

# PRODUCT CATALOG

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**MAKINA TAKIM**

PRODUCT CATALOG

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MakinaTakimEnd



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**Makina Takım Endüstrisi A.Ş.**

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**MAKINA TAKIM**

PRODUCT CATALOG





## EXPERIENCE MORE THAN 50 YEARS IN TURKISH INDUSTRY

Makina Takim Endüstrisi A.Ş. (MTE), was established in 1957 as the first cutting tool manufacturer of Turkey. MTE, is the first factory established within the range of 100 km between İstanbul and İzmit on E-5 motorway. 3 years after its establishment, it began to export its products to USA in 1960 and became the first establishment that export industrial products in Turkey. A portion of the company's shares were opened to public in 1968, and as of today, more than 50% of the company's shares are publicly traded. In 1998, MTE acquired the rival company Evar Kesici Takim Sanayi A.Ş. and began to serve the Turkish cutting-tool industry in a broader array.

As the biggest cutting-tool manufacturer in Turkey, MTE continues its operations on a closed area of 12.000 square meters and an open area of 27.000 square meters, with 234 employees. Our plant manufactures drilling, screw, cutting, and saw product groups, with workbench park and over 30.000 different types of individual products available.

In addition, the plant manufactures specially designed products requested by industrialist customers for their own benches; these items are crafted according to the knowledge and experience of our engineers. With over 50 years of experience in the manufacture of specialty cutting tools, it has amassed a specialty product design archive of approximately 50.000 pieces, including the entire design and production information for each of these tools.



PLANT VIDEO


 IDEAL TOOL GEOMETRY  
WITH PRECISION

 LATEST TECHNOLOGY  
PRODUCTION MACHINES

 HIGH QUALITY  
RAW MATERIALS WITH  
HIGH PERFORMANCE

 WIDE RANGE OF  
PRODUCTS

 10000 m2 NEW PRODUCTION  
AREA WITH MODERN PRODUCTION  
TECHNOLOGY

500 TONS OF PRODUCTION  
ANNUALLY WITH STATE  
OF THE ART MANUFACTURING  
TECHNOLOGIES

Being one of the oldest companies of Turkish industry and consequently having worked with many other companies involved within Turkish industry over a long period, patent, know-how and workbench production knowledge it obtained or transferred from the greatest technology producers since its establishment, its high quality in the produced products with the engineer, employee crew it trained in its own factory, its capacity size and with its accumulation of knowledge and manufacturing technology, enable Makina Takim brand to be one of the leading cutting tool brand of Turkey. In addition, it is among the known brands most preferred in the industry abroad.

Makina Takim Endüstrisi A.Ş. meets the increasing demands of its customers by following technological innovations in the cutting-tool sector, and through its knowledge and experience, all of which ensure internal and external customer satisfaction. It provides reliable services to all the cutting-tool users before and after sale through its Istanbul, Bursa, Ankara, and Izmir Branches, and through its broad network of dealers throughout Turkey.


 MAXIMUM STOCK LEVELS


 STRONG DISTRIBUTION  
CHANNELS

TECHNICAL SUPPORT



# VISION MISSION QUALITY POLICY STATEMENT

Makina Takim Endüstrisi A.Ş. (MTE), WAS ESTABLISHED IN 1957 AS THE FIRST CUTTING TOOL MANUFACTURER OF TURKEY. 3 YEARS AFTER ITS ESTABLISHMENT, IT BEGAN TO EXPORT ITS PRODUCTS TO USA IN 1960 AND BECAME THE FIRST ESTABLISHMENT THAT EXPORT INDUSTRIAL PRODUCTS IN TURKEY.

#### Our vision

As a follower and developer of technological innovation in the cutting tool sector and sustainable leading manufacturer of Turkey and the region, becoming an international brand that can respond local and global demand in a dynamic way.

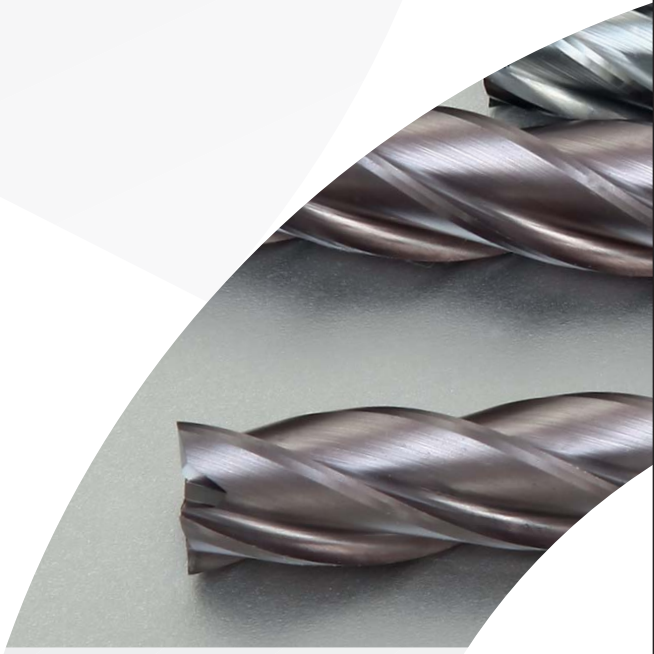
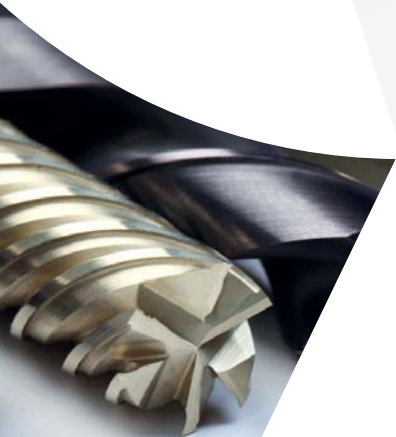
#### Our mission

To meet the requirements of Turkish industries by providing products and services of the highest quality and at the most appropriate prices; to contribute in the development of the industries we serve by closely following developments in the cutting-tools and machining industries of the greater world; to minimize the foreign-source dependency of the cutting-tools and products industry in Turkey; and to increase our contributions to shareholders, internal and external customers, society, and the protection of environment.

#### Quality Policy

To meet customer needs and expectations in the line of Makina Takim vision, develops high performance products with wide product range, produces on time and provides after - sell service.





## INDEX

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SOLID CARBIDE TOOLS (VHM)	9
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DRILL BITS	61
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TAPS	115
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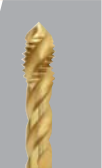
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HIGH PERFORMANCE TAPS <b>MTEORange</b>	159
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ROUND DIES/THREAD CHASERS	205
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REAMERS	217
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COUNTERSINKS	233
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MILLING CUTTERS	247
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SAWS & TOOL BITS	275
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SPECIAL TOOLS	285
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Material	<b>HSS</b> High Speed Steel	<b>HSS-E</b> High Speed Steel With Co	<b>VHM</b> Solid Carbide			
Norm	<b>DIN 9</b>	<b>DIN 8094</b>				
Type	<b>N</b>	<b>H</b>	<b>W</b>			
Point Angle						
Thread Type	<b>M</b>	<b>MF</b>	<b>UNC</b>	<b>UNF</b>	<b>BSW</b>	<b>BSP</b>
Thread Angle						
Helix Angle	<b>R25°</b>	<b>R35°</b>	<b>R45°</b>			
Cutting Direction						
The Shank						



SOLID  
CARBIDE  
(VHM)  
TOOLS



SOLID CARBIDE (VHM) TOOLS





Tool Type	Standard	CoaTiNg	Page No
VHM DRILL BITS	Din 338	TiAIN	15
VHM SHORT DRILL BITS	Din 6539	TiAIN	16
VHM DRILL BITS 3XD	MTE	TiAIN	17
VHM DRILL BITS 3XD - INTERNAL COOLANT	MTE	TiAIN	19
VHM DRILL BITS 5XD	MTE	TiAIN	21
VHM DRILL BITS 5XD - INTERNAL COOLANT	MTE	TiAIN	23
VHM DRILL BITS 5XD - INTERNAL COOLANT - DOUBLE MARGIN	MTE	TiAIN	25
VHM DRILL BITS 8XD - INTERNAL COOLANT - DOUBLE MARGIN	MTE	TiAIN	27
VHM DRILL BITS 12XD - INTERNAL COOLANT - DOUBLE MARGIN	MTE	TiAIN	29
VHM DRILL BITS 15XD - INTERNAL COOLANT - DOUBLE MARGIN	MTE	TiAIN	30
VHM NC CENTERING DRILL BITS - 90°	MTE	TiN	31
VHM NC CENTERING DRILL BITS - 120°	MTE	TiN	32
VHM CENTER DRILL	MTE	TiAIN	33
VHM END MILLS 2 FLUTES	Din 6528	TiAIN	34
VHM LONG END MILLS 2 FLUTES	MTE	TiAIN	35
VHM EXTRA LONG END MILLS 2 FLUTES	MTE	TiAIN	36
VHM END MILLS 3 FLUTES	Din 6528	TiAIN	37
VHM LONG END MILLS 3 FLUTES	MTE	TiAIN	38
VHM EXTRA LONG END MILLS 3 FLUTES	MTE	TiAIN	39
VHM END MILLS 4 FLUTES	Din 6528	TiAIN	40
VHM LONG END MILLS 4 FLUTES	MTE	TiAIN	41
VHM EXTRA LONG END MILLS 4 FLUTES	MTE	TiAIN	42
VHM END MILLS 2 FLUTES - ALU	Din 6527	-	43
VHM END MILLS 3 FLUTES - ALU	MTE	-	44
VHM END MILLS 3 FLUTES - INOX - CHAMFER	Din 6527	AlTiN	45
VHM END MILLS 4 FLUTES - INOX - CHAMFER	MTE	AlTiN	46
VHM END MILLS 4 FLUTES	Din 6527	TiAIN	47
VHM END MILLS 4 FLUTES - 35°/38°	MTE	TiAIN	48
VHM END MILLS 3/4 FLUTES 65 HRC - RADIUS	MTE	AlTiN	49
VHM END MILLS 4 FLUTES 35°/38° - INOX - CHAMFER	MTE	AlTiN	50
VHM END MILLS BALL NOSE 4 FLUTES 35°/38°	Din 6527	TiAIN	51
VHM ROUGHING END MILLS 4 FLUTES 35°/38°	MTE	TiAIN	52
VHM BALL NOSE SHORT END MILLS 2 FLUTES	MTE	TiAIN	53
VHM BALL NOSE LONG END MILLS 2 FLUTES	MTE	TiAIN	54
VHM BALL NOSE EXTRA LONG END MILLS 2 FLUTES	MTE	TiAIN	55
VHM BALL NOSE SHORT END MILLS 4 FLUTES	MTE	TiAIN	56
VHM BALL NOSE LONG END MILLS 4 FLUTES	MTE	TiAIN	57
VHM BALL NOSE EXTRA LONG END MILLS 4 FLUTES	MTE	TiAIN	58
VHM MACHINE REAMER	MTE	TiAIN	59
VHM MACHINE REAMER STRAIGHT FLUTE	MTE	TiAIN	60

Materials		DIN	VHM Drill Bit Diameter, (mm)		
			DRILL BITS	Ø3-6	Ø6-10
			CutTiNg Speed (Vc),m/min.	Feed Rate mm/rev	
P	<b>STEEL</b>				
	Construction soft steel	St37-3	100-130	0,10-0,25	0,15-0,30
	Free-cutTiNg steels, Construction steel, Carburizing steel	9 S 20 ,9 SMn 28 St33-1 ,St37-3 ,C10	90-120	0,10-0,25	0,15-0,30
	Carbon steel Low-alloy steel Cast steel	35S20 ,St52-3 9SMnPb28 ,C45 St-50-2 ,GS40Mn5	70-100	0,10-0,25	0,15-0,30
	Alloy steel Cold-Work tool steel	C55 ,C60 41CrAlMo7 ,41Cr4 100Cr6	60-80	0,08-0,14	0,10-0,22
	Tempered steel Up to 38 HRC	30CrNiMo8 34CrMo4 ,40NiCrMo2 36CrNiMo4 ,42CrMo4	40-70	0,10-0,25	0,15-0,30
	High-alloyed steels hardened Up to 44 HRC	55NiCrMoV6 S6-5-2 ,50CrV4	30-50	0,06-0,12	0,08-0,18
M	<b>STAINLESS STEEL</b>				
	Ferritic, Martensic, Austenic, Austenitic-Ferritic duplex	X 46 Cr 13 X 5CrNi18 10 X2CrNiMoN22-5-3	40-70*	0,08-0,14	0,08-0,20
K	<b>CAST IRON</b>				
	Grey cast iron	GG15 ,GG20 GG25 GG30	100-120	0,12-0,25	0,25-0,40
	Malleable cast iron	GTS-35-10 ,GTS-45-06 GTS-55-04,GTW-35-04	70-90	0,12-0,25	0,25-0,40
	Sphedial cast iron	GGG40 ,GGG50 GGG60 ,GGG70	90-120	0,12-0,25	0,25-0,40
N	<b>NON-FERROUS MATERIALS ALUMINIUM ALLOYS</b>				
	Unalloyed aluminium, Aluminium alloys	Al99.99 AlCuSiMn GAlSi10Mg	180-220	0,12-0,20	0,15-0,35
	<b>COPPER ALLOYS</b>				
	Pure copper, Low alloyed copper, Copper zinc alloys (Brass, long chipping), Copper zinc alloys (Brass, short chipping)	Cu - OF Cu Zn 37 ,Cu Zn 15 Cu Zn 39 Pb 3 Cu Zn 39 Pb 2	110-160 150-170 180-240	0,12-0,20	0,15-0,35
S	<b>SPECIAL MATERIALS - TITANIUM ALLOYS</b>				
	Titanium alloys	Ti Al 6 V 4	20-40*	0,06-0,12	0,08-0,15
	<b>HEAT RESISTENT SUPER ALLOYS</b>				
	Nickel alloys	Ni Cu 30 Fe	10-25*	0,06-0,10	0,08-0,12
H	<b>HARD MATERIALS</b>				
	High strenght steels Hardened steels Hard casTiNg	Weldox1100 Hardox 500 Armox 600T HSSE	20-40*	0,06-0,10	0,08-0,12






























\* Standard tools doesn't recommended for unsuitable materials.


























SOLID CARBIDE (VHM) TOOLS

		VHM End Mill Diameter, (mm)										
Ø10-14	Ø14-20	ENDMILLS	Ø3	Ø4	Ø5	Ø6	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20
Feed Rate mm/rev		CutTiNg Speed (Vc),m/min.	Feed Rate mm/rev									
0,20-0,40	0,22-0,40	100-120	0.012	0.025	0.03	0.035	0.05	0.06	0.09	0.1	0.11	0.13
0,20-0,40	0,22-0,40	80-110	0.012	0.025	0.03	0.035	0.05	0.06	0.09	0.1	0.11	0.13
0,20-0,40	0,22-0,40	80-110	0.012	0.025	0.03	0.035	0.05	0.06	0.09	0.1	0.11	0.13
0,12-0,25	0,18-0,28	70-90	0.008	0.015	0.015	0.018	0.03	0.035	0.04	0.04	0.06	0.08
0,20-0,40	0,22-0,40	70-90	0.008	0.015	0.015	0.018	0.03	0.035	0.04	0.04	0.06	0.08
0,10-0,20	0,15-0,22	80-100	0.01	0.02	0.02	0.03	0.04	0.05	0.06	0.06	0.08	0.1
0,12-0,22	0,14-0,24	30-50*	0.012	0.025	0.03	0.035	0.05	0.06	0.09	0.1	0.11	0.13
0,30-0,45	0,40-0,52	110-130	0.008	0.015	0.015	0.018	0.03	0.035	0.04	0.04	0.06	0.08
0,30-0,45	0,40-0,52	50-80	0.02	0.027	0.03	0.033	0.045	0.056	0.068	0.075	0.09	0.11
0,30-0,45	0,40-0,52	80-100	0.02	0.027	0.03	0.033	0.045	0.056	0.068	0.075	0.09	0.11
0,25-0,40	0,30-0,50	180-220	0.012	0.025	0.03	0.035	0.05	0.06	0.09	0.1	0.11	0.13
0,25-0,40	0,30-0,50	70-90	0.012	0.025	0.03	0.035	0.05	0.06	0.09	0.1	0.11	0.13
		90-120	0.012	0.025	0.03	0.035	0.05	0.06	0.09	0.1	0.11	0.13
		100-130	0.012	0.025	0.03	0.035	0.05	0.06	0.09	0.1	0.11	0.13
0,10-0,20	0,15-0,25	40-60*	0.012	0.025	0.03	0.035	0.05	0.06	0.09	0.1	0.11	0.13
0,10-0,15	0,12-0,18	30-50*										
0,10-0,15	0,12-0,18	30-50*	0.007	0.014	0.014	0.02	0.028	0.034	0.043	0.043	0.051	0.056

## Recommendations for Area of Use of Complete Hard Metal Milling Cutters

End Mill	z=2	z=3	z=4	Multiple Edged End Mill z=6, 8
Operation Type				
Very clean Milling 				
Clean Milling 				
Rough Milling 				
Slote Milling 				
SloTiNg 				

End Mill	Face Radius z=2	Face Radius z=4	Face Radius z=2	End Mill z=4	Ring Cutter z=2
Operation Type					
Form Milling 					
Slote Milling 					
SloTiNg 					



Suitable

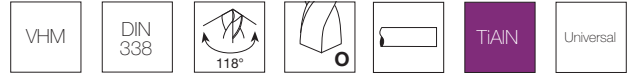


Used when necessary

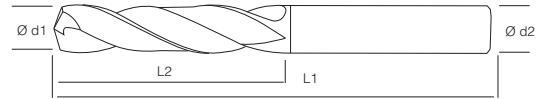


Not Suitable

CutTiNg length is very important with respect to the suitability of operaTiNg type.  
For example, a short cutTiNg length means high stability and good result.



## VHM DIN 338 DRILL BITS

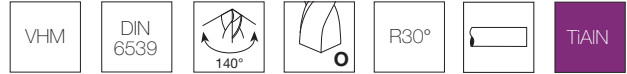


SOLID CARBIDE (VHM) TOOLS

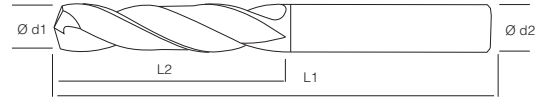
Product Code	d1 mm	d2 mm	L1 mm	L2 mm
B12551003000	3	3	61	33
B12551003500	3.5	3.5	70	39
B12551004000	4	4	75	43
B12551004500	4.5	4.5	80	47
B12551005000	5	5	86	52
B12551005500	5.5	5.5	93	57
B12551006000	6	6	93	57
B12551006500	6.5	6.5	101	63
B12551007000	7	7	109	69
B12551007500	7.5	7.5	109	69
B12551008000	8	8	117	75
B12551008500	8.5	8.5	117	75

Product Code	d1 mm	d2 mm	L1 mm	L2 mm
B12551009000	9	9	125	81
B12551009500	9.5	9.5	125	81
B12551010000	10	10	133	87
B12551011000	11	11	142	94
B12551012000	12	12	151	101
B12551013000	13	13	151	101
B12551014000	14	14	160	108
B12551015000	15	15	169	114
B12551016000	16	16	178	120
B12551017000	17	17	184	125
B12551018000	18	18	191	130
B12551019000	19	19	198	135
B12551020000	20	20	205	140





## VHM SHORT DRILL BITS

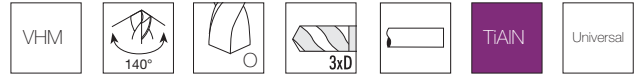


Product Code	d1 mm	d2 mm	L1 mm	L2 mm
B12551103000	3	3	46	16
B12551103500	3.5	3.5	52	20
B12551104000	4	4	55	22
B12551104500	4.5	4.5	58	24
B12551105000	5	5	62	26
B12551105500	5.5	5.5	66	28
B12551106000	6	6	66	28
B12551106500	6.5	6.5	70	31
B12551106800	6.8	6.8	74	34
B12551108000	8	8	79	37

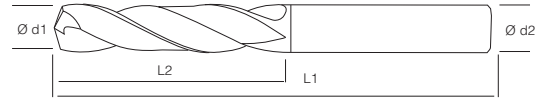
Product Code	d1 mm	d2 mm	L1 mm	L2 mm
B12551108500	8.5	8.5	79	37
B12551109000	9	9	84	40
B12551109500	9.5	9.5	84	40
B12551110000	10	10	89	43
B12551111000	11	11	95	47
B12551112000	12	12	102	51
B12551114000	14	14	107	54
B12551116000	16	16	115	58
B12551118000	18	18	123	62
B12551120000	20	20	131	66







### VHM DRILL BITS 3XD

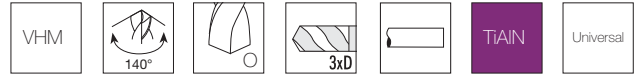


SOLID CARBIDE (VHM) TOOLS

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560300300	3.0	6	62	20	14
B12560300310	3.1	6	62	20	14
B12560300320	3.2	6	62	20	14
B12560300330	3.3	6	62	20	14
B12560300340	3.4	6	62	20	14
B12560300350	3.5	6	62	20	14
B12560300360	3.6	6	62	20	14
B12560300370	3.7	6	62	20	14
B12560300380	3.8	6	66	24	17
B12560300390	3.9	6	66	24	17
B12560300400	4.0	6	66	24	17
B12560300410	4.1	6	66	24	17
B12560300420	4.2	6	66	24	17
B12560300430	4.3	6	66	24	17
B12560300440	4.4	6	66	24	17
B12560300450	4.5	6	66	24	17
B12560300460	4.6	6	66	24	17
B12560300470	4.7	6	66	24	17
B12560300480	4.8	6	66	28	20
B12560300490	4.9	6	66	28	20
B12560300500	5.0	6	66	28	20
B12560300510	5.1	6	66	28	20
B12560300520	5.2	6	66	28	20
B12560300530	5.3	6	66	28	20
B12560300540	5.4	6	66	28	20
B12560300550	5.5	6	66	28	20
B12560300560	5.6	6	66	28	20
B12560300570	5.7	6	66	28	20
B12560300580	5.8	6	66	28	20
B12560300590	5.9	6	66	28	20
B12560300600	6.0	6	66	28	20
B12560300610	6.1	8	79	34	24
B12560300620	6.2	8	79	34	24
B12560300630	6.3	8	79	34	24
B12560300640	6.4	8	79	34	24
B12560300650	6.5	8	79	34	24
B12560300660	6.6	8	79	34	24

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560300670	6.7	8	79	34	24
B12560300680	6.8	8	79	34	24
B12560300690	6.9	8	79	34	24
B12560300700	7.0	8	79	34	24
B12560300710	7.1	8	79	41	29
B12560300720	7.2	8	79	41	29
B12560300730	7.3	8	79	41	29
B12560300740	7.4	8	79	41	29
B12560300750	7.5	8	79	41	29
B12560300760	7.6	8	79	41	29
B12560300770	7.7	8	79	41	29
B12560300780	7.8	8	79	41	29
B12560300790	7.9	8	79	41	29
B12560300800	8.0	8	79	41	29
B12560300810	8.1	10	89	47	35
B12560300820	8.2	10	89	47	35
B12560300830	8.3	10	89	47	35
B12560300840	8.4	10	89	47	35
B12560300850	8.5	10	89	47	35
B12560300860	8.6	10	89	47	35
B12560300870	8.7	10	89	47	35
B12560300880	8.8	10	89	47	35
B12560300890	8.9	10	89	47	35
B12560300900	9.0	10	89	47	35
B12560300910	9.1	10	89	47	35
B12560300920	9.2	10	89	47	35
B12560300930	9.3	10	89	47	35
B12560300940	9.4	10	89	47	35
B12560300950	9.5	10	89	47	35
B12560300960	9.6	10	89	47	35
B12560300970	9.7	10	89	47	35
B12560300980	9.8	10	89	47	35
B12560300990	9.9	10	89	47	35
B12560301000	10.0	10	89	47	35
B12560301010	10.1	12	102	55	40
B12560301020	10.2	12	102	55	40
B12560301030	10.3	12	102	55	40

Continued 18 page

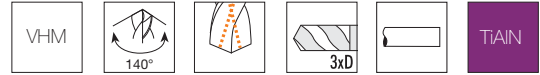


### VHM DRILL BITS 3XD

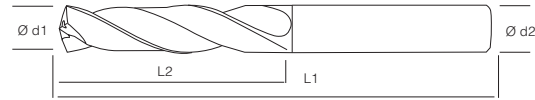


Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560301040	10.4	12	102	55	40
B12560301050	10.5	12	102	55	40
B12560301060	10.6	12	102	55	40
B12560301070	10.7	12	102	55	40
B12560301080	10.8	12	102	55	40
B12560301090	10.9	12	102	55	40
B12560301100	11.0	12	102	55	40
B12560301110	11.1	12	102	55	40
B12560301120	11.2	12	102	55	40
B12560301130	11.3	12	102	55	40
B12560301140	11.4	12	102	55	40
B12560301150	11.5	12	102	55	40
B12560301160	11.6	12	102	55	40
B12560301170	11.7	12	102	55	40
B12560301180	11.8	12	102	55	40
B12560301190	11.9	12	102	55	40
B12560301200	12.0	12	102	55	40
B12560301230	12.3	14	107	60	43
B12560301250	12.5	14	107	60	43
B12560301280	12.8	14	107	60	43

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560301300	13.0	14	107	60	43
B12560301350	13.5	14	107	60	43
B12560301380	13.8	14	107	60	43
B12560301400	14.0	14	107	60	43
B12560301450	14.5	16	115	65	45
B12560301480	14.8	16	115	65	45
B12560301500	15.0	16	115	65	45
B12560301550	15.5	16	115	65	45
B12560301580	15.8	16	115	65	45
B12560301600	16.0	16	115	65	45
B12560301650	16.5	18	123	73	51
B12560301680	16.8	18	123	73	51
B12560301700	17.0	18	123	73	51
B12560301750	17.5	18	123	73	51
B12560301780	17.8	18	123	73	51
B12560301800	18.0	18	123	73	51
B12560301850	18.5	20	131	79	55
B12560301900	19.0	20	131	79	55
B12560301950	19.5	20	131	79	55
B12560301980	19.8	20	131	79	55
B12560302000	20.0	20	131	79	55



### VHM DRILL BITS 3XD - Internal Coolant

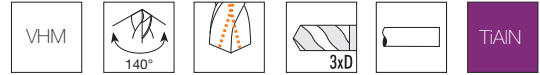


SOLID CARBIDE (VHM) TOOLS

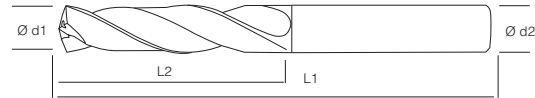
Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560310300	3.0	6	62	20	14
B12560310310	3.1	6	62	20	14
B12560310320	3.2	6	62	20	14
B12560310330	3.3	6	62	20	14
B12560310340	3.4	6	62	20	14
B12560310350	3.5	6	62	20	14
B12560310360	3.6	6	62	20	14
B12560310370	3.7	6	62	20	14
B12560310380	3.8	6	66	24	17
B12560310390	3.9	6	66	24	17
B12560310400	4.0	6	66	24	17
B12560310410	4.1	6	66	24	17
B12560310420	4.2	6	66	24	17
B12560310430	4.3	6	66	24	17
B12560310440	4.4	6	66	24	17
B12560310450	4.5	6	66	24	17
B12560310460	4.6	6	66	24	17
B12560310470	4.7	6	66	24	17
B12560310480	4.8	6	66	28	20
B12560310490	4.9	6	66	28	20
B12560310500	5.0	6	66	28	20
B12560310510	5.1	6	66	28	20
B12560310520	5.2	6	66	28	20
B12560310530	5.3	6	66	28	20
B12560310540	5.4	6	66	28	20
B12560310550	5.5	6	66	28	20
B12560310560	5.6	6	66	28	20
B12560310570	5.7	6	66	28	20
B12560310580	5.8	6	66	28	20
B12560310590	5.9	6	66	28	20
B12560310600	6.0	6	66	28	20
B12560310610	6.1	8	79	34	24
B12560310620	6.2	8	79	34	24
B12560310630	6.3	8	79	34	24
B12560310640	6.4	8	79	34	24
B12560310650	6.5	8	79	34	24

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560310660	6.6	8	79	34	24
B12560310670	6.7	8	79	34	24
B12560310680	6.8	8	79	34	24
B12560310690	6.9	8	79	34	24
B12560310700	7.0	8	79	34	24
B12560310710	7.1	8	79	41	29
B12560310720	7.2	8	79	41	29
B12560310730	7.3	8	79	41	29
B12560310740	7.4	8	79	41	29
B12560310750	7.5	8	79	41	29
B12560310760	7.6	8	79	41	29
B12560310770	7.7	8	79	41	29
B12560310780	7.8	8	79	41	29
B12560310790	7.9	8	79	41	29
B12560310800	8.0	8	79	41	29
B12560310810	8.1	10	89	47	35
B12560310820	8.2	10	89	47	35
B12560310830	8.3	10	89	47	35
B12560310840	8.4	10	89	47	35
B12560310850	8.5	10	89	47	35
B12560310860	8.6	10	89	47	35
B12560310870	8.7	10	89	47	35
B12560310880	8.8	10	89	47	35
B12560310890	8.9	10	89	47	35
B12560310900	9.0	10	89	47	35
B12560310910	9.1	10	89	47	35
B12560310920	9.2	10	89	47	35
B12560310930	9.3	10	89	47	35
B12560310940	9.4	10	89	47	35
B12560310950	9.5	10	89	47	35
B12560310960	9.6	10	89	47	35
B12560310970	9.7	10	89	47	35
B12560310980	9.8	10	89	47	35
B12560310990	9.9	10	89	47	35
B12560311000	10.0	10	89	47	35
B12560311010	10.1	12	102	55	40

Continued 20 page

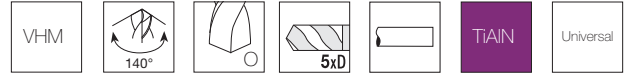


### VHM DRILL BITS 3XD - Internal Coolant



Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560311020	10.2	12	102	55	40
B12560311030	10.3	12	102	55	40
B12560311040	10.4	12	102	55	40
B12560311050	10.5	12	102	55	40
B12560311060	10.6	12	102	55	40
B12560311070	10.7	12	102	55	40
B12560311080	10.8	12	102	55	40
B12560311090	10.9	12	102	55	40
B12560311100	11.0	12	102	55	40
B12560311110	11.1	12	102	55	40
B12560311120	11.2	12	102	55	40
B12560311130	11.3	12	102	55	40
B12560311140	11.4	12	102	55	40
B12560311150	11.5	12	102	55	40
B12560311160	11.6	12	102	55	40
B12560311170	11.7	12	102	55	40
B12560311180	11.8	12	102	55	40
B12560311190	11.9	12	102	55	40
B12560311200	12.0	12	102	55	40
B12560311230	12.3	14	107	60	43
B12560311250	12.5	14	107	60	43

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560311280	12.8	14	107	60	43
B12560311300	13.0	14	107	60	43
B12560311350	13.5	14	107	60	43
B12560311380	13.8	14	107	60	43
B12560311400	14.0	14	107	60	43
B12560311450	14.5	16	115	65	45
B12560311480	14.8	16	115	65	45
B12560311500	15.0	16	115	65	45
B12560311550	15.5	16	115	65	45
B12560311580	15.8	16	115	65	45
B12560311600	16.0	16	115	65	45
B12560311650	16.5	18	123	73	51
B12560311680	16.8	18	123	73	51
B12560311700	17.0	18	123	73	51
B12560311750	17.5	18	123	73	51
B12560311780	17.8	18	123	73	51
B12560311800	18.0	18	123	73	51
B12560311850	18.5	20	131	79	55
B12560311900	19.0	20	131	79	55
B12560311950	19.5	20	131	79	55
B12560311980	19.8	20	131	79	55
B12560312000	20.0	20	131	79	55



### VHM DRILL BITS 5XD

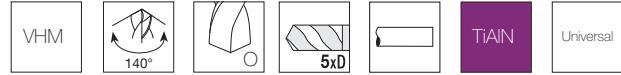


SOLID CARBIDE (VHM) TOOLS

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560500300	3,0	6	66	28	23.0
B12560500310	3,1	6	66	28	23.0
B12560500320	3,2	6	66	28	23.0
B12560500330	3,3	6	66	28	23.0
B12560500340	3,4	6	66	28	23.0
B12560500350	3,5	6	66	28	23.0
B12560500360	3,6	6	66	28	23.0
B12560500370	3,7	6	66	28	23.0
B12560500380	3,8	6	74	36	29.0
B12560500390	3,9	6	74	36	29.0
B12560500400	4,0	6	74	36	29.0
B12560500410	4,1	6	74	36	29.0
B12560500420	4,2	6	74	36	29.0
B12560500430	4,3	6	74	36	29.0
B12560500440	4,4	6	74	36	29.0
B12560500450	4,5	6	74	36	29.0
B12560500460	4,6	6	74	36	29.0
B12560500470	4,7	6	74	36	29.0
B12560500480	4,8	6	82	44	35.0
B12560500490	4,9	6	82	44	35.0
B12560500500	5,0	6	82	44	35.0
B12560500510	5,1	6	82	44	35.0
B12560500520	5,2	6	82	44	35.0
B12560500530	5,3	6	82	44	35.0
B12560500540	5,4	6	82	44	35.0
B12560500550	5,5	6	82	44	35.0
B12560500560	5,6	6	82	44	35.0
B12560500570	5,7	6	82	44	35.0
B12560500580	5,8	6	82	44	35.0
B12560500590	5,9	6	82	44	35.0
B12560500600	6,0	6	82	44	35.0
B12560500610	6,1	8	91	53	43.0
B12560500620	6,2	8	91	53	43.0
B12560500630	6,3	8	91	53	43.0
B12560500640	6,4	8	91	53	43.0
B12560500650	6,5	8	91	53	43.0
B12560500660	6,6	8	91	53	43.0

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560500670	6,7	8	91	53	43.0
B12560500680	6,8	8	91	53	43.0
B12560500690	6,9	8	91	53	43.0
B12560500700	7,0	8	91	53	43.0
B12560500710	7,1	8	91	53	43.0
B12560500720	7,2	8	91	53	43.0
B12560500730	7,3	8	91	53	43.0
B12560500740	7,4	8	91	53	43.0
B12560500750	7,5	8	91	53	43.0
B12560500760	7,6	8	91	53	43.0
B12560500770	7,7	8	91	53	43.0
B12560500780	7,8	8	91	53	43.0
B12560500790	7,9	8	91	53	43.0
B12560500800	8,0	10	91	53	43.0
B12560500810	8,1	10	103	61	49.0
B12560500820	8,2	10	103	61	49.0
B12560500830	8,3	10	103	61	49.0
B12560500840	8,4	10	103	61	49.0
B12560500850	8,5	10	103	61	49.0
B12560500860	8,6	10	103	61	49.0
B12560500870	8,7	10	103	61	49.0
B12560500880	8,8	10	103	61	49.0
B12560500890	8,9	10	103	61	49.0
B12560500900	9,0	10	103	61	49.0
B12560500910	9,1	10	103	61	49.0
B12560500920	9,2	10	103	61	49.0
B12560500930	9,3	10	103	61	49.0
B12560500940	9,4	10	103	61	49.0
B12560500950	9,5	10	103	61	49.0
B12560500960	9,6	10	103	61	49.0
B12560500970	9,7	10	103	61	49.0
B12560500980	9,8	10	103	61	49.0
B12560500990	9,9	10	103	61	49.0
B12560501000	10,0	10	103	61	49.0
B12560501010	10,1	12	118	71	56.0
B12560501020	10,2	12	118	71	56.0
B12560501030	10,3	12	118	71	56.0

Continued 22 page

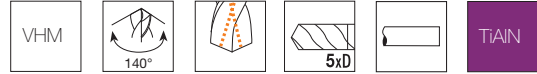


### VHM DRILL BITS 5XD



Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560501040	10,4	12	118	71	56.0
B12560501050	10,5	12	118	71	56.0
B12560501060	10,6	12	118	71	56.0
B12560501070	10,7	12	118	71	56.0
B12560501080	10,8	12	118	71	56.0
B12560501090	10,9	12	118	71	56.0
B12560501100	11,0	12	118	71	56.0
B12560501110	11,1	12	118	71	56.0
B12560501120	11,2	12	118	71	56.0
B12560501130	11,3	12	118	71	56.0
B12560501140	11,4	12	118	71	56.0
B12560501150	11,5	12	118	71	56.0
B12560501160	11,6	12	118	71	56.0
B12560501170	11,7	12	118	71	56.0
B12560501180	11,8	12	118	71	56.0
B12560501190	11,9	12	118	71	56.0
B12560501200	12,0	12	118	71	56.0
B12560501220	12,2	14	124	77	60.0
B12560501230	12,3	14	124	77	60.0
B12560501250	12,5	14	124	77	60.0
B12560501280	12,8	14	124	77	60.0

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560501300	13,0	14	124	77	60.0
B12560501350	13,5	14	124	77	60.0
B12560501380	13,8	14	124	77	60.0
B12560501400	14,0	14	124	77	60.0
B12560501450	14,5	16	133	83	63.0
B12560501480	14,8	16	133	83	63.0
B12560501500	15,0	16	133	83	63.0
B12560501550	15,5	16	133	83	63.0
B12560501580	15,8	16	133	83	63.0
B12560501600	16,0	16	133	83	63.0
B12560501650	16,5	18	143	93	71.0
B12560501680	16,8	18	143	93	71.0
B12560501700	17,0	18	143	93	71.0
B12560501750	17,5	18	143	93	71.0
B12560501780	17,8	18	143	93	71.0
B12560501800	18,0	18	143	93	71.0
B12560501850	18,5	20	153	101	77.0
B12560501900	19,0	20	153	101	77.0
B12560501950	19,5	20	153	101	77.0
B12560502000	20,0	20	153	101	77.0



### VHM DRILL BITS 5XD - Internal Coolant

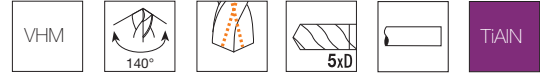


SOLID CARBIDE (VHM) TOOLS

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560510300	3.0	6	66	28	23.0
B12560510310	3.1	6	66	28	23.0
B12560510320	3.2	6	66	28	23.0
B12560510330	3.3	6	66	28	23.0
B12560510340	3.4	6	66	28	23.0
B12560510350	3.5	6	66	28	23.0
B12560510360	3.6	6	66	28	23.0
B12560510370	3.7	6	66	28	23.0
B12560510380	3.8	6	74	36	23.0
B12560510390	3.9	6	74	36	23.0
B12560510400	4.0	6	74	36	29.0
B12560510410	4.1	6	74	36	29.0
B12560510420	4.2	6	74	36	29.0
B12560510430	4.3	6	74	36	29.0
B12560510440	4.4	6	74	36	29.0
B12560510450	4.5	6	74	36	29.0
B12560510460	4.6	6	74	36	29.0
B12560510470	4.7	6	74	36	29.0
B12560510480	4.8	6	82	44	35.0
B12560510490	4.9	6	82	44	35.0
B12560510500	5.0	6	82	44	35.0
B12560510510	5.1	6	82	44	35.0
B12560510520	5.2	6	82	44	35.0
B12560510530	5.3	6	82	44	35.0
B12560510540	5.4	6	82	44	35.0
B12560510550	5.5	6	82	44	35.0
B12560510560	5.6	6	82	44	35.0
B12560510565	5.65	6	82	44	35.0
B12560510570	5.7	6	82	44	35.0
B12560510580	5.8	6	82	44	35.0
B12560510590	5.9	6	82	44	35.0
B12560510600	6.0	6	82	44	35.0
B12560510610	6.1	8	91	53	43.0
B12560510620	6.2	8	91	53	43.0
B12560510630	6.3	8	91	53	43.0

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560510640	6.4	8	91	53	43.0
B12560510650	6.5	8	91	53	43.0
B12560510660	6.6	8	91	53	43.0
B12560510670	6.7	8	91	53	43.0
B12560510680	6.8	8	91	53	43.0
B12560510690	6.9	8	91	53	43.0
B12560510700	7.0	8	91	53	43.0
B12560510710	7.1	8	91	53	43.0
B12560510720	7.2	8	91	53	43.0
B12560510730	7.3	8	91	53	43.0
B12560510740	7.4	8	91	53	43.0
B12560510750	7.5	8	91	53	43.0
B12560510760	7.6	8	91	53	43.0
B12560510770	7.7	8	91	53	43.0
B12560510780	7.8	8	91	53	43.0
B12560510790	7.9	8	91	53	43.0
B12560510800	8.0	10	91	53	43.0
B12560510810	8.1	10	103	61	49.0
B12560510820	8.2	10	103	61	49.0
B12560510830	8.3	10	103	61	49.0
B12560510840	8.4	10	103	61	49.0
B12560510850	8.5	10	103	61	49.0
B12560510860	8.6	10	103	61	49.0
B12560510870	8.7	10	103	61	49.0
B12560510880	8.8	10	103	61	49.0
B12560510890	8.9	10	103	61	49.0
B12560510900	9.0	10	103	61	49.0
B12560510910	9.1	10	103	61	49.0
B12560510920	9.2	10	103	61	49.0
B12560510930	9.3	10	103	61	49.0
B12560510940	9.4	10	103	61	49.0
B12560510950	9.5	10	103	61	49.0
B12560510960	9.6	10	103	61	49.0
B12560510970	9.7	10	103	61	49.0
B12560510980	9.8	10	103	61	49.0
B12560510990	9.9	10	103	61	49.0
B12560511000	10.0	10	103	61	49.0

Continued 24 page



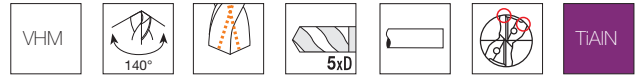
### VHM DRILL BITS 5XD - Internal Coolant



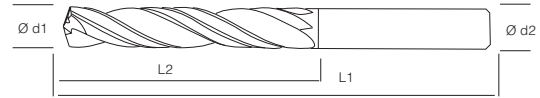
Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560511010	10.1	12	118	71	56.0
B12560511020	10.2	12	118	71	56.0
B12560511030	10.3	12	118	71	56.0
B12560511040	10.4	12	118	71	56.0
B12560511050	10.5	12	118	71	56.0
B12560511060	10.6	12	118	71	56.0
B12560511070	10.7	12	118	71	56.0
B12560511080	10.8	12	118	71	56.0
B12560511090	10.9	12	118	71	56.0
B12560511100	11.0	12	118	71	56.0
B12560511110	11.1	12	118	71	56.0
B12560511120	11.2	12	118	71	56.0
B12560511130	11.3	12	118	71	56.0
B12560511140	11.4	12	118	71	56.0
B12560511150	11.5	12	118	71	56.0
B12560511160	11.6	12	118	71	56.0
B12560511170	11.7	12	118	71	56.0
B12560511180	11.8	12	118	71	56.0
B12560511190	11.9	12	118	71	56.0
B12560511200	12.0	12	118	71	56.0
B12560511220	12.2	14	124	77	60.0
B12560511230	12.3	14	124	77	60.0
B12560511250	12.5	14	124	77	60.0

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560511280	12.8	14	124	77	60.0
B12560511300	13.0	14	124	77	60.0
B12560511350	13.5	14	124	77	60.0
B12560511380	13.8	14	124	77	60.0
B12560511400	14.0	14	124	77	60.0
B12560511450	14.5	16	133	83	63.0
B12560511480	14.8	16	133	83	63.0
B12560511500	15.0	16	133	83	63.0
B12560511510	15.1	16	133	83	63.0
B12560511550	15.5	16	133	83	63.0
B12560511580	15.8	16	133	83	63.0
B12560511600	16.0	16	133	83	63.0
B12560511650	16.5	18	143	93	71.0
B12560511680	16.8	18	143	93	71.0
B12560511700	17.0	18	143	93	71.0
B12560511750	17.5	18	143	93	71.0
B12560511780	17.8	18	143	93	71.0
B12560511800	18.0	18	143	93	71.0
B12560511850	18.5	20	153	101	71.0
B12560511900	19.0	20	153	101	71.0
B12560511950	19.5	20	153	101	71.0
B12560512000	20.0	20	153	101	71.0





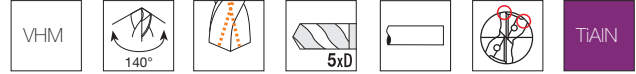
### VHM DRILL BITS 5XD - Internal Coolant- Double Margin



SOLID CARBIDE (VHM) TOOLS

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560520300	3.0	6	66	28	23
B12560520310	3.1	6	66	28	23
B12560520320	3.2	6	66	28	23
B12560520330	3.3	6	66	28	23
B12560520340	3.4	6	66	28	23
B12560520350	3.5	6	66	28	23
B12560520360	3.6	6	66	28	23
B12560520370	3.7	6	66	28	23
B12560520380	3.8	6	74	36	29
B12560520390	3.9	6	74	36	29
B12560520400	4.0	6	74	36	29
B12560520410	4.1	6	74	36	29
B12560520420	4.2	6	74	36	29
B12560520430	4.3	6	74	36	29
B12560520440	4.4	6	74	36	29
B12560520450	4.5	6	74	36	29
B12560520460	4.6	6	74	36	29
B12560520470	4.7	6	74	36	29
B12560520480	4.8	6	82	44	35
B12560520490	4.9	6	82	44	35
B12560520500	5.0	6	82	44	35
B12560520510	5.1	6	82	44	35
B12560520520	5.2	6	82	44	35
B12560520530	5.3	6	82	44	35
B12560520540	5.4	6	82	44	35
B12560520550	5.5	6	82	44	35
B12560520560	5.6	6	82	44	35
B12560520570	5.7	6	82	44	35
B12560520580	5.8	6	82	44	35
B12560520590	5.9	6	82	44	35
B12560520600	6.0	8	82	44	35
B12560520610	6.1	8	91	53	43
B12560520620	6.2	8	91	53	43
B12560520630	6.3	8	91	53	43
B12560520640	6.4	8	91	53	43
B12560520650	6.5	8	91	53	43
B12560520660	6.6	8	91	53	43
B12560520670	6.7	8	91	53	43
B12560520680	6.8	8	91	53	43
B12560520690	6.9	8	91	53	43
B12560520700	7.0	8	91	53	43

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560520710	7.1	8	91	53	43
B12560520720	7.2	8	91	53	43
B12560520730	7.3	8	91	53	43
B12560520740	7.4	8	91	53	43
B12560520750	7.5	8	91	53	43
B12560520760	7.6	8	91	53	43
B12560520770	7.7	8	91	53	43
B12560520780	7.8	8	91	53	43
B12560520790	7.9	8	91	53	43
B12560520800	8.0	8	91	53	43
B12560520810	8.1	10	103	61	49
B12560520820	8.2	10	103	61	49
B12560520830	8.3	10	103	61	49
B12560520840	8.4	10	103	61	49
B12560520850	8.5	10	103	61	49
B12560520860	8.6	10	103	61	49
B12560520870	8.7	10	103	61	49
B12560520880	8.8	10	103	61	49
B12560520890	8.9	10	103	61	49
B12560520900	9.0	10	103	61	49
B12560520910	9.1	10	103	61	49
B12560520920	9.2	10	103	61	49
B12560520930	9.3	10	103	61	49
B12560520940	9.4	10	103	61	49
B12560520950	9.5	10	103	61	49
B12560520960	9.6	10	103	61	49
B12560520970	9.7	10	103	61	49
B12560520980	9.8	10	103	61	49
B12560520990	9.9	10	103	61	49
B12560521000	10.0	10	103	61	49
B12560521010	10.1	12	118	71	56
B12560521020	10.2	12	118	71	56
B12560521030	10.3	12	118	71	56
B12560521040	10.4	12	118	71	56
B12560521050	10.5	12	118	71	56
B12560521060	10.6	12	118	71	56
B12560521070	10.7	12	118	71	56
B12560521080	10.8	12	118	71	56
B12560521090	10.9	12	118	71	56
B12560521100	11.0	12	118	71	56
B12560521110	11.1	12	118	71	56

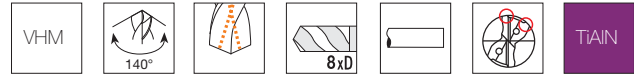


### VHM DRILL BITS 5XD - Internal Coolant- Double Margin



Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560521120	11.2	12	118	71	56
B12560521130	11.3	12	118	71	56
B12560521140	11.4	12	118	71	56
B12560521150	11.5	12	118	71	56
B12560521160	11.6	12	118	71	56
B12560521170	11.7	12	118	71	56
B12560521180	11.8	12	118	71	56
B12560521190	11.9	12	118	71	56
B12560521200	12.0	12	118	71	56
B12560521220	12.2	14	124	77	60
B12560521230	12.3	14	124	77	60
B12560521250	12.5	14	124	77	60
B12560521280	12.8	14	124	77	60
B12560521300	13.0	14	124	77	60
B12560521350	13.5	14	124	77	60
B12560521380	13.8	14	124	77	60
B12560521400	14.0	14	124	77	60

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560521450	14.5	16	133	83	63
B12560521480	14.8	16	133	83	63
B12560521500	15.0	16	133	83	63
B12560521550	15.5	16	133	83	63
B12560521580	15.8	16	133	83	63
B12560521600	16.0	16	133	83	63
B12560521650	16.5	18	143	93	71
B12560521680	16.8	18	143	93	71
B12560521700	17.0	18	143	93	71
B12560521750	17.5	18	143	93	71
B12560521780	17.8	18	143	93	71
B12560521800	18.0	18	143	93	71
B12560521850	18.5	20	153	101	77
B12560521900	19.0	20	153	101	77
B12560521950	19.5	20	153	101	77
B12560522000	20.0	20	153	101	77



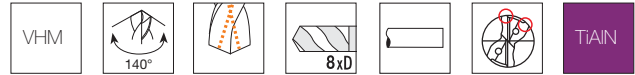
### VHM DRILL BITS 8XD - Internal Coolant - Double Margin



SOLID CARBIDE (VHM) TOOLS

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560820300	3.0	6	72	34	27.0
B12560820310	3.1	6	72	34	27.0
B12560820320	3.2	6	72	34	27.0
B12560820330	3.3	6	72	34	27.0
B12560820340	3.4	6	72	34	27.0
B12560820350	3.5	6	72	34	27.0
B12560820360	3.6	6	72	34	27.0
B12560820370	3.7	6	72	34	27.0
B12560820380	3.8	6	81	43	35.0
B12560820390	3.9	6	81	43	35.0
B12560820400	4.0	6	81	43	35.0
B12560820410	4.1	6	81	43	35.0
B12560820420	4.2	6	81	43	35.0
B12560820430	4.3	6	81	43	35.0
B12560820440	4.4	6	81	43	35.0
B12560820450	4.5	6	81	43	35.0
B12560820460	4.6	6	81	43	35.0
B12560820470	4.7	6	95	57	35.0
B12560820480	4.8	6	95	57	45.0
B12560820490	4.9	6	95	57	45.0
B12560820500	5.0	6	95	57	45.0
B12560820510	5.1	6	95	57	45.0
B12560820520	5.2	6	95	57	45.0
B12560820530	5.3	6	95	57	45.0
B12560820540	5.4	6	95	57	45.0
B12560820550	5.5	6	95	57	45.0
B12560820560	5.6	6	95	57	45.0
B12560820570	5.7	6	95	57	45.0
B12560820580	5.8	6	95	57	45.0
B12560820590	5.9	6	95	57	45.0
B12560820600	6.0	6	95	57	45.0
B12560820610	6.1	8	114	76	52.0
B12560820620	6.2	8	114	76	52.0
B12560820630	6.3	8	114	76	52.0
B12560820640	6.4	8	114	76	52.0
B12560820650	6.5	8	114	76	52.0
B12560820660	6.6	8	114	76	52.0
B12560820670	6.7	8	114	76	52.0
B12560820680	6.8	8	114	76	52.0
B12560820690	6.9	8	114	76	52.0
B12560820700	7.0	8	114	76	60.0

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560820710	7.1	8	114	76	60.0
B12560820720	7.2	8	114	76	60.0
B12560820730	7.3	8	114	76	60.0
B12560820740	7.4	8	114	76	60.0
B12560820750	7.5	8	114	76	60.0
B12560820760	7.6	8	114	76	60.0
B12560820770	7.7	8	114	76	60.0
B12560820780	7.8	8	114	76	60.0
B12560820790	7.9	8	114	76	60.0
B12560820800	8.0	8	114	76	60.0
B12560820810	8.1	10	142	95	68.0
B12560820820	8.2	10	142	95	68.0
B12560820830	8.3	10	142	95	68.0
B12560820840	8.4	10	142	95	68.0
B12560820850	8.5	10	142	95	68.0
B12560820860	8.6	10	142	95	68.0
B12560820870	8.7	10	142	95	68.0
B12560820880	8.8	10	142	95	68.0
B12560820890	8.9	10	142	95	68.0
B12560820900	9.0	10	142	95	68.0
B12560820910	9.1	10	142	95	76.0
B12560820920	9.2	10	142	95	76.0
B12560820930	9.3	10	142	95	76.0
B12560820940	9.4	10	142	95	76.0
B12560820950	9.5	10	142	95	76.0
B12560820960	9.6	10	142	95	76.0
B12560820970	9.7	10	142	95	76.0
B12560820980	9.8	10	142	95	76.0
B12560820990	9.9	10	142	95	76.0
B12560821000	10.0	10	142	95	76.0
B12560821010	10.1	12	162	114	90.0
B12560821020	10.2	12	162	114	90.0
B12560821030	10.3	12	162	114	90.0
B12560821040	10.4	12	162	114	90.0
B12560821050	10.5	12	162	114	90.0
B12560821060	10.6	12	162	114	90.0
B12560821070	10.7	12	162	114	90.0
B12560821080	10.8	12	162	114	90.0
B12560821090	10.9	12	162	114	90.0
B12560821100	11.0	12	162	114	90.0
B12560821110	11.1	12	162	114	90.0



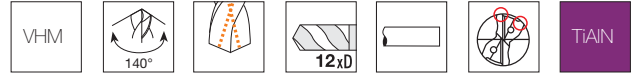
### VHM DRILL BITS 8XD - Internal Coolant - Double Margin



Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560821120	11.2	12	162	114	90.0
B12560821130	11.3	12	162	114	90.0
B12560821140	11.4	12	162	114	90.0
B12560821150	11.5	12	162	114	90.0
B12560821160	11.6	12	162	114	90.0
B12560821170	11.7	12	162	114	90.0
B12560821180	11.8	12	162	114	90.0
B12560821190	11.9	12	162	114	90.0
B12560821200	12.0	12	162	114	90.0

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12560821250	12.5	14	178	133	106.0
B12560821280	12.8	14	178	133	106.0
B12560821300	13.0	14	178	133	106.0
B12560821350	13.5	14	178	133	106.0
B12560821400	14.0	14	178	133	106.0
B12560821450	14.5	16	203	152	122.0
B12560821500	15.0	16	203	152	122.0
B12560821550	15.5	16	203	152	122.0
B12560821600	16.0	16	203	152	122.0





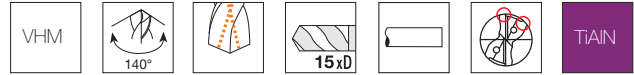
### VHM DRILL BITS 12XD - Internal Coolant - Double Margin



SOLID CARBIDE (VHM) TOOLS

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12561220300	3.0	6	92	54	48.0
B12561220330	3.3	6	92	54	48.0
B12561220350	3.5	6	92	54	48.0
B12561220380	3.8	6	102	64	58.0
B12561220400	4.0	6	102	64	58.0
B12561220420	4.2	6	102	64	58.0
B12561220450	4.5	6	102	64	58.0
B12561220480	4.8	6	116	78	70.0
B12561220500	5.0	6	116	78	70.0
B12561220550	5.5	6	116	78	70.0
B12561220580	5.8	6	116	78	70.0
B12561220600	6.0	6	116	78	70.0
B12561220650	6.5	8	146	108	94.0
B12561220680	6.8	8	146	108	94.0
B12561220700	7.0	8	146	108	94.0
B12561220750	7.5	8	146	108	94.0
B12561220780	7.8	8	146	108	94.0
B12561220800	8.0	8	146	108	94.0
B12561220850	8.5	10	162	120	110.0
B12561220880	8.8	10	162	120	110.0

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12561220900	9.0	10	162	120	110.0
B12561220950	9.5	10	162	120	110.0
B12561220980	9.8	10	162	120	110.0
B12561221000	10.0	10	162	120	110.0
B12561221020	10.2	12	204	156	142.0
B12561221050	10.5	12	204	156	142.0
B12561221080	10.8	12	204	156	142.0
B12561221100	11.0	12	204	156	142.0
B12561221150	11.5	12	204	156	142.0
B12561221180	11.8	12	204	156	142.0
B12561221200	12.0	12	204	156	142.0
B12561221250	12.5	14	230	182	166.0
B12561221280	12.8	14	230	182	166.0
B12561221300	13.0	14	230	182	166.0
B12561221350	13.5	14	230	182	166.0
B12561221400	14.0	14	230	182	166.0
B12561221450	14.5	16	260	208	192.0
B12561221500	15.0	16	260	208	192.0
B12561221550	15.5	16	260	208	192.0
B12561221600	16.0	16	260	208	192.0



### VHM DRILL BITS 15XD - Internal Coolant

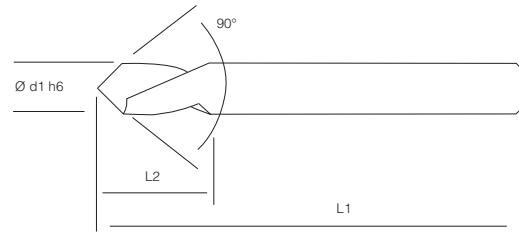


Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12561520300	3.0	6	100	60	45
B12561520310	3.1	6	100	60	47
B12561520320	3.2	6	100	60	48
B12561520330	3.3	6	100	60	50
B12561520340	3.4	6	100	60	51
B12561520350	3.5	6	100	60	53
B12561520360	3.6	6	108	68	54
B12561520370	3.7	6	108	68	56
B12561520380	3.8	6	108	68	57
B12561520390	3.9	6	108	68	59
B12561520400	4.0	6	108	68	60
B12561520410	4.1	6	115	78	62
B12561520420	4.2	6	115	78	63
B12561520430	4.3	6	115	78	65
B12561520440	4.4	6	115	78	66
B12561520450	4.5	6	115	78	68
B12561520460	4.6	6	125	84	69
B12561520470	4.7	6	125	84	71
B12561520480	4.8	6	125	84	72
B12561520490	4.9	6	125	84	74
B12561520500	5.0	6	125	84	75
B12561520510	5.1	6	130	92	77
B12561520520	5.2	6	130	92	78
B12561520530	5.3	6	130	92	80
B12561520540	5.4	6	130	92	81
B12561520550	5.5	6	130	92	83
B12561520560	5.6	6	140	100	84
B12561520570	5.7	6	140	100	86
B12561520580	5.8	6	140	100	87
B12561520590	5.9	6	140	100	90
B12561520600	6.0	6	140	100	90
B12561520610	6.1	8	145	108	92
B12561520620	6.2	8	145	108	93

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	NL min
B12561520630	6.3	8	145	108	96
B12561520640	6.4	8	145	108	96
B12561520650	6.5	8	145	108	97
B12561520660	6.6	8	170	130	99
B12561520670	6.7	8	170	130	101
B12561520680	6.8	8	170	130	102
B12561520690	6.9	8	170	130	104
B12561520700	7.0	8	170	130	105
B12561520750	7.5	8	170	130	115
B12561520780	7.8	8	170	130	117
B12561520800	8.0	8	170	130	120
B12561520850	8.5	10	208	163	128
B12561520880	8.8	10	208	163	132
B12561520900	9.0	10	208	163	135
B12561520950	9.5	10	208	163	143
B12561520980	9.8	10	208	163	147
B12561521000	10.0	10	208	163	150
B12561521020	10.2	12	245	195	153
B12561521050	10.5	12	245	195	158
B12561521080	10.8	12	245	195	162
B12561521100	11.0	12	245	195	165
B12561521120	11.2	12	245	195	168
B12561521150	11.5	12	245	195	173
B12561521180	11.8	12	245	195	177
B12561521200	12.0	12	245	195	180
B12561521250	12.5	14	280	230	188
B12561521300	13.0	14	280	230	195
B12561521380	13.8	14	280	230	207
B12561521400	14.0	14	280	230	210
B12561521480	14.8	16	310	260	222
B12561521500	15.0	16	310	260	225
B12561521580	15.8	16	310	260	237
B12561521600	16.0	16	310	260	240



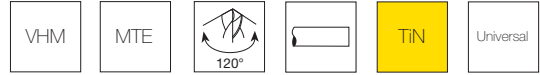
### VHM NC CENTERING DRILL BITS - 90°



SOLID CARBIDE (VHM) TOOLS

Product Code	d1 mm	L1 mm	L2 mm
B10562100300	3	46	13
B10562100400	4	55	16
B10562100500	5	60	16
B10562100600	6	66	19
B10562100800	8	79	23
B10562101000	10	89	26
B10562101200	12	102	31
B10562101600	16	115	34
B10562102000	20	131	38





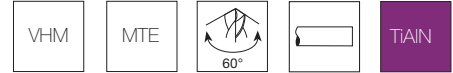
### VHM NC CENTERING DRILL BITS - 120°



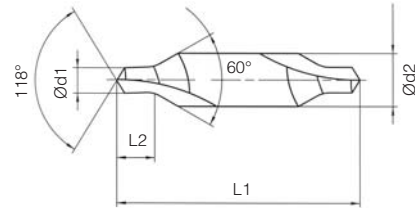
Product Code	d1 mm	L1 mm	L2 mm
B10562200300	3	46	13
B10562200400	4	55	16
B10562200500	5	60	16
B10562200600	6	66	19
B10562200800	8	79	23
B10562201000	10	89	26
B10562201200	12	102	31
B10562201600	16	115	34
B10562202000	20	131	38





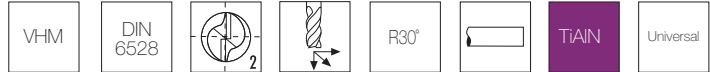


### VHM CENTER DRILL

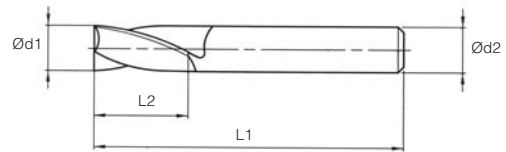


SOLID CARBIDE (VHM) TOOLS

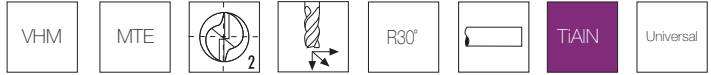
Product Code	d1 mm	d2 mm	L1 mm	L2 mm
B12562000100	1	3	50	1.3
B12562000125	1.25	3	50	1.6
B12562000160	1.6	4	50	2.0
B12562000200	2	5	50	2.5
B12562000250	2.5	6	57	3.1
B12562000315	3.15	8	63	3.9
B12562000400	4	10	72	5.0
B12562000500	5	12	83	6.3
B12562000630	6.3	16	92	8.0
B12562000800	8	20	104	10.1



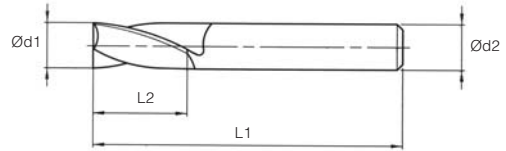
## VHM END MILLS - 2 FLUTES



Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)
B12553203000	3	3	50	7	2
B12553203500	3.5	3.5	50	7	2
B12553204000	4	4	50	8	2
B12553204500	4.5	4.5	50	8	2
B12553205000	5	5	50	10	2
B12553206000	6	6	57	10	2
B12553207000	7	7	60	13	2
B12553208000	8	8	63	16	2
B12553209000	9	9	67	16	2
B12553210000	10	10	72	19	2
B12553211000	11	11	83	22	2
B12553212000	12	12	83	22	2
B12553213000	13	13	83	22	2
B12553214000	14	14	83	22	2
B12553215000	15	15	92	26	2
B12553216000	16	16	92	26	2
B12553218000	18	18	92	26	2
B12553220000	20	20	104	32	2



## VHM LONG END MILLS - 2 FLUTES

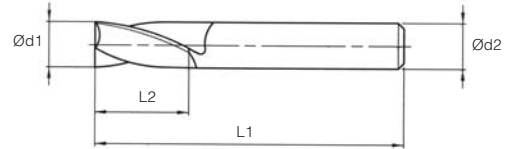


SOLID CARBIDE (VHM) TOOLS

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)
B12553203000L	3	3	50	15	2
B12553204000L	4	4	50	17	2
B12553205000L	5	5	50	20	2
B12553206000L	6	6	57	20	2
B12553208000L	8	8	63	30	2
B12553210000L	10	10	72	32	2
B12553212000L	12	12	83	40	2
B12553214000L	14	14	83	40	2
B12553216000L	16	16	92	50	2
B12553218000L	18	18	92	50	2
B12553220000L	20	20	104	60	2

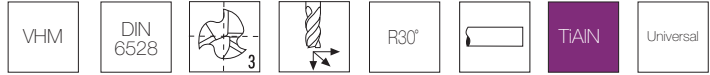


## VHM EXTRA LONG END MILLS - 2 FLUTES

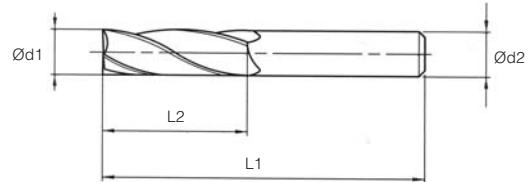


Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)
B12553203000XL	3	3	83	20	2
B12553204000XL	4	4	83	22	2
B12553205000XL	5	5	92	25	2
B12553206000XL	6	6	92	25	2
B12553208000XL	8	8	105	38	2
B12553210000XL	10	10	105	44	2
B12553212000XL	12	12	105	52	2
B12553214000XL	14	14	105	52	2
B12553216000XL	16	16	150	64	2
B12553218000XL	18	18	150	64	2
B12553220000XL	20	20	150	75	2



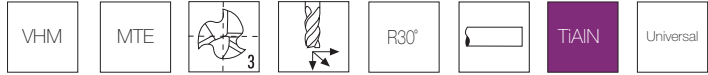


## VHM END MILLS - 3 FLUTES

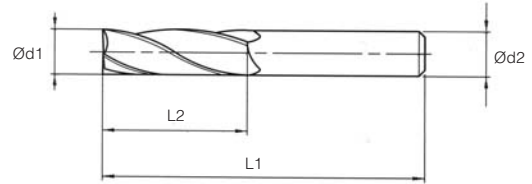


SOLID CARBIDE (VHM) TOOLS

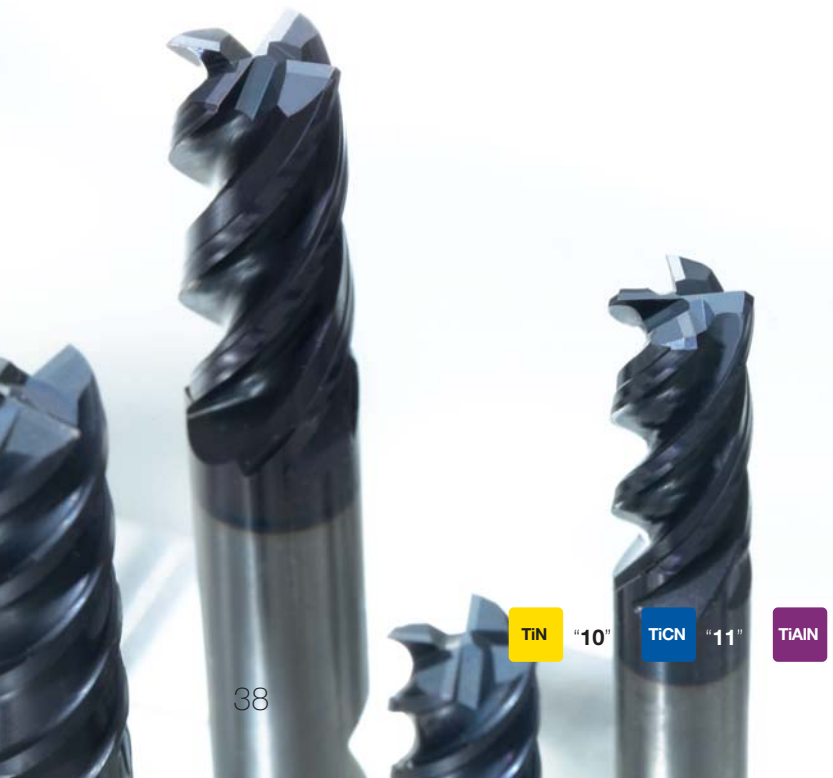
Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)
B12553103000	3	3	50	7	3
B12553103500	3.5	3.5	50	7	3
B12553104000	4	4	50	8	3
B12553104500	4.5	4.5	50	8	3
B12553105000	5	5	50	10	3
B12553106000	6	6	57	10	3
B12553107000	7	7	60	13	3
B12553108000	8	8	63	16	3
B12553109000	9	9	67	16	3
B12553110000	10	10	72	19	3
B12553111000	11	11	83	22	3
B12553112000	12	12	83	22	3
B12553113000	13	13	83	22	3
B12553114000	14	14	83	22	3
B12553115000	15	15	92	26	3
B12553116000	16	16	92	26	3
B12553118000	18	18	92	26	3
B12553120000	20	20	104	32	3



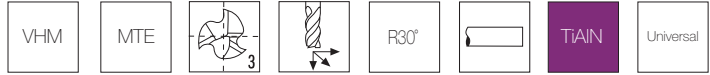
## VHM LONG END MILLS - 3 FLUTES



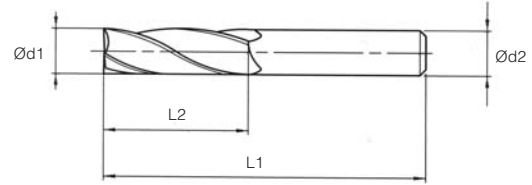
Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)
B12553103000L	3	3	50	15	3
B12553104000L	4	4	50	17	3
B12553105000L	5	5	50	20	3
B12553106000L	6	6	57	20	3
B12553108000L	8	8	63	30	3
B12553110000L	10	10	72	32	3
B12553112000L	12	12	83	40	3
B12553114000L	14	14	83	40	3
B12553116000L	16	16	92	50	3
B12553118000L	18	18	92	50	3
B12553120000L	20	20	104	60	3



TiN "10"
TiCN "11"
TiAlN "12"
STAR "13"
ALTiN "16"



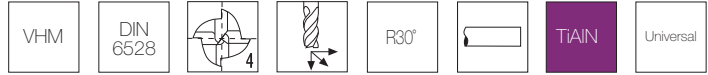
## VHM EXTRA LONG END MILLS - 3 FLUTES



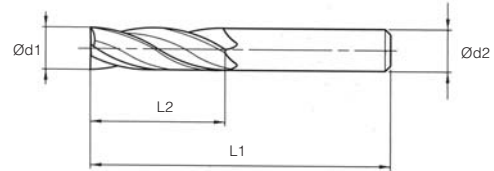
SOLID CARBIDE (VHM) TOOLS

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)
B12553103000XL	3	3	83	20	3
B12553104000XL	4	4	83	22	3
B12553105000XL	5	5	92	25	3
B12553106000XL	6	6	92	25	3
B12553108000XL	8	8	105	38	3
B12553110000XL	10	10	105	44	3
B12553112000XL	12	12	105	52	3
B12553114000XL	14	14	105	52	3
B12553116000XL	16	16	150	64	3
B12553118000XL	18	18	150	64	3
B12553120000XL	20	20	150	75	3





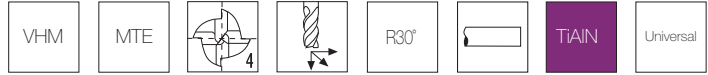
### VHM END MILLS - 4 FLUTES



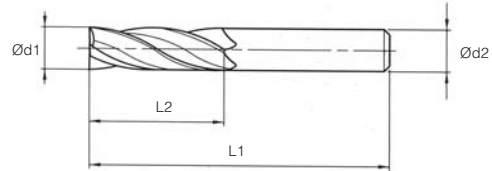
Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)
B12553003000	3	3	50	10	4
B12553003500	3.5	3.5	50	10	4
B12553004000	4	4	50	11	4
B12553004500	4.5	4.5	50	11	4
B12553005000	5	5	50	13	4
B12553006000	6	6	57	13	4
B12553007000	7	7	60	16	4
B12553008000	8	8	63	19	4
B12553009000	9	9	67	19	4
B12553010000	10	10	72	22	4
B12553011000	11	11	83	26	4
B12553012000	12	12	83	26	4
B12553013000	13	13	83	26	4
B12553014000	14	14	83	26	4
B12553015000	15	15	92	32	4
B12553016000	16	16	92	32	4
B12553018000	18	18	92	32	4
B12553020000	20	20	104	38	4





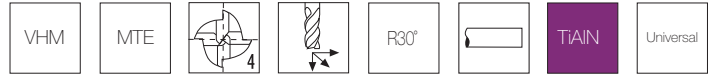


## VHM LONG END MILLS - 4 FLUTES



SOLID CARBIDE (VHM) TOOLS

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)
B12553003000L	3	3	50	15	4
B12553004000L	4	4	50	17	4
B12553005000L	5	5	50	20	4
B12553006000L	6	6	57	20	4
B12553008000L	8	8	63	30	4
B12553010000L	10	10	72	32	4
B12553012000L	12	12	83	40	4
B12553014000L	14	14	83	40	4
B12553016000L	16	16	92	50	4
B12553018000L	18	18	92	50	4
B12553020000L	20	20	104	60	4

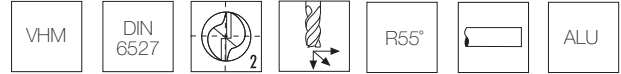


## VHM EXTRA LONG END MILLS - 4 FLUTES

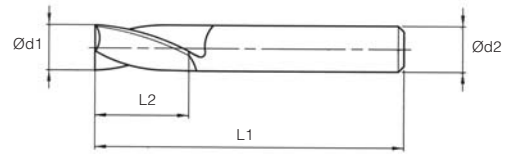


Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)
B12553003000XL	3	3	83	20	4
B12553004000XL	4	4	83	22	4
B12553005000XL	5	5	92	25	4
B12553006000XL	6	6	92	25	4
B12553008000XL	8	8	105	38	4
B12553010000XL	10	10	105	44	4
B12553012000XL	12	12	105	52	4
B12553014000XL	14	14	105	52	4
B12553016000XL	16	16	150	64	4
B12553018000XL	18	18	150	64	4
B12553020000XL	20	20	150	75	4





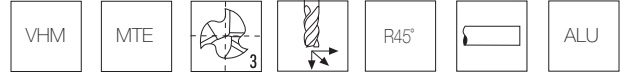
### VHM END MILLS - 2 FLUTES - ALU



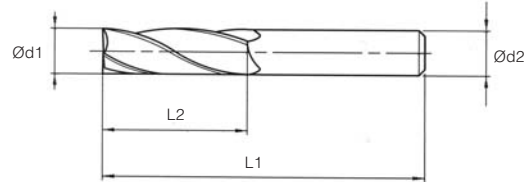
SOLID CARBIDE (VHM) TOOLS

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)
B00553503000	3	6	57	7	2
B00553504000	4	6	57	8	2
B00553505000	5	6	57	10	2
B00553506000	6	6	57	10	2
B00553508000	8	8	63	16	2
B00553510000	10	10	72	19	2
B00553512000	12	12	83	22	2
B00553514000	14	14	83	22	2
B00553516000	16	16	92	26	2
B00553518000	18	18	92	26	2
B00553520000	20	20	104	32	2





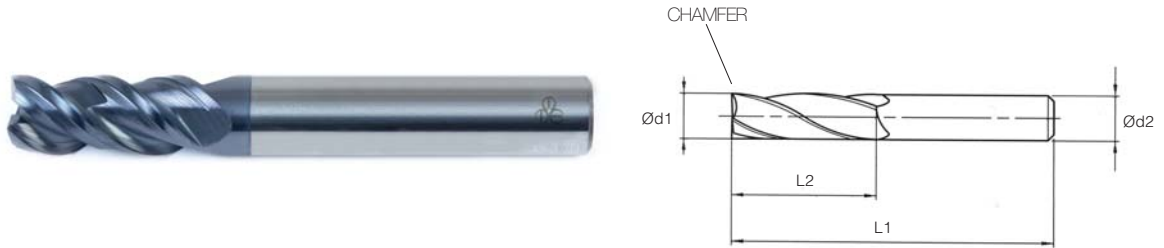
## VHM END MILLS - 3 FLUTES - ALU



Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)
B00553606000	6	6	60	16	3
B00553608000	8	8	78	25	3
B00553610000	10	10	78	28	3
B00553612000	12	12	89	32	3
B00553614000	14	14	89	32	3
B00553616000	16	16	96	35	3
B00553620000	20	20	111	45	3
B00553625000	25	25	126	50	3



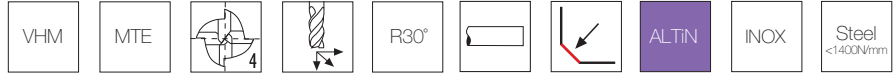
### VHM END MILLS - 3 FLUTES - INOX - CHAMFER



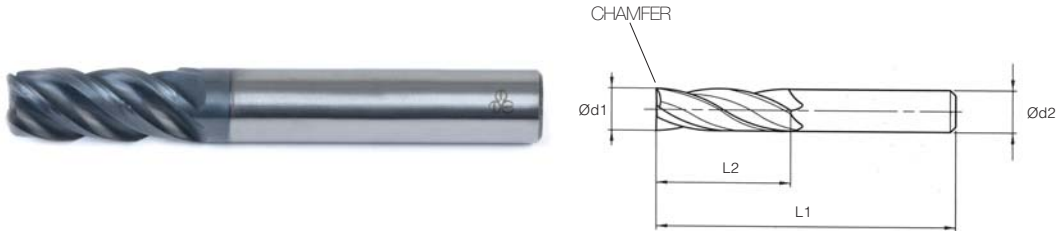
SOLID CARBIDE (VHM) TOOLS

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Chamfer	Z (Number of Flutes)
B16553703000	3	6	57	7	0.05	3
B16553704000	4	6	57	8	0.05	3
B16553705000	5	6	57	10	0.08	3
B16553706000	6	6	57	10	0.08	3
B16553708000	8	8	63	16	0.1	3
B16553710000	10	10	72	19	0.1	3
B16553712000	12	12	83	22	0.15	3
B16553714000	14	14	83	22	0.2	3
B16553716000	16	16	92	26	0.2	3
B16553720000	20	20	104	32	0.2	3





### VHM END MILLS - 4 FLUTES - INOX - CHAMFER

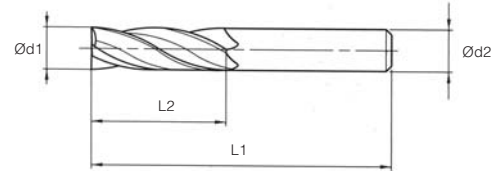


Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Chamfer	Z (Number of Flutes)
B16553804000	4	6	55	12	0.4	4
B16553805000	5	6	57	13	0.4	4
B16553806000	6	6	57	13	0.4	4
B16553808000	8	8	63	16	0.5	4
B16553810000	10	10	72	22	0.5	4
B16553812000	12	12	83	26	0.5	4
B16553814000	14	14	83	26	0.5	4
B16553816000	16	16	92	32	0.5	4
B16553818000	18	18	92	32	0.5	4
B16553820000	20	20	104	38	0.5	4





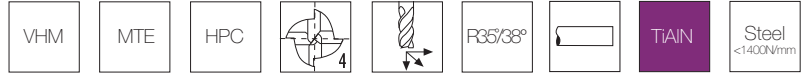
## VHM END MILLS - 4 FLUTES



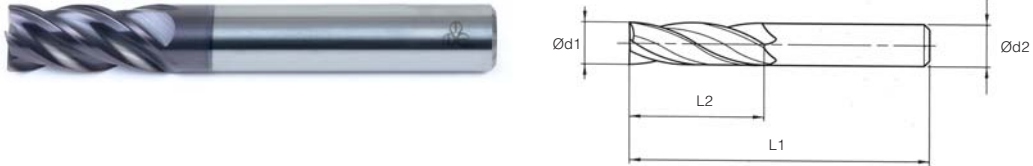
SOLID CARBIDE (VHM) TOOLS

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)
B12554403000	3	6	57	8	4
B12554404000	4	6	57	11	4
B12554405000	5	6	57	13	4
B12554406000	6	6	57	13	4
B12554408000	8	8	63	19	4
B12554410000	10	10	72	22	4
B12554412000	12	12	83	26	4
B12554414000	14	14	83	26	4
B12554416000	16	16	92	32	4
B12554418000	18	18	92	32	4
B12554420000	20	20	104	38	4





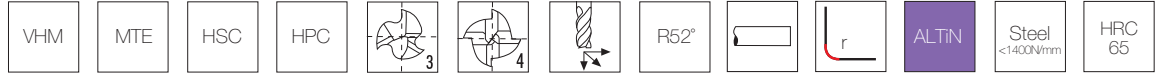
VHM END MILLS - 4 FLUTES - 35°/38°



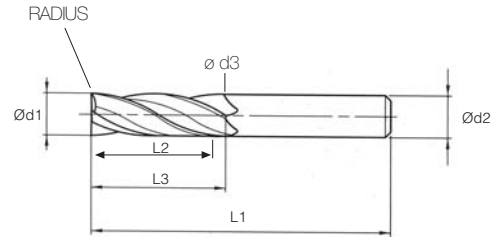
Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Chamfer	Z (Number of Flutes)
B12557003000	3	6	57	8	0.10	4
B12557004000	4	6	57	11	0.13	4
B12557005000	5	6	57	13	0.18	4
B12557006000	6	6	57	13	0.20	4
B12557008000	8	8	63	19	0.20	4
B12557010000	10	10	72	22	0.30	4
B12557012000	12	12	83	26	0.30	4
B12557014000	14	14	83	26	0.30	4
B12557016000	16	16	92	32	0.40	4
B12557018000	18	18	92	32	0.40	4
B12557020000	20	20	104	38	0.50	4







### VHM END MILLS - 3/4 FLUTES - HRC 65 - RADIUS



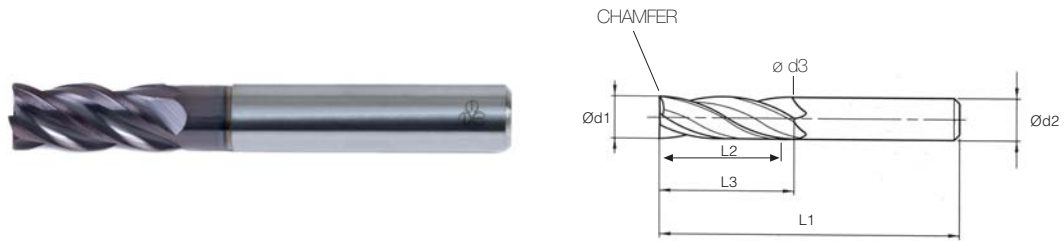
SOLID CARBIDE (VHM) TOOLS

Product Code	d1 mm	d2 mm	d3 mm	L1 mm	L2 mm	L3 mm	Radius	Z (Number of Flutes)
B16554503000R02	3	6	2.9	57	8	18	0.20	3
B16554503000R05	3	6	2.9	57	8	18	0.50	3
B16554504000R02	4	6	3.8	57	11	21	0.20	4
B16554504000R03	4	6	3.8	57	11	21	0.30	4
B16554504000R05	4	6	3.8	57	11	21	0.50	4
B16554504000R10	4	6	3.8	57	11	21	1.00	4
B16554505000R02	5	6	4.8	57	13	21	0.20	4
B16554505000R03	5	6	4.8	57	13	21	0.30	4
B16554505000R05	5	6	4.8	57	13	21	0.50	4
B16554505000R10	5	6	4.8	57	13	21	1.00	4
B16554506000R02	6	6	5.8	57	13	21	0.20	4
B16554506000R03	6	6	5.8	57	13	21	0.30	4
B16554506000R05	6	6	5.8	57	13	21	0.50	4
B16554506000R10	6	6	5.8	57	13	21	1.00	4
B16554506000R15	6	6	5.8	57	13	21	1.50	4
B16554506000R20	6	6	5.8	57	13	21	2.00	4
B16554508000R03	8	8	7.8	63	19	27	0.30	4
B16554508000R05	8	8	7.8	63	19	27	0.50	4
B16554508000R10	8	8	7.8	63	19	27	1.00	4
B16554508000R15	8	8	7.8	63	19	27	1.50	4
B16554508000R20	8	8	7.8	63	19	27	2.00	4

Product Code	d1 mm	d2 mm	d3 mm	L1 mm	L2 mm	L3 mm	Radius	Z (Number of Flutes)
B16554510000R03	10	10	9.8	72	22	32	0.30	4
B16554510000R05	10	10	9.8	72	22	32	0.50	4
B16554510000R10	10	10	9.8	72	22	32	1.00	4
B16554510000R15	10	10	9.8	72	22	32	1.50	4
B16554510000R20	10	10	9.8	72	22	32	2.00	4
B16554512000R03	12	12	11.8	83	26	38	0.30	4
B16554512000R05	12	12	11.8	83	26	38	0.50	4
B16554512000R10	12	12	11.8	83	26	38	1.00	4
B16554512000R15	12	12	11.8	83	26	38	1.50	4
B16554512000R20	12	12	11.8	83	26	38	2.00	4
B16554516000R03	16	16	15.8	92	32	44	0.30	4
B16554516000R05	16	16	15.8	92	32	44	0.50	4
B16554516000R10	16	16	15.8	92	32	44	1.00	4
B16554516000R15	16	16	15.8	92	32	44	1.50	4
B16554516000R20	16	16	15.8	92	32	44	2.00	4
B16554520000R03	20	20	19.8	92	38	54	0.30	4
B16554520000R05	20	20	19.8	92	38	54	0.50	4
B16554520000R10	20	20	19.8	92	38	54	1.00	4
B16554520000R15	20	20	19.8	92	38	54	1.50	4
B16554520000R20	20	20	19.8	92	38	54	2.00	4

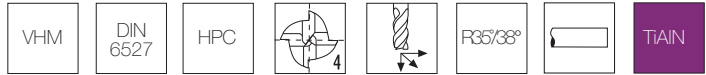


VHM END MILLS - 4 FLUTES - 35°/38° - INOX - CHAMFER



Product Code	d1 mm	d2 mm	d3 mm	L1 mm	L2 mm	L3 mm	Chamfer	Z (Number of Flutes)
B16557103000	3	6	2.8	57	8	18	0.13	4
B16557104000	4	6	3.6	57	11	21	0.18	4
B16557105000	5	6	4.6	57	13	21	0.20	4
B16557106000	6	6	5.5	57	13	21	0.20	4
B16557108000	8	8	7.5	69	19	27	0.20	4
B16557110000	10	10	9.5	72	22	32	0.30	4
B16557112000	12	12	11.5	83	26	38	0.30	4
B16557114000	14	14	13.6	83	26	42	0.30	4
B16557116000	16	16	15.5	92	32	44	0.40	4
B16557118000	18	18	17.5	92	32	50	0.40	4
B16557120000	20	20	19.5	104	38	54	0.50	4





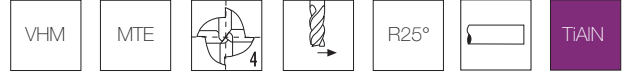
VHM END MILLS BALL NOSE - 4 FLUTES - 35°/38°



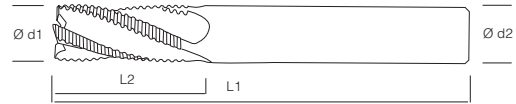
SOLID CARBIDE (VHM) TOOLS

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)	R
B12557303000	3	6	57	8	4	1.5
B12557304000	4	6	57	11	4	2
B12557305000	5	6	57	13	4	2.5
B12557306000	6	6	57	13	4	3
B12557308000	8	8	63	19	4	4
B12557310000	10	10	72	22	4	5
B12557312000	12	12	83	26	4	6
B12557314000	14	14	83	26	4	7
B12557316000	16	16	92	32	4	8
B12557320000	20	20	104	38	4	10



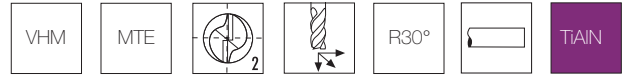


## VHM ROUGHING END MILLS - 4 FLUTES

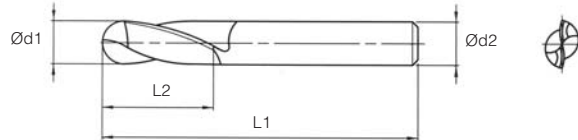


Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)
B12557203000	3	6	57	8	4
B12557204000	4	6	57	11	4
B12557205000	5	6	57	13	4
B12557206000	6	6	57	13	4
B12557208000	8	8	69	19	4
B12557210000	10	10	72	22	4
B12557212000	12	12	83	26	4
B12557214000	14	14	83	26	4
B12557216000	16	16	92	32	4
B12557218000	18	18	92	32	4
B12557220000	20	20	104	38	4
B12557225000	25	25	104	38	4





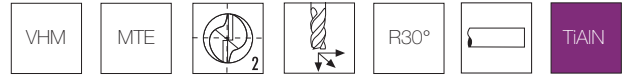
## VHM BALL NOSE SHORT END MILLS - 2 FLUTES



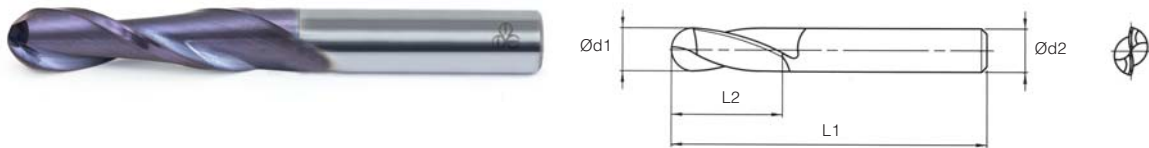
SOLID CARBIDE (VHM) TOOLS

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)	R
B12554003000K	3	3	57	7	2	1.5
B12554004000K	4	4	57	8	2	2
B12554005000K	5	5	57	10	2	2.5
B12554006000K	6	6	57	10	2	3
B12554008000K	8	8	63	16	2	4
B12554010000K	10	10	72	19	2	5
B12554012000K	12	12	83	22	2	6
B12554014000K	14	14	83	22	2	7
B12554016000K	16	16	92	26	2	8
B12554018000K	18	18	92	26	2	9
B12554020000K	20	20	104	32	2	10



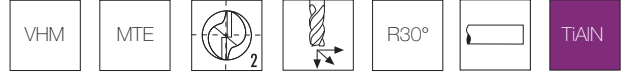


## VHM BALL NOSE LONG END MILLS - 2 FLUTES



Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)	R
B12554003000L	3	3	65	12	2	1.5
B12554004000L	4	4	65	14	2	2
B12554005000L	5	5	75	16	2	2.5
B12554006000L	6	6	75	20	2	3
B12554008000L	8	8	83	32	2	4
B12554010000L	10	10	100	40	2	5
B12554012000L	12	12	100	40	2	6
B12554014000L	14	14	110	40	2	7
B12554016000L	16	16	110	45	2	8
B12554018000L	18	18	110	45	2	9
B12554020000L	20	20	110	50	2	10





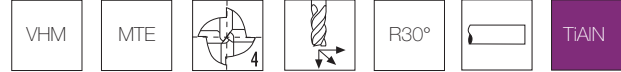
## VHM BALL NOSE EXTRA LONG END MILLS - 2 FLUTES



SOLID CARBIDE (VHM) TOOLS

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)	R
B12554003000XL	3	3	83	20	2	1.5
B12554004000XL	4	4	83	25	2	2
B12554005000XL	5	5	92	25	2	2.5
B12554006000XL	6	6	100	40	2	3
B12554008000XL	8	8	110	40	2	4
B12554010000XL	10	10	150	50	2	5
B12554012000XL	12	12	150	60	2	6
B12554014000XL	14	14	150	70	2	7
B12554016000XL	16	16	150	70	2	8
B12554018000XL	18	18	150	70	2	9
B12554020000XL	20	20	150	70	2	10



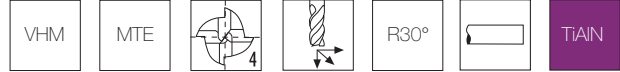


## VHM BALL NOSE SHORT END MILLS - 4 FLUTES



Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)	R
B12554103000K	3	3	57	7	4	1.5
B12554104000K	4	4	57	8	4	2
B12554105000K	5	5	57	10	4	2.5
B12554106000K	6	6	57	10	4	3
B12554108000K	8	8	63	16	4	4
B12554110000K	10	10	72	19	4	5
B12554112000K	12	12	83	22	4	6
B12554114000K	14	14	83	22	4	7
B12554116000K	16	16	92	26	4	8
B12554118000K	18	18	92	26	4	9
B12554120000K	20	20	104	32	4	10





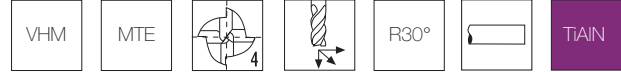
### VHM BALL NOSE LONG END MILLS - 4 FLUTES



SOLID CARBIDE (VHM) TOOLS

Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)	R
B12554103000L	3	3	65	12	4	1.5
B12554104000L	4	4	65	14	4	2
B12554105000L	5	5	75	16	4	2.5
B12554106000L	6	6	75	20	4	3
B12554108000L	8	8	83	32	4	4
B12554110000L	10	10	100	40	4	5
B12554112000L	12	12	100	40	4	6
B12554114000L	14	14	110	40	4	7
B12554116000L	16	16	110	45	4	8
B12554118000L	18	18	110	45	4	9
B12554120000L	20	20	110	50	4	10





## VHM BALL NOSE EXTRA LONG END MILLS - 4 FLUTES



Product Code	d1 mm	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)	R
B12554103000XL	3	3	83	20	4	1.5
B12554104000XL	4	4	83	25	4	2
B12554105000XL	5	5	92	25	4	2.5
B12554106000XL	6	6	100	40	4	3
B12554108000XL	8	8	110	40	4	4
B12554110000XL	10	10	150	50	4	5
B12554112000XL	12	12	150	60	4	6
B12554114000XL	14	14	150	70	4	7
B12554116000XL	16	16	150	70	4	8
B12554118000XL	18	18	150	70	4	9
B12554120000XL	20	20	150	70	4	10

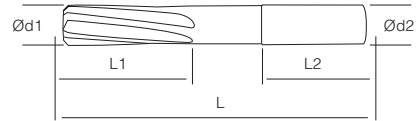
VHM

MTE



TiAlN

## VHM MACHINE REAMERS



SOLID CARBIDE (VHM) TOOLS

Product Code	d1 mm	d2 mm	L mm	L1 mm	L2 mm	Z (Number of Flutes)
B12565100300	3.0	3.0	61	15	30	6
B12565100400	4.0	4.0	75	19	32	6
B12565100500	5.0	5.0	86	23	34	6
B12565100600	6.0	6.0	93	26	36	6
B12565100800	8.0	8.0	117	33	42	6
B12565101000	10.0	10.0	133	38	46	6
B12565101200	12.0	12.0	150	44	46	6
B12565101400	14.0	14.0	160	47	50	6
B12565101600	16.0	16.0	165	52	50	6
B12565101800	18.0	18.0	165	55	52	6
B12565102000	20.0	20.0	165	60	58	6

TiN "10"

TiCN "11"

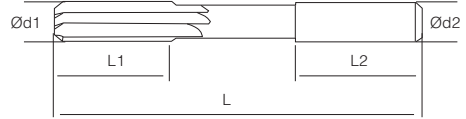
TiAlN "12"

STAR "13"

ALTiN "16"



## VHM MACHINE REAMER STRAIGHT FLUTE



Product Code	d1 mm	d2 mm	L mm	L1 mm	L2 mm	Z (Number of Flutes)
B12565000300	3.0	3.0	61	15	30	6
B12565000400	4.0	4.0	75	19	32	6
B12565000500	5.0	5.0	86	23	34	6
B12565000600	6.0	6.0	93	26	36	6
B12565000800	8.0	8.0	117	33	42	6
B12565001000	10.0	10.0	133	38	46	6
B12565001200	12.0	12.0	150	44	46	6
B12565001400	14.0	14.0	160	47	50	6
B12565001600	16.0	16.0	165	52	50	6
B12565001800	18.0	18.0	165	55	52	6
B12565002000	20.0	20.0	165	60	58	6

TWIST  
DRILLS



TWIST DRILLS



Tool Type	Standart	QualTy	Coating	Page
STRAIGHT SHANK TWIST DRILLS - ROLL FORGED	Din 338	HSS	-	65
STRAIGHT SHANK TWIST DRILLS - GROUND	Din 338	HSS	-	67
STRAIGHT SHANK LEFT HAND TWIST DRILLS - GORUND	Din 338	HSS	OX	70
STRAIGHT SHANK TWIST DRILLS - SILVER SERIES	Din 338	HSS-E	-	74
STRAIGHT SHANK TWIST DRILLS - GOLD SERIES	Din 338	HSS-E	-	76
STRAIGHT SHANK TWIST DRILLS - TIN COATED	Din 338	HSS-E	TiN	78
REDUCED SHANK TWIST DRILLS	Din 338	HSS	OX	79
REDUCED SHANK TWIST DRILLS	Din 338	HSS-E	OX	80
STRAIGHT SHANK TWIST DRILLS - LONG SERIES	Din 340	HSS	-	81
STRAIGHT SHANK TWIST DRILLS - LONG SERIES	Din 340	HSS-E	-	83
STRAIGHT SHANK TWIST DRILLS - LONG SILVER SERIES	Din 340	HSS-E	-	85
STRAIGHT SHANK TWIST DRILLS - LONG GOLD SERIES	Din 340	HSS-E	-	87
STRAIGHT SHANK TWIST DRILLS - EXTRA LONG SERIES TYPE N	Din 1869 Nr.1	HSS	-	89
STRAIGHT SHANK TWIST DRILLS - EXTRA LONG SERIES TYPE GT 100	Din 1869 Nr.1	HSS-E	-	90
STRAIGHT SHANK TWIST DRILLS - EXTRA LONG SERIES TYPE N	Din 1869 Nr.2	HSS	-	91
STRAIGHT SHANK TWIST DRILLS - EXTRA LONG SERIES TYPE GT 100	Din 1869 Nr.2	HSS-E	-	92
STRAIGHT SHANK TWIST DRILLS - EXTRA LONG SERIES TYPE N	Din 1869 Nr.3	HSS	-	93
STRAIGHT SHANK TWIST DRILLS - EXTRA LONG SERIES TYPE GT 100	Din 1869 Nr.3	HSS-E	-	94
MORSE TAPER SHANK TWIST DRILLS	Din 345	HSS	-	95
MORSE TAPER SHANK TWIST DRILLS	Din 345	HSS-E	-	97
MORSE TAPER SHANK TWIST DRILLS - LONG SERIES	Din 341	HSS	-	99
MTE HARDOX DRILL BITS	MTE	HSS-E (%8 Co)	-	100
MORSE TAPER SHANK TWIST DRILLS - EXTRA LONG SERIES	Din 1870 Nr.1	HSS	-	101
MORSE TAPER SHANK TWIST DRILLS - EXTRA LONG SERIES	Din 1870 Nr.2	HSS	-	102
STRAIGHT SHANK TWIST DRILLS - SHORT SERIES	Din 1897	HSS	-	103
DOUBLE ENDED BODY DRILLS	MTE	HSS	-	104
SPOT WELD DRILLS - SHORT (SPOTLE / VARIO DRILLS)	MTE	HSS-E (%8 Co)	-	105
SPOT WELD DRILLS - SHORT (SPOTLE / VARIO DRILLS)	MTE	HSS-E (%8 Co)	TiN	105
SPOT WELD DRILLS - LONG	MTE	HSS-E (%8 Co)	-	106
SPOT WELD DRILLS - LONG	MTE	HSS-E (%8 Co)	TiN	106
CENTER DRILLS - FORM A	Din 333/A	HSS	-	107
CENTER DRILLS - FORM A	Din 333/A	HSS	TiN	107
CENTER DRILLS - FORM A	Din 333/A	HSS-E	-	108
CENTER DRILLS - FORM A	Din 333/A	HSS-E	TiN	108
CENTER DRILLS - FORM B	Din 333/A	HSS	-	109
CENTER DRILLS - FORM R	Din 333/A	HSS	-	109
CENTER DRILLS - LONG SERIES	Din 333/A	HSS-E	-	110
CENTER DRILLS - LONG SERIES	Din 333/A	HSS-E	TiN	110
STRAIGHT SHANK SUBLAND DRILLS	MTE	HSS	OX	111
STRAIGHT SHANK SUBLAND DRILLS	MTE	HSS-E	OX	111
ROLL FORGED SET DRILLS	Din 338	HSS	-	112



TWIST DRILLS







## STRAIGHT SHANK TWIST DRILLS - ROLL FORGED



Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B0000000200	2,0	49	24	B00000010490	4,9	86	52
B00000010210	2,1	49	24	B00000000500	5,0	86	52
B00000010220	2,2	53	27	B00000010510	5,1	86	52
B00000010230	2,3	53	27	B00000010520	5,2	86	52
B00000010240	2,4	57	30	B00000010530	5,3	86	52
B00000000250	2,5	57	30	B00000010540	5,4	93	57
B00000010260	2,6	57	30	B00000000550	5,5	93	57
B00000010270	2,7	61	33	B00000010560	5,6	93	57
B00000010280	2,8	61	33	B00000010570	5,7	93	57
B00000010290	2,9	61	33	B00000010580	5,8	93	57
B00000000300	3,0	61	33	B00000010590	5,9	93	57
B00000010310	3,1	65	36	B00000000600	6,0	93	57
B00000010320	3,2	65	36	B00000010610	6,1	101	63
B00000010330	3,3	65	36	B00000010620	6,2	101	63
B00000010340	3,4	70	39	B00000010630	6,3	101	63
B00000000350	3,5	70	39	B00000010640	6,4	101	63
B00000010360	3,6	70	39	B00000000650	6,5	101	63
B00000010370	3,7	70	39	B00000010660	6,6	101	63
B00000010380	3,8	75	43	B00000010670	6,7	101	63
B00000010390	3,9	75	43	B00000010680	6,8	109	69
B00000000400	4,0	75	43	B00000010690	6,9	109	69
B00000010410	4,1	75	43	B00000000700	7,0	109	69
B00000010420	4,2	75	43	B00000010710	7,1	109	69
B00000010430	4,3	80	47	B00000010720	7,2	109	69
B00000010440	4,4	80	47	B00000010730	7,3	109	69
B00000000450	4,5	80	47	B00000010740	7,4	109	69
B00000010460	4,6	80	47	B00000000750	7,5	109	69
B00000010470	4,7	80	47	B00000010760	7,6	117	75
B00000010480	4,8	86	52	B00000010770	7,7	117	75

Continued 66 page



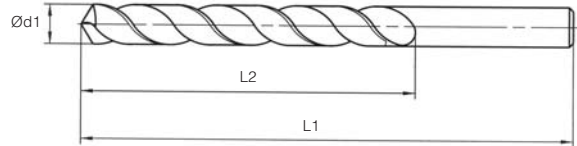
## STRAIGHT SHANK TWIST DRILLS - ROLL FORGED



Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00000010780	7,8	117	75	B00000011060	10,6	133	87
B00000010790	7,9	117	75	B00000011070	10,7	142	94
B00000000800	8,0	117	75	B00000011080	10,8	142	94
B00000010810	8,1	117	75	B00000011090	10,9	142	94
B00000010820	8,2	117	75	B00000001100	11,0	142	94
B00000010830	8,3	117	75	B00000011110	11,1	142	94
B00000010840	8,4	117	75	B00000011120	11,2	142	94
B00000000850	8,5	117	75	B00000011130	11,3	142	94
B00000010860	8,6	125	81	B00000011140	11,4	142	94
B00000010870	8,7	125	81	B00000001150	11,5	142	94
B00000010880	8,8	125	81	B00000011160	11,6	142	94
B00000010890	8,9	125	81	B00000011170	11,7	142	94
B00000000900	9,0	125	81	B00000011180	11,8	142	94
B00000010910	9,1	125	81	B00000011190	11,9	151	101
B00000010920	9,2	125	81	B00000001200	12,0	151	101
B00000010930	9,3	125	81	B00000011210	12,1	151	101
B00000010940	9,4	125	81	B00000011220	12,2	151	101
B00000000950	9,5	125	81	B00000011230	12,3	151	101
B00000010960	9,6	133	87	B00000011240	12,4	151	101
B00000010970	9,7	133	87	B00000001250	12,5	151	101
B00000010980	9,8	133	87	B00000011260	12,6	151	101
B00000010990	9,9	133	87	B00000011270	12,7	151	101
B00000001000	10,0	133	87	B00000011280	12,8	151	101
B00000011010	10,1	133	87	B00000011290	12,9	151	101
B00000011020	10,2	133	87	B00000001300	13,0	151	101
B00000011030	10,3	133	87	B00000011310	13,1	151	101
B00000011040	10,4	133	87	B00000011320	13,2	151	101
B00000001050	10,5	133	87				



## STRAIGHT SHANK TWIST DRILLS - GROUND



\* H - W Types Upon Request

Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00007000040	0,40	20	5	B00007000430	4,30	80	47
B00007000050	0,50	22	6	B00007000440	4,40	80	47
B00007000060	0,60	24	7	B00007000450	4,50	80	47
B00007000070	0,70	28	9	B00007000460	4,60	80	47
B00007000080	0,80	30	10	B00007000470	4,70	80	47
B00007000090	0,90	32	11	B00007000480	4,80	86	52
B00007000100	1,00	34	12	B00007000490	4,90	86	52
B00007000110	1,10	36	14	B00007000500	5,00	86	52
B00007000120	1,20	38	16	B00007000510	5,10	86	52
B00007000130	1,30	38	16	B00007000520	5,20	86	52
B00007000140	1,40	40	18	B00007000530	5,30	86	52
B00007000150	1,50	40	18	B00007000540	5,40	93	57
B00007000160	1,60	43	20	B00007000550	5,50	93	57
B00007000170	1,70	43	20	B00007000560	5,60	93	57
B00007000180	1,80	46	22	B00007000570	5,70	93	57
B00007000190	1,90	46	22	B00007000580	5,80	93	57
B00007000200	2,00	49	24	B00007000590	5,90	93	57
B00007000210	2,10	49	24	B00007000600	6,00	93	57
B00007000220	2,20	53	27	B00007000610	6,10	101	63
B00007000230	2,30	53	27	B00007000620	6,20	101	63
B00007000240	2,40	57	30	B00007000630	6,30	101	63
B00007000250	2,50	57	30	B00007000640	6,40	101	63
B00007000260	2,60	57	30	B00007000650	6,50	101	63
B00007000270	2,70	61	33	B00007000660	6,60	101	63
B00007000280	2,80	61	33	B00007000670	6,70	101	63
B00007000290	2,90	61	33	B00007000680	6,80	109	69
B00007000300	3,00	61	33	B00007000690	6,90	109	69
B00007000310	3,10	65	36	B00007000700	7,00	109	69
B00007000320	3,20	65	36	B00007000710	7,10	109	69
B00007000330	3,30	65	36	B00007000720	7,20	109	69
B00007000340	3,40	70	39	B00007000730	7,30	109	69
B00007000350	3,50	70	39	B00007000740	7,40	109	69
B00007000360	3,60	70	39	B00007000750	7,50	109	69
B00007000370	3,70	70	39	B00007000760	7,60	117	75
B00007000380	3,80	75	43	B00007000770	7,70	117	75
B00007000390	3,90	75	43	B00007000780	7,80	117	75
B00007000400	4,00	75	43	B00007000790	7,90	117	75
B00007000410	4,10	75	43	B00007000800	8,00	117	75
B00007000420	4,20	75	43	B00007000810	8,10	117	75

Continued 68 page



## STRAIGHT SHANK TWIST DRILLS - GROUND



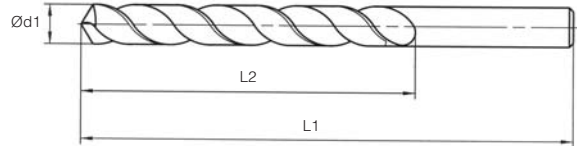
\* H - W Types Upon Request

Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00007000820	8,20	117	75	B00007001210	12,10	151	101
B00007000830	8,30	117	75	B00007001220	12,20	151	101
B00007000840	8,40	117	75	B00007001230	12,30	151	101
B00007000850	8,50	117	75	B00007001240	12,40	151	101
B00007000860	8,60	125	81	B00007001250	12,50	151	101
B00007000870	8,70	125	81	B00007001260	12,60	151	101
B00007000880	8,80	125	81	B00007001270	12,70	151	101
B00007000890	8,90	125	81	B00007001280	12,80	151	101
B00007000900	9,00	125	81	B00007001290	12,90	151	101
B00007000910	9,10	125	81	B00007001300	13,00	151	101
B00007000920	9,20	125	81	B00007001310	13,10	151	101
B00007000930	9,30	125	81	B00007001320	13,20	151	101
B00007000940	9,40	125	81	B00007001330	13,30	160	108
B00007000950	9,50	125	81	B00007001340	13,40	160	108
B00007000960	9,60	133	87	B00007001350	13,50	160	108
B00007000970	9,70	133	87	B00007001360	13,60	160	108
B00007000980	9,80	133	87	B00007001370	13,70	160	108
B00007000990	9,90	133	87	B00007001380	13,80	160	108
B00007001000	10,00	133	87	B00007001390	13,90	160	108
B00007001010	10,10	133	87	B00007001400	14,00	160	108
B00007001020	10,20	133	87	B00007001410	14,10	169	114
B00007001030	10,30	133	87	B00007001420	14,20	169	114
B00007001040	10,40	133	87	B00007001430	14,30	169	114
B00007001050	10,50	133	87	B00007001440	14,40	169	114
B00007001060	10,60	133	87	B00007001450	14,50	169	114
B00007001070	10,70	142	94	B00007001460	14,60	169	114
B00007001080	10,80	142	94	B00007001470	14,70	169	114
B00007001090	10,90	142	94	B00007001480	14,80	169	114
B00007001100	11,00	142	94	B00007001490	14,90	169	114
B00007001110	11,10	142	94	B00007001500	15,00	169	114
B00007001120	11,20	142	94	B00007001510	15,10	178	120
B00007001130	11,30	142	94	B00007001520	15,20	178	120
B00007001140	11,40	142	94	B00007001530	15,30	178	120
B00007001150	11,50	142	94	B00007001540	15,40	178	120
B00007001160	11,60	142	94	B00007001550	15,50	178	120
B00007001170	11,70	142	94	B00007001560	15,60	178	120
B00007001180	11,80	142	94	B00007001570	15,70	178	120
B00007001190	11,90	151	101	B00007001580	15,80	178	120
B00007001200	12,00	151	101	B00007001590	15,90	178	120

Continued 69 page



## STRAIGHT SHANK TWIST DRILLS - GROUND



\* H - W Types Upon Request

Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00007001600	16,00	178	120	B00007001860	18,60	198	135
B00007001610	16,10	184	125	B00007001870	18,70	198	135
B00007001620	16,20	184	125	B00007001880	18,80	198	135
B00007001630	16,30	184	125	B00007001890	18,90	198	135
B00007001640	16,40	184	125	B00007001900	19,00	198	135
B00007001650	16,50	184	125	B00007001910	19,10	205	140
B00007001660	16,60	184	125	B00007001920	19,20	205	140
B00007001670	16,70	184	125	B00007001930	19,30	205	140
B00007001680	16,80	184	125	B00007001940	19,40	205	140
B00007001690	16,90	184	125	B00007001950	19,50	205	140
B00007001700	17,00	184	125	B00007001960	19,60	205	140
B00007001710	17,10	191	130	B00007001970	19,70	205	140
B00007001720	17,20	191	130	B00007001980	19,80	205	140
B00007001730	17,30	191	130	B00007001990	19,90	205	140
B00007001740	17,40	191	130	B00007002000	20,00	205	140
B00007001750	17,50	191	130	B00002102050	20,50	213	145
B00007001760	17,60	191	130	B00002102100	21,00	213	145
B00007001770	17,70	191	130	B00002102150	21,50	221	150
B00007001780	17,80	191	130	B00002102200	22,00	221	150
B00007001790	17,90	191	130	B00002102250	22,50	229	155
B00007001800	18,00	191	130	B00002102300	23,00	229	155
B00007001810	18,10	198	135	B00002102350	23,50	229	155
B00007001820	18,20	198	135	B00002102400	24,00	236	160
B00007001830	18,30	198	135	B00002102450	24,50	236	160
B00007001840	18,40	198	135	B00002102500	25,00	236	160
B00007001850	18,50	198	135				



STRAIGHT SHANK LEFT HAND TWIST DRILLS - GROUND



Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00007010100	1,00	34	12	B00007010490	4,90	86	52
B00007010110	1,10	36	14	B00007010500	5,00	86	52
B00007010120	1,20	38	16	B00007010510	5,10	86	52
B00007010130	1,30	38	16	B00007010520	5,20	86	52
B00007010140	1,40	40	18	B00007010530	5,30	86	52
B00007010150	1,50	40	18	B00007010540	5,40	93	57
B00007010160	1,60	43	20	B00007010550	5,50	93	57
B00007010170	1,70	43	20	B00007010560	5,60	93	57
B00007010180	1,80	46	22	B00007010570	5,70	93	57
B00007010190	1,90	46	22	B00007010580	5,80	93	57
B00007010200	2,00	49	24	B00007010590	5,90	93	57
B00007010210	2,10	49	24	B00007010600	6,00	93	57
B00007010220	2,20	53	27	B00007010610	6,10	101	63
B00007010230	2,30	53	27	B00007010620	6,20	101	63
B00007010240	2,40	57	30	B00007010630	6,30	101	63
B00007010250	2,50	57	30	B00007010640	6,40	101	63
B00007010260	2,60	57	30	B00007010650	6,50	101	63
B00007010270	2,70	61	33	B00007010660	6,60	101	63
B00007010280	2,80	61	33	B00007010670	6,70	101	63
B00007010290	2,90	61	33	B00007010680	6,80	109	69
B00007010300	3,00	61	33	B00007010690	6,90	109	69
B00007010310	3,10	65	36	B00007010700	7,00	109	69
B00007010320	3,20	65	36	B00007010710	7,10	109	69
B00007010330	3,30	65	36	B00007010720	7,20	109	69
B00007010340	3,40	70	39	B00007010730	7,30	109	69
B00007010350	3,50	70	39	B00007010740	7,40	109	69
B00007010360	3,60	70	39	B00007010750	7,50	109	69
B00007010370	3,70	70	39	B00007010760	7,60	117	75
B00007010380	3,80	75	43	B00007010770	7,70	117	75
B00007010390	3,90	75	43	B00007010780	7,80	117	75
B00007010400	4,00	75	43	B00007010790	7,90	117	75
B00007010410	4,10	75	43	B00007010800	8,00	117	75
B00007010420	4,20	75	43	B00007010810	8,10	117	75
B00007010430	4,30	80	47	B00007010820	8,20	117	75
B00007010440	4,40	80	47	B00007010830	8,30	117	75
B00007010450	4,50	80	47	B00007010840	8,40	117	75
B00007010460	4,60	80	47	B00007010850	8,50	117	75
B00007010470	4,70	80	47	B00007010860	8,60	125	81
B00007010480	4,80	86	52	B00007010870	8,70	125	81

Continued 71 page



### STRAIGHT SHANK LEFT HAND TWIST DRILLS - GROUND



Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00007010880	8,80	125	81	B00007011270	12,70	151	101
B00007010890	8,90	125	81	B00007011280	12,80	151	101
B00007010900	9,00	125	81	B00007011290	12,90	151	101
B00007010910	9,10	125	81	B00007011300	13,00	151	101
B00007010920	9,20	125	81	B00007011310	13,10	151	101
B00007010930	9,30	125	81	B00007011320	13,20	151	101
B00007010940	9,40	125	81	B00007011330	13,30	160	108
B00007010950	9,50	125	81	B00007011340	13,40	160	108
B00007010960	9,60	133	87	B00007011350	13,50	160	108
B00007010970	9,70	133	87	B00007011360	13,60	160	108
B00007010980	9,80	133	87	B00007011370	13,70	160	108
B00007010990	9,90	133	87	B00007011380	13,80	160	108
B00007011000	10,00	133	87	B00007011390	13,90	160	108
B00007011010	10,10	133	87	B00007011400	14,00	160	108
B00007011020	10,20	133	87	B00007011410	14,10	169	114
B00007011030	10,30	133	87	B00007011420	14,20	169	114
B00007011040	10,40	133	87	B00007011430	14,30	169	114
B00007011050	10,50	133	87	B00007011440	14,40	169	114
B00007011060	10,60	133	87	B00007011450	14,50	169	114
B00007011070	10,70	142	94	B00007011460	14,60	169	114
B00007011080	10,80	142	94	B00007011470	14,70	169	114
B00007011090	10,90	142	94	B00007011480	14,80	169	114
B00007011100	11,00	142	94	B00007011490	14,90	169	114
B00007011110	11,10	142	94	B00007011500	15,00	169	114
B00007011120	11,20	142	94	B00007011510	15,10	178	120
B00007011130	11,30	142	94	B00007011520	15,20	178	120
B00007011140	11,40	142	94	B00007011530	15,30	178	120
B00007011150	11,50	142	94	B00007011540	15,40	178	120
B00007011160	11,60	142	94	B00007011550	15,50	178	120
B00007011170	11,70	142	94	B00007011560	15,60	178	120
B00007011180	11,80	142	94	B00007011570	15,70	178	120
B00007011190	11,90	151	101	B00007011580	15,80	178	120
B00007011200	12,00	151	101	B00007011590	15,90	178	120
B00007011210	12,10	151	101	B00007011600	16,00	178	120
B00007011220	12,20	151	101	B00007011610	16,10	184	125
B00007011230	12,30	151	101	B00007011620	16,20	184	125
B00007011240	12,40	151	101	B00007011630	16,30	184	125
B00007011250	12,50	151	101	B00007011640	16,40	184	125
B00007011260	12,60	151	101	B00007011650	16,50	184	125

Continued 72 page



STRAIGHT SHANK LEFT HAND TWIST DRILLS - GROUND



Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00007011660	16,60	184	125	B00007011830	18,30	198	135
B00007011670	16,70	184	125	B00007011840	18,40	198	135
B00007011680	16,80	184	125	B00007011850	18,50	198	135
B00007011690	16,90	184	125	B00007011860	18,60	198	135
B00007011700	17,00	184	125	B00007011870	18,70	198	135
B00007011710	17,10	191	130	B00007011880	18,80	198	135
B00007011720	17,20	191	130	B00007011890	18,90	198	135
B00007011730	17,30	191	130	B00007011900	19,00	198	135
B00007011740	17,40	191	130	B00007011910	19,10	205	140
B00007011750	17,50	191	130	B00007011920	19,20	205	140
B00007011760	17,60	191	130	B00007011930	19,30	205	140
B00007011770	17,70	191	130	B00007011940	19,40	205	140
B00007011780	17,80	191	130	B00007011950	19,50	205	140
B00007011790	17,90	191	130	B00007011960	19,60	205	140
B00007011800	18,00	191	130	B00007011970	19,70	205	140
B00007011810	18,10	198	135	B00007011980	19,80	205	140
B00007011820	18,20	198	135	B00007011990	19,90	205	140
				B00007012000	20,00	205	140



## Why Use Silver Series Twist Drills?

In the machining world of today, there is not available an economic and suitable for any kind of material universal twist drill yet. On the other hand, in the competitive market conditions, the labor cost and production time per unit are two most important parameters for cutting tool end users with above reasons, Makina Takim Endüstri A.Ş., thanking to owned superior technology and accumulated extensive knowledge developed and manufactured a new twist drill, suitable for a certain group of materials. This new product is the Silver Series Twist Drill.

**Silver Series Twist Drills** are suitable and give very good results in ductile and high-alloyed, adhesive and hard-to-machining metals, which blunt quickly the cutting edges.

The using of **Silver Series Twist Drills** in the below specified operating conditions increases the production speed and provides the significant savings in cutting tools cost.

**Silver Series Twist Drills** are special production in terms of geometry, sizes, material and heat treatment conditions.



TWIST DRILLS

## Application of Silver Series Twist Drills

Intended Use	Material No	DIN Norm	Tensile Strength (N/mm <sup>2</sup> )	Hardness	Cutting Speed (m/min)	Coolant
Sulphuric Stainless Steel	1.4005	X12CrS13	≤ 850	252 HB 265 HV <sub>10</sub>	10 - 14	Cooling Fluid
	1.4104	X14CrMoS17				
	1.4105	X6CrMoS17				
	1.4305	X8CrNiS18 9				
Austenitic Stainless Steel	1.4301	X5CrNi18 10				
	1.4541	X6CrNiTi18 10				
	1.4571	X6CrNiMoTi17 12 2				
Martensitic Stainless Steel	1.4057	X17CrNi16-1				
	1.4122	X39CrMo17-1				
	1.4521	X2CrMoTi18 2				
Titanium and Titanium Alloys	3.7024	Ti99,5	≤ 850	252 HB 265 HV <sub>10</sub>	6 - 10	Cooling Fluid
	3.7114	TiAl5Sn2,5				
	3.7124	TiCu2				
	3.7154	TiAl6Zr5				
	3.7164	TiAl6V4				
Aluminium and Titanium Alloys	3.7184	TiAl4Mo4Sn2,5	850 - 1200	252-352 HB 265-374 HV <sub>10</sub>	90	Oil (Emulsion)
	3.0255	Al 99,5				
	3.2315	AlMgSi1				
	3.3515	AlMg1				
Aluminium Alloys	3.0615	AlMgSiPb	≤ 450	133 HB 265 HV <sub>10</sub>	90	Oil (Emulsion)
	3.1325	AlCuMg1				
	3.3245	AlMg3Si				
	3.4365	AlZnMgCu1,5				
Aluminium Cast ≤ %10 Si	3.2131	G-AlSi5Cu1	≤ 600	178 HB 187 HV <sub>10</sub>	55 - 70	Oil (Emulsion)
	3.2153	G-AlSi7Cu3				
	3.2573	G-AlSi9				
Aluminium Cast > %10 Si	3.2581	G-AlSi12	≤ 600	178 HB 187 HV <sub>10</sub>	55 - 70	Oil (Emulsion)
	3.2583	G-AlSi12Cu				
Copper, Low Alloyed	2.0070	SE-Cu	≤ 400	119 HB 125 HV <sub>10</sub>	36	Oil (Emulsion)
	2.1020	CuSn6				
	2.1096	G-CuSn5ZnPb				
Brass, Long Chipping	2.0250	CuZn20	≤ 600	178 HB 187 HV <sub>10</sub>	45	Oil (Emulsion)
	2.0280	CuZn33				
	2.0332	CuZn37Pb0,5				
Bronze, Long Chipping	2.0916	CuAl5	≤ 850	252 HB 265 HV <sub>10</sub>	22 - 28	Oil (Emulsion)
	2.0960	CuAl9Mn				
	2.1050	CuSn10				
	2.0980	CuAl11Ni				
	2.1247	CuBe2				
			850 - 1000	252-298 HB 265-314 HV <sub>10</sub>		



## STRAIGHT SHANK TWIST DRILLS - SILVER SERIES



Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00005010200	2,00	49	24	B00005010610	6,10	101	63
B00005010210	2,10	49	24	B00005010620	6,20	101	63
B00005010220	2,20	53	27	B00005010630	6,30	101	63
B00005010230	2,30	53	27	B00005010640	6,40	101	63
B00005010240	2,40	57	30	B00005010650	6,50	101	63
B00005010250	2,50	57	30	B00005010660	6,60	101	63
B00005010260	2,60	57	30	B00005010670	6,70	101	63
B00005010270	2,70	61	33	B00005010680	6,80	109	69
B00005010280	2,80	61	33	B00005010690	6,90	109	69
B00005010290	2,90	61	33	B00005010700	7,00	109	69
B00005010300	3,00	61	33	B00005010710	7,10	109	69
B00005010310	3,10	65	36	B00005010720	7,20	109	69
B00005010320	3,20	65	36	B00005010730	7,30	109	69
B00005010330	3,30	65	36	B00005010740	7,40	109	69
B00005010340	3,40	70	39	B00005010750	7,50	109	69
B00005010350	3,50	70	39	B00005010760	7,60	117	75
B00005010360	3,60	70	39	B00005010770	7,70	117	75
B00005010370	3,70	70	39	B00005010780	7,80	117	75
B00005010380	3,80	75	43	B00005010790	7,90	117	75
B00005010390	3,90	75	43	B00005010800	8,00	117	75
B00005010400	4,00	75	43	B00005010810	8,10	117	75
B00005010410	4,10	75	43	B00005010820	8,20	117	75
B00005010420	4,20	75	43	B00005010830	8,30	117	75
B00005010430	4,30	80	47	B00005010840	8,40	117	75
B00005010440	4,40	80	47	B00005010850	8,50	117	75
B00005010450	4,50	80	47	B00005010860	8,60	125	81
B00005010460	4,60	80	47	B00005010870	8,70	125	81
B00005010470	4,70	80	47	B00005010880	8,80	125	81
B00005010480	4,80	86	52	B00005010890	8,90	125	81
B00005010490	4,90	86	52	B00005010900	9,00	125	81
B00005010500	5,00	86	52	B00005010910	9,10	125	81
B00005010510	5,10	86	52	B00005010920	9,20	125	81
B00005010520	5,20	86	52	B00005010930	9,30	125	81
B00005010530	5,30	86	52	B00005010940	9,40	125	81
B00005010540	5,40	93	57	B00005010950	9,50	125	81
B00005010550	5,50	93	57	B00005010960	9,60	133	87
B00005010560	5,60	93	57	B00005010970	9,70	133	87
B00005010570	5,70	93	57	B00005010980	9,80	133	87
B00005010580	5,80	93	57	B00005010990	9,90	133	87
B00005010590	5,90	93	57	B00005011000	10,00	133	87
B00005010600	6,00	93	57	B00005011010	10,10	133	87



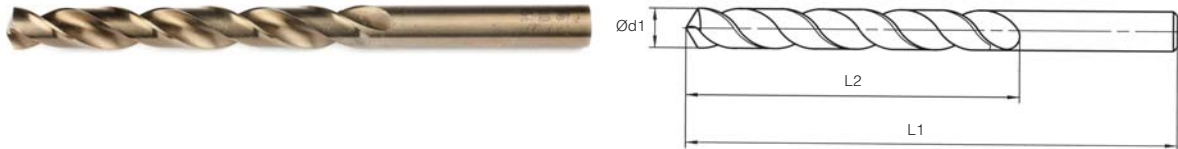
## STRAIGHT SHANK TWIST DRILLS - SILVER SERIES



Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00005011020	10,20	133	87	B00005011300	13,00	151	101
B00005011030	10,30	133	87	B00005011310	13,10	151	101
B00005011040	10,40	133	87	B00005011320	13,20	151	101
B00005011050	10,50	133	87	B00005011350	13,50	160	108
B00005011060	10,60	133	87	B00005011400	14,00	160	108
B00005011070	10,70	142	94	B00005011450	14,50	169	114
B00005011080	10,80	142	94	B00005011500	15,00	169	114
B00005011090	10,90	142	94	B00005011550	15,50	178	120
B00005011100	11,00	142	94	B00005011600	16,00	178	120
B00005011110	11,10	142	94	B00005011650	16,50	184	125
B00005011120	11,20	142	94	B00005011700	17,00	184	125
B00005011130	11,30	142	94	B00005011750	17,50	191	130
B00005011140	11,40	142	94	B00005011800	18,00	191	130
B00005011150	11,50	142	94	B00005011850	18,50	198	135
B00005011160	11,60	142	94	B00005011900	19,00	198	135
B00005011170	11,70	142	94	B00005011950	19,50	205	140
B00005011180	11,80	142	94	B00005012000	20,00	205	140
B00005011190	11,90	151	101	B00005012050	20,50	213	145
B00005011200	12,00	151	101	B00005012100	21,00	213	145
B00005011210	12,10	151	101	B00005012150	21,50	221	150
B00005011220	12,20	151	101	B00005012200	22,00	221	150
B00005011230	12,30	151	101	B00005012250	22,50	229	155
B00005011240	12,40	151	101	B00005012300	23,00	229	155
B00005011250	12,50	151	101	B00005012350	23,50	229	155
B00005011260	12,60	151	101	B00005012400	24,00	236	160
B00005011270	12,70	151	101	B00005012450	24,50	236	160
B00005011280	12,80	151	101	B00005012500	25,00	236	160
B00005011290	12,90	151	101				



## STRAIGHT SHANK TWIST DRILLS - GOLD SERIES

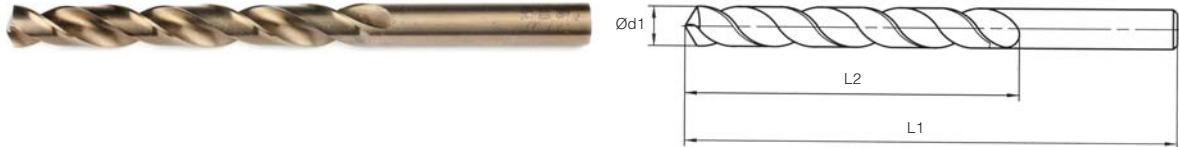


Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00005000100	1,00	34	12	B00005000510	5,10	86	52
B00005000110	1,10	36	14	B00005000520	5,20	86	52
B00005000120	1,20	38	16	B00005000530	5,30	86	52
B00005000130	1,30	38	16	B00005000540	5,40	93	57
B00005000140	1,40	40	18	B00005000550	5,50	93	57
B00005000150	1,50	40	18	B00005000560	5,60	93	57
B00005000160	1,60	43	20	B00005000570	5,70	93	57
B00005000170	1,70	43	20	B00005000580	5,80	93	57
B00005000180	1,80	46	22	B00005000590	5,90	93	57
B00005000190	1,90	46	22	B00005000600	6,00	93	57
B00005000200	2,00	49	24	B00005000610	6,10	101	63
B00005000210	2,10	49	24	B00005000620	6,20	101	63
B00005000220	2,20	53	27	B00005000630	6,30	101	63
B00005000230	2,30	53	27	B00005000640	6,40	101	63
B00005000240	2,40	57	30	B00005000650	6,50	101	63
B00005000250	2,50	57	30	B00005000660	6,60	101	63
B00005000260	2,60	57	30	B00005000670	6,70	101	63
B00005000270	2,70	61	33	B00005000680	6,80	109	69
B00005000280	2,80	61	33	B00005000690	6,90	109	69
B00005000290	2,90	61	33	B00005000700	7,00	109	69
B00005000300	3,00	61	33	B00005000710	7,10	109	69
B00005000310	3,10	65	36	B00005000720	7,20	109	69
B00005000320	3,20	65	36	B00005000730	7,30	109	69
B00005000330	3,30	65	36	B00005000740	7,40	109	69
B00005000340	3,40	70	39	B00005000750	7,50	109	69
B00005000350	3,50	70	39	B00005000760	7,60	117	75
B00005000360	3,60	70	39	B00005000770	7,70	117	75
B00005000370	3,70	70	39	B00005000780	7,80	117	75
B00005000380	3,80	75	43	B00005000790	7,90	117	75
B00005000390	3,90	75	43	B00005000800	8,00	117	75
B00005000400	4,00	75	43	B00005000810	8,10	117	75
B00005000410	4,10	75	43	B00005000820	8,20	117	75
B00005000420	4,20	75	43	B00005000830	8,30	117	75
B00005000430	4,30	80	47	B00005000840	8,40	117	75
B00005000440	4,40	80	47	B00005000850	8,50	117	75
B00005000450	4,50	80	47	B00005000860	8,60	125	81
B00005000460	4,60	80	47	B00005000870	8,70	125	81
B00005000470	4,70	80	47	B00005000880	8,80	125	81
B00005000480	4,80	86	52	B00005000890	8,90	125	81
B00005000490	4,90	86	52	B00005000900	9,00	125	81
B00005000500	5,00	86	52	B00005000910	9,10	125	81

Continued 77 page



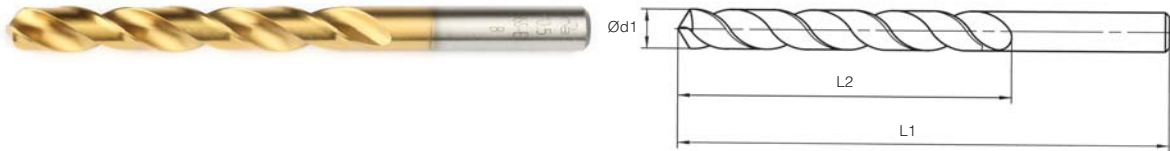
## STRAIGHT SHANK TWIST DRILLS - GOLD SERIES



Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00005000920	9,20	125	81	B00005001250	12,50	151	101
B00005000930	9,30	125	81	B00005001260	12,60	151	101
B00005000940	9,40	125	81	B00005001270	12,70	151	101
B00005000950	9,50	125	81	B00005001280	12,80	151	101
B00005000960	9,60	133	87	B00005001290	12,90	151	101
B00005000970	9,70	133	87	B00005001300	13,00	151	101
B00005000980	9,80	133	87	B00005001310	13,10	151	101
B00005000990	9,90	133	87	B00005001320	13,20	151	101
B00005001000	10,00	133	87	B00005001350	13,50	160	108
B00005001010	10,10	133	87	B00005001400	14,00	160	108
B00005001020	10,20	133	87	B00005001450	14,50	169	114
B00005001030	10,30	133	87	B00005001500	15,00	169	114
B00005001040	10,40	133	87	B00005001550	15,50	178	120
B00005001050	10,50	133	87	B00005001600	16,00	178	120
B00005001060	10,60	133	87	B00005001650	16,50	184	125
B00005001070	10,70	142	94	B00005001700	17,00	184	125
B00005001080	10,80	142	94	B00005001750	17,50	191	130
B00005001090	10,90	142	94	B00005001800	18,00	191	130
B00005001100	11,00	142	94	B00005001850	18,50	198	135
B00005001110	11,10	142	94	B00005001900	19,00	198	135
B00005001120	11,20	142	94	B00005001950	19,50	205	140
B00005001130	11,30	142	94	B00005002000	20,00	205	140
B00005001140	11,40	142	94	B00005002050	20,50	213	145
B00005001150	11,50	142	94	B00005002100	21,00	213	145
B00005001160	11,60	142	94	B00005002150	21,50	221	150
B00005001170	11,70	142	94	B00005002200	22,00	221	150
B00005001180	11,80	142	94	B00005002250	22,50	229	155
B00005001190	11,90	151	101	B00005002300	23,00	229	155
B00005001200	12,00	151	101	B00005002350	23,50	229	155
B00005001210	12,10	151	101	B00005002400	24,00	236	160
B00005001220	12,20	151	101	B00005002450	24,50	236	160
B00005001230	12,30	151	101	B00005002500	25,00	236	160
B00005001240	12,40	151	101				



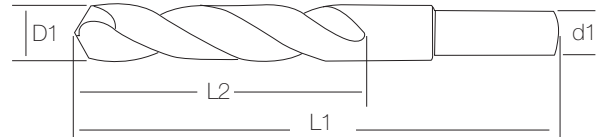
## STRAIGHT SHANK TWIST DRILLS - TIN COATED



Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00006000150	1,50	40	18	B00006001050	10,50	133	87
B00006000200	2,00	49	24	B00006001100	11,00	142	94
B00006000250	2,50	57	30	B00006001150	11,50	142	94
B00006000300	3,00	61	33	B00006001200	12,00	151	101
B00006000330	3,30	65	36	B00006001250	12,50	151	101
B00006000350	3,50	70	39	B00006001300	13,00	151	101
B00006000400	4,00	75	43	B00006001350	13,50	160	108
B00006000420	4,20	75	43	B00006001400	14,00	160	108
B00006000450	4,50	80	47	B00006001450	14,50	169	114
B00006000500	5,00	86	52	B00006001500	15,00	169	114
B00006000550	5,50	93	57	B00006001550	15,50	178	120
B00006000600	6,00	93	57	B00006001600	16,00	178	120
B00006000650	6,50	101	63	B00006001650	16,50	184	125
B00006000680	6,80	109	69	B00006001700	17,00	184	125
B00006000700	7,00	109	69	B00006001750	17,50	191	130
B00006000750	7,50	109	69	B00006001800	18,00	191	130
B00006000800	8,00	117	75	B00006001850	18,50	198	135
B00006000850	8,50	117	75	B00006001900	19,00	198	135
B00006000900	9,00	125	81	B00006001950	19,50	205	140
B00006000950	9,50	125	81	B00006002000	20,00	205	140
B00006001000	10,00	133	87				

HSS	DIN 338	h8	OX
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## REDUCED SHANK TWIST DRILLS



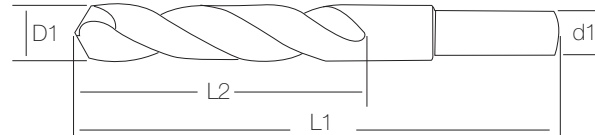
Product Code	D1 mm	d1 mm	L1 mm	L2 mm	L3 mm
B20008641350	13.5	10	160	108	30
B20008641400	14	10	160	108	30
B20008641450	14.5	10	169	114	30
B20008641500	15	10	169	114	30
B20008641550	15.5	10	178	120	30
B20008641600	16	10	178	120	30
B20008641650	16.5	13	184	125	35
B20008641700	17	13	184	125	35
B20008641750	17.5	13	191	130	35
B20008641800	18	13	191	130	35
B20008641850	18.5	13	198	135	35
B20008641900	19	13	198	135	35
B20008641950	19.5	13	205	140	35
B20008642000	20	13	205	140	35
B20008642050	20.5	13	261	171	35
B20008642100	21	13	261	171	35
B20008642150	21.5	13	268	176	35
B20008642200	22	13	268	176	35
B20008642250	22.5	13	275	180	35
B20008642300	23	13	275	180	35
B20008642350	23.5	13	275	180	35
B20008642400	24	13	282	185	35
B20008642450	24.5	13	282	185	35
B20008642500	25	13	282	185	35

HSS-E	DIN 338	h8	OX
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## REDUCED SHANK TWIST DRILLS



**HSS-E**



Product Code	D1 mm	d1 mm	L1 mm	L2 mm	L3 mm
B20008651350	13.5	10	160	108	30
B20008651400	14	10	160	108	30
B20008651450	14.5	10	169	114	30
B20008651500	15	10	169	114	30
B20008651550	15.5	10	178	120	30
B20008651600	16	10	178	120	30
B20008651650	16.5	13	184	125	35
B20008651700	17	13	184	125	35
B20008651750	17.5	13	191	130	35
B20008651800	18	13	191	130	35
B20008651850	18.5	13	198	135	35
B20008651900	19	13	198	135	35
B20008651950	19.5	13	205	140	35
B20008652000	20	13	205	140	35
B20008652050	20.5	13	261	171	35
B20008652100	21	13	261	171	35
B20008652150	21.5	13	268	176	35
B20008652200	22	13	268	176	35
B20008652250	22.5	13	275	180	35
B20008652300	23	13	275	180	35
B20008652350	23.5	13	275	180	35
B20008652400	24	13	282	185	35
B20008652450	24.5	13	282	185	35
B20008652500	25	13	282	185	35





## STRAIGHT SHANK TWIST DRILLS - LONG SERIES



Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00007200100	1,00	56	33	B00007200510	5,10	132	87
B00007200110	1,10	60	37	B00007200520	5,20	132	87
B00007200120	1,20	65	41	B00007200530	5,30	132	87
B00007200130	1,30	65	41	B00007200540	5,40	139	91
B00007200140	1,40	70	45	B00007200550	5,50	139	91
B00007200150	1,50	70	45	B00007200560	5,60	139	91
B00007200160	1,60	76	50	B00007200570	5,70	139	91
B00007200170	1,70	76	50	B00007200580	5,80	139	91
B00007200180	1,80	80	53	B00007200590	5,90	139	91
B00007200190	1,90	80	53	B00007200600	6,00	139	91
B00007200200	2,00	85	56	B00007200610	6,10	148	97
B00007200210	2,10	85	56	B00007200620	6,20	148	97
B00007200220	2,20	90	59	B00007200630	6,30	148	97
B00007200230	2,30	90	59	B00007200640	6,40	148	97
B00007200240	2,40	95	62	B00007200650	6,50	148	97
B00007200250	2,50	95	62	B00007200660	6,60	148	97
B00007200260	2,60	95	62	B00007200670	6,70	148	97
B00007200270	2,70	100	66	B00007200680	6,80	156	102
B00007200280	2,80	100	66	B00007200690	6,90	156	102
B00007200290	2,90	100	66	B00007200700	7,00	156	102
B00007200300	3,00	100	66	B00007200710	7,10	156	102
B00007200310	3,10	106	69	B00007200720	7,20	156	102
B00007200320	3,20	106	69	B00007200730	7,30	156	102
B00007200330	3,30	106	69	B00007200740	7,40	156	102
B00007200340	3,40	112	73	B00007200750	7,50	156	102
B00007200350	3,50	112	73	B00007200760	7,60	165	109
B00007200360	3,60	112	73	B00007200770	7,70	165	109
B00007200370	3,70	112	73	B00007200780	7,80	165	109
B00007200380	3,80	119	78	B00007200790	7,90	165	109
B00007200390	3,90	119	78	B00007200800	8,00	165	109
B00007200400	4,00	119	78	B00007200810	8,10	165	109
B00007200410	4,10	119	78	B00007200820	8,20	165	109
B00007200420	4,20	119	78	B00007200830	8,30	165	109
B00007200430	4,30	126	82	B00007200840	8,40	165	109
B00007200440	4,40	126	82	B00007200850	8,50	165	109
B00007200450	4,50	126	82	B00007200860	8,60	175	115
B00007200460	4,60	126	82	B00007200870	8,70	175	115
B00007200470	4,70	126	82	B00007200880	8,80	175	115
B00007200480	4,80	132	87	B00007200890	8,90	175	115
B00007200490	4,90	132	87	B00007200900	9,00	175	115
B00007200500	5,00	132	87	B00007200910	9,10	175	115

Continued 82 page



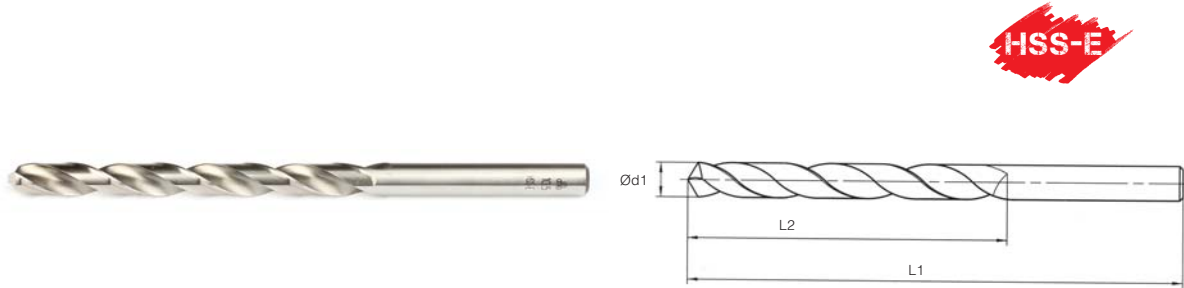
## STRAIGHT SHANK TWIST DRILLS - LONG SERIES



Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00007200920	9,20	175	115	B00007201270	12,70	205	134
B00007200930	9,30	175	115	B00007201280	12,80	205	134
B00007200940	9,40	175	115	B00007201300	13,00	205	134
B00007200950	9,50	175	115	B00007201320	13,20	205	134
B00007200960	9,60	184	121	B00007201350	13,50	214	140
B00007200970	9,70	184	121	B00007201400	14,00	214	140
B00007200980	9,80	184	121	B00007201450	14,50	220	144
B00007200990	9,90	184	121	B00007201500	15,00	220	144
B00007201000	10,00	184	121	B00007201550	15,50	227	149
B00007201010	10,10	184	121	B00007201600	16,00	227	149
B00007201020	10,20	184	121	B00007201650	16,50	235	154
B00007201030	10,30	184	121	B00007201700	17,00	235	154
B00007201040	10,40	184	121	B00007201750	17,50	241	158
B00007201050	10,50	184	121	B00007201800	18,00	241	158
B00007201060	10,60	184	121	B00007201850	18,50	247	162
B00007201070	10,70	195	128	B00007201900	19,00	247	162
B00007201080	10,80	195	128	B00007201950	19,50	254	166
B00007201090	10,90	195	128	B00007202000	20,00	254	166
B00007201100	11,00	195	128	B00007202050	20,50	261	171
B00007201130	11,30	195	128	B00007202100	21,00	261	171
B00007201140	11,40	195	128	B00007202150	21,50	268	176
B00007201150	11,50	195	128	B00007202200	22,00	268	176
B00007201170	11,70	195	128	B00007202250	22,50	275	180
B00007201180	11,80	195	128	B00007202300	23,00	275	180
B00007201190	11,90	205	134	B00007202350	23,50	275	180
B00007201200	12,00	205	134	B00007202400	24,00	282	185
B00007201220	12,20	205	134	B00007202450	24,50	282	185
B00007201230	12,30	205	134	B00007202500	25,00	282	185
B00007201250	12,50	205	134				



## STRAIGHT SHANK TWIST DRILLS - LONG SERIES



Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00005200100	1,00	56	33	B00005200490	4,90	132	87
B00005200110	1,10	60	37	B00005200500	5,00	132	87
B00005200120	1,20	65	41	B00005200510	5,10	132	87
B00005200130	1,30	65	41	B00005200520	5,20	132	87
B00005200140	1,40	70	45	B00005200530	5,30	132	87
B00005200150	1,50	70	45	B00005200540	5,40	139	91
B00005200160	1,60	76	50	B00005200550	5,50	139	91
B00005200170	1,70	76	50	B00005200560	5,60	139	91
B00005200180	1,80	80	53	B00005200570	5,70	139	91
B00005200190	1,90	80	53	B00005200580	5,80	139	91
B00005200200	2,00	85	56	B00005200590	5,90	139	91
B00005200210	2,10	85	56	B00005200600	6,00	139	91
B00005200220	2,20	90	59	B00005200610	6,10	148	97
B00005200230	2,30	90	59	B00005200620	6,20	148	97
B00005200240	2,40	95	62	B00005200630	6,30	148	97
B00005200250	2,50	95	62	B00005200640	6,40	148	97
B00005200260	2,60	95	62	B00005200650	6,50	148	97
B00005200270	2,70	100	66	B00005200660	6,60	148	97
B00005200280	2,80	100	66	B00005200670	6,70	148	97
B00005200290	2,90	100	66	B00005200680	6,80	156	102
B00005200300	3,00	100	66	B00005200690	6,90	156	102
B00005200310	3,10	106	69	B00005200700	7,00	156	102
B00005200320	3,20	106	69	B00005200710	7,10	156	102
B00005200330	3,30	106	69	B00005200720	7,20	156	102
B00005200340	3,40	112	73	B00005200730	7,30	156	102
B00005200350	3,50	112	73	B00005200740	7,40	156	102
B00005200360	3,60	112	73	B00005200750	7,50	156	102
B00005200370	3,70	112	73	B00005200760	7,60	165	109
B00005200380	3,80	119	78	B00005200770	7,70	165	109
B00005200390	3,90	119	78	B00005200780	7,80	165	109
B00005200400	4,00	119	78	B00005200790	7,90	165	109
B00005200410	4,10	119	78	B00005200800	8,00	165	109
B00005200420	4,20	119	78	B00005200810	8,10	165	109
B00005200430	4,30	126	82	B00005200820	8,20	165	109
B00005200440	4,40	126	82	B00005200830	8,30	165	109
B00005200450	4,50	126	82	B00005200840	8,40	165	109
B00005200460	4,60	126	82	B00005200850	8,50	165	109
B00005200470	4,70	126	82	B00005200860	8,60	175	115
B00005200480	4,80	132	87	B00005200870	8,70	175	115

Continued 84 page



## STRAIGHT SHANK TWIST DRILLS - LONG SERIES



Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00005200880	8,80	175	115	B00005201230	12,30	205	134
B00005200890	8,90	175	115	B00005201250	12,50	205	134
B00005200900	9,00	175	115	B00005201270	12,70	205	134
B00005200910	9,10	175	115	B00005201280	12,80	205	134
B00005200920	9,20	175	115	B00005201300	13,00	205	134
B00005200930	9,30	175	115	B00005201320	13,20	205	134
B00005200940	9,40	175	115	B00005201350	13,50	214	140
B00005200950	9,50	175	115	B00005201400	14,00	214	140
B00005200960	9,60	184	121	B00005201450	14,50	220	144
B00005200970	9,70	184	121	B00005201500	15,00	220	144
B00005200980	9,80	184	121	B00005201550	15,50	227	149
B00005200990	9,90	184	121	B00005201600	16,00	227	149
B00005201000	10,00	184	121	B00005201650	16,50	235	154
B00005201010	10,10	184	121	B00005201700	17,00	235	154
B00005201020	10,20	184	121	B00005201750	17,50	241	158
B00005201030	10,30	184	121	B00005201800	18,00	241	158
B00005201040	10,40	184	121	B00005201850	18,50	247	162
B00005201050	10,50	184	121	B00005201900	19,00	247	162
B00005201060	10,60	184	121	B00005201950	19,50	254	166
B00005201070	10,70	195	128	B00005202000	20,00	254	166
B00005201080	10,80	195	128	B00005202050	20,50	261	171
B00005201090	10,90	195	128	B00005202100	21,00	261	171
B00005201100	11,00	195	128	B00005202150	21,50	268	176
B00005201130	11,30	195	128	B00005202200	22,00	268	176
B00005201140	11,40	195	128	B00005202250	22,50	275	180
B00005201150	11,50	195	128	B00005202300	23,00	275	180
B00005201170	11,70	195	128	B00005202350	23,50	275	180
B00005201180	11,80	195	128	B00005202400	24,00	282	185
B00005201190	11,90	205	134	B00005202450	24,50	282	185
B00005201200	12,00	205	134	B00005202500	25,00	282	185
B00005201220	12,20	205	134				



## STRAIGHT SHANK TWIST DRILLS - LONG SILVER SERIES



Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00008610100	1,00	56	33	B00008610490	4,90	132	87
B00008610110	1,10	60	37	B00008610500	5,00	132	87
B00008610120	1,20	65	41	B00008610510	5,10	132	87
B00008610130	1,30	65	41	B00008610520	5,20	132	87
B00008610140	1,40	70	45	B00008610530	5,30	132	87
B00008610150	1,50	70	45	B00008610540	5,40	139	91
B00008610160	1,60	76	50	B00008610550	5,50	139	91
B00008610170	1,70	76	50	B00008610560	5,60	139	91
B00008610180	1,80	80	53	B00008610570	5,70	139	91
B00008610190	1,90	80	53	B00008610580	5,80	139	91
B00008610200	2,00	85	56	B00008610590	5,90	139	91
B00008610210	2,10	85	56	B00008610600	6,00	139	91
B00008610220	2,20	90	59	B00008610610	6,10	148	97
B00008610230	2,30	90	59	B00008610620	6,20	148	97
B00008610240	2,40	95	62	B00008610630	6,30	148	97
B00008610250	2,50	95	62	B00008610640	6,40	148	97
B00008610260	2,60	95	62	B00008610650	6,50	148	97
B00008610270	2,70	100	66	B00008610660	6,60	148	97
B00008610280	2,80	100	66	B00008610670	6,70	148	97
B00008610290	2,90	100	66	B00008610680	6,80	156	102
B00008610300	3,00	100	66	B00008610690	6,90	156	102
B00008610310	3,10	106	69	B00008610700	7,00	156	102
B00008610320	3,20	106	69	B00008610710	7,10	156	102
B00008610330	3,30	106	69	B00008610720	7,20	156	102
B00008610340	3,40	112	73	B00008610730	7,30	156	102
B00008610350	3,50	112	73	B00008610740	7,40	156	102
B00008610360	3,60	112	73	B00008610750	7,50	156	102
B00008610370	3,70	112	73	B00008610760	7,60	165	109
B00008610380	3,80	119	78	B00008610770	7,70	165	109
B00008610390	3,90	119	78	B00008610780	7,80	165	109
B00008610400	4,00	119	78	B00008610790	7,90	165	109
B00008610410	4,10	119	78	B00008610800	8,00	165	109
B00008610420	4,20	119	78	B00008610810	8,10	165	109
B00008610430	4,30	126	82	B00008610820	8,20	165	109
B00008610440	4,40	126	82	B00008610830	8,30	165	109
B00008610450	4,50	126	82	B00008610840	8,40	165	109
B00008610460	4,60	126	82	B00008610850	8,50	165	109
B00008610470	4,70	126	82	B00008610860	8,60	175	115
B00008610480	4,80	132	87	B00008610870	8,70	175	115

Continued 86 page



## STRAIGHT SHANK TWIST DRILLS - LONG SILVER SERIES



Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00008610880	8,80	175	115	B00008611230	12,30	205	134
B00008610890	8,90	175	115	B00008611250	12,50	205	134
B00008610900	9,00	175	115	B00008611270	12,70	205	134
B00008610910	9,10	175	115	B00008611280	12,80	205	134
B00008610920	9,20	175	115	B00008611300	13,00	205	134
B00008610930	9,30	175	115	B00008611320	13,20	205	134
B00008610940	9,40	175	115	B00008611350	13,50	214	140
B00008610950	9,50	175	115	B00008611400	14,00	214	140
B00008610960	9,60	184	121	B00008611450	14,50	220	144
B00008610970	9,70	184	121	B00008611500	15,00	220	144
B00008610980	9,80	184	121	B00008611550	15,50	227	149
B00008610990	9,90	184	121	B00008611600	16,00	227	149
B00008611000	10,00	184	121	B00008611650	16,50	235	154
B00008611010	10,10	184	121	B00008611700	17,00	235	154
B00008611020	10,20	184	121	B00008611750	17,50	241	158
B00008611030	10,30	184	121	B00008611800	18,00	241	158
B00008611040	10,40	184	121	B00008611850	18,50	247	162
B00008611050	10,50	184	121	B00008611900	19,00	247	162
B00008611060	10,60	184	121	B00008611950	19,50	254	166
B00008611070	10,70	195	128	B00008612000	20,00	254	166
B00008611080	10,80	195	128	B00008612050	20,50	261	171
B00008611090	10,90	195	128	B00008612100	21,00	261	171
B00008611100	11,00	195	128	B00008612150	21,50	268	176
B00008611130	11,30	195	128	B00008612200	22,00	268	176
B00008611140	11,40	195	128	B00008612250	22,50	275	180
B00008611150	11,50	195	128	B00008612300	23,00	275	180
B00008611170	11,70	195	128	B00008612350	23,50	275	180
B00008611180	11,80	195	128	B00008612400	24,00	282	185
B00008611190	11,90	205	134	B00008612450	24,50	282	185
B00008611200	12,00	205	134	B00008612500	25,00	282	185
B00008611220	12,20	205	134				



## STRAIGHT SHANK TWIST DRILLS - LONG GOLD SERIES



Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00008600100	1,00	56	33	B00008600490	4,90	132	87
B00008600110	1,10	60	37	B00008600500	5,00	132	87
B00008600120	1,20	65	41	B00008600510	5,10	132	87
B00008600130	1,30	65	41	B00008600520	5,20	132	87
B00008600140	1,40	70	45	B00008600530	5,30	132	87
B00008600150	1,50	70	45	B00008600540	5,40	139	91
B00008600160	1,60	76	50	B00008600550	5,50	139	91
B00008600170	1,70	76	50	B00008600560	5,60	139	91
B00008600180	1,80	80	53	B00008600570	5,70	139	91
B00008600190	1,90	80	53	B00008600580	5,80	139	91
B00008600200	2,00	85	56	B00008600590	5,90	139	91
B00008600210	2,10	85	56	B00008600600	6,00	139	91
B00008600220	2,20	90	59	B00008600610	6,10	148	97
B00008600230	2,30	90	59	B00008600620	6,20	148	97
B00008600240	2,40	95	62	B00008600630	6,30	148	97
B00008600250	2,50	95	62	B00008600640	6,40	148	97
B00008600260	2,60	95	62	B00008600650	6,50	148	97
B00008600270	2,70	100	66	B00008600660	6,60	148	97
B00008600280	2,80	100	66	B00008600670	6,70	148	97
B00008600290	2,90	100	66	B00008600680	6,80	156	102
B00008600300	3,00	100	66	B00008600690	6,90	156	102
B00008600310	3,10	106	69	B00008600700	7,00	156	102
B00008600320	3,20	106	69	B00008600710	7,10	156	102
B00008600330	3,30	106	69	B00008600720	7,20	156	102
B00008600340	3,40	112	73	B00008600730	7,30	156	102
B00008600350	3,50	112	73	B00008600740	7,40	156	102
B00008600360	3,60	112	73	B00008600750	7,50	156	102
B00008600370	3,70	112	73	B00008600760	7,60	165	109
B00008600380	3,80	119	78	B00008600770	7,70	165	109
B00008600390	3,90	119	78	B00008600780	7,80	165	109
B00008600400	4,00	119	78	B00008600790	7,90	165	109
B00008600410	4,10	119	78	B00008600800	8,00	165	109
B00008600420	4,20	119	78	B00008600810	8,10	165	109
B00008600430	4,30	126	82	B00008600820	8,20	165	109
B00008600440	4,40	126	82	B00008600830	8,30	165	109
B00008600450	4,50	126	82	B00008600840	8,40	165	109
B00008600460	4,60	126	82	B00008600850	8,50	165	109
B00008600470	4,70	126	82	B00008600860	8,60	175	115
B00008600480	4,80	132	87	B00008600870	8,70	175	115

Continued 88 page



## STRAIGHT SHANK TWIST DRILLS - LONG GOLD SERIES



Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00008600880	8,80	175	115	B00008601230	12,30	205	134
B00008600890	8,90	175	115	B00008601250	12,50	205	134
B00008600900	9,00	175	115	B00008601270	12,70	205	134
B00008600910	9,10	175	115	B00008601280	12,80	205	134
B00008600920	9,20	175	115	B00008601300	13,00	205	134
B00008600930	9,30	175	115	B00008601320	13,20	205	134
B00008600940	9,40	175	115	B00008601350	13,50	214	140
B00008600950	9,50	175	115	B00008601400	14,00	214	140
B00008600960	9,60	184	121	B00008601450	14,50	220	144
B00008600970	9,70	184	121	B00008601500	15,00	220	144
B00008600980	9,80	184	121	B00008601550	15,50	227	149
B00008600990	9,90	184	121	B00008601600	16,00	227	149
B00008601000	10,00	184	121	B00008601650	16,50	235	154
B00008601010	10,10	184	121	B00008601700	17,00	235	154
B00008601020	10,20	184	121	B00008601750	17,50	241	158
B00008601030	10,30	184	121	B00008601800	18,00	241	158
B00008601040	10,40	184	121	B00008601850	18,50	247	162
B00008601050	10,50	184	121	B00008601900	19,00	247	162
B00008601060	10,60	184	121	B00008601950	19,50	254	166
B00008601070	10,70	195	128	B00008602000	20,00	254	166
B00008601080	10,80	195	128	B00008602050	20,50	261	171
B00008601090	10,90	195	128	B00008602100	21,00	261	171
B00008601100	11,00	195	128	B00008602150	21,50	268	176
B00008601130	11,30	195	128	B00008602200	22,00	268	176
B00008601140	11,40	195	128	B00008602250	22,50	275	180
B00008601150	11,50	195	128	B00008602300	23,00	275	180
B00008601170	11,70	195	128	B00008602350	23,50	275	180
B00008601180	11,80	195	128	B00008602400	24,00	282	185
B00008601190	11,90	205	134	B00008602450	24,50	282	185
B00008601200	12,00	205	134	B00008602500	25,00	282	185
B00008601220	12,20	205	134				





STRAIGHT SHANK TWIST DRILLS - EXTRA LONG SERIES TYPE N



Product Code	d1 mm	L1 mm	L2 mm
B00007500200	2,0	125	85
B00007500250	2,5	140	95
B00007500300	3,0	150	100
B00007500350	3,5	165	115
B00007500400	4,0	175	120
B00007500420	4,2	175	120
B00007500450	4,5	185	125
B00007500500	5,0	195	135
B00007500550	5,5	205	140
B00007500600	6,0	205	140
B00007500650	6,5	215	150
B00007500700	7,0	225	155
B00007500750	7,5	225	155
B00007500800	8,0	240	165
B00007500850	8,5	240	165

Product Code	d1 mm	L1 mm	L2 mm
B00007500900	9,0	250	175
B00007500950	9,5	250	175
B00007501000	10,0	265	185
B00007501050	10,5	265	185
B00007501100	11,0	280	195
B00007501150	11,5	280	195
B00007501200	12,0	295	205
B00007501250	12,5	295	205
B00007501300	13,0	295	205
B00007501350	13,5	305	215
B00007501400	14,0	305	215
B00007501450	14,5	320	220
B00007501500	15,0	320	220



STRAIGHT SHANK TWIST DRILLS - EXTRA LONG SERIES  
TYPE GT 100



Product Code	d1 mm	L1 mm	L2 mm
B00005550200	2,0	125	85
B00005550250	2,5	140	95
B00005550300	3,0	150	100
B00005550350	3,5	165	115
B00005550400	4,0	175	120
B00005550450	4,5	185	125
B00005550500	5,0	195	135
B00005550550	5,5	205	140
B00005550600	6,0	205	140
B00005550650	6,5	215	150
B00005550700	7,0	225	155
B00005550750	7,5	225	155

Product Code	d1 mm	L1 mm	L2 mm
B00005550800	8,0	240	165
B00005550850	8,5	240	165
B00005550900	9,0	250	175
B00005550950	9,5	250	175
B00005551000	10,0	265	185
B00005551050	10,5	265	185
B00005551100	11,0	280	195
B00005551150	11,5	280	195
B00005551200	12,0	295	205
B00005551250	12,5	295	205
B00005551300	13,0	295	205



## STRAIGHT SHANK TWIST DRILLS - EXTRA LONG SERIES TYPE N



Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00007530300	3,0	190	130	B00007530800	8,0	305	210
B00007530350	3,5	210	145	B00007530850	8,5	305	210
B00007530400	4,0	220	150	B00007530900	9,0	320	220
B00007530420	4,2	220	150	B00007530950	9,5	320	220
B00007530450	4,5	235	160	B00007531000	10,0	340	235
B00007530500	5,0	245	170	B00007531050	10,5	340	235
B00007530550	5,5	260	180	B00007531100	11,0	365	250
B00007530600	6,0	260	180	B00007531150	11,5	365	250
B00007530650	6,5	275	190	B00007531200	12,0	375	260
B00007530700	7,0	290	200	B00007531250	12,5	375	260
B00007530750	7,5	290	200	B00007531300	13,0	375	260



STRAIGHT SHANK TWIST DRILLS - EXTRA LONG SERIES  
TYPE GT 100



Product Code	d1 mm	L1 mm	L2 mm
B00005610300	3,0	190	130
B00005610350	3,5	210	145
B00005610400	4,0	220	150
B00005610450	4,5	235	160
B00005610500	5,0	245	170
B00005610550	5,5	260	180
B00005610600	6,0	260	180
B00005610650	6,5	275	190
B00005610700	7,0	290	200
B00005610750	7,5	290	200
B00005610800	8,0	305	210

Product Code	d1 mm	L1 mm	L2 mm
B00005610850	8,5	305	210
B00005610900	9,0	320	220
B00005610950	9,5	320	220
B00005611000	10,0	340	235
B00005611050	10,5	340	235
B00005611100	11,0	365	250
B00005611150	11,5	365	250
B00005611200	12,0	375	260
B00005611250	12,5	375	260
B00005611300	13,0	375	260



### STRAIGHT SHANK TWIST DRILLS - EXTRA LONG SERIES TYPE N



Product Code	d1 mm	L1 mm	L2 mm
B00007560300	3,0	235	160
B00007560350	3,5	265	180
B00007560400	4,0	280	190
B00007560450	4,5	295	200
B00007560500	5,0	315	210
B00007560550	5,5	330	225
B00007560600	6,0	330	225
B00007560650	6,5	350	235
B00007560700	7,0	370	250
B00007560750	7,5	370	250
B00007560800	8,0	390	265

Product Code	d1 mm	L1 mm	L2 mm
B00007560850	8,5	390	265
B00007560900	9,0	410	280
B00007560950	9,5	410	280
B00007561000	10,0	430	295
B00007561050	10,5	430	295
B00007561100	11,0	455	310
B00007561150	11,5	455	310
B00007561200	12,0	480	330
B00007561250	12,5	480	330
B00007561300	13,0	480	330



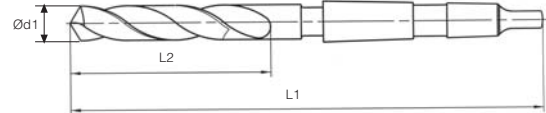
## STRAIGHT SHANK TWIST DRILLS - EXTRA LONG SERIES TYPE GT 100



Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00005670300	3,0	235	160	B00005670850	8,5	390	265
B00005670350	3,5	265	180	B00005670900	9,0	410	280
B00005670400	4,0	280	190	B00005670950	9,5	410	280
B00005670450	4,5	295	200	B00005671000	10,0	430	295
B00005670500	5,0	315	210	B00005671050	10,5	430	295
B00005670550	5,5	330	225	B00005671100	11,0	455	310
B00005670600	6,0	330	225	B00005671150	11,5	455	310
B00005670650	6,5	350	235	B00005671200	12,0	480	330
B00005670700	7,0	370	250	B00005671250	12,5	480	330
B00005670750	7,5	370	250	B00005671300	13,0	480	330
B00005670800	8,0	390	265				



## MORSE TAPER SHANK TWIST DRILLS



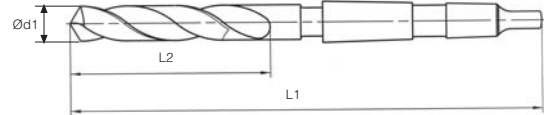
Product Code	d1 mm	L1 mm	L2 mm	Morse Taper No
B00007400800	8,00	156	75	1
B00007400850	8,50	156	75	1
B00007400900	9,00	162	81	1
B00007400950	9,50	162	81	1
B00007401000	10,00	168	87	1
B00007401050	10,50	168	87	1
B00007401100	11,00	175	94	1
B00007401150	11,50	175	94	1
B00007401200	12,00	182	101	1
B00007401250	12,50	182	101	1
B00007401300	13,00	182	101	1
B00007401350	13,50	189	108	1
B00007401400	14,00	189	108	1
B00007401450	14,50	212	114	2
B00007401500	15,00	212	114	2
B00007401550	15,50	218	120	2
B00007401600	16,00	218	120	2
B00007401650	16,50	223	125	2
B00007401700	17,00	223	125	2
B00007401750	17,50	228	130	2
B00007401800	18,00	228	130	2
B00007401850	18,50	233	135	2
B00007401900	19,00	233	135	2
B00007401950	19,50	238	140	2
B00007402000	20,00	238	140	2
B00004002050	20,50	243	145	2
B00004002100	21,00	243	145	2
B00004002150	21,50	248	150	2
B00004002200	22,00	248	150	2
B00004002250	22,50	253	155	2
B00004002300	23,00	253	155	2
B00004002350	23,50	276	155	3
B00004002400	24,00	281	160	3
B00004002450	24,50	281	160	3

Product Code	d1 mm	L1 mm	L2 mm	Morse Taper No
B00004002500	25,00	281	160	3
B00004002550	25,50	286	165	3
B00004002600	26,00	286	165	3
B00004002650	26,50	286	165	3
B00004002700	27,00	291	170	3
B00004002750	27,50	291	170	3
B00004002800	28,00	291	170	3
B00004002850	28,50	296	175	3
B00004002900	29,00	296	175	3
B00004002950	29,50	296	175	3
B00004003000	30,00	296	175	3
B00004003050	30,50	301	180	3
B00004003100	31,00	301	180	3
B00004003150	31,50	301	180	3
B00004003200	32,00	334	185	4
B00004003250	32,50	334	185	4
B00004003300	33,00	334	185	4
B00004003350	33,50	334	185	4
B00004003400	34,00	339	190	4
B00004003450	34,50	339	190	4
B00004003500	35,00	339	190	4
B00004003550	35,50	339	190	4
B00004003600	36,00	344	195	4
B00004003650	36,50	344	195	4
B00004003700	37,00	344	195	4
B00004003750	37,50	344	195	4
B00004003800	38,00	349	200	4
B00004003850	38,50	349	200	4
B00004003900	39,00	349	200	4
B00004003950	39,50	349	200	4
B00004004000	40,00	349	200	4
B00004004100	41,00	354	205	4
B00004004200	42,00	354	205	4
B00004004300	43,00	359	210	4

Continued 96 page



## MORSE TAPER SHANK TWIST DRILLS



Product Code	d1 mm	L1 mm	L2 mm	Morse Taper No
B00004004400	44,00	359	210	4
B00004004500	45,00	359	210	4
B00004004600	46,00	364	215	4
B00004004700	47,00	364	215	4
B00004004800	48,00	369	220	4
B00004004900	49,00	369	220	4
B00004005000	50,00	369	220	4
B00004005100	51,00	412	225	5
B00004005200	52,00	412	225	5
B00004005300	53,00	412	225	5
B00004005400	54,00	417	230	5
B00004005500	55,00	417	230	5
B00004005600	56,00	417	230	5
B00004005700	57,00	422	235	5
B00004005800	58,00	422	235	5
B00004005900	59,00	422	235	5
B00004006000	60,00	422	235	5
B00004006100	61,00	427	240	5
B00004006200	62,00	427	240	5
B00004006300	63,00	427	240	5
B00004006400	64,00	432	245	5
B00004006500	65,00	432	245	5
B00004006600	66,00	432	245	5
B00004006700	67,00	432	245	5

Product Code	d1 mm	L1 mm	L2 mm	Morse Taper No
B00004006800	68,00	437	250	5
B00004006900	69,00	437	250	5
B00004007000	70,00	437	250	5
B00004007100	71,00	442	255	5
B00004007200	72,00	442	255	5
B00004007300	73,00	442	255	5
B00004007400	74,00	442	255	5
B00004007500	75,00	442	255	5
B00004007600	76,00	447	260	5
B00004007700	77,00	514	260	6
B00004007800	78,00	514	260	6
B00004007900	79,00	514	260	6
B00004008000	80,00	514	260	6
B00004008100	81,00	519	265	6
B00004008200	82,00	519	265	6
B00004008300	83,00	519	265	6
B00004008400	84,00	519	265	6
B00004008500	85,00	519	265	6
B00004008600	86,00	524	270	6
B00004008700	87,00	524	270	6
B00004008800	88,00	524	270	6
B00004008900	89,00	524	270	6
B00004009000	90,00	524	270	6

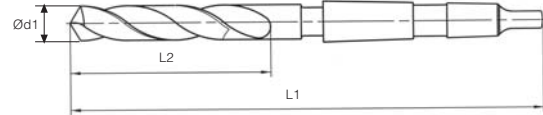




### MORSE TAPER SHANK TWIST DRILLS



**HSS-E**



TWIST DRILLS

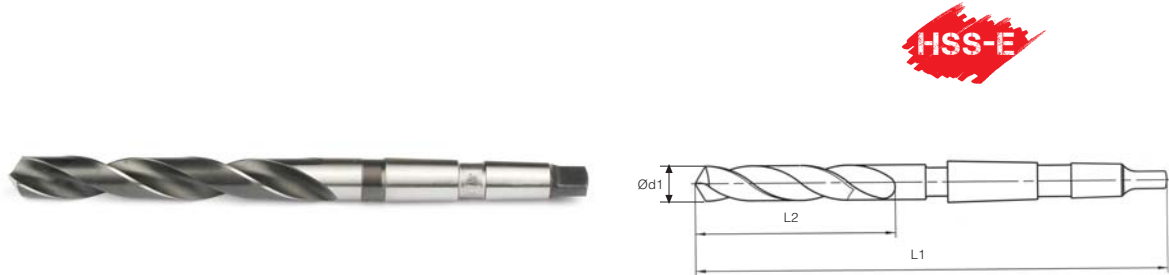
Product Code	d1 mm	L1 mm	L2 mm	Morse Taper No
B00008630800	8,00	156	75	1
B00008630850	8,50	156	75	1
B00008630900	9,00	162	81	1
B00008630950	9,50	162	81	1
B00008631000	10,00	168	87	1
B00008631050	10,50	168	87	1
B00008631100	11,00	175	94	1
B00008631150	11,50	175	94	1
B00008631200	12,00	182	101	1
B00008631250	12,50	182	101	1
B00008631300	13,00	182	101	1
B00008631350	13,50	189	108	1
B00008631400	14,00	189	108	1
B00008631450	14,50	212	114	2
B00008631500	15,00	212	114	2
B00008631550	15,50	218	120	2
B00008631600	16,00	218	120	2
B00008631650	16,50	223	125	2
B00008631700	17,00	223	125	2
B00008631750	17,50	228	130	2
B00008631800	18,00	228	130	2
B00008631850	18,50	233	135	2
B00008631900	19,00	233	135	2
B00008631950	19,50	238	140	2
B00008632000	20,00	238	140	2
B00008632050	20,50	243	145	2
B00008632100	21,00	243	145	2
B00008632150	21,50	248	150	2
B00008632200	22,00	248	150	2
B00008632250	22,50	253	155	2
B00008632300	23,00	253	155	2
B00008632350	23,50	276	155	3
B00008632400	24,00	281	160	3
B00008632450	24,50	281	160	3

Product Code	d1 mm	L1 mm	L2 mm	Morse Taper No
B00008632500	25,00	281	160	3
B00008632550	25,50	286	165	3
B00008632600	26,00	286	165	3
B00008632650	26,50	286	165	3
B00008632700	27,00	291	170	3
B00008632750	27,50	291	170	3
B00008632800	28,00	291	170	3
B00008632850	28,50	296	175	3
B00008632900	29,00	296	175	3
B00008632950	29,50	296	175	3
B00008633000	30,00	296	175	3
B00008633050	30,50	301	180	3
B00008633100	31,00	301	180	3
B00008633150	31,50	301	180	3
B00008633200	32,00	334	185	4
B00008633250	32,50	334	185	4
B00008633300	33,00	334	185	4
B00008633350	33,50	334	185	4
B00008633400	34,00	339	190	4
B00008633450	34,50	339	190	4
B00008633500	35,00	339	190	4
B00008633550	35,50	339	190	4
B00008633600	36,00	344	195	4
B00008633650	36,50	344	195	4
B00008633700	37,00	344	195	4
B00008633750	37,50	344	195	4
B00008633800	38,00	349	200	4
B00008633850	38,50	349	200	4
B00008633900	39,00	349	200	4
B00008633950	39,50	349	200	4
B00008634000	40,00	349	200	4
B00008634100	41,00	354	205	4
B00008634200	42,00	354	205	4
B00008634300	43,00	359	210	4

Continued 98 page



MORSE TAPER SHANK TWIST DRILLS



Product Code	d1 mm	L1 mm	L2 mm	Morse Taper No
B00008634400	44,00	359	210	4
B00008634500	45,00	359	210	4
B00008634600	46,00	364	215	4
B00008634700	47,00	364	215	4
B00008634800	48,00	369	220	4
B00008634900	49,00	369	220	4
B00008635000	50,00	369	220	4
B00008635100	51,00	412	225	5
B00008635200	52,00	412	225	5
B00008635300	53,00	412	225	5
B00008635400	54,00	417	230	5
B00008635500	55,00	417	230	5
B00008635600	56,00	417	230	5
B00008635700	57,00	422	235	5
B00008635800	58,00	422	235	5
B00008635900	59,00	422	235	5
B00008636000	60,00	422	235	5
B00008636100	61,00	427	240	5
B00008636200	62,00	427	240	5
B00008636300	63,00	427	240	5
B00008636400	64,00	432	245	5
B00008636500	65,00	432	245	5
B00008636600	66,00	432	245	5
B00008636700	67,00	432	245	5

Product Code	d1 mm	L1 mm	L2 mm	Morse Taper No
B00008636800	68,00	437	250	5
B00008636900	69,00	437	250	5
B00008637000	70,00	437	250	5
B00008637100	71,00	442	255	5
B00008637200	72,00	442	255	5
B00008637300	73,00	442	255	5
B00008637400	74,00	442	255	5
B00008637500	75,00	442	255	5
B00008637600	76,00	447	260	5
B00008637700	77,00	514	260	6
B00008637800	78,00	514	260	6
B00008637900	79,00	514	260	6
B00008638000	80,00	514	260	6
B00008638100	81,00	519	265	6
B00008638200	82,00	519	265	6
B00008638300	83,00	519	265	6
B00008638400	84,00	519	265	6
B00008638500	85,00	519	265	6
B00008638600	86,00	524	270	6
B00008638700	87,00	524	270	6
B00008638800	88,00	524	270	6
B00008638900	89,00	524	270	6
B00008639000	90,00	524	270	6



### MORSE TAPER SHANK TWIST DRILLS - LONG SERIES

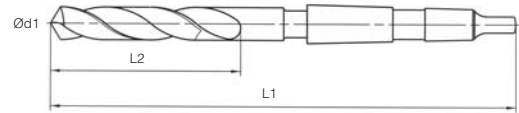


Product Code	d1 mm	L1 mm	L2 mm	Morse Taper No
B00007301200	12,0	215	134	1
B00007301250	12,5	215	134	1
B00007301300	13,0	215	134	1
B00007301350	13,5	223	142	1
B00007301400	14,0	223	142	1
B00007301450	14,5	245	147	2
B00007301500	15,0	245	147	2
B00007301600	16,0	251	153	2
B00007301700	17,0	257	159	2
B00007301800	18,0	263	165	2
B00007301900	19,0	269	171	2
B00007302000	20,0	275	177	2
B00004422050	20,5	282	184	2
B00004422100	21,0	282	184	2
B00004422150	21,5	289	191	2
B00004422200	22,0	289	191	2
B00004422250	22,5	296	198	2
B00004422300	23,0	296	198	2
B00004422350	23,5	319	198	3
B00004422400	24,0	327	206	3
B00004422450	24,5	327	206	3
B00004422500	25,0	327	206	3
B00004422550	25,5	335	214	3
B00004422600	26,0	335	214	3
B00004422650	26,5	335	214	3
B00004422700	27,0	343	222	3

Product Code	d1 mm	L1 mm	L2 mm	Morse Taper No
B00004422750	27,5	343	222	3
B00004422800	28,0	343	222	3
B00004422850	28,5	351	230	3
B00004422900	29,0	351	230	3
B00004422950	29,5	351	230	3
B00004423000	30,0	351	230	3
B00004423100	31,0	360	239	3
B00004423200	32,0	397	248	4
B00004423300	33,0	397	248	4
B00004423400	34,0	406	257	4
B00004423500	35,0	406	257	4
B00004423600	36,0	416	267	4
B00004423700	37,0	416	267	4
B00004423800	38,0	426	277	4
B00004423900	39,0	426	277	4
B00004424000	40,0	426	277	4
B00004424100	41,0	436	287	4
B00004424200	42,0	436	287	4
B00004424300	43,0	447	298	4
B00004424400	44,0	447	298	4
B00004424500	45,0	447	298	4
B00004424600	46,0	459	310	4
B00004424700	47,0	459	310	4
B00004424800	48,0	470	321	4
B00004424900	49,0	470	321	4
B00004425000	50,0	470	321	4



## MTE HARDOX DRILLING BITS

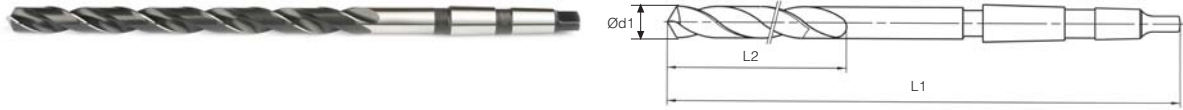


Product Code	d1 mm	L1 mm	L2 mm	Morse Taper No
B00002531300	13,0	177	81	2
B00002531350	13,5	177	81	2
B00002531400	14,0	182	86	2
B00002531450	14,5	182	86	2
B00002531500	15,0	185	89	2
B00002531550	15,5	185	89	2
B00002531600	16,0	185	89	2
B00002531650	16,5	185	89	2
B00002531700	17,0	188	92	2
B00002531750	17,5	188	92	2
B00002531800	18,0	188	92	2
B00002531850	18,5	211	95	3
B00002531900	19,0	211	95	3
B00002531950	19,5	211	95	3
B00002532000	20,0	211	95	3
B00002532050	20,5	211	95	3
B00002532100	21,0	220	105	3
B00002532150	21,5	220	105	3
B00002532200	22,0	220	105	3
B00002532250	22,5	220	105	3
B00002532300	23,0	220	105	3
B00002532350	23,5	220	105	3
B00002532400	24,0	220	105	3
B00002532450	24,5	223	108	3
B00002532500	25,0	223	108	3

Product Code	d1 mm	L1 mm	L2 mm	Morse Taper No
B00002532550	25,5	223	108	3
B00002532600	26,0	223	108	3
B00002532650	26,5	223	108	3
B00002532700	27,0	254	124	4
B00002532750	27,5	254	124	4
B00002532800	28,0	254	124	4
B00002532850	28,5	254	124	4
B00002532900	29,0	254	124	4
B00002532950	29,5	254	124	4
B00002533000	30,0	254	124	4
B00002533100	31,0	254	124	4
B00002533200	32,0	263	133	4
B00002533250	32,5	263	133	4
B00002533300	33,0	263	133	4
B00002533350	33,5	263	133	4
B00002533400	34,0	276	146	4
B00002533450	34,5	276	146	4
B00002533500	35,0	281	146	4
B00002533550	35,5	281	146	4
B00002533600	36,0	281	146	4
B00002533700	37,0	287	152	4
B00002533800	38,0	287	152	4
B00002533900	39,0	287	152	4
B00002534000	40,0	287	152	4



### MORSE TAPER SHANK TWIST DRILLS - EXTRA LONG SERIES



Product Code	d1 mm	L1 mm	L2 mm	Morse Taper No
B00007701000	10,0	285	185	1
B00007701100	11,0	300	195	1
B00007701200	12,0	310	205	1
B00007701300	13,0	310	205	1
B00007701400	14,0	325	220	1
B00007701500	15,0	340	220	2
B00007701600	16,0	355	230	2
B00007701700	17,0	355	230	2
B00007701800	18,0	370	245	2
B00007701900	19,0	370	245	2
B00007702000	20,0	385	260	2
B00004512100	21,0	385	260	2
B00004512200	22,0	405	270	2
B00004512300	23,0	405	270	2
B00004512400	24,0	440	290	3
B00004512500	25,0	440	290	3

Product Code	d1 mm	L1 mm	L2 mm	Morse Taper No
B00004512600	26,0	440	290	3
B00004512700	27,0	460	305	3
B00004512800	28,0	460	305	3
B00004512900	29,0	460	305	3
B00004513000	30,0	460	305	3
B00004513100	31,0	480	320	3
B00004513200	32,0	505	320	3
B00004513300	33,0	505	320	3
B00004513400	34,0	530	340	4
B00004513500	35,0	530	340	4
B00004513600	36,0	530	340	4
B00004513700	37,0	530	340	4
B00004513800	38,0	555	360	4
B00004513900	39,0	555	360	4
B00004514000	40,0	555	360	4



## MORSE TAPER SHANK TWIST DRILLS - EXTRA LONG SERIES

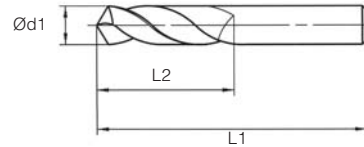


Product Code	d1 mm	L1 mm	L2 mm	Morse Taper No
B00007731400	14,0	410	275	1
B00007731500	15,0	425	275	2
B00007731600	16,0	445	295	2
B00007731700	17,0	445	295	2
B00007731800	18,0	465	310	2
B00007731900	19,0	465	310	2
B00007732000	20,0	490	325	2
B00004602100	21,0	490	325	2
B00004602200	22,0	515	345	2

Product Code	d1 mm	L1 mm	L2 mm	Morse Taper No
B00004602300	23,0	515	345	2
B00004602400	24,0	555	365	3
B00004602500	25,0	555	365	3
B00004602600	26,0	555	365	3
B00004602700	27,0	580	385	3
B00004602800	28,0	580	385	3
B00004602900	29,0	580	385	3
B00004603000	30,0	580	385	3



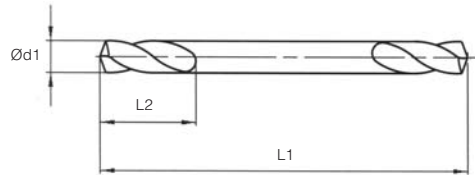
## STRAIGHT SHANK TWIST DRILLS - SHORT SERIES



Product Code	d1 mm	L1 mm	L2 mm	Product Code	d1 mm	L1 mm	L2 mm
B00007800200	2,00	38	12	B00007801000	10,00	89	43
B00007800250	2,50	43	14	B00007801050	10,50	89	43
B00007800300	3,00	46	16	B00007801100	11,00	95	47
B00007800310	3,10	49	18	B00007801150	11,50	95	47
B00007800320	3,20	49	18	B00007801200	12,00	102	51
B00007800330	3,30	49	18	B00007801250	12,50	102	51
B00007800350	3,50	52	20	B00007801300	13,00	102	51
B00007800400	4,00	55	22	B00004671350	13,50	107	54
B00007800420	4,20	55	22	B00004671400	14,00	107	54
B00007800450	4,50	58	24	B00004671450	14,50	111	56
B00007800500	5,00	62	26	B00004671500	15,00	111	56
B00007800520	5,20	62	26	B00004671550	15,50	115	58
B00007800550	5,50	66	28	B00004671600	16,00	115	58
B00007800600	6,00	66	28	B00004671650	16,50	119	60
B00007800650	6,50	70	31	B00004671700	17,00	119	60
B00007800700	7,00	74	34	B00004671750	17,50	123	62
B00007800750	7,50	74	34	B00004671800	18,00	123	62
B00007800800	8,00	79	37	B00004671850	18,50	127	64
B00007800850	8,50	79	37	B00004671900	19,00	127	64
B00007800900	9,00	84	40	B00004671950	19,50	131	66
B00007800950	9,50	84	40	B00004672000	20,00	131	66



## DOUBLE ENDED BODY DRILLS



Product Code	d1 mm	L1 mm	L2 mm
B00008770200	2,0	38	8
B00008770250	2,5	43	10
B00008770300	3,0	46	11
B00008770310	3,1	49	11
B00008770320	3,2	49	11
B00008770330	3,3	49	11
B00008770350	3,5	52	14

Product Code	d1 mm	L1 mm	L2 mm
B00008770400	4,0	55	14
B00008770420	4,2	55	14
B00008770450	4,5	58	17
B00008770500	5,0	62	17
B00008770520	5,2	62	17
B00008770550	5,5	66	19
B00008770600	6,0	66	19



HSS-E (%8Co)
MTE
h8
↻

SPOT WELD DRILLS - SHORT (SPOTLE / VARIO DRILLS)



Product Code	d1 mm	L1 mm	L2 mm
B00005990342	6,0	44	17
B00005990344	8,0	40	18,5
B00005990301	8,0	44	18,5

HSS-E (%8Co)
MTE
h8
↻
TiN

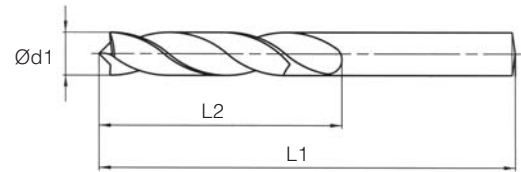
SPOT WELD DRILLS - SHORT (SPOTLE / VARIO DRILLS)




Product Code	d1 mm	L1 mm	L2 mm
B10005990342	6,0	44	17
B10005990344	8,0	40	18,5
B10005990301	8,0	44	18,5

HSS-E (%8Co)
MTE
h8

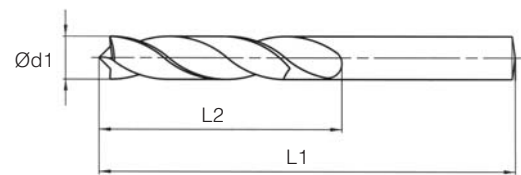

SPOT WELD DRILLS - LONG



Product Code	d1 mm	L1 mm	L2 mm
B00005990317	6,0	66	27
B00005990341	7,0	74	34
B00005990300	8,0	79	36

HSS-E (%8Co)
MTE
h8

TIN

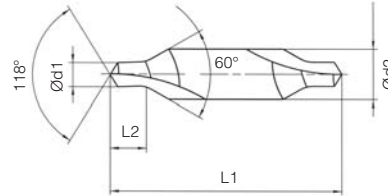
SPOT WELD DRILLS - LONG



Product Code	d1 mm	L1 mm	L2 mm
B10005990317	6,0	66	27
B10005990341	7,0	74	34
B10005990300	8,0	79	36



### CENTER DRILLS - FORM A



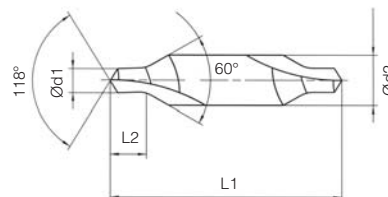
TWIST DRILLS

Product Code	d1 mm	d2 (h9) mm	L1 mm	L2 mm
B00010010100	1,00	3,15	31,5	1,3
B00010010125	1,25	3,15	31,5	1,6
B00010010160	1,60	4,00	35,5	2,0
B00010010200	2,00	5,00	40,0	2,5
B00010010250	2,50	6,30	45,0	3,1
B00010010315	3,15	8,00	50,0	3,9

Product Code	d1 mm	d2 (h9) mm	L1 mm	L2 mm
B00010010400	4,00	10,00	56,0	5,0
B00010010500	5,00	12,50	63,0	6,3
B00010010630	6,30	16,00	71,0	8,0
B00010010800	8,00	20,00	80,0	10,1
B00010011000	10,00	25,00	100,0	12,8
B00010011250	12,50	31,50	125,0	16,5

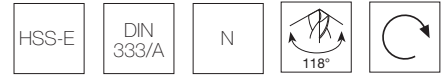


### CENTER DRILLS - FORM A

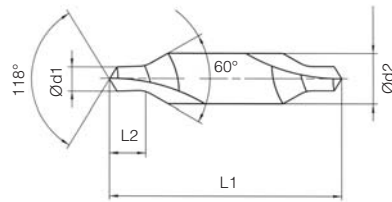


Product Code	d1 mm	d2 (h9) mm	L1 mm	L2 mm
B10010010100	1,00	3,15	31,5	1,3
B10010010125	1,25	3,15	31,5	1,6
B10010010160	1,60	4,00	35,5	2,0
B10010010200	2,00	5,00	40,0	2,5
B10010010250	2,50	6,30	45,0	3,1
B10010010315	3,15	8,00	50,0	3,9

Product Code	d1 mm	d2 (h9) mm	L1 mm	L2 mm
B10010010400	4,00	10,00	56,0	5,0
B10010010500	5,00	12,50	63,0	6,3
B10010010630	6,30	16,00	71,0	8,0
B10010010800	8,00	20,00	80,0	10,1
B10010011000	10,00	25,00	100,0	12,8
B10010011250	12,50	31,50	125,0	16,5



### CENTER DRILLS - FORM A

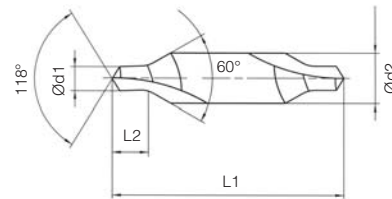


Product Code	d1 mm	d2 (h9) mm	L1 mm	L2 mm
B00010110100	1,00	3,15	31,5	1,3
B00010110125	1,25	3,15	31,5	1,6
B00010110160	1,60	4,00	35,5	2,0
B00010110200	2,00	5,00	40,0	2,5
B00010110250	2,50	6,30	45,0	3,1
B00010110315	3,15	8,00	50,0	3,9

Product Code	d1 mm	d2 (h9) mm	L1 mm	L2 mm
B00010110400	4,00	10,00	56,0	5,0
B00010110500	5,00	12,50	63,0	6,3
B00010110630	6,30	16,00	71,0	8,0
B00010110800	8,00	20,00	80,0	10,1
B00010111000	10,00	25,00	100,0	12,8
B00010111250	12,00	31,50	125,0	16,5

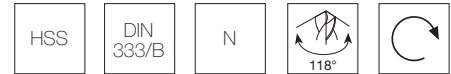


### CENTER DRILLS - FORM A

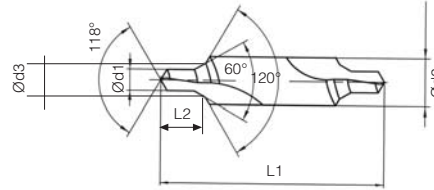


Product Code	d1 mm	d2 (h9) mm	L1 mm	L2 mm
B10010110100	1,00	3,15	31,5	1,3
B10010110125	1,25	3,15	31,5	1,6
B10010110160	1,60	4,00	35,5	2,0
B10010110200	2,00	5,00	40,0	2,5
B10010110250	2,50	6,30	45,0	3,1
B10010110315	3,15	8,00	50,0	3,9

Product Code	d1 mm	d2 (h9) mm	L1 mm	L2 mm
B10010110400	4,00	10,00	56,0	5,0
B10010110500	5,00	12,50	63,0	6,3
B10010110630	6,30	16,00	71,0	8,0
B10010110800	8,00	20,00	80,0	10,1
B10010111000	10,00	25,00	100,0	12,8
B10010111250	12,00	31,50	125,0	16,5



### CENTER DRILLS - FORM B

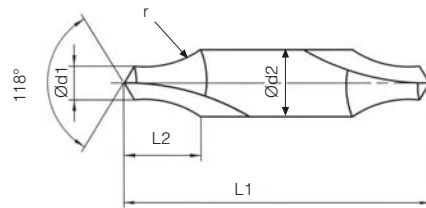


Product Code	d1 mm	d2 (h9) mm	d3 mm	L1 mm	L2 mm
B00010000100	1,00	4,0	2,12	35,5	1,3
B00010000125	1,25	5,0	2,65	40,0	1,6
B00010000160	1,60	6,3	3,35	45,0	2,0
B00010000200	2,00	8,0	4,25	50,0	2,5
B00010000250	2,50	10,0	5,30	56,0	3,1
B00010000315	3,15	11,2	6,70	60,0	3,9

Product Code	d1 mm	d2 (h9) mm	d3 mm	L1 mm	L2 mm
B00010000400	4,00	14,0	8,50	67,0	5,0
B00010000500	5,00	18,0	10,60	75,0	6,3
B00010000630	6,30	20,0	13,20	80,0	8,0
B00010000800	8,00	25,0	17,00	100,0	10,1
B00010001000	10,00	31,5	21,20	125,0	12,8

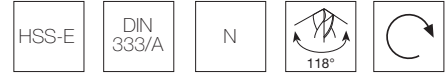


### CENTER DRILLS - FORM R



Product Code	d1 mm	d2 (h9) mm	L1 mm	L2 mm
B00010020200	2,00	5,00	40,0	5,30
B00010020250	2,50	6,30	45,0	6,70
B00010020315	3,15	8,00	50,0	8,50
B00010020400	4,00	10,00	56,0	10,60

Product Code	d1 mm	d2 (h9) mm	L1 mm	L2 mm
B00010020500	5,00	12,50	63,0	13,20
B00010020630	6,30	16,00	71,0	17,00
B00010020800	8,00	20,00	80,0	21,20
B00010021000	10,00	25,00	100,0	26,50

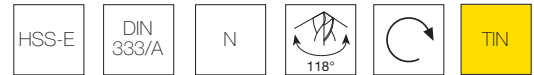


### CENTER DRILLS - LONG SERIES



Product Code	d1 mm	d2 (h9) mm	L1 mm	L2 mm
B00010520100	2,0	6,00	100	2,5
B00010525100	2,5	8,00	100	3,1
B00010530100	3,0	8,00	100	3,7
B00010540100	4,0	10,00	100	5,0
B00010550100	5,0	12,50	100	6,3

Product Code	d1 mm	d2 (h9) mm	L1 mm	L2 mm
B00010520120	2,0	6,00	120	2,5
B00010525120	2,5	8,00	120	3,1
B00010530120	3,0	8,00	120	3,7
B00010540120	4,0	10,00	120	5,0
B00010550120	5,0	12,50	120	6,3



### CENTER DRILLS - LONG SERIES

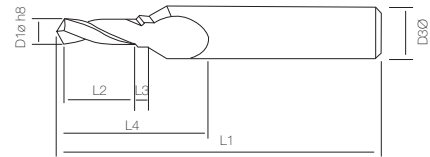


Product Code	d1 mm	d2 (h9) mm	L1 mm	L2 mm
B10010520100	2,0	6,00	100	2,5
B10010525100	2,5	8,00	100	3,1
B10010530100	3,0	8,00	100	3,7
B10010540100	4,0	10,00	100	5,0
B10010550100	5,0	12,50	100	6,3

Product Code	d1 mm	d2 (h9) mm	L1 mm	L2 mm
B10010520120	2,0	6,00	120	2,5
B10010525120	2,5	8,00	120	3,1
B10010530120	3,0	8,00	120	3,7
B10010540120	4,0	10,00	120	5,0
B10010550120	5,0	12,50	120	6,3



### STRAIGHT SHANK SUBLAND DRILLS



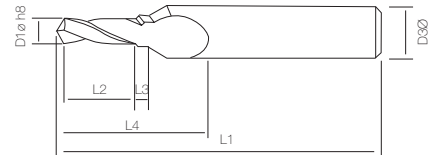
Product Code	D	d1 mm	d2 mm	d3 mm	L1 mm	L2 mm	L3 mm
B20008660400	M4	3.4	4.3	8	63	16	1.6
B20008660500	M5	4.3	5.3	10	67	18	2.15
B20008660600	M6	5.1	6.4	12	71	21	2.9
B20008660800	M8	6.9	8.4	14	88	25	3.5
B20008661000	M10	8.7	10.5	16	94	30	4.7
B20008661200	M12	10.4	13	20	105	35	6.5
B20008661600	M16	14.2	17	25	132	40	8.3
B20008662000	M20	17.7	21	31.5	145	45	10.35
B20008662400	M24	21.2	25	40	160	52	12



### STRAIGHT SHANK SUBLAND DRILLS



**HSS-E**



Product Code	D	d1 mm	d2 mm	d3 mm	L1 mm	L2 mm	L3 mm
B20008670400	M4	3.4	4.3	8	63	16	1.6
B20008670500	M5	4.3	5.3	10	67	18	2.15
B20008670600	M6	5.1	6.4	12	71	21	2.9
B20008670800	M8	6.9	8.4	14	88	25	3.5
B20008671000	M10	8.7	10.5	16	94	30	4.7
B20008671200	M12	10.4	13	20	105	35	6.5
B20008671600	M16	14.2	17	25	132	40	8.3
B20008672000	M20	17.7	21	31.5	145	45	10.35
B20008672400	M24	21.2	25	40	160	52	12



ROLL FORGED SET DRILLS



Product Code	d1 mm
B00000210010	Ø1 - Ø10 +0,5 Roll forged drill 19 pcs Set



Product Code	d1 mm
B00000210013	Ø1 - Ø13 +0,5 Roll forged drill 25 pcs Set



## Recommendations from Ali Usta

### Ali Usta says;

Depending on the operation to be performed, type work piece and required precision, Twist Drills are chosen from types N, H and W.

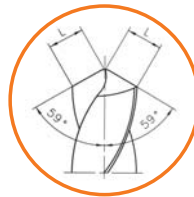
**N**  
Steel and steel types



**H**  
Brass



**W**  
Aluminium, Copper



The point angle of the twist drill must be chosen according to the type work piece.

### Ali Usta;

talks about Twist drill ,

- Too large point angle may cause a deviation from axis and enlarging the diameter of the hole.
- The choosing a too small point angle ensures good centering and size accuracy, but causes high friction around the hole, rapid abrasion and decreases tool life.
- 118° point angle provides optimum results and preferred for most of the materials.



### Ali Usta offers to you

some simple recommendations about point angles.

- 90° point angle for drilling hard plastic materials with high abrasion.
- For ductile materials and long chipping metals is preferred point angle 130° -140° in order to eliminate the chip accumulation.

### SOME IMPORTANT RECOMMENDATIONS FOR TWIST DRILLS

- 1) Keep your twist drills always available for use with sharpened point.
- 2) Don't use your twist drills until getting completely blunt, it 's never economical to work with a drill in bad condition.
- 3) Don't keep your twist drills in chip-full flute condition.
- 4) Use appropriate cooling (cutting) fluid during drilling. Always make sure that the cutting fluid reaches the cutting edges.
- 5) The work piece must by bound always properly. The smallest horizontal movements may cause the drill bit break or accidents.
- 6) Correctly choose the type and quality of the twist drill and sharpen the drill bit appropriately according to the work you will perform. Pay particular attention not to allow the cutting point to burn and soften during sharpening..

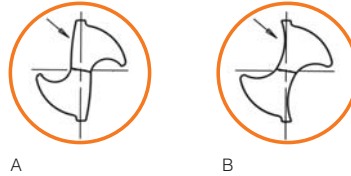
## Solutions of Ali Usta

Ali Usta presents the problems encountered during the drilling and their causes and solutions with figures.

### 1 - Low cutting efficiency

A - If the point angle is lower than 118°, the cutting edges become convex and the cutting efficiency is reduced.

B - If the point angle is higher than 118°, the cutting edges become concave. The cutting efficiency is reduced because the corners at the end are weak.



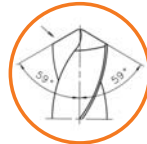
### 2 - Hole size is found too large.

If the point angle is symmetric to the axis of the drill bit, one of the angles is greater than 59° and the other is smaller than 59°. On the side where the angle is greater than 59°, the cutting sides are short. The greater load of the cutting process is applied on this edge and therefore the drill bit is transmitted to the other side and the size of the hole is found larger than required.



### 3 - The twist drill overwears quickly

If the point angle is symmetric to the axis but one of the cutting edges is longer than the other, this means the transversal cutting edge is cam. In such case, since the cutting edge is subjected to improper tensions, the longer cutting edge wears quickly.



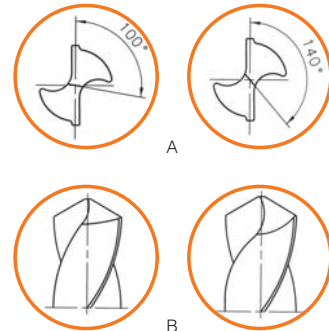
(The section shown with an arrow in the figure)

Please note that the chips coming out of one flute is more than the other during drilling.

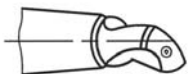
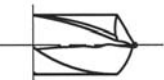
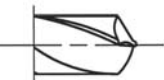

### 4 - Cracking and breaking of the drill's web

A - When the clearance angle is too smaller, it results in friction instead of appropriate cutting and the Web of the drill can crack. The chisel edge angle is smaller than 130°.

B - When the clearance angle is too large, this reduces the resistance of the cutting edge. Breakings may occur on cutting edges in normal values of the drill. The chisel edge angle exceeds 130°. (140°), the chisel edge extends and prevents the drill from centering properly, thus the hole becomes too large and oval.



## FREQUENTLY ENCOUNTERED ISSUES IN USING TWIST DRILLS

ERROR	CAUSE	SOLUTION
<p>The tang of Morse taper shank breaks or turns.</p> 	<ol style="list-style-type: none"> <li>1) The Morse taper shank is not suitable for the bushing.</li> <li>2) No rotating force must exist on the chuck.</li> </ol>	<ol style="list-style-type: none"> <li>1) The bushing inside must be clean and smooth.</li> <li>2) Worn out bushing must be replaced.</li> </ol>
<p>The Web of the drill is cracked</p> 	<ol style="list-style-type: none"> <li>1) Feed <math>s=(\text{mm/rev})</math> is chosen too much.</li> <li>2) Clearance angle is too small.</li> <li>3) Too much Web thinning .</li> <li>4) The drill is with damaged point before the work.</li> </ol>	<ol style="list-style-type: none"> <li>1) Work must be performed by choosing appropriate values</li> <li>2) Clearance angle must be normalized</li> <li>3) Appropriate Web thinning must be performed</li> <li>4) Soft hammer must be used for fixing and removing processes.</li> </ol>
<p>Cutting edge breakage and easily wearing</p> 	<ol style="list-style-type: none"> <li>1) Clearance angle is too large, the margin width got thinned</li> <li>2) It works at too high cutting speeds</li> </ol>	<ol style="list-style-type: none"> <li>1) The drill must be sharpened with the appropriate clearance angle.</li> <li>2) Appropriate values must be chosen from the catalogue.</li> </ol>
<p>The drill breaks on the channel end.</p> 	<ol style="list-style-type: none"> <li>1) The work piece is not fixed properly. It has moved during drilling.</li> <li>2) The face of the work piece is inclined, corrugated or with different hardness. Exact centering is not achieved at the beginning of the drilling and the bit has slipped on the work piece.</li> <li>3) Cylindrical shank drill turns in the chuck.</li> </ol>	<ol style="list-style-type: none"> <li>1) The work piece must be fixed properly in place.</li> <li>2) Drill centering wrench must be used and spot must be opened on the location to be drilled.</li> <li>3) The drill must be properly fixed to the chuck.</li> </ol>

# TAPS



TAPS

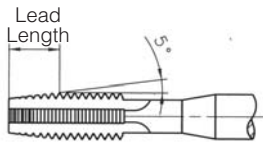
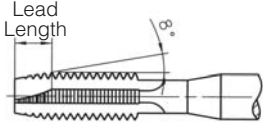
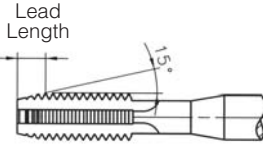
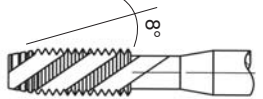
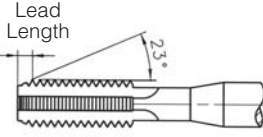


Tool Type	Standard	Quality	Coating	Page No
HAND TAPS IN SETS OF THREE FOR METRIC THREAD	Din 352	HSS	-	123
HAND TAPS IN SETS OF THREE FOR METRIC THREAD	Din 352	HSS-E	-	124
HAND TAPS IN SETS OF THREE FOR METRIC THREAD - 1 NR PILOT	Din 352	HSS-E	-	125
HAND TAPS IN SETS OF THREE FOR WITHWORTH THREAD	MTE	HSS	-	126
HAND TAPS IN SETS OF THREE FOR UNC THREAD	MTE	HSS	-	127
HAND TAPS IN SETS OF TWO FOR MF THREAD	Din 2181	HSS	-	128
HAND TAPS IN SETS OF TWO FOR UNF THREAD	Din 2181	HSS	-	129
HAND TAPS IN SETS OF TWO FOR WITHWORTH PIPE THREAD	Din 5157	HSS	-	130
MACHINE TAPS FOR METRIC THREAD - SHORT SERIES	Din 352	HSS	-	131
MACHINE TAPS FOR METRIC THREAD - SHORT SERIES	Din 352	HSS-E	-	132
MACHINE TAPS FOR WITHWORTH THREAD - SHORT SERIES	MTE	HSS	-	132
MACHINE TAPS FOR UNC THREAD - SHORT SERIES	MTE	HSS	-	133
MACHINE TAPS FOR METRIC FINE THREAD - SHORT SERIES	Din 2181	HSS	-	134
MACHINE TAPS FOR UNF THREAD - SHORT SERIES	Din 2181	HSS	-	135
MACHINE TAPS FOR WITHWORTH PIPE THREAD - SHORT SERIES	Din 5157	HSS-E	-	135
MACHINE TAPS WITH STRAIGHT FLUTES FOR METRIC THREAD	Din 371/C	HSS-E	-	136
MACHINE TAPS WITH SPIRAL FLUTES FOR METRIC THREAD	Din 371/E	HSS-E	-	136
MACHINE TAPS STRAIGHT FLUTES WITH SPIRAL POINT FOR METRIC THREAD	Din 371/C	HSS-E	-	137
MACHINE TAPS WITH STRAIGHT FLUTES FOR METRIC THREAD	Din 376/C	HSS-E	-	138
MACHINE TAPS STRAIGHT FLUTES WITH SPIRAL POINT FOR METRIC THREAD	Din 376/B	HSS-E	-	139
MACHINE TAPS WITH SPIRAL FLUTES FOR METRIC THREAD	Din 376/C	HSS-E	-	134
MACHINE TAPS WITH STRAIGHT FLUTES FOR METRIC FINETHREAD	Din 374/C	HSS-E	-	141
MACHINE TAPS STRAIGHT FLUTES WITH SPIRAL POINT FOR METRIC FINE THREAD	Din 374/B	HSS-E	-	143
MACHINE TAPS WITH SPIRAL FLUTES FOR METRIC FINE THREAD	Din 374/C	HSS-E	-	144
MACHINE TAPS WITH STRAIGHT FLUTES FOR UNC THREAD	MTE	HSS-E	-	145
MACHINE TAPS WITH SPIRAL FLUTES FOR UNC THREAD	MTE	HSS-E	-	145
MACHINE TAPS WITH STRAIGHT FLUTES FOR UNF THREAD	MTE	HSS-E	-	146
MACHINE TAPS WITH SPIRAL FLUTES FOR UNF THREAD	MTE	HSS-E	-	146
MACHINE TAPS WITH STRAIGHT FLUTES FOR WITHWORTH THREAD	MTE	HSS-E	-	147
MACHINE TAPS WITH SPIRAL FLUTES FOR WITHWORTH THREAD	MTE	HSS-E	-	147
MACHINE TAPS WITH STRAIGHT FLUTES FOR WITHWORTH PIPE THREAD	Din 5156/C	HSS-E	-	148
MACHINE TAPS STRAIGHT FLUTES WITH SPIRAL POINT FOR WITHWORTH PIPE THREAD	Din 5156/B	HSS-E	-	148
MACHINE TAPS WITH SPIRAL FLUTES FOR WITHWORTH PIPE THREAD	Din 5156/C	HSS-E	-	149
MACHINE TAPS FOR NPT - THREAD - TAPER 1/16	MTE	HSS	-	149
NUT TAPS METRIC	Din 357	HSS	-	150
NUT TAPS METRIC - 5 FLUTES	MTE	HSS-E	TiN	151
NUT TAPS METRIC FINE - 5 FLUTES	MTE	HSS-E	TiN	152
NUT TAPS - UNC - 5 FLUTES	MTE	HSS-E	TiN	153
NUT TAPS - UNF - 5 FLUTES	MTE	HSS-E	TiN	154
DRILLING - TAPPING COMBINED TOOLS	MTE	HSS-E	-	155



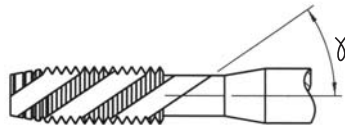
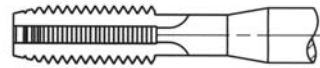
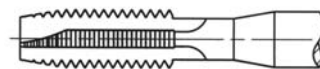
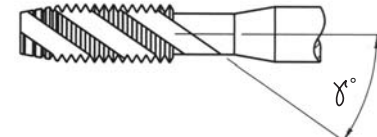
TAPS

## Taps Chamfer Forms and Application

TAP FORM		LEAD LENGTH	LEAD ANGLE	RECOMMENDED APPLICATION
A		6-8 Pitch	5°	for through holes in materials forming short chips
B		3.5-5.5 Pitch	8°	for through holes in materials forming long chips
C		2-3 Pitch	15°	for blind and through holes in materials forming short chips
D		3.5-5.5 Pitch	8°	for through holes in materials forming long chips
E		1.5-2 Pitch	23°	for blind holes with extremely short lead.

Avoid chamfer form E if possible

## Helix Directions and Helix Angles

SYMBOL		HELIX ANGLE		HELIX DIRECTION		APPLICATION TAP FORM
LEFT	RIGHT	MIN.	MAX.			
L 15°	-	-10°	-20°	LEFT HELIX		D
-	-	-	-	STRAIGHT FLUTE		A,C,D,E
-	-	-	-	STRAIGHT FLUTE SPIRAL POINT		B
-	R 15° R 25° R 35° R 45°	+10° +20° +30° +40°	+20° +30° +40° +50°	RIGHT HELIX		C,E



FOR TAP WITH STRAIGHT FLUTE IS RECOMENDED SPIRAL POINT "FORM B"







## Recommended Operating Conditions for Taps

Material Groups	Sample Materials	Cutting Angle	Cutting speed (m/min.)	Cutting Fluid
Unalloyed and low alloyed steels and steel casts	≤ 400 N/mm <sup>2</sup> St33-1/St37-3 C 10/9 S 20	13° - 18°	6 - 20	SE
	400 - 800 N/mm <sup>2</sup> St42-1/St70-2/GS-38 C 10/Ck 15/C 45/GS-70 9 SMn28/45 S20	11° - 14°	6 - 15	SE
Tool steels (Structural steels)	800 - 1200 N/mm <sup>2</sup> 14 NiCr 10/15 CrNi 6 38 CrNiMo 4 C 55/C 60	8° - 12°	4 - 8	SE SO P
Toughened steels	1200 - 1400 N/mm <sup>2</sup> 17 CrNiMo 6/20 CrMo 5 30 CrNiMo 8 21 NiCrMo 2	4° - 7°	2 - 4	P
Cold pressed steels, deep drawn sheets	≤ 600 N/mm <sup>2</sup> Cq 15/Cq 35 15 CrNi 6 14 NiCr 18	11° - 14°	10 - 15	SE H
INOX	Alloyed tool steels, Stainless and acid resistant steels X 10 Cr 13/X 12 CrNiS 18 8 X 12 CrNi 25 4 G-X 20 Cr 14 G-X 40 CrSi 13	8° - 12°	1 - 4	SE SO P
Cast Iron	Gray Cast ≤ 220 HB GG 15/GG 40	3° - 6°	6 - 20	M BY K
	Malleable Cast ≤ 290 HB GTW-35-04/GTW-60 GTS-35-10/GTS-70-02	8° - 11°	6 - 12	SE SO
	Brittle Cast ≤ 200 HB GGG 40/GGG 70	6° - 9°	3 - 12	SE H
Densified aluminium	Pure aluminium, hardenable alloyed Al 99,0/Al 99,5 AlMgSi 1 AlMgSiPb	20° - 24°	15 - 40	M SO
Alloyed cast aluminium	G - AlSiMg Alloyed G-AlSi 5 Mg G-AlSi 12 Mg G-AlSi 5 Mg/G-AlSi 12 Mg	13° - 16° 13° - 16° 13° - 16°	10 - 40 8 - 20	M SO M, SO
	G - AlMg Alloyed (% 3-10 Mg) G-AlMg 3/G-AlMg 5 G-AlMg 3 Si/G-AlMg 5 Si	13° - 16° 13° - 16°	10 - 40	M SO
	Piston Material G-AlSi 12 CuNiMg	13° - 16°	4 - 8	M SO
	Cylinder block (Authentic top alloyed) G-AlSi 17 Cu 4 Mg	13° - 16°	4 - 8	M SO
	Highly Hard G-Al-Leg G-ALCu 4 Ti/G-AlCu 4 TiMg	13° - 16°	10 - 40	M, SO
	Copper Cu/E 2-Cu 58/F-Cu ÖE-Cu/SW-Cu/SF-Cu	20° - 25°	14 - 17	SE SO
Copper - Zinc alloy (Brass)	Short Chip CuZn 44 Pb 2 (Ms 56) CuZn 39 Pb 2 (Ms 58) GK-CuZn 37 Pb (GK-MS 60)	2° - 5°	15 - 30	H M
	Long Chip CuZn 40(Ms 60)/CuZn 37(Ms 63) CuZn 40 Mn 2/CuZn 31 Si 1 G-CuZn 40 Fe CuZn 33 (Ms 67)/CuZn 5 (Ms 95) CuZn 28 Sn 1 (SoMs 71) CuZn 20 Al 2 (SoMs 76) CuNiZn-Leg	8° - 12° 10° - 14°	10 - 20 10 - 20	H M H M
		Short Chip ≤ %8 Sn G-CuSn 7 ZnPb (Rg 7) Long Chip > %8 Sn G-CuSn 10 Zn (Rg 10) eksik	8° - 12° 6° - 9°	2 - 8 6 - 15
Zinc and zinc alloys	DIN 1706 GD-ZnAl 4 GK-ZnAl 6 Cu 1	8° - 12°	8 - 15	SE SO
Magnesium and magnesium alloys	DIN 1729 DIN 17800 G-AMgAl 8 Zn 1 GK-MgAl 8 Zn 1 H-Mg 99,95	3° - 5°	10 - 20	M SE
Nickel and nickel alloys	Ni, Hastelloy, Nimonic Monel, Invar, Inconel	3° - 5°	< 4	SO
Titanium and titanium alloys	Ti, Ferro Tic Amoco Bronze with Q 18 Amoco Bronze over Q 18	4° - 6° 0° - 2°	<4 <4	SO P SO P
	Plastic materials	Termoplastic Duroplastic	18° - 22° 3° - 5°	10 - 40 <15
Graphite - Ceramic Materials	Stellit	2° - 6°	5 - 10	K,H BY
Sintered and pulverized materials		7° - 9°	6 - 15	K,H BY

E = Emulsion  
SE = Special Emulsion  
O = Coolant  
D = Dry

SO = Special Cutting Oil  
P = Cutting Paste  
VO = Vegetable Oil  
A = Air

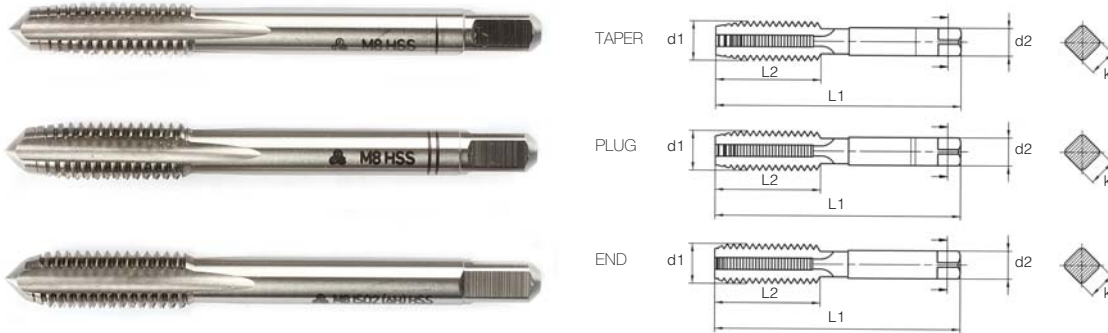
for TiN coated tools, the above specified cutting speeds must be doubled as minimum.

In the above given low cutting speed option, it is recommended to use a fluent cooling fluid and paste for cast steels.

for optimum cutting speeds, cutting conditions and manufacturing techniques shall be taken into consideration.



## HAND TAPS IN SETS OF THREE FOR METRIC THREAD

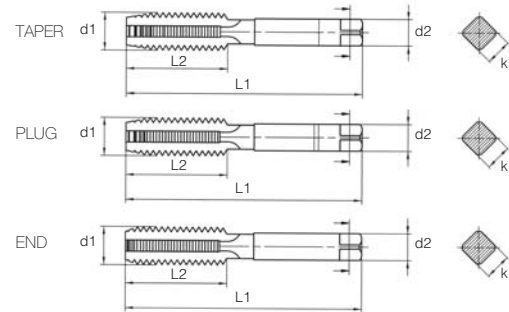


TAPS

Product Code	d1 mm	P	L1 mm	L2 mm	d2 mm	k (h12) mm
B00100040200	M2	0,4	36	8	2,8	2,1
B00100040250	M2,5	0,45	40	9	2,8	2,1
B00100040300	M3	0,5	40	11	3,5	2,7
B00100040350	M3,5	0,6	45	13	4,0	3,0
B00100040400	M4	0,7	45	13	4,5	3,4
B00100040450	M4.5	0,75	50	16	6,0	4,9
B00100040500	M5	0,8	50	16	6,0	4,9
B00100040600	M6	1	56	19	6,0	4,9
B00100040700	M7	1	56	19	6,0	4,9
B00100040800	M8	1,25	63	22	6,0	4,9
B00100040900	M9	1,25	63	22	7,0	5,5
B00100041000	M10	1,5	70	24	7,0	5,5
B00100041100	M11	1,5	70	24	8,0	6,2
B00100041200	M12	1,75	75	28	9,0	7,0
B00100041400	M14	2	80	30	11,0	9,0
B00100041600	M16	2	80	32	12,0	9,0
B00100041800	M18	2,5	95	34	14,0	11,0
B00100042000	M20	2,5	95	34	16,0	12,0
B00100042200	M22	2,5	100	34	18,0	14,5
B00100042400	M24	3	110	38	18,0	14,5
B00100042600	M26	3	110	38	20,0	16,0
B00100042700	M27	3	110	38	20,0	16,0
B00100042800	M28	3	110	38	20,0	16,0
B00100043000	M30	3,5	125	45	22,0	18,0
B00100043300	M33	3,5	125	50	25,0	20,0
B00100043600	M36	4	150	56	28,0	22,0
B00100043900	M39	4	150	60	32,0	24,0
B00100044200	M42	4,5	150	60	32,0	24,0
B00100044500	M45	4,5	160	65	36,0	29,0
B00100044800	M48	5	180	70	36,0	29,0
B00100045200	M52	5	180	70	40,0	32,0
B00100045600	M56	5,5	180	70	40,0	35,0



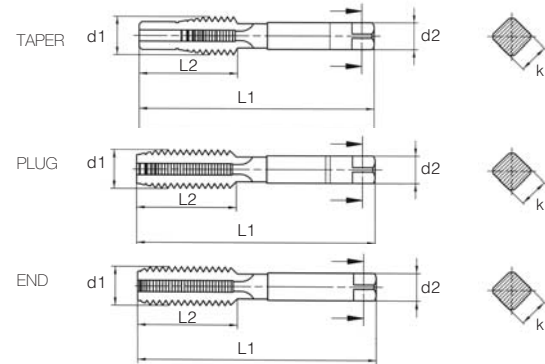
## HAND TAPS IN SETS OF THREE FOR METRIC THREAD



Product Code	d1 mm	P	L1 mm	L2 mm	d2 mm	k (h12) mm
B00109130200	M2	0,4	36	8	2,8	2,1
B00109130300	M3	0,5	40	11	3,5	2,7
B00109130400	M4	0,7	45	13	4,5	3,4
B00109130500	M5	0,8	50	16	6,0	4,9
B00109130600	M6	1	56	19	6,0	4,9
B00109130800	M8	1,25	63	22	6,0	4,9
B00109131000	M10	1,5	70	24	7,0	5,5
B00109131200	M12	1,75	75	28	9,0	7,0
B00109131400	M14	2	80	30	11,0	9,0
B00109131600	M16	2	80	32	12,0	9,0
B00109132000	M20	2,5	95	34	16,0	12,0
B00109132400	M24	3	110	38	18,0	14,5
B00109132700	M27	3	110	38	20,0	16,0
B00109133000	M30	3,5	125	45	22,0	18,0



## HAND TAPS IN SETS OF THREE FOR METRIC THREAD - 1 NR PILOT

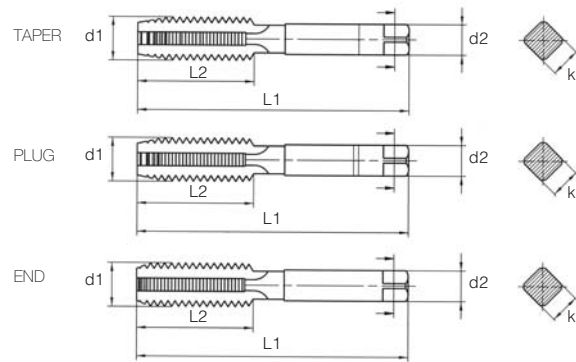


TAPS

Product Code	d1 mm	P	L1 mm	L2 mm	d2 mm	k (h12) mm
B00109490300	M3	0,5	40	11	3,5	2,7
B00109490400	M4	0,7	45	13	4,5	3,4
B00109490500	M5	0,8	50	16	6,0	4,9
B00109490600	M6	1	56	19	6,0	4,9
B00109490700	M7	1	56	19	6,0	4,9
B00109490800	M8	1,25	63	22	6,0	4,9
B00109490900	M9	1,25	63	22	7,0	5,5
B00109491000	M10	1,5	70	24	7,0	5,5
B00109491100	M11	1,5	70	24	8,0	6,2
B00109491200	M12	1,75	75	28	9,0	7,0
B00109491400	M14	2	80	30	11,0	9,0
B00109491600	M16	2	80	32	12,0	9,0
B00109491800	M18	2,5	95	34	14,0	11,0
B00109492000	M20	2,5	95	34	16,0	12,0
B00109492000	M20	2,5	95	40	16,0	12,0
B00109492200	M22	2,5	100	40	18,0	14,5
B00109492400	M24	3	110	50	18,0	14,5
B00109492600	M26	3	110	50	20,0	16,0
B00109492700	M27	3	110	50	20,0	16,0
B00109492800	M28	3	110	50	20,0	16,0
B00109493000	M30	3,5	125	56	22,0	18,0



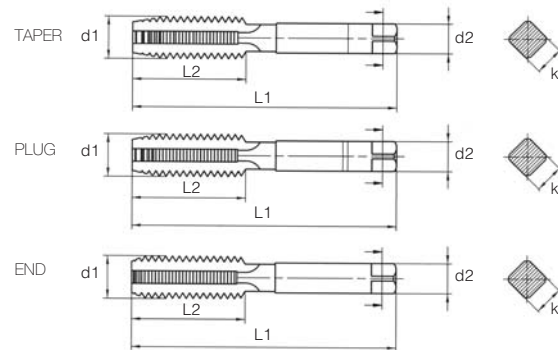
## HAND TAPS IN SETS OF THREE FOR WHITWORTH THREAD



Product Code	d1 BSW	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00100100317	W 1/8"	40	40	11	3,5	2,7
B00100100397	W 5/32"	32	45	13	4,5	3,4
B00100100476	W 3/16"	24	50	16	6,0	4,9
B00100100556	W 7/32"	24	50	16	6,0	4,9
B00100100635	W 1/4"	20	50	19	6,0	4,9
B00100100794	W 5/16"	18	56	22	6,0	4,9
B00100100952	W 3/8"	16	70	24	7,0	5,5
B00100101111	W 7/16"	14	70	24	8,0	6,2
B00100101270	W 1/2"	12	75	29	9,0	7,0
B00100101429	W 9/16"	12	80	30	11,0	9,0
B00100101587	W 5/8"	11	80	32	12,0	9,0
B00100101905	W 3/4"	10	95	40	14,0	11,0
B00100102222	W 7/8"	9	100	40	18,0	14,5
B00100102540	W 1"	8	110	50	20,0	16,0



## HAND TAPS IN SETS OF THREE FOR UNC THREAD

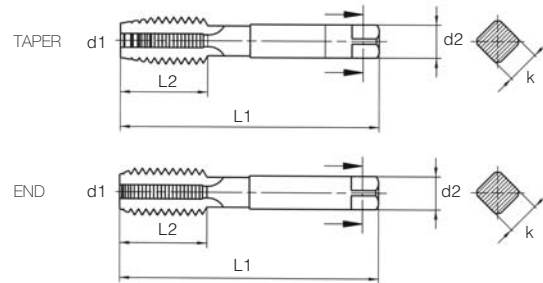


TAPS

Product Code	d1 UNC	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00100140350	Nr. 6	32	45	13	4,0	3,0
B00100140417	Nr. 8	32	45	13	4,5	3,4
B00100140483	Nr. 10	24	50	16	6,0	4,9
B00100140549	Nr. 12	24	50	16	6,0	4,9
B00100140635	1/4"	20	50	19	6,0	4,9
B00100140794	5/16"	18	56	22	6,0	4,9
B00100140952	3/8"	16	70	24	7,0	5,5
B00100141111	7/16"	14	70	24	8,0	6,2
B00100141270	1/2"	13	75	29	9,0	7,0
B00100141429	9/16"	12	80	30	11,0	9,0
B00100141587	5/8"	11	80	32	12,0	9,0
B00100141905	3/4"	10	95	40	14,0	11,0
B00100142222	7/8"	9	100	40	18,0	14,5
B00100142540	1"	8	110	50	20,0	16,0
B00100143175	1 1/4"	7	125	56	25,0	20,0
B00100143810	1 1/2"	6	150	63	32,0	24,0
B00100144445	1 3/4"	5	160	70	36,0	29,0
B00100145080	2"	4 1/2	180	75	40,0	32,0



## HAND TAPS IN SETS OF TWO FOR MF THREAD



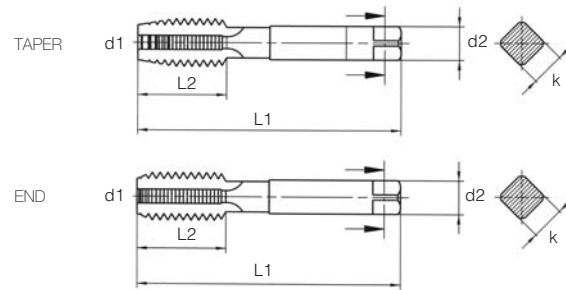
Product Code	d1 mm	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00102030302	M 3	0,35	40	8	3,5	2,7
B00102030352	M 3,5	0,35	45	9	4	3,0
B00102030402	M 4	0,35	45	10	4,5	3,4
B00102030403	M 4	0,5	45	10	4,5	3,4
B00102030503	M 5	0,5	50	12	6	4,9
B00102030603	M 6	0,5	56	14	6	4,9
B00102030604	M 6	0,75	56	14	6	4,9
B00102030803	M 8	0,5	56	18	6	4,9
B00102030804	M 8	0,75	56	18	6	4,9
B00102030805	M 8	1	63	22	6	4,9
B00102031000	M 10	1,25	70	24	7	5,5
B00102031003	M 10	0,5	63	20	7	5,5
B00102031004	M 10	0,75	63	20	7	5,5
B00102031005	M 10	1	63	20	7	5,5
B00102031105	M 11	1	63	20	8	6,2
B00102031200	M 12	1,25	70	22	9	7,0
B00102031205	M 12	1	70	22	9	7,0
B00102031206	M 12	1,5	70	22	9	7,0
B00102031400	M 14	1,25	70	22	11	9,0
B00102031405	M 14	1	70	22	11	9,0
B00102031406	M 14	1,5	70	22	11	9,0
B00102031505	M 15	1	70	22	12	9,0
B00102031506	M 15	1,5	70	22	12	9,0
B00102031605	M 16	1	70	22	12	9,0
B00102031606	M 16	1,5	70	22	12	9,0
B00102031805	M 18	1	80	22	14	11,0
B00102031806	M 18	1,5	80	22	14	11,0

Product Code	d1 mm	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00102031808	M 18	2	80	22	14	11,0
B00102032005	M 20	1	80	22	16	12,0
B00102032006	M 20	1,5	80	22	16	12,0
B00102032008	M 20	2	80	22	16	12,0
B00102032205	M 22	1	80	22	18	14,5
B00102032206	M 22	1,5	80	22	18	14,5
B00102032208	M 22	2	80	22	18	14,5
B00102032405	M 24	1	90	22	18	14,5
B00102032406	M 24	1,5	90	22	18	14,5
B00102032408	M 24	2	90	22	18	14,5
B00102032506	M 25	1,5	90	22	18	14,5
B00102032606	M 26	1,5	90	22	18	14,5
B00102032608	M 26	2	90	22	18	14,5
B00102032706	M 27	1,5	90	22	20	16,0
B00102032708	M 27	2	90	22	20	16,0
B00102032806	M 28	1,5	90	22	20	16,0
B00102032808	M 28	2	90	22	20	16,0
B00102033006	M 30	1,5	90	22	22	18,0
B00102033008	M 30	2	90	22	22	18,0
B00102033206	M 32	1,5	90	22	22	18,0
B00102033208	M 32	2	90	22	22	18,0
B00102033308	M 33	2	100	25	25	20,0
B00102033406	M 34	1,5	100	25	28	22,0
B00102033506	M 35	1,5	100	25	28	22,0
B00102033606	M 36	1,5	100	25	28	22,0
B00102033608	M 36	2	125	40	28	22,0





## HAND TAPS IN SETS OF TWO FOR UNF THREAD

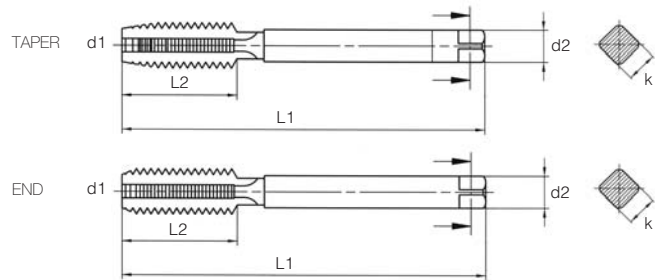


TAPS

Product Code	d1 UNF	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00102060350	Nr. 6	40	45	12	4	3,0
B00102060417	Nr. 8	36	50	12	6	4,9
B00102060483	Nr. 10	32	50	12	6	4,9
B00102060549	Nr. 12	28	50	14	6	4,9
B00102060635	1/4"	28	50	16	6	4,9
B00102060794	5/16"	24	56	22	6	4,9
B00102060952	3/8"	24	63	20	7	5,5
B00102061111	7/16"	20	63	20	8	6,2
B00102061270	1/2"	20	70	22	9	7,0
B00102061429	9/16"	18	70	22	11	9,0
B00102061587	5/8"	18	70	22	12	9,0
B00102061905	3/4"	16	80	22	14	11,0
B00102062222	7/8"	14	80	22	18	14,5
B00102062540	1"	12	90	22	18	14,5
B00102063175	1 1/4"	12	90	22	22	18
B00102063810	1 1/2"	12	110	32	32	24



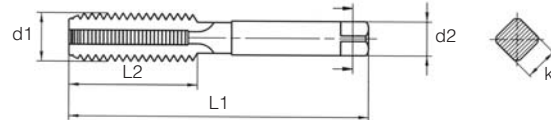
## HAND TAPS IN SETS OF TWO FOR WHITWORTH PIPE THREAD



Product Code	d1 BSP	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00102300973	G 1/8"	28	63	19	7	5,5
B00102301316	G 1/4"	19	70	21	11	9
B00102301666	G 3/8"	19	70	21	12	9
B00102302095	G 1/2"	14	80	22	16	12
B00102302291	G 5/8"	14	80	22	18	14,5
B00102302644	G 3/4"	14	90	22	20	16
B00102303020	G 7/8"	14	90	22	22	18
B00102303325	G 1"	11	100	25	25	20
B00102304191	G 1 1/4"	11	125	31	32	24
B00102304780	G 1 1/2"	11	140	31	36	29
B00102305375	G 1 3/4"	11	140	33	40	32
B00102305961	G 2"	11	160	37	45	35



## MACHINE TAPS FOR METRIC THREAD - SHORT SERIES

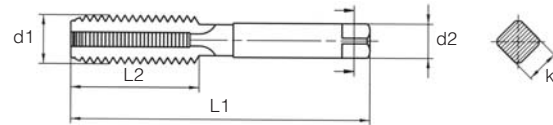


TAPS

Product Code	d1 mm	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00104040200	M 2	0.4	36	8	2,8	2,1
B00104040250	M 2,5	0.45	40	9	2,8	2,1
B00104040300	M 3	0.5	40	11	3,5	2,7
B00104040350	M 3,5	0.6	45	12	4,0	3,0
B00104040400	M 4	0.7	45	13	4,5	3,4
B00104040500	M 5	0.8	50	16	6,0	4,9
B00104040600	M 6	1	56	19	6,0	4,9
B00104040700	M 7	1	56	19	6,0	4,9
B00104040800	M 8	1.25	63	22	6,0	4,9
B00104040900	M 9	1.25	63	22	7,0	5,5
B00104041000	M 10	1.5	70	24	7,0	5,5
B00104041200	M 12	1.75	75	28	9,0	7,0
B00104041400	M 14	2	80	30	11,0	9,0
B00104041600	M 16	2	80	32	12,0	9,0
B00104041800	M 18	2.5	95	34	14,0	11,0
B00104042000	M 20	2.5	95	34	16,0	12,0
B00104042200	M 22	2.5	10	34	18,0	14,5
B00104042400	M 24	3	110	38	18,0	14,5
B00104042600	M26	3	110	38	26,0	16,0
B00104042700	M27	3	110	38	20,0	16,0
B00104042800	M28	3	110	38	20,0	16,0
B00104043000	M 30	3.5	125	45	22,0	18,0
B00104043300	M 33	3.5	125	50	25,0	20,0
B00104043600	M 36	4	150	56	28,0	22,0
B00104043900	M 39	4	150	60	32,0	24,0
B00104044200	M42	4.5	150	60	32,0	24,0
B00104044500	M45	4.5	160	65	36,0	29,0
B00104044800	M48	5	180	70	36,0	29,0
B00104045200	M52	5	180	70	40,0	32,0
B00104045600	M56	5.5	180	70	40,0	35,0



## MACHINE TAPS FOR METRIC THREAD - SHORT SERIES



Product Code	d1 mm	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00109160300	M 3	0,5	40	11	3,5	2,7
B00109160400	M 4	0,7	45	13	4,5	3,4
B00109160500	M 5	0,8	50	16	6,0	4,9
B00109160600	M 6	1	56	19	6,0	4,9
B00109160800	M 8	1,25	63	22	6,0	4,9
B00109161000	M 10	1,5	70	24	7,0	5,5
B00109161200	M 12	1,75	75	28	9,0	7,0
B00109161400	M 14	2	80	30	11,0	9,0
B00109161600	M 16	2	80	32	12,0	9,0
B00109162000	M 20	2,5	95	34	16,0	12,0
B00109162400	M 24	3	110	38	18,0	12,0
B00109162700	M 27	3	110	38	20,0	14,5
B00109163000	M 30	3,5	125	45	22,0	18,0



## MACHINE TAPS FOR WHITWORTH THREAD - SHORT SERIES



Product Code	d1 BSW	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00104280317	W 1/8"	40	40	11	3,5	2,7
B00104280397	W 5/32"	32	45	13	4,5	3,4
B00104280476	W 3/16"	24	50	16	6	4,9
B00104280635	W 1/4"	20	50	19	6	4,9
B00104280794	W 5/16"	18	56	22	6	4,9
B00104280952	W 3/8"	16	70	24	7	5,5
B00104281111	W 7/16"	14	70	24	8	6,2
B00104281270	W 1/2"	12	75	29	9	7,0



## MACHINE TAPS FOR UNC THREAD - SHORT SERIES



TAPS

Product Code	d1 UNC	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00104240350	Nr. 6	32	45	13	4	3,0
B00104240417	Nr. 8	32	45	13	4,5	3,4
B00104240483	Nr. 10	24	50	16	6	4,9
B00104240635	1/4"	20	50	19	6	4,9
B00104240794	5/16"	18	56	22	6	4,9
B00104240952	3/8"	16	70	24	7	5,5
B00104241111	7/16"	14	70	24	8	6,2
B00104241270	1/2"	13	75	29	9	7,0



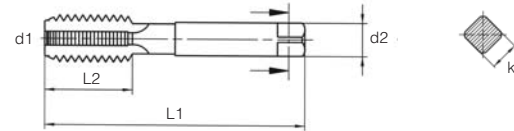
## MACHINE TAPS FOR METRIC FINE THREAD - SHORT SERIES



Product Code	d1 mm	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00104120302	M3	0.35	40	8	3.5	2.7
B00104120403	M 4	0.5	45	10	4.5	3.4
B00104120503	M 5	0.5	50	12	6	4,9
B00104120604	M6	0.75	56	14	6	4,9
B00104120804	M 8	0.75	56	18	6	4,9
B00104120805	M 8	1	63	22	6	4,9
B00104121005	M 10	1	63	20	7	5,5
B00104121000	M 10	1.25	70	24	7	5,5
B00104121205	M 12	1	70	22	9	7,0
B00104121200	M 12	1.25	70	22	9	7,0
B00104121206	M 12	1.5	70	22	9	7,0
B00104121405	M 14	1	70	22	11	9,0
B00104121400	M 14	1.25	70	22	11	9,0
B00104121406	M 14	1.5	70	22	11	9,0
B00104121605	M 16	1	70	22	12	9,0
B00104121606	M 16	1.5	70	22	12	9,0
B00104121800	M 18	1.25	80	22	14	11,0
B00104121806	M 18	1.5	80	22	14	11,0
B00104122005	M 20	1	80	22	16	12,0
B00104122006	M 20	1.5	80	22	16	12,0
B00104122008	M 20	2	80	22	16	12,0
B00104122205	M 22	1	80	22	18	14,5
B00104122206	M 22	1.5	80	22	18	14,5
B00104122405	M 24	1	90	22	18	14,5
B00104122406	M 24	1.5	90	22	18	14,5
B00104123005	M 30	1	90	22	22	18,0
B00104123006	M 30	1.5	90	22	22	18,0
B00104123008	M 30	2	90	22	22	18,0



## MACHINE TAPS FOR UNF THREAD - SHORT SERIES



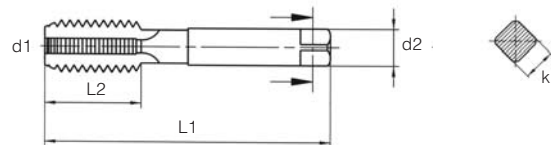
Product Code	d1 UNF	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00104140350	Nr. 6	40	45	12	4,0	3,0
B00104140417	Nr. 8	36	50	12	6,0	4,9
B00104140483	Nr. 10	32	50	12	6,0	4,9
B00104140635	1/4"	28	50	16	6,0	4,9
B00104140794	5/16"	24	56	22	6,0	4,9
B00104140952	3/8"	24	63	20	7,0	5,5
B00104141111	7/16"	20	63	20	8,0	6,2
B00104141270	1/2"	20	70	22	9,0	7,0
B00104141429	9/16"	18	70	22	11,0	9,0
B00104141587	5/8"	18	70	22	12,0	9,0
B00104141905	3/4"	16	80	22	14,0	11,0
B00104142222	7/8"	14	80	22	18,0	14,5
B00104142540	1"	12	90	22	18,0	14,5



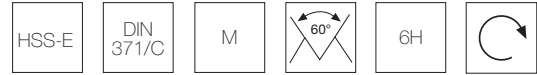
TAPS



## MACHINE TAPS FOR WHITWORTH PIPE THREAD - SHORT SERIES



Product Code	d1 BSP	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00109450973	G 1/8"	28	63	18	7	5,5
B00109451316	G 1/4"	19	70	21	11	9,0
B00109451666	G 3/8"	19	70	21	12	9,0
B00109452095	G 1/2"	14	80	22	16	12,0
B00109452644	G 3/4"	14	90	22	20	16,0
B00109453325	G 1"	11	100	25	25	20,0



## MACHINE TAPS WITH STRAIGHT FLUTES FOR METRIC THREAD



Product Code	d1 mm	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00105720200	M2	0,4	45	8	2,8	2,1
B00105720250	M 2,5	0,45	50	9	2,8	2,1
B00105720300	M3	0,5	56	10	3,5	2,7
B00105720350	M3,5	0,6	56	12	4,0	3,0
B00105720400	M4	0,7	63	12	4,5	3,4
B00105720450	M4,5	0,75	70	14	6,0	4,9
B00105720500	M5	0,8	70	14	6,0	4,9
B00105720600	M6	1	80	16	6,0	4,9
B00105720700	M7	1	80	16	7,0	5,5
B00105720800	M8	1,25	90	18	8,0	6,2
B00105720900	M9	1,25	90	18	9,0	7,0
B00105721000	M10	1,5	100	20	10,0	8,0
B00105721200	M12	1,75	110	24	12,0	9,0



## MACHINE TAPS STRAIGHT FLUTE WITH SPIRAL POINT FOR METRIC THREAD

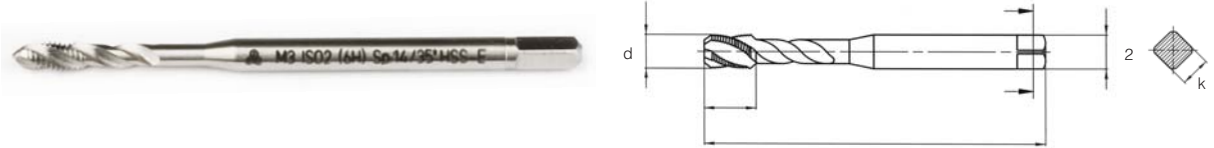


Product Code	d1 mm	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00105710250	M2,5	0,45	50	9	2,8	2,1
B00105710300	M3	0,5	56	10	3,5	2,7
B00105710400	M4	0,7	63	12	4,5	3,4
B00105710500	M5	0,8	70	14	6,0	4,9
B00105710600	M6	1	80	16	6,0	4,9
B00105710800	M8	1,25	90	18	8,0	6,2
B00105711000	M10	1,5	100	20	10,0	8,0
B00105711200	M12	1,75	110	24	12,0	9,0





## MACHINE TAPS WITH SPIRAL FLUTES FOR METRIC THREAD



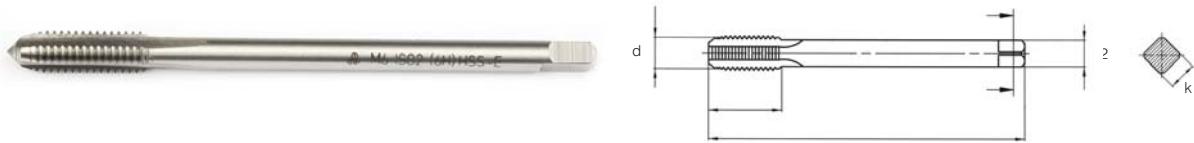
Product Code	d1 mm	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00105790607	M2	0,4	40	8	2,8	2,1
B00105790608	M2,5	0,45	50	9	2,8	2,1
B00105790133	M3	0,5	56	6	3,5	2,7
B00105790134	M4	0,7	63	7	4,5	3,4
B00105790135	M5	0,8	70	8	6,0	4,9
B00105790136	M6	1	80	10	6,0	4,9
B00105790142	M7	1	80	10	7,0	5,5
B00105790137	M8	1,25	90	12	8,0	6,2
B00105790138	M10	1,5	100	14	10,0	8,0
B00105790139	M12	1,75	110	16	12,0	9,0



TAPS



## MACHINE TAPS WITH STRAIGHT FLUTES FOR METRIC THREAD



Product Code	d1 mm	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00105780300	M3	0,5	56	10	2,2	-
B00105780350	M3,5	0,6	56	11	2,5	2,1
B00105780400	M4	0,7	63	12	2,8	2,1
B00105780450	M4,5	0,75	70	14	3,5	2,7
B00105780500	M5	0,8	70	14	3,5	2,7
B00105780600	M6	1	80	16	4,5	3,4
B00105780700	M7	1	80	16	5,5	4,3
B00105780800	M8	1,25	90	18	6,0	4,9
B00105780900	M9	1,25	90	18	7,0	5,5
B00105781000	M10	1,5	100	20	7,0	5,5
B00105781100	M11	1,5	100	20	8,0	6,2
B00105781200	M12	1,75	110	24	9,0	7,0
B00105781400	M14	2	110	26	11,0	9,0
B00105781600	M16	2	110	28	12,0	9,0
B00105781800	M18	2,5	125	30	14,0	11,0
B00105782000	M20	2,5	140	32	16,0	12,0
B00105782200	M22	2,5	140	32	18,0	14,5
B00105782400	M24	3	160	34	18,0	14,5
B00105782700	M27	3	160	38	20,0	16,0
B00105782800	M28	3	160	38	20,0	16,0
B00105783000	M30	3,5	180	45	22,0	18,0
B00105783300	M33	3,5	180	50	25,0	20,0
B00105783600	M36	4	200	56	28,0	22,0
B00105783900	M39	4	200	60	32,0	24,0
B00105784200	M42	4,5	200	60	32,0	24,0



## MACHINE TAPS STRAIGHT FLUTE WITH SPIRAL POINT FOR METRIC THREAD



TAPS

Product Code	d1 mm	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00105770300	M3	0,5	56	10	2,2	-
B00105770400	M4	0,7	63	12	2,8	2,1
B00105770500	M5	0,8	70	14	3,5	2,7
B00105770600	M6	1	80	16	4,5	3,4
B00105770800	M8	1,25	90	18	6,0	4,9
B00105771000	M10	1,5	100	20	7,0	5,5
B00105771200	M12	1,75	110	24	9,0	7,0
B00105771400	M14	2	110	26	11,0	9,0
B00105771600	M16	2	110	28	12,0	9,0
B00105771800	M18	2,5	125	30	14,0	11,0
B00105772000	M20	2,5	140	32	16,0	12,0
B00105772200	M22	2,5	140	32	18,0	14,5
B00105772400	M24	3	160	34	18,0	14,5
B00105772700	M27	3	160	38	20,0	16,0
B00105773000	M30	3,5	180	45	22,0	18,0



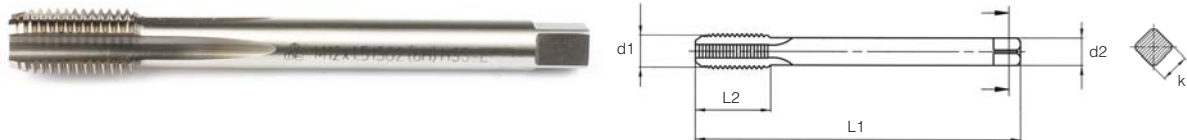
## MACHINE TAPS WITH SPIRAL FLUTES FOR METRIC THREAD



Product Code	d1 mm	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00105790249	M3	0,5	56	6	2,2	-
B00105790251	M4	0,7	63	7	2,8	2,1
B00105790252	M5	0,8	70	8	3,5	2,7
B00105790253	M6	1	80	10	4,5	3,4
B00105790255	M8	1,25	90	12	6,0	4,9
B00105790257	M10	1,5	100	14	7,0	5,5
B00105790259	M12	1,75	110	16	9,0	7,0
B00105790260	M14	2	110	18	11,0	9,0
B00105790261	M16	2	110	20	12,0	9,0
B00105790262	M18	2,5	125	22	14,0	11,0
B00105790263	M20	2,5	140	22	16,0	12,0
B00105790264	M22	2,5	140	24	18,0	14,5
B00105790265	M24	3	160	28	18,0	14,5
B00105790407	M27	3	160	30	20,0	16,0
B00105790267	M30	3,5	180	35	22,0	18,0
B00105790402	M33	3,5	180	35	25,0	20,0
B00105790268	M36	4	200	44	28,0	22,0



## MACHINE TAPS WITH STRAIGHT FLUTES FOR METRIC FINE THREAD



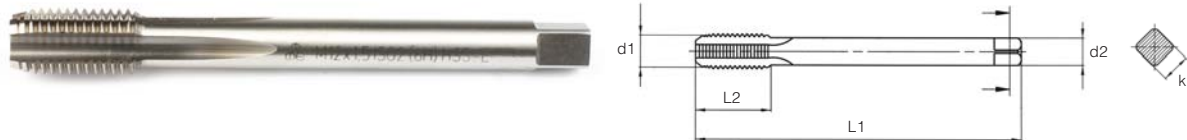
TAPS

Product Code	d1 mm	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00105750403	M4	0,5	63	10	2,8	2,1
B00105750503	M5	0,5	70	12	3,5	2,7
B00105750603	M6	0,5	80	14	4,5	3,4
B00105750604	M6	0,75	80	14	4,5	3,4
B00105750704	M7	0,75	80	14	5,5	4,3
B00105750804	M8	0,75	90	22	6,0	4,9
B00105750805	M8	1	90	22	6,0	4,9
B00105750905	M9	1	90	22	7,0	5,5
B00105751000	M10	1,25	90	20	7,0	5,5
B00105751004	M10	0,75	90	20	7,0	5,5
B00105751005	M10	1	90	20	7,0	5,5
B00105751200	M12	1,25	100	22	9,0	7,0
B00105751204	M12	0,75	100	22	9,0	7,0
B00105751205	M12	1	100	22	9,0	7,0
B00105751206	M12	1,5	100	22	9,0	7,0
B00105751400	M14	1,25	100	22	11,0	9,0
B00105751405	M14	1	100	22	11,0	9,0
B00105751406	M14	1,5	100	22	11,0	9,0
B00105751605	M16	1	100	22	12,0	9,0
B00105751606	M16	1,5	100	22	12,0	9,0
B00105751805	M18	1	110	25	14,0	11,0
B00105751806	M18	1,5	110	25	14,0	11,0
B00105751808	M18	2	125	34	14,0	11,0
B00105752005	M20	1	125	25	16,0	12,0
B00105752006	M20	1,5	125	25	16,0	12,0
B00105752008	M20	2	140	34	16,0	12,0
B00105752205	M22	1	125	25	18,0	14,5
B00105752206	M22	1,5	125	25	18,0	14,5
B00105752208	M22	2	140	34	18,0	14,5
B00105752405	M24	1	140	28	18,0	14,5
B00105752406	M24	1,5	140	28	18,0	14,5
B00105752408	M24	2	140	28	18,0	14,5
B00105752605	M26	1	140	28	18,0	14,5

Continued page



## MACHINE TAPS WITH STRAIGHT FLUTES FOR METRIC FINE THREAD



Product Code	d1 mm	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00105752606	M26	1,5	140	28	18,0	14,5
B00105752608	M26	2	140	28	18,0	14,5
B00105752706	M27	1,5	140	28	20,0	16,0
B00105752708	M27	2	140	28	20,0	16,0
B00105752806	M28	1,5	140	28	20,0	16,0
B00105752808	M28	2	140	28	20,0	16,0
B00105753006	M30	1,5	150	28	22,0	18,0
B00105753008	M30	2	150	28	22,0	18,0
B00105753206	M32	1,5	150	28	22,0	18,0
B00105753208	M32	2	150	28	22,0	18,0
B00105753306	M33	1,5	160	30	25,0	20,0
B00105753308	M33	2	160	30	25,0	20,0
B00105753606	M36	1,5	170	30	28,0	22,0
B00105753608	M36	2	170	30	28,0	22,0
B00105753609	M36	3	200	36	28,0	22,0
B00105753806	M38	1,5	170	30	28,0	22,0
B00105754006	M40	1,5	170	30	32,0	24,0
B00105754008	M40	2	170	30	32,0	24,0
B00105754206	M42	1,5	170	30	32,0	24,0
B00105754208	M42	2	170	30	32,0	24,0
B00105754506	M45	1,5	180	32	36,0	29,0
B00105754508	M45	2	180	32	36,0	29,0

HSS-E

DIN  
374/B

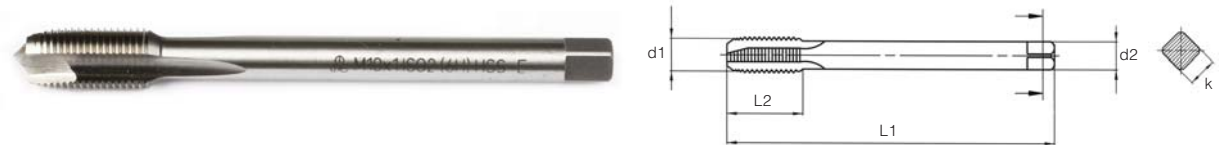
MF

60°

6H



## MACHINE TAPS STRAIGHT FLUTE WITH SPIRAL POINT FOR METRIC FINE THREAD

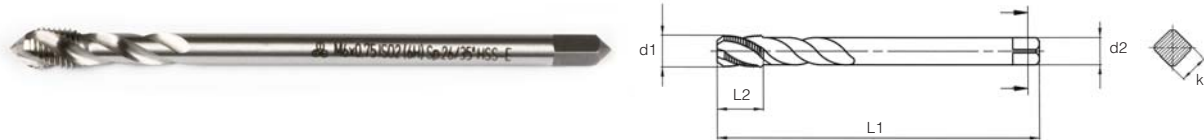


TAPS

Product Code	d1 mm	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00105740603	M6	0,5	80	14	4,5	3,4
B00105740604	M6	0,75	80	14	4,5	3,4
B00105740804	M8	0,75	90	22	6,0	4,9
B00105740805	M8	1	90	22	6,0	4,9
B00105741005	M10	1	90	20	7,0	5,5
B00105741000	M10	1,25	100	20	7,0	5,5
B00105741205	M12	1	100	22	9,0	7,0
B00105741200	M12	1,25	100	22	9,0	7,0
B00105741206	M12	1,5	100	22	9,0	7,0
B00105741405	M14	1	100	22	11,0	9,0
B00105741400	M14	1,25	100	22	11,0	9,0
B00105741406	M14	1,5	100	22	11,0	9,0
B00105741605	M16	1	100	22	12,0	9,0
B00105741606	M16	1,5	100	22	12,0	9,0
B00105741805	M18	1	110	25	14,0	11,0
B00105741806	M18	1,5	110	25	14,0	11,0
B00105742005	M20	1	125	25	16,0	12,0
B00105742006	M20	1,5	125	25	16,0	12,0
B00105742206	M22	1,5	125	25	18,0	14,5
B00105742406	M24	1,5	140	28	18,0	14,5
B00105742706	M27	1,5	140	28	20,0	16,0
B00105742806	M28	1,5	140	28	20,0	16,0
B00105743206	M32	1,5	150	28	22,0	18,0



## MACHINE TAPS WITH SPIRAL FLUTES FOR METRIC FINE THREAD

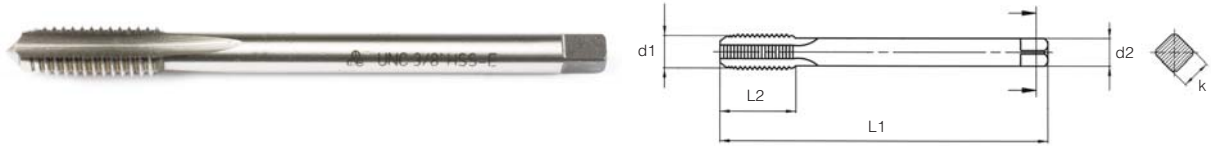


Product Code	d1 mm	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00105790565	M6	0.75	80	8	4,5	3,4
B00105790682	M8	0.75	80	10	6,0	4,9
B00105790490	M8	1	90	10	6,0	4,9
B00105790764	M9	1	90	10	7,0	5,5
B00105790336	M10	1	90	12	7,0	5,5
B00105790390	M10	1.25	100	12	7,0	5,5
B00105790391	M12	1	100	14	9,0	7,0
B00105790392	M12	1.25	100	14	9,0	7,0
B00105790006	M12	1.5	100	14	9,0	7,0
B00105790393	M14	1	100	16	11,0	9,0
B00105790394	M14	1.25	100	16	11,0	9,0
B00105790292	M14	1.5	100	16	11,0	9,0
B00105790680	M16	1	100	18	12,0	9,0
B00105790712	M16	1.25	100	18	12,0	9,0
B00105790338	M16	1.5	100	18	12,0	9,0
B00105790676	M18	1	110	20	14,0	11,0
B00105790287	M18	1.5	110	20	14,0	11,0
B00105790612	M18	2	125	20	14,0	11,0
B00105790591	M20	1	125	22	16,0	12,0
B00105790340	M20	1.5	125	22	16,0	12,0
B00105790637	M20	2	140	22	16,0	12,0
B00105790679	M22	1	125	25	18,0	14,5
B00105790186	M22	1.5	125	25	18,0	14,5
B00105790658	M22	2	140	25	18,0	14,5
B00105790551	M24	1.5	140	25	18,0	14,5
B00105790441	M24	2	140	25	18,0	14,5
B00105790721	M26	1.5	140	25	18,0	14,5
B00105790683	M27	1.5	140	25	20,0	16,0
B00105790692	M27	2	140	25	20,0	16,0
B00105790552	M28	1.5	140	25	20,0	16,0
B00105790791	M28	2	140	25	20,0	16,0
B00105790553	M30	1.5	150	25	22,0	18,0
B00105790759	M30	2	150	25	22,0	18,0
B00105790684	M36	1.5	170	30	28,0	22,0





## MACHINE TAPS WITH STRAIGHT FLUTES FOR UNC THREAD



Product Code	d1 UNC	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00105950635	1/4"	20	80	19	4,5	3,4
B00105950794	5/16"	18	90	22	6,0	4,9
B00105950952	3/8"	16	100	24	7,0	5,5
B00105951111	7/16"	14	100	24	8,0	6,2
B00105951270	1/2"	13	110	29	9,0	7,0
B00105951429	9/16"	12	110	30	11,0	9,0
B00105951587	5/8"	11	110	32	12,0	9,0
B00105951905	3/4"	10	125	34	14,0	11,0
B00105952222	7/8"	9	140	34	18,0	14,5
B00105952540	1"	8	160	38	20	16



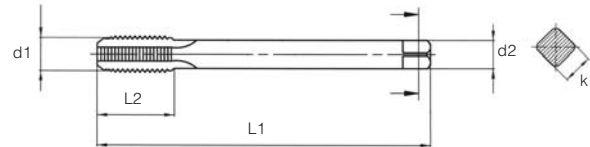
## MACHINE TAPS WITH SPIRAL FLUTES FOR UNC THREAD



Product Code	d1 UNC	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00105990037	1/4"	20	80	12	4,5	3,4
B00105990009	5/16"	18	90	14	6,0	4,9
B00105990008	3/8"	16	100	16	7,0	5,5
B00105990003	7/16"	14	100	16	8,0	6,2
B00105990006	1/2"	13	110	20	9,0	7,0
B00105990021	9/16"	12	110	22	11,0	9,0
B00105990022	5/8"	11	110	22	12,0	9,0
B00105990031	3/4"	10	125	28	14,0	11,0
B00105990065	7/8"	9	140	28	18,0	14,5
B00105990066	1"	8	160	32	20,0	16



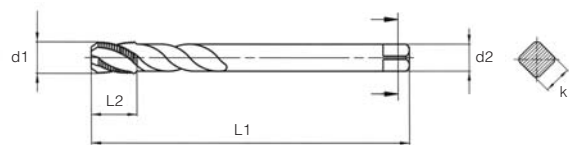
## MACHINE TAPS WITH STRAIGHT FLUTES FOR UNF THREAD



Product Code	d1 UNC	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00105980635	1/4"	28	80	19	4,5	3,4
B00105980794	5/16"	24	90	22	6,0	4,9
B00105980952	3/8"	24	100	24	7,0	5,5
B00105981111	7/16"	20	100	24	8,0	6,2
B00105981270	1/2"	20	110	29	9,0	7,0
B00105981429	9/16"	18	110	30	11,0	9,0
B00105981587	5/8"	18	110	32	12,0	9,0
B00105981905	3/4"	16	125	34	14,0	11,0
B00105982222	7/8"	14	140	34	18,0	14,5
B00105982540	1"	12	160	38	20	16



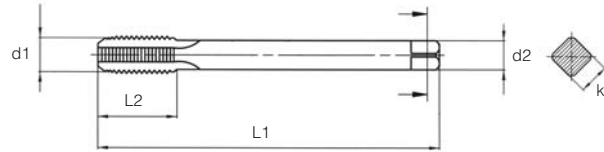
## MACHINE TAPS WITH SPIRAL FLUTES FOR UNF THREAD



Product Code	d1 UNF	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00105990014	1/4"	28	80	12	4,5	3,4
B00105990038	5/16"	24	90	14	6,0	4,9
B00105990015	3/8"	24	100	16	7,0	5,5
B00105990023	7/16"	20	100	16	8,0	6,2
B00105990024	1/2"	20	110	20	9,0	7,0
B00105990025	9/16"	18	110	22	11,0	9,0
B00105990026	5/8"	18	110	22	12,0	9,0
B00105990032	3/4"	16	125	28	14,0	11,0
B00105990051	7/8"	14	140	28	18,0	14,5
B00105990078	1"	12	160	32	20	16



## MACHINE TAPS WITH STRAIGHT FLUTES FOR WHITWORTH THREAD



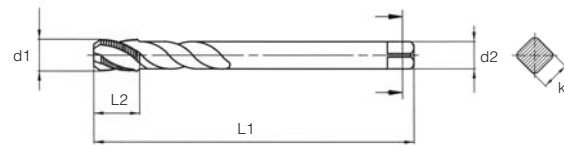
Product Code	d1 BSW	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00105920317	W 1/8"	40	56	11	2.2	-
B00105920397	W 5/32"	32	63	13	2.8	2.1
B00105920476	W 3/16"	24	70	16	3.5	2.7
B00105920556	W 7/32"	24	70	16	3.5	2.7
B00105920635	W 1/4"	20	80	19	4.5	3.4
B00105920794	W 5/16"	18	90	22	6	4.9
B00105920952	W 3/8"	16	100	24	7	5.5
B00105921111	W 7/16"	14	100	24	8	6.2
B00105921270	W 1/2"	12	110	29	9	7
B00105921429	W 9/16"	12	110	30	11	9
B00105921587	W 5/8"	11	110	32	12	9
B00105921905	W 3/4"	10	125	34	14	11
B00105922222	W 7/8"	9	140	34	18	14.5
B00105922540	W 1"	8	160	38	20	16



TAPS



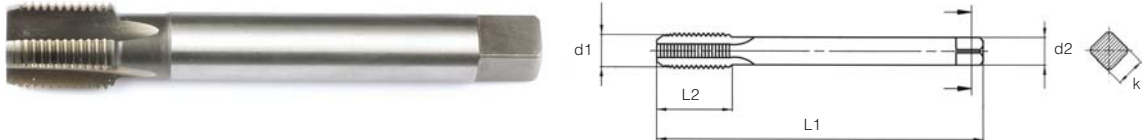
## MACHINE TAPS WITH SPIRAL FLUTES FOR WHITWORTH THREAD



Product Code	d1 BSW	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00105990074	W 1/8"	40	56	6	2.2	-
B00105990075	W 5/32"	32	63	7	2.8	2.1
B00105990076	W 3/16"	24	70	10	3.5	2.7
B00105990077	W 7/32"	24	70	10	3.5	2.7
B00105990047	W 1/4"	20	80	12	4.5	3.4
B00105990069	W 5/16"	18	90	14	6	4.9
B00105990049	W 3/8"	16	100	16	7	5.5
B00105990027	W 7/16"	14	100	16	8	6.2
B00105990028	W 1/2"	12	110	18	9	7



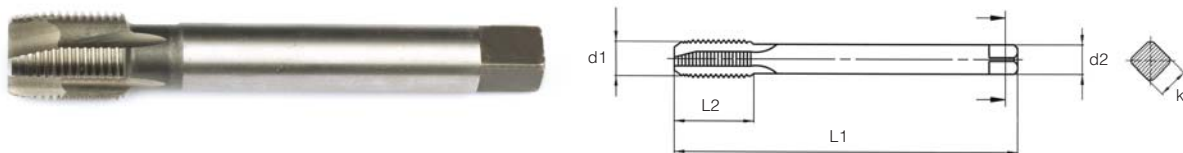
## MACHINE TAPS WITH STRAIGHT FLUTES FOR WHITWORTH PIPE THREAD



Product Code	d1 BSW	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00109580973	G 1/8"	28	90	20	7,0	5,5
B00109581316	G 1/4"	19	100	22	11,0	9,0
B00109581666	G 3/8"	19	100	22	12,0	9,0
B00109582095	G 1/2"	14	125	25	16,0	12,0
B00109582644	G 3/4"	14	140	28	20,0	16,0
B00109583325	G 1"	11	160	30	25,0	20,0



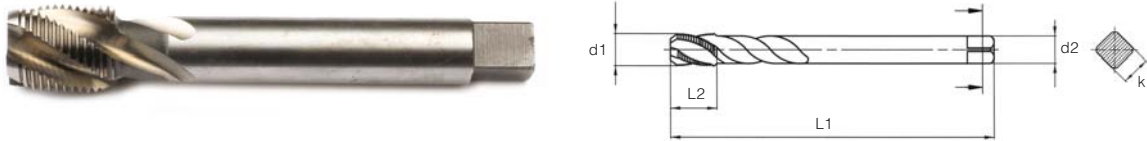
## MACHINE TAPS STRAIGHT FLUTE WITH SPIRAL POINT FOR WHITWORTH PIPE THREAD



Product Code	d1 BSW	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00109570973	G 1/8"	28	90	20	7,0	5,5
B00109571316	G 1/4"	19	100	22	11,0	9,0
B00109571666	G 3/8"	19	100	22	12,0	9,0
B00109572095	G 1/2"	14	125	25	16,0	12,0
B00109572644	G 3/4"	14	140	28	20,0	16,0



## MACHINE TAPS WITH SPIRAL FLUTES FOR WHITWORTH THREAD



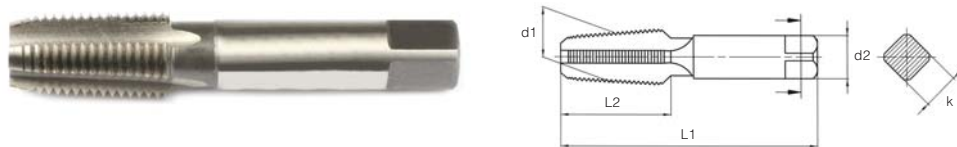
Product Code	d1 BSP	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00109420074	G 1/8"	28	90	12	7,0	5,5
B00109420053	G 1/4"	19	100	16	11,0	9,0
B00109420054	G 3/8"	19	100	18	12,0	9,0
B00109420061	G 1/2"	14	125	22	16,0	12,0
B00109420055	G 3/4"	14	140	23	20,0	16,0
B00109420058	G 1"	11	160	28	25,0	20,0



TAPS



## MACHINE TAPS FOR NPT - THREAD - TAPER 1/16



Product Code	d1 NPT	P G/Inch	L1 mm	L2 mm	d2 mm	k (h12) mm
B00104400794	1/16"	27	54	18	6	4,9
B00104401029	1/8"	27	54	19	7	5,5
B00104401372	1/4"	18	62	27	11	9,0
B00104401714	3/8"	18	65	27	12	9,0
B00104402134	1/2"	14	80	35	16	12,0
B00104402667	3/4"	14	83	35	20	16,0
B00104403340	1"	11 1/2	95	45	25	20,0
B00104404826	1" 1/2	11 1/2	108	45	36	29,0

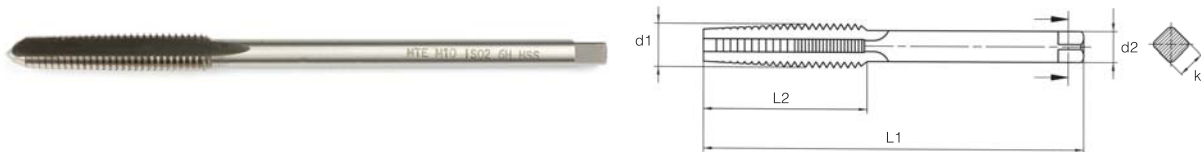
HSS

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DIN  
357

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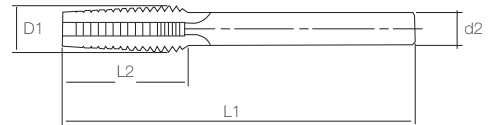
## METRIC NUT TAPS



Product Code	d1	P	L1 mm	L2 mm	d2 mm	k (h12) mm
B00106020300	M3	0.5	70	22	2.2	-
B00106020400	M4	0.7	90	25	2.8	2.1
B00106020500	M5	0.8	100	28	3.5	2.7
B00106020600	M6	1	110	32	4.5	3.4
B00106020800	M8	1.25	125	40	6	4.9
B00106021000	M10	1.5	140	45	7	5.5
B00106021200	M12	1.75	180	50	9	7
B00106021400	M14	2	200	56	11	9
B00106021600	M16	2	200	63	12	9
B00106021800	M18	2.5	220	63	14	11
B00106022000	M20	2.5	250	70	16	12
B00106022200	M22	2.5	280	80	18	14.5
B00106022400	M24	3	280	80	18	14.5
B00106022700	M27	3	315	90	20	16



## NUT TAPS - METRIC 5 FLUTES



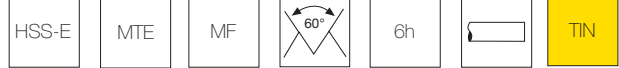
Product Code	d1	P	L1 mm	L2 mm	d2 mm	k (h12) mm
B100106600300	M 3	0.5	50	13	2.2	-
B100106600400	M 4	0.7	63	18	2.8	2.1
B100106600500	M 5	0.8	70	21	3.5	2.7
B100106600600	M 6	1	75	26	4.5	3.4
B100106600800	M 8	1.25	85	32	6	4.9
B100106601000	M 10	1.5	100	39	7	5.5
B100106601200	M 12	1.75	110	46	9	7
B100106601400	M 14	2	125	52	11	9
B100106601600	M 16	2	135	52	12	9
B100106601800	M 18	2.5	145	65	14	11
B100106602000	M 20	2.5	145	65	16	12
B100106602200	M 22	2.5	155	65	18	14.5
B100106602400	M 24	3	175	78	18	14.5



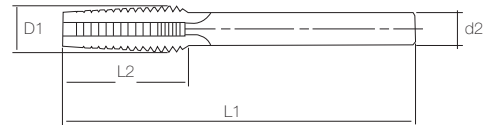
TAPS



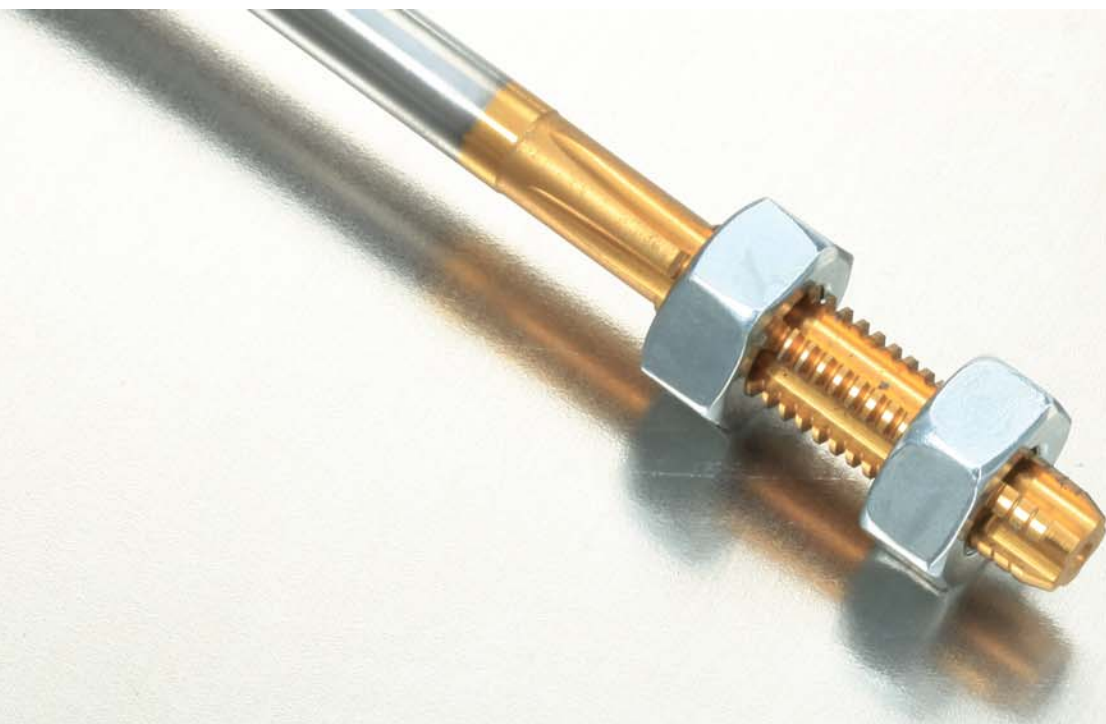
VIDEO



## NUT TAPS - MF 5 FLUTES



Product Code	d1	P	L1 mm	L2 mm	d2 mm	k (h12) mm
B10106610805	M 8	1	85	26	6	4.9
B10106611005	M 10	1	100	26	8	6.2
B10106611000	M 10	1.25	100	32.5	8	6.2
B10106611205	M 12	1	110	26	9	7
B10106611200	M 12	1.25	110	32.5	9	7
B10106611206	M 12	1.5	110	39	9	7
B10106611405	M 14	1	125	26	11	9
B10106611406	M 14	1.5	125	39	11	9
B10106611605	M 16	1	135	26	12	9
B10106611606	M 16	1.5	135	39	12	9
B10106611806	M 18	1.5	145	39	14	11
B10106611808	M 18	2	145	52	14	11
B10106612006	M 20	1.5	145	39	16	12
B10106612008	M 20	2	145	52	16	12
B10106612206	M 22	1.5	155	39	18	14.5
B10106612208	M 22	2	155	52	18	14.5
B10106612406	M 24	1.5	175	39	18	14.5
B10106612408	M 24	2	175	52	18	14.5







## NUT TAPS - UNC 5 FLUTES



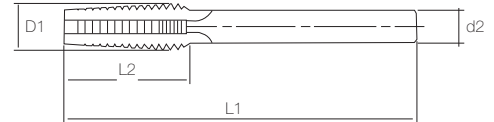
Product Code	d1	P	L1 mm	L2 mm	d2 mm	k (h12) mm
B10106640317	No: 5	40	60	16	2.2	-
B10106640350	No: 6	32	65	20	2.5	2.1
B10106640417	No: 8	32	65	20	2.8	2.1
B10106640438	No: 10	24	75	27	3.5	2.7
B10106640549	No: 12	24	75	27	3.5	2.7
B10106640635	1/4"	20	80	32	4.5	3.4
B10106640794	5/16"	18	85	36	6	4.9
B10106640952	3/8"	16	95	40	7	5.5
B10106641111	7/16"	14	110	46	9	7
B10106641270	1/2"	13	110	50	9	7
B10106641429	9/16"	12	125	54	11	9
B10106641587	5/8"	11	135	59	12	9
B10106641905	3/4"	10	145	65	14	11
B10106642222	7/8"	9	145	72	18	14.5
B10106642540	1"	8	175	80	20	16



TAPS



## NUT TAPS - UNF 5 FLUTES



Product Code	d1	P	L1 mm	L2 mm	d2 mm	k (h12) mm
B10106650317	No: 5	44	60	15	2.2	-
B10106650350	No: 6	40	65	16	2.5	2.1
B10106650417	No: 8	36	65	18	2.8	2.1
B10106650438	No: 10	32	75	20	3.5	2.7
B10106650549	No: 12	28	75	23	3.5	2.7
B10106650635	1/4"	28	75	23	4.5	3.4
B10106650794	5/16"	24	85	27	6	4.9
B10106650952	3/8"	24	95	27	7	5.5
B10106651111	7/16"	20	110	32	9	7
B10106651270	1/2"	20	110	32	9	7
B10106651429	9/16"	18	125	36	11	9
B10106651587	5/8"	18	135	36	12	9
B10106651905	3/4"	16	145	40	14	11
B10106652222	7/8"	14	145	46	18	14.5
B10106652540	1"	12	175	54	20	16

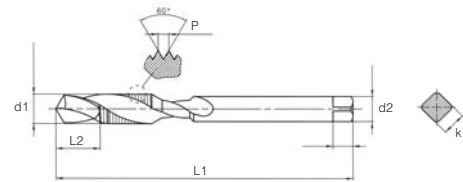
HSS-E

MTE

M



## DRILLING - TAPPING COMBINED TOOLS



TAPS

Product Code	d1 mm	P G/Inch	L1 mm	L2 mm	d2 mm
B00109370400	M 4	0,7	70	10	4,5
B00109370500	M 5	0,8	78	12	6,0
B00109370600	M 6	1	85	14	6,0
B00109370800	M 8	1,25	93	20	6,0
B00109371000	M 10	1,5	110	25	9,0

## Recommendations from Ali Usta

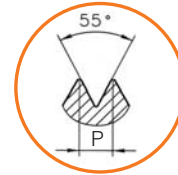
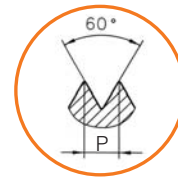
Most Used Thread Profiles:

- Metric thread and USA ( $\alpha=60^\circ$ )
- Whitworth thread ( $\alpha=55^\circ$ )

### Ali Usta;

#### How to choose the Tap?

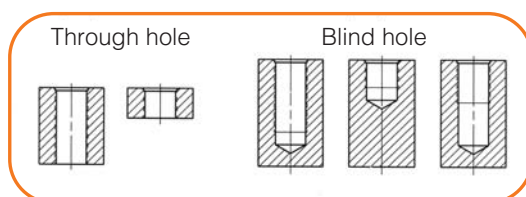
The Tap is chosen depending on the thread profile, type of material work piece and the condition of the hole.



### Ali Usta says;

Taps are most precise cutting tools with respect to measuring. Taps are divided into two groups depending on the using method;

- Hand Taps ( Sets of Two and Three ).
- Machine Taps (for machine using, providing stand-alone the required size).



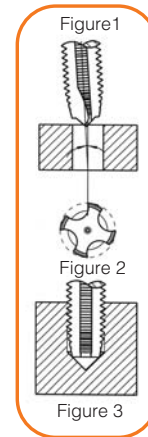
### Ali Usta does not use the same Tap for every kind of hole:

In through holes use form A (long lead ) or form B (Spiral point sharpening); as in blind holes use Taps form C with helical flutes. The wrong using may causes chip congestion and may break the Tap.

## Solutions of Ali Usta

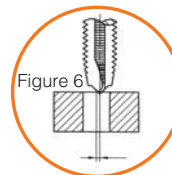
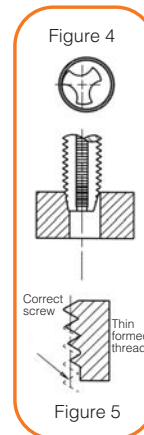
### Tap breakage

- 1.1. Tapping hole size too small
- 1.2 Tap axis and hole axis are not aligned with each other. (Figure 1)
- 1.3 Tap became blunt.
- 1.4 Tap is improperly sharpened.
- 1.5 Rake angle is not suitable for threading material.
- 1.6 Cutting speed is not suitable.
- 1.7 Chip congestion, used Tap type is not suitable. (Figure 2)
- 1.8 Tap face continues to advance even though it touches to the bottom of the hole (blind hole). (Figure 3)



### Thread surface don't accords to the requirements

- 2.1. Rake angle of the Tap is not suitable.
- 2.2. GTap is improperly sharpened or blunt
- 2.3. Diameter of the hole is drilled too small
- 2.4. Cutting fluid is wrong or inadequate.
- 2.5. Threads of the Tap are broken.
- 2.6. Tap or work piece is not fixed properly.
- 2.7. Threaded material is very hard or contains structural inaccuracies.



### Thread size is larger than gauge

- 3.1. Tap with runout.
- 3.2. Cutting speed is high.
- 3.3. Rake angle is selected improperly.
- 3.4. Wrong graduation on the lead of the Tap. (Figure 4)
- 3.5. Excessive pressure applied on the Tap. (Figure 5)
- 3.6. Tapping assembly is not suitable or has gaps.
- 3.7. Chip compaction in the flutes.
- 3.8. Cutting fluid is unsuitable or inadequate
- 3.9. The pitch diameter is too large.

### Chip adhesion on Tap surface

- 5.1. Enlarge diameter of hole.
- 5.2. Change rake angle.
- 5.3. Replace coolant or increase its pressure.
- 5.4. Use Tap with surface treatment

### Tap gets blunt quickly

- 4.1. Use Tap with surface treatment (Steam tempering, nitration or TiN coating).
- 4.2. Increase the chamfer length
- 4.3. Reduce cutting speed.
- 4.4. Tap axis and hole axis are not the same. (Figure 6)
- 4.5. Increase cutting fluid oil or change cutting oil.
- 4.6. Change rake angle.

### Thread cracking

- 6.1. Use Tap with long threads.
- 6.2. Use coated (PVD) Taps.
- 6.3. Use coolant largely.
- 6.4. Reduce cutting speed.
- 6.5. Use helical fluted Taps.
- 6.6. Avoid high cutting torque (easily cutting tap)



TAPS



HIGH  
PERFORMANCE  
TAPS

**MTEO**Range



HIGH PERFORMANCE TAPS



GALAXY VENUS  
URANUS  
NEPTUN JUPITER MARS  
SATURN MERCURY



HIGH  
PERFORMANCE  
TAPS

ORANGE MOVEMENT

**MTEORange**



HIGH PERFORMANCE TAPS

Tool Type		Standard	Quality	Coating	Page No
GALAXY	UNIVERSAL SPIRAL POINT	ISO2 6H	HSS-E	TiN	167
GALAXY	UNIVERSAL SPIRAL FLUTE	ISO2 6H	HSS-E	TiN	168
GALAXY	UNIVERSAL SPIRAL POINT	ISO2 6H	PM	TiN	169
GALAXY	UNIVERSAL SPIRAL FLUTE	ISO2 6H	PM	TiN	170
GALAXY	UNIVERSAL SPIRAL POINT WITHWORTH PIPE THREAD	ISO2 6H	HSS-E	TiN	171
GALAXY	UNIVERSAL SPIRAL FLUTE WITHWORTH PIPE THREAD	ISO2 6H	HSS-E	TiN	172
NEPTUN	STEEL SPIRAL POINT	ISO2 6H	HSS-E	TiN	173
NEPTUN	STEEL SPIRAL POINT	ISO2 6H	PM	TiN	174
NEPTUN	STEEL SPIRAL FLUTE	ISO2 6H	HSS-E	TiN	175
NEPTUN	STEEL SPIRAL FLUTE	ISO2 6H	PM	TiN	176
NEPTUN	STEEL STRAIGHT FLUTE	6HX	HSS-E	TiN	177
VENUS	INOX SPIRAL POINT	ISO2 6H	HSS-E	Star	178
VENUS	INOX SPIRAL POINT	ISO2 6H	PM	Star	179
VENUS	INOX SPIRAL FLUTE	ISO2 6H	HSS-E	Star	180
VENUS	INOX SPIRAL FLUTE	ISO2 6H	PM	Star	181
MARS	CAST IRON STRAIGHT FLUTE	6HX	HSS-E	Star	182
MARS	CAST IRON STRAIGHT FLUTE	6HX	PM	Star	183
MARS	CAST IRON SPIRAL FLUTE	6HX	HSS-E	Star	184
MARS	CAST IRON SPIRAL FLUTE	6HX	PM	Star	185
URANUS	NON-FERROUS STRAIGHT FLUTE - COPPER ALLOYS	6HX	HSS-E	OX	186
URANUS	NON-FERROUS SPIRAL POINT - ALUMINIUM ALLOYS	ISO2 6H	HSS-E	OX	187
URANUS	NON-FERROUS SPIRAL FLUTE - ALUMINIUM ALLOYS	ISO2 6H	HSS-E	OX	188
URANUS	NON-FERROUS SPIRAL FLUTE - COPPER ALLOYS	ISO2 6H	HSS-E	OX	189
URANUS	MACHINE TAPS STRAIGHT FLUTE - UNC	2B	HSS-E	OX	190
URANUS	MACHINE TAPS SPIRAL FLUTE - UNC	2B	HSS-E	OX	191
URANUS	MACHINE TAPS STRAIGHT FLUTE - UNF	2B	HSS-E	OX	192
URANUS	MACHINE TAPS SPIRAL FLUTE - UNF	2B	HSS-E	OX	193
SATURN	HEAT RESISTANT TI-NI LEFT HELIX	6HX	PM	Star	194
SATURN	HEAT RESISTANT TI-NI SPIRAL FLUTE	6HX	PM	Star	195
MERCURY	50/55 HRC STRAIGHT FLUTE	6HX	PM	Star	196
JUPITER	HIGH SPEED SPIRAL POINT	6HX	PM	Star	197
JUPITER	HIGH SPEED STRAIGHT FLUTE	6HX	PM	Star	198
JUPITER	HIGH SPEED SPIRAL FLUTE	6HX	PM	Star	199
	FORMING TAPS - OIL NUT	6HX	HSS-E	TiN	200
	FORMING TAPS - OIL NUT	6HX	PM	Star	201
	FORMING TAPS	6HX	HSS-E	TiN	202
	FORMING TAPS	6HX	PM	Star	203

# Materials For Cutting Tools

	Materials	DIN	Nr	Rm Mpa	HB	HRc		
<b>P</b>	<b>Steel</b>							
<b>1.1</b>	Construction soft steel	St37-3	1.0123	≤ 400	≤ 119	-		
<b>1.2</b>	Free-cutting steels Constructional steel Carburizing steel	9 S 20	1.0711	370-450	110-130	-		
		9 SMn 28	1.0715	390-580	115-170	-		
		St33-1	1.0035	280-530	85-155	-		
		St37-3	1.0116	370-450	110-130	-		
<b>1.3</b>	Carbon steel Low-alloy steel Cast steel	C10	1.0301	410-540	120-160	-		
		35S20	1.0726	510-880	150-260	-		
		St52-3	1.0570	450-680	130-200	-		
		95MnPb28	1.0718	380-810	110-240	-		
		C 45	1.0503	650-800	190-240	-		
		St-50-2	1.0050	450-640	130-190	-		
<b>1.4</b>	Alloy steel Cold - Work tool steel	GS40Mn5	1.1168	750-850	220-250	-		
		C55	1.0535	750-900	220-265	-		
		C60	1.0601	850-1000	250-300	25-31		
		41CrAlMo7	1.8509	800-1000	240-300	22-31		
		41Cr4	1.7035	880-1030	260-302	26-32		
<b>1.5</b>	Tempered steel Up to 38 HRc	100Cr6	1.2067	-	-	-		
		30CrNiMo8	1.6546	980-1180	290-350	30-37		
		34CrMo4	1.7220	980-1130	290-335	30-36		
		40NiCrMo2	1.6546	1000-1200	295-355	31-38		
		36CrNiMo4	1.6511	1030-1230	335-365	32-39		
<b>1.6</b>	High-alloyed steels hardened Up to 44 Hrc	42CrMo4	1.7225	880-1200	260-355	26-38		
		55NiCrMoV6	1.2713	800	240	23		
		S6-5-2	1.3343	880	260	26		
	50CrV4	1.8159	1280-1450	375-430	40-45			
<b>M</b>	<b>Stainless Steel</b>							
<b>2.1</b>	Ferritic Martensitic	X 46 Cr 13	1.4034	≤ 800	≤ 235	-		
		X 12 Cr 13	1.4006	650-850	190-250	-		
		X 6 Cr 17	1.4016	400-630	120-185	-		
		X 17 Cr Ni 16 2	1.4057	900-1050	265-310	27-33		
<b>2.2</b>	Austenitic	X 5 CrNi18 10	1.4301	500-700	150-205	-		
		X2CrNiMo17 13 2	1.4404	500-700	150-205	-		
		X2CrNi18 9	1.4306	460-680	135-200	-		
		X6CrNi18 10	1.4541	500-700	150-205	-		
		X6CrNiMoTi17 12 2	1.4571	500-700	150-205	-		
<b>2.3</b>	Austenitic- ferritic duplex	X2CrNiMoN22-5-3	1.4462	500-1200	150-350	-		
		X2CrNiMoCuN25-6-3	1.4507	700-900	270	-		
		X2CrNiMoN25-7-4	1.4410	730-930	290	-		
<b>K</b>	<b>Cast Iron</b>							
<b>3.1</b>	Grey cast iron	GG15	0.6015	110-150	-	-		
		GG20	0.6020	150-200	-	-		
		GG25	0.6025	200-250	-	-		
		GG30	0.6030	240-270	-	-		
<b>3.2</b>	Malleable cast iron	GTS-35-10	0.8135	400-800	120-140	-		
		GTS-45-06	0.8145	450	150-200	-		
		GTS-55-04	0.8155	550	165	-		
<b>3.3</b>	Spheroidal cast iron	GTW-35-04	0.8035	350	105	-		
		GGG40	0.7040	400	120	-		
		GGG50	0.7050	500	150	-		
		GGG60	0.7060	600	180	-		
	GGG70	0.7070	700	205	-			
<b>N</b>	<b>Non-Ferrous Materials</b>							
<b>4.1</b>	Unalloyed aluminium	Al99.99	3.0305	≥ 58	15	-		
		Al99.8A	-	≥ 75	19	-		
		Al99.5	-	≥ 58	15	-		
		Al99.0	-	≥ 90	23	-		
<b>4.2</b>	Aluminium alloys %1 < Si < %7	Al Cu Si Mn	3.1255	350	95	-		
		Al Mg 1	3.3315	100-185	29-48	-		
		Al Cu Mg 2	3.1355	360-440	105-125	-		
		Al Zn Mg Cu 0.5	3.4345	490-530	130-140	-		
		G Al Si 5 Mg	3.2341	140-300	≤ 90	-		
<b>4.3</b>	Aluminium alloys Si ≥ %7	G Al Si 7 Mg	3.2371	160-210	50-65	-		
		G Al Si 10 Mg	3.2381	160-280	50-80	-		
		GD Al Si 10 Mg	3.2382	220-280	60-80	-		
		G Al Si 12	3.2581	200-220	95	-		
<b>4.4</b>	Copper Alloys	Pure copper						
		Low-alloyed copper	Cu - OF	2.0040	-	-	-	
		Copper zinc alloys (Brass, long chipping)	Cu Zn 37	2.0321	-	-	-	
			Cu Zn 15	2.0240	-	-	-	
		Copper zinc alloys (Brass, short chipping)	Cu Zn 39 Pb 3	2.0401	250-270	70-75	-	
			Cu Zn 39 Pb 2	2.0402	250-270	70-75	-	
		<b>4.7</b>	Copper aluminium alloys (Long chipping)	Cu Al 5	2.0916	-	-	-
				Cu Al 8	2.0932	-	-	-
				Cu Al 9 Fe 3	2.0940	450-500	100-110	-
<b>4.8</b>	Copper tin alloys (Long chipping)	Cu Al 9 Mn 2	2.0966	500-550	100-110	-		
		Cu Sn 10	2.1050	270	80	-		
<b>4.9</b>	Copper tin alloys (Short chipping)	Cu Sn 8 P	2.1030	450	133	-		
		Cu Sn 7 Zn Pb	2.1090	≤ 600	-	-		
		Cu Pb 5 Sn 5	2.1170	≤ 600	-	-		
	Cu Pb 10 Sn	2.1176	≤ 600	-	-			
	<b>Magnesium Alloys</b>							
<b>4.10</b>	Magnesium wrought alloys	MgAl6Zn	3.5612	-	-	-		
		MgMn2	3.5200	-	-	-		
		MgAl8Zn	3.5812	-	-	-		
	<b>Plastic Materials</b>							
<b>4.11</b>	Duroplastics (Short chipping)	Bakalit	-	-	-	-		
		Novopan	-	-	-	-		
		Resopal	-	-	-	-		
		Moltopren	-	-	-	-		
<b>4.12</b>	Thermoplastics (Long chipping)	Polyamid	0.6025	-	-	-		
		Polystyrol	0.6030	-	-	-		
		Polyvinylchlorid	0.6035	-	-	-		
		Ultramid	0.6040	-	-	-		
<b>4.13</b>	Fibre -reinforced synthetics	GFK	-	-	-	-		
		CFK	-	-	-	-		
		AFK	-	-	-	-		
<b>S</b>	<b>Special materials - Titanium Materials</b>							
<b>5.1</b>	Pure titanium	Ti 4	3.7064	500	150	-		
		Ti Al 6 V 4	3.7165	890	260	-		
		Ti Al 3 V 2-5	-	-	-	-		
<b>5.2</b>	Titanium alloys	Ti 5 Al 2 - 5 Sn	3.7112	790	235	-		
	<b>Heat resistant super alloys</b>							
<b>5.3</b>	Pure nickel	Ni 99-2	2.4060	500	150	-		
		Ni Cu 30 Fe	2.4360	570	170	-		
		Ni Cr 15 Fe	2.4816	680	200	-		
<b>5.4</b>	Nickel alloys	Ni Cr 19 Ni6 Mo	2.4668	1350	400	42		
		Ni Mo 16 Cr 16 Ti	2.4610	900	265	-		
<b>H</b>	<b>High strength materials</b>							
<b>6.1</b>	High strength steels	Weldox1100	-	-	-	< 50		
		Hardox 500	-	-	-	< 55		
		Hardened steels	-	-	-	< 60		
<b>6.2</b>	Hard casting	Armox 600T	-	-	-	< 65		
<b>6.3</b>	Hard casting	HSSE	-	-	-	< 65		



HIGH PERFORMANCE TAPS










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URANUS	URANUS	URANUS	URANUS	URANUS	SATURN	SATURN	MERCURY	JUPITER	JUPITER	JUPITER	FORMING TAPS		FORMING TAPS		FORMING TAPS
R45 -		R45		R45	L15	R15				R15	OIL NUT		OIL NUT		
HSS-E C	HSS-E B	HSS-E C	HSS-E B	HSS-E C	PM C	PM C	PM C	PM B	PM C	PM C	HSS-E C		PM C		PM C
TIN	TIN	TIN	TIN	TIN	STAR	STAR	STAR	STAR	STAR	STAR	TIN	STAR		TIN	STAR
C/2-3	C/2-3	C/2-3	C/2-3	C/2-3	C/2-3	C/2-3	C/2-3	B/3.5-5.5	C/2-3	C/2-3	C/2-3	C/2-3		C/2-3	C/2-3
E/SO/P	E/SO/P	E/SO/P	E/SO/P	E/SO/P	E/SO/P	E/SO/P	E/SO/P	E/SO/P	E/SO/P	E/SO/P	E/SO	E/SO		E/SO	E/SO
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	

MTEOR
HELICAL ANGLE
MATERIAL FORM
COATING
HOLE TYPE
CLUTCH SIZE
COOLING

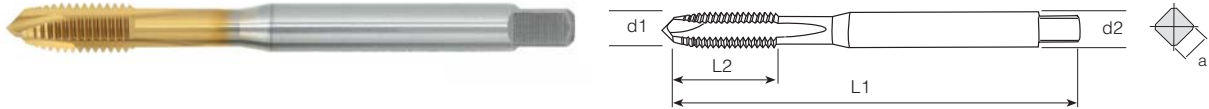
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20-40									30-60		30-60	10-30	10-30	10-30	10-30	1.2
10-35									30-60		30-60	10-30	10-30	10-30	10-30	1.3
10-20									20-40		20-40					1.4
5-15					5-20	5-20			10-30		10-30					1.5
					2-10	2-10										1.6
																M
5-15									10-25		10-25	10-25	10-25	10-25	10-25	2.1
5-15									10-25		10-25	10-25	10-25	10-25	10-25	2.2
5-15					2-10	2-10			5-20		5-20	10-25	10-25	10-25	10-25	2.3
																K
	10-25		10-25								30-60					3.1
10-30											30-60					3.2
10-30					10-25						20-40	20-40				3.3
																N
																4.1
15-35	10-25		10-25						20-60			20-40	20-40	20-40	20-40	4.2
15-25	10-25		10-25						20-60	20-40	20-40					4.3
10-30		10-20		10-20					20-40		20-40	20-40	20-40	20-40	20-40	4.4
20-50									30-60			20-40	20-40	20-40	20-40	4.5
																4.6
10-30					5-25	5-25										4.7
10-30					5-25	5-25										4.8
					2-10	2-10					20-40					4.9
																4.10
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					2-10	2-10										5.4
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								1-5								6.1
								1-3								6.2
																6.3
																6.4

HIGH PERFORMANCE TAPS

Material	<b>HSS-E</b> High Speed Steel	<b>PM</b> Powder Material			
Norm	<b>DIN 371</b>	<b>DIN 376</b>	<b>DIN 374</b>		
Helical Angle	<b>R15°</b> Right Hand Helix	<b>L15°</b> Left Hand Helix	<b>R40°</b> Right Hand Helix	<b>R45°</b> Right Hand Helix	
Helical Direction	 Right Hand Helix				
Thread Type	<b>M</b> Metric Fine	<b>MF</b> Metric Standart			
Tolerans	<b>ISO2 6H</b>	<b>6HX</b>			
Coating	<b>OX</b>	<b>TIN</b>	<b>TICN</b>	<b>TiAlN</b>	<b>Star</b>
Material	<b>MS</b> Brass Material	<b>AL</b> Aluminium Alloys	<b>Cu+</b> Copper Alloys	<b>Ti-Ni</b> Titanium Nickel Alloys	
Cooling	<b>E</b> Emulsion	<b>SO</b> Special Purpose Oil	<b>P</b> Tap Paste		
Clutch Size	<b>C</b>  2-3	<b>B</b>  3,5-5,5			
Hole Type	 Through Hole	 Half Open Hole	 Blind Hole	 Blind Hole	



**GALAXY** UNIVERSAL SPIRAL POINT



**DIN-371**

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10800000300	M 3	0.5	56	10	3.5	2.7	2.5
B10800000400	M 4	0.7	63	12	4.5	3.4	3.3
B10800000500	M 5	0.8	70	14	6	4.9	4.2
B10800000600	M 6	1	80	16	6	4.9	5
B10800000800	M 8	1.25	90	18	8	6.2	6.8
B10800001000	M10	1.5	100	20	10	8	8.5
B10800001200	M12	1.75	110	24	12	9	10.2

**DIN-376**

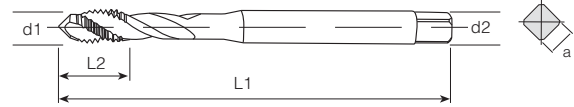
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10800021200	M12	1.75	110	24	9	7	10.2
B10800021400	M14	2	110	26	11	9	12
B10800021600	M16	2	110	28	12	9	14
B10800021800	M18	2.5	125	30	14	11	15.5
B10800022000	M20	2.5	140	32	16	12	17.5

- P1.1 - P1.2 - P1.3 - P1.4
- M2.1 - M2.2
- 
- N4.5 - N4.7 - N4.8
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HIGH PERFORMANCE TAPS



## GALAXY UNIVERSAL SPIRAL FLUTE



### DIN-371

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	<sup>a</sup> (h12) mm	Drill ø
B10800010300	M 3	0.5	56	6	3.5	2.7	2.5
B10800010400	M 4	0.7	63	7	4.5	3.4	3.3
B10800010500	M 5	0.8	70	8	6	4.9	4.2
B10800010600	M 6	1	80	10	6	4.9	5
B10800010800	M 8	1.25	90	12	8	6.2	6.8
B10800011000	M10	1.5	100	14	10	8	8.5
B10800011200	M12	1.75	110	16	12	9	10.2

### DIN-376

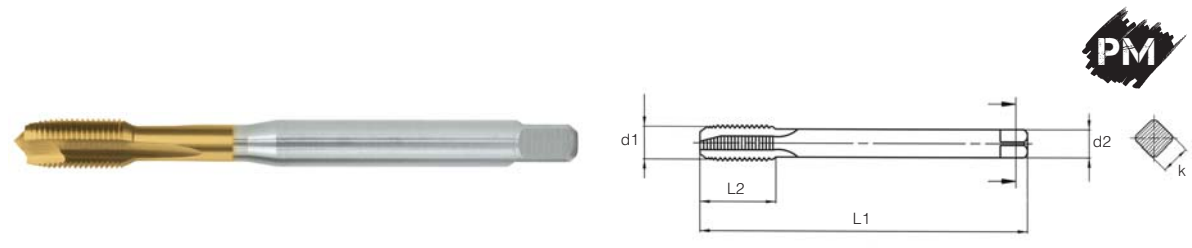
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	<sup>a</sup> (h12) mm	Drill ø
B10800031200	M12	1.75	110	16	9	7	10.2
B10800031400	M14	2	110	18	11	9	12
B10800031600	M16	2	110	20	12	9	14
B10800031800	M18	2.5	125	22	14	11	15.5
B10800032000	M20	2.5	140	22	16	12	17.5

- P1.1 - P1.2 - P1.3 - P1.4
- M2.1 - M2.2
- 
- N4.5 - N4.7 - N4.8
- 
-



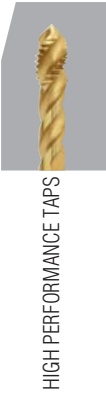


**GALAXY** UNIVERSAL SPIRAL POINT



**DIN-374**

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	<sup>a</sup> (h12) mm	Drill ø
B10820040604	M 6	0.75	80	14	4.5	3.4	5.2
B10820040804	M 8	0.75	90	22	6	4.9	7.2
B10820040805	M 8	1	90	22	6	4.9	7.0
B10820041005	M10	1	90	22	7	5.5	9.0
B10820041000	M10	1.25	90	22	7	5.5	8.8
B10820041205	M12	1	100	22	9	7	11.0
B10820041200	M12	1.25	100	22	9	7	10.8
B10820041206	M12	1.5	100	22	9	7	10.5
B10820041406	M14	1.5	100	22	11	9	12.5
B10820041606	M16	1.5	100	22	12	9	14.5
B10820041806	M18	1.5	110	25	14	11	16.5
B10820042006	M20	1.5	125	25	16	12	18.5

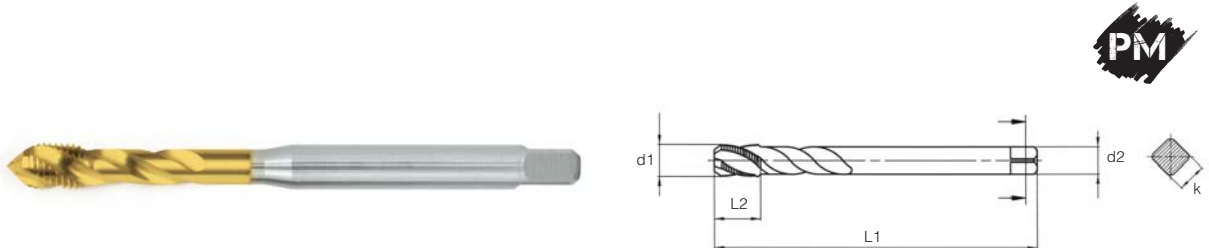


- P1.1 - P1.2 - P1.3 - P1.4
- 
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- N4.5 - N4.7 - N4.8
- 
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- TIN "10"
- TICN "11"
- STAR "13"
- OX "20"



**GALAXY** UNIVERSAL SPIRAL FLUTE



**DIN-374**

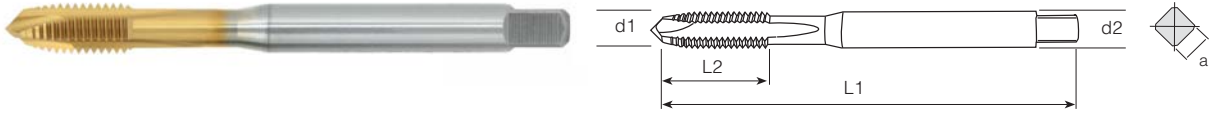
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10820050604	M 6	0.75	80	8	4.5	3.4	5.2
B10820050804	M 8	0.75	90	10	6	4.9	7.2
B10820050805	M 8	1	90	10	6	4.9	7.0
B10820051005	M10	1	90	12	7	5.5	9.0
B10820051000	M10	1.25	90	12	7	5.5	8.8
B10820051205	M12	1	100	14	9	7	11.0
B10820051200	M12	1.25	100	14	9	7	10.8
B10820051206	M12	1.5	100	14	9	7	10.5
B10820051406	M14	1.5	100	16	11	9	12.5
B10820051606	M16	1.5	100	18	12	9	14.5
B10820051806	M18	1.5	110	20	14	11	16.5
B10820052006	M20	1.5	125	22	16	12	18.5

- P1.1 - P1.2 - P1.3 - P1.4
- 
- 
- N4.5 - N4.7 - N4.8
- 
- 

- TIN "10"
- TICN "11"
- STAR "13"
- OX "20"

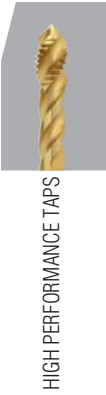


**GALAXY** UNIVERSAL SPIRAL POINT WITH WORTH PIPE THREAD



**DIN-371 / DIN-376**

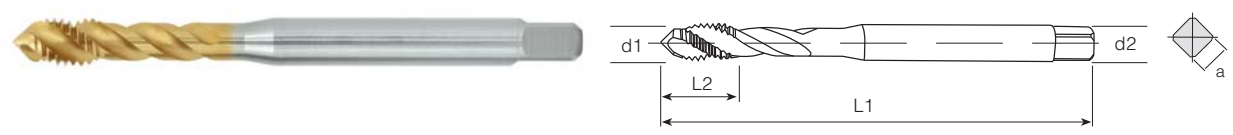
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	k (h12) mm
B10800100973	G 1/8"	28	90	20	7	5.5
B10800101316	G 1/4"	19	100	22	11	9
B10800101666	G 3/8"	19	100	22	12	9
B10800102095	G 1/2"	14	125	25	16	12
B10800102291	G 5/8"	14	125	25	18	14.5
B10800102644	G 3/4"	14	140	28	20	16
B10800103020	G 7/8"	14	150	28	22	18
B10800103325	G 1"	14	160	30	25	20



- P1.1 - P1.2 - P1.3 - P1.4
- M2.1 - M2.2
- 
- N4.5 - N4.7 - N4.8
- 
-



**GALAXY** UNIVERSAL SPIRAL FLUTE WITH WORTH PIPE THREAD



**DIN-371 / DIN-376**

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	k (h12) mm
B10800110973	G 1/8"	28	90	12	7	5.5
B10800111316	G 1/4"	19	100	16	11	9
B10800111666	G 3/8"	19	100	18	12	9
B10800112095	G 1/2"	14	125	22	16	12
B10800112291	G 5/8"	14	125	22	18	14.5
B10800112644	G 3/4"	14	140	23	20	16
B10800113020	G 7/8"	14	150	23	22	18
B10800113325	G 1"	14	160	28	25	20

- P1.1 - P1.2 - P1.3 - P1.4
- M2.1 - M2.2
- 
- N4.5 - N4.7 - N4.8
- 
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- TIN "10"
- TICN "11"
- STAR "13"
- OX "20"



## NEPTUN STEEL SPIRAL POINT



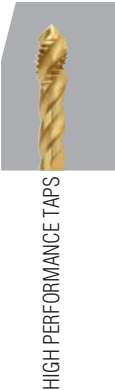
### DIN-371

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10801010300	M 3	0.5	56	10	3.5	2.7	2.5
B10801010400	M 4	0.7	63	12	4.5	3.4	3.3
B10801010500	M 5	0.8	70	14	6	4.9	4.2
B10801010600	M 6	1	80	16	6	4.9	5
B10801010800	M 8	1.25	90	18	8	6.2	6.8
B10801011000	M10	1.5	100	20	10	8	8.5
B10801011200	M12	1.75	110	24	12	9	10.2

### DIN-376

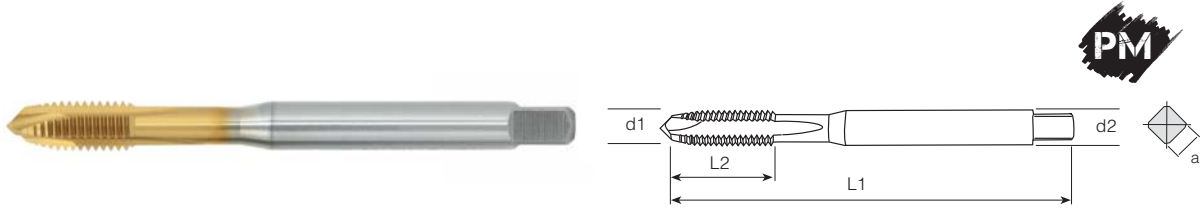
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10800021200	M12	1.75	110	24	9	7	10.2
B10800021400	M14	2	110	26	11	9	12
B10800021600	M16	2	110	28	12	9	14
B10800021800	M18	2.5	125	30	14	11	15.5
B10800022000	M20	2.5	140	32	16	12	17.5

- P1.1 - P1.2 - P1.3 - P1.4 - P1.5
- M2.1 - M2.3
- K3.2 - K3.3
- N4.2 - N4.3
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## NEPTUN STEEL SPIRAL POINT



### DIN-371

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10821010300	M 3	0.5	56	10	3.5	2.7	2.5
B10821010400	M 4	0.7	63	12	4.5	3.4	3.3
B10821010500	M 5	0.8	70	14	6	4.9	4.2
B10821010600	M 6	1	80	16	6	4.9	5
B10821010800	M 8	1.25	90	18	8	6.2	6.8
B10821011000	M10	1.5	100	20	10	8	8.5
B10821011200	M12	1.75	110	24	12	9	10.2

### DIN-376

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10821111200	M12	1.75	110	24	9	7	10.2
B10821111400	M14	2	110	26	11	9	12
B10821111600	M16	2	110	28	12	9	14
B10821111800	M18	2.5	125	30	14	11	15.5
B10821112000	M20	2.5	140	32	16	12	17.5

- P1.1 - P1.2 - P1.3 - P1.4 - P1.5
- M2.1 - M2.3
- K3.2 - K3.3
- N4.2 - N4.3
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## NEPTUN STEEL SPIRAL FLUTE



### DIN-371

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10801020300	M 3	0.5	56	6	3.5	2.7	2.5
B10801020400	M 4	0.7	63	7	4.5	3.4	3.3
B10801020500	M 5	0.8	70	8	6	4.9	4.2
B10801020600	M 6	1	80	10	6	4.9	5
B10801020800	M 8	1.25	90	12	8	6.2	6.8
B10801021000	M10	1.5	100	14	10	8	8.5
B10801021200	M12	1.75	110	16	12	9	10.2

### DIN-376

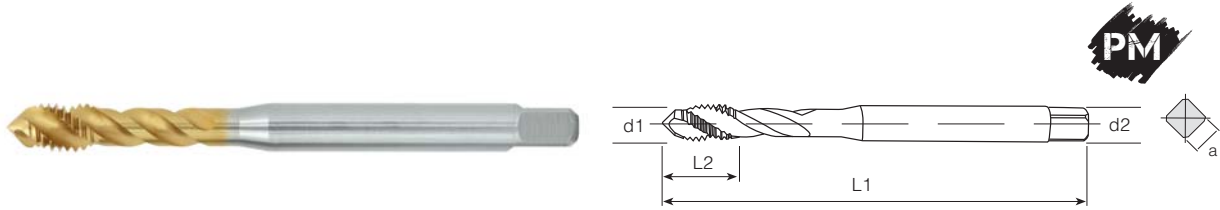
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10801121200	M12	1.75	110	18	9	7	10.2
B10801121400	M14	2	110	20	11	9	12
B10801121600	M16	2	110	20	12	9	14
B10801121800	M18	2.5	125	25	14	11	15.5
B10801122000	M20	2.5	140	25	16	12	17.5

- P1.4 - P1.5
- M2.1 - M2.3
- K3.2 - K3.3
- N4.2
- 
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## NEPTUN STEEL SPIRAL FLUTE



### DIN-371

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10821020300	M 3	0.5	56	6	3.5	2.7	2.5
B10821020400	M 4	0.7	63	7	4.5	3.4	3.3
B10821020500	M 5	0.8	70	8	6	4.9	4.2
B10821020600	M 6	1	80	10	6	4.9	5
B10821020800	M 8	1.25	90	12	8	6.2	6.8
B10821021000	M10	1.5	100	14	10	8	8.5
B10821021200	M12	1.75	110	16	12	9	10.2

### DIN-376

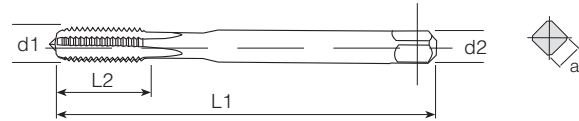
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10821121200	M12	1.75	110	18	9	7	10.2
B10821121400	M14	2	110	20	11	9	12
B10821121600	M16	2	110	20	12	9	14
B10821121800	M18	2.5	125	25	14	11	15.5
B10821122000	M20	2.5	140	25	16	12	17.5

- P1.1 - P1.5
- M2.1 - M2.3
- K3.2 - K3.3
- N4.2
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## NEPTUN STEEL STRAIGHT FLUTE



### DIN-371

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10821020300	M 3	0.5	56	6	3.5	2.7	2.5
B10821020400	M 4	0.7	63	7	4.5	3.4	3.3
B10821020500	M 5	0.8	70	8	6	4.9	4.2
B10821020600	M 6	1	80	10	6	4.9	5
B10821020800	M 8	1.25	90	12	8	6.2	6.8
B10821021000	M10	1.5	100	14	10	8	8.5
B10821021200	M12	1.75	110	16	12	9	10.2

### DIN-376

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10821121200	M12	1.75	110	24	9	7	10.2
B10821121400	M14	2	110	26	11	9	12
B10821121600	M16	2	110	28	12	9	14
B10821121800	M18	2.5	125	30	14	11	15.5
B10821122000	M20	2.5	140	32	16	12	17.5

P1.3 - P1.4 - P1.5

-

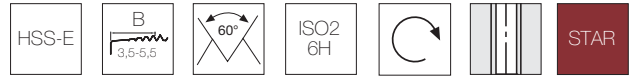
K3.1 - K3.3

N4.9

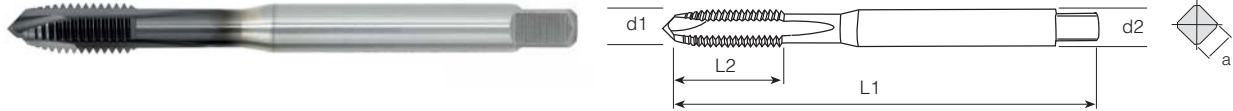
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TIN "10" TICN "11" STAR "13" OX "20"



**VENUS** INOX SPIRAL POINT



**DIN-371**

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13802000300	M 3	0.5	56	10	3.5	2.7	2.5
B13802000400	M 4	0.7	63	12	4.5	3.4	3.3
B13802000500	M 5	0.8	70	14	6	4.9	4.2
B13802000600	M 6	1	80	16	6	4.9	5
B13802000800	M 8	1.25	90	18	8	6.2	6.8
B13802001000	M10	1.5	100	20	10	8	8.5
B13802001200	M12	1.75	110	24	12	9	10.2

**DIN-376**

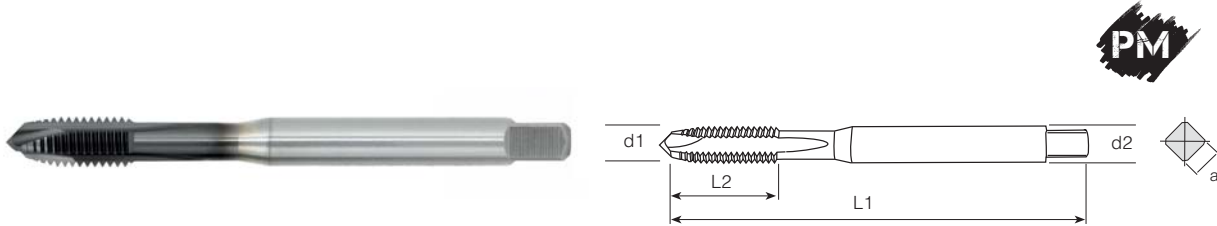
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13802101200	M12	1.75	110	24	9	7	10.2
B13802101400	M14	2	110	26	11	9	12
B13802101600	M16	2	110	28	12	9	14
B13802101800	M18	2.5	125	30	14	11	15.5
B13802102000	M20	2.5	140	32	16	12	17.5

- P1.1 - P1.2 - P1.3 - P1.4
- M2.1 - M2.2
- 
- N4.5 - N4.7 - N4.8
- 
- 

TIN "10"    TICN "11"    STAR "13"    OX "20"



## VENUS INOX SPIRAL POINT



### DIN-371

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13822000300	M 3	0.5	56	10	3.5	2.7	2.5
B13822000400	M 4	0.7	63	12	4.5	3.4	3.3
B13822000500	M 5	0.8	70	14	6	4.9	4.2
B13822000600	M 6	1	80	16	6	4.9	5
B13822000800	M 8	1.25	90	18	8	6.2	6.8
B13822001000	M10	1.5	100	20	10	8	8.5
B13822001200	M12	1.75	110	24	12	9	10.2

### DIN-376

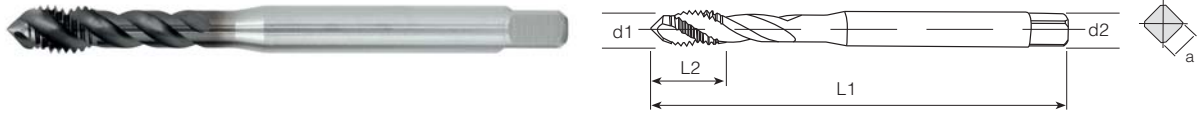
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13822101200	M12	1.75	110	24	9	7	10.2
B13822101400	M14	2	110	26	11	9	12
B13822101600	M16	2	110	28	12	9	14
B13822101800	M18	2.5	125	30	14	11	15.5
B13822102000	M20	2.5	140	32	16	12	17.5

- P1.1 - P1.2 - P1.3 - P1.4
- M2.1 - M2.2
- 
- N4.5 - N4.7 - N4.8
- 
- 

HIGH PERFORMANCE TAPS



**VENUS** INOX SPIRAL FLUTE



**DIN-371**

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13802010300	M 3	0.5	56	6	3.5	2.7	2.5
B13802010400	M 4	0.7	63	7	4.5	3.4	3.3
B13802010500	M 5	0.8	70	8	6	4.9	4.2
B13802010600	M 6	1	80	10	6	4.9	5
B13802010800	M 8	1.25	90	12	8	6.2	6.8
B13802011000	M10	1.5	100	14	10	8	8.5
B13802011200	M12	1.75	110	16	12	9	10.2

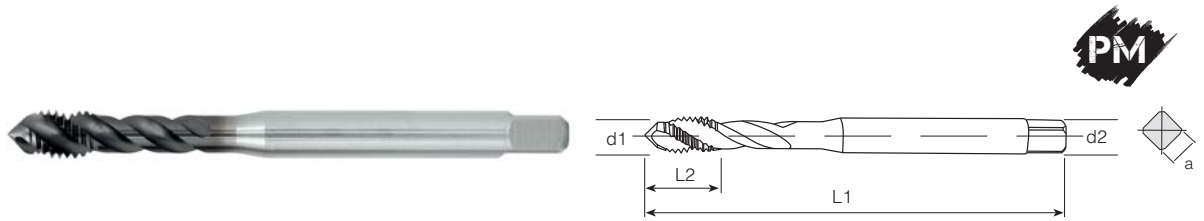
**DIN-376**

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13802111200	M12	1.75	110	16	9	7	10.2
B13802111400	M14	2	110	18	11	9	12
B13802111600	M16	2	110	20	12	9	14
B13802111800	M18	2.5	125	22	14	11	15.5
B13802112000	M20	2.5	140	22	16	12	17.5





**VENUS** INOX SPIRAL FLUTE



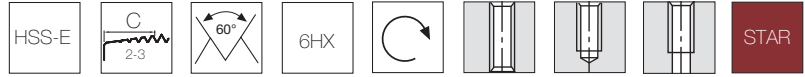
**DIN-371**

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13822010300	M 3	0.5	56	6	3.5	2.7	2.5
B13822010400	M 4	0.7	63	7	4.5	3.4	3.3
B13822010500	M 5	0.8	70	8	6	4.9	4.2
B13822010600	M 6	1	80	10	6	4.9	5
B13822010800	M 8	1.25	90	12	8	6.2	6.8
B13822011000	M10	1.5	100	14	10	8	8.5
B13822011200	M12	1.75	110	16	12	9	10.2

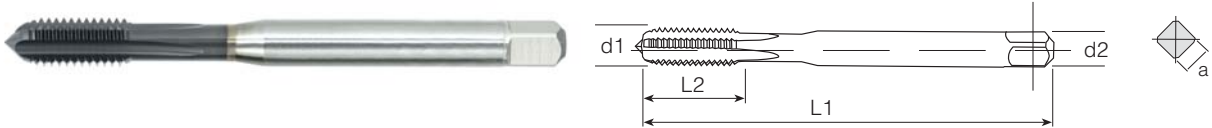
**DIN-376**

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13822111200	M12	1.75	110	16	9	7	10.2
B13822111400	M14	2	110	18	11	9	12
B13822111600	M16	2	110	20	12	9	14
B13822111800	M18	2.5	125	22	14	11	15.5
B13822112000	M20	2.5	140	22	16	12	17.5





**MARS** CAST IRON STRAIGHT FLUTE



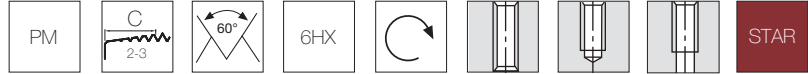
**DIN-371**

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13802500300	M 3	0.5	56	10	3.5	2.7	2.5
B13802500400	M 4	0.7	63	12	4.5	3.4	3.3
B13802500500	M 5	0.8	70	14	6	4.9	4.2
B13802500600	M 6	1	80	16	6	4.9	5
B13802500800	M 8	1.25	90	18	8	6.2	6.8
B13802501000	M10	1.5	100	20	10	8	8.5
B13802501200	M12	1.75	110	24	12	9	10.2

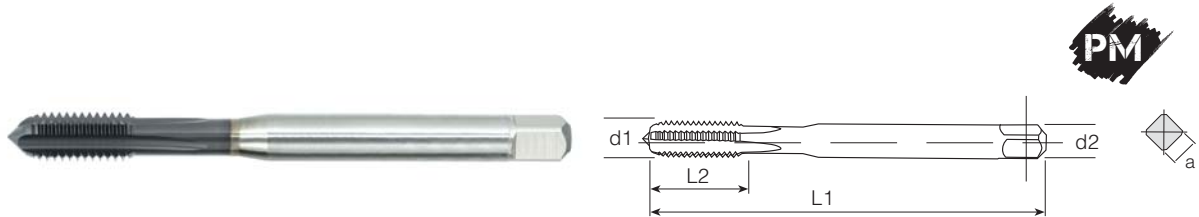
**DIN-376**

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13802601200	M12	1.75	110	24	9	7	10.2
B13802601400	M14	2	110	26	11	9	12
B13802601600	M16	2	110	28	12	9	14
B13802601800	M18	2.5	125	30	14	11	15.5
B13802602000	M20	2.5	140	32	16	12	17.5





## MARS CAST IRON STRAIGHT FLUTE



### DIN-371

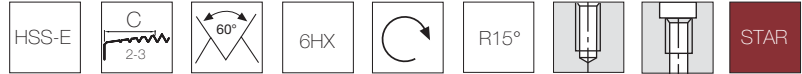
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13812500300	M 3	0.5	56	10	3.5	2.7	2.5
B13812500400	M 4	0.7	63	12	4.5	3.4	3.3
B13812500500	M 5	0.8	70	14	6	4.9	4.2
B13812500600	M 6	1	80	16	6	4.9	5
B13812500800	M 8	1.25	90	18	8	6.2	6.8
B13812501000	M10	1.5	100	20	10	8	8.5
B13812501200	M12	1.75	110	24	12	9	10.2

### DIN-376

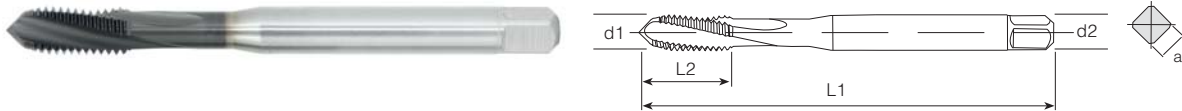
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13812601200	M12	1.75	110	24	9	7	10.2
B13812601400	M14	2	110	26	11	9	12
B13812601600	M16	2	110	28	12	9	14
B13812601800	M18	2.5	125	30	14	11	15.5
B13812602000	M20	2.5	140	32	16	12	17.5



HIGH PERFORMANCE TAPS



**MARS** CAST IRON SPIRAL FLUTE

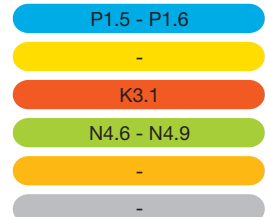


**DIN-371**

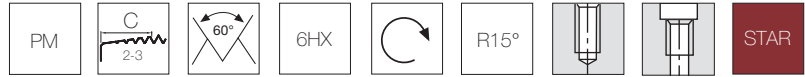
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13802510300	M 3	0.5	56	10	3.5	2.7	2.5
B13802510400	M 4	0.7	63	12	4.5	3.4	3.3
B13802510500	M 5	0.8	70	14	6	4.9	4.2
B13802510600	M 6	1	80	16	6	4.9	5
B13802510800	M 8	1.25	90	18	8	6.2	6.8
B13802511000	M10	1.5	100	20	10	8	8.5
B13802511200	M12	1.75	110	24	12	9	10.2

**DIN-376**

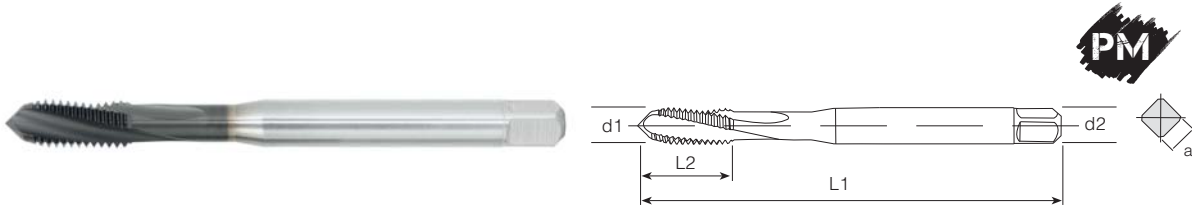
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13802611200	M12	1.75	110	24	9	7	10.2
B13802611400	M14	2	110	26	11	9	12
B13802611600	M16	2	110	28	12	9	14
B13802611800	M18	2.5	125	30	14	11	15.5
B13802612000	M20	2.5	140	32	16	12	17.5







**MARS** CAST IRON SPIRAL FLUTE



**DIN-371**

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13812510300	M 3	0.5	56	10	3.5	2.7	2.5
B13812510400	M 4	0.7	63	12	4.5	3.4	3.3
B13812510500	M 5	0.8	70	14	6	4.9	4.2
B13812510600	M 6	1	80	16	6	4.9	5
B13812510800	M 8	1.25	90	18	8	6.2	6.8
B13812511000	M10	1.5	100	20	10	8	8.5
B13812511200	M12	1.75	110	24	12	9	10.2

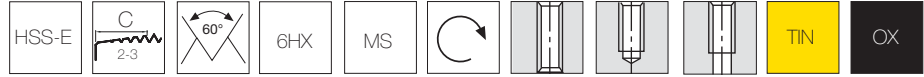
**DIN-376**

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13812611200	M12	1.75	110	24	9	7	10.2
B13812611400	M14	2	110	26	11	9	12
B13812611600	M16	2	110	28	12	9	14
B13812611800	M18	2.5	125	30	14	11	15.5
B13812612000	M20	2.5	140	32	16	12	17.5

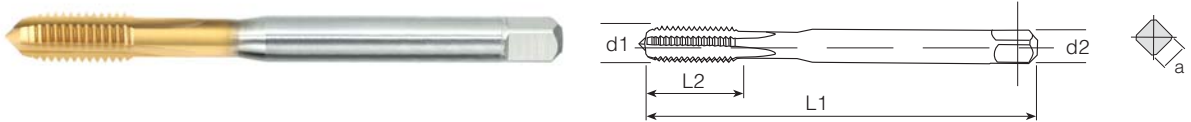
- P1.5 - P1.6
- 
- K3.1
- N4.6 - N4.9
- 
- 

- TIN "10"
- TICN "11"
- STAR "13"
- OX "20"

HIGH PERFORMANCE TAPS



**URANUS** NON-FERROUS STRAIGHT FLUTE - COPPER ALLOYS



**DIN-371**

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10803000300	M 3	0.5	56	10	3.5	2.7	2.5
B10803000400	M 4	0.7	63	12	4.5	3.4	3.3
B10803000500	M 5	0.8	70	14	6	4.9	4.2
B10803000600	M 6	1	80	16	6	4.9	5
B10803000800	M 8	1.25	90	18	8	6.2	6.8
B10803001000	M10	1.5	100	20	10	8	8.5
B10803001200	M12	1.75	110	24	12	9	10.2

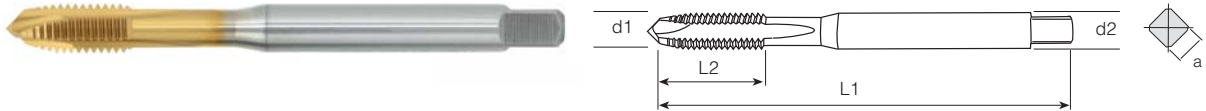
**DIN-376**

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10803101200	M12	1.75	110	24	9	7	10.2
B10803101400	M14	2	110	26	11	9	12
B10803101600	M16	2	110	28	12	9	14
B10803101800	M18	2.5	125	30	14	11	15.5
B10803102000	M20	2.5	140	32	16	12	17.5





**URANUS** NON-FERROUS SPIRAL POINT - ALUMINUM ALLOYS



**DIN-371**

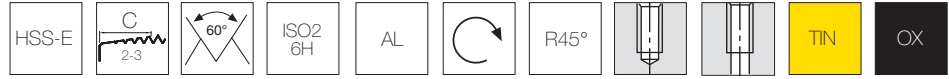
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10803010300	M 3	0.5	56	10	3.5	2.7	2.5
B10803010400	M 4	0.7	63	12	4.5	3.4	3.3
B10803010500	M 5	0.8	70	14	6	4.9	4.2
B10803010600	M 6	1	80	16	6	4.9	5
B10803010800	M 8	1.25	90	18	8	6.2	6.8
B10803011000	M10	1.5	100	20	10	8	8.5
B10803011200	M12	1.75	110	24	12	9	10.2

**DIN-376**

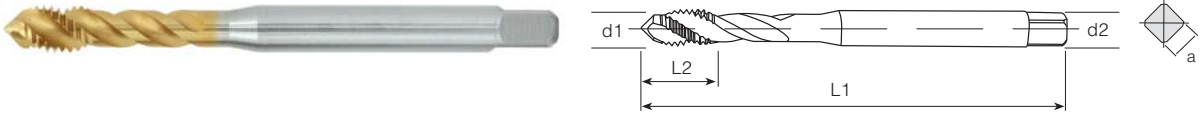
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10803111200	M12	1.75	110	24	9	7	10.2
B10803111400	M14	2	110	26	11	9	12
B10803111600	M16	2	110	28	12	9	14
B10803111800	M18	2.5	125	30	14	11	15.5
B10803112000	M20	2.5	140	32	16	12	17.5



HIGH PERFORMANCE TAPS



**URANUS** NON-FERROUS SPIRAL FLUTE - ALUMINUM ALLOYS



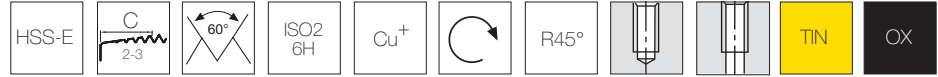
**DIN-371**

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10803020300	M 3	0.5	56	6	3.5	2.7	2.5
B10803020400	M 4	0.7	63	7	4.5	3.4	3.3
B10803020500	M 5	0.8	70	8	6	4.9	4.2
B10803020600	M 6	1	80	10	6	4.9	5
B10803020800	M 8	1.25	90	12	8	6.2	6.8
B10803021000	M10	1.5	100	14	10	8	8.5
B10803021200	M12	1.75	110	16	12	9	10.2

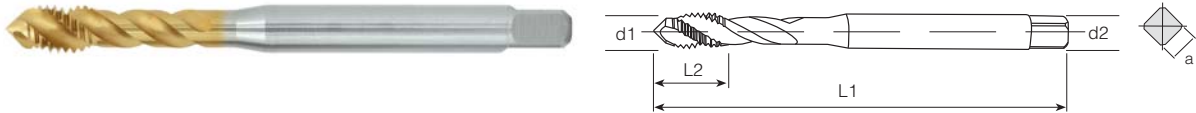
**DIN-376**

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10803121200	M12	1.75	110	16	9	7	10.2
B10803121400	M14	2	110	18	11	9	12
B10803121600	M16	2	110	20	12	9	14
B10803121800	M18	2.5	125	22	14	11	15.5
B10803122000	M20	2.5	140	22	16	12	17.5





## URANUS NON-FERROUS SPIRAL FLUTE - COPPER ALLOYS



### DIN-371

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10803030300	M 3	0.5	56	6	3.5	2.7	2.5
B10803030400	M 4	0.7	63	7	4.5	3.4	3.3
B10803030500	M 5	0.8	70	8	6	4.9	4.2
B10803030600	M 6	1	80	10	6	4.9	5
B10803030800	M 8	1.25	90	12	8	6.2	6.8
B10803031000	M10	1.5	100	14	10	8	8.5
B10803031200	M12	1.75	110	16	12	9	10.2

### DIN-376

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10803131200	M12	1.75	110	16	9	7	10.2
B10803131400	M14	2	110	18	11	9	12
B10803131600	M16	2	110	20	12	9	14
B10803131800	M18	2.5	125	22	14	11	15.5
B10803132000	M20	2.5	140	22	16	12	17.5

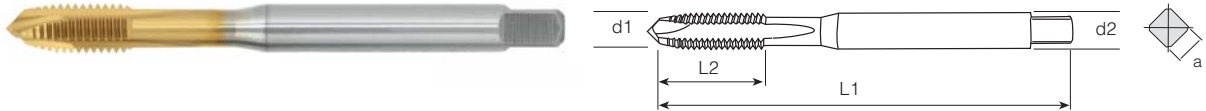
- P1.1 - P1.4 - P1.3 - P1.4
- M2.1 - M2.2 - M2.3
- 
- N4.2 - N4.4 - N4.5 - N4.7 - N4.8
- 
- 

TIN "10" OX "20"

HIGH PERFORMANCE TAPS



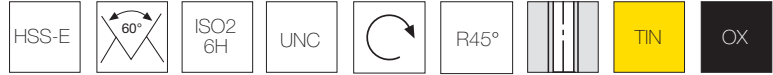
**URANUS** STRAIGHT FLUTE MACHINE TAPS - UNC



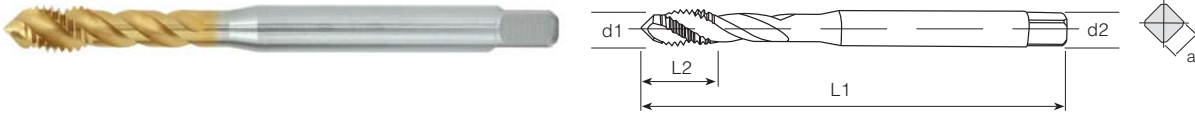
**DIN-371 / DIN-376**

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm
B10803300284	Nr:4	40	56	10	3.5	2.7
B10803300350	Nr: 6	32	56	12	4	3
B10803300417	Nr: 8	32	63	12	4.5	3.4
B10803300483	Nr: 10	24	70	14	6	4.9
B10803300549	Nr: 12	24	80	16	6	5.5
B10803300635	1/4"	20	80	16	7	5.5
B10803300794	5/16"	18	90	18	8	6.2
B10803300952	3/8"	16	100	20	10	8
B10803301111	7/16"	14	100	22	8	6.2
B10803301270	1/2"	13	110	25	9	7
B10803301429	9/16"	12	110	30	12	9
B10803301905	3/4"	10	125	32	14	11



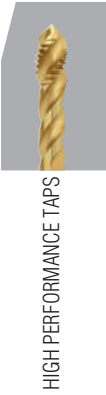


## URANUS SPIRAL FLUTE MACHINE TAPS - UNC



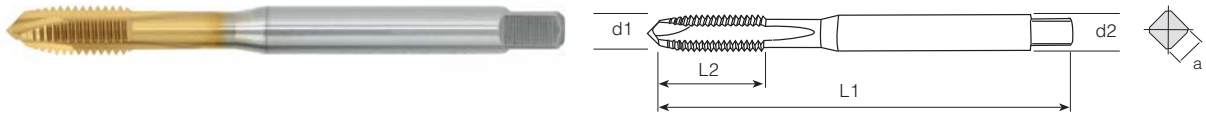
### DIN-371 / DIN-376

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	k (h12) mm
B10803400284	Nr:4	40	56	6	3.5	2.7
B10803400350	Nr: 6	32	56	7	4	3
B10803400417	Nr: 8	32	63	7	4.5	3.4
B10803400483	Nr: 10	24	70	8	6	4.9
B10803400549	Nr: 12	24	80	12	6	5.5
B10803400635	1/4"	20	80	12	7	5.5
B10803400794	5/16"	18	90	12	8	6.2
B10803400952	3/8"	16	100	16	10	8
B10803401111	7/16"	14	100	18	8	6.2
B10803401270	1/2"	13	110	20	9	7
B10803401429	9/16"	12	110	24	12	9
B10803401905	3/4"	10	125	25	14	11





**URANUS** STRAIGHT FLUTE MACHINE TAPS - UNF

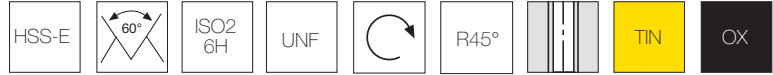


**DIN-371 / DIN-376**

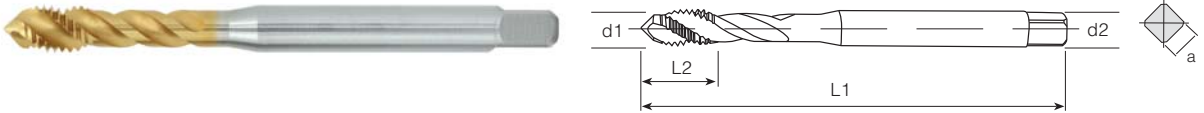
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	k (h12) mm
B10803350284	Nr:4	48	56	10	2.2	2.7
B10803350350	Nr: 6	40	56	12	2.5	3
B10803350417	Nr: 8	36	63	12	2.8	3.4
B10803350483	Nr: 10	32	70	14	3.5	4.9
B10803350549	Nr: 12	28	80	16	4	5.5
B10803350635	1/4"	28	80	16	4.5	5.5
B10803350794	5/16"	24	90	18	6	6.2
B10803350952	3/8"	24	100	18	7	8
B10803351111	7/16"	20	100	20	8	6.2
B10803351270	1/2"	20	110	20	9	7
B10803351429	9/16"	18	110	22	12	9
B10803351905	3/4"	16	125	25	14	11





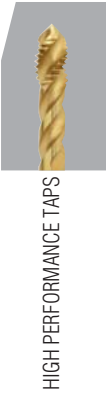


**URANUS** SPIRAL FLUTE MACHINE TAPS - UNF



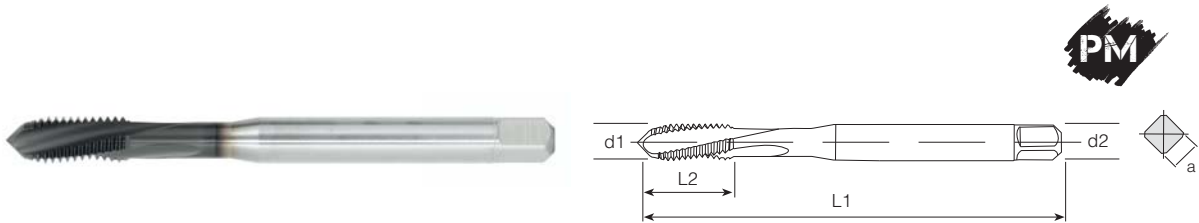
**DIN-371 / DIN-376**

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	k (h12) mm
B10803450284	Nr:4	48	56	6	2.2	2.7
B10803450350	Nr: 6	40	56	7	2.5	3
B10803450417	Nr: 8	36	63	7	2.8	3.4
B10803450483	Nr: 10	32	70	8	3.5	4.9
B10803450549	Nr: 12	28	80	10	4	5.5
B10803450635	1/4"	28	80	10	4.5	5.5
B10803450794	5/16"	24	90	12	6	6.2
B10803450952	3/8"	24	100	12	7	8
B10803451111	7/16"	20	100	14	8	6.2
B10803451270	1/2"	20	110	14	9	7
B10803451429	9/16"	18	110	18	11	9
B10803451905	3/4"	16	125	20	14	11





**SATURN** HEAT RESISTANT TI-NI LEFT HELIX



**DIN-371**

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13824010300	M 3	0.5	56	10	3.5	2.7	2.5
B13824010400	M 4	0.7	63	12	4.5	3.4	3.3
B13824010500	M 5	0.8	70	14	6	4.9	4.2
B13824010600	M 6	1	80	16	6	4.9	5
B13824010800	M 8	1.25	90	18	8	6.2	6.8
B13824011000	M10	1.5	100	20	10	8	8.5
B13824011200	M12	1.75	110	24	12	9	10.2

**DIN-376**

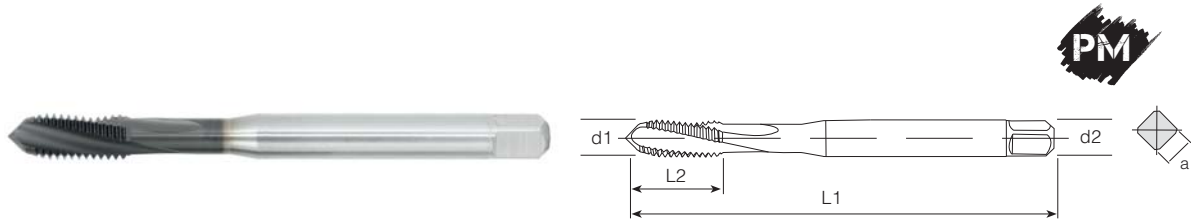
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13824111200	M12	1.75	110	24	9	7	10.2
B13824111400	M14	2	110	26	11	9	12
B13824111600	M16	2	110	28	12	9	14
B13824111800	M18	2.5	125	30	14	11	15.5
B13824112000	M20	2.5	140	32	16	12	17.5

- P1.6
- M2.3
- 
- N4.7 - N4.8 - N4.9
- M5.2
- 





**SATURN** HEAT RESISTANT TI-Ni SPIRAL FLUTE



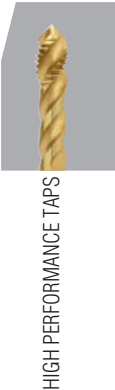
**DIN-371**

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13824000300	M 3	0.5	56	10	3.5	2.7	2.5
B13824000400	M 4	0.7	63	12	4.5	3.4	3.3
B13824000500	M 5	0.8	70	14	6	4.9	4.2
B13824000600	M 6	1	80	16	6	4.9	5
B13824000800	M 8	1.25	90	18	8	6.2	6.8
B13824001000	M10	1.5	100	20	10	8	8.5
B13824001200	M12	1.75	110	24	12	9	10.2

**DIN-376**

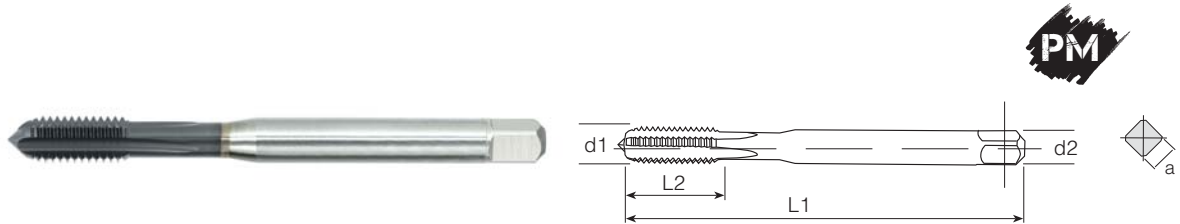
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13824101200	M12	1.75	110	24	9	7	10.2
B13824101400	M14	2	110	26	11	9	12
B13824101600	M16	2	110	28	12	9	14
B13824101800	M18	2.5	125	30	14	11	15.5
B13824102000	M20	2.5	140	32	16	12	17.5

- P1.6
- M2.3
- 
- N4.9
- M5.2
- 



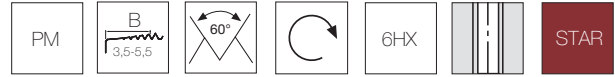


**MERCURY** 50/55 HRC STRAIGHT FLUTE

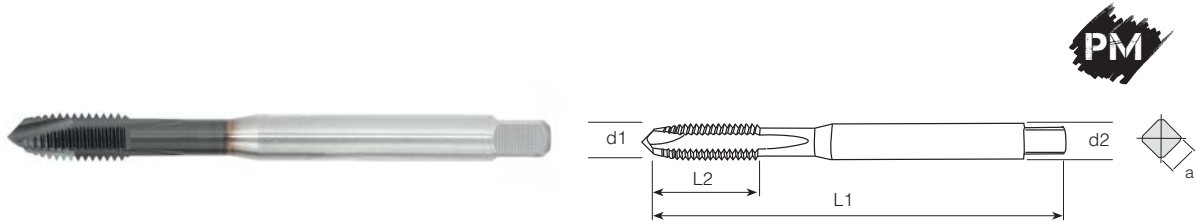


Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13824500600	M 6	1	80	10	6	4.9	5.1
B13824500800	M 8	1.25	90	12	8	6.2	6.9
B13824501000	M10	1.5	100	14	10	8	8.6
B13824501200	M12	1.75	110	16	12	9	10.3





## JUPITER HIGH SPEED SPIRAL POINT



### DIN-371

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13825010300	M 3	0.5	56	10	3.5	2.7	2.5
B13825010400	M 4	0.7	63	12	4.5	3.4	3.3
B13825010500	M 5	0.8	70	14	6	4.9	4.2
B13825010600	M 6	1	80	16	6	4.9	5
B13825010800	M 8	1.25	90	18	8	6.2	6.8
B13825011000	M10	1.5	100	20	10	8	8.5
B13825011200	M12	1.75	110	24	12	9	10.2

### DIN-376

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13825111200	M12	1.75	110	24	9	7	10.2
B13825111400	M14	2	110	26	11	9	12
B13825111600	M16	2	110	28	12	9	14
B13825111800	M18	2.5	125	30	14	11	15.5
B13825112000	M20	2.5	140	32	16	12	17.5

P1.1 - P1.2 - P1.3 - P1.4

M2.1 - M2.2

K3.3

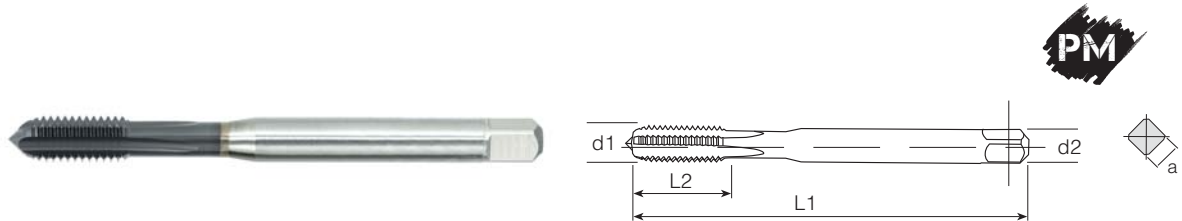
N4.3 - N4.4 - N4.5

-

-



## JUPITER HIGH SPEED STRAIGHT FLUTE

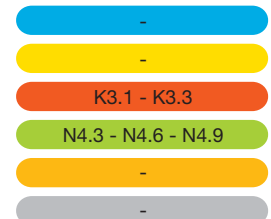


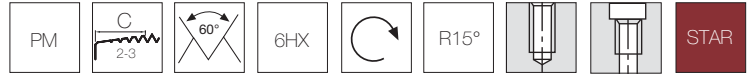
### DIN-371

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13825000300	M 3	0.5	56	6	3.5	2.7	2.5
B13825000400	M 4	0.7	63	7	4.5	3.4	3.3
B13825000500	M 5	0.8	70	8	6	4.9	4.2
B13825000600	M 6	1	80	10	6	4.9	5
B13825000800	M 8	1.25	90	12	8	6.2	6.8
B13825001000	M10	1.5	100	14	10	8	8.5
B13825001200	M12	1.75	110	16	12	9	10.2

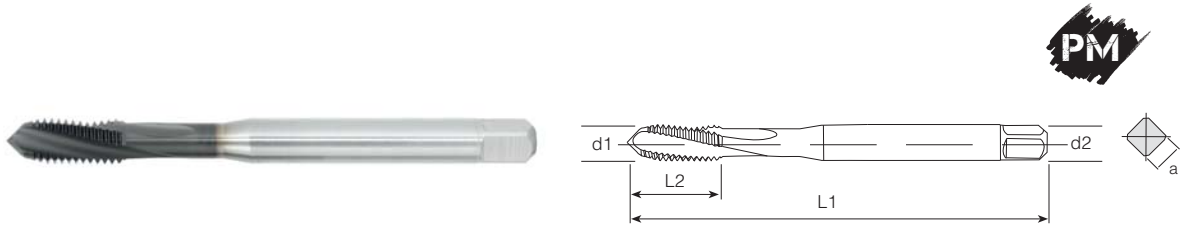
### DIN-376

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13825101200	M12	1.75	110	24	9	7	10.2
B13825101400	M14	2	110	26	11	9	12
B13825101600	M16	2	110	28	12	9	14
B13825101800	M18	2.5	125	30	14	11	15.5
B13825102000	M20	2.5	140	32	16	12	17.5





## JUPITER HIGH SPEED SPIRAL FLUTE



### DIN-371

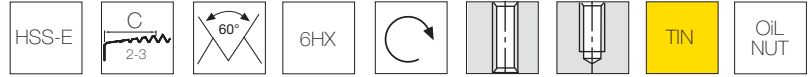
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13825020300	M 3	0.5	56	6	3.5	2.7	2.5
B13825020400	M 4	0.7	63	7	4.5	3.4	3.3
B13825020500	M 5	0.8	70	8	6	4.9	4.2
B13825020600	M 6	1	80	10	6	4.9	5
B13825020800	M 8	1.25	90	12	8	6.2	6.8
B13825021000	M10	1.5	100	14	10	8	8.5
B13825021200	M12	1.75	110	16	12	9	10.2

### DIN-376

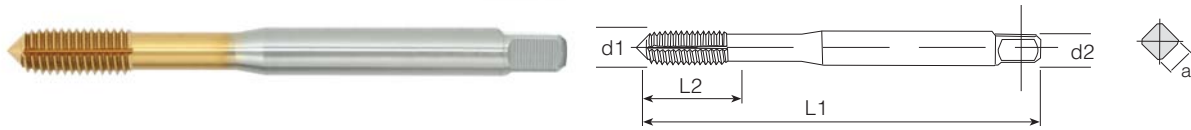
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13825121200	M12	1.75	110	24	9	7	10.2
B13825121400	M14	2	110	26	11	9	12
B13825121600	M16	2	110	28	12	9	14
B13825121800	M18	2.5	125	30	14	11	15.5
B13825122000	M20	2.5	140	32	16	12	17.5

P1.1 - P1.2 - P1.3 - P1.4

- 
- K3.3
- N4.3
- 
-



## FORMING TAPS



### DIN-371

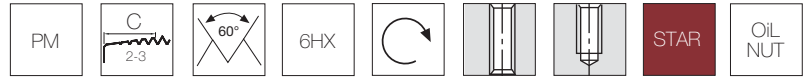
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10805500300	M 3	0.5	56	10	3.5	2.7	2.8
B10805500400	M 4	0.7	63	12	4.5	3.4	3.7
B10805500500	M 5	0.8	70	14	6	4.9	4.65
B10805500600	M 6	1	80	16	6	4.9	5.6
B10805500800	M 8	1.25	90	18	8	6.2	7.45
B10805501000	M10	1.5	100	20	10	8	9.35
B10805501200	M12	1.75	110	24	12	9	11.25

### DIN-376

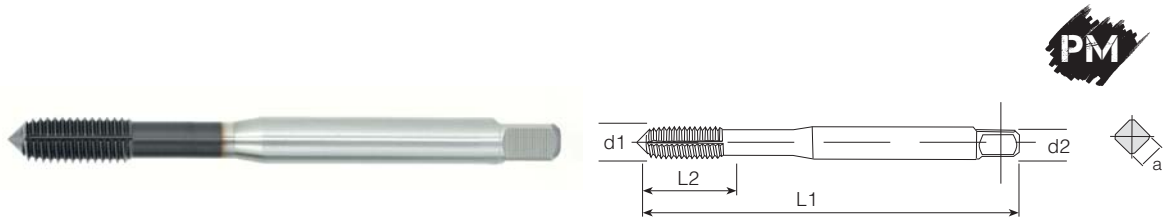
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10805601200	M12	1.75	110	18	9	7	11.25
B10805601400	M14	2	110	26	11	9	13
B10805601600	M16	2	110	27	12	9	15
B10805601800	M18	2.5	125	32	14	11	16.8
B10805602000	M20	2.5	140	32	16	12	18.8

- P1.1 - P1.2 - P1.3
- M2.1 - M2.2
- 
- N4.1 - N4.4
- 
-





## FORMING TAPS

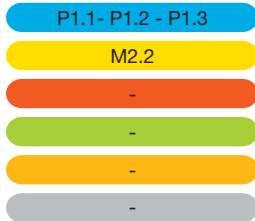


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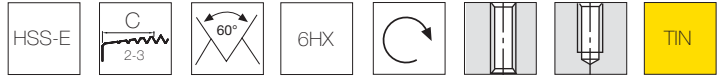
Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13825510300	M 3	0.5	56	10	3.5	2.7	2.8
B13825510400	M 4	0.7	63	12	4.5	3.4	3.7
B13825510500	M 5	0.8	70	14	6	4.9	4.65
B13825510600	M 6	1	80	16	6	4.9	5.6
B13825510800	M 8	1.25	90	18	8	6.2	7.45
B13825511000	M10	1.5	100	20	10	8	9.35
B13825511200	M12	1.75	110	24	12	9	11.25

### DIN-376

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13825611200	M12	1.75	110	18	9	7	11.25
B13825611400	M14	2	110	26	11	9	13
B13825611600	M16	2	110	27	12	9	15
B13825611800	M18	2.5	125	32	14	11	16.8
B13825612000	M20	2.5	140	32	16	12	18.8



HIGH PERFORMANCE TAPS



## FORMING TAPS

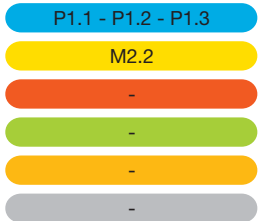


### DIN-371

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10805510300	M 3	0.5	56	10	3.5	2.7	2.8
B10805510400	M 4	0.7	63	12	4.5	3.4	3.7
B10805510500	M 5	0.8	70	14	6	4.9	4.65
B10805510600	M 6	1	80	16	6	4.9	5.6
B10805510800	M 8	1.25	90	18	8	6.2	7.45
B10805511000	M10	1.5	100	20	10	8	9.35
B10805511200	M12	1.75	110	24	12	9	11.25

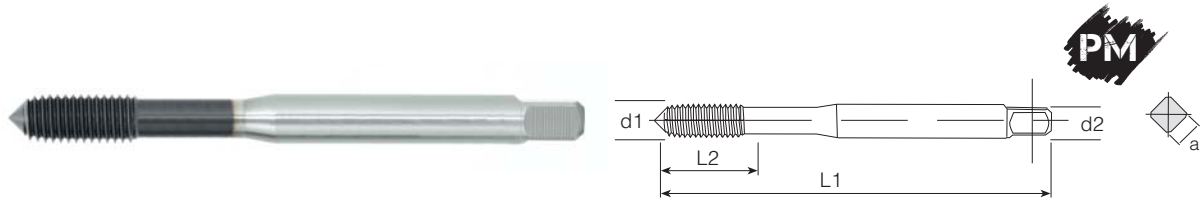
### DIN-376

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B10805611200	M12	1.75	110	18	9	7	11.25
B10805611400	M14	2	110	26	11	9	13
B10805611600	M16	2	110	27	12	9	15
B10805611800	M18	2.5	125	32	14	11	16.8
B10805612000	M20	2.5	140	32	16	12	18.8





## FORMING TAPS



### DIN-371

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13825500300	M 3	0.5	56	10	3.5	2.7	2.8
B13825500400	M 4	0.7	63	12	4.5	3.4	3.7
B13825500500	M 5	0.8	70	14	6	4.9	4.65
B13825500600	M 6	1	80	16	6	4.9	5.6
B13825500800	M 8	1.25	90	18	8	6.2	7.45
B13825501000	M10	1.5	100	20	10	8	9.35
B13825501200	M12	1.75	110	24	12	9	11.25

### DIN-376

Product code	d1 mm	P pitch	L1 mm	L2 mm	d2 mm	a (h12) mm	Drill ø
B13825601200	M12	1.75	110	18	9	7	11.25
B13825601400	M14	2	110	26	11	9	13
B13825601600	M16	2	110	27	12	9	15
B13825601800	M18	2.5	125	32	14	11	16.8
B13825602000	M20	2.5	140	32	16	12	18.8

- P1.1 - P1.2 - P1.3
- M2.1 - M2.2
- 
- N4.1 - N4.4
- 
-



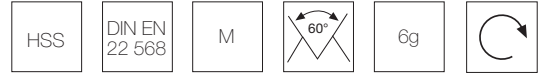
# ROUND DIES THREAD CHASERS



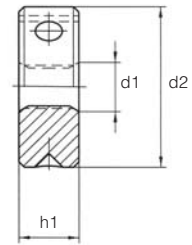
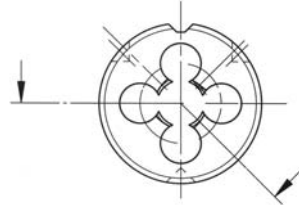


Tool Type	Standard	Quality	Page No
ROUND DIES FOR METRIC THREAD	DIN EN 22 568	HSS	208
ROUND DIES FOR METRIC FINE THREAD	DIN EN 22 568	HSS	209
ROUND DIES FOR WHITWORTH THREAD	DIN EN 22 568	HSS	210
ROUND DIES FOR UNC THREAD	DIN EN 22 568	HSS	211
ROUND DIES FOR UNF THREAD	DIN EN 22 568	HSS	212
ROUND DIES FOR WHITWORTH PIPE THREAD	DIN EN 24 231	HSS	213
ROUND DIES FOR NPT THREAD	MTE Norm	HSS	214
VIRAX THREAD CHASERS	MTE Norm	HSS	215





## ROUND DIES FOR METRIC THREAD



Product Code	d1 mm	P	d2 (f9) mm	h1 mm
B00110020200	M2	0.4	16	5
B00110020250	M2,5	0.45	16	5
B00110020300	M3	0.5	20	5
B00110020350	M3,5	0.6	20	5
B00110020400	M4	0.7	20	5
B00110020500	M5	0.8	20	7
B00110020600	M6	1	20	7
B00110020700	M7	1	25	9
B00110020800	M8	1.25	25	9
B00110020900	M9	1.25	25	9
B00110021000	M10	1.5	30	11
B00110021200	M12	1.75	38	14
B00110021400	M14	2	38	14
B00110021600	M16	2	45	18

Product Code	d1 mm	P	d2 (f9) mm	h1 mm
B00110021800	M18	2.5	45	18
B00110022000	M20	2.5	45	18
B00110022200	M22	2.5	55	22
B00110022400	M24	3	55	22
B00110022700	M27	3	65	25
B00110023000	M30	3.5	65	25
B00110023300	M33	3.5	65	25
B00110023600	M36	4	65	25
B00110023900	M39	4	75	30
B00110024200	M42	4.5	75	30
B00110024500	M45	4.5	90	36
B00110024800	M48	5	90	36
B00110025200	M52	5	90	36



HSS

DIN EN  
22 568

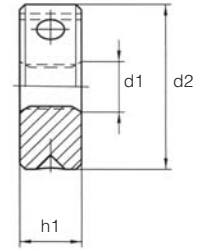
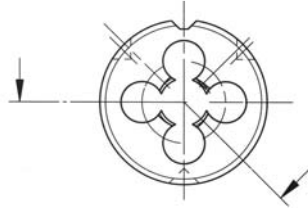
MF

60°

6g

↻

## ROUND DIES FOR METRIC FINE THREAD



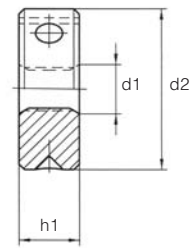
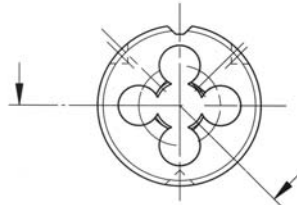
Product Code	d1 mm	P	d2 (f9) mm	h1 mm
B00110030604	M 6	0,75	20	7
B00110030805	M 8	1	25	9
B00110031005	M 10	1	30	11
B00110031000	M 10	1,25	30	11
B00110031205	M 12	1	38	10
B00110031200	M 12	1,25	38	10
B00110031206	M 12	1,5	38	10
B00110031405	M 14	1	38	10
B00110031400	M 14	1,25	38	10
B00110031406	M 14	1,5	38	10
B00110031605	M 16	1	45	14
B00110031606	M 16	1,5	45	14
B00110031806	M 18	1,5	45	14
B00110032006	M 20	1,5	45	14
B00110032206	M 22	1,5	55	16
B00110032406	M 24	1,5	55	16
B00110033006	M 30	1,5	65	18



ROUND DIES THREAD CHASERS



## ROUND DIES FOR WHITWORTH THREAD



Product Code	d1 BSW	P G/Inch	d2 (f9) mm	h1 mm
B00110040317	W 1/8"	40	20	5
B00110040397	W 5/32"	32	20	7
B00110040476	W 3/16"	24	20	7
B00110040635	W 1/4"	20	20	7
B00110040794	W 5/16"	18	25	9
B00110040952	W 3/8"	16	30	11
B00110041111	W 7/16"	14	30	11
B00110041270	W 1/2"	12	38	14
B00110041429	W 9/16"	12	38	14
B00110041587	W 5/8"	11	45	18
B00110041905	W 3/4"	10	45	18
B00110042222	W 7/8"	9	55	22
B00110042540	W 1"	8	55	22

HSS

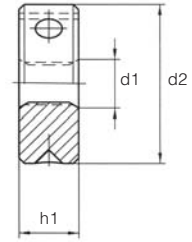
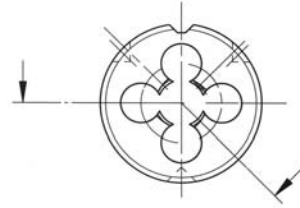
DIN EN  
22 568

UNC

60°

2A

## ROUND DIES FOR UNC THREAD

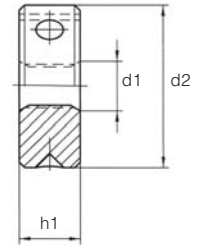
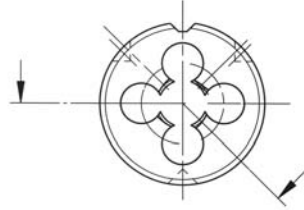


Product Code	d1 UNC	P G/Inch	d2 (f9) mm	h1 mm
B00110060635	1/4"	20	20	7
B00110060794	5/16"	18	25	9
B00110060952	3/8"	16	30	11
B00110061111	7/16"	14	30	11
B00110061270	1/2"	13	38	14
B00110061429	9/16"	12	38	14
B00110061587	5/8"	11	45	18
B00110061905	3/4"	10	45	18
B00110062222	7/8"	9	55	22
B00110062540	1"	8	55	22





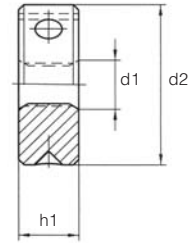
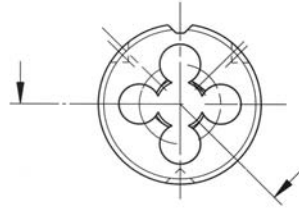
ROUND DIES FOR UNF THREAD



Product Code	d1 UNF	P G/Inch	d2 (f9) mm	h1 mm
B00110070635	1/4"	28	20	7
B00110070794	5/16"	24	25	9
B00110070952	3/8"	24	30	11
B00110071111	7/16"	20	30	11
B00110071270	1/2"	20	38	10
B00110071429	9/16"	18	38	10
B00110071587	5/8"	18	45	14
B00110071905	3/4"	16	45	14
B00110072222	7/8"	14	55	16
B00110072540	1"	12	55	16



ROUND DIES FOR WHITWORTH PIPE THREAD

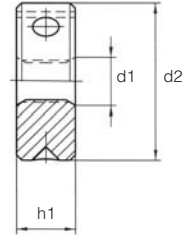
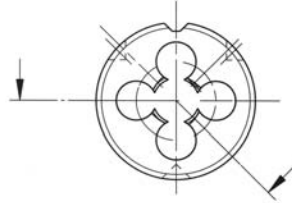


Product Code	d1 BSP	P G/Inch	d2 (f9) mm	h1 mm
B00110080973	G 1/8"	28	30	11
B00110081316	G 1/4"	19	38	10
B00110081666	G 3/8"	19	45	14
B00110082095	G 1/2"	14	45	14
B00110082644	G 3/4"	14	55	16
B00110083325	G 1"	11	65	18





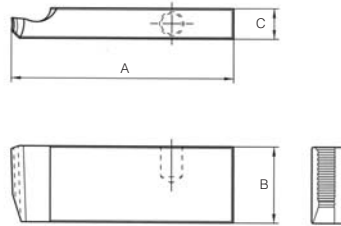
## ROUND DIES FOR NPT THREAD



Product Code	d1 NPT	P G/Inch	d2 (f9) mm	h1 mm
B00110090136	1/8"	27	30	11
B00110090137	1/4"	18	38	14
B00110090138	3/8"	18	45	18
B00110090139	1/2"	14	45	18
B00110090140	3/4"	14	55	22
B00110090141	1"	11 1/2	65	25



## VIRAX THREAD CHASERS



Product Code	d1 BSP	P G/Inch	A mm	B mm	C mm
B00121010005	G 1/2" - G 3/4"	14	71.5	25	10
B00121010006	G 1" - G 1 1/4"	11	65.6	25	10
B00121010007	G 1 1/2" - G 2"	11	58.4	25	10







# REAMERS



REAMERS



Tool Type	Quality	Standard	Page No
HAND REAMERS	HSS	DIN 206	224
HAND TAPER REAMERS	HSS	DIN 9	225
STRAIGHT SHANK MACHINE REAMERS	HSS	DIN 212	226
STRAIGHT SHANK MACHINE REAMERS	HSS-E	DIN 212	227
MORSE TAPER REAMERS	HSS	DIN 208	228
SHELL REAMERS	HSS	DIN 311	229



## Reaming Tolerance

Tables showing the lowest and highest values of the nominal diameters of reamers are below.

Reamer nominal diameter d1 (mm)		Lower and upper measures of reamer nominal diameter d1 (measures in $\mu\text{m}$ ) Hole tolerance areas									
(from)	(up)	A9	A11	B8	B9	B10	B11	C8	C9	C10	C11
1	3	+291	+321	+151	+161	+174	+191	+71	+81	+94	+111
		+282	+300	+146	+152	+160	+170	+66	+72	+80	+90
3	6	+295	+333	+155	+165	+180	+203	+85	+95	+110	+133
		+284	+306	+148	+154	+163	+176	+78	+84	+93	+106
6	10	+310	+356	+168	+180	+199	+226	+98	+110	+129	+156
		+297	+324	+160	+167	+178	+194	+90	+97	+108	+124
10	18	+326	+383	+172	+186	+209	+243	+117	+131	+154	+188
		+310	+344	+162	+170	+184	+204	+107	+115	+129	+149
18	30	+344	+410	+188	+204	+231	+270	+138	+154	+181	+220
		+325	+364	+176	+185	+201	+224	+126	+135	+151	+174
30	40	+362	+446	+203	+222	+255	+306	+153	+172	+205	+256
		+340	+390	+189	+200	+220	+250	+139	+150	+170	+200
40	50	+372	+456	+213	+232	+265	+316	+163	+182	+215	+266
		+350	+400	+199	+210	+230	+260	+149	+160	+180	+210
50	65	+402	+501	+229	+252	+292	+351	+179	+202	+242	+301
		+376	+434	+212	+226	+250	+284	+162	+176	+200	+234
65	80	+422	+521	+239	+262	+302	+361	+189	+212	+252	+311
		+396	+454	+222	+236	+260	+294	+172	+186	+210	+244
80	100	+453	+567	+265	+293	+339	+407	+215	+243	+289	+357
		+422	+490	+246	+262	+290	+330	+196	+212	+240	+280
100	120	+483	+597	+285	+313	+359	+427	+225	+253	+299	+367
		+452	+520	+266	+282	+310	+350	+206	+222	+250	+290
120	140	+545	+672	+313	+345	+396	+472	+253	+285	+336	+412
		+510	+584	+290	+310	+340	+384	+230	+250	+280	+324
140	160	+605	+732	+333	+365	+416	+492	+263	+295	+346	+422
		+570	+644	+310	+330	+360	+404	+240	+260	+290	+334
160	180	+665	+792	+363	+395	+446	+522	+283	+315	+366	+442
		+630	+704	+340	+360	+390	+434	+260	+280	+310	+354

(from)	(up)	D8	D9	D10	D11	E7	E8	E9	F6	F7	F8	F9	G6	G7
1	3	+31	+41	+54	+71	+22	+25	+35	+11	+14	+17	+27	+7	+10
		+26	+32	+40	+50	+18	+20	+26	+8	+10	+12	+18	+4	+6
3	6	+45	+55	+70	+93	+30	+35	+45	+16	+20	+25	+35	+10	+14
		+38	+44	+53	+66	+25	+28	+34	+13	+15	+18	+24	+7	+9
6	10	+58	+70	+89	+116	+37	+43	+55	+20	+25	+31	+43	+12	+17
		+50	+57	+68	+84	+31	+35	+42	+16	+19	+23	+30	+8	+11
10	18	+72	+86	+109	+143	+47	+54	+68	+25	+31	+38	+52	+15	+21
		+62	+70	+84	+104	+40	+44	+52	+21	+24	+28	+36	+11	+14
18	30	+93	+109	+136	+175	+57	+68	+84	+31	+37	+48	+64	+18	+24
		+81	+90	+106	+129	+49	+56	+65	+26	+29	+36	+45	+13	+16
30	50	+113	+132	+165	+216	+71	+83	+102	+38	+46	+58	+77	+22	+30
		+99	+110	+130	+160	+62	+69	+80	+32	+37	+44	+55	+16	+21
50	80	+139	+162	+202	+261	+85	+99	+122	+46	+55	+69	+92	+26	+35
		+122	+136	+160	+194	+74	+82	+96	+39	+44	+52	+66	+19	+24
80	120	+165	+193	+239	+307	+101	+117	+145	+54	+65	+81	+109	+30	+41
		+146	+162	+190	+230	+88	+98	+114	+46	+52	+62	+78	+22	+28
120	180	+198	+230	+281	+357	+119	+138	+170	+64	+77	+96	+128	+35	+48
		+175	+195	+225	+269	+105	+115	+135	+55	+63	+73	+93	+26	+34

## Reaming Tolerance

Reamer nominal diameter d1 (mm)		Lower and upper measures of reamer nominal diameter d1 (measures in $\mu\text{m}$ ) Hole tolerance areas													
(from)	(up)	H6	H7	H8	H9	H10	H11	H12	J6	J7	J8	JS6	JS7	JS8	JS9
1	3	+5	+8	+11	+21	+34	+51	+85	+1	+2	+3	+2	+3	+4	+8
		+2	+4	+6	+12	+20	+30	+50	-2	-2	-2	-1	-1	-1	-1
3	6	+6	+10	+15	+25	+40	+63	+102	+3	+4	+7	+2	+4	+6	+10
		+3	+5	+8	+14	+23	+36	+60	0	-1	0	-1	-1	-1	-1
6	10	+7	+12	+18	+30	+49	+76	+127	+3	+5	+8	+3	+5	+7	+12
		+3	+6	+10	+17	+28	+44	+74	-1	-1	0	-1	-1	-1	-1
10	18	+9	+15	+22	+36	+59	+93	+153	+4	+7	+10	+3	+6	+9	+15
		+5	+8	+12	+20	+34	+54	+90	0	0	0	-1	-1	-1	-1
18	30	+11	+17	+28	+44	+71	+110	+178	+6	+8	+15	+4	+7	+11	+18
		+6	+9	+16	+25	+41	+64	+104	+1	0	+3	-1	-1	-1	-1
30	50	+13	+21	+33	+52	+85	+136	+212	+7	+10	+18	+5	+8	+13	+21
		+7	+12	+19	+30	+50	+80	+124	+1	+1	+4	-1	-1	-1	-1
50	80	+16	+25	+39	+62	+102	+161	+255	+10	+13	+21	+6	+10	+16	+25
		+9	+14	+22	+36	+60	+94	+150	+3	+2	+4	-1	-1	-1	-1
80	120	+18	+29	+45	+73	+119	+187	+297	+12	+16	+25	+7	+12	+18	+30
		+10	+16	+26	+42	+70	+110	+174	+4	+3	+6	-1	-1	-1	-1
120	180	+21	+34	+53	+85	+136	+212	+340	+14	+20	+31	+8	+14	+22	+35
		+12	+20	+30	+50	+80	+124	+200	+5	+6	+8	-1	0	-1	0

(from)	(up)	K6	K7	K8	M6	M7	M8	N6	N7	N8	N9	N10	N11	P6	P7
1	3	-1	-2	-3	-3	-4	-	-5	-6	-7	-8	-10	-13	-7	-8
		-4	-6	-8	-6	-8	-	-8	-10	-12	-17	-24	-34	-10	-12
3	6	0	+1	+2	-3	-2	-1	-7	-6	-5	-5	-8	-12	-11	-10
		-3	-4	-5	-6	-7	-8	-10	-11	-12	-16	-25	-39	-14	-15
6	10	0	+2	+2	-5	-3	-3	-9	-7	-7	-6	-9	-14	-14	-12
		-4	-4	-6	-9	-9	-11	-13	-13	-15	-19	-30	-46	-18	-18
10	18	0	+3	+3	-6	-3	-3	-11	-8	-8	-7	-11	-17	-17	-14
		-4	-4	-7	-10	-10	-13	-15	-15	-18	-23	-36	-56	-21	-21
18	30	0	+2	+5	-6	-4	-1	-13	-11	-8	-8	-13	-20	-20	-18
		-5	-6	-7	-11	-12	-13	-18	-19	-20	-27	-43	-66	-25	-26
30	50	0	+3	+6	-7	-4	-1	-15	-12	-9	-10	-15	-24	-24	-21
		-6	-6	-8	-13	-13	-15	-21	-21	-23	-32	-50	-80	-30	-30
50	80	+1	+4	+7	-8	-5	-2	-17	-14	-11	-12	-18	-29	-29	-26
		-6	-7	-10	-15	-16	-19	-24	-25	-28	-38	-60	-96	-36	-37
80	120	0	+4	+7	-10	-6	-3	-20	-16	-13	-14	-21	-33	-34	-30
		-8	-9	-12	-18	-19	-22	-28	-29	-32	-45	-70	-110	-42	-43
120	180	0	+6	+10	-12	-6	-2	-24	-18	-14	-15	-24	-38	-40	-34
		-9	-8	-13	-21	-20	-25	-33	-32	-37	-50	-80	-126	-49	-48



REAMERS

## Recommended Cutting Values for Machine Reamers

Material		Reamer Nominal Diameter - mm									Cooling and Cutting Fluid
		5	8	10	15	20	25	30	40	50	
Steel <500N/mm <sup>2</sup>	Vc	10-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12	Ductile Steel: Boron-oil emulsion, Cutting Oil
	f	0,1	0,13	0,15	0,2	0,25	0,25	0,3	0,35	0,4	
	n	700	440	350	232	176	137	115	88	71	
Steel 500-700 mm <sup>2</sup>	Vc	8-10	8-10	8-10	8-10	8-10	8-10	8-10	8-10	8-10	Tool Steel: Vegetable oil
	f	0,1	0,13	0,15	0,2	0,25	0,25	0,3	0,35	0,4	
	n	572	358	288	191	143	115	95	72	58	
Steel 700-900 N/mm <sup>2</sup>	Vc	6-8	6-8	6-8	6-8	6-8	6-8	6-8	6-8	6-8	Alloyed Steel: Vegetable oil, Cutting oil
	f	0,1	0,13	0,15	0,2	0,25	0,25	0,3	0,35	0,4	
	n	445	278	222	148	111	89	74	56	45	
Steel 900-1100 N/mm <sup>2</sup>	Vc	4-6	4-6	4-6	4-6	4-6	4-6	4-6	4-6	4-6	Heat resistant and stainless steel: Cutting Oil
	f	0,08	0,1	0,1	0,15	0,2	0,25	0,3	0,35	0,4	
	n	318	198	159	106	80	64	53	40	32	
Cast Steel 400-500 N/mm <sup>2</sup>	Vc	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10	Vegetable oil
	f	0,1	0,13	0,15	0,2	0,25	0,25	0,3	0,35	0,4	
	n	510	318	254	170	127	102	85	64	51	
Cast Steel 500-700 N/mm <sup>2</sup>	Vc	4-6	4-6	4-6	4-6	4-6	4-6	4-6	4-6	4-6	Vegetable oil
	f	0,07	0,08	0,1	0,13	0,18	0,18	0,22	0,25	0,3	
	n	318	198	159	106	80	64	53	40	32	
Gray Cast <200 HB	Vc	8-10	8-10	8-10	6-10	8-10	6-10	8-10	8-10	8-10	Dry, Vegetable oil
	f	0,18	0,2	0,23	0,25	0,3	0,3	0,35	0,4	0,45	
	n	572	358	288	191	143	115	95	72	58	
Gray Cast >200 HB	Vc	4-6	4-6	4-6	4-6	4-6	4-6	4-6	4-6	4-6	Dry, Vegetable oil
	f	0,12	0,15	0,17	0,2	0,25	0,25	0,3	0,35	0,4	
	n	318	198	159	106	80	64	53	40	32	
Tempered Cast <450 N/mm <sup>2</sup>	Vc	8-10	8-10	8-10	8-10	8-10	8-10	8-10	8-10	8-10	Dry - Boron oil emulsion
	f	0,18	0,2	0,23	0,25	0,3	0,3	0,35	0,4	0,45	
	n	572	358	288	191	143	115	95	72	58	
Tempered Cast 450-600 mm <sup>2</sup>	Vc	6-8	6-8	6-8	6-8	6-8	6-8	6-8	6-8	6-8	Dry - Boron oil emulsion
	f	0,15	0,18	0,2	0,2	0,25	0,3	0,35	0,4	0,4	
	n	445	278	222	148	111	89	74	56	45	
Copper	Vc	8-12	8-12	8-12	8-12	8-12	8-12	8-12	8-12	8-12	Boron-oil emulsion
	f	0,15	0,18	0,2	0,25	0,3	0,3	0,35	0,4	0,45	
	n	636	398	318	212	158	127	106	80	54	
Brass-Soft	Vc	10-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12	Dry
	f	0,2	0,25	0,3	0,35	0,4	0,4	0,45	0,5	0,6	
	n	700	440	350	232	176	137	115	88	71	
Brass-Hard	Vc	12-14	12-14	12-14	12-14	12-14	12-14	12-14	12-14	12-14	Boron-oil emulsion
	f	0,2	0,25	0,3	0,35	0,4	0,4	0,45	0,5	0,6	
	n	828	518	413	276	207	166	132	104	83	
Light Metals	Vc	15-20	15-20	15-20	15-20	15-20	15-20	15-20	15-20	15-20	Vegetable oil
	f	0,15	0,18	0,2	0,25	0,3	0,3	0,35	0,4	0,4	
	n	1140	720	573	382	288	225	189	144	117	
Silumin	Vc	10-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12	10-12	Diesel
	f	0,15	0,18	0,2	0,25	0,3	0,3	0,35	0,4	0,4	
	n	700	440	350	232	176	137	115	88	71	
Plastic-Hard	Vc	4-6	4-6	4-6	4-6	4-6	4-6	4-6	4-6	4-6	Dry, pressurized air
	f	0,2	0,25	0,3	0,35	0,4	0,45	0,45	0,5	0,5	
	n	318	198	159	106	80	64	53	40	32	
Plastic-Soft	Vc	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10	Dry, pressurized air
	f	0,25	0,3	0,35	0,4	0,45	0,5	0,55	0,6	0,6	
	n	510	318	254	170	127	102	85	64	51	

Vc: Cutting speed(m/min)

f: Feed (mm/revolution)

n: Revolution (revolution/min)

## Size Range and Pass (mm)

### RECOMMENDED REAMING RATES;

Material	Reamer Nominal Diameter - mm				
	3-5	5-10	10-20	20-30	Over 30
Steel <500N/mm <sup>2</sup>	0,1-0,2	0,2	0,2-0,3	0,3-0,4	0,4-0,5
Steel 700-1100 N/mm <sup>2</sup>	0,1-0,2	0,2	0,2	0,3	0,3-0,4
Steel Cast	0,1-0,2	0,2	0,2	0,2-0,3	0,3-0,4
Gray Cast	0,1-0,2	0,2	0,2-0,3	0,3-0,4	0,4-0,5
Tempered Cast	0,1-0,2	0,2	0,3	0,4	0,5
Copper	0,1-0,2	0,2-0,3	0,3-0,4	0,4-0,5	0,5
Brass - Bronze	0,1-0,2	0,2	0,2-0,3	0,3	0,3-0,4
Light Metal	0,1-0,2	0,2-0,3	0,3-0,4	0,4-0,5	0,5
Plastic - Hard	0,1-0,2	0,3	0,4	0,4-0,5	0,5
Plastic - Soft	0,1-0,2	0,2	0,2	0,3	0,3-0,4

### Notes

- If left very little pass the front side of the reamer gets blunt.  
Rear surfaces apply pressure only on the lateral surfaces of the hole.
- In preliminary reaming table values must be increased with 50%.
- On ground reamers and reamers with indexable bits, it's recommended less pass thickness
- For acquiring a high quality hole surface, particularly in hard materials it's recommended preliminary and final reaming.

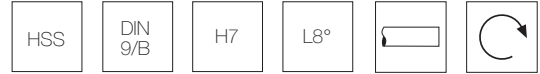


## HAND REAMERS



Product Code	d1 mm	L1 mm	L2 mm	k mm	Product Code	d1 mm	L1 mm	L2 mm	k mm
B00301010200	2,0	50	25	1,60	B00301011500	15,0	163	81	11,20
B00301010250	2,5	58	29	2,10	B00301011550	15,5	175	87	12,50
B00301010300	3,0	62	31	2,24	B00301011600	16,0	175	87	12,50
B00301010350	3,5	71	35	2,70	B00301011650	16,5	175	87	12,50
B00301010400	4,0	76	38	3,15	B00301011700	17,0	175	87	12,50
B00301010450	4,5	81	41	3,55	B00301011750	17,5	188	93	14,00
B00301010500	5,0	87	44	4,00	B00301011800	18,0	188	93	14,00
B00301010550	5,5	93	47	4,50	B00301011850	18,5	188	93	14,00
B00301010600	6,0	93	47	4,50	B00301011900	19,0	188	93	14,00
B00301010650	6,5	100	50	5,00	B00301011950	19,5	201	100	16,00
B00301010700	7,0	107	54	5,60	B00301012000	20,0	201	100	16,00
B00301010750	7,5	107	54	5,60	B00301012100	21,0	201	100	16,00
B00301010800	8,0	115	58	6,30	B00301012200	22,0	215	107	18,00
B00301010850	8,5	115	58	6,30	B00301012300	23,0	215	107	18,00
B00301010900	9,0	124	62	7,10	B00301012400	24,0	231	115	20,00
B00301010950	9,5	124	62	7,10	B00301012500	25,0	231	115	20,00
B00301011000	10,0	133	66	8,00	B00301012600	26,0	231	115	20,00
B00301011050	10,5	133	66	8,00	B00301012700	27,0	247	124	22,40
B00301011100	11,0	142	71	9,00	B00301012800	28,0	247	124	22,40
B00301011150	11,5	142	71	9,00	B00301012900	29,0	247	124	22,40
B00301011200	12,0	152	76	10,00	B00301013000	30,0	247	124	22,40
B00301011250	12,5	152	76	10,00	B00301013200	32,0	265	133	25,00
B00301011300	13,0	152	76	10,00	B00301013300	33,0	265	133	25,00
B00301011350	13,5	163	81	11,20	B00301013500	35,0	284	142	28,00
B00301011400	14,0	163	81	11,20	B00301013600	36,0	284	142	28,00
B00301011450	14,5	163	81	11,20	B00301013800	38,0	305	152	31,50
					B00301014000	40,0	305	152	31,50





## HAND TAPER REAMERS



Product Code	d1 mm	d2 mm	d3 mm	L1 mm	L2 mm	L3 mm	k mm
B00300010200	2,0	1,9	2,86	68	48	5	2,40
B00300010250	2,5	2,4	3,36	68	48	5	2,40
B00300010300	3,0	2,9	4,06	80	58	5	3,00
B00300010350	3,5	3,4	4,66	87	63	5	3,40
B00300010400	4,0	3,9	5,26	93	68	5	3,80
B00300010450	4,5	4,4	5,80	97	70	5	4,30
B00300010500	5,0	4,9	6,36	100	73	5	4,90
B00300010550	5,5	5,4	7,18	118	89	5	6,20
B00300010600	6,0	5,9	8,00	135	105	5	6,20
B00300010650	6,5	6,4	8,60	140	110	5	6,20
B00300010700	7,0	6,9	9,40	160	125	5	7,00
B00300010800	8,0	7,9	10,80	180	145	5	8,00
B00300011000	10,0	9,9	13,40	215	175	5	10,00
B00300011200	12,0	11,8	16,00	255	210	10	11,00
B00300011600	16,0	15,8	20,40	280	230	10	14,50
B00300011800	18,0	17,8	22,80	310	250	10	14,50
B00300012000	20,0	19,8	24,80	310	250	10	18,00



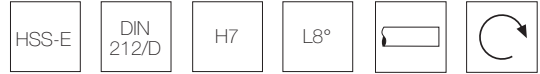
REAMERS



## STRAIGHT SHANK MACHINE REAMERS



Product Code	d1 mm	d2 (h9) mm	L1 mm	L2 mm	Product Code	d1 mm	d2 (h9) mm	L1 mm	L2 mm
B00303010200	2	2	49	11	B00303011250	12.5	10	151	44
B00303010250	2.5	2.5	57	14	B00303011300	13	10	151	44
B00303010300	3	3	61	15	B00303011350	13.5	12.5	160	47
B00303010350	3.5	3.5	70	18	B00303011400	14	12.5	160	47
B00303010400	4	4	75	19	B00303011450	14.5	12.5	162	50
B00303010450	4.5	4.5	80	21	B00303011500	15	12.5	162	50
B00303010500	5	5	86	23	B00303011550	15.5	12.5	170	52
B00303010550	5.5	5.6	93	26	B00303011600	16	12.5	170	52
B00303010600	6	5.6	93	26	B00303011650	16.5	14	175	54
B00303010650	6.5	6.3	101	28	B00303011700	17	14	175	54
B00303010700	7	7.1	109	31	B00303011750	17.5	14	182	56
B00303010750	7.5	7.1	109	31	B00303011800	18	14	182	56
B00303010800	8	8	117	33	B00303011850	18.5	16	189	58
B00303010850	8.5	8	117	33	B00303011900	19	16	189	58
B00303010900	9	9	125	36	B00303012000	20	16	195	60
B00303010950	9.5	9	125	36	B00303012200	22	18	225	55
B00303011000	10	10	133	38	B00303012400	24	20	240	60
B00303011050	10.5	10	133	38	B00303012500	25	20	245	60
B00303011100	11	10	142	41	B00303012600	26	20	250	60
B00303011150	11.5	10	142	41	B00303012800	28	22	270	65
B00303011200	12	10	151	44	B00303013000	30	24	280	70



## STRAIGHT SHANK MACHINE REAMERS



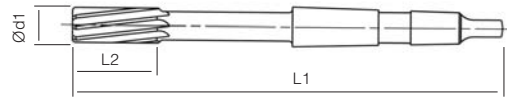
Product Code	d1 mm	d2 (h9) mm	L1 mm	L2 mm	Product Code	d1 mm	d2 (h9) mm	L1 mm	L2 mm
B00353010200	2	2	49	11	B00353011250	12,5	10	151	44
B00353010250	2,5	2,5	57	14	B00353011300	13	10	151	44
B00353010300	3	3	61	15	B00353011350	13,5	12,5	160	47
B00353010350	3,5	3,5	70	18	B00353011400	14	12,5	160	47
B00353010400	4	4	75	19	B00353011450	14,5	12,5	162	50
B00353010450	4,5	4,5	80	21	B00353011500	15	12,5	162	50
B00353010500	5	5	86	23	B00353011550	15,5	12,5	170	52
B00353010550	5,5	5,6	93	26	B00353011600	16	12,5	170	52
B00353010600	6	5,6	93	26	B00353011650	16,5	14	175	54
B00353010650	6,5	6,3	101	28	B00353011700	17	14	175	54
B00353010700	7	7,1	109	31	B00353011750	17,5	14	182	56
B00353010750	7,5	7,1	109	31	B00353011800	18	14	182	56
B00353010800	8	8	117	33	B00353011850	18,5	16	189	58
B00353010850	8,5	8	117	33	B00353011900	19	16	189	58
B00353010900	9	9	125	36	B00353012000	20	16	195	60
B00353010950	9,5	9	125	36	B00353012200	22	18	225	55
B00353011000	10	10	133	38	B00353012400	24	20	240	60
B00353011050	10,5	10	133	38	B00353012500	25	20	245	60
B00353011100	11	10	142	41	B00353012600	26	20	250	60
B00353011150	11,5	10	142	41	B00353012800	28	22	270	65
B00353011200	12	10	151	44	B00353013000	30	24	280	70



REAMERS



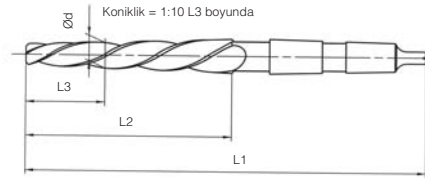
## MORSE TAPER REAMERS



Product Code	d1 mm	L1 mm	L2 mm	Morse Taper
B00302010800	8	156	33	1
B00302011000	10	168	38	1
B00302011100	11	175	41	1
B00302011200	12	182	44	1
B00302011300	13	182	44	1
B00302011400	14	189	47	1
B00302011500	15	204	50	2
B00302011600	16	210	52	2
B00302011700	17	214	54	2
B00302011800	18	219	56	2
B00302011900	19	223	58	2
B00302012000	20	228	60	2
B00302012100	21	232	62	2
B00302012200	22	237	64	2
B00302012300	23	241	66	2
B00302012400	24	268	68	3
B00302012500	25	268	68	3
B00302012600	26	273	70	3
B00302012700	27	277	71	3
B00302012800	28	277	71	3
B00302012900	29	281	73	3
B00302013000	30	281	73	3
B00302013200	32	317	77	4
B00302013500	35	321	78	4
B00302014000	40	329	81	4



## SHELL REAMERS



Product Code	d mm	L1 mm	L2 mm	L3 mm	Morse Taper
B00305001000	10	171	95	30	1
B00305001200	12	199	105	39	2
B00305001300	13	199	105	39	2
B00305001500	15	219	125	45	2
B00305001600	16	229	135	48	2
B00305001700	17	251	135	51	3
B00305001800	18	261	145	58	3
B00305002000	20	271	155	62	3

## Recommendations of Ali Usta

### Ali Usta says;

Reamers are precision tools used for acquiring of smooth hole surface and measuring accuracy.

#### Hand reamers:

- Cylindrical shank hand reamer
- 1/50 taper pin hand reamer

#### Machine Reamers:

- Cylindrical shank machine reamer
- Morse taper shank machine reamer



### Ali Usta;

#### IMPORTANT CRITERIAS IN

#### Choosing Reamers:

- For easy cutting and better surface quality, choose reamer with helical flutes.
- The reamers are produced with straight or helical flutes. (Left helix, Right hand) For steel with resistance 1200 N/mm<sup>2</sup>, hard cast iron and stainless steel is used carbide tipped reamers.



### Ali Usta recommends also;

For different materials use different types of reamers.

- TYPE N - 8° Left helix right hand (Rake angle 0°-5°)  
For long chipped ductile steel and cast iron with medium hardness an normal resistance.
- TYPE W - 35°-40° Left helix, right hand. (Rake angle 8°- 5°)  
For long chipped materials such as soft aluminium, brass, copper and copper alloys with low resistance



## Solutions of Ali Usta

### Hole size is found too large.

- There is clearance in the machine's shaft and slides or runout reamer.
- Faulty reamer attachment (shell, clips, etc).
- Reamer's lead length is not suitable or sharpening is faulty.
- Cutting speed and feed is too high.
- Cutting oil with low concentration is used.



### Hole size is found too small.

- Reamer's size and tolerance are not suitable and sharpening is faulty.
- The material is subject to plastic deformation since sufficient chip is not removed because the reamer is chosen small.
- Cutting oil with high concentration is used.



### Taper or oval hole is found.

- There is runout on the machine shaft.
- The tool's lead is not suitable.
- The axis of the front hole and the reamer's axis don't coincide.



### Surface quality of the hole is not good.

- Reamer margin is selected small.
- Lead length is short and there is runout on cutting edges.
- Helical direction is chosen wrongly.
- Cutting speed and feed is not suitable.
- Cutting oil is not suitable. Cooling pressure must be increased.







# COUNTERSINKS



COUNTERSINKS



Tool Type	Standard	Quality	Coating	Page Nr
TAPER SHEET DRILL	MTE	HSS	-	238
STEP DRILL	MTE	HSS	-	238
STRAIGHT SHANK COUNTERSINK - 90°	Din 335/A	HSS	-	239
STRAIGHT SHANK COUNTERSINK (3 FLUTES) - 90°	Din 335/C	HSS	-	239
STRAIGHT SHANK COUNTERSINK (3 FLUTES) - 90°	Din 335/C	HSS	TiN	240
STRAIGHT SHANK COUNTERSINK - 60°	Din 334/A	HSS	-	240
STRAIGHT SHANK COUNTERSINK (3 FLUTES) - 60°	Din 334/C	HSS	-	241
STRAIGHT SHANK COUNTERSINK (3 FLUTES) - 60°	Din 334/C	HSS	TiN	241
COUNTERSINK CROSS HOLE - 90°	MTE	HSS-E	-	242
COUNTERBORES WITH PARALLEL SHANK	Din 373	HSS	-	243
CORE DRILL WITH WELDON SHANK - SHORT	MTE	HSS	-	244
CORE DRILL WITH WELDON SHANK - LONG	MTE	HSS	-	245



## Recommended Cutting Values for Countersinks

Material	Unalloyed steel up to 700 N/mm <sup>2</sup>	Unalloyed steel higher than 700 N/mm <sup>2</sup>	Unalloyed steel up to 1000 N/mm <sup>2</sup>	Steel cast up to 250 N/mm <sup>2</sup>	Steel cast higher than 250 N/mm <sup>2</sup>	Brittle brass	Ductile brass	Al. alloys up to 11% Si	Thermo plastic	Duro plastic
Cutting speed(m/min.)	20	15	10	10	8	40	20	20	15	10
Cutting Fluid Size Ø mm	Cutting Spray Rev/min	Cutting Spray Rev/min	Cutting Spray Rev/min	Pressurized Air Rev/min	Pressurized Air Rev/min	Pressurized Air Rev/min	Pressurized Air Rev/min	Cutting Spray Rev/min	Water Rev/min	Pressurized Air Rev/min
4,3	1481	1111	741	741	593	2963	1481	1481	1111	741
5,0	1274	955	637	637	510	2548	1274	1274	955	637
5,3	1202	901	601	601	481	2404	1202	1202	901	601
5,8	1098	824	549	549	439	2196	1098	1098	824	549
6,0	1062	796	531	531	425	2123	1062	1062	796	531
6,3	1011	758	506	506	404	2022	1011	1011	758	506
7,0	910	682	455	455	364	1820	910	910	682	455
7,3	873	654	436	436	349	1745	873	873	654	436
8,0	796	597	398	398	318	1592	796	796	597	398
8,3	767	576	384	384	307	1535	767	767	576	384
9,4	678	508	339	339	271	1355	678	678	508	339
10,0	637	478	318	318	255	1274	637	637	478	318
10,4	612	459	306	306	245	1225	612	612	459	306
11,5	554	415	277	277	222	1108	554	554	415	277
12,0	531	398	265	265	212	1062	531	531	398	265
12,4	514	385	257	257	205	1027	514	514	385	257
12,5	510	382	255	255	204	1019	510	510	382	255
13,4	475	356	238	238	190	951	475	475	356	238
15,0	425	318	212	212	170	849	425	425	318	212
16,0	398	299	199	199	159	796	398	398	299	199
16,5	386	290	193	193	154	772	386	386	290	193
19,0	335	251	168	168	134	670	335	335	251	168
20,0	318	239	159	159	127	637	318	318	239	159
20,5	311	233	155	155	124	621	311	311	233	155
23,0	277	208	138	138	111	554	277	277	208	138
25,0	255	191	127	127	102	510	255	255	191	127
26,0	245	184	122	122	98	490	245	245	184	122
28,0	227	171	114	114	91	455	227	227	171	114
30,0	212	159	106	106	85	425	212	212	159	106
31,0	205	154	103	103	82	411	205	205	154	103
31,5	202	152	101	101	81	404	202	202	152	101
34,0	187	141	94	94	75	375	187	187	141	94
37,0	172	129	86	86	69	344	172	172	129	86
40,0	159	119	80	80	64	318	159	159	119	80
50,0	127	96	64	64	51	255	127	127	96	64
63,0	101	76	51	51	40	202	101	101	76	51
80,0	80	60	40	40	32	159	80	80	60	40

Nrte: Cutting speeds may vary depending on the operating conditions.

## Recommended Cutting Values for Sheet Drills

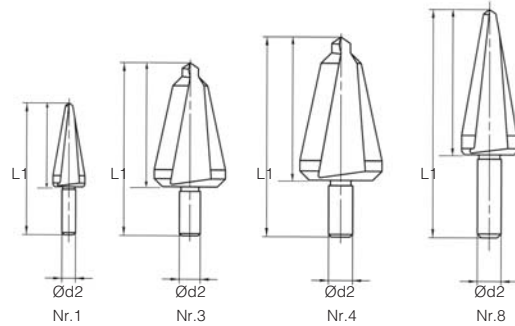
Material		Unalloyed steel up to 700 N/mm <sup>2</sup>	Unalloyed steel higher than 700 N/mm <sup>2</sup>	Unalloyed steel up to 1000 N/mm <sup>2</sup>	Steel cast up to 250 N/mm <sup>2</sup>	Steel cast higher than 250 N/mm <sup>2</sup>	Brittle brass	Ductile brass	Al. alloys up to 11% Si	Thermo plastic	Duro plastic
Sheet thickness		Up to 4 mm	Up to 4 mm	Up to 4 mm	Up to 4 mm	Up to 4 mm	Up to 4 mm	Up to 4 mm	Up to 4 mm	Up to 4 mm	Up to 4 mm
Cutting speed m/min.		30	20	20	15	10	60	35	30	20	15
Cutting Fluid		Cutting Spray	Cutting Spray	Cutting Spray	Pressurized Air	Pressurized Air	Pressurized Air	Pressurized Air	Cutting Spray	Water	Pressurized Air
Size	Ø mm	Rev/min	Rev/min	Rev/min	Rev/min	Rev/min	Rev/min	Rev/min	Rev/min	Rev/min	Rev/min
Nr. 1	3,0-14,0	3185-682	2123-455	2123-455	1592-341	1062-227	6369-1365	3715-796	3185-682	2123-455	1592-345
Nr. 2	5,0-20,0	1911-478	1274-318	1274-318	955-239	637-159	3822-955	2229-557	1911-478	1274-318	955-239
Nr. 3	16,0-30,5	597-313	398-209	398-209	299-157	199-104	1194-627	697-365	597-313	398-209	299-135
Nr. 4	24,0-40,0	398-239	265-159	265-159	199-119	133-80	796-478	464-279	398-239	265-159	199-114
Nr. 5	36,0-50,0	265-191	177-127	177-127	133-96	88-64	531-382	310-223	265-191	177-127	133-98
Nr. 6	40,0-61,0	239-157	159-104	159-104	119-78	80-52	478-313	279-183	239-157	159-104	119-78
Nr. 7	5,0-25,4	1911-376	1274-251	1274-251	955-188	637-125	3822-752	2229-439	1911-376	1274-251	955-86
Nr. 8	5,0-31,0	1911-308	1274-205	1274-205	955-154	637-103	3822-616	2229-360	1911-308	1274-205	955-154
Nr. 9	5,0-22,5	1911-425	1274-283	1274-283	955-212	637-142	3822-849	2229-495	1911-425	1274-283	955-215

Nrte: Cutting speeds may vary depending on the operating conditions.





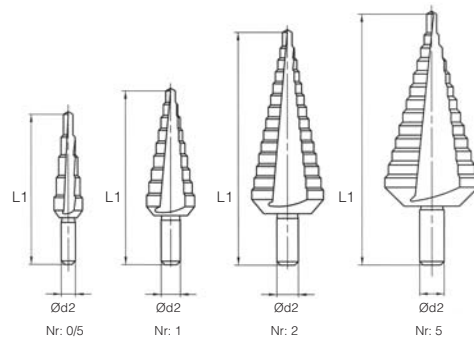
### TAPER SHEET DRILL



Product Code	Nr	Drilling Range	d2 mm	L1 mm
B00319990646	Nr 1	3-14	6	58
B00319990647	Nr 2	5-20	8	71
B00319990648	Nr 3	16-30,5	9	76
B00319990649	Nr 4	24-40	10	89
B00319990650	Nr 8	5-31	9	103



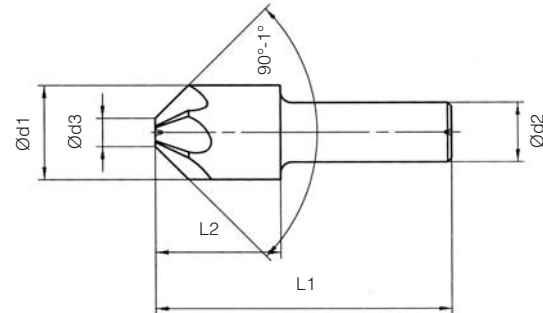
### STEP DRILL



Product Code	Nr	Drilling Range	d2 mm	L1 mm	Diameter Steps
B00314010512	Nr 0,5	4-12	6	65	5
B00314010120	Nr 1	4-20	8	75	9
B00314010230	Nr 2	4-30	10	100	14
B00314010539	Nr 5	4-39	10	107	13



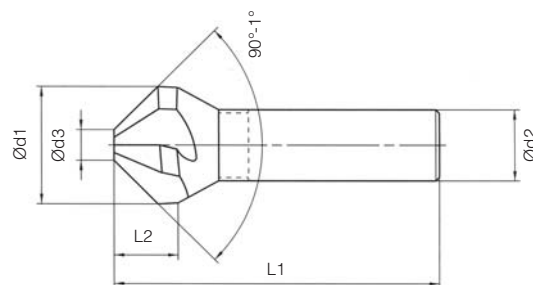
### STRAIGHT SHANK COUNTERSINK-90°



Product Code	d1 mm	d2 mm	d3 mm	L1 mm	L2 mm
B00313100800	8,0	8	-	48	-
B00313101250	12,5	8	2,0	48	16
B00313101600	16,0	10	3,2	56	20
B00313102000	20,0	10	5,0	60	24
B00313102500	25,0	10	7,0	71	26
B00313103150	31,5	16	9,0	90	30

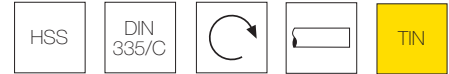


### STRAIGHT SHANK COUNTERSINK (3 FLUTES)-90°

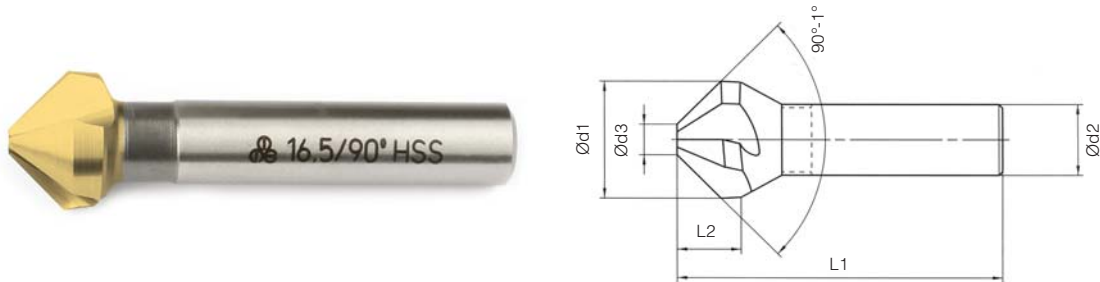


Product Code	d1 mm	d2 mm	d3 mm	L1 mm	L2 mm
B00313120630	6,3	5,0	1,5	45	5,0
B00313120830	8,3	6,0	2,0	50	6,0
B00313121040	10,4	6,0	2,5	50	7,1
B00313121240	12,4	8,0	2,8	56	8,0
B00313121650	16,5	10,0	3,2	60	10,0
B00313122050	20,5	10,0	3,5	63	12,5
B00313122500	25,0	10,0	3,8	67	15,0
B00313123150	31,0	12,0	4,2	71	18,0





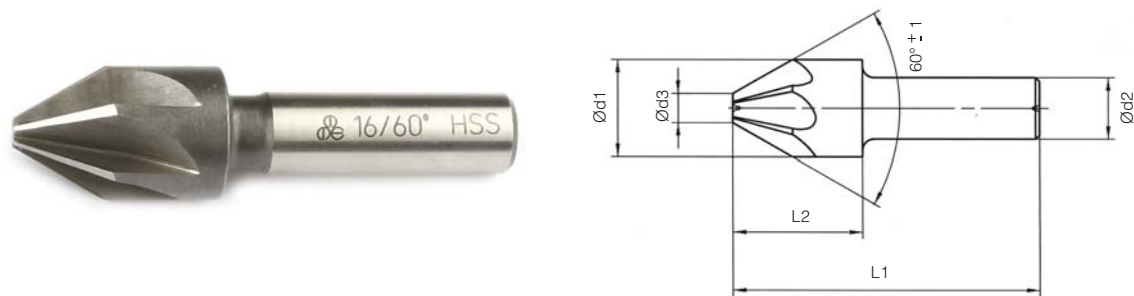
### STRAIGHT SHANK COUNTERSINK (3 FLUTES)-90°



Product Code	d1 mm	d2 mm	d3 mm	L1 mm	L2 mm
B10313120630	6,3	5,0	1,5	45	5,0
B10313120830	8,3	6,0	2,0	50	6,0
B10313121040	10,4	6,0	2,5	50	7,1
B10313121240	12,4	8,0	2,8	56	8,0
B10313121650	16,5	10,0	3,2	60	10,0
B10313122050	20,5	10,0	3,5	63	12,5
B10313122500	25,0	10,0	3,8	67	15,0
B10313123150	31,0	12,0	4,2	71	18,0



### STRAIGHT SHANK COUNTERSINK-60°

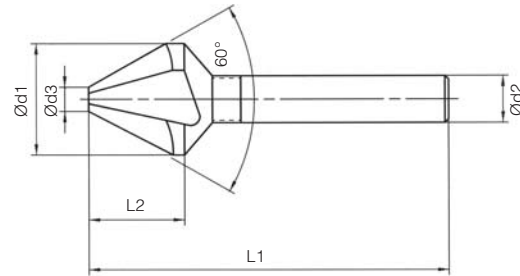


Product Code	d1 mm	d2 mm	d3 mm	L1 mm	L2 mm
B00313000800	8,0	8	-	50	-
B00313001250	12,5	8	2,0	50	18
B00313001600	16,0	10	3,2	60	24
B00313002000	20,0	10	5,0	63	27
B00313002500	25,0	10	7,0	78	33





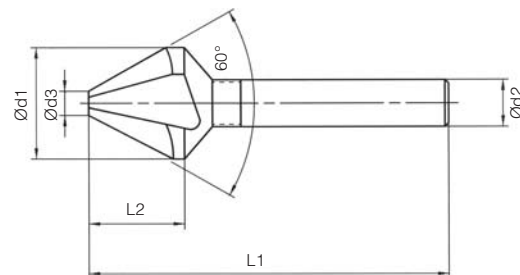
STRAIGHT SHANK COUNTERSINK (3 FLUTES)-60°



Product Code	d1 mm	d2 mm	d3 mm	L1 mm	L2 mm
B00313020800	8,0	6	2,0	50	8,0
B00313021250	12,5	8	3,2	56	11,2
B00313021600	16,0	10	4,0	63	14,0
B00313022000	20,0	10	5,0	67	17,0
B00313022500	25,0	10	6,3	71	20,0



STRAIGHT SHANK COUNTERSINK (3 FLUTES)-60°

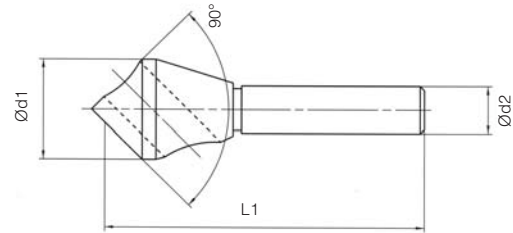


Product Code	d1 mm	d2 mm	d3 mm	L1 mm	L2 mm
B10313020800	8,0	6	2,0	50	8,0
B10313021250	12,5	8	3,2	56	11,2
B10313021600	16,0	10	4,0	63	14,0
B10313022000	20,0	10	5,0	67	17,0
B10313022500	25,0	10	6,3	71	20,0





COUNTERSINKS CROSS HOLE - 90°

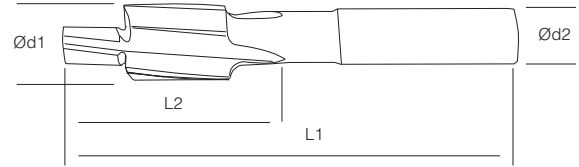


Product Code	Operating Range	d1 mm	d2 mm	L mm
B00369990068	2 - 5	10	6,0	45
B00369990069	5 - 10	14	8,0	48
B00369990070	10 - 15	21	10,0	65
B00369990071	15 - 20	28	12,0	85
B00369990072	20 - 25	35	12,7	102

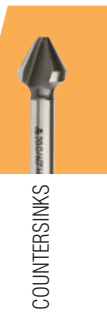




## COUNTERBORES WITH PARALLEL SHANK



Product Code	d1 mm	d2 mm	d1 mm	d2 mm	d3 mm	L1 mm	L2 mm
B00311190012	M3	6	3.2	5	71	14	4
B00311190013	M4	8	4.3	5	71	14	4
B00311190014	M5	10	5.3	8	80	18	6
B00311190009	M6	11	6.4	8	80	18	6
B00311190010	M8	15	8.4	12.5	100	22	10
B00311190011	M10	18	10.5	12.5	100	22	14
B00311190015	M12	20	13	12.5	100	22	14

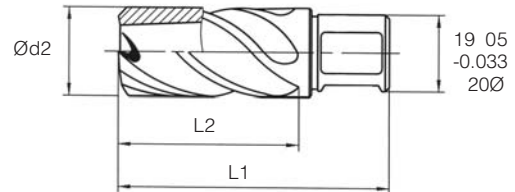




## CORE DRILL WITH WELDON SHANK-SHORT



Drilling Length 25 mm



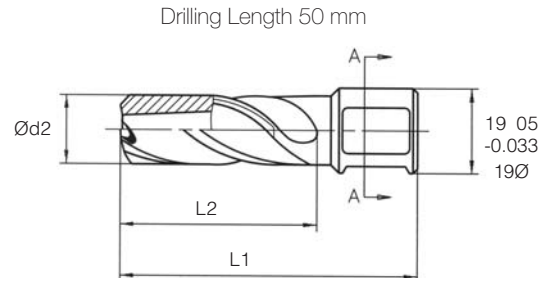
Product Code	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)
B00310301200	12	65	36	4
B00310301300	13	65	36	4
B00310301400	14	65	36	4
B00310301500	15	65	36	4
B00310301600	16	65	36	6
B00310301700	17	65	36	6
B00310301800	18	65	36	6
B00310301900	19	65	36	6
B00310302000	20	65	36	6
B00310302100	21	65	38	6
B00310302200	22	65	38	6
B00310302300	23	65	38	6
B00310302400	24	65	38	6
B00310302500	25	65	38	6

Product Code	d2 mm	L1 mm	L2 mm	Z (Number of Flutes)
B00310302600	26	65	38	6
B00310302700	27	65	38	6
B00310302800	28	65	38	8
B00310302900	29	65	38	8
B00310303000	30	65	38	8
B00310303100	31	65	40	8
B00310303200	32	65	40	8
B00310303300	33	65	40	8
B00310303400	34	65	40	10
B00310303500	35	65	40	10
B00310303600	36	65	40	10
B00310303700	37	65	40	10
B00310303800	38	65	40	10
B00310303900	39	65	40	10
B00310304000	40	65	40	10





## CORE DRILL WITH WELDON SHANK-LONG



Product Code	d2 mm	L1 mm	L2 mm	z (Number of Flutes)
B00310401200	12	90	60	4
B00310401300	13	90	60	4
B00310401400	14	90	60	4
B00310401500	15	90	60	4
B00310401600	16	90	60	6
B00310401700	17	90	60	6
B00310401800	18	90	60	6
B00310401900	19	90	60	6
B00310402000	20	90	60	6
B00310402100	21	90	60	6
B00310402200	22	90	60	6
B00310402300	23	90	60	6
B00310402400	24	90	60	6
B00310402500	25	90	60	6

Product Code	d2 mm	L1 mm	L2 mm	z (Number of Flutes)
B00310402600	26	90	60	6
B00310402700	27	90	60	6
B00310402800	28	90	60	8
B00310402900	29	90	60	8
B00310403000	30	90	60	8
B00310403100	31	90	62	8
B00310403200	32	90	62	8
B00310403300	33	90	62	8
B00310403400	34	90	62	10
B00310403500	35	90	62	10
B00310403600	36	90	62	10
B00310403700	37	90	62	10
B00310403800	38	90	62	10
B00310403900	39	90	62	10
B00310404000	40	90	62	10





# MILLING CUTTERS



MILLING CUTTERS

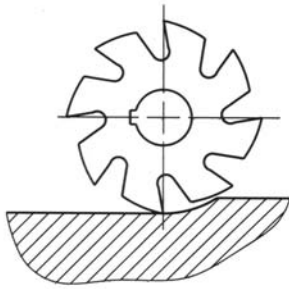




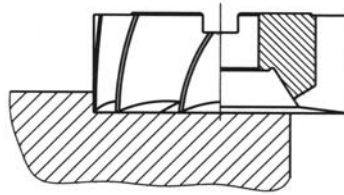
Tool Type	Quality	Standard	Page No
END MILLS - SHORT SERIES - TYPE BN	HSS - E (%8Co)	DIN 844	256
END MILLS - LONG SERIES - TYPE BN	HSS - E (%8Co)	DIN 844	257
END MILLS - SHORT SERIES - TYPE BN - TiCN COATED	HSS - E (%8Co)	DIN 844	258
END MILLS - LONG SERIES - TYPE BN - TiCN COATED	HSS - E (%8Co)	DIN 844	258
END MILLS - SHORT SERIES - TYPE BW	HSS - E (%8Co)	DIN 844	259
END MILLS - LONG SERIES - TYPE BW	HSS - E (%8Co)	DIN 844	259
END MILLS - SHORT SERIES - TYPE BNF	HSS - E (%8Co)	DIN 844	260
END MILLS - SHORT SERIES - TYPE BNR	HSS - E (%8Co)	DIN 844	260
END MILLS - LONG SERIES - TYPE BNR	HSS - E (%8Co)	DIN 844	261
END MILLS - LONG SERIES - TYPE BNF	HSS - E (%8Co)	DIN 844	261
SLOT CUTTERS	HSS - E (%8Co)	DIN 844	262
BALL NOSED END MILLS - SHORT SERIES	HSS - E (%8Co)	DIN 1889/B	263
BALL NOSED END MILLS - LONG SERIES	HSS - E (%8Co)	DIN 1889/B	263
WOODRUFF KEYSEAT CUTTERS - STAGGERED TEETH	HSS - E	DIN 850/D	264
T- SLOT CUTTERS - STARGGERED TEETH	HSS - E	DIN 851/B	264
DOVETAIL CUTTERS	HSS - E	DIN 1833/C	265
SINGLE FLUTE ALUMINIUM END MILLS	HSS - E (%8Co)	MTE Norm	266
SINGLE FLUTE ALUMINIUM END MILLS	HSS - E (%8Co)	MTE Norm	266
MORSE TAPER END MILLS - SHORT SERIES - TYPE BN	HSS - E	DIN 845	267
MORSE TAPER END MILLS - LONG SERIES - TYPE BN	HSS - E	DIN 845	267
MORSE TAPER END MILLS - SHORT SERIES - TYPE BNR	HSS - E	DIN 845	268
MORSE TAPER END MILLS - SHORT SERIES - TYPE BNF	HSS - E	DIN 845	268
DRILLING - MILLING COMBINED TOOLS	HSS	MTE Norm	269
SHELL END MILLS	HSS	DIN 1880	269
SIDE AND FACE CUTTERS - STRAIGHT TEETH	HSS	DIN 885/B	270
SIDE AND FACE CUTTERS - STAGGERED TEETH	HSS	DIN 885/A	270
ANGULAR CUTTERS	HSS	DIN 842	271
DOUBLE ANGLE MILLING CUTTERS	HSS	DIN 847	271
CONCAVE RADIUS CUTTERS	HSS	DIN 855	272
CONVEX RADIUS CUTTERS	HSS	DIN 856	272



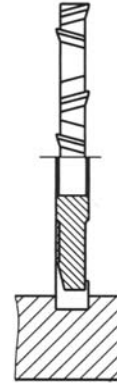
## Application Examples of Milling Cutter Types



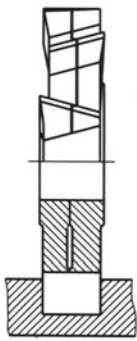
Plain Milling Cutter



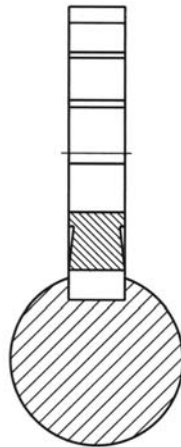
Shell End Mill



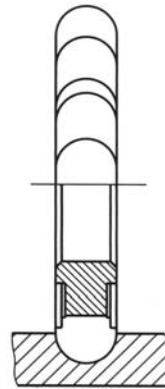
Side and Face Milling Cutter



Adjustable Side and Face Milling Cutter



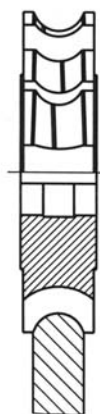
Side and Face Milling Cutter



Convex Milling Cutter



Concave Milling Cutter

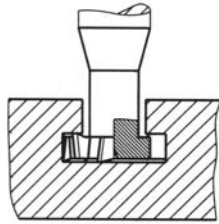


Adjustable Milling Cutter

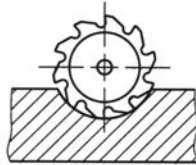


Corner Radius Milling Cutter

## Application Examples of Milling Cutter Types



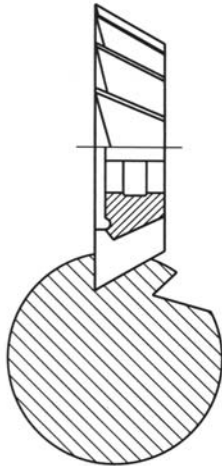
T-Slot Cutter



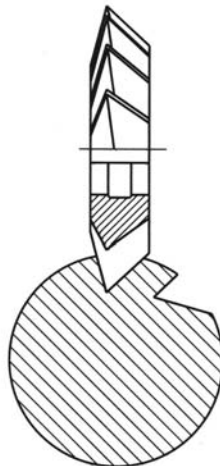
Woodruff Milling Cutter



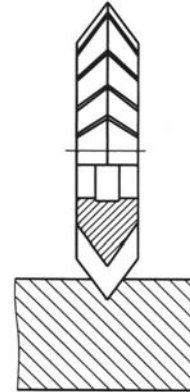
Angular Milling Cutter



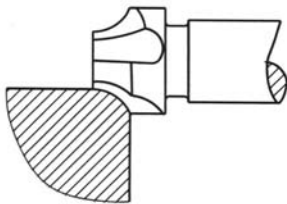
Single - Angled Milling Cutter



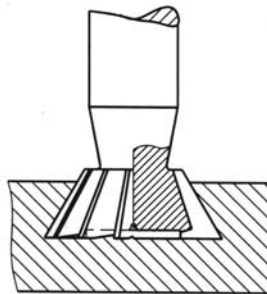
Double - Angled Milling Cutter



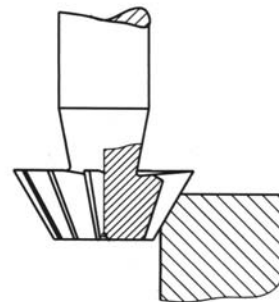
Double - Angled Milling Cutter



Corner Radius Milling Cutter



Dovetail Cutter



Dovetail Cutter



## Milling Cutters Types and Materials

The application of milling cutters according to the tool type is show on Table 1 below; the chip breaker form raughing milling cutters Table 2; using area according to the material is shown Table 3.

**Table1**

Tool Type		Areas of Usage
DIN	TS	
N	N	Materials with normal resistance and hardness values
H	S	Hard, hard ductile materials with high resistance and short chipping materials
W	Y	Soft, ductile and / or long chipping materials

**Table 2**

Tool Type		Areas of Usage
NF	HF	
NR	HR	Roughing

**Table 3 A-** Steel and steel cast materials

Description of Material		Tensile Resistance (N/mm <sup>2</sup> )		Milling Cutter Types				
		from	up to	N	H	W	NF NR	HF HR
Automate Steel		370	600	•		○	•	○
		550	1000	•	○		•	
Construction Steel	Non-alloyed	-	600	•		○	•	
	Alloyed	500	900	•			•	
Stainless steels and stainless steel cast		450	950	•			•	
Nitruration Steel	Softened	700	900	•			•	
	Toughened	800	1250	•	○		•	•
Steel Cast		400	1100	•			•	
	Soft or tempered	500	750	•			•	
Toughened Steel	Non alloyed, toughened	700	1000	•			•	
	Alloyed, toughened	700	1000	•			•	
		900	1250	•	○		•	•
	Alloyed, toughened	900	1250	•	○		•	•
Tool Steel	Non-alloyed or alloyed, softened	Hardness 180	(HB) 240	•			•	
	High carbon and / or high alloyed softened, finned	Hardness 220	(HB) 300	○	•		○	•
		100	240	•		•	•	
Cast Iron	Graphite	230	320	○	•	•	○	•
	Round	100	240	•		•	○	○
	Graphite	230	320	○	•	•	○	•
Tempered Cast		100	270	•		•	○	○

**Table3 B -** Non Ferrous Metals

Description of Material		Tensile Strength (N/mm <sup>2</sup> )		Milling Cutter Types					
		from	to	N	H	W	NF	NR	HF HR
Aluminium cast alloy with up to 10% Si		-	180	○		•			
Aluminium cast alloy with more than10 % Si		150	250	•		○	○		
Copper		200	400	○		•			
	Low resistance, High copper content	200	550	○		•			
Copper and Copper alloys	High resistance, low or High copper content	250	850	•		○		○	
	Chip breaking characteristic (alloyed in Pb <sup>1</sup> Ph <sup>1</sup> Te alloyed)	250	500	○	•				
Magnesium and Mg. alloys		150	300	•		○			
Titanium alloys	Medium resistance	-	700	•		○	•	•	
	Low resistance	600	1100	○	•		○		•

## Tool Types and Operating Values of Milling Cutters According to the Material

V= Cutting speed (m/min.)

fz= feed per (mm/thread)

F = Feed (mm/min)=fz.n.z.

z = Number of threads of milling cutter

n = Number of revolution of milling cutter (revolution/minute)

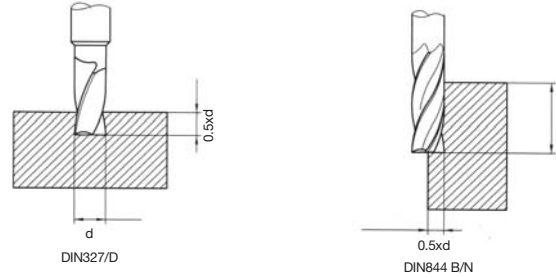
Type of Material	Milling cutter material	Shell End Mills		Side and Face Milling Cutters			
		V	fz	Tip	V	fz	Tip
Non-alloyed steels Up to 500 N/mm <sup>2</sup>	HSS	16..20	0.20	N	16..20	0.12	N
	HSS-E	30..40	0.2..0.25		20..25	0.10..1.16	
Non-alloyed and alloyed steels Up to 800 N/mm <sup>2</sup>	HSS	14..16	0.16	N	14..16	0.10	N
	HSS-E	27..33	0.2..0.25		16..20	0.10..0.12	
Non-alloyed and alloyed steels Up to 1000 N/mm <sup>2</sup>	HSS	11..14	0.12	N-H	11..14	0.08	N-H
	HSS-E	20..26	0.18..0.22		12..16	0.08..0.10	
Non-alloyed and alloyed steels Up to 1300 N/mm <sup>2</sup>	HSS	8..11	0.06	H	8..11	0.05	H
	HSS-E	13..15	0.09..0.15		10..12	0.05..0.07	
Aluminium alloys (soft)	HSS	300	0.12	W	280	0.12	W
	HSS-E	300	0.15		300	0.12	
Aluminium alloys (medium, hard)	HSS	220	0.12	N-W	200	0.10	N-W
	HSS-E	240	0.12		220	0.10	
Aluminium alloys (hard)	HSS	180	0.10	N-W	160	0.10	N-W
	HSS-E	200	0.10		180	0.10	
Grey cast iron Up to 200 HB	HSS	12..14	0.25	N	12..14	0.20	N
	HSS-E	22..26	0.2..0.25		14..20	0.20	
Grey cast iron higher than 200 HB	HSS	8..12	0.16	H	8..12	0.10	H
	HSS-E	12..18	0.15..0.20		8..12	0.10	
Tempered Cast Up to 200 HB	HSS	14..18	0.20	N	14..18	0.16	N
	HSS-E	16..20	0.20		16..20	0.20	
Steel Cast Up to 700 N/mm <sup>2</sup>	HSS	11..14	0.16	N(H)	11..14	0.16	N(H)
	HSS-E	12..18	0.15..0.20		11..14	0.20	
Brass (soft)	HSS	40	0.20	W	36	0.16	W
	HSS-E	40-60	0.15..0.20		40	0.20	
Brass-Bronze (hard)	HSS	32	0.16	N	32	0.12	N
	HSS-E	30..36	0.16		36	0.20	

The table values above are given as reference values;

- For materials with homogeneous structure,
- For stable machine and stable fixing conditions;
- For proper cooling conditions;
- For perpendicular positioning of the tool to the axis of the work piece.



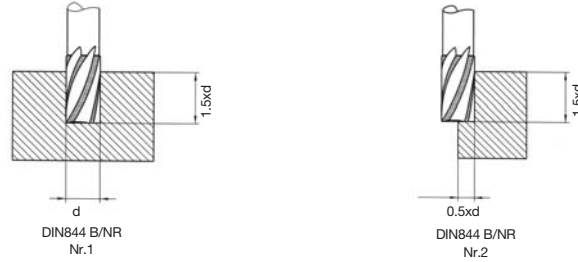
## Recommended Operating Conditions for End Mills



Material	Cutting speed (m/min.)	Number of Flutes Diameter (mm)	DIN 327 / D												DIN 844 B / N						
			2	2	2	2	2	2	2	2	2	2	2	2	4	4	4	4	4	6	6
I Structural, Nitride Steels, Automate Steels, Tempered Steels > 700 N/mm <sup>2</sup> Tool Steels Gray Cast Iron GG<200HB	HSS-E	25-32	fz	.004	.008	.015	.025	.040	.050	.075	.090	.100	.006	.007	.010	.016	.022	.028	.035	.040	.046
			n	4500	2300	1500	1100	900	750	550	450	300	2300	1500	1100	900	750	550	450	350	300
	HSS-E TiN Coated	38-48	fz	.004	.008	.015	.025	.040	.050	.075	.090	.100	.006	.007	.010	.016	.022	.028	.035	.040	.046
			n	6800	3400	2300	1700	1400	1100	850	700	450	3400	2300	1700	1400	1100	850	700	550	450
II Acid and Heat resistant Steel, Alloyed Steel < 1000N/mm <sup>2</sup> Tempered and Tool Steels, Gray Cast Iron GG>200HB	HSS-E	18-25	fz	.004	.008	.015	.023	.035	.045	.070	.085	.090	.005	.006	.009	.014	.019	.025	.031	.034	.037
			n	3400	1700	1100	900	700	550	450	350	250	1700	1100	900	700	550	450	350	300	250
	HSS-E TiN Coated	27-37	fz	.004	.008	.015	.023	.035	.040	.070	.085	.090	.005	.006	.009	.014	.019	.025	.031	.034	.037
			n	5100	2500	1700	1300	1000	850	650	500	350	2500	1700	1300	1000	850	650	500	400	350
III Alloyed Steel < 1400 N/mm <sup>2</sup> Valve Steel, Cold Work Steels, Speed Steels, Acid Resistant Steels	HSS-E	12-18	fz	.003	.007	.012	.020	.032	.040	.065	.080	.085	.006	.007	.010	.015	.020	.026	.033	.036	.039
			n	2400	1200	800	600	500	400	300	250	150	1200	800	600	500	400	300	250	200	150
	HSS-E TiN Coated	12-27	fz	.003	.007	.012	.020	.032	.040	.065	.080	.085	.006	.007	.010	.015	.020	.026	.033	.036	.039
			n	3100	1600	1000	800	600	500	400	300	200	1600	1000	800	600	500	400	300	250	200
IV Difficult Chip Removal Steels, High Temperature Resistant Steels, Ti and Ni Alloyed Steels	HSS-E	3-15	fz	.002	.006	.010	.019	.028	.035	.055	.065	.070	.006	.007	0.11	.016	.022	.028	.035	.037	.043
			n	1400	700	500	350	300	250	180	140	100	700	500	350	300	250	180	140	110	100
	HSS-E TiN Coated	3-20	fz	.002	.006	.010	.019	.028	.035	.055	.065	.070	.006	.007	0.11	.016	.022	.028	.035	.037	.043
			n	1800	900	600	450	350	300	250	180	120	900	600	450	350	300	250	180	150	120
V Aluminium with Non-Hardened Surface, Al - Mg Alloy	HSS-E	200-300	fz	.004	.008	.015	.025	.040	.050	.080	.110	.170	.007	.008	.014	.021	.029	.037	.050	.060	.075
			n	40000	20000	13300	10000	8000	6600	5000	4000	2700	20000	13300	10000	8000	6600	5000	4000	3200	2700
	HSS-E TiN Coated	200-450	fz	.004	.008	.015	.025	.040	.050	.080	.110	.170	.007	.008	.014	.021	.029	.037	.050	.060	.075
			n	51800	26000	17300	13000	10400	8600	7400	5200	3500	26000	17300	13000	10400	8600	7400	5200	4100	3500
VI Aluminium Cast <= %6 Si Aluminium with Non-Hardened Surface	HSS-E	70-120	fz	.004	.008	.015	.025	.040	.050	.080	.110	.170	.007	.008	.014	.021	.029	.037	.050	.060	.075
			n	15000	7600	5000	3800	3000	2500	1900	1500	1000	7600	5000	3800	3000	2500	1900	1500	1200	1000
	HSS-E TiN Coated	70-180	fz	.004	.008	.015	.025	.040	.050	.080	.110	.170	.007	.008	.014	.021	.029	.037	.050	.060	.075
			n	20000	10000	6600	5000	4000	3300	2500	2000	1300	10000	6600	5000	4000	3300	2500	2000	1600	1300
VII Aluminium Cast >= %6 Si Copper Brass, Copper Alloys	HSS-E	40-70	fz	.005	.009	.020	.032	.050	.065	.100	.130	.180	.010	.014	.023	.036	.040	.050	.060	.070	.090
			n	8800	4400	2900	2200	1800	1500	1100	900	600	4400	2900	2200	1800	1500	1100	900	700	600
	HSS-E TiN Coated	40-100	fz	.005	.009	.020	.032	.050	.065	.100	.130	.180	.010	.014	.023	.036	.040	.050	.060	.070	.090
			n	11000	5600	3700	2800	2200	1900	1400	1100	750	5600	3700	2800	2200	1900	1400	1100	900	750
			Vf	110	100	148	180	220	250	280	290	270	224	207	258	320	300	280	264	380	400

fz: Feed per thread (mm/thread)  
 n: Rev. (rev/min)  
 vf: Total feed per minute (m/min)

## Recommended Operating Conditions for End Mills



Material	Cutting speed (m/min.)	Number of Flutes	Diameter (mm)	DIN 844 B / NR Nr.1												DIN 844 B / NR Nr.2											
				4 6	4 8	4 10	4 12	4 16	4 20	5 25	5 30	6 40	4 6	4 8	4 10	4 12	4 16	4 20	5 25	5 30	6 40						
I Structural, Nitride Steels, Free Cutting Steels, Tempered Steels > 700 N/mm <sup>2</sup> Tool Steels Gray Cast Iron GG<200HB	HSS-E	25-32	fz	.007	.010	.016	.022	.028	.035	.040	.046	.054	.014	.020	.032	.044	.056	.070	.080	.092	.108						
			n	1500	1100	900	750	550	450	350	300	250	1500	1100	900	750	550	450	350	300	250						
	HSS-E TiN Coated	38-48	fz	.007	.010	.016	.022	.028	.035	.040	.046	.054	.014	.020	.032	.044	.056	.070	.080	.092	.108						
			n	2300	1700	1400	1100	850	700	550	450	350	300	250	1700	1300	1000	850	700	550	450	350					
II Acid and Heat resistant Steel, Alloyed Steel < 1000N/mm <sup>2</sup> Tempered and Tool Steels, Gray Cast Iron GG>200HB	HSS-E	18-25	fz	.006	.009	.014	.019	.025	.031	.034	.037	.041	.012	.018	.028	.038	.050	.062	.068	.074	.082						
			n	1100	900	700	550	450	350	300	250	170	1100	900	700	550	450	350	300	250	170						
	HSS-E TiN Coated	27-37	fz	.006	.009	.014	.019	.025	.031	.034	.037	.041	.012	.018	.028	.038	.050	.062	.068	.074	.082						
			n	1700	1300	1000	850	650	500	400	350	250	1700	1300	1000	850	650	500	400	350	250						
III Alloyed Steel < 1400 N/mm <sup>2</sup> Valve Steel, Cold Work Steels, Speed Steels, Acid Resistant Steels	HSS-E	12-18	fz	.007	.010	.015	.020	.026	.033	.036	.039	.045	.014	.020	.030	.040	.052	.066	.072	.078	.090						
			n	800	600	500	400	300	250	200	150	120	800	600	500	400	300	250	200	150	120						
	HSS-E TiN Coated	12-27	fz	.007	.010	.015	.020	.026	.033	.036	.039	.045	.014	.020	.030	.040	.052	.066	.072	.078	.090						
			n	1000	800	600	500	400	300	250	200	150	1000	800	600	500	400	300	250	200	150						
IV Difficult Chip Removal Steels, High Temperature Resistant Steels, Ti and Ni Alloyed Steels	HSS-E	3-15	fz	.007	.011	.016	.022	.028	.035	.037	.043	.050	.014	.022	.032	.044	.056	.070	.074	.086	.100						
			n	500	350	300	250	180	140	110	100	70	500	350	300	250	180	140	110	100	70						
	HSS-E TiN Coated	3-20	fz	.007	.011	.016	.022	.028	.035	.037	.043	.050	.014	.022	.032	.044	.056	.070	.074	.086	.100						
			n	600	450	350	300	250	180	150	120	90	600	450	350	300	250	180	150	120	90						
V Aluminium with Non-Hardened Surface, Al - Mg Alloy	HSS-E	200-300	fz	.008	.014	.021	.029	.037	.050	.060	.075	.080	.016	.028	.042	.058	.074	.100	.120	.150	.160						
			n	13300	10000	8000	6000	5000	4000	3200	2700	2000	13300	8000	8000	6000	5000	4000	3200	2700	2000						
	HSS-E TiN Coated	200-450	fz	.008	.014	.021	.029	.037	.050	.060	.075	.080	.016	.028	.042	.058	.074	.100	.120	.150	.160						
			n	17300	13000	10400	8600	7400	5200	4100	3500	2600	17300	13000	10400	8600	7400	5200	4100	3500	2600						
VI Aluminium Cast <= %6 Si Aluminium with Hardened Surface	HSS-E	70-120	fz	.008	.014	.021	.029	.037	.050	.060	.075	.080	.016	.028	.042	.058	.074	.100	.120	.150	.160						
			n	5000	3800	3000	2500	1900	1500	1200	1000	750	5000	3800	3000	2500	1900	1500	1200	1000	750						
	HSS-E TiN Coated	70-180	fz	.008	.014	.021	.029	.037	.050	.060	.075	.080	.016	.028	.042	.058	.074	.100	.120	.150	.160						
			n	6600	5000	4000	3300	2500	2000	1600	1300	1000	6600	5000	4000	3300	2500	2000	1600	1300	1000						
VII Aluminium Cast >= %6 Si Copper Brass, Copper Alloys	HSS-E	40-70	fz	.014	.023	.036	.040	.050	.060	.070	.090	.095	.028	.046	.072	.080	.100	.120	.140	.180	.190						
			n	2900	2200	1800	1500	1100	900	700	600	450	2900	2200	1800	1500	1100	900	700	600	450						
	HSS-E TiN Coated	40-100	fz	.014	.023	.036	.040	.050	.060	.070	.090	.095	.028	.046	.072	.080	.100	.120	.140	.180	.190						
			n	3700	2800	2200	1900	1400	1100	900	750	550	3700	2800	2200	1900	1400	1100	900	750	550						



MILLING CUTTERS

fz: Feed per thread (mm/thread)  
 n: Rev. (rev/min)  
 vf: Total feed per minute (m/min)



## END MILLS - SHORT SERIES - TYPE BN



Product code	d1 mm	d2 mm	L1 mm	L2 mm	Z Nr of Flutes	Product code	d1 mm	d2 mm	L1 mm	L2 mm	Z Nr of Flutes
B00276180200	2,0	6	51	7	3	B00276181500	15,0	12	83	26	4
B00276180250	2,5	6	52	8	3	B00276181600	16,0	16	92	32	4
B00276180300	3,0	6	52	8	3	B00276181700	17,0	16	92	32	4
B00276180350	3,5	6	54	10	3	B00276181800	18,0	16	92	32	4
B00276180400	4,0	6	55	11	4	B00276181900	19,0	16	92	32	4
B00276180450	4,5	6	55	11	4	B00276182000	20,0	20	104	38	4
B00276180500	5,0	6	57	13	4	B00257182100	21,0	20	104	38	5
B00276180550	5,5	6	57	13	4	B00257182200	22,0	20	104	38	5
B00276180600	6,0	6	57	13	4	B00257182300	23,0	20	104	38	5
B00276180650	6,5	10	66	16	4	B00257182400	24,0	25	121	45	5
B00276180700	7,0	10	66	16	4	B00257182500	25,0	25	121	45	5
B00276180750	7,5	10	66	16	4	B00257182600	26,0	25	121	45	5
B00276180800	8,0	10	69	19	4	B00257182700	27,0	25	121	45	5
B00276180850	8,5	10	69	19	4	B00257182800	28,0	25	121	45	5
B00276180900	9,0	10	69	19	4	B00257182900	29,0	25	121	45	5
B00276180950	9,5	10	69	19	4	B00257183000	30,0	25	121	45	5
B00276181000	10,0	10	72	22	4	B00257183200	32,0	32	133	53	6
B00276181050	10,5	12	79	22	4	B00257183300	33,0	32	133	53	6
B00276181100	11,0	12	79	22	4	B00257183400	34,0	32	133	53	6
B00276181150	11,5	12	79	22	4	B00257183500	35,0	32	133	53	6
B00276181200	12,0	12	83	26	4	B00257183600	36,0	32	133	53	6
B00276181250	12,5	12	83	26	4	B00257183800	38,0	40	155	63	6
B00276181300	13,0	12	83	26	4	B00257184000	40,0	40	155	63	6
B00276181400	14,0	12	83	26	4						

\* Over  $\varnothing$  20 mm Producing from HSS-E (%5Co)



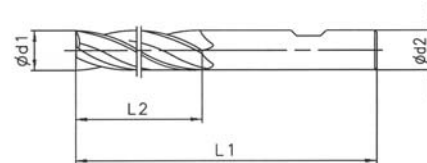
HSS-E  
(%8 Co)DIN  
844

BN

js14



## END MILLS - LONG SERIES - TYPE BN



Product code	d1 mm	d2 mm	L1 mm	L2 mm	z Nr of Flutes
B00276220200	2	6	54	10	3
B00276220250	2,5	6	56	12	3
B00276220300	3	6	56	12	3
B00276220400	4	6	63	19	4
B00276220500	5	6	68	24	4
B00276220600	6	6	68	24	4
B00276220700	7	10	80	30	4
B00276220800	8	10	88	38	4
B00276220900	9	10	88	38	4
B00276221000	10	10	95	45	4
B00276221100	11	12	102	45	4
B00276221200	12	12	110	53	4
B00276221300	13	12	110	53	4
B00276221400	14	12	110	53	4
B00276221500	15	12	110	53	4
B00276221600	16	16	123	63	4
B00276221700	17	16	123	63	4
B00276221800	18	16	123	63	4
B00276221900	19	16	123	63	4
B00276222000	20	20	141	75	4
B00257222200	22	20	141	75	5
B00257222400	24	25	166	90	5
B00257222500	25	25	166	90	5
B00257222600	26	25	166	90	5
B00257222800	28	25	166	90	5
B00257223000	30	25	166	90	5
B00257223200	32	32	186	106	6
B00257223400	34	32	186	106	6
B00257223600	36	32	186	106	6
B00257223800	38	40	217	125	6
B00257224000	40	40	217	125	6



MILLING CUTTERS

\* Over  $\varnothing$  20 mm Producing from HSS-E (%5Co)



## END MILLS - SHORT SERIES - TYPE BN - TICN COATED



Product code	d1 mm	d2 mm	L1 mm	L2 mm	Z Nr of Flutes
B11276180200	2,0	6	51	7	3
B11276180300	3,0	6	52	8	3
B11276180400	4,0	6	55	11	4
B11276180500	5,0	6	57	13	4
B11276180600	6,0	6	57	13	4
B11276180800	8,0	10	69	19	4

Product code	d1 mm	d2 mm	L1 mm	L2 mm	Z Nr of Flutes
B11276181000	10,0	10	72	22	4
B11276181200	12,0	12	83	26	4
B11276181400	14,0	12	83	26	4
B11276181600	16,0	16	92	32	4
B11276181800	18,0	16	92	32	4
B11276182000	20,0	20	104	38	4



## END MILLS - LONG SERIES - TYPE BN - TICN COATED



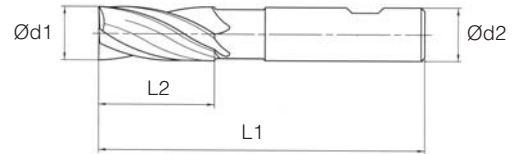
Product code	d1 mm	d2 mm	L1 mm	L2 mm	Z Nr of Flutes
B11276220400	4,0	6	63	19	4
B11276220500	5,0	6	68	24	4
B11276220600	6,0	6	68	24	4
B11276220800	8,0	10	88	38	4

Product code	d1 mm	d2 mm	L1 mm	L2 mm	Z Nr of Flutes
B11276221000	10,0	10	95	45	4
B11276221200	12,0	12	110	53	4
B11276221600	16,0	16	123	63	4
B11276222000	20,0	20	141	75	4

\* Over  $\varnothing$  20 mm Producing from HSS-E (%5Co)



### END MILLS - SHORT SERIES - TYPE BW

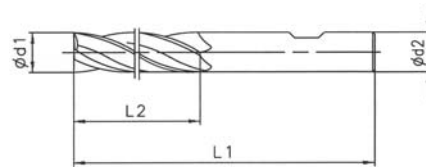


Product code	d1 mm	d2 mm	L1 mm	L2 mm	Z Nr of Flutes
B00276190200	2,0	6	51	7	3
B00276190300	3,0	6	52	8	3
B00276190400	4,0	6	55	11	3
B00276190500	5,0	6	57	13	3
B00276190600	6,0	6	57	13	3
B00276190800	8,0	10	69	19	3
B00276191000	10,0	10	72	22	3
B00276191200	12,0	12	83	26	4
B00276191400	14,0	12	83	26	4
B00276191600	16,0	16	92	32	4

Product code	d1 mm	d2 mm	L1 mm	L2 mm	Z Nr of Flutes
B00276191800	18,0	16	92	32	4
B00276192000	20,0	20	104	38	4
B00257192200	22,0	20	104	38	4
B00257192400	24,0	25	121	45	4
B00257192500	25,0	25	121	45	4
B00257192600	26,0	25	121	45	4
B00257192800	28,0	25	121	45	4
B00257193000	30,0	25	121	45	4
B00257193200	32,0	32	133	53	4



### END MILLS - LONG SERIES - TYPE BW



Product code	d1 mm	d2 mm	L1 mm	L2 mm	Z Nr of Flutes
B00276230300	3	6	56	12	3
B00276230400	4	6	63	19	4
B00276230500	5	6	68	24	4
B00276230600	6	6	68	24	4
B00276230800	8	10	88	38	4
B00276231000	10	10	95	45	4
B00276231200	12	12	110	53	4
B00276231400	14	12	110	53	4
B00276231600	16	16	123	63	4

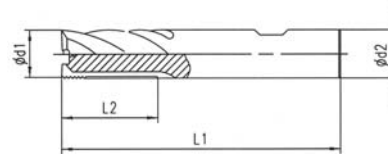
Product code	d1 mm	d2 mm	L1 mm	L2 mm	Z Nr of Flutes
B00276231800	18	16	123	63	4
B00276232000	20	20	141	75	4
B00257232200	22	20	141	75	5
B00257232400	24	25	166	90	5
B00257232500	25	25	166	90	5
B00257232600	26	25	166	90	5
B00257232800	28	25	166	90	5
B00257233000	30	25	166	90	5
B00257233200	32	32	186	106	6

\* Over ø 20 mm Producing from HSS-E (%5Co)





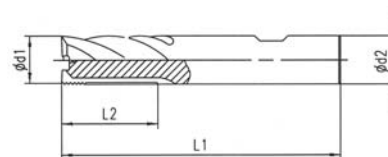
## END MILLS - SHORT SERIES - TYPE BNF



Product code	d1 mm	d2 mm	L1 mm	L2 mm	Z Nr of Flutes	Product code	d1 mm	d2 mm	L1 mm	L2 mm	Z Nr of Flutes
B00279330800	8,0	10	69	19	4	B00274332200	22,0	20	104	38	5
B00279331000	10,0	10	72	22	4	B00274332400	24,0	25	121	45	5
B00279331200	12,0	12	83	26	4	B00274332500	25,0	25	121	45	5
B00279331400	14,0	12	83	26	4	B00274332600	26,0	25	121	45	5
B00279331600	16,0	16	92	32	4	B00274332800	28,0	25	121	45	5
B00279331800	18,0	16	92	32	4	B00274333000	30,0	25	121	45	5
B00279332000	20,0	20	104	38	4	B00274333200	32,0	32	133	53	6



## END MILLS - SHORT SERIES - TYPE BNR

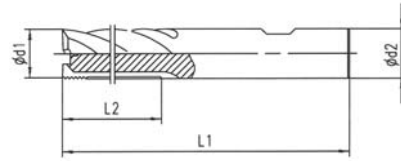


Product code	d1 mm	d2 mm	L1 mm	L2 mm	Z Nr of Flutes	Product code	d1 mm	d2 mm	L1 mm	L2 mm	Z Nr of Flutes
B00277330800	8,0	10	69	19	4	B00273332200	22,0	20	104	38	5
B00277331000	10,0	10	72	22	4	B00273332400	24,0	25	121	45	5
B00277331200	12,0	12	83	26	4	B00273332500	25,0	25	121	45	5
B00277331400	14,0	12	83	26	4	B00273332600	26,0	25	121	45	5
B00277331600	16,0	16	92	32	4	B00273332800	28,0	25	121	45	5
B00277331800	18,0	16	92	32	4	B00273333000	30,0	25	121	45	5
B00277332000	20,0	20	104	38	4	B00273333200	32,0	32	133	53	6

\* Over  $\varnothing$  20 mm Producing from HSS-E (%5Co)



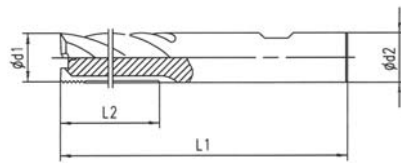
### END MILLS - LONG SERIES - TYPE BNR



Product code	d1 mm	d2 mm	L1 mm	L2 mm	Z Nr of Flutes	Product code	d1 mm	d2 mm	L1 mm	L2 mm	Z Nr of Flutes
B00277390800	8	10	88	38	4	B00273392200	22	20	141	75	5
B00277391000	10	10	95	45	4	B00273392400	24	25	166	90	5
B00277391200	12	12	110	53	4	B00273392500	25	25	166	90	5
B00277391400	14	12	110	53	4	B00273392600	26	25	166	90	5
B00277391600	16	16	123	63	4	B00273392800	28	25	166	90	5
B00277391800	18	16	123	63	4	B00273393000	30	25	166	90	5
B00277392000	20	20	141	75	4	B00273393200	32	32	186	106	6



### END MILLS - LONG SERIES - TYPE BNF



Product code	d1 mm	d2 mm	L1 mm	L2 mm	Z Nr of Flutes	Product code	d1 mm	d2 mm	L1 mm	L2 mm	Z Nr of Flutes
B00279391000	10	10	95	45	4	B00274392400	24	25	166	90	5
B00279391200	12	12	110	53	4	B00274392500	25	25	166	90	5
B00279391400	14	12	110	53	4	B00274392600	26	25	166	90	5
B00279391600	16	16	123	63	4	B00274392800	28	25	166	90	5
B00279391800	18	16	123	63	4	B00274393000	30	25	166	90	5
B00279392000	20	20	141	75	4	B00274393200	32	32	186	106	6
B00274392200	22	20	141	75	5						

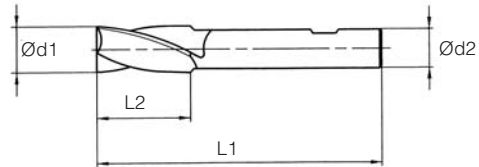
\* Over ø 20 mm Producing from HSS-E (%5Co)



MILLING CUTTERS



## SLOT CUTTERS



Product code	d1 mm	d2 mm	L1 mm	L2 mm	z Nr of Flutes
B00278140200	2	6	48	4	2
B00278140250	2,5	6	49	5	2
B00278140300	3	6	49	5	2
B00278140400	4	6	51	7	2
B00278140500	5	6	52	8	2
B00278140600	6	6	52	8	2
B00278140700	7	10	60	10	2
B00278140800	8	10	61	11	2
B00278140900	9	10	61	11	2
B00278141000	10	10	63	13	2

Product code	d1 mm	d2 mm	L1 mm	L2 mm	z Nr of Flutes
B00278141100	11	12	70	13	2
B00278141200	12	12	73	16	2
B00278141300	13	12	73	16	2
B00278141400	14	12	73	16	2
B00278141500	15	12	73	16	2
B00278141600	16	16	79	19	2
B00278141700	17	16	79	19	2
B00278141800	18	16	79	19	2
B00278141900	19	16	79	19	2
B00278142000	20	20	88	22	2

\* Over  $\varnothing$  20 mm Producing from HSS-E (%5Co)



### BALL NOSED END MILLS - SHORT SERIES



Product code	d1 mm	d2 mm	L1 mm	L2 mm	R
B00272300600	6	6	57	13	3
B00272300800	8	10	69	19	4
B00272301000	10	10	72	22	5
B00272301200	12	12	83	26	6

Product code	d1 mm	d2 mm	L1 mm	L2 mm	R
B00272301400	14	12	83	26	7
B00272301600	16	16	92	32	8
B00272301800	18	16	92	32	9
B00272302000	20	20	104	38	10



### BALL NOSED END MILLS - LONG SERIES



Product code	d1 mm	d2 mm	L1 mm	L2 mm	R
B00272500600	6	6	68	24	3
B00272500800	8	10	88	38	4
B00272501000	10	10	95	45	5
B00272501200	12	12	110	53	6
B00272501400	14	12	110	53	7

Product code	d1 mm	d2 mm	L1 mm	L2 mm	R
B00272501600	16	16	123	63	8
B00272501800	18	16	123	63	9
B00272502000	20	20	141	75	10
B00272502500	25	25	166	90	12,5
B00272503200	32	32	186	106	16

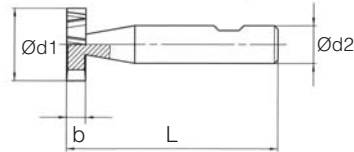
\* Over ø 20 mm Producing from HSS-E (%5Co)



MILLING CUTTERS



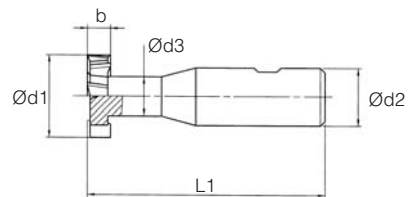
## WOODRUFF KEYSEAT CUTTERS - STAGGERED TEETH



Product code	d1 mm	b (e8) mm	d2 mm	L mm	Product code	d1 mm	b (e8) mm	d2 mm	L mm
B00261220600	13,5	3	10	56	B00261221500	22,5	6	10	63
B00261220700	13,5	4	10	56	B00261221600	22,5	8	10	63
B00261220800	16,5	3	10	56	B00261221700	25,5	6	10	63
B00261220900	16,5	4	10	56	B00261221800	28,5	6	10	63
B00261221000	16,5	5	10	56	B00261221900	28,5	8	10	63
B00261221100	19,5	4	10	63	B00261222000	28,5	10	12	71
B00261221200	19,5	5	10	63	B00261222300	32,5	8	12	71
B00261221300	19,5	6	10	63	B00261222400	32,5	10	12	71
B00261221400	22,5	5	10	63	B00261222600	45,5	10	12	71



## T- SLOT CUTTERS - STARGGERED TEETH



Product code	d1 mm	b (e8) mm	d2 mm	d3 mm	L1 mm	Product code	d1 mm	b (e8) mm	d2 mm	d3 mm	L1 mm
B00262111100	11,0	4,0	10	4	53,5	B00262112800	28,0	12,0	16	13	85,0
B00262111250	12,5	6,0	10	5	57,0	B00262113200	32,0	14,0	16	15	90,0
B00262111600	16,0	8,0	10	7	62,0	B00262113600	36,0	16,0	25	17	103,0
B00262111800	18,0	8,0	12	8	70,0	B00262114000	40,0	18,0	25	19	108,0
B00262112100	21,0	9,0	12	10	74,0	B00262114500	45,0	20,0	25	21	113,0
B00262112500	25,0	11,0	16	12	82,0						

\* Over  $\varnothing$  20 mm Producing from HSS-E (%5Co)

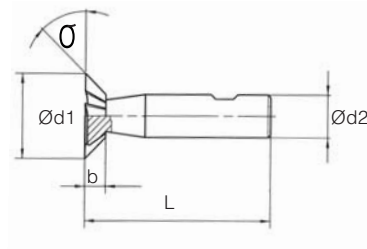


HSS-E  
(%8 Co)DIN  
1833/C

js16



## DOVETAIL CUTTERS



Product code	d1 mm	b mm	L mm	d2 mm
B00263201600	16 x 45°	4,0	60	12
B00263202000	20 x 45°	5,0	63	12
B00263202500	25 x 45°	6,3	67	12
B00263203200	32 x 45°	8,0	71	16

Product code	d1 mm	b mm	L mm	d2 mm
B00263231600	16 x 60°	6,3	60	12
B00263232000	20 x 60°	8,0	63	12
B00263232500	25 x 60°	10,0	67	12
B00263233200	32 x 60°	12,5	71	16

HSS-E  
(%8 Co)

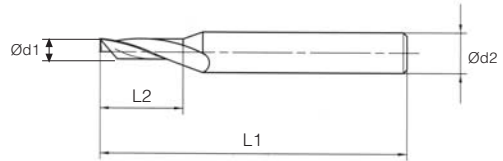
MTE



h9



## SINGLE FLUTE ALUMINIUM END MILLS



Product code	d1 mm	d2 (h8) mm	L1 mm	L2 mm
B00276500300	3	8	60	12
B00276500400	4	8	60	12
B00276510400	4	8	100	23
B00276500500	5	8	60	14
B00276510500	5	8	100	23

Product code	d1 mm	d2 (h8) mm	L1 mm	L2 mm
B00276500600	6	8	60	14
B00276510600	6	8	100	25
B00276500800	8	8	80	14
B00276510800	8	8	120	25
B00276511000	10	10	120	25

HSS-E  
(%8 Co)

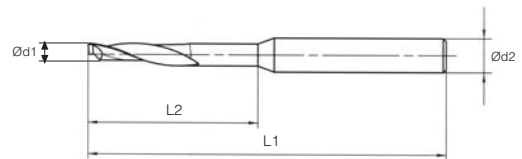
MTE



h9



## SINGLE FLUTE ALUMINIUM END MILLS



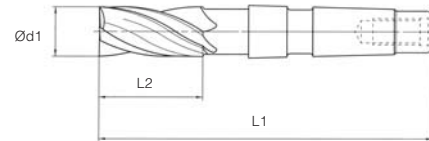
Product code	d1 mm	d2 (h8) mm	L1 mm	L2 mm
B00257520400	4	8	20x45	80
B00257520500	5	8	20x45	80

Product code	d1 mm	d2 (h8) mm	L1 mm	L2 mm
B00257520600	6	8	20x45	80

\* Over  $\varnothing$  20 mm Producing from HSS-E (%5Co)



## MORSE TAPER END MILLS - SHORT SERIES - TYPE BN

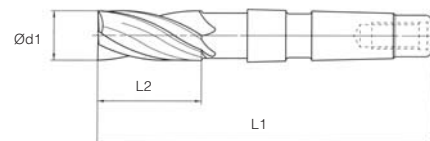


Product code	d1 mm	L1 mm	L2 mm	Z Nr of Flutes
B00258141600	16	117	32	2
B00258141800	18	117	32	2
B00258142000	20	123	38	2
B00258142200	22	123	38	2
B00258142500	25	147	45	3
B00258142600	26	147	45	3
B00258142800	28	147	45	3

Product code	d1 mm	L1 mm	L2 mm	Z Nr of Flutes
B00258143000	30	147	45	3
B00258143200	32	178	53	4
B00258143600	36	178	53	4
B00258144000	40	188	63	4
B00258144500	45	188	63	4
B00258145000	50	233	75	5



## MORSE TAPER END MILLS - LONG SERIES - TYPE BN



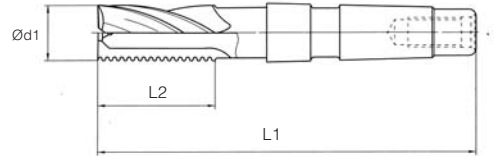
Product code	d1 mm	L1 mm	L2 mm	Z Nr of Flutes
B00258261600	16	148	63	2
B00258261800	18	148	63	2
B00258262000	20	160	75	2
B00258262200	22	160	75	2
B00258262500	25	192	90	3
B00258262600	26	192	90	3

Product code	d1 mm	L1 mm	L2 mm	Z Nr of Flutes
B00258262800	28	192	90	3
B00258263000	30	192	90	3
B00258263200	32	231	106	4
B00258263600	36	231	106	4
B00258264000	40	250	125	4

\* Over  $\varnothing$  20 mm Producing from HSS-E (%5Co)



### MORSE TAPER END MILLS - SHORT SERIES - TYPE BNR

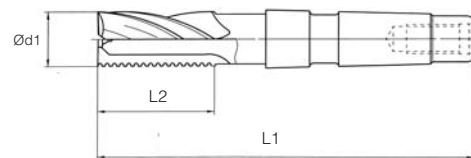


Product code	d1 mm	L1 mm	L2 mm	Z Nr of Flutes
B00273441600	16	117	32	2
B00273441800	18	117	32	2
B00273442000	20	123	38	2
B00273442200	22	123	38	2
B00273442500	25	147	45	3
B00273442600	26	147	45	3

Product code	d1 mm	L1 mm	L2 mm	Z Nr of Flutes
B00273442800	28	147	45	3
B00273443000	30	147	45	3
B00273443200	32	178	53	4
B00273443600	36	178	53	4
B00273444000	40	188	63	4



### MORSE TAPER END MILLS - SHORT SERIES - TYPE BNF



Product code	d1 mm	L1 mm	L2 mm	Mors Taper Nr
B00274441600	16	117	32	2
B00274441800	18	117	32	2
B00274442000	20	123	38	2
B00274442200	22	123	38	2
B00274442500	25	147	45	3
B00274442600	26	147	45	3

Product code	d1 mm	L1 mm	L2 mm	Mors Taper Nr
B00274442800	28	147	45	3
B00274443000	30	147	45	3
B00274443200	32	178	53	4
B00274443600	36	178	53	4
B00274444000	40	188	63	4

\* Over ø 20 mm Producing from HSS-E (%5Co)



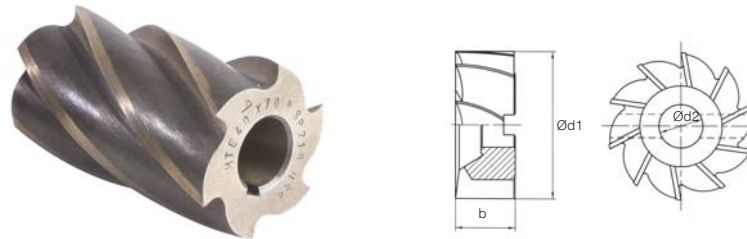
### DRILLING - MILLING COMBINED TOOLS



Product code	d1 mm	d1 mm	L1 mm	L2 mm
B00902000686	6	6	90	18
B00902000688	8	8	90	18



### SHELL END MILLS



Product code	d1 mm	d2 (H7) mm	b (k16) mm	Product code	d1 mm	d2 (H7) mm	b (k16) mm
B00201000040	40	16	32	B00201000080	80	27	45
B00201000050	50	22	36	B00201000100	100	32	50
B00201000063	63	27	40				

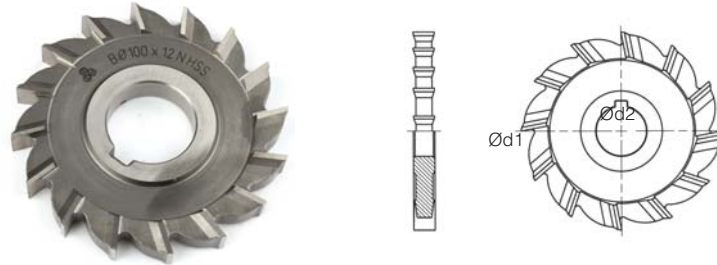


MILLING CUTTERS

\* HSS-E Available upon request

HSS	DIN 885/B	N	js16	
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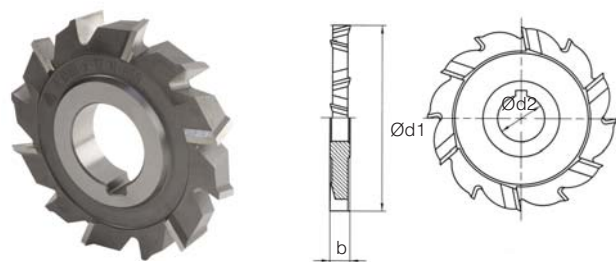
### SIDE AND FACE CUTTERS - STRAIGHT TEETH



Product code	d1 mm	d2 (H7) mm	b (k11) mm	Product code	d1 mm	d2 (H7) mm	b (k11) mm
B00252030800	63	22	8	B00252033900	80	27	20
B00252030900	63	22	10	B00252036000	100	32	10
B00252031000	63	22	12	B00252036100	100	32	12
B00252031100	63	22	14	B00252036200	100	32	14
B00252033300	80	27	8	B00252036300	100	32	16
B00252033400	80	27	10	B00252036400	100	32	18
B00252033500	80	27	12	B00252036500	100	32	20
B00252033600	80	27	14	B00252036600	100	32	22
B00252033700	80	27	16	B00252036700	100	32	25
B00252033800	80	27	18				

HSS	DIN 885/A	N	js16	
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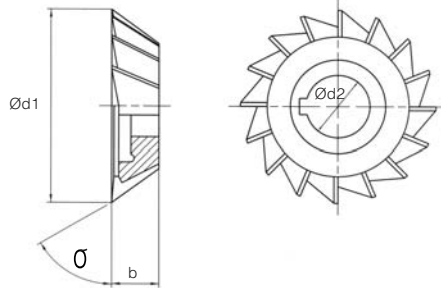
### SIDE AND FACE CUTTERS - STAGGERED TEETH



Product code	d1 mm	d2 (H7) mm	b (k11) mm	Product code	d1 mm	d2 (H7) mm	b (k11) mm
B00252000400	50	16	10	B00252003800	80	27	18
B00252000800	63	22	8	B00252003900	80	27	20
B00252000900	63	22	10	B00252006000	100	32	10
B00252001000	63	22	12	B00252006100	100	32	12
B00252001100	63	22	14	B00252006200	100	32	14
B00252003300	80	27	8	B00252006300	100	32	16
B00252003400	80	27	10	B00252006400	100	32	18
B00252003500	80	27	12	B00252006500	100	32	20
B00252003600	80	27	14	B00252006600	100	32	22
B00252003700	80	27	16	B00252006700	100	32	25

HSS    DIN 842    H    js16   

### ANGULAR CUTTERS

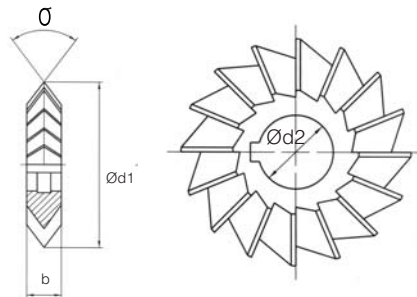


Product code	d1 mm	d2 (H7) mm	b (js14) mm	$\alpha$
B00203020040	40	10	10	45
B00203020050	50	13	13	45
B00203020063	63	16	18	45
B00203020080	80	22	22	45
B00203020100	100	27	28	45
B00203040040	40	10	13	60
B00203040050	50	13	16	60
B00203040063	63	16	20	60

Product code	d1 mm	d2 (H7) mm	b (js14) mm	$\alpha$
B00203040080	80	25	22	60
B00203040100	100	32	27	60
B00203060040	40	13	10	50
B00203060050	50	16	13	50
B00203060063	63	20	16	50
B00203060080	80	25	22	50
B00203060100	100	32	27	50

HSS    DIN 847    H    js16   

### DOUBLE ANGLE MILLING CUTTERS



Product code	d1 mm	d2 (H7) mm	b (js16) mm	$\alpha$
B00206100050	50	16	8	45
B00206100063	63	22	10	45
B00206100080	80	27	12	45
B00206100100	100	32	18	45
B00206110050	50	16	10	60
B00206110063	63	22	14	60

Product code	d1 mm	d2 (H7) mm	b (js16) mm	$\alpha$
B00206110080	80	27	18	60
B00206110100	100	32	25	60
B00206120050	50	16	14	90
B00206120063	63	22	20	90
B00206120080	80	27	22	90
B00206120100	100	32	32	90

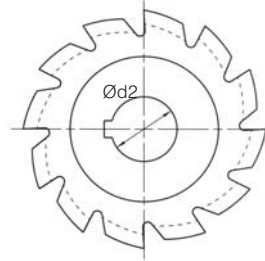
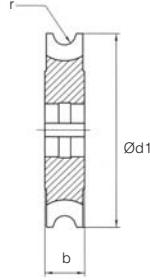


MILLING CUTTERS

\* HSS-E Available upon request



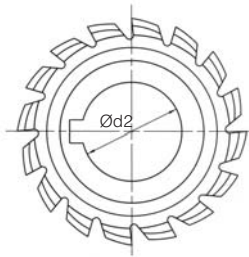
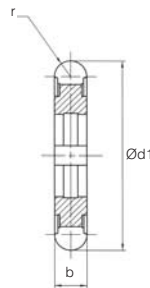
## CONCAVE RADIUS CUTTERS



Product code	d1 mm	d2 (H7) mm	b (js16) mm	r (H11)	Product code	d1 mm	d2 (H7) mm	b (js16) mm	r (H11)
B00216320100	50	16	6,0	1,00	B00216320315	63	22	12,0	3,15
B00216320125	50	16	6,0	1,25	B00216320400	63	22	16,0	4,00
B00216320160	50	16	8,0	1,60	B00216320500	63	22	20,0	5,00
B00216320200	50	16	9,0	2,00	B00216320600	80	27	24,0	6,00
B00216320250	63	22	10,0	2,50	B00216320630	80	27	24,0	6,30
B00216320300	63	22	12,0	3,00	B00216320800	80	27	32,0	8,00



## CONVEX RADIUS CUTTERS



Product code	d1 mm	d2 (H7) mm	b (js16) mm	r (H11)	Product code	d1 mm	d2 (H7) mm	b (js16) mm	r (H11)
B00216400100	50	16	2,0	1,00	B00216400315	63	22	6,3	3,15
B00216400125	50	16	2,5	1,25	B00216400400	63	22	8,0	4,00
B00216400160	50	16	3,2	1,60	B00216400500	63	22	10,0	5,00
B00216400200	50	16	4,0	2,00	B00216400600	80	27	12,0	6,00
B00216400250	63	22	5,0	2,50	B00216400630	80	27	12,6	6,30
B00216400300	63	22	6,0	3,00	B00216400800	80	27	16,0	8,00

\* HSS-E Available upon request



## Ali Usta says;

Milling cutters are tools which are subject to the highest level of mechanic forces in machining.

Milling cutters are cutting tools for threading surfaces, holes and channels also used for special forms and threads for machining on metal, plastic, etc materials.

Milling cutters are divided into two classes:

- Drilling milling cutters; used by connecting from holes to the chuck.
- Cylindrical and Morse taper shank milling cutters; used by connecting to tool holders MK shells.

## Ali Usta recommends:

Use different types of milling cutters for each material to be processed.

- Use TYPE N for ductile, long chipping materials with medium hardness and normal resistance (non-alloyed or low-alloyed steels, grey cast iron, tempered cast and brass materials)
- Use TYPE H (or S) for hard and brittle materials which medium and short chipping (alloyed steel, cast steel, hard gray cast iron and brass materials)
- Use TYPE W (or Y) for soft, long chipping materials with low resistance (Aluminium and soft aluminium alloys, soft brass, MS 63, copper and copper alloys)

## Ali Usta;

In choosing milling cutters we must pay attention to the following:

Milling cutters are chosen depending on the connection positions of milling cutters, type of the material and the side or face cutting position of the milling cutter. In choosing the correct type of milling cutters we must pay attention to the type of steel made from.

### Milling cutters manufactured

**Type N:** Number of cutting edges, chip and helical length normal

**Type H:** Number of cutting edges, more chip and helical angle less than normal

**Type W:** Number of cutting edges, more chip and helical angle more than normal

### Materials of Milling Cutters

- Cobalt alloyed high speed steel (HSS-E)
- Solid carbide metals

### In addition:

- TITANIUM NITRIDE (TiN) AND
- TITANIUM CARBON-NITRIDE (TiCN) surface coatings can be used.



## Ali Usta reminds to keep the following principles always in mind:

- When proceed from soft materials to hard materials, in other words, from low resistant to high resistant materials, cutting speed and progress gradually decreases.
- The chips are the biggest enemy of the cutting tools; therefore chips must be immediately removed away from the work piece and tool. If necessary, better use rough machining cutters.
- TiN coated tools must be operated with higher revolutions than uncoated tools.
- The work piece and the end mills must be connected to the machine as close as possible.
- Do not use milling cutters with blunt and worn cutting edges.
- Must be preferred a down milling (in concurrent direction) as far as possible.
- Chuck must be ensured the clean, without burr and oil-free spindle, the tool's axis and the shaft's axis must match each other.



## Ali Usta presents the problems encountered in milling, their causes and solutions.



### 1- Breaking of the cutting edges

#### CAUSE

- 1.1. Too much feed
- 1.2. Work piece is not rigid
- 1.3. Cutting tool is not fixed tightly
- 1.4. The stability of cutting tool is inadequate
- 1.5. Threads are too sharp

#### SOLUTION

Feed must be decreased  
 More rigid machine or connection devices is required  
 Connecting nut must be assembled  
 Must be used short type tool or short connection holder.  
 Change the rake angle or chamfer the sharp edges

### 2- Too much wearing

#### CAUSE

- 2.1. Cutting speed is too high
- 2.2. Work piece is too hard
- 2.3. Formation of tempered chips
- 2.4. Unsuitable feed speed (too high)
- 2.5. Unsuitable cutting angle
- 2.6. Back of the cutting edge scuffs

#### SOLUTION

Reduce speed and use coolant  
 Use TiN coated end mill  
 Reduce the cutting speed  
 Reduce feed rate  
 Choose cutting angle as per material  
 Increase the clearance angle

### 3- Vibration

#### CAUSE

- 3.1. Feed rate and cutting speed are too high
- 3.2. Cutting tool and connecting system are not suitable
- 3.3. Clearance angle is too large
- 3.4. Work piece is improperly connected
- 3.5. Cutting depth too large
- 3.6. Cutting tool is too long or total length is too long

#### SOLUTION

Suitable cutting values must be used  
 More rigid tool and connection must be used  
 Adjust the margin  
 Work piece must be connected properly  
 Cutting depth must be reduced  
 Cutting tool must be connected shorter or short milling cutter must be chosen

### 4- Difficulty in chip removal

#### CAUSE

- 4.1. Chip volume is too much
- 4.2. The chip flute is narrow in milling at the bottom of thread
- 4.3. Insufficient cooling

#### SOLUTION

Reduce the feed and cutting speed's rates  
 Use an end mill with less threads and wide fluted  
 Increase cooling pressure

### 5- Bad surface quality

#### CAUSE

- 5.1. The chosen feed rate may be too large
- 5.2. Cutting speed is too low
- 5.3. Wear out in cutting tool may be high
- 5.4. Formation of blue chips

#### SOLUTION

Reduce the feed rate  
 Increase the speed  
 Make point sharpening in short period  
 Reduce the cutting speed



SAWS &  
TOOL  
BITS





Tool Type	Quality	Standard	Page No
HAND SAWS FOR METALS	WS - Chromium		278
HAND SAWS FOR METALS	HSS		278
MACHINE SAWS FOR METALS	HSS		279
BI-METAL HACKSAW BLADES FOR METALS TPI 18/24/32	Bi-Metal		280
CYLINDRICAL (ROUND) TOOL BITS	HSS - E (%10Co)	DIN 4964/A	281
SQUARE TOOL BITS	HSS - E (%10Co)	DIN 4964/B	282
TRAPEZOIDAL TOOL BITS	HSS - E (%10Co)	DIN 4964/E	283
TRAPEZOIDAL TOOL BITS	HSS - E (%10Co)	DIN 4964/E	284



WS  
CROME

## HAND SAWS FOR METALS

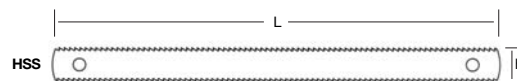


Product Code	L mm	h mm	b mm	Z (Nr of Teeth)
B00650301138	300	13	0,8	18
B00650301258	300	25	0,8	18

HSS



## HAND SAWS FOR METALS

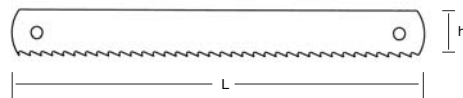


Product Code	L mm	h mm	b mm	Z (Nr of Teeth)
B00652301138	300	13	0,8	18
B00652311138	300	13	0,8	24
B00652301258	300	25	0,8	18
B00652311258	300	25	0,8	24

HSS



## MACHINE SAWS FOR METALS

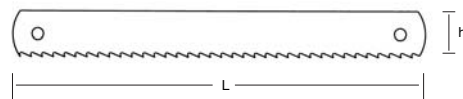


Product Code	L mm	h mm	b mm	z (Nr of Teeth)	Product Code	L mm	h mm	b mm	z (Nr of Teeth)
B00673030151	300	30	1,5	6	B00675040200	500	40	2	4
B00673030152	300	30	1,5	8	B00675040201	500	40	2	6
B00673530151	350	30	1,5	6	B00675040202	500	40	2	8
B00673530152	350	30	1,5	8	B00675040203	500	40	2	10
B00673530153	350	30	1,5	10	B00675050251	500	50	2,5	6
B00674035151	400	35	1,5	6	B00675550251	550	50	2,5	6
B00674035152	400	35	1,5	8	B00675550252	550	50	2,5	8
B00674035153	400	35	1,5	10	B00676050250	600	50	2,5	4
B00674040201	400	40	2	6	B00676050251	600	50	2,5	6
B00674040202	400	40	2	8	B00676050252	600	50	2,5	8
B00674535151	450	35	1,5	6	B00676550250	650	50	2,5	4
B00674535152	450	35	1,5	8	B00676550251	650	50	2,5	6
B00674535153	450	35	1,5	10	B00676550252	650	50	2,5	8
B00674540201	450	40	2	6	B00677050250	700	50	2,5	4
B00674540202	450	40	2	8	B00677050251	700	50	2,5	6
B00674540203	450	40	2	10	B00677050252	700	50	2,5	8

BI-METAL



## BI-METAL HACKSAW BLADES FOR METALS TPI 18/24/32

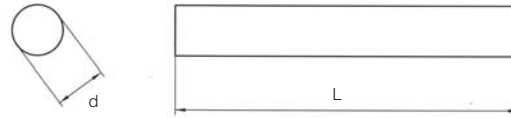


Product Code	L mm	h mm	b mm	Z (Nr of Teeth)
B00653301136	300	13	0,63	18
B00653311136	300	13	0,63	24
B00653321136	300	13	0,63	32



HSS-E  
(%10Co)DIN  
4964/A

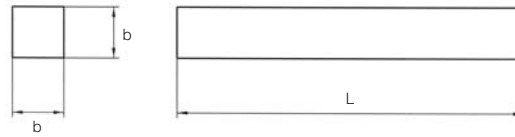
## CYLINDRICAL (ROUND) TOOL BITS



Product Code	d1 mm	L mm	Product Code	d1 mm	L mm
B00420004080	4	80	B00420010160	10	160
B00420004100	4	100	B00420012100	12	100
B00420005080	5	80	B00420012125	12	125
B00420005100	5	100	B00420012160	14	160
B00420006080	6	80	B00420014100	14	100
B00420006100	6	100	B00420014125	14	125
B00420008080	8	80	B00420014160	14	160
B00420008100	8	100	B00420016125	16	125
B00420008125	8	125	B00420016160	16	160
B00420010080	10	80	B00420016200	16	200
B00420010100	10	100	B00420018200	18	200
B00420010125	10	125	B00420020160	20	160
			B00420020200	20	200

HSS-E  
(%10Co)DIN  
4964/B

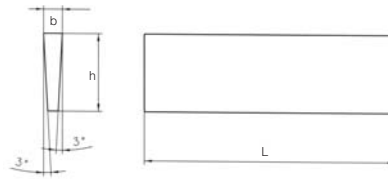
## SQUARE TOOL BITS



Product Code	b mm	L mm	Product Code	b mm	L mm
B00400404063	4	63	B00401010160	10	160
B00400404080	4	80	B00401010200	10	200
B00400404100	4	100	B00401212100	12	100
B00400505063	5	63	B00401212125	12	125
B00400505080	5	80	B00401212160	12	160
B00400505100	5	100	B00401212200	12	200
B00400606063	6	63	B00401414100	14	100
B00400606080	6	80	B00401414125	14	125
B00400606100	6	100	B00401414160	14	160
B00400606125	6	125	B00401414200	14	200
B00400606160	6	160	B00401616125	16	125
B00400808063	8	63	B00401616160	16	160
B00400808080	8	80	B00401616200	16	200
B00400808100	8	100	B00401818160	18	160
B00400808125	8	125	B00401818200	18	200
B00400808160	8	160	B00402020160	20	160
B00400808200	8	200	B00402020200	20	200
B00401010100	10	100	B00402525200	25	200
B00401010125	10	125			

HSS-E  
(%10Co)DIN  
4964/E

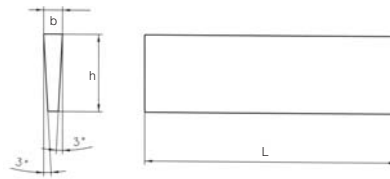
## TRAPEZOIDAL TOOL BITS



Product Code	b mm	h mm	L mm	h:b Ratio of Edge
B00411025125	2.5	10	125	4.0:1
B00411025160	2.5	10	160	4.0:1
B00411230100	3	12	100	4.0:1
B00411230125	3	12	125	4.0:1
B00411230160	3	12	160	4.0:1
B00411640125	4	16	125	4.0:1
B00411640160	4	16	160	4.0:1
B00412050160	5	20	160	4.0:1
B00412050200	5	20	200	4.0:1
B00412560100	6	25	100	4.0:1
B00412560160	6	25	160	4.0:1
B00412560200	6	25	200	4.0:1

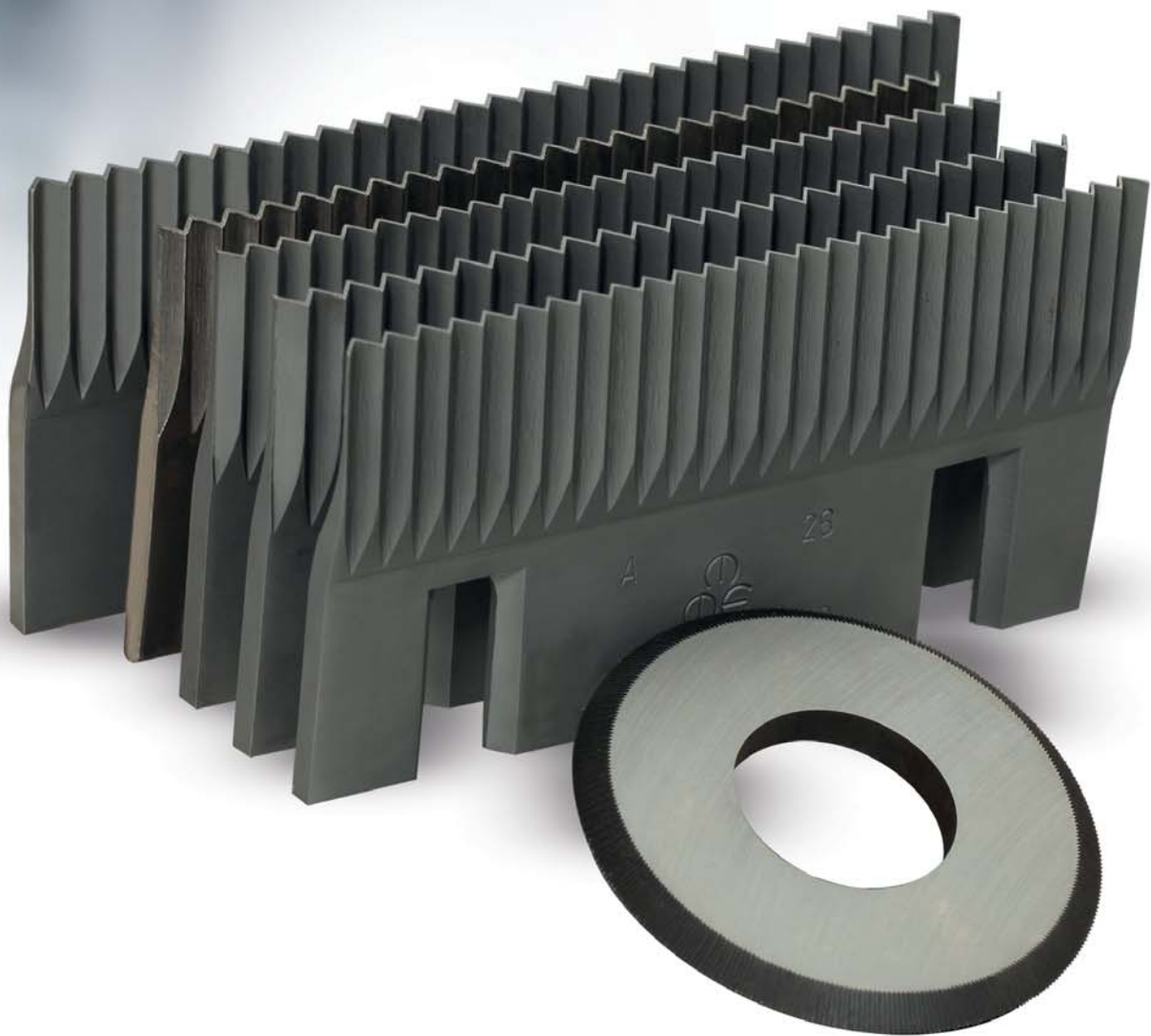
HSS-E  
(%10Co)DIN  
4964/E

## TRAPEZOIDAL TOOL BITS



Product Code	b inch	h inch	L inch
B00460000203	3/32"	3/8"	4"
B00460000207	1/8"	1/2"	6"
B00460000210	5/32"	5/8"	5"
B00460000211	5/32"	5/8"	6"
B00460000214	3/16"	3/4"	6"
B00460000217	3/16"	7/8"	6"
B00460000218	3/16"	7/8"	8"
B00460000220	7/32"	1"	6"
B00460000221	7/32"	1"	8"

# SPECIAL TOOLS





Tool Type	Page No
SUGAR BEET KNIFES	288
CHOPPED STRAND CUTTERS	288
R-D TAPS	289
RADIAL THREAD CHASERS	290
TRIMMING KNIFES	291
ULTRASONIC KNIFES	292
COUPLING TAPS	293
CARPET CUTTING BLADES	294
CIRCULAR SAW BLADES	295



WS  
CHROMETS  
153/3

## SUGAR BEET KNIFES



Product Code	Number of Division	Type	Thickness mm
B00750000011	23	A	6.5
B00750000012	23	B	6.5
B00750000013	26	A	6.5
B00750000014	26	B	6.5
B00750000017	27	A	7.3
B00750000018	27	B	7.3
B00750000001	28	A	6.5
B00750000002	28	B	6.5

WS  
CHROMETS  
153/3

## SUGAR BEET GRINDING FRAISER



Product Code	D	Thickness mm	Degree	Z
B00299600001	100	8.5	74	320
B00299600002	100	8.5	87	400



VIDEO



WS  
CHROME

TS  
153/3



## CHOPPED STRAND CUTTERS



Product Code	D	L
B00299210001	126.2	152.5



WS  
CHROMETS  
153/3

## R-D TAPS



Product Code	D	L
B00109920016	22.4	10
B00109900102	33	8
B00109900103	28.5	5
B00109900096	23	10



WS  
CHROMETS  
153/3

## RADIAL THREAD CHASERS



Product Code	D mm	Plate Thickness mm	Z
B00790110035	117,8	1,52	60,3
B00790110127	88,9	3,05	178
B00790110102	104,84	3,2	47.15
B00790110016	101,5	3,2	41.2



WS  
CHROMETS  
153/3

## TRIMMING KNIFES



Product Code	L	H	Thickness mm	Z
B00765110015	65	60	2.8	AA



WS  
CHROMETS  
153/3

## ULTRASONIC KNIFES



Product Code	D mm	Degree
B00299120248	6	3



WS  
CHROMETS  
153/3

## COUPLING TAPS



Product Code	D mm	L	L1	L2	D	D1	D2
B10107800086	G 1/2"x14	100	32	30	18	R 1/4"x19	11
B10107800087	G 3/4"x14	100	35	30	23	R 3/8"x19	14.5
B10107800088	G 1"x11	100	40	30	29.5	R 5/8"x14	20
B10107800089	G 1 1/4"x11	140	40	35	38	R 3/4"x14	23.5
B10107800090	G 1 1/2"x11	140	40	35	44	R 7/8"x14	27.5
B10107800091	G 2"x11	140	40	35	55	R 1"x11	29.5

WS  
CHROMETS  
153/3

## CORD FABRIC CUTTING BLADES



Product Code	D mm	Thickness
B00762010002	91	1.25



