	-	
	N3	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 proper	-	-	
		N4.1	Thermoplastic polymers		-	-
	N4	N4.2	Thermosetting polymers		-	-
		N4.3	Reinforced polymers or composites		_	_
	114		Graphite		_	_
					< 200 HB	_ ≤ 660
	N5	N5.1				
	N5	N5.1 S1.1				
		N5.1 S1.1 S1.2	Titanium or titanium alloys		200 – 280 HB	> 660 ≤ 950
	N5	N5.1 S1.1 S1.2 S1.3			200 – 280 HB 280 – 360 HB	> 660 ≤ 950 > 950 ≤ 1200
	N5 S1	N5.1 S1.1 S1.2 S1.3 S2.1	Titanium or titanium alloys		200 – 280 HB 280 – 360 HB < 200 HB	> 660 ≤ 950
ς	N5	N5.1 S1.1 S1.2 S1.3			200 – 280 HB 280 – 360 HB	> 660 ≤ 950 > 950 ≤ 1200
S	N5 S1 S2	N5.1 S1.1 S1.2 S1.3 S2.1 S2.2	Titanium or titanium alloys Fe-based high-temperature alloys		200 – 280 HB 280 – 360 HB < 200 HB	$> 660 \le 950$ $> 950 \le 1200$ ≤ 690
S	N5 S1	N5.1 S1.1 S1.2 S1.3 S2.1 S2.2 S3.1	Titanium or titanium alloys		200 – 280 HB 280 – 360 HB < 200 HB 200 – 280 HB < 280 HB	$> 660 \le 950$ > 950 \le 1200 \$\le 690\$ > 690 \le 970 \$\le 940\$
S	N5 S1 S2 S3	N5.1 S1.2 S1.3 S2.1 S2.2 S3.1 S3.2	Titanium or titanium alloys Fe-based high-temperature alloys		200 – 280 HB 280 – 360 HB < 200 HB 200 – 280 HB < 280 HB 280 – 360 HB	$> 660 \le 950$ $> 950 \le 1200$ ≤ 690 $> 690 \le 970$ ≤ 940 $> 940 \le 1200$
S	N5 S1 S2	N5.1 51.2 51.3 52.1 52.2 53.1 53.2 54.1	Titanium or titanium alloys Fe-based high-temperature alloys		200 - 280 HB 280 - 360 HB 200 - 280 HB 200 - 280 HB 280 - 360 HB 280 - 360 HB < 240 HB	$> 660 \le 950$ > 950 \le 1200 \$\le 690\$ > 690 \le 970 \$\le 940\$ > 940 \le 1200 \$\le 800\$
S	N5 S1 S2 S3 S4	N5.1 S1.1 S1.2 S1.3 S2.1 S2.2 S3.1 S3.2 S4.1 S4.2	Titanium or titanium alloys Fe-based high-temperature alloys Ni-based high-temperature alloys Co-based high-temperature alloys		200 - 280 HB 280 - 360 HB 200 - 280 HB 200 - 280 HB 280 - 360 HB 280 - 360 HB 240 - 320 HB	$> 660 \le 950$ $> 950 \le 1200$ ≤ 690 $> 690 \le 970$ ≤ 940 $> 940 \le 1200$ ≤ 800 $> 800 \le 1070$
S	N5 S1 S2 S3	N5.1 51.2 51.3 52.1 52.2 53.1 53.2 54.1 54.2 H1.1	Titanium or titanium alloys Fe-based high-temperature alloys Ni-based high-temperature alloys		200 - 280 HB 280 - 360 HB 200 - 280 HB 200 - 280 HB 280 - 360 HB 280 - 360 HB 240 - 320 HB 240 - 320 HB	$> 660 \le 950$ > 950 \le 1200 \$\le 690\$ > 690 \le 970 \$\le 940\$ > 940 \le 1200 \$\le 800\$
S	N5 S1 S2 S3 S4 H1	N5.1 51.2 51.3 52.2 53.1 53.2 54.1 54.2 H1.1 H2.1	Titanium or titanium alloys Fe-based high-temperature alloys Ni-based high-temperature alloys Co-based high-temperature alloys Chilled cast iron		200 - 280 HB 280 - 360 HB 200 - 280 HB 200 - 280 HB 280 - 360 HB 280 - 360 HB 240 - 320 HB	$> 660 \le 950$ $> 950 \le 1200$ ≤ 690 $> 690 \le 970$ ≤ 940 $> 940 \le 1200$ ≤ 800 $> 800 \le 1070$
S	N5 S1 S2 S3 S4	N5.1 51.2 51.3 52.1 52.2 53.1 53.2 54.1 54.2 H1.1	Titanium or titanium alloys Fe-based high-temperature alloys Ni-based high-temperature alloys Co-based high-temperature alloys		200 - 280 HB 280 - 360 HB 200 - 280 HB 200 - 280 HB 280 - 360 HB 280 - 360 HB 240 - 320 HB 240 - 320 HB	$> 660 \le 950$ $> 950 \le 1200$ ≤ 690 $> 690 \le 970$ ≤ 940 $> 940 \le 1200$ ≤ 800 $> 800 \le 1070$ -
S	N5 S1 S2 S3 S4 H1 H2	N5.1 51.2 51.3 52.1 52.2 53.1 53.2 54.1 54.2 H1.1 H2.1 H2.2	Titanium or titanium alloys Fe-based high-temperature alloys Ni-based high-temperature alloys Co-based high-temperature alloys Chilled cast iron Hardened cast iron		200 - 280 HB 280 - 360 HB < 200 HB 200 - 280 HB < 280 HB 280 - 360 HB 280 - 360 HB 240 HB 240 - 320 HB < 440 HB < 55 HRC > 55 HRC	$> 660 \le 950$ $> 950 \le 1200$ ≤ 690 $> 690 \le 970$ ≤ 940 $> 940 \le 1200$ ≤ 800 $> 800 \le 1070$ $-$
S H	N5 S1 S2 S3 S4 H1	N5.1 S1.2 S1.3 S2.1 S2.2 S3.1 S3.2 S4.1 S4.2 H1.1 H2.1 H2.2 H3.1	Titanium or titanium alloys Fe-based high-temperature alloys Ni-based high-temperature alloys Co-based high-temperature alloys Chilled cast iron		200 - 280 HB 280 - 360 HB < 200 HB 200 - 280 HB 280 - 360 HB 280 - 360 HB 240 - 320 HB 240 - 320 HB < 55 HRC > 55 HRC < 51 HRC	$> 660 \le 950$ $> 950 \le 1200$ ≤ 690 $> 690 \le 970$ ≤ 940 $> 940 \le 1200$ ≤ 800 $> 800 \le 1070$ - - -
S H	N5 S1 S2 S3 S4 H1 H2	N5.1 51.2 51.3 52.1 52.2 53.1 53.2 54.1 54.2 H1.1 H2.1 H2.2	Titanium or titanium alloys Fe-based high-temperature alloys Ni-based high-temperature alloys Co-based high-temperature alloys Chilled cast iron Hardened cast iron		200 - 280 HB 280 - 360 HB < 200 HB 200 - 280 HB < 280 HB 280 - 360 HB 280 - 360 HB 240 HB 240 - 320 HB < 440 HB < 55 HRC > 55 HRC	$> 660 \le 950$ $> 950 \le 1200$ ≤ 690 $> 690 \le 970$ ≤ 940 $> 940 \le 1200$ ≤ 800 $> 800 \le 1070$ - - - -