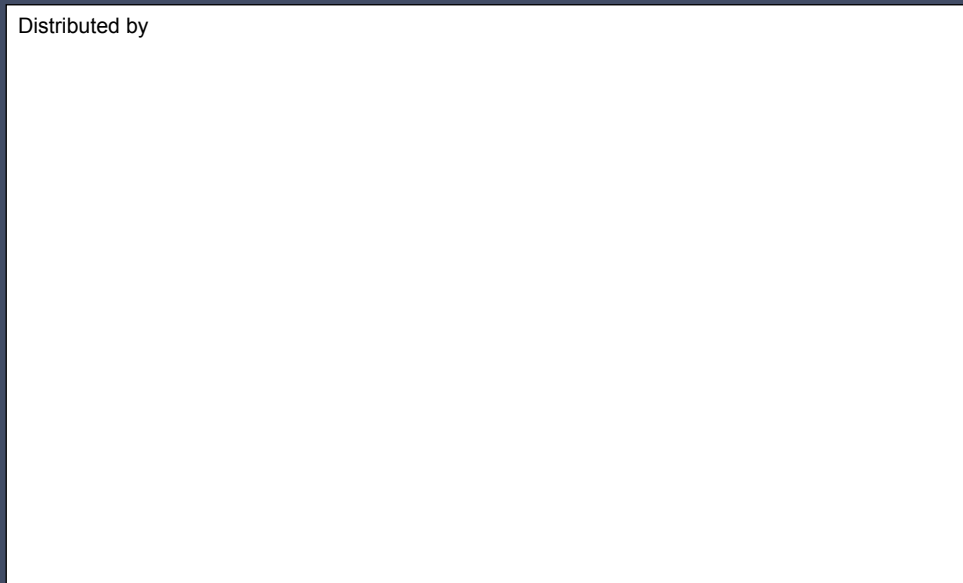




HOLEMAKING

HOLEMAKING

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www.europatool.co.uk

Catalogue No. HT16/1

Material Group Examples

Steel	11 Magnetic soft steels	12 Structural steels	13 Plain carbon steels	14 Alloy steels
P	EN1 EN2 OSOA12 230Mo7	EN3A, 4, 5, 6, 7, 8 060A35 040A10 EN32 210M15	EN9, 10 EN43 070M20 060A62 080M46	EN16, 17, 19 BO1 BO2 D2 D3
Hardened Steel	15 Alloy/Tempered steels	16 Hardened steels		
H	S95 S98, S99 BH11 BH13 830M31	>38 HRC Hardox400 Hardox500 P20		
Stainless Steel	21 Free machining	22 Austenitic	23 Martensitic/Ferritic	
M	EN56, 58 303S21 304S15 316S 321S17	EN58J 420S37 431S29	Duplex Super Duplex 17-4 PH S130	
Cast Iron	31 Grey cast iron soft	32 Grey cast iron hard	33 Nodular graphite	34 Nodular graphite
K	GG10 GG20 GG30 GG40	GG25 GG35 GF150	GGG40 GGG50 SG Iron	GGG70 GGG80 Meehanite
Titanium	41 Titanium unalloyed	42 Titanium alloys	43 Titanium alloys	
S	Pure Titanium TA1 - 9 Ti99.0	Ti6Al4V Ti6Al2Sn4Zr2Mo Ti4Al4Mo2Sn0.5Si	Ti10Al2Fe3Al Ti5Al5V5Mo3Cr Ti7Al4Mo Ti3Al8V6Cr4Zr4Mo Ti6Al6V6Sn Ti15V3 Cr3Sn3Al	
Nickel	51 Nickel unalloyed	52 Heat resisting alloys	53 Heat resisting alloys	
S	NA11 NA12 Nickel 200	Nimonic 75 Hastelloy C Inconel 601, 617, 625 Incoloy 800, 825 Monel 400	Nimonic 80 Rene 41 Inconel 718, 750-X Incoloy 925 Monel K-500	
Copper	61 Copper unalloyed	62 Short chip alloys	63 Long chip alloys	64 Cu - Al - Fe alloys
N	Commercially pure C101	CZ120 PB104 G-CuSn5ZnPb	CZ106 CZ108 CuZn37	Ampco18 Ampco20 Ampco26
Aluminium	71 Aluminium unalloyed	72 Aluminium, Si <0.5%	73 Aluminium, Si 0.5-10%	74 Aluminium, Si >10%
N	Al99.5H Al99.9 Al99.9Mg0.5	AlMn1 AlMn1Mg0.5 LM5, 10, 12 6061	HE9, 30 LM2, 4, 16, 18, 21-27 6082 6063	G-AlSi10Mg G-AlSi12 G-MgAl6 LM6,12, 13, 20, 28-30
Synthetics	81 Thermoplastics	82 Thermosetting plastics	83 Reinforced plastics	
O	Nylon Acetal	Tufnol	CFRP, GFRP Circuit Board Kevlar	

► For full material group tables, refer to pages 194 - 199

CARBIDE DRILLING **P.4-45**

HSS & HSS-E DRILLING **P.46-109**

SPADE DRILLING **P.110-151**

REAMING **P.152-175**

**COUNTERBORING
COUNTERSINKING** **P.176-187**

TECHNICAL DATA **P.189-200**

SUPERIOR PERFORMANCE



INOX DRILL

3xD - 5xD - 8xD



Special flute geometry highly suited to machining stainless steels.

Applied INOX coating gives better surface finish and longer tool life.

Excellent chip evacuation due to improved surface treatment.

Point R-thinning gives superior centering and chip curling.






















IDEAL FOR MATERIAL GROUPS



SOLID CARBIDE DRILLS

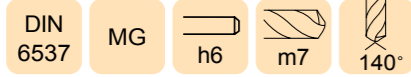


●: Excellent ○: Good

P				H		M			K				S					N							O			INOX THROUGH COOLANT DRILLS					
11	12	13	14	15	16	21	22	23	31	32	33	34	41	42	43	51	52	53	61	62	63	64	71	72	73	74	81	82	83	Code	Item	Description	Page No.
○	○	○	○			●	●	●					●	●	●	○	○	○					○	○	○	○				823323		3xD ø3.0mm - 20.0mm	P.8
○	○	○	○			●	●	●					●	●	●	○	○	○					○	○	○	○				825323		5xD ø1.5mm - 20.0mm	P.10
○	○	○	○			●	●	●					●	●	●	○	○	○					○	○	○	○				828323		8xD ø3.0mm - 14.0mm	P.12
THROUGH COOLANT DRILLS																																	
●	●	●	●						●	●	●	●																		803323		3xD ø3.0mm - 20.0mm	P.14
●	●	●	●						●	●	●	●																		804323		5xD ø1.0mm - 20.0mm	P.16
●	●	●	●						●	●	●	●																		805323		8xD ø3.0mm - 12.0mm	P.18
●	●	●	●						●	●	●	●																		810323		10xD ø3.0mm - 14.0mm	P.20
●	●	●	●						●	●	●	●																		815323		15xD ø3.0mm - 12.0mm	P.20
●	●	●	●						●	●	●	●																		820323		20xD ø3.0mm - 12.0mm	P.20
PULSAR HRc70 DRILLS																																	
				●	●																									821223		5xD ø3.0mm - 14.0mm	P.21
ALU-XP THROUGH COOLANT DRILLS																																	
																							●	●	●	●				843303		3xD ø3.0mm - 20.0mm	P.22
																							●	●	●	●				845303		5xD ø3.0mm - 20.0mm	P.24
																							●	●	●	●				848303		8xD ø3.0mm - 14.0mm	P.26
CFRP DRILLS																																	
																											●			850390		Jobber ø2.5mm - 12.0mm	P.28
SOLID DRILLS																																	
●	●	●	●						●	●	●	●																		807323		3xD ø3.0mm - 20.0mm	P.30
●	●	●	●						●	●	●	●																		808323		5xD ø1.0mm - 20.0mm	P.32
●	●	●	●						●	●	●	●																		802323		Stub TiAlN ø3.0mm - 20.0mm	P.34
●	●	●	●			○	○		●	●	●	●	○	○		○	○					○	○	○	○				800303		Stub ø1.0mm - 13.0mm	P.36	
●	●	●	●			○	○		●	●	●	●	○	○		○	○					○	○	○	○				801303		Jobber ø1.0mm - 13.0mm	P.38	
○	○	○	○			○	○		○	○	○	○	○	○		○	○					○	○	○	○				806303 806403		Spotting 90° & 120° ø6.0mm - 20.0mm	P.29	
																																Cutting Data	P.42

► For material group examples, refer to page 2
 ► For full material group tables, refer to pages 194-199

CARBIDE INOX 3D DIN6537 WITH COOLANT HOLE

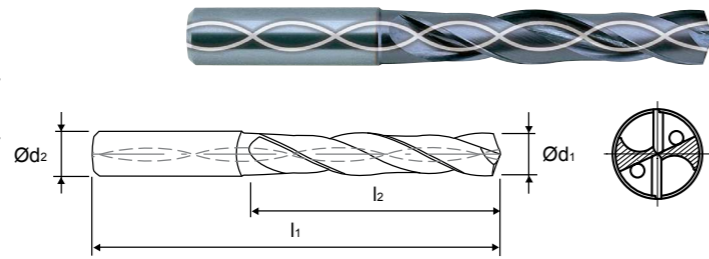


Series No. 823323

▶ cutting conditions : p.42



Application :
For drilling tough materials, stainless steels, nickel alloys, titanium up to HRc35 and aluminium.



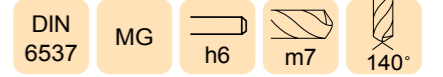
Advantage :
Special flute shape and geometry highly suited to machining stainless steels.
Excellent chip evacuation due to better surface treatment.
Point R-thinning gives superior centering and chip curling.
Applied INOX coating achieves better surface finish and longer tool life.

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8233230300	3.0	6.0	20	62
8233230310	3.1	6.0	20	62
8233230320	3.2	6.0	20	62
8233230330	3.3	6.0	20	62
8233230340	3.4	6.0	20	62
8233230350	3.5	6.0	20	62
8233230360	3.6	6.0	20	62
8233230370	3.7	6.0	20	62
8233230380	3.8	6.0	24	66
8233230390	3.9	6.0	24	66
8233230400	4.0	6.0	24	66
8233230410	4.1	6.0	24	66
8233230420	4.2	6.0	24	66
8233230430	4.3	6.0	24	66
8233230440	4.4	6.0	24	66
8233230450	4.5	6.0	24	66
8233230460	4.6	6.0	24	66
8233230470	4.7	6.0	24	66
8233230480	4.8	6.0	28	66
8233230490	4.9	6.0	28	66
8233230500	5.0	6.0	28	66
8233230510	5.1	6.0	28	66
8233230520	5.2	6.0	28	66
8233230530	5.3	6.0	28	66
8233230540	5.4	6.0	28	66
8233230550	5.5	6.0	28	66
8233230560	5.6	6.0	28	66
8233230570	5.7	6.0	28	66
8233230580	5.8	6.0	28	66
8233230590	5.9	6.0	28	66
8233230600	6.0	6.0	28	66

●: Excellent ○: Good

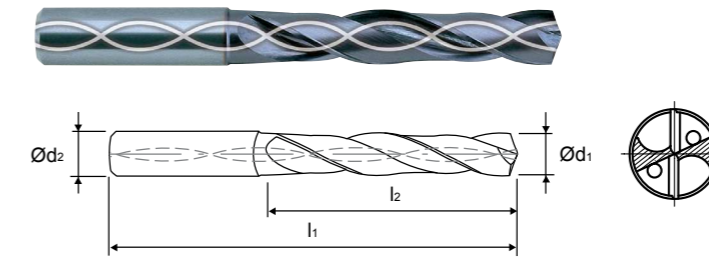
P		H		M		K		S			N				O	
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●	●			●	●			●	●	●						
13	14	16		23		33	34	51	52	53	71	72	73	74	83	
●	●			●				○	○	○	○	○	○	○		

CARBIDE INOX 3D DIN6537 WITH COOLANT HOLE



Series No. 823323

▶ cutting conditions : p.42



Application :
For drilling tough materials, stainless steels, nickel alloys, titanium up to HRc35 and aluminium.

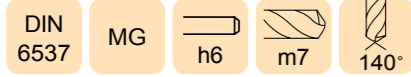
Advantage :
Special flute shape and geometry highly suited to machining stainless steels.
Excellent chip evacuation due to better surface treatment.
Point R-thinning gives superior centering and chip curling.
Applied INOX coating achieves better surface finish and longer tool life.

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8233230920	9.2	10.0	47	89
8233230930	9.3	10.0	47	89
8233230940	9.4	10.0	47	89
8233230950	9.5	10.0	47	89
8233230960	9.6	10.0	47	89
8233230970	9.7	10.0	47	89
8233230980	9.8	10.0	47	89
8233230990	9.9	10.0	47	89
8233231000	10.0	10.0	47	89
8233231010	10.1	12.0	55	102
8233231020	10.2	12.0	55	102
8233231030	10.3	12.0	55	102
8233231040	10.4	12.0	55	102
8233231050	10.5	12.0	55	102
8233231060	10.6	12.0	55	102
8233231070	10.7	12.0	55	102
8233231080	10.8	12.0	55	102
8233231090	10.9	12.0	55	102
8233231100	11.0	12.0	55	102
8233231110	11.1	12.0	55	102
8233231120	11.2	12.0	55	102
8233231130	11.3	12.0	55	102
8233231140	11.4	12.0	55	102

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15		21	22	31	32	41	42	43	61	62	63	64	81	82
●	●			●	●			●	●	●						
13	14	16		23		33	34	51	52	53	71	72	73	74	83	
●	●			●				○	○	○	○	○	○	○		

CARBIDE INOX 5D DIN6537 WITH COOLANT HOLE

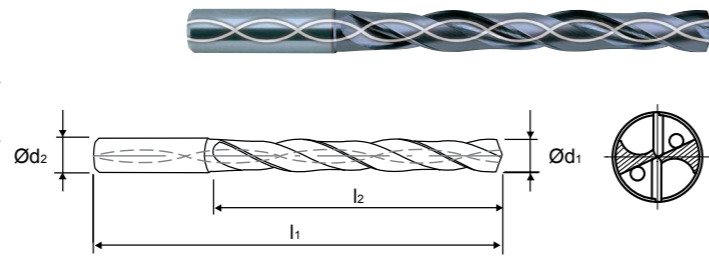


Series No. 825323

▶ cutting conditions : p.42



Application :
For drilling tough materials, stainless steels, nickel alloys, titanium up to HRc35 and aluminium.



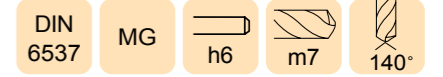
Advantage :
Special flute shape and geometry highly suited to machining stainless steels.
Excellent chip evacuation due to better surface treatment.
Point R-thinning gives superior centering and chip curling.
Applied INOX coating achieves better surface finish and longer tool life.

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8253230150	1.5	3.0	16	55
8253230160	1.6	3.0	16	55
8253230170	1.7	3.0	16	55
8253230180	1.8	3.0	16	55
8253230190	1.9	3.0	16	55
8253230200	2.0	4.0	21	57
8253230210	2.1	4.0	21	57
8253230220	2.2	4.0	21	57
8253230230	2.3	4.0	21	57
8253230240	2.4	4.0	21	57
8253230250	2.5	4.0	21	57
8253230260	2.6	4.0	21	57
8253230270	2.7	4.0	21	57
8253230280	2.8	4.0	21	57
8253230290	2.9	4.0	21	57
8253230300	3.0	6.0	28	66
8253230310	3.1	6.0	28	66
8253230320	3.2	6.0	28	66
8253230330	3.3	6.0	28	66
8253230340	3.4	6.0	28	66
8253230350	3.5	6.0	28	66
8253230360	3.6	6.0	28	66
8253230370	3.7	6.0	28	66
8253230380	3.8	6.0	36	74
8253230390	3.9	6.0	36	74
8253230400	4.0	6.0	36	74
8253230410	4.1	6.0	36	74
8253230420	4.2	6.0	36	74
8253230430	4.3	6.0	36	74
8253230440	4.4	6.0	36	74
8253230450	4.5	6.0	36	74

●: Excellent ○: Good

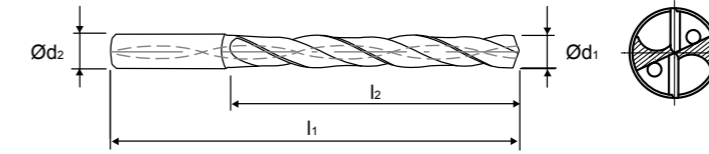
P		H		M		K		S			N				O	
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●	●			●	●			●	●	●						
13	14	16		23		33	34	51	52	53	71	72	73	74	83	
●	●			●				○	○	○	○	○	○	○		

CARBIDE INOX 5D DIN6537 WITH COOLANT HOLE



Series No. 825323

▶ cutting conditions : p.42



Application :
For drilling tough materials, stainless steels, nickel alloys, titanium up to HRc35 and aluminium.

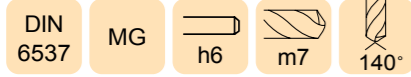
Advantage :
Special flute shape and geometry highly suited to machining stainless steels.
Excellent chip evacuation due to better surface treatment.
Point R-thinning gives superior centering and chip curling.
Applied INOX coating achieves better surface finish and longer tool life.

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8253230770	7.7	8.0	53	91
8253230780	7.8	8.0	53	91
8253230790	7.9	8.0	53	91
8253230800	8.0	8.0	53	91
8253230810	8.1	10.0	61	103
8253230820	8.2	10.0	61	103
8253230830	8.3	10.0	61	103
8253230840	8.4	10.0	61	103
8253230850	8.5	10.0	61	103
8253230860	8.6	10.0	61	103
8253230870	8.7	10.0	61	103
8253230880	8.8	10.0	61	103
8253230890	8.9	10.0	61	103
8253230900	9.0	10.0	61	103
8253230910	9.1	10.0	61	103
8253230920	9.2	10.0	61	103
8253230930	9.3	10.0	61	103
8253230940	9.4	10.0	61	103
8253230950	9.5	10.0	61	103
8253230960	9.6	10.0	61	103
8253230970	9.7	10.0	61	103
8253230980	9.8	10.0	61	103
8253230990	9.9	10.0	61	103
8253231000	10.0	10.0	61	103
8253231010	10.1	12.0	71	118
8253231020	10.2	12.0	71	118
8253231030	10.3	12.0	71	118
8253231040	10.4	12.0	71	118
8253231050	10.5	12.0	71	118
8253231060	10.6	12.0	71	118

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15		21	22	31	32	41	42	43	61	62	63	64	81	82
●	●			●	●			●	●	●						
13	14	16		23		33	34	51	52	53	71	72	73	74	83	
●	●			●				○	○	○	○	○	○	○		

CARBIDE INOX 8D DIN6537 WITH COOLANT HOLE

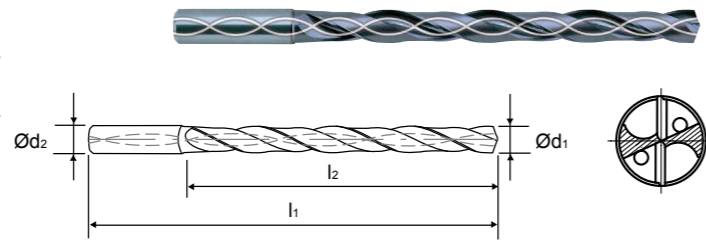


Series No. 828323

▶ cutting conditions : p.42



Application :
For drilling tough materials, stainless steels, nickel alloys, titanium up to HRc35 and aluminium.



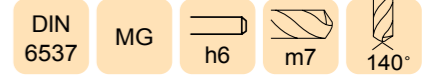
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Excellent chip evacuation due to better surface treatment.
Point R-thinning gives superior centering and chip curling.
Applied INOX coating achieves better surface finish and longer tool life.

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8283230300	3.0	6.0	34	72
8283230310	3.1	6.0	34	72
8283230320	3.2	6.0	34	72
8283230330	3.3	6.0	34	72
8283230340	3.4	6.0	34	72
8283230350	3.5	6.0	34	72
8283230360	3.6	6.0	34	72
8283230370	3.7	6.0	34	72
8283230380	3.8	6.0	43	81
8283230390	3.9	6.0	43	81
8283230400	4.0	6.0	43	81
8283230410	4.1	6.0	43	81
8283230420	4.2	6.0	43	81
8283230430	4.3	6.0	43	81
8283230440	4.4	6.0	43	81
8283230450	4.5	6.0	43	81
8283230460	4.6	6.0	43	81
8283230470	4.7	6.0	43	81
8283230480	4.8	6.0	57	95
8283230490	4.9	6.0	57	95
8283230500	5.0	6.0	57	95
8283230510	5.1	6.0	57	95
8283230520	5.2	6.0	57	95
8283230530	5.3	6.0	57	95
8283230540	5.4	6.0	57	95
8283230550	5.5	6.0	57	95
8283230560	5.6	6.0	57	95
8283230570	5.7	6.0	57	95
8283230580	5.8	6.0	57	95
8283230590	5.9	6.0	57	95
8283230600	6.0	6.0	57	95

●: Excellent ○: Good

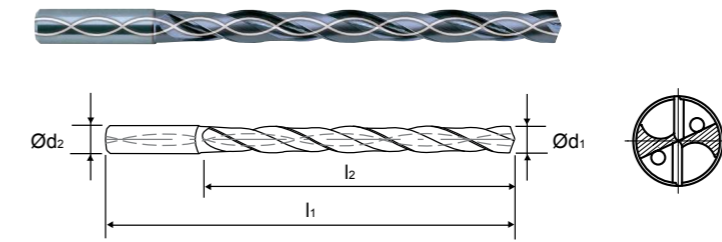
P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●		●	●			●	●	●							
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●		●				○	○	○	○	○	○	○			

CARBIDE INOX 8D DIN6537 WITH COOLANT HOLE



Series No. 828323

▶ cutting conditions : p.42



Application :
For drilling tough materials, stainless steels, nickel alloys, titanium up to HRc35 and aluminium.

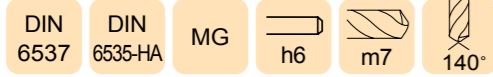
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Point R-thinning gives superior centering and chip curling.
Applied INOX coating achieves better surface finish and longer tool life.

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8283230920	9.2	10.0	95	142
8283230930	9.3	10.0	95	142
8283230940	9.4	10.0	95	142
8283230950	9.5	10.0	95	142
8283230960	9.6	10.0	95	142
8283230970	9.7	10.0	95	142
8283230980	9.8	10.0	95	142
8283230990	9.9	10.0	95	142
8283231000	10.0	10.0	95	142
8283231010	10.1	12.0	114	162
8283231020	10.2	12.0	114	162
8283231030	10.3	12.0	114	162
8283231040	10.4	12.0	114	162
8283231050	10.5	12.0	114	162
8283231060	10.6	12.0	114	162
8283231070	10.7	12.0	114	162
8283231080	10.8	12.0	114	162

●: Excellent ○: Good

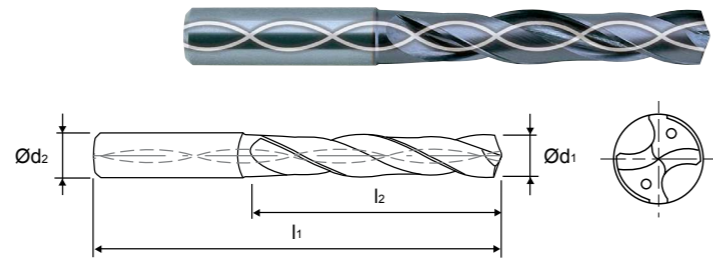
P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●		●	●			●	●	●							
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●		●				○	○	○	○	○	○	○			

CARBIDE TiAlN 3D DIN6537 WITH COOLANT HOLE



Series No. 803323

▶ cutting conditions : p.42



Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron

Advantage :

Self centering, centre drilling is not required
Excellent positioning, bush is not necessary
Special Design, reaming is not required
Good chip removal, powerful drilling

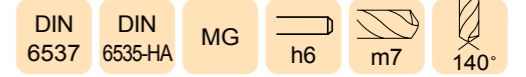
EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8033230300	3.0	6.0	20	62
8033230310	3.1			
8033230320	3.2			
8033230330	3.3			
8033230340	3.4			
8033230350	3.5			
8033230360	3.6			
8033230370	3.7			
8033230380	3.8			
8033230390	3.9			
8033230400	4.0	6.0	24	66
8033230410	4.1			
8033230420	4.2			
8033230430	4.3			
8033230440	4.4			
8033230450	4.5			
8033230460	4.6			
8033230470	4.7			
8033230480	4.8			
8033230490	4.9			
8033230500	5.0	6.0	28	66
8033230510	5.1			
8033230520	5.2			
8033230530	5.3			
8033230540	5.4			
8033230550	5.5			
8033230560	5.6			

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8033230570	5.7	6.0	28	66
8033230580	5.8			
8033230590	5.9			
8033230600	6.0			
8033230610	6.1			
8033230620	6.2			
8033230630	6.3	8.0	34	79
8033230640	6.4			
8033230650	6.5			
8033230660	6.6			
8033230670	6.7			
8033230680	6.8			
8033230690	6.9			
8033230700	7.0			
8033230710	7.1			
8033230720	7.2			
8033230730	7.3			
8033230740	7.4			
8033230750	7.5			
8033230760	7.6			
8033230770	7.7			
8033230780	7.8			
8033230790	7.9			
8033230800	8.0			
8033230810	8.1	10.0	47	89
8033230820	8.2			
8033230830	8.3			

●: Excellent ○: Good

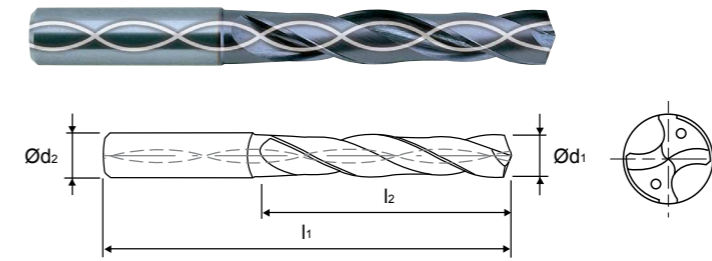
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		●	●											
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
●	●		●	●											

CARBIDE TiAlN 3D DIN6537 WITH COOLANT HOLE



Series No. 803323

▶ cutting conditions : p.42



Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron.

Advantage :

Self centering, centre drilling is not required
Excellent positioning, bush is not necessary
Special Design, reaming is not required
Good chip removal, powerful drilling

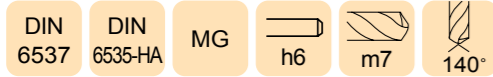
EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8033230840	8.4	10.0	47	89
8033230850	8.5			
8033230860	8.6			
8033230870	8.7			
8033230880	8.8			
8033230890	8.9			
8033230900	9.0			
8033230910	9.1			
8033230920	9.2			
8033230930	9.3			
8033230940	9.4	12.0	55	102
8033230950	9.5			
8033230960	9.6			
8033230970	9.7			
8033230980	9.8			
8033230990	9.9			
8033231000	10.0			
8033231010	10.1			
8033231020	10.2			
8033231030	10.3			
8033231040	10.4	20.0	79	131
8033231050	10.5			
8033231060	10.6			
8033231070	10.7			
8033231080	10.8			
8033231090	10.9			
8033231100	11.0			

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8033231110	11.1	12.0	55	102
8033231120	11.2			
8033231130	11.3			
8033231140	11.4			
8033231150	11.5			
8033231160	11.6			
8033231170	11.7			
8033231180	11.8			
8033231190	11.9			
8033231200	12.0			
8033231250	12.5			
8033231300	13.0			
8033231350	13.5			
8033231400	14.0			
8033231450	14.5			
8033231500	15.0			
8033231550	15.5			
8033231600	16.0			
8033231650	16.5	18.0	73	123
8033231700	17.0			
8033231750	17.5			
8033231800	18.0			
8033231850	18.5			
8033231900	19.0			
8033231950	19.5			
8033232000	20.0			

●: Excellent ○: Good

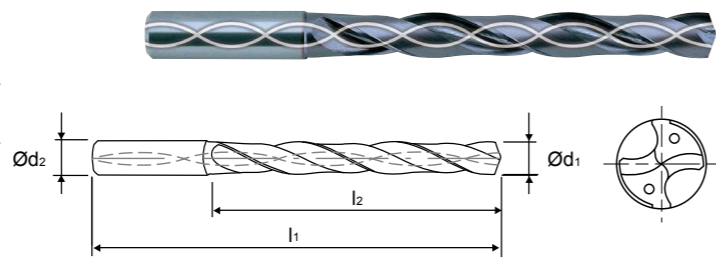
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		●	●											
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
●	●		●	●											

CARBIDE TiAlN 5D DIN6537 WITH COOLANT HOLE



Series No. 804323

▶ cutting conditions : p.42



Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron.

Advantage :

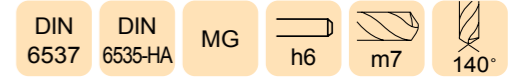
Self centering, centre drilling is not required
Excellent positioning, bush is not necessary
Special Design, reaming is not required
Good chip removal, powerful drilling

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8043230100	1.0	3.0	8	55
8043230110	1.1	3.0	12	55
8043230120	1.2			
8043230130	1.3			
8043230140	1.4	3.0	16	55
8043230150	1.5			
8043230160	1.6			
8043230170	1.7	3.0	16	55
8043230180	1.8			
8043230190	1.9			
8043230200	2.0	4.0	21	57
8043230210	2.1			
8043230220	2.2			
8043230230	2.3	4.0	21	57
8043230240	2.4			
8043230250	2.5			
8043230260	2.6	4.0	21	57
8043230270	2.7			
8043230280	2.8			
8043230290	2.9	6.0	28	66
8043230300	3.0			
8043230310	3.1			
8043230320	3.2	6.0	28	66
8043230330	3.3			
8043230340	3.4			
8043230350	3.5	6.0	28	66
8043230360	3.6			
8043230370	3.7			
8043230380	3.8	6.0	36	74
8043230390	3.9			
8043230400	4.0			
8043230410	4.1			

●: Excellent ○: Good

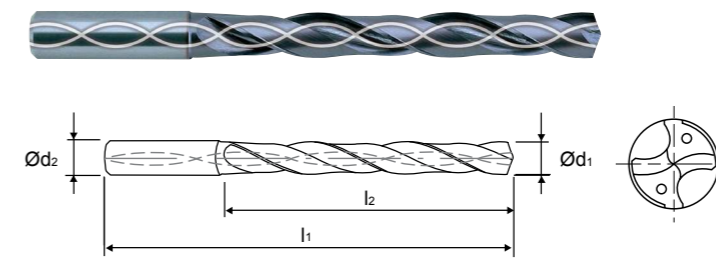
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●				●	●									
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●				●	●									

CARBIDE TiAlN 5D DIN6537 WITH COOLANT HOLE



Series No. 804323

▶ cutting conditions : p.42



Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron.

Advantage :

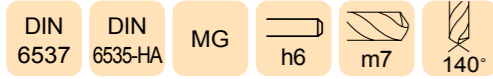
Self centering, centre drilling is not required
Excellent positioning, bush is not necessary
Special Design, reaming is not required
Good chip removal, powerful drilling

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8043230740	7.4	8.0	53	91
8043230750	7.5			
8043230760	7.6			
8043230770	7.7	8.0	53	91
8043230780	7.8			
8043230790	7.9			
8043230800	8.0	10.0	61	103
8043230810	8.1			
8043230820	8.2			
8043230830	8.3	10.0	61	103
8043230840	8.4			
8043230850	8.5			
8043230860	8.6	10.0	61	103
8043230870	8.7			
8043230880	8.8			
8043230890	8.9	10.0	61	103
8043230900	9.0			
8043230910	9.1			
8043230920	9.2	12.0	71	118
8043230930	9.3			
8043230940	9.4			
8043230950	9.5	12.0	71	118
8043230960	9.6			
8043230970	9.7			
8043230980	9.8	12.0	71	118
8043230990	9.9			
8043231000	10.0			
8043231010	10.1	12.0	71	118
8043231020	10.2			
8043231030	10.3			
8043231040	10.4	12.0	71	118
8043231050	10.5			

●: Excellent ○: Good

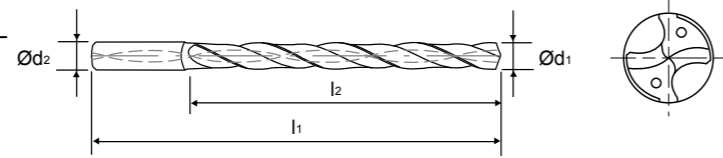
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●				●	●									
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●				●	●									

CARBIDE TiAIN 8D DIN6537 WITH COOLANT HOLE



Series No. 805323

▶ cutting conditions : p.42



Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron.

Advantage :

Self centering, centre drilling is not required
Excellent positioning, bush is not necessary
Special Design, reaming is not required
Good chip removal, powerful drilling

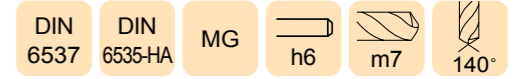
EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8053230300	3.0	6.0	34	72
8053230310	3.1			
8053230320	3.2			
8053230330	3.3			
8053230340	3.4			
8053230350	3.5			
8053230360	3.6			
8053230370	3.7			
8053230380	3.8			
8053230390	3.9			
8053230400	4.0	6.0	43	81
8053230410	4.1			
8053230420	4.2			
8053230430	4.3			
8053230440	4.4			
8053230450	4.5			
8053230460	4.6			
8053230470	4.7			
8053230480	4.8			
8053230490	4.9			
8053230500	5.0	6.0	57	95
8053230510	5.1			
8053230520	5.2			

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8053230530	5.3	6.0	57	95
8053230540	5.4			
8053230550	5.5			
8053230560	5.6			
8053230570	5.7			
8053230580	5.8			
8053230590	5.9			
8053230600	6.0			
8053230610	6.1			
8053230620	6.2			
8053230630	6.3	8.0	76	114
8053230640	6.4			
8053230650	6.5			
8053230660	6.6			
8053230670	6.7			
8053230680	6.8			
8053230690	6.9			
8053230700	7.0			
8053230710	7.1			
8053230720	7.2			
8053230730	7.3			
8053230740	7.4			
8053230750	7.5			

●: Excellent ○: Good

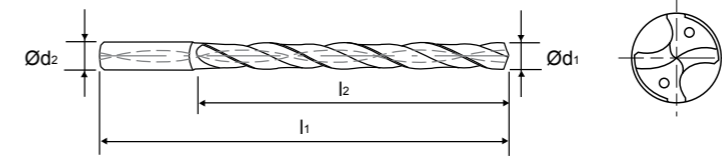
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		●	●											
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
●	●			●	●										

CARBIDE TiAIN 8D DIN6537 WITH COOLANT HOLE



Series No. 805323

▶ cutting conditions : p.42



Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron.

Advantage :

Self centering, centre drilling is not required
Excellent positioning, bush is not necessary
Special Design, reaming is not required
Good chip removal, powerful drilling

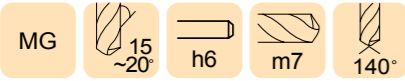
EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8053230760	7.6	8.0	76	114
8053230770	7.7			
8053230780	7.8			
8053230790	7.9			
8053230800	8.0			
8053230810	8.1			
8053230820	8.2			
8053230830	8.3			
8053230840	8.4			
8053230850	8.5			
8053230860	8.6	10.0	95	142
8053230870	8.7			
8053230880	8.8			
8053230890	8.9			
8053230900	9.0			
8053230910	9.1			
8053230920	9.2			
8053230930	9.3			
8053230940	9.4			
8053230950	9.5			
8053230960	9.6			
8053230970	9.7			
8053230980	9.8			

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8053230990	9.9	10.0	95	142
8053231000	10.0			
8053231010	10.1			
8053231020	10.2			
8053231030	10.3			
8053231040	10.4			
8053231050	10.5			
8053231060	10.6			
8053231070	10.7			
8053231080	10.8			
8053231090	10.9	12.0	114	162
8053231100	11.0			
8053231110	11.1			
8053231120	11.2			
8053231130	11.3			
8053231140	11.4			
8053231150	11.5			
8053231160	11.6			
8053231170	11.7			
8053231180	11.8			
8053231190	11.9			
8053231200	12.0			

●: Excellent ○: Good

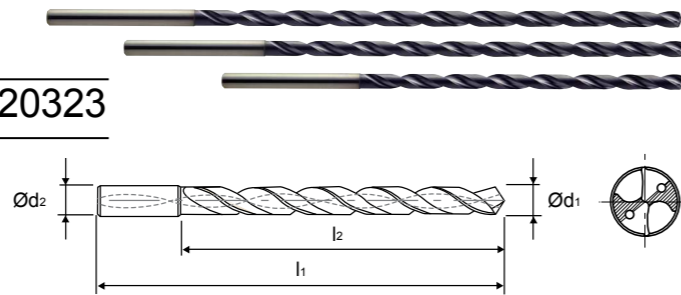
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		●	●											
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
●	●			●	●										

CARBIDE TiAIN MQL WITH COOLANT HOLE



Series No. 810323, 815323, 820323

▶ cutting conditions : p.43



Application :
Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron.

Advantage :
Non step drilling from 10 times to 15 times of drill diameter. Available for processing MQL (Minimum Quantity Lubrication). Excellent positioning - Bush is not necessary. Special design - Good chip removal. Powerful drilling.

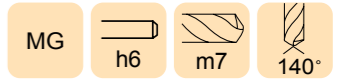
10 X D

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8103230300	3.0	3.0	39	90
8103230330	3.3	4.0	46	97
8103230350	3.5	4.0	46	97
8103230400	4.0	4.0	52	103
8103230420	4.2	5.0	59	112
8103230450	4.5	5.0	59	112
8103230500	5.0	5.0	65	118
8103230550	5.5	6.0	72	127
8103230600	6.0	6.0	78	133
8103230650	6.5	7.0	85	141
8103230680	6.8	7.0	91	147
8103230700	7.0	7.0	91	147
8103230750	7.5	8.0	98	155
8103230800	8.0	8.0	104	161
8103230850	8.5	9.0	111	169
8103230900	9.0	9.0	117	175
8103230950	9.5	10.0	124	182
8103231000	10.0	10.0	130	188
8103231050	10.5	11.0	137	201
8103231100	11.0	11.0	143	207
8103231150	11.5	12.0	150	215
8103231200	12.0	12.0	156	221
8103231250	12.5	13.0	163	229
8103231300	13.0	13.0	169	235
8103231350	13.5	14.0	176	243
8103231400	14.0	14.0	182	249

●: Excellent ○: Good

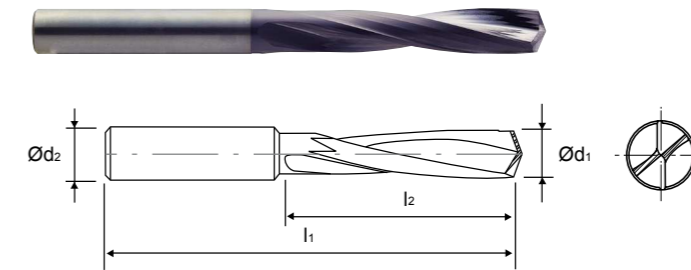
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		●	●											
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●				●	●									

PULSAR CARBIDE TiAIN HRC70



Series No. 821223

▶ cutting conditions : p.44



Application :
For drilling High Hardened Steels (Quenched Steels, Tempered Steels) Under HRC70

Advantage :
Special Design
Minimized cutting load through special point thinning
Good chip removal
Powerful Drilling

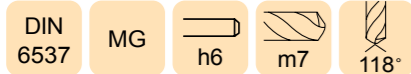
EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8212230300	3.0	3	16	46
8212230330	3.3	4	18	48
8212230340	3.4	4	20	50
8212230350	3.5	4	20	50
8212230400	4.0	4	22	52
8212230420	4.2	6	25	65
8212230430	4.3	6	28	68
8212230440	4.4	6	28	68
8212230450	4.5	6	28	68
8212230500	5.0	6	32	72
8212230510	5.1	6	32	72
8212230520	5.2	6	32	72
8212230550	5.5	6	35	75
8212230600	6.0	6	35	75
8212230650	6.5	8	40	80
8212230680	6.8	8	45	85
8212230690	6.9	8	45	85

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8212230700	7.0	8	45	85
8212230750	7.5	8	45	85
8212230800	8.0	8	50	98
8212230850	8.5	10	50	98
8212230860	8.6	10	57	105
8212230880	8.8	10	57	105
8212230900	9.0	10	57	105
8212230950	9.5	10	57	105
8212231000	10.0	10	63	111
8212231020	10.2	12	63	111
8212231030	10.3	12	63	111
8212231050	10.5	12	63	111
8212231080	10.8	12	71	119
8212231100	11.0	12	71	119
8212231150	11.5	12	71	119
8212231200	12.0	12	71	119
8212231400	14.0	14	77	125

●: Excellent ○: Good

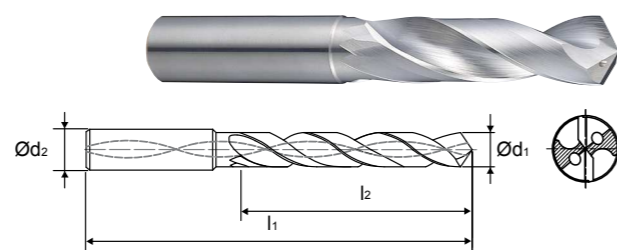
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
		●													
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
		●													

ALU-XP CARBIDE 3D DIN6537



Series No. 843303

▶ cutting conditions : p.44



Application :

For high performance drilling of aluminium and aluminium alloys

Advantage :

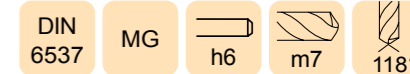
Good chip treatment due to special flute geometry and wide chip space.
Polished flute gives better surface finish and helps prevent built-up edge.

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8433030300	3.0	6.0	20	62
8433030310	3.1	6.0	20	62
8433030320	3.2	6.0	20	62
8433030330	3.3	6.0	20	62
8433030340	3.4	6.0	20	62
8433030350	3.5	6.0	20	62
8433030360	3.6	6.0	20	62
8433030370	3.7	6.0	20	62
8433030380	3.8	6.0	24	66
8433030390	3.9	6.0	24	66
8433030400	4.0	6.0	24	66
8433030410	4.1	6.0	24	66
8433030420	4.2	6.0	24	66
8433030430	4.3	6.0	24	66
8433030440	4.4	6.0	24	66
8433030450	4.5	6.0	24	66
8433030460	4.6	6.0	24	66
8433030470	4.7	6.0	24	66
8433030480	4.8	6.0	28	66
8433030490	4.9	6.0	28	66
8433030500	5.0	6.0	28	66
8433030510	5.1	6.0	28	66
8433030520	5.2	6.0	28	66
8433030530	5.3	6.0	28	66
8433030540	5.4	6.0	28	66
8433030550	5.5	6.0	28	66
8433030560	5.6	6.0	28	66
8433030570	5.7	6.0	28	66
8433030580	5.8	6.0	28	66
8433030590	5.9	6.0	28	66
8433030600	6.0	6.0	28	66

●: Excellent ○: Good

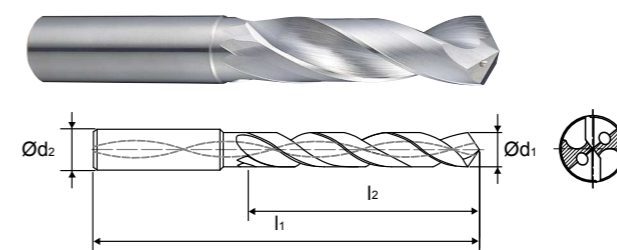
P		H		M		K		S			N				O	
11	12	15		21	22	31	32	41	42	43	61	62	63	64	81	82
13	14	16		23		33	34	51	52	53	71	72	73	74	83	
											●	●	●	●		

ALU-XP CARBIDE 3D DIN6537



Series No. 843303

▶ cutting conditions : p.44



Application :

For high performance drilling of aluminium and aluminium alloys

Advantage :

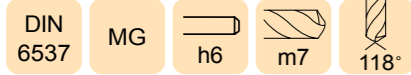
Good chip treatment due to special flute geometry and wide chip space.
Polished flute gives better surface finish and helps prevent built-up edge.

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8433030920	9.2	10.0	47	89
8433030930	9.3	10.0	47	89
8433030940	9.4	10.0	47	89
8433030950	9.5	10.0	47	89
8433030960	9.6	10.0	47	89
8433030970	9.7	10.0	47	89
8433030980	9.8	10.0	47	89
8433030990	9.9	10.0	47	89
8433031000	10.0	10.0	47	89
8433031010	10.1	12.0	55	102
8433031020	10.2	12.0	55	102
8433031030	10.3	12.0	55	102
8433031040	10.4	12.0	55	102
8433031050	10.5	12.0	55	102
8433031060	10.6	12.0	55	102
8433031070	10.7	12.0	55	102
8433031080	10.8	12.0	55	102
8433031090	10.9	12.0	55	102
8433031100	11.0	12.0	55	102
8433031110	11.1	12.0	55	102
8433031120	11.2	12.0	55	102
8433031130	11.3	12.0	55	102
8433031140	11.4	12.0	55	102

●: Excellent ○: Good

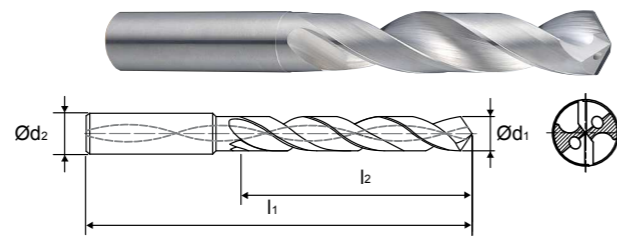
P		H		M		K		S			N				O	
11	12	15		21	22	31	32	41	42	43	61	62	63	64	81	82
13	14	16		23		33	34	51	52	53	71	72	73	74	83	
											●	●	●	●		

ALU-XP CARBIDE 5D DIN6537



Series No. 845303

▶ cutting conditions : p.44



Application :

For high performance drilling of aluminium and aluminium alloys

Advantage :

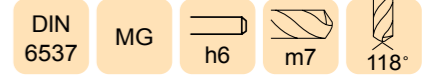
Good chip treatment due to special flute geometry and wide chip space.
Polished flute gives better surface finish and helps prevent built-up edge.

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8453030300	3.0	6.0	28	66
8453030310	3.1	6.0	28	66
8453030320	3.2	6.0	28	66
8453030330	3.3	6.0	28	66
8453030340	3.4	6.0	28	66
8453030350	3.5	6.0	28	66
8453030360	3.6	6.0	28	66
8453030370	3.7	6.0	28	66
8453030380	3.8	6.0	36	74
8453030390	3.9	6.0	36	74
8453030400	4.0	6.0	36	74
8453030410	4.1	6.0	36	74
8453030420	4.2	6.0	36	74
8453030430	4.3	6.0	36	74
8453030440	4.4	6.0	36	74
8453030450	4.5	6.0	36	74
8453030460	4.6	6.0	36	74
8453030470	4.7	6.0	36	74
8453030480	4.8	6.0	44	82
8453030490	4.9	6.0	44	82
8453030500	5.0	6.0	44	82
8453030510	5.1	6.0	44	82
8453030520	5.2	6.0	44	82
8453030530	5.3	6.0	44	82
8453030540	5.4	6.0	44	82
8453030550	5.5	6.0	44	82
8453030560	5.6	6.0	44	82
8453030570	5.7	6.0	44	82
8453030580	5.8	6.0	44	82
8453030590	5.9	6.0	44	82
8453030600	6.0	6.0	44	82

●: Excellent ○: Good

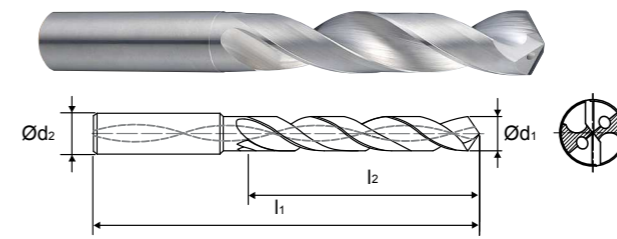
P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
13	14	16	23	33	34	51	52	53	71	72	73	74	83			
									●	●	●	●				

ALU-XP CARBIDE 5D DIN6537



Series No. 845303

▶ cutting conditions : p.44



Application :

For high performance drilling of aluminium and aluminium alloys

Advantage :

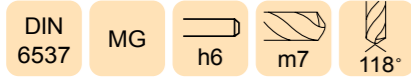
Good chip treatment due to special flute geometry and wide chip space.
Polished flute gives better surface finish and helps prevent built-up edge.

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8453030920	9.2	10.0	61	103
8453030930	9.3	10.0	61	103
8453030940	9.4	10.0	61	103
8453030950	9.5	10.0	61	103
8453030960	9.6	10.0	61	103
8453030970	9.7	10.0	61	103
8453030980	9.8	10.0	61	103
8453030990	9.9	10.0	61	103
8453031000	10.0	10.0	61	103
8453031010	10.1	12.0	71	118
8453031020	10.2	12.0	71	118
8453031030	10.3	12.0	71	118
8453031040	10.4	12.0	71	118
8453031050	10.5	12.0	71	118
8453031060	10.6	12.0	71	118
8453031070	10.7	12.0	71	118
8453031080	10.8	12.0	71	118
8453031090	10.9	12.0	71	118
8453031100	11.0	12.0	71	118
8453031110	11.1	12.0	71	118
8453031120	11.2	12.0	71	118
8453031130	11.3	12.0	71	118
8453031140	11.4	12.0	71	118

●: Excellent ○: Good

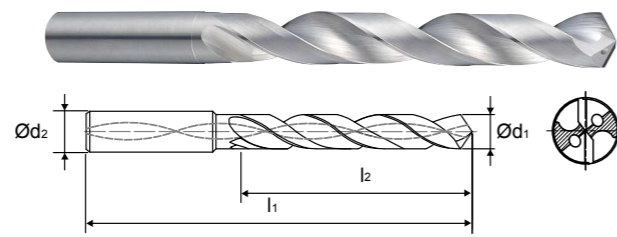
P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
13	14	16	23	33	34	51	52	53	71	72	73	74	83			
									●	●	●	●				

ALU-XP CARBIDE 8D DIN6537



Series No. 848303

▶ cutting conditions : p.44



Application :

For high performance drilling of aluminium and aluminium alloys

Advantage :

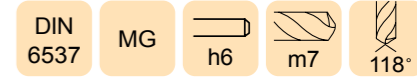
Good chip treatment due to special flute geometry and wide chip space.
Polished flute gives better surface finish and helps prevent built-up edge.

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8483030300	3.0	6.0	34	72
8483030310	3.1	6.0	34	72
8483030320	3.2	6.0	34	72
8483030330	3.3	6.0	34	72
8483030340	3.4	6.0	34	72
8483030350	3.5	6.0	34	72
8483030360	3.6	6.0	34	72
8483030370	3.7	6.0	34	72
8483030380	3.8	6.0	43	81
8483030390	3.9	6.0	43	81
8483030400	4.0	6.0	43	81
8483030410	4.1	6.0	43	81
8483030420	4.2	6.0	43	81
8483030430	4.3	6.0	43	81
8483030440	4.4	6.0	43	81
8483030450	4.5	6.0	43	81
8483030460	4.6	6.0	43	81
8483030470	4.7	6.0	43	81
8483030480	4.8	6.0	57	95
8483030490	4.9	6.0	57	95
8483030500	5.0	6.0	57	95
8483030510	5.1	6.0	57	95
8483030520	5.2	6.0	57	95
8483030530	5.3	6.0	57	95
8483030540	5.4	6.0	57	95
8483030550	5.5	6.0	57	95
8483030560	5.6	6.0	57	95
8483030570	5.7	6.0	57	95
8483030580	5.8	6.0	57	95
8483030590	5.9	6.0	57	95
8483030600	6.0	6.0	57	95

●: Excellent ○: Good

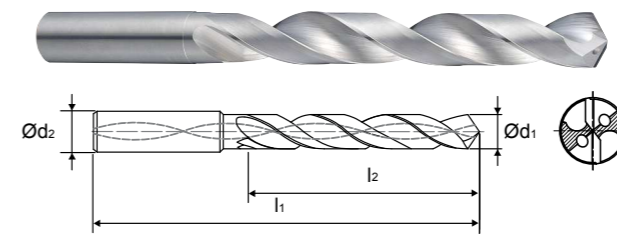
P		H		M		K		S			N				O	
11	12	15		21	22	31	32	41	42	43	61	62	63	64	81	82
13	14	16		23		33	34	51	52	53	71	72	73	74	83	
											●	●	●	●		

ALU-XP CARBIDE 8D DIN6537



Series No. 848303

▶ cutting conditions : p.44



Application :

For high performance drilling of aluminium and aluminium alloys

Advantage :

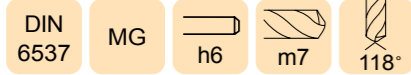
Good chip treatment due to special flute geometry and wide chip space.
Polished flute gives better surface finish and helps prevent built-up edge.

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8483030920	9.2	10.0	95	142
8483030930	9.3	10.0	95	142
8483030940	9.4	10.0	95	142
8483030950	9.5	10.0	95	142
8483030960	9.6	10.0	95	142
8483030970	9.7	10.0	95	142
8483030980	9.8	10.0	95	142
8483030990	9.9	10.0	95	142
8483031000	10.0	10.0	95	142
8483031010	10.1	12.0	114	162
8483031020	10.2	12.0	114	162
8483031030	10.3	12.0	114	162
8483031040	10.4	12.0	114	162
8483031050	10.5	12.0	114	162
8483031060	10.6	12.0	114	162
8483031070	10.7	12.0	114	162
8483031080	10.8	12.0	114	162

●: Excellent ○: Good

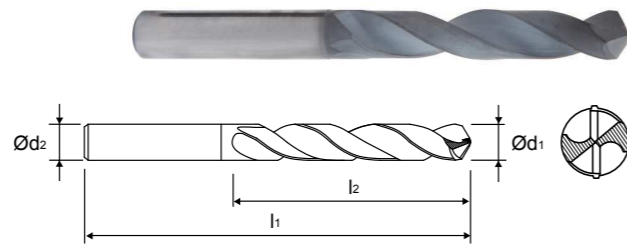
P		H		M		K		S			N				O	
11	12	15		21	22	31	32	41	42	43	61	62	63	64	81	82
13	14	16		23		33	34	51	52	53	71	72	73	74	83	
											●	●	●	●		

CARBIDE CFRP DRILL



Series No. 850390

► cutting conditions : p.44



Application :
For improved hole quality in composite materials.

Advantage :
Special point geometry for improved hole quality.
Minimal burr and delamination at entry/exit point.
Diamond coated for increased tool life.

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8503900250	2.5	6.0	24	66
8503900300	3.0	6.0	28	66
8503900400	4.0	6.0	36	74
8503900500	5.0	6.0	44	82
8503900600	6.0	6.0	44	82
8503900800	8.0	8.0	53	91
8503900900	9.0	10.0	61	103
8503901000	10.0	10.0	61	103
8503901100	11.0	12.0	71	118
8503901200	12.0	12.0	71	118

●: Excellent ○: Good

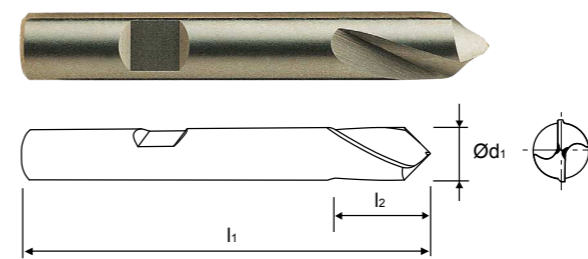
P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
13	14	16	23	33	34	51	52	53	71	72	73	74	83	●		

CARBIDE 90° & 120° SPOTTING DRILL



Series No. 806303, 806403

► cutting conditions : p.45



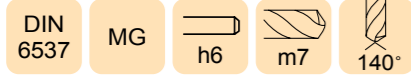
Application :
For more precise centering work on NC/CNC machine.
A larger diameter than the subsequent drilling tool allows for centering and chamfering simultaneously.

EUROPA CODE 90°	EUROPA CODE 120°	O.D d ₁	FL l ₂	OAL l ₁
8063030600	8064030600	6.0	13	50
8063030800	8064030800	8.0	23	60
8063031000	8064031000	10.0	24	70
8063031200	8064031200	12.0		
8063031600	8064031600	16.0	29	75
8063032000	8064032000	20.0	35	100

●: Excellent ○: Good

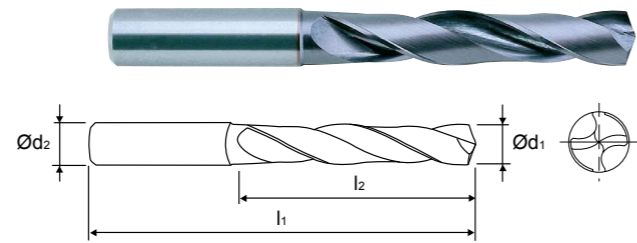
P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
○	○		○	○	○	○	○	○								
13	14	16	23	33	34	51	52	53	71	72	73	74	83			
○	○				○	○	○	○	○	○	○	○	○			

CARBIDE TiAIN 3D DRILL



Series No. 807323

► cutting conditions : p.45



Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron.

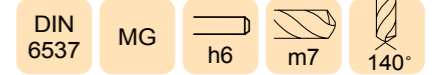
Advantage :

Self centering, centre drilling is not required
Excellent positioning, bush is not necessary
Special Design, reaming is not required
Good chip removal, powerful drilling

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8073230300	3.0	6.0	20	62
8073230310	3.1	6.0	20	62
8073230320	3.2	6.0	20	62
8073230330	3.3	6.0	20	62
8073230340	3.4	6.0	20	62
8073230350	3.5	6.0	20	62
8073230360	3.6	6.0	20	62
8073230370	3.7	6.0	20	62
8073230380	3.8	6.0	24	66
8073230390	3.9	6.0	24	66
8073230400	4.0	6.0	24	66
8073230410	4.1	6.0	24	66
8073230420	4.2	6.0	24	66
8073230430	4.3	6.0	24	66
8073230440	4.4	6.0	24	66
8073230450	4.5	6.0	24	66
8073230460	4.6	6.0	24	66
8073230470	4.7	6.0	24	66
8073230480	4.8	6.0	28	66
8073230490	4.9	6.0	28	66
8073230500	5.0	6.0	28	66
8073230510	5.1	6.0	28	66
8073230520	5.2	6.0	28	66
8073230530	5.3	6.0	28	66
8073230540	5.4	6.0	28	66
8073230550	5.5	6.0	28	66
8073230560	5.6	6.0	28	66
8073230570	5.7	6.0	28	66
8073230580	5.8	6.0	28	66
8073230590	5.9	6.0	28	66
8073230600	6.0	6.0	28	66

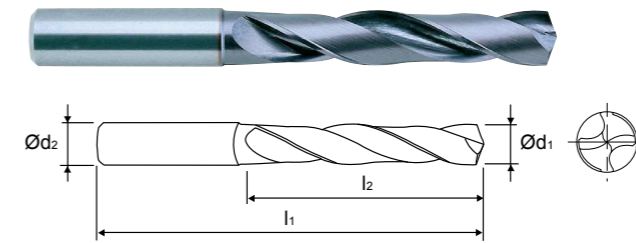
MATERIAL APPLICATION GUIDE ON FOLLOWING PAGE

CARBIDE TiAIN 3D DRILL



Series No. 807323

► cutting conditions : p.45



Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron.

Advantage :

Self centering, centre drilling is not required
Excellent positioning, bush is not necessary
Special Design, reaming is not required
Good chip removal, powerful drilling

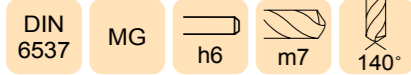
EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8073230920	9.2	10.0	47	89
8073230930	9.3	10.0	47	89
8073230940	9.4	10.0	47	89
8073230950	9.5	10.0	47	89
8073230960	9.6	10.0	47	89
8073230970	9.7	10.0	47	89
8073230980	9.8	10.0	47	89
8073230990	9.9	10.0	47	89
8073231000	10.0	10.0	47	89
8073231010	10.1	12.0	55	102
8073231020	10.2	12.0	55	102
8073231030	10.3	12.0	55	102
8073231040	10.4	12.0	55	102
8073231050	10.5	12.0	55	102
8073231060	10.6	12.0	55	102
8073231070	10.7	12.0	55	102
8073231080	10.8	12.0	55	102
8073231090	10.9	12.0	55	102
8073231100	11.0	12.0	55	102
8073231110	11.1	12.0	55	102
8073231120	11.2	12.0	55	102
8073231130	11.3	12.0	55	102
8073231140	11.4	12.0	55	102
8073231150	11.5	12.0	55	102
8073231160	11.6	12.0	55	102
8073231170	11.7	12.0	55	102
8073231180	11.8	12.0	55	102

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8073231190	11.9	12.0	55	102
8073231200	12.0	12.0	55	102
8073231230	12.3	14.0	60	107
8073231250	12.5	14.0	60	107
8073231280	12.8	14.0	60	107
8073231300	13.0	14.0	60	107
8073231350	13.5	14.0	60	107
8073231380	13.8	14.0	60	107
8073231400	14.0	14.0	60	107
8073231450	14.5	16.0	65	115
8073231480	14.8	16.0	65	115
8073231500	15.0	16.0	65	115
8073231550	15.5	16.0	65	115
8073231580	15.8	16.0	65	115
8073231600	16.0	16.0	65	115
8073231650	16.5	18.0	73	123
8073231680	16.8	18.0	73	123
8073231700	17.0	18.0	73	123
8073231750	17.5	18.0	73	123
8073231780	17.8	18.0	73	123
8073231800	18.0	18.0	73	123
8073231850	18.5	20.0	79	131
8073231900	19.0	20.0	79	131
8073231950	19.5	20.0	79	131
8073231980	19.8	20.0	79	131
8073232000	20.0	20.0	79	131

●: Excellent ○: Good

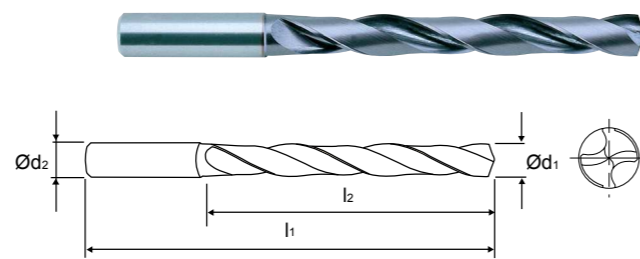
P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●				●	●										
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●				●	●										

CARBIDE TiAIN 5D DRILL



Series No. 808323

▶ cutting conditions : p.45



Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron.

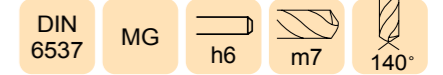
Advantage :

Self centering, centre drilling is not required
Excellent positioning, bush is not necessary
Special Design, reaming is not required
Good chip removal, powerful drilling

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8083230100	1.0	3.0	8	55
8083230110	1.1	3.0	12	55
8083230120	1.2	3.0	12	55
8083230130	1.3	3.0	12	55
8083230140	1.4	3.0	12	55
8083230150	1.5	3.0	16	55
8083230160	1.6	3.0	16	55
8083230170	1.7	3.0	16	55
8083230180	1.8	3.0	16	55
8083230190	1.9	3.0	16	55
8083230200	2.0	4.0	21	57
8083230210	2.1	4.0	21	57
8083230220	2.2	4.0	21	57
8083230230	2.3	4.0	21	57
8083230240	2.4	4.0	21	57
8083230250	2.5	4.0	21	57
8083230260	2.6	4.0	21	57
8083230270	2.7	4.0	21	57
8083230280	2.8	4.0	21	57
8083230290	2.9	4.0	21	57
8083230300	3.0	6.0	28	66
8083230310	3.1	6.0	28	66
8083230320	3.2	6.0	28	66
8083230330	3.3	6.0	28	66
8083230340	3.4	6.0	28	66
8083230350	3.5	6.0	28	66
8083230360	3.6	6.0	28	66
8083230370	3.7	6.0	28	66
8083230380	3.8	6.0	36	74
8083230390	3.9	6.0	36	74
8083230400	4.0	6.0	36	74
8083230410	4.1	6.0	36	74
8083230420	4.2	6.0	36	74
8083230430	4.3	6.0	36	74
8083230440	4.4	6.0	36	74
8083230450	4.5	6.0	36	74

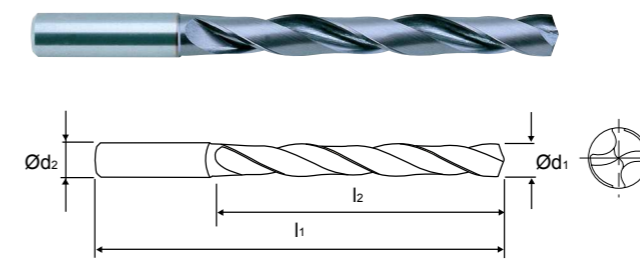
MATERIAL APPLICATION GUIDE ON FOLLOWING PAGE

CARBIDE TiAIN 5D DRILL



Series No. 808323

▶ cutting conditions : p.45



Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron.

Advantage :

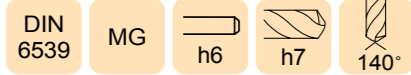
Self centering, centre drilling is not required
Excellent positioning, bush is not necessary
Special Design, reaming is not required
Good chip removal, powerful drilling

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8083230820	8.2	10.0	61	103
8083230830	8.3	10.0	61	103
8083230840	8.4	10.0	61	103
8083230850	8.5	10.0	61	103
8083230860	8.6	10.0	61	103
8083230870	8.7	10.0	61	103
8083230880	8.8	10.0	61	103
8083230890	8.9	10.0	61	103
8083230900	9.0	10.0	61	103
8083230910	9.1	10.0	61	103
8083230920	9.2	10.0	61	103
8083230930	9.3	10.0	61	103
8083230940	9.4	10.0	61	103
8083230950	9.5	10.0	61	103
8083230960	9.6	10.0	61	103
8083230970	9.7	10.0	61	103
8083230980	9.8	10.0	61	103
8083230990	9.9	10.0	61	103
8083231000	10.0	10.0	61	103
8083231010	10.1	12.0	71	118
8083231020	10.2	12.0	71	118
8083231030	10.3	12.0	71	118
8083231040	10.4	12.0	71	118
8083231050	10.5	12.0	71	118
8083231060	10.6	12.0	71	118
8083231070	10.7	12.0	71	118
8083231080	10.8	12.0	71	118
8083231090	10.9	12.0	71	118
8083231100	11.0	12.0	71	118
8083231110	11.1	12.0	71	118
8083231120	11.2	12.0	71	118
8083231130	11.3	12.0	71	118

●: Excellent ○: Good

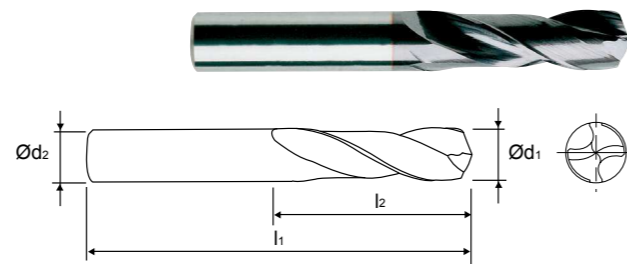
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●				●	●									
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●				●	●									

CARBIDE TiAIN GOLD DRILL DIN6539



Series No. 802323

► cutting conditions : p.45



Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron.

Advantage :

Self centering, centre drilling is not required
Excellent positioning, bush is not necessary
Special Design, reaming is not required
Good chip removal, powerful drilling

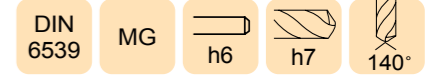
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8023230300	3.0	16	46
8023230310	3.1	18	49
8023230320	3.2		
8023230330	3.3		
8023230340	3.4	20	52
8023230350	3.5		
8023230360	3.6		
8023230370	3.7		
8023230380	3.8	22	55
8023230390	3.9		
8023230400	4.0		
8023230410	4.1		
8023230420	4.2		
8023230430	4.3	24	58
8023230440	4.4		
8023230450	4.5		
8023230460	4.6		
8023230470	4.7		
8023230480	4.8	26	62
8023230490	4.9		
8023230500	5.0		
8023230510	5.1		
8023230520	5.2		

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8023230530	5.3	26	62
8023230540	5.4	28	66
8023230550	5.5		
8023230560	5.6		
8023230570	5.7		
8023230580	5.8	31	70
8023230590	5.9		
8023230600	6.0		
8023230610	6.1		
8023230620	6.2		
8023230630	6.3	34	74
8023230640	6.4		
8023230650	6.5		
8023230660	6.6		
8023230670	6.7		
8023230680	6.8	31	70
8023230690	6.9		
8023230700	7.0		
8023230710	7.1		
8023230720	7.2		
8023230730	7.3	34	74
8023230740	7.4		
8023230750	7.5		

●: Excellent ○: Good

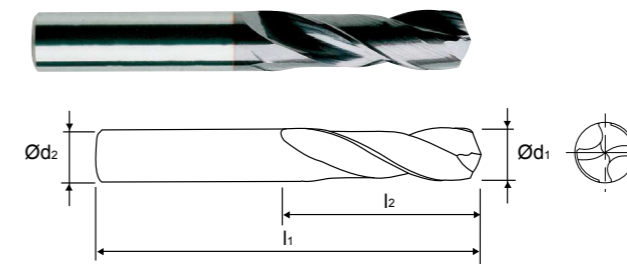
P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●				●	●										
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●				●	●										

CARBIDE TiAIN GOLD DRILL DIN6539



Series No. 802323

► cutting conditions : p.45



Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron.

Advantage :

Self centering, centre drilling is not required
Excellent positioning, bush is not necessary
Special Design, reaming is not required
Good chip removal, powerful drilling

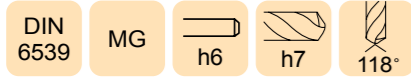
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8023230760	7.6	37	79
8023230770	7.7		
8023230780	7.8		
8023230790	7.9		
8023230800	8.0		
8023230810	8.1		
8023230820	8.2		
8023230830	8.3		
8023230840	8.4		
8023230850	8.5		
8023230860	8.6	40	84
8023230870	8.7		
8023230880	8.8		
8023230890	8.9		
8023230900	9.0		
8023230910	9.1		
8023230920	9.2		
8023230930	9.3		
8023230940	9.4		
8023230950	9.5		
8023230960	9.6	43	89
8023230970	9.7		
8023230980	9.8		

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8023230990	9.9	43	89
8023231000	10.0		
8023231020	10.2		
8023231050	10.5		
8023231100	11.0	47	95
8023231150	11.5		
8023231200	12.0	51	102
8023231300	13.0		
8023231350	13.5	54	107
8023231400	14.0		
8023231450	14.5	56	111
8023231500	15.0		
8023231550	15.5	58	115
8023231600	16.0		
8023231650	16.5	60	119
8023231700	17.0		
8023231750	17.5	62	123
8023231800	18.0		
8023231850	18.5	64	127
8023231900	19.0		
8023231950	19.5	66	131
8023232000	20.0		

●: Excellent ○: Good

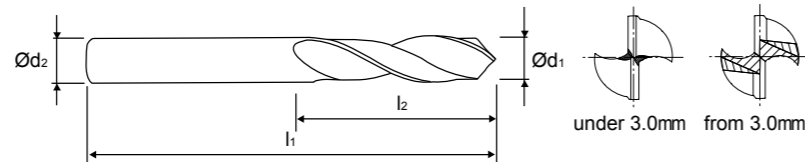
P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●				●	●										
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●				●	●										

CARBIDE STUB DRILL DIN6539



Series No. 800303

► cutting conditions : p.45



Application :

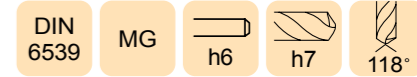
Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, titanium, nickel alloy and aluminium.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8003030100	1.0	6	26
8003030110	1.1	7	28
8003030120	1.2	8	30
8003030130	1.3	8	30
8003030140	1.4	9	32
8003030150	1.5	9	32
8003030160	1.6	10	34
8003030170	1.7	10	34
8003030180	1.8	11	36
8003030190	1.9	11	36
8003030200	2.0	12	38
8003030210	2.1	12	38
8003030220	2.2	13	40
8003030230	2.3	13	40
8003030240	2.4	14	43
8003030250	2.5	14	43
8003030260	2.6	14	43
8003030270	2.7	16	46
8003030280	2.8	16	46
8003030290	2.9	16	46
8003030300	3.0	16	46
8003030310	3.1	18	49
8003030320	3.2	18	49
8003030330	3.3	18	49
8003030340	3.4	20	52
8003030350	3.5	20	52
8003030360	3.6	20	52
8003030370	3.7	20	52
8003030380	3.8	22	55
8003030390	3.9	22	55
8003030400	4.0	22	55

●: Excellent ○: Good

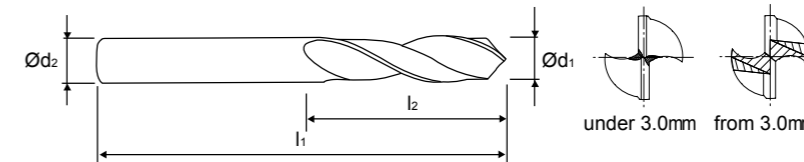
P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		○	○	●	●	○	○							
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●				●	●	○	○		○	○	○	○		

CARBIDE STUB DRILL DIN6539



Series No. 800303

► cutting conditions : p.45



Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, titanium, nickel alloy and aluminium.

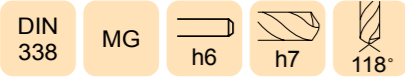
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8003030680	6.8	34	74
8003030690	6.9		
8003030700	7.0		
8003030710	7.1		
8003030720	7.2		
8003030730	7.3		
8003030740	7.4		
8003030750	7.5		
8003030760	7.6		
8003030770	7.7		
8003030780	7.8	37	79
8003030790	7.9		
8003030800	8.0		
8003030810	8.1		
8003030820	8.2		
8003030830	8.3		
8003030840	8.4		
8003030850	8.5		
8003030860	8.6		
8003030870	8.7		

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8003030880	8.8	40	84
8003030890	8.9		
8003030900	9.0		
8003030910	9.1		
8003030920	9.2		
8003030930	9.3		
8003030940	9.4		
8003030950	9.5		
8003030960	9.6		
8003030970	9.7		
8003030980	9.8	43	89
8003030990	9.9		
8003031000	10.0		
8003031020	10.2		
8003031050	10.5		
8003031100	11.0		
8003031150	11.5		
8003031200	12.0		
8003031300	13.0		

●: Excellent ○: Good

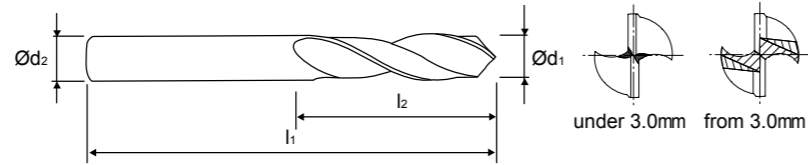
P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		○	○	●	●	○	○							
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●				●	●	○	○		○	○	○	○		

CARBIDE JOBBER DRILL DIN338



Series No. 801303

► cutting conditions : p.45



Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, titanium, nickel alloy and aluminium.

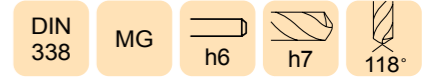
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8013030100	1.0	12	34
8013030110	1.1	14	36
8013030120	1.2	16	38
8013030130	1.3		
8013030140	1.4	18	40
8013030150	1.5		
8013030160	1.6	20	43
8013030170	1.7		
8013030180	1.8	22	46
8013030190	1.9		
8013030200	2.0	24	49
8013030210	2.1		
8013030220	2.2	27	53
8013030230	2.3		
8013030240	2.4	30	57
8013030250	2.5		
8013030260	2.6	33	61
8013030270	2.7		
8013030280	2.8	36	65
8013030290	2.9		
8013030300	3.0		
8013030310	3.1		

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8013030320	3.2	36	65
8013030330	3.3		
8013030340	3.4	39	70
8013030350	3.5		
8013030360	3.6	43	75
8013030370	3.7		
8013030380	3.8	47	80
8013030390	3.9		
8013030400	4.0	52	86
8013030410	4.1		
8013030420	4.2	57	93
8013030430	4.3		
8013030440	4.4	63	101
8013030450	4.5		
8013030460	4.6	69	109
8013030470	4.7		
8013030480	4.8	75	117
8013030490	4.9		
8013030500	5.0	81	125
8013030510	5.1		
8013030520	5.2	87	132
8013030530	5.3		

●: Excellent ○: Good

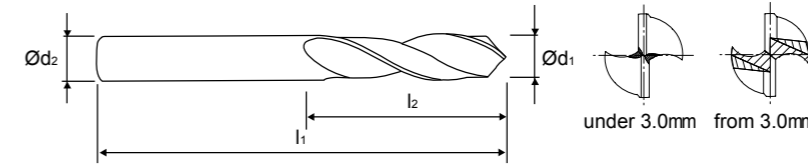
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●	○	○	●	●	○	○								
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
●	●			●	●	○	○		○	○	○	○			

CARBIDE JOBBER DRILL DIN338



Series No. 801303

► cutting conditions : p.45



Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, titanium, nickel alloy and aluminium.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8013030540	5.4	57	93
8013030550	5.5		
8013030560	5.6	63	101
8013030570	5.7		
8013030580	5.8	69	109
8013030590	5.9		
8013030600	6.0	75	117
8013030610	6.1		
8013030620	6.2	81	125
8013030630	6.3		
8013030640	6.4	87	132
8013030650	6.5		
8013030660	6.6	93	140
8013030670	6.7		
8013030680	6.8	99	148
8013030690	6.9		
8013030700	7.0	105	156
8013030710	7.1		
8013030720	7.2	111	164
8013030730	7.3		
8013030740	7.4		

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8013030750	7.5	69	109
8013030780	7.8	75	117
8013030800	8.0		
8013030810	8.1	81	125
8013030820	8.2		
8013030830	8.3	87	132
8013030840	8.4		
8013030850	8.5	93	140
8013030900	9.0		
8013030930	9.3	99	148
8013030940	9.4		
8013030950	9.5	105	156
8013030960	9.6		
8013031000	10.0	111	164
8013031020	10.2		
8013031050	10.5	117	172
8013031100	11.0		
8013031150	11.5	123	180
8013031200	12.0		
8013031300	13.0		

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●	○	○	●	●	○	○								
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
●	●			●	●	○	○		○	○	○	○			



CARBIDE DRILLS

CUTTING DATA

CARBIDE DRILL CUTTING CONDITION



SOLID CARBIDE DRILLS

823323, 825323, 828323 (Inox)



Material Group	vc (m/min)	fn (mm/rev)														
		ø1.0 -1.9	ø2.0 -2.9	ø3.0 -3.9	ø4.0 -4.9	ø5.0 -5.9	ø6.0 -6.9	ø7.0 -7.9	ø8.0 -9.9	ø10.0 -11.9	ø12.0 -13.5	ø14.0 -15.5	ø16.0 -17.5	ø18.0 -19.5	ø20.0	
P	11 12 115 (105-125)	0.02	0.03	0.04	0.05	0.05	0.06	0.07	0.08	0.10	0.12	0.15	0.20	0.22	0.24	
	13 14 105 (95-115)	0.02	0.03	0.04	0.05	0.05	0.06	0.07	0.08	0.10	0.12	0.15	0.20	0.22	0.24	
	M	21 22 65 (60-70)	0.02	0.03	0.04	0.05	0.05	0.06	0.07	0.08	0.10	0.12	0.16	0.20	0.22	0.24
23 40 (35-45)		0.02	0.03	0.03	0.03	0.03	0.04	0.05	0.06	0.08	0.10	0.12	0.15	0.17	0.19	
S		41 42 45 (40-50)	0.01	0.02	0.03	0.04	0.05	0.06	0.06	0.07	0.08	0.10	0.12	0.14	0.16	0.18
	43 40 (35-45)	0.01	0.02	0.03	0.04	0.05	0.06	0.06	0.07	0.08	0.10	0.12	0.14	0.16	0.18	
	51 52 30 (25-35)	0.05	0.05	0.06	0.08	0.08	0.10	0.10	0.11	0.12	0.14	0.14	0.15	0.15	0.15	
	53 25 (20-30)	0.03	0.03	0.04	0.06	0.06	0.08	0.08	0.09	0.10	0.12	0.12	0.13	0.13	0.13	
	N	71 72 210 (200-220)	0.04	0.08	0.12	0.18	0.20	0.25	0.28	0.30	0.40	0.50	0.60	0.80	1.00	1.20
73 74 165 (155-175)		0.03	0.06	0.10	0.15	0.18	0.25	0.28	0.30	0.35	0.40	0.50	0.60	0.70	0.80	

- ▶ For 8xD drills reduce feed rate by 15%
- ▶ For recommended coolant pressure refer to p.191

803323, 804323, 805323 (T/Coolant)



Material Group	vc (m/min)	fn (mm/rev)														
		ø1.0 -1.9	ø2.0 -2.9	ø3.0 -3.9	ø4.0 -4.9	ø5.0 -5.9	ø6.0 -6.9	ø7.0 -7.9	ø8.0 -9.9	ø10.0 -11.9	ø12.0 -13.5	ø14.0 -15.5	ø16.0 -17.5	ø18.0 -19.5	ø20.0	
P	11 12 140 (130-150)	0.05	0.07	0.16	0.17	0.18	0.20	0.22	0.25	0.30	0.33	0.36	0.39	0.42	0.45	
	13 14 125 (115-135)	0.05	0.07	0.16	0.17	0.18	0.20	0.22	0.25	0.30	0.33	0.36	0.39	0.42	0.45	
	K	31 32 240 (230-250)	0.15	0.07	0.16	0.17	0.18	0.20	0.22	0.25	0.30	0.33	0.36	0.39	0.42	0.45
33 34 150 (140-160)		0.15	0.07	0.16	0.17	0.18	0.20	0.22	0.25	0.30	0.33	0.36	0.39	0.42	0.45	

- ▶ For 8xD drills reduce feed rate by 15%
- ▶ For diameters below 3.0mm reduce cutting speed by 40%
- ▶ For recommended coolant pressure refer to p.191

vc - cutting speed (m/min)
n - RPM (rev/min)
fn - feed rate (mm/rev)
ø - drill diameter (mm)

To calculate RPM from cutting speed: $n = \frac{v_c \cdot 1000}{\pi \cdot \phi}$

To calculate cutting speed from RPM: $v_c = \frac{n \cdot \pi \cdot \phi}{1000}$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

CARBIDE DRILL CUTTING CONDITION



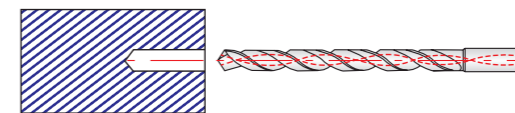
SOLID CARBIDE DRILLS

810323, 815323, 820323 (MQL)

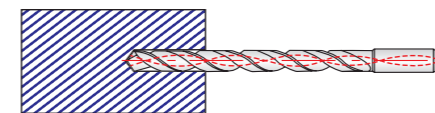


Material Group	vc (m/min)	fn (mm/rev)														
		ø1.0 -1.9	ø2.0 -2.9	ø3.0 -3.9	ø4.0 -4.9	ø5.0 -5.9	ø6.0 -6.9	ø7.0 -7.9	ø8.0 -9.9	ø10.0 -11.9	ø12.0 -13.5	ø14.0 -15.5	ø16.0 -17.5	ø18.0 -19.5	ø20.0	
P	11 12 95 (65-125)	-	-	0.09	0.12	0.15	0.18	-	0.22	0.28	0.33	0.37	-	-	-	
	13 14 85 (60-115)	-	-	0.09	0.12	0.15	0.18	-	0.22	0.28	0.33	0.37	-	-	-	
	K	31 32 95 (65-125)	-	-	0.09	0.12	0.15	0.18	-	0.22	0.28	0.33	0.37	-	-	-
33 34 70 (60-80)		-	-	0.09	0.12	0.15	0.18	-	0.22	0.28	0.33	0.37	-	-	-	

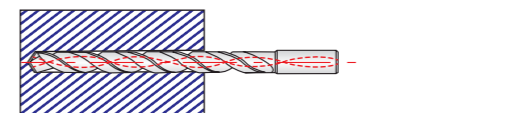
- ▶ For recommended coolant pressure refer to p.191



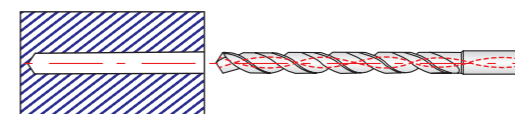
1. Guide drilling should be carried out with 5xD drill 0.1mm larger than finished hole diameter and drilled between 3xD and 5xD depth.



2. For main drilling, reduce to 300RPM and feed in at 400mm/min while entering pilot hole.



3. Just before the end of the pilot hole, reduce feed rate to zero and increase the RPM according to the recommended cutting condition shown in the chart above.



4. Increase feed rate and drill to depth without step drilling.



5. When extracting drill after drilling, reduce to 300RPM and feed rate of 1000mm/min when drill reaches pilot hole depth.

6. When exiting hole reduce feed by 50%.

vc - cutting speed (m/min)
n - RPM (rev/min)
fn - feed rate (mm/rev)
ø - drill diameter (mm)

To calculate RPM from cutting speed: $n = \frac{v_c \cdot 1000}{\pi \cdot \phi}$

To calculate cutting speed from RPM: $v_c = \frac{n \cdot \pi \cdot \phi}{1000}$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

CARBIDE DRILL CUTTING CONDITION



821223 (Pulsar HRc70)



Material Group	Hardness HRc	vc (m/min)	fn (mm/rev)												
			ø3.0 -3.9	ø4.0 -4.9	ø5.0 -5.9	ø6.0 -6.9	ø7.0 -7.9	ø8.0 -9.9	ø10.0 -11.9	ø12.0 -13.5	ø14.0 -15.5	ø16.0 -17.5	ø18.0 -19.5	ø20.0	
H	15 16	50-55 (14-22)	0.04	0.04	0.04	0.04	-	0.04	0.04	0.04	0.04	0.04	-	-	-
		55-60 (10-16)	0.04	0.04	0.04	0.04	-	0.04	0.04	0.04	0.04	0.04	-	-	-
		60-70 (8-13)	0.04	0.04	0.04	0.04	-	0.04	0.04	0.04	0.04	0.04	-	-	-

843303, 845303, 848303 (Alu-XP)



Material Group	vc (m/min)	fn (mm/rev)														
		ø1.0 -1.9	ø2.0 -2.9	ø3.0 -3.9	ø4.0 -4.9	ø5.0 -5.9	ø6.0 -6.9	ø7.0 -7.9	ø8.0 -9.9	ø10.0 -11.9	ø12.0 -13.5	ø14.0 -15.5	ø16.0 -17.5	ø18.0 -19.5	ø20.0	
N	71 72	140 (80-200)	-	-	0.20	0.30	0.40	0.50	0.50	0.60	0.60	0.70	0.70	0.80	0.90	1.00
		73 74	140 (80-200)	-	-	0.15	0.20	0.25	0.30	0.30	0.35	0.35	0.40	0.40	0.40	0.40

- ▶ For 8xD drills reduce feed rate by 15%
- ▶ For recommended coolant pressure refer to p.191

850390 (CFRP)



Material Group	vc (m/min)	fn (mm/rev)														
		ø1.0 -1.9	ø2.0 -2.9	ø3.0 -3.9	ø4.0 -4.9	ø5.0 -5.9	ø6.0 -6.9	ø7.0 -7.9	ø8.0 -9.9	ø10.0 -11.9	ø12.0 -13.5	ø14.0 -15.5	ø16.0 -17.5	ø18.0 -19.5	ø20.0	
O	83	125 (100-150)	-	0.03	0.04	0.04	0.05	0.05	0.06	0.06	0.07	0.07	-	-	-	-

vc - cutting speed (m/min)
n - RPM (rev/min)
fn - feed rate (mm/rev)
ø - drill diameter (mm)

$$\text{To calculate RPM from cutting speed: } n = \frac{v_c \cdot 1000}{\pi \cdot \phi}$$

$$\text{To calculate cutting speed from RPM: } v_c = \frac{n \cdot \pi \cdot \phi}{1000}$$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

CARBIDE DRILL CUTTING CONDITION



802323, 807323, 808323 (TiAIN)



Material Group	vc (m/min)	fn (mm/rev)														
		ø1.0 -1.9	ø2.0 -2.9	ø3.0 -3.9	ø4.0 -4.9	ø5.0 -5.9	ø6.0 -6.9	ø7.0 -7.9	ø8.0 -9.9	ø10.0 -11.9	ø12.0 -13.5	ø14.0 -15.5	ø16.0 -17.5	ø18.0 -19.5	ø20.0	
P	11 12	100 (100-120)	0.04	0.06	0.13	0.14	0.15	0.17	0.19	0.22	0.25	0.27	0.29	0.31	0.33	0.35
	13 14	95 (85-105)	0.04	0.06	0.13	0.14	0.15	0.17	0.19	0.22	0.25	0.27	0.29	0.31	0.33	0.35
K	31 32	240 (180-200)	0.04	0.06	0.13	0.14	0.15	0.17	0.19	0.22	0.25	0.27	0.29	0.31	0.33	0.35
	33 34	120 (110-130)	0.04	0.16	0.13	0.14	0.15	0.17	0.19	0.22	0.25	0.27	0.29	0.31	0.33	0.35

- ▶ For 5xD drills reduce feed rate by 15%
- ▶ For diameters below 3.0mm reduce cutting speed by 40%

800303, 801303, 806303, 806403



Material Group	vc (m/min)	fn (mm/rev)														
		ø1.0 -1.9	ø2.0 -2.9	ø3.0 -3.9	ø4.0 -4.9	ø5.0 -5.9	ø6.0 -6.9	ø7.0 -7.9	ø8.0 -9.9	ø10.0 -11.9	ø12.0 -13.5	ø14.0 -15.5	ø16.0 -17.5	ø18.0 -19.5	ø20.0	
P	11 12	70 (65-75)	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.11	0.13	0.15	-	-	-	-
	13 14	50 (45-55)	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.11	0.13	0.15	-	-	-	-
M	21 22	35 (30-40)	0.03	0.04	0.04	0.05	0.06	0.07	0.08	0.10	0.12	0.13	-	-	-	-
	K	31 32	90 (80-100)	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.13	0.17	0.20	-	-	-
33 34		60 (50-70)	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.13	0.17	0.20	-	-	-	-
S	41 42	35 (33-40)	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.10	0.12	0.13	-	-	-	-
	51 52	18 (15-20)	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.09	0.11	0.12	-	-	-	-
N	71 72	160 (150-170)	0.05	0.06	0.07	0.08	0.09	0.11	0.13	0.16	0.20	0.24	-	-	-	-
	73 74	120 (110-130)	0.05	0.06	0.07	0.08	0.09	0.11	0.13	0.16	0.20	0.24	-	-	-	-

vc - cutting speed (m/min)
n - RPM (rev/min)
fn - feed rate (mm/rev)
ø - drill diameter (mm)

$$\text{To calculate RPM from cutting speed: } n = \frac{v_c \cdot 1000}{\pi \cdot \phi}$$

$$\text{To calculate cutting speed from RPM: } v_c = \frac{n \cdot \pi \cdot \phi}{1000}$$

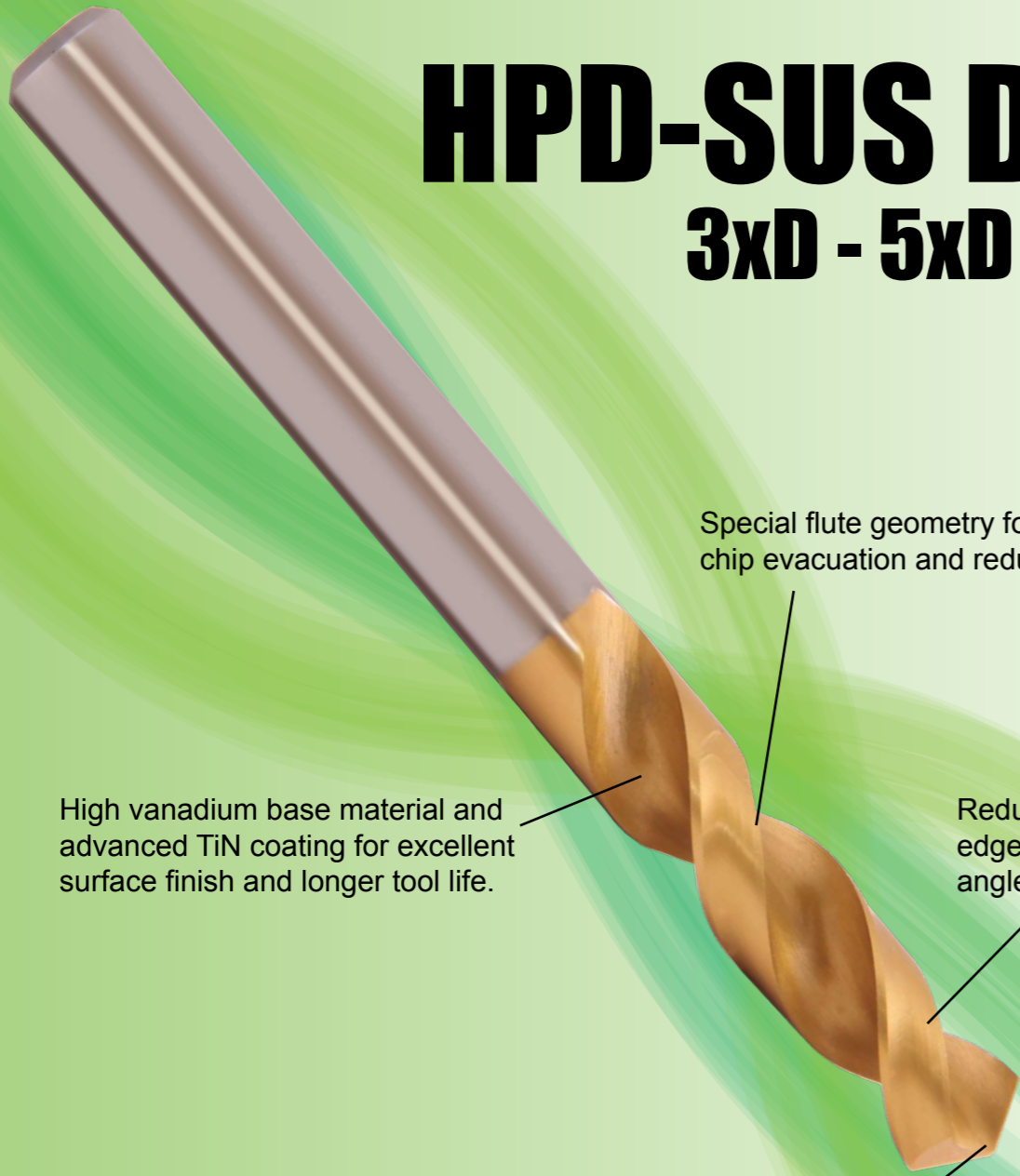
All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

SUPERIOR PERFORMANCE



HPD-SUS DRILL

3xD - 5xD



Special flute geometry for increased chip evacuation and reduced vibration.

High vanadium base material and advanced TiN coating for excellent surface finish and longer tool life.

Reduced risk of built-up edge due to high helix angle.

Four facet point gives superior centering and reduced deflection.

IDEAL FOR MATERIAL GROUPS





HSSCo, PM & HSS TWIST DRILLS






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P				H		M			K				S					N								O			HPD-SUS HSS-EX DRILLS				
11	12	13	14	15	16	21	22	23	31	32	33	34	41	42	43	51	52	53	61	62	63	64	71	72	73	74	81	82	83	Code	Item	Description	Page No.
○	○	○				●	●	●											○	○	○	○	○	○	○	○	●	●		820434		Stub ø2.0mm - 13.0mm	P.52
○	○	○				●	●	●											○	○	○	○	○	○	○	○	●	●		810434		Jobber ø2.0mm - 20.0mm	P.54

P				H		M			K				S					N								O			HPD HSS-EX DRILLS				
●	●	●	●						○	○	○												○	○	○					810205		Jobber ø2.0mm - 25.0mm	P.56

P				H		M			K				S					N								O			SABRE PM DRILLS			
●	●	●	○			○	○	○	○	○	○		●	●	●	●	●					○	○	○					820422		Stub ø1.0mm - 13.0mm	P.60

P				H		M			K				S					N								O			GOLDEX DRILLS				
●	●	●	○			○	○						○	○									○	○	○					810504		HSS Jobber ø1.0mm - 13.0mm	P.62
○	○	○	○			●	●						●	●									○	○	○					810505		HSS-E Jobber ø1.0mm - 13.0mm	P.64
●	●	●	○			○	○		●	●	●		○	○									●	●	●					811505		HSS-E Jobber Worm Pattern ø2.0mm - 13.0mm	P.66

P				H		M			K				S					N								O			HSSCo DRILLS				
●	●	○	○			●	●		○	○	○		○	○									○	○	○		○	○		820502		Stub ø1.0mm - 31.0mm	P.68
●	●	○	○			●	●		○	○	○		○	○									○	○	○		○	○		820702		Jobber ø1.0mm - 20.0mm	P.72
●	●	○	○			●	●		○	○	○		○	○									○	○	○		○	○		820902		Long Series ø2.0mm - 12.0mm	P.74
●	●	●	○	○	○				●	●	●	●																		820116		Long Series Worm Pattern ø2.0mm - 13.0mm	P.76
●	●	○	○			○	○		○	○	○		○	○					○	○	○	○	○	○	○		○	○		821402 822402		Spotting Drill 90° & 120°, ø3.0mm - 20.0mm	P.77

P				H		M			K				S					N								O			HSS DRILLS				
●	●	○	○						○	○	○												○	○	○		○	○		820601		Stub ø1.0mm - 13.0mm	P.78
●	●	○	○						○	○	○												○	○	○		○	○		0000 0001		Two Tone Jobber ø2.5mm - 17.5mm, ø3/32" - 9/16"	P.80
●	●	○	○						○	○	○												○	○	○		○	○		820801 810801		Jobber ø1.0mm - 20.0mm, ø3/64" - 1/2"	P.84
●	●	○	○			○	○		○	○	○		○	○									○	○	○		○	○		821901		Blacksmith ø13.0mm - 25.0mm	P.89
●	●	○	○			○	○		○	○	○		○	○									○	○	○		○	○		820901		Long Series ø1.0mm - 20.0mm	P.90
●	●	○	○			○	○		○	○	○		○	○									○	○	○		○	○		821001		Extra Long Series ø2.0mm - 13.0mm	P.92
●	●	○	○			○	○		○	○	○		○	○									○	○	○		○	○		0162 0161		Extra Long Series Bright Finish ø1.4mm - 14.0mm, ø5/64" - 1/2"	P.93

► For material group examples, refer to page 2
 ► For full material group tables, refer to pages 194-199



APPLICATION GUIDE

INDEX

●: Excellent ○: Good

P				H		M			K				S					N							O				
11	12	13	14	15	16	21	22	23	31	32	33	34	41	42	43	51	52	53	61	62	63	64	71	72	73	74	81	82	83
●	●	○	○			○	○		○	○	○		○	○										○	○	○	○	○	
●	●	○	○			○	○		○	○	○		○	○										○	○	○	○	○	

HSS DRILLS

Code	Item	Description	Page No.
821601		Morse Taper Shank ø13.0mm - 60.0mm	P.96
3001		Morse Taper Shank ø7/32" - 2.3/4"	P.98

CENTRE DRILLS

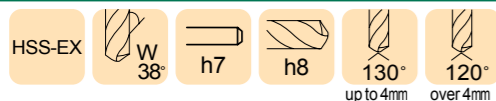
●	●	○	○			○	○		○	○	○		○	○					○	○	○	○	○	○	○	○	○	
●	●	○	○			○	○		○	○	○		○	○					○	○	○	○	○	○	○	○	○	

Code	Item	Description	Page No.
810334		Form A ø0.5mm - 6.3mm	P.100
888301		BS1 - BS7 ø1/8" - 3/4"	P.101

DRILL SETS

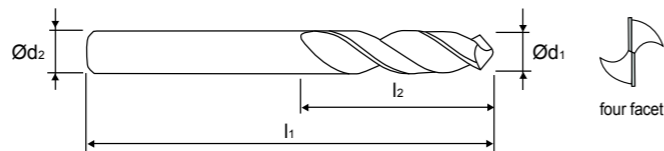
810504		HSS Goldex ø1.0mm - 10.0mm x 0.5	P.102
810504		HSS Goldex ø1.0mm - 13.0mm x 0.5	P.102
810505		HSSCo Goldex ø1.0mm - 10.0mm x 0.5	P.102
810505		HSSCo Goldex ø1.0mm - 13.0mm x 0.5	P.102
820702		HSSCo Jobber ø1.0mm - 10.0mm x 0.5	P.102
820702		HSSCo Jobber ø1.0mm - 13.0mm x 0.5	P.102
10220025		Two Tone Jobber ø1.0mm - 13.0mm x 0.5	P.102
820801		HSS Jobber ø1.0mm - 5.9mm x 0.1	P.102
820801		HSS Jobber ø6.0mm - 10.0mm x 0.1	P.102
820801		HSS Jobber ø1.0mm - 10.0mm x 0.5	P.102
820801	HSS Jobber ø1.0mm - 13.0mm x 0.5	P.102	
		Cutting Data	P.104

HPD-SUS STUB DRILL



Series No. 820434

▶ cutting conditions : p.104



Application

Excellent performance in stainless steels, also for mild steels, aluminiums, coppers and plastics.

Advantage

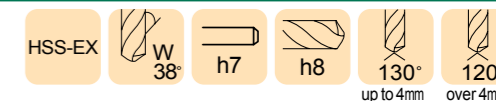
High helix with sharp cutting edges - reduces built-up edge, suitable for high performance drilling.
Wide flute and stub length - increased chip removal, reduced vibration and deflection.
High vanadium HSS-EX material with superior TiN coating - higher speed and feed, longer tool life, high quality surface finish and high productivity.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8204340200	2.0	12	44
8204340210	2.1	12	44
8204340220	2.2	13	45
8204340230	2.3	13	45
8204340240	2.4	14	46
8204340250	2.5	14	46
8204340260	2.6	14	46
8204340270	2.7	16	48
8204340280	2.8	16	48
8204340290	2.9	16	48
8204340300	3.0	16	48
8204340310	3.1	18	50
8204340320	3.2	18	50
8204340330	3.3	18	50
8204340340	3.4	20	52
8204340350	3.5	20	52
8204340360	3.6	20	52
8204340370	3.7	20	52
8204340380	3.8	22	54
8204340390	3.9	22	54
8204340400	4.0	22	54
8204340410	4.1	22	66
8204340420	4.2	22	66
8204340430	4.3	24	68
8204340440	4.4	24	68
8204340450	4.5	24	68
8204340460	4.6	24	68
8204340470	4.7	24	68

●: Excellent ○: Good

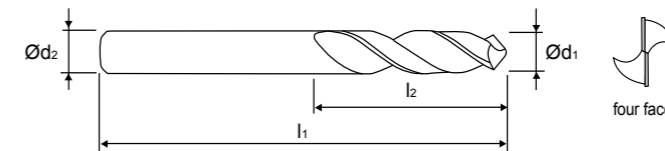
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
○	○	●	●							○	○	○	○	●	●
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
○		●							○	○	○	○			

HPD-SUS STUB DRILL



Series No. 820434

▶ cutting conditions : p.104



Application

Excellent performance in stainless steels, also for mild steels, aluminiums, coppers and plastics.

Advantage

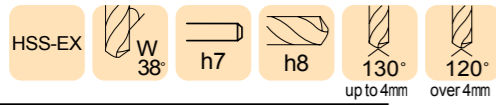
High helix with sharp cutting edges - reduces built-up edge, suitable for high performance drilling.
Wide flute and stub length - increased chip removal, reduced vibration and deflection.
High vanadium HSS-EX material with superior TiN coating - higher speed and feed, longer tool life, high quality surface finish and high productivity.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8204340760	7.6	37	81
8204340770	7.7	37	81
8204340780	7.8	37	81
8204340790	7.9	37	81
8204340800	8.0	37	81
8204340810	8.1	37	87
8204340820	8.2	37	87
8204340830	8.3	37	87
8204340840	8.4	37	87
8204340850	8.5	37	87
8204340860	8.6	40	90
8204340870	8.7	40	90
8204340880	8.8	40	90
8204340890	8.9	40	90
8204340900	9.0	40	90
8204340910	9.1	40	90
8204340920	9.2	40	90
8204340930	9.3	40	90
8204340940	9.4	40	90
8204340950	9.5	40	90
8204340960	9.6	43	93
8204340970	9.7	43	93
8204340980	9.8	43	93
8204340990	9.9	43	93
8204341000	10.0	43	93
8204341010	10.1	43	100
8204341020	10.2	43	100
8204341030	10.3	43	100

●: Excellent ○: Good

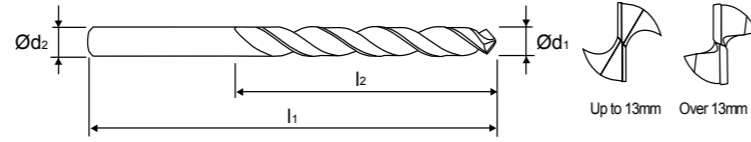
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
○	○	●	●							○	○	○	○	●	●
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
○		●							○	○	○	○			

HPD-SUS JOBBER DRILL



Series No. 810434

▶ cutting conditions : p.104



Application

Excellent performance in stainless steels, also for mild steels, aluminiums, coppers and plastics.

Advantage

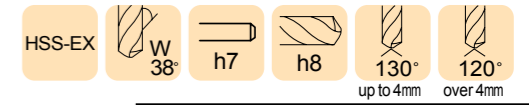
High helix with sharp cutting edges - reduces built-up edge, suitable for high performance drilling.
Reinforced web and jobber length - increased rigidity and highly suited to 4D ~ 5D drilling.
High vanadium HSS-EX material with superior TiN coating - higher speed and feed, longer tool life, high quality surface finish and high productivity.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8104340200	2.0	24	56
8104340210	2.1	24	56
8104340220	2.2	27	59
8104340230	2.3	27	59
8104340240	2.4	30	62
8104340250	2.5	30	62
8104340260	2.6	30	62
8104340270	2.7	33	65
8104340280	2.8	33	65
8104340290	2.9	33	65
8104340300	3.0	33	65
8104340310	3.1	36	68
8104340320	3.2	36	68
8104340330	3.3	36	68
8104340340	3.4	39	71
8104340350	3.5	39	71
8104340360	3.6	39	71
8104340370	3.7	39	71
8104340380	3.8	43	75
8104340390	3.9	43	75
8104340400	4.0	43	75
8104340410	4.1	43	87
8104340420	4.2	43	87
8104340430	4.3	47	91
8104340440	4.4	47	91
8104340450	4.5	47	91
8104340460	4.6	47	91
8104340470	4.7	47	91

●: Excellent ○: Good

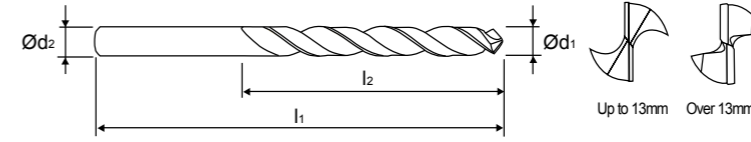
P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
○	○		●	●						○	○	○	○	●	●
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○			●							○	○	○	○		

HPD-SUS JOBBER DRILL



Series No. 810434

▶ cutting conditions : p.104



Application

Excellent performance in stainless steels, also for mild steels, aluminiums, coppers and plastics.

Advantage

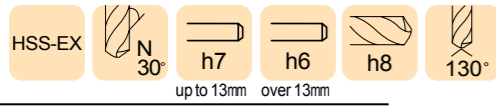
High helix with sharp cutting edges - reduces built-up edge, suitable for high performance drilling.
Reinforced web and jobber length - increased rigidity and highly suited to 4D ~ 5D drilling.
High vanadium HSS-EX material with superior TiN coating - higher speed and feed, longer tool life, high quality surface finish and high productivity.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8104340760	7.6	75	119
8104340770	7.7	75	119
8104340780	7.8	75	119
8104340790	7.9	75	119
8104340800	8.0	75	119
8104340810	8.1	75	125
8104340820	8.2	75	125
8104340830	8.3	75	125
8104340840	8.4	75	125
8104340850	8.5	75	125
8104340860	8.6	81	131
8104340870	8.7	81	131
8104340880	8.8	81	131
8104340890	8.9	81	131
8104340900	9.0	81	131
8104340910	9.1	81	131
8104340920	9.2	81	131
8104340930	9.3	81	131
8104340940	9.4	81	131
8104340950	9.5	81	131
8104340960	9.6	87	137
8104340970	9.7	87	137
8104340980	9.8	87	137
8104340990	9.9	87	137
8104341000	10.0	87	137
8104341010	10.1	87	144
8104341020	10.2	87	144

●: Excellent ○: Good

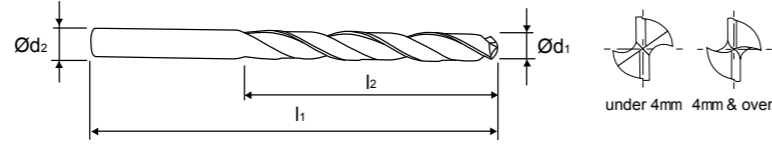
P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
○	○		●	●						○	○	○	○	●	●
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○			●							○	○	○	○		

HPD JOBBER DRILL



Series No. 810205

▶ cutting conditions : p.104



Application

Designed for non-step, high speed, 4D - 5D drilling in steels, cast irons and aluminiums.

Advantage

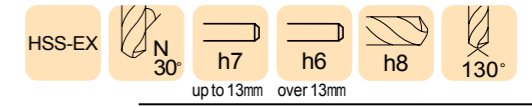
Helical thinning - good chip removal, self-centering for improved accuracy.
High vanadium HSS-EX material with superior TiN coating - higher speed and feed, longer tool life, high quality surface finish and high productivity.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8102050200	2.0	24	56
8102050205	2.05	24	56
8102050210	2.1	24	56
8102050215	2.15	27	59
8102050220	2.2	27	59
8102050225	2.25	27	59
8102050230	2.3	27	59
8102050235	2.35	27	59
8102050240	2.4	30	62
8102050245	2.45	30	62
8102050250	2.5	30	62
8102050255	2.55	30	62
8102050260	2.6	30	62
8102050265	2.65	30	62
8102050270	2.7	33	65
8102050275	2.75	33	65
8102050280	2.8	33	65
8102050285	2.85	33	65
8102050290	2.9	33	65
8102050295	2.95	33	65
8102050300	3.0	33	65
8102050305	3.05	36	68
8102050310	3.1	36	68
8102050315	3.15	36	68
8102050320	3.2	36	68
8102050325	3.25	36	68
8102050330	3.3	36	68
8102050335	3.35	36	68
8102050340	3.4	39	71
8102050345	3.45	39	71
8102050350	3.5	39	71

●: Excellent ○: Good

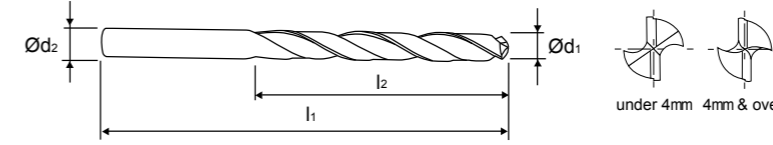
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●				○	○									
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●				○					○	○	○			

HPD JOBBER DRILL



Series No. 810205

▶ cutting conditions : p.104



Application

Designed for non-step, high speed, 4D - 5D drilling in steels, cast irons and aluminiums.

Advantage

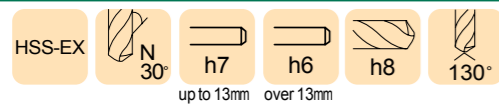
Helical thinning - good chip removal, self-centering for improved accuracy.
High vanadium HSS-EX material with superior TiN coating - higher speed and feed, longer tool life, high quality surface finish and high productivity.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8102050510	5.1	52	96
8102050515	5.15	52	96
8102050520	5.2	52	96
8102050525	5.25	52	96
8102050530	5.3	52	96
8102050535	5.35	57	101
8102050540	5.4	57	101
8102050545	5.45	57	101
8102050550	5.5	57	101
8102050555	5.55	57	101
8102050560	5.6	57	101
8102050565	5.65	57	101
8102050570	5.7	57	101
8102050575	5.75	57	101
8102050580	5.8	57	101
8102050585	5.85	57	101
8102050590	5.9	57	101
8102050595	5.95	57	101
8102050600	6.0	57	101
8102050605	6.05	63	107
8102050610	6.1	63	107
8102050615	6.15	63	107
8102050620	6.2	63	107
8102050625	6.25	63	107
8102050630	6.3	63	107
8102050635	6.35	63	107
8102050640	6.4	63	107
8102050645	6.45	63	107
8102050650	6.5	63	107
8102050655	6.55	63	107
8102050660	6.6	63	107

●: Excellent ○: Good

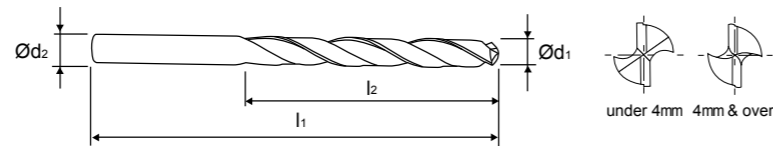
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●				○	○									
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●				○					○	○	○			

HPD JOBBER DRILL



Series No. 810205

▶ cutting conditions : p.104



Application

Designed for non-step, high speed, 4D - 5D drilling in steels, cast irons and aluminiums.

Advantage

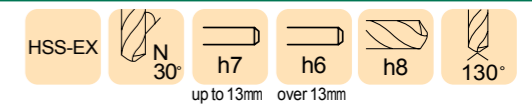
Helical thinning - good chip removal, self-centering for improved accuracy.
High vanadium HSS-EX material with superior TiN coating - higher speed and feed, longer tool life, high quality surface finish and high productivity.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8102050820	8.2	75	125
8102050825	8.25	75	125
8102050830	8.3	75	125
8102050835	8.35	75	125
8102050840	8.4	75	125
8102050845	8.45	75	125
8102050850	8.5	75	125
8102050855	8.55	81	131
8102050860	8.6	81	131
8102050865	8.65	81	131
8102050870	8.7	81	131
8102050875	8.75	81	131
8102050880	8.8	81	131
8102050885	8.85	81	131
8102050890	8.9	81	131
8102050895	8.95	81	131
8102050900	9.0	81	131
8102050905	9.05	81	131
8102050910	9.1	81	131
8102050915	9.15	81	131
8102050920	9.2	81	131
8102050925	9.25	81	131
8102050930	9.3	81	131
8102050935	9.35	81	131
8102050940	9.4	81	131
8102050945	9.45	81	131
8102050950	9.5	81	131
8102050955	9.55	87	137
8102050960	9.6	87	137
8102050965	9.65	87	137
8102050970	9.7	87	137

●: Excellent ○: Good

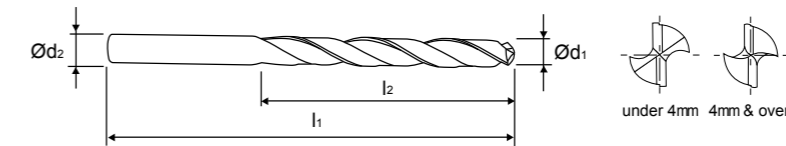
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●				○	○									
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●				○	○				○	○	○			

HPD JOBBER DRILL



Series No. 810205

▶ cutting conditions : p.104



Application

Designed for non-step, high speed, 4D - 5D drilling in steels, cast irons and aluminiums.

Advantage

Helical thinning - good chip removal, self-centering for improved accuracy.
High vanadium HSS-EX material with superior TiN coating - higher speed and feed, longer tool life, high quality surface finish and high productivity.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8102051130	11.3	94	151
8102051135	11.35	94	151
8102051140	11.4	94	151
8102051145	11.45	94	151
8102051150	11.5	94	151
8102051155	11.55	94	151
8102051160	11.6	94	151
8102051165	11.65	94	151
8102051170	11.7	94	151
8102051175	11.75	94	151
8102051180	11.8	94	151
8102051185	11.85	101	158
8102051190	11.9	101	158
8102051195	11.95	101	158
8102051200	12.0	101	158
8102051210	12.1	101	158
8102051220	12.2	101	158
8102051230	12.3	101	158
8102051240	12.4	101	158
8102051250	12.5	101	158
8102051260	12.6	101	158
8102051270	12.7	101	158
8102051280	12.8	101	158
8102051290	12.9	101	158
8102051300	13.0	101	158
8102051350	13.5	90	150
8102051400	14.0	90	150
8102051410	14.1	95	155
8102051450	14.5	95	155

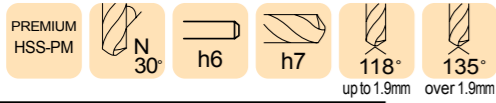
●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●				○	○									
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●				○	○				○	○	○			

HSSCo, PM & HSS DRILLS

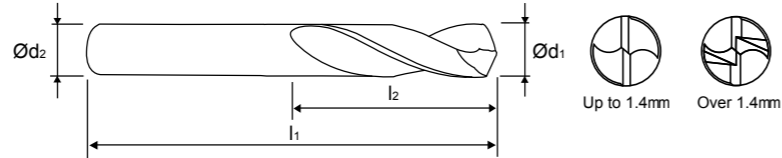
HSSCo, PM & HSS DRILLS

SABRE PM STUB DRILL



Series No. 820422

▶ cutting conditions : p.105



Available to order from European stock.
Please check for delivery.

Application

Steels, Pre-hardened steels, Hardened steels(HRc30~45), stainless steels, cast irons, titanium, nickel alloys and aluminiums.

Advantage

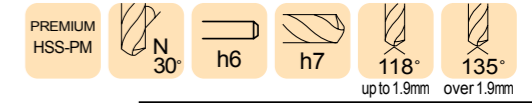
Point designed to maximize self-centering.
Wide flute design for good chip evacuation.
Premium powder base material for excellent toughness.
TiAlN coated for extended tool life.

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8204220100	1.0	3.0	6	38
8204220110	1.1	3.0	7	39
8204220120	1.2	3.0	8	40
8204220130	1.3	3.0	8	40
8204220140	1.4	3.0	9	41
8204220150	1.5	3.0	9	41
8204220160	1.6	3.0	10	42
8204220170	1.7	3.0	10	42
8204220180	1.8	3.0	11	43
8204220190	1.9	3.0	11	43
8204220200	2.0	3.0	12	44
8204220210	2.1	3.0	12	44
8204220220	2.2	3.0	13	45
8204220230	2.3	3.0	13	45
8204220240	2.4	3.0	14	46
8204220250	2.5	3.0	14	46
8204220260	2.6	3.0	14	46
8204220270	2.7	3.0	16	48
8204220280	2.8	3.0	16	48
8204220290	2.9	3.0	16	48
8204220300	3.0	3.0	16	48
8204220310	3.1	4.0	18	50
8204220320	3.2	4.0	18	50
8204220330	3.3	4.0	18	50
8204220340	3.4	4.0	20	52
8204220350	3.5	4.0	20	52
8204220360	3.6	4.0	20	52
8204220370	3.7	4.0	20	52
8204220380	3.8	4.0	22	54
8204220390	3.9	4.0	22	54
8204220400	4.0	4.0	22	54

●: Excellent ○: Good

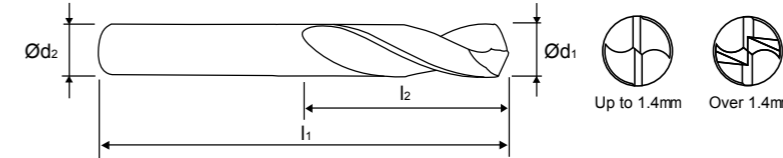
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●	○	○	○	○	○	●	●	●						
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
●	●		○	○		●	●	●	○	○	○				

SABRE PM STUB DRILL



Series No. 820422

▶ cutting conditions : p.105



Available to order from European stock.
Please check for delivery.

Application

Steels, Pre-hardened steels, Hardened steels(HRc30~45), stainless steels, cast irons, titanium, nickel alloys and aluminiums.

Advantage

Point designed to maximize self-centering.
Wide flute design for good chip evacuation.
Premium powder base material for excellent toughness.
TiAlN coated for extended tool life.

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8204220720	7.2	8.0	34	78
8204220730	7.3	8.0	34	78
8204220740	7.4	8.0	34	78
8204220750	7.5	8.0	34	78
8204220760	7.6	8.0	37	81
8204220770	7.7	8.0	37	81
8204220780	7.8	8.0	37	81
8204220790	7.9	8.0	37	81
8204220800	8.0	8.0	37	81
8204220810	8.1	10	37	87
8204220820	8.2	10	37	87
8204220830	8.3	10	37	87
8204220840	8.4	10	37	87
8204220850	8.5	10	37	87
8204220860	8.6	10	40	90
8204220870	8.7	10	40	90
8204220880	8.8	10	40	90
8204220890	8.9	10	40	90
8204220900	9.0	10	40	90
8204220910	9.1	10	40	90
8204220920	9.2	10	40	90
8204220930	9.3	10	40	90
8204220940	9.4	10	40	90
8204220950	9.5	10	40	90
8204220960	9.6	10	43	93
8204220970	9.7	10	43	93
8204220980	9.8	10	43	93
8204220990	9.9	10	43	93
8204221000	10.0	10	43	93
8204221010	10.1	12	43	100

●: Excellent ○: Good

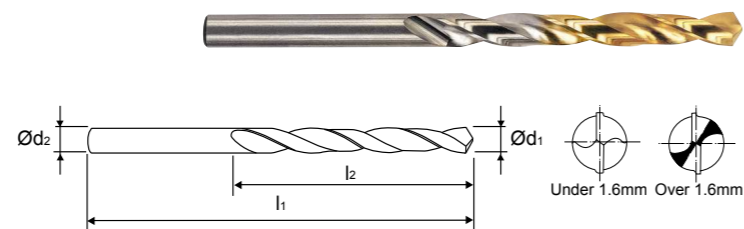
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●	○	○	○	○	○	●	●	●						
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
●	●		○	○		●	●	●	○	○	○				

GOLDEX HSS JOBBER DRILL



Series No. 810504

► cutting conditions : p.106



Application

Drilling in steel, cast steel - alloyed and non-alloyed, stainless steel, titanium and aluminium.

Advantage

Bright finish body for maximum chip clearance.
Self-centering split point above 1.6mm
TiN coated on working area for longer tool life.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8105040100	1.0	12	34
8105040110	1.1	14	36
8105040120	1.2	16	38
8105040130	1.3	16	38
8105040140	1.4	18	40
8105040150	1.5	18	40
8105040160	1.6	20	43
8105040170	1.7	20	43
8105040180	1.8	22	46
8105040190	1.9	22	46
8105040200	2.0	24	49
8105040210	2.1	24	49
8105040220	2.2	27	53
8105040230	2.3	27	53
8105040240	2.4	30	57
8105040250	2.5	30	57
8105040260	2.6	30	57
8105040270	2.7	33	61
8105040280	2.8	33	61
8105040290	2.9	33	61
8105040300	3.0	33	61
8105040310	3.1	36	65
8105040320	3.2	36	65
8105040330	3.3	36	65
8105040340	3.4	39	70
8105040350	3.5	39	70
8105040360	3.6	39	70
8105040370	3.7	39	70
8105040380	3.8	43	75
8105040390	3.9	43	75
8105040400	4.0	43	75

●: Excellent ○: Good

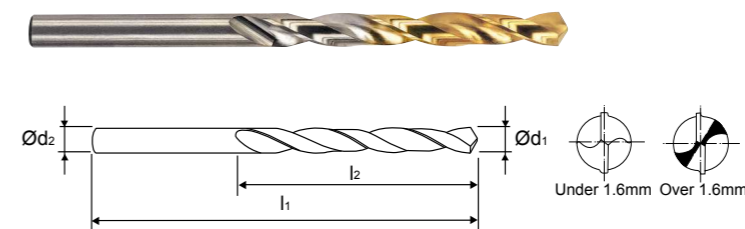
P		H		M		K		S			N				O	
11	12	15		21	22	31	32	41	42	43	61	62	63	64	81	82
●	●			○	○			○	○							
13	14	16		23		33	34	51	52	53	71	72	73	74	83	
●	●										○	○	○			

GOLDEX HSS JOBBER DRILL



Series No. 810504

► cutting conditions : p.106



Application

Drilling in steel, cast steel - alloyed and non-alloyed, stainless steel, titanium and aluminium.

Advantage

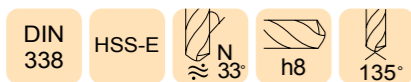
Bright finish body for maximum chip clearance.
Self-centering split point above 1.6mm
TiN coated on working area for longer tool life.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8105040720	7.2	69	109
8105040730	7.3	69	109
8105040740	7.4	69	109
8105040750	7.5	69	109
8105040760	7.6	75	117
8105040770	7.7	75	117
8105040780	7.8	75	117
8105040790	7.9	75	117
8105040800	8.0	75	117
8105040810	8.1	75	117
8105040820	8.2	75	117
8105040830	8.3	75	117
8105040840	8.4	75	117
8105040850	8.5	75	117
8105040860	8.6	81	125
8105040870	8.7	81	125
8105040880	8.8	81	125
8105040890	8.9	81	125
8105040900	9.0	81	125
8105040910	9.1	81	125
8105040920	9.2	81	125
8105040930	9.3	81	125
8105040940	9.4	81	125
8105040950	9.5	81	125
8105040960	9.6	87	133
8105040970	9.7	87	133
8105040980	9.8	87	133
8105040990	9.9	87	133
8105041000	10.0	87	133
8105041010	10.1	87	133

●: Excellent ○: Good

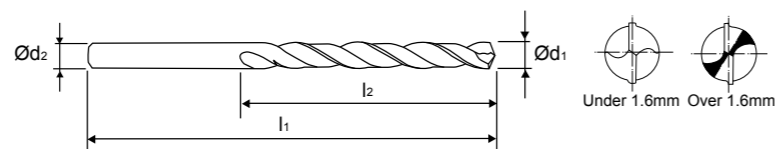
P		H		M		K		S			N				O	
11	12	15		21	22	31	32	41	42	43	61	62	63	64	81	82
●	●			○	○			○	○							
13	14	16		23		33	34	51	52	53	71	72	73	74	83	
●	●										○	○	○			

GOLDEX HSS-E JOBBER DRILL



Series No. 810505

▶ cutting conditions : p.106



Application

Particularly suited to stainless steel and titanium.
Drilling in steel, cast steel - alloyed and non-alloyed, stainless steel, titanium and aluminium.

Advantage

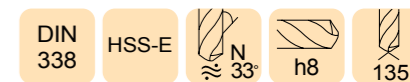
Bright finish body for maximum chip clearance.
Self-centering split point above 1.6mm
TiN coated on working area for longer tool life.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8105050100	1.0	12	34
8105050110	1.1	14	36
8105050120	1.2	16	38
8105050130	1.3	16	38
8105050140	1.4	18	40
8105050150	1.5	18	40
8105050160	1.6	20	43
8105050170	1.7	20	43
8105050180	1.8	22	46
8105050190	1.9	22	46
8105050200	2.0	24	49
8105050210	2.1	24	49
8105050220	2.2	27	53
8105050230	2.3	27	53
8105050240	2.4	30	57
8105050250	2.5	30	57
8105050260	2.6	30	57
8105050270	2.7	33	61
8105050280	2.8	33	61
8105050290	2.9	33	61
8105050300	3.0	33	61
8105050310	3.1	36	65
8105050320	3.2	36	65
8105050330	3.3	36	65
8105050340	3.4	39	70
8105050350	3.5	39	70
8105050360	3.6	39	70
8105050370	3.7	39	70
8105050380	3.8	43	75
8105050390	3.9	43	75
8105050400	4.0	43	75

●: Excellent ○: Good

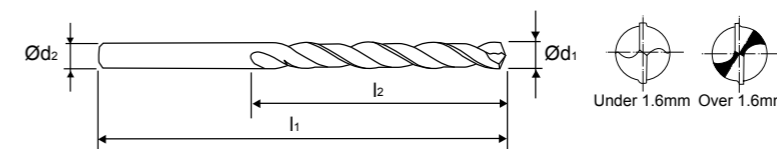
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
○	○	●	●	●	●										
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
○	○					○	○	○							

GOLDEX HSS-E JOBBER DRILL



Series No. 810505

▶ cutting conditions : p.106



Application

Particularly suited to stainless steel and titanium.
Drilling in steel, cast steel - alloyed and non-alloyed, stainless steel, titanium and aluminium.

Advantage

Bright finish body for maximum chip clearance.
Self-centering split point above 1.6mm
TiN coated on working area for longer tool life.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8105050720	7.2	69	109
8105050730	7.3	69	109
8105050740	7.4	69	109
8105050750	7.5	69	109
8105050760	7.6	75	117
8105050770	7.7	75	117
8105050780	7.8	75	117
8105050790	7.9	75	117
8105050800	8.0	75	117
8105050810	8.1	75	117
8105050820	8.2	75	117
8105050830	8.3	75	117
8105050840	8.4	75	117
8105050850	8.5	75	117
8105050860	8.6	81	125
8105050870	8.7	81	125
8105050880	8.8	81	125
8105050890	8.9	81	125
8105050900	9.0	81	125
8105050910	9.1	81	125
8105050920	9.2	81	125
8105050930	9.3	81	125
8105050940	9.4	81	125
8105050950	9.5	81	125
8105050960	9.6	87	133
8105050970	9.7	87	133
8105050980	9.8	87	133
8105050990	9.9	87	133
8105051000	10.0	87	133
8105051010	10.1	87	133

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
○	○	●	●	●	●										
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
○	○					○	○	○							

HSSCo, PM & HSS DRILLS

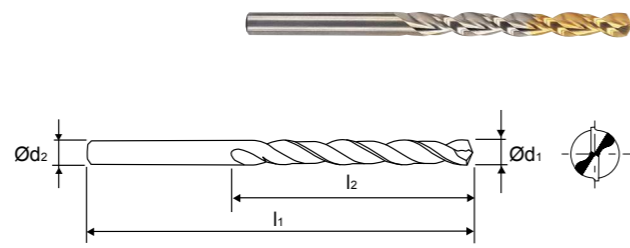
HSSCo, PM & HSS DRILLS

GOLDEX HSS-E JOBBER DRILL WORM PATTERN



Series No. 811505

► cutting conditions : p.106



Application

Drilling deep holes in steel, cast iron, stainless steel, titanium and aluminium.

Advantage

Bright finish body and worm pattern for maximum chip clearance.
Self-centering split point.
TiN coated on working area for longer tool life.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8115050200	2.0	24	49
8115050210	2.1	24	49
8115050220	2.2	27	53
8115050230	2.3	27	53
8115050240	2.4	30	57
8115050250	2.5	30	57
8115050260	2.6	30	57
8115050270	2.7	33	61
8115050280	2.8	33	61
8115050290	2.9	33	61
8115050300	3.0	33	61
8115050310	3.1	36	65
8115050320	3.2	36	65
8115050330	3.3	36	65
8115050340	3.4	39	70
8115050350	3.5	39	70
8115050360	3.6	39	70
8115050370	3.7	39	70
8115050380	3.8	43	75
8115050390	3.9	43	75
8115050400	4.0	43	75
8115050410	4.1	43	75
8115050420	4.2	43	75
8115050430	4.3	47	80
8115050440	4.4	47	80
8115050450	4.5	47	80
8115050460	4.6	47	80
8115050470	4.7	47	80
8115050480	4.8	52	86

●: Excellent ○: Good

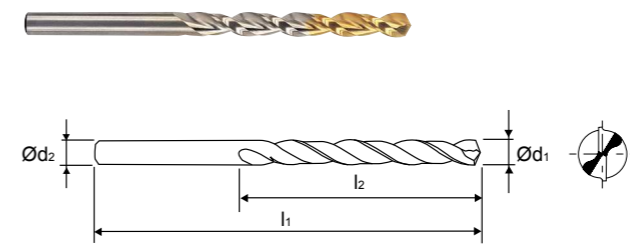
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●	○	○	●	●	○	○								
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
●	●			●					●	●	●				

GOLDEX HSS-E JOBBER DRILL WORM PATTERN



Series No. 811505

► cutting conditions : p.106



Application

Drilling deep holes in steel, cast iron, stainless steel, titanium and aluminium.

Advantage

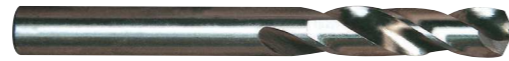
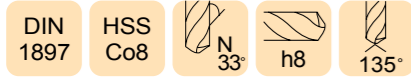
Bright finish body and worm pattern for maximum chip clearance.
Self-centering split point.
TiN coated on working area for longer tool life.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8115050780	7.8	75	117
8115050790	7.9	75	117
8115050800	8.0	75	117
8115050810	8.1	75	117
8115050820	8.2	75	117
8115050830	8.3	75	117
8115050840	8.4	75	117
8115050850	8.5	75	117
8115050860	8.6	81	125
8115050870	8.7	81	125
8115050880	8.8	81	125
8115050890	8.9	81	125
8115050900	9.0	81	125
8115050910	9.1	81	125
8115050920	9.2	81	125
8115050930	9.3	81	125
8115050940	9.4	81	125
8115050950	9.5	81	125
8115050960	9.6	87	133
8115050970	9.7	87	133
8115050980	9.8	87	133
8115050990	9.9	87	133
8115051000	10.0	87	133
8115051010	10.1	87	133
8115051020	10.2	87	133
8115051030	10.3	87	133
8115051040	10.4	87	133

●: Excellent ○: Good

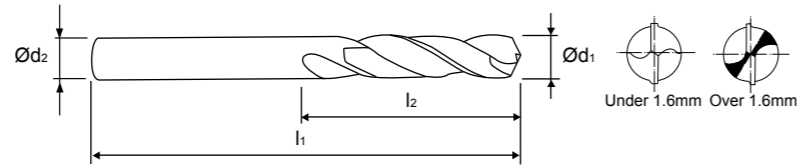
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		○	○	●	●	○	○							
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
●	●			●					●	●	●				

HSSCo STUB DRILL DIN1897



Series No. 820502

▶ cutting conditions : p.107



Application

Suitable for drilling thin materials with portable electric drills.
Special twist drills for automatic and turret lathes

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8205020100	1.0	6	26
8205020110	1.1	7	28
8205020120	1.2	8	30
8205020125	1.25	8	30
8205020130	1.3	8	30
8205020140	1.4	9	32
8205020150	1.5	9	32
8205020160	1.6	10	34
8205020170	1.7	10	34
8205020175	1.75	11	36
8205020180	1.8	11	36
8205020190	1.9	11	36
8205020200	2.0	12	38
8205020210	2.1	12	38
8205020220	2.2	13	40
8205020225	2.25	13	40
8205020230	2.3	13	40
8205020240	2.4	14	43
8205020250	2.5	14	43
8205020260	2.6	14	43
8205020270	2.7	16	46
8205020275	2.75	16	46

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8205020280	2.8	16	46
8205020290	2.9	16	46
8205020300	3.0	16	46
8205020310	3.1	18	49
8205020320	3.2	18	49
8205020325	3.25	18	49
8205020330	3.3	18	49
8205020340	3.4	20	52
8205020350	3.5	20	52
8205020360	3.6	20	52
8205020370	3.7	20	52
8205020375	3.75	20	52
8205020380	3.8	22	55
8205020390	3.9	22	55
8205020400	4.0	22	55
8205020410	4.1	22	55
8205020420	4.2	22	55
8205020425	4.25	22	55
8205020430	4.3	24	58
8205020440	4.4	24	58
8205020450	4.5	24	58
8205020460	4.6	24	58

●: Excellent ○: Good

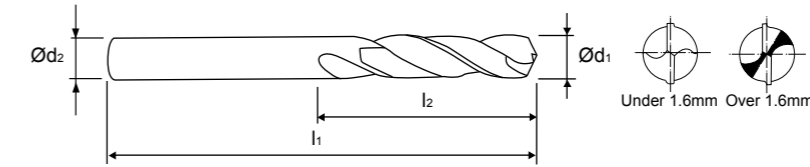
P		H		M		K		S		N				O		
11	12	15		21	22	31	32	41	42	43	61	62	63	64	81	82
●	●			●	●	○	○	○	○						○	○
13	14	16		23		33	34	51	52	53	71	72	73	74	83	
○	○					○					○	○	○			

HSSCo STUB DRILL DIN1897



Series No. 820502

▶ cutting conditions : p.107



Application

Suitable for drilling thin materials with portable electric drills.
Special twist drills for automatic and turret lathes

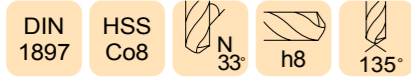
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8205020465	4.65	24	58
8205020470	4.7	24	58
8205020475	4.75	24	58
8205020480	4.8	26	62
8205020490	4.9	26	62
8205020500	5.0	26	62
8205020510	5.1	26	62
8205020520	5.2	26	62
8205020525	5.25	26	62
8205020530	5.3	26	62
8205020540	5.4	28	66
8205020550	5.5	28	66
8205020555	5.55	28	66
8205020560	5.6	28	66
8205020570	5.7	28	66
8205020575	5.75	28	66
8205020580	5.8	28	66
8205020590	5.9	28	66
8205020600	6.0	28	66
8205020610	6.1	31	70
8205020620	6.2	31	70
8205020625	6.25	31	70

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8205020630	6.3	31	70
8205020640	6.4	31	70
8205020650	6.5	31	70
8205020660	6.6	31	70
8205020670	6.7	31	70
8205020675	6.75	34	74
8205020680	6.8	34	74
8205020690	6.9	34	74
8205020700	7.0	34	74
8205020710	7.1	34	74
8205020720	7.2	34	74
8205020725	7.25	34	74
8205020730	7.3	34	74
8205020740	7.4	34	74
8205020745	7.45	34	74
8205020750	7.5	34	74
8205020760	7.6	37	79
8205020770	7.7	37	79
8205020775	7.75	37	79
8205020780	7.8	37	79
8205020790	7.9	37	79
8205020800	8.0	37	79

●: Excellent ○: Good

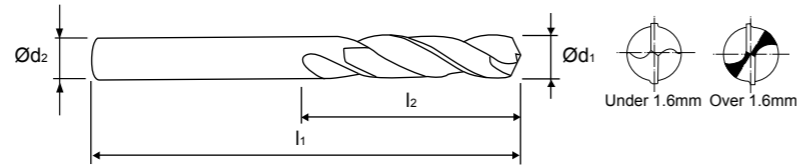
P		H		M		K		S		N				O		
11	12	15		21	22	31	32	41	42	43	61	62	63	64	81	82
●	●			●	●	○	○	○	○						○	○
13	14	16		23		33	34	51	52	53	71	72	73	74	83	
○	○					○					○	○	○			

HSSCo STUB DRILL DIN1897



Series No. 820502

▶ cutting conditions : p.107



Application

Suitable for drilling thin materials with portable electric drills.
Special twist drills for automatic and turret lathes

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8205020810	8.1	37	79
8205020820	8.2	37	79
8205020825	8.25	37	79
8205020830	8.3	37	79
8205020840	8.4	37	79
8205020850	8.5	37	79
8205020860	8.6	40	84
8205020870	8.7	40	84
8205020875	8.75	40	84
8205020880	8.8	40	84
8205020890	8.9	40	84
8205020900	9.0	40	84
8205020910	9.1	40	84
8205020920	9.2	40	84
8205020925	9.25	40	84
8205020930	9.3	40	84
8205020935	9.35	40	84
8205020940	9.4	40	84
8205020950	9.5	40	84
8205020960	9.6	43	89
8205020970	9.7	43	89

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8205020975	9.75	43	89
8205020980	9.8	43	89
8205020990	9.9	43	89
8205021000	10.0	43	89
8205021020	10.2	43	89
8205021025	10.25	43	89
8205021050	10.5	43	89
8205021075	10.75	47	95
8205021100	11.0	47	95
8205021125	11.25	47	95
8205021150	11.5	47	95
8205021175	11.75	47	95
8205021180	11.8	47	95
8205021200	12.0	51	102
8205021225	12.25	51	102
8205021250	12.5	51	102
8205021275	12.75	51	102
8205021300	13.0	51	102
8205021325	13.25	54	107
8205021350	13.5	54	107
8205021375	13.75	54	107

●: Excellent ○: Good

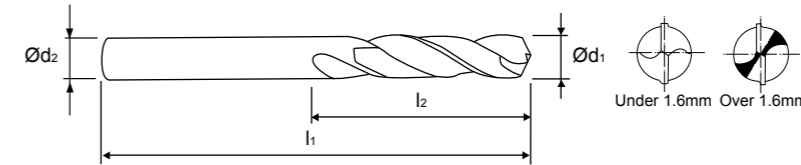
P		H		M		K		S		N				O		
11	12	15		21	22	31	32	41	42	43	61	62	63	64	81	82
●	●			●	●	○	○	○	○						○	○
13	14	16		23		33	34	51	52	53	71	72	73	74	83	
○	○					○					○	○	○			

HSSCo STUB DRILL DIN1897



Series No. 820502

▶ cutting conditions : p.107



Application

Suitable for drilling thin materials with portable electric drills.
Special twist drills for automatic and turret lathes

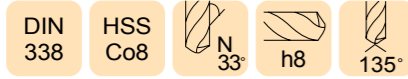
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8205021380	13.8	54	107
8205021400	14.0	54	107
8205021425	14.25	56	111
8205021450	14.5	56	111
8205021475	14.75	56	111
8205021500	15.0	56	111
8205021525	15.25	58	115
8205021550	15.5	58	115
8205021575	15.75	58	115
8205021600	16.0	58	115
8205021625	16.25	60	119
8205021650	16.5	60	119
8205021675	16.75	60	119
8205021700	17.0	60	119
8205021725	17.25	62	123
8205021750	17.5	62	123
8205021775	17.75	62	123
8205021800	18.0	62	123
8205021825	18.25	64	127
8205021850	18.5	64	127
8205021875	18.75	64	127

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8205021900	19.0	64	127
8205021925	19.25	66	131
8205021950	19.5	66	131
8205021975	19.75	66	131
8205022000	20.0	66	131
8205022050	20.5	68	136
8205022100	21.0	68	136
8205022150	21.5	70	141
8205022200	22.0	70	141
8205022250	22.5	72	146
8205022300	23.0	72	146
8205022350	23.5	72	146
8205022400	24.0	75	151
8205022450	24.5	75	151
8205022500	25.0	75	151
8205022600	26.0	78	156
8205022700	27.0	81	162
8205022800	28.0	81	162
8205022900	29.0	84	168
8205023000	30.0	84	168
8205023100	31.0	87	174

●: Excellent ○: Good

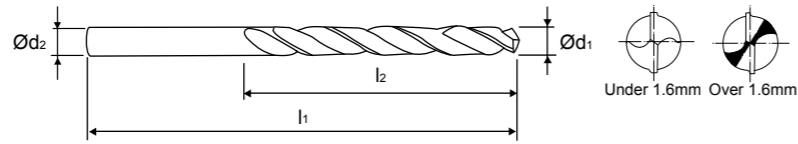
P		H		M		K		S		N				O		
11	12	15		21	22	31	32	41	42	43	61	62	63	64	81	82
●	●			●	●	○	○	○	○						○	○
13	14	16		23		33	34	51	52	53	71	72	73	74	83	
○	○					○					○	○	○			

HSSCo JOBBER DRILL DIN338



Series No. 820702

▶ cutting conditions : p.107



Application

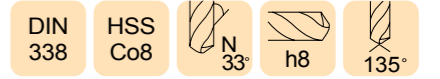
Drilling stainless steels and difficult to cut materials such as titanium.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8207020100	1.0	12	34
8207020110	1.1	14	36
8207020120	1.2	16	38
8207020125	1.25	16	36
8207020130	1.3	16	38
8207020140	1.4	18	40
8207020150	1.5	18	40
8207020160	1.6	20	43
8207020170	1.7	20	43
8207020175	1.75	22	46
8207020180	1.8	22	46
8207020190	1.9	22	46
8207020200	2.0	24	49
8207020210	2.1	24	49
8207020220	2.2	27	53
8207020225	2.25	27	53
8207020230	2.3	27	53
8207020240	2.4	30	57
8207020250	2.5	30	57
8207020260	2.6	30	57
8207020270	2.7	33	61
8207020275	2.75	33	61
8207020280	2.8	33	61
8207020290	2.9	33	61
8207020300	3.0	33	61
8207020310	3.1	36	65
8207020320	3.2	36	65
8207020325	3.25	36	65
8207020330	3.3	36	65
8207020340	3.4	39	70
8207020350	3.5	39	70
8207020360	3.6	39	70
8207020370	3.7	39	70

●: Excellent ○: Good

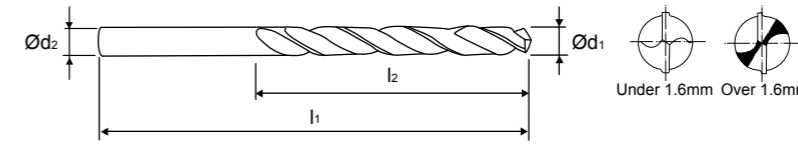
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
○	○			○					○	○	○				

HSSCo JOBBER DRILL DIN338



Series No. 820702

▶ cutting conditions : p.107



Application

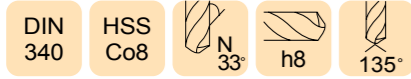
Drilling stainless steels and difficult to cut materials such as titanium.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8207020650	6.5	63	101
8207020660	6.6	63	101
8207020670	6.7	63	101
8207020675	6.75	69	109
8207020680	6.8	69	109
8207020690	6.9	69	109
8207020700	7.0	69	109
8207020710	7.1	69	109
8207020720	7.2	69	109
8207020725	7.25	69	109
8207020730	7.3	69	109
8207020740	7.4	69	109
8207020750	7.5	69	109
8207020760	7.6	75	117
8207020770	7.7	75	117
8207020775	7.75	75	117
8207020780	7.8	75	117
8207020790	7.9	75	117
8207020800	8.0	75	117
8207020810	8.1	75	117
8207020820	8.2	75	117
8207020825	8.25	75	117
8207020830	8.3	75	117
8207020840	8.4	75	117
8207020850	8.5	75	117
8207020860	8.6	81	125
8207020870	8.7	81	125
8207020875	8.75	81	125
8207020880	8.8	81	125
8207020890	8.9	81	125
8207020900	9.0	81	125
8207020910	9.1	81	125

●: Excellent ○: Good

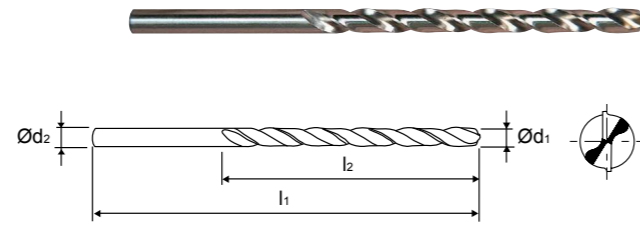
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
○	○			○					○	○	○				

HSSCo LONG SERIES DRILL DIN340



Series No. 820902

▶ cutting conditions : p.107



Application

Drilling stainless steels and difficult to cut materials such as titanium.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8209020200	2.0	56	85
8209020210	2.1	56	85
8209020220	2.2	59	90
8209020230	2.3	59	90
8209020240	2.4	62	95
8209020250	2.5	62	95
8209020260	2.6	62	95
8209020270	2.7	66	100
8209020280	2.8	66	100
8209020290	2.9	66	100
8209020300	3.0	66	100
8209020310	3.1	69	106
8209020320	3.2	69	106
8209020330	3.3	69	106
8209020340	3.4	73	112
8209020350	3.5	73	112
8209020360	3.6	73	112
8209020370	3.7	73	112
8209020380	3.8	78	119
8209020390	3.9	78	119
8209020400	4.0	78	119
8209020410	4.1	78	119
8209020420	4.2	78	119
8209020430	4.3	82	126
8209020440	4.4	82	126
8209020450	4.5	82	126

●: Excellent ○: Good

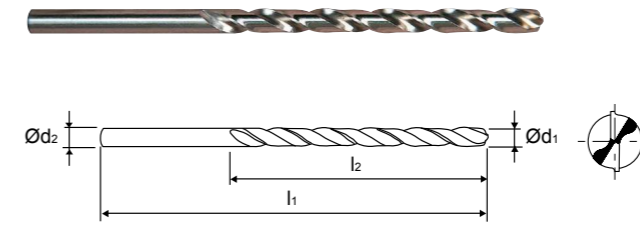
P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		●	●	○	○	○	○						○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○					○	○	○			

HSSCo LONG SERIES DRILL DIN340



Series No. 820902

▶ cutting conditions : p.107



Application

Drilling stainless steels and difficult to cut materials such as titanium.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8209020720	7.2	102	156
8209020730	7.3	102	156
8209020740	7.4	102	156
8209020750	7.5	102	156
8209020760	7.6	109	165
8209020770	7.7	109	165
8209020780	7.8	109	165
8209020790	7.9	109	165
8209020800	8.0	109	165
8209020810	8.1	109	165
8209020820	8.2	109	165
8209020830	8.3	109	165
8209020840	8.4	109	165
8209020850	8.5	109	165
8209020860	8.6	115	175
8209020870	8.7	115	175
8209020880	8.8	115	175
8209020890	8.9	115	175
8209020900	9.0	115	175

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8209020910	9.1	115	175
8209020920	9.2	115	175
8209020930	9.3	115	175
8209020940	9.4	115	175
8209020950	9.5	115	175
8209020960	9.6	121	184
8209020970	9.7	121	184
8209020980	9.8	121	184
8209020990	9.9	121	184
8209021000	10.0	121	184
8209021020	10.2	121	184
8209021050	10.5	121	184
8209021080	10.8	128	195
8209021100	11.0	128	195
8209021120	11.2	128	195
8209021150	11.5	128	195
8209021180	11.8	128	195
8209021200	12.0	134	205

●: Excellent ○: Good

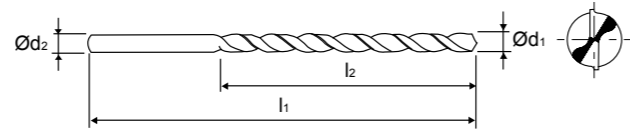
P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		●	●	○	○	○	○						○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○					○	○	○			

HSSCo LONG SERIES DRILL DIN340 WORM PATTERN



Series No. 820116

▶ cutting conditions : p.108



Application

Drilling deep holes in steels, alloy steels, tool steels, grey cast iron, malleable cast iron.

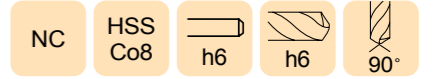
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8201160200	2.0	56	85
8201160210	2.1	56	85
8201160220	2.2	59	90
8201160230	2.3	59	90
8201160240	2.4	62	95
8201160250	2.5	62	95
8201160260	2.6	62	95
8201160270	2.7	66	100
8201160280	2.8	66	100
8201160290	2.9	66	100
8201160300	3.0	66	100
8201160310	3.1	69	106
8201160320	3.2	69	106
8201160330	3.3	69	106
8201160340	3.4	73	112
8201160350	3.5	73	112
8201160360	3.6	73	112
8201160370	3.7	73	112
8201160380	3.8	78	119
8201160390	3.9	78	119
8201160400	4.0	78	119
8201160410	4.1	78	119
8201160420	4.2	78	119
8201160450	4.5	82	126
8201160480	4.8	87	132
8201160500	5.0	87	132

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8201160520	5.2	87	132
8201160550	5.5	91	139
8201160580	5.8	91	139
8201160600	6.0	91	139
8201160620	6.2	97	148
8201160650	6.5	97	148
8201160680	6.8	102	156
8201160700	7.0	102	156
8201160720	7.2	102	156
8201160750	7.5	102	156
8201160780	7.8	109	165
8201160800	8.0	109	165
8201160820	8.2	109	165
8201160850	8.5	109	165
8201160900	9.0	115	175
8201160950	9.5	115	175
8201160980	9.8	121	184
8201161000	10.0	121	184
8201161050	10.5	121	184
8201161100	11.0	128	195
8201161150	11.5	128	195
8201161200	12.0	134	205
8201161250	12.5	134	205
8201161300	13.0	134	205

●: Excellent ○: Good

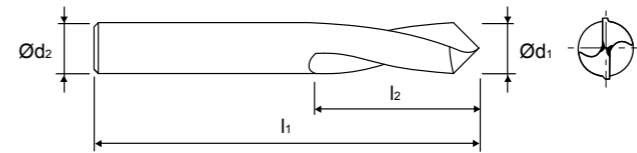
P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●	○			●	●										
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●	○			●	●										

HSSCo SPOTTING DRILL 90°



Series No. 821402

▶ cutting conditions : p.109

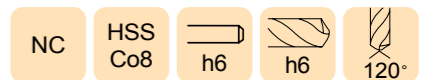


Application :

For more precise centering work on NC/CNC Machines. The large diameter of the tool permits chamfering work after centering continuously.

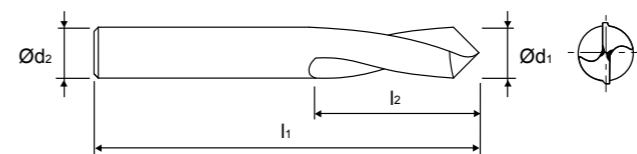
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8214020300	3	12	46
8214020400	4	12	55
8214020500	5	15	60
8214020600	6	20	66
8214020800	8	25	79
8214021000	10	25	89
8214021200	12	30	102
8214021600	16	35	115
8214022000	20	40	131

HSSCo SPOTTING DRILL 120°



Series No. 822402

▶ cutting conditions : p.109

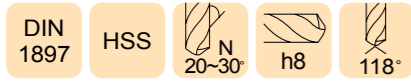


Application :

For more precise centering work on NC/CNC Machines. The large diameter of the tool permits chamfering work after centering continuously.

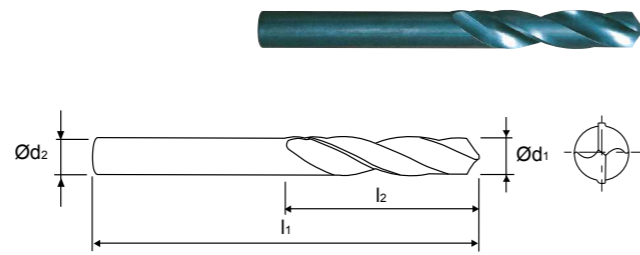
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8224020300	3	12	46
8224020400	4	12	55
8224020500	5	15	60
8224020600	6	20	66
8224020800	8	25	79
8224021000	10	25	89
8224021200	12	30	102
8224021600	16	35	115
8224022000	20	40	131

HSS STUB DRILL DIN1897



Series No. 820601

▶ cutting conditions : p.108



Surface treatment

Steam Tempered (Black Oxide Finish)
Bright Finish under 2mm

Application

Suitable for drilling thin materials with portable electric drills.
Special twist drills for automatic and turret lathes.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8206010100	1.0	6	26
8206010110	1.1	7	28
8206010120	1.2	8	30
8206010125	1.25	8	30
8206010130	1.3	8	30
8206010140	1.4	9	32
8206010150	1.5	9	32
8206010160	1.6	9	34
8206010170	1.7	10	34
8206010175	1.75	11	36
8206010180	1.8	11	36
8206010190	1.9	11	36
8206010200	2.0	12	38
8206010210	2.1	12	38
8206010220	2.2	13	40
8206010225	2.25	13	40
8206010230	2.3	13	40
8206010240	2.4	14	43
8206010250	2.5	14	43
8206010260	2.6	14	43
8206010270	2.7	16	46
8206010275	2.75	16	46
8206010280	2.8	16	46
8206010290	2.9	16	46
8206010300	3.0	16	46
8206010310	3.1	18	49
8206010320	3.2	18	49
8206010325	3.25	18	49
8206010330	3.3	18	49
8206010340	3.4	20	52
8206010350	3.5	20	52

●: Excellent ○: Good

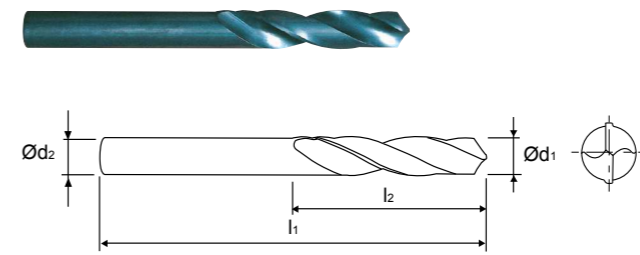
P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		○	○	○	○	○	○						○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○					○	○	○			

HSS STUB DRILL DIN1897



Series No. 820601

▶ cutting conditions : p.108



Surface treatment

Steam Tempered (Black Oxide Finish)

Application

Suitable for drilling thin materials with portable electric drills.
Special twist drills for automatic and turret lathes.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8206010620	6.2	31	70
8206010625	6.25	31	70
8206010630	6.3	31	70
8206010640	6.4	31	70
8206010650	6.5	31	70
8206010660	6.6	31	70
8206010670	6.7	31	70
8206010675	6.75	34	74
8206010680	6.8	34	74
8206010690	6.9	34	74
8206010700	7.0	34	74
8206010710	7.1	34	74
8206010720	7.2	34	74
8206010725	7.25	34	74
8206010730	7.3	34	74
8206010740	7.4	34	74
8206010750	7.5	34	74
8206010760	7.6	37	79
8206010770	7.7	37	79
8206010775	7.75	37	79
8206010780	7.8	37	79
8206010790	7.9	37	79
8206010800	8.0	37	79
8206010810	8.1	37	79
8206010820	8.2	37	79
8206010825	8.25	37	79
8206010830	8.3	37	79
8206010840	8.4	37	79
8206010850	8.5	37	79
8206010860	8.6	40	84

●: Excellent ○: Good

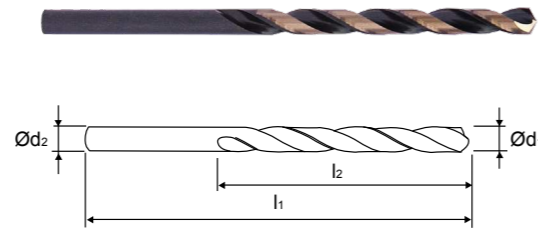
P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		○	○	○	○	○	○						○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○					○	○	○			

HSS JOBBER DRILL DIN338 TWO TONE



Series No. 0001

▶ cutting conditions : p.108



Point Geometry
2.5mm to 13.0mm - Split point.
Above 13.0mm - Notched thinned point.

Application
Drilling steels, cast irons, soft aluminiums and plastic.

Surface treatment
Below 5.0mm - Bright or straw colour.
5.0mm to 13.0mm - Steam tempered/straw colour (two tone).
Above 13.0mm - Straw colour

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
00010098	2.5	30	57
00010102	2.6	30	57
00010106	2.7	33	61
00010110	2.8	33	61
00010113	2.85	33	61
00010114	2.9	33	61
00010117	3.0	33	61
00010120	3.05	36	65
00010122	3.1	36	65
00010127	3.2	36	65
00010130	3.3	36	65
00010134	3.4	39	70
00010137	3.5	39	70
00010142	3.6	39	70
00010143	3.65	39	70
00010146	3.7	39	70
00010147	3.75	39	70
00010150	3.8	43	75
00010153	3.9	43	75
00010158	4.0	43	75
00010161	4.1	43	75

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
00010165	4.2	43	75
00010167	4.25	43	75
00010169	4.3	47	80
00010174	4.4	47	80
00010177	4.5	47	80
00010181	4.6	47	80
00010185	4.7	47	80
00010190	4.8	52	86
00010193	4.9	52	86
00010197	5.0	52	86
00010201	5.1	52	86
00010205	5.2	52	86
00010209	5.3	52	86
00010213	5.4	57	93
00010217	5.5	57	93
00010221	5.6	57	93
00010224	5.7	57	93
00010228	5.8	57	93
00010232	5.9	57	93
00010236	6.0	57	93
00010240	6.1	63	101

●: Excellent ○: Good

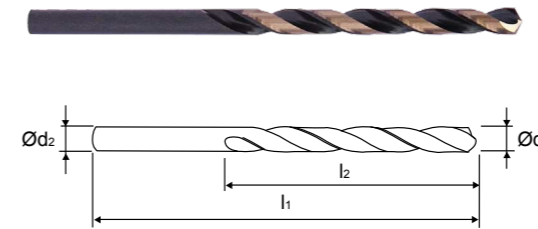
P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●				○	○								○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○					○	○	○			

HSS JOBBER DRILL DIN338 TWO TONE



Series No. 0001

▶ cutting conditions : p.108



Point Geometry
2.5mm to 13.0mm - Split point.
Above 13.0mm - Notched thinned point.

Application
Drilling steels, cast irons, soft aluminiums and plastic.

Surface treatment
Below 5.0mm - Bright or straw colour.
5.0mm to 13.0mm - Steam tempered/straw colour (two tone).
Above 13.0mm - Straw colour

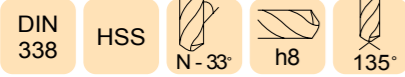
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
00010244	6.2	63	101
00010246	6.25	63	101
00010248	6.3	63	101
00010252	6.4	63	101
00010256	6.5	63	101
00010260	6.6	63	101
00010263	6.7	63	101
00010268	6.8	69	109
00010275	6.9	69	109
00010276	7.0	69	109
00010279	7.1	69	109
00010284	7.2	69	109
00010287	7.3	69	109
00010291	7.4	69	109
00010295	7.5	69	109
00010299	7.6	75	117
00010303	7.7	75	117
00010307	7.8	75	117
00010311	7.9	75	117
00010315	8.0	75	117
00010319	8.1	75	117

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
00010322	8.2	75	117
00010327	8.3	75	117
00010331	8.4	75	117
00010335	8.5	75	117
00010338	8.6	75	117
00010342	8.7	81	125
00010346	8.8	81	125
00010350	8.9	81	125
00010354	9.0	81	125
00010358	9.1	81	125
00010362	9.2	81	125
00010366	9.3	81	125
00010370	9.4	81	125
00010373	9.5	81	125
00010378	9.6	87	133
00010382	9.7	87	133
00010386	9.8	87	133
00010389	9.9	87	133
00010394	10.0	87	133
00010398	10.1	87	133
00010402	10.2	87	133

●: Excellent ○: Good

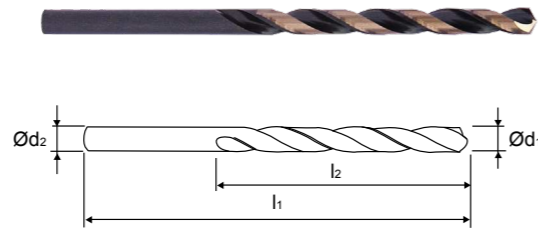
P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●				○	○								○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○					○	○	○			

HSS JOBBER DRILL DIN338 TWO TONE



Series No. 0001

▶ cutting conditions : p.108



Point Geometry

2.5mm to 13.0mm - Split point.
Above 13.0mm - Notched thinned point.

Application

Drilling steels, cast irons, soft aluminiums and plastic.

Surface treatment

Below 5.0mm - Bright or straw colour.
5.0mm to 13.0mm - Steam tempered/straw colour (two tone).
Above 13.0mm - Straw colour

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
00010405	10.3	87	133
00010409	10.4	87	133
00010414	10.5	87	133
00010417	10.6	87	133
00010421	10.7	94	142
00010425	10.8	94	142
00010429	10.9	94	142
00010433	11.0	94	142
00010437	11.1	94	142
00010441	11.2	94	142
00010445	11.3	94	142
00010449	11.4	94	142
00010452	11.5	94	142
00010457	11.6	94	142
00010461	11.7	94	142
00010465	11.8	94	142
00010468	11.9	101	151
00010472	12.0	101	151
00010476	12.1	101	151
00010480	12.2	101	151
00010483	12.3	101	151

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
00010488	12.4	101	151
00010492	12.5	101	151
00010496	12.6	101	151
00010499	12.7	101	151
00010504	12.8	101	151
00010508	12.9	101	151
00010512	13.0	101	151
00010516	13.1	101	151
00010524	13.3	108	160
00010528	13.4	108	160
00010532	13.5	108	160
00010535	13.6	108	160
00010539	13.7	108	160
00010543	13.8	108	160
00010551	14.0	108	160
00010571	14.5	114	169
00010630	16.0	120	178
00010650	16.5	125	184
00010669	17.0	125	184
00010689	17.5	130	191

●: Excellent ○: Good

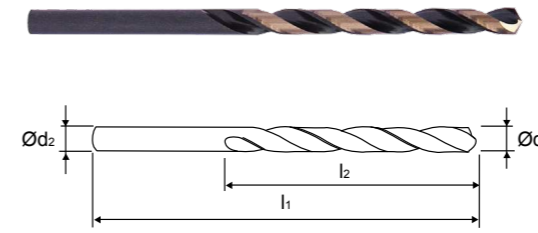
P		H		M		K		S		N				O		
11	12	15		21	22	31	32	41	42	43	61	62	63	64	81	82
●	●					○	○								○	○
13	14	16		23		33	34	51	52	53	71	72	73	74	83	
○	○					○	○				○	○	○			

HSS JOBBER DRILL BS328 TWO TONE



Series No. 0000

▶ cutting conditions : p.108



Point Geometry

3/32" to 1/2" - Split point.
Above 1/2" - Notched thinned point.

Application

Drilling steels, cast irons, soft aluminiums and plastic.

Surface treatment

Below 3/16" - Bright or straw colour.
3/16" to 1/2" - Steam tempered/straw colour (two tone).
Above 1/2" - Straw colour.

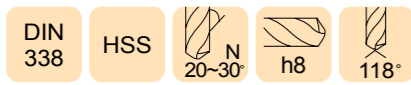
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
00000094	3/32	1.1/4	2.1/4
00000109	7/64	1.1/2	2.5/8
00000125	1/8	1.5/8	2.3/4
00000140	9/64	1.3/4	2.7/8
00000156	5/32	2"	3.1/8
00000172	11/64	2.1/8	3.1/4
00000188	3/16	2.5/16	3.1/2
00000203	13/64	2.7/16	3.5/8
00000219	7/32	2.1/2	3.3/4
00000234	15/64	2.5/8	3.7/8
00000250	1/4	2.3/4	4"
00000265	17/64	2.7/8	4.1/8
00000281	9/32	2.15/16	4.1/4
00000297	19/64	3.1/16	4.3/8
00000312	5/16	3.3/16	4.1/2
00000328	21/64	3.5/16	4.5/8
00000343	11/32	3.7/16	4.3/4
00000359	23/64	3.1/2	4.7/8
00000375	3/8	3.5/8	5"
00000390	25/64	3.3/4	5.1/8

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
00000406	13/32	3.7/8	5.1/4
00000422	27/64	3.15/16	5.3/8
00000438	7/16	4.1/16	5.1/2
00000453	29/64	4.3/16	5.5/8
00000469	15/32	4.5/16	5.3/4
00000484	31/64	4.3/8	5.7/8
00000500	1/2	4.1/2	6"
00000562	9/16	4.9/16	6.3/4

●: Excellent ○: Good

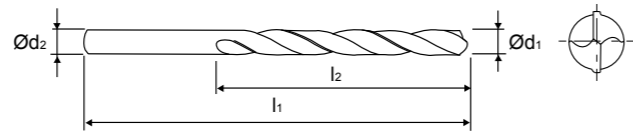
P		H		M		K		S		N				O		
11	12	15		21	22	31	32	41	42	43	61	62	63	64	81	82
●	●					○	○								○	○
13	14	16		23		33	34	51	52	53	71	72	73	74	83	
○	○					○	○				○	○	○			

HSS JOBBER DRILL DIN338



Series No. 820801

▶ cutting conditions : p.108



Surface treatment

Steam Tempered (Black Oxide Finish)
Bright Finish under 2.0mm

Application

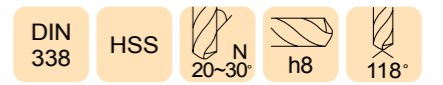
Drilling steels, cast irons, soft aluminums and plastic.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8208010100	1.0	12	34
8208010105	1.05	12	34
8208010110	1.1	14	36
8208010115	1.15	14	36
8208010120	1.2	16	38
8208010125	1.25	16	36
8208010130	1.3	16	38
8208010135	1.35	18	40
8208010140	1.4	18	40
8208010145	1.45	18	40
8208010150	1.5	18	40
8208010155	1.55	20	43
8208010160	1.6	20	43
8208010165	1.65	20	43
8208010170	1.7	20	43
8208010175	1.75	22	46
8208010180	1.8	22	46
8208010185	1.85	22	46
8208010190	1.9	22	46
8208010195	1.95	24	49
8208010200	2.0	24	49
8208010205	2.05	24	49
8208010210	2.1	24	49
8208010215	2.15	27	53
8208010220	2.2	27	53
8208010225	2.25	27	53
8208010230	2.3	27	53
8208010235	2.35	27	53
8208010240	2.4	30	57
8208010245	2.45	30	57
8208010250	2.5	30	57
8208010255	2.55	30	57

●: Excellent ○: Good

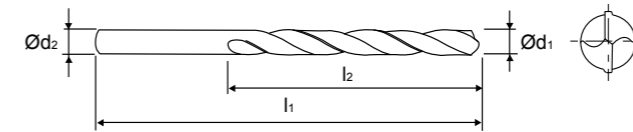
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●				○	○								○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○	○				○	○	○			

HSS JOBBER DRILL DIN338



Series No. 820801

▶ cutting conditions : p.108



Surface treatment

Steam Tempered (Black Oxide Finish)
Bright Finish under 2.0mm

Application

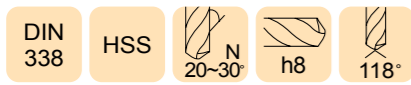
Drilling steels, cast irons, soft aluminums and plastic.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8208010420	4.2	43	75
8208010425	4.25	43	75
8208010430	4.3	47	80
8208010435	4.35	47	80
8208010440	4.4	47	80
8208010445	4.45	47	80
8208010450	4.5	47	80
8208010455	4.55	47	80
8208010460	4.6	47	80
8208010465	4.65	47	80
8208010470	4.7	47	80
8208010475	4.75	47	80
8208010480	4.8	52	86
8208010485	4.85	52	86
8208010490	4.9	52	86
8208010495	4.95	52	86
8208010500	5.0	52	86
8208010505	5.05	52	86
8208010510	5.1	52	86
8208010515	5.15	52	86
8208010520	5.2	52	86
8208010525	5.25	52	86
8208010530	5.3	52	86
8208010535	5.35	57	93
8208010540	5.4	57	93
8208010545	5.45	57	93
8208010550	5.5	57	93
8208010555	5.55	57	93
8208010560	5.6	57	93
8208010565	5.65	57	93
8208010570	5.7	57	93
8208010575	5.75	57	93

●: Excellent ○: Good

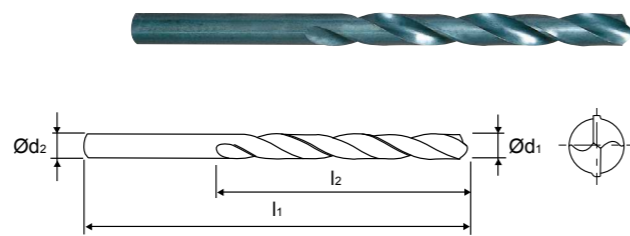
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●				○	○								○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○	○				○	○	○			

HSS JOBBER DRILL DIN338



Series No. 820801

▶ cutting conditions : p.108



Surface treatment

Steam Tempered (Black Oxide Finish)
Bright Finish under 2.0mm

Application

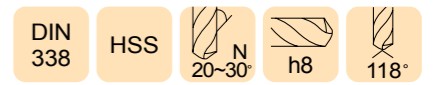
Drilling steels, cast irons, soft aluminums and plastic.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8208010740	7.4	69	109
8208010745	7.45	69	109
8208010750	7.5	69	109
8208010755	7.55	75	117
8208010760	7.6	75	117
8208010765	7.65	75	117
8208010770	7.7	75	117
8208010775	7.75	75	117
8208010780	7.8	75	117
8208010785	7.85	75	117
8208010790	7.9	75	117
8208010795	7.95	75	117
8208010800	8.0	75	117
8208010810	8.1	75	117
8208010820	8.2	75	117
8208010825	8.25	75	117
8208010830	8.3	75	117
8208010840	8.4	75	117
8208010850	8.5	75	117
8208010860	8.6	81	125
8208010870	8.7	81	125
8208010875	8.75	81	125
8208010880	8.8	81	125
8208010890	8.9	81	125
8208010900	9.0	81	125
8208010910	9.1	81	125
8208010920	9.2	81	125
8208010925	9.25	81	125
8208010930	9.3	81	125
8208010940	9.4	81	125
8208010950	9.5	81	125
8208010960	9.6	87	133

●: Excellent ○: Good

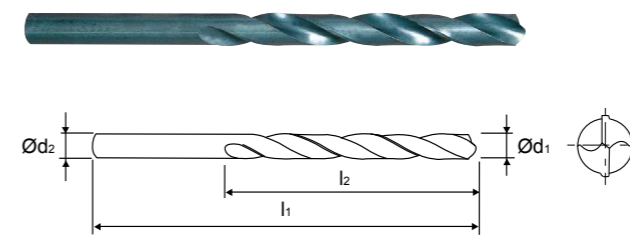
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●				○	○								○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○	○				○	○	○			

HSS JOBBER DRILL DIN338



Series No. 820801

▶ cutting conditions : p.108



Surface treatment

Steam Tempered (Black Oxide Finish)
Bright Finish under 2.0mm

Application

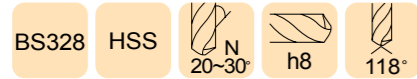
Drilling steels, cast irons, soft aluminums and plastic.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8208011230	12.3	101	151
8208011240	12.4	101	151
8208011250	12.5	101	151
8208011260	12.6	101	151
8208011270	12.7	101	151
8208011275	12.75	101	151
8208011280	12.8	101	151
8208011290	12.9	101	151
8208011300	13.0	101	151
8208011325	13.25	108	160
8208011350	13.5	108	160
8208011375	13.75	108	160
8208011400	14.0	108	160
8208011425	14.25	114	169
8208011450	14.5	114	169
8208011475	14.75	114	169
8208011500	15.0	114	169
8208011525	15.25	120	178
8208011550	15.5	120	178

●: Excellent ○: Good

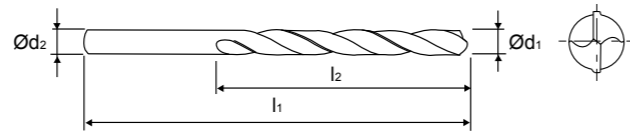
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●				○	○								○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○	○				○	○	○			

HSS JOBBER DRILL BS328



Series No. 810801

▶ cutting conditions : p.108



Surface treatment

Steam Tempered (Black Oxide Finish)
Bright Finish under 3/32

Application

Drilling steels, cast irons, soft aluminums and plastic.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8108010030	3/64	3/4	1.3/4
8108010040	1/16	7/8	1.7/8
8108010050	5/64	1"	2"
8108010060	3/32	1.1/4	2.1/4
8108010070	7/64	1.1/2	2.5/8
8108010080	1/8	1.5/8	2.3/4
8108010090	9/64	1.3/4	2.7/8
8108010100	5/32	2"	3.1/8
8108010110	11/64	2.1/8	3.1/4
8108010120	3/16	2.5/16	3.1/2
8108010130	13/64	2.7/16	3.5/8
8108010140	7/32	2.1/2	3.3/4
8108010150	15/64	2.5/8	3.7/8
8108010160	1/4	2.3/4	4"
8108010170	17/64	2.7/8	4.1/8

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8108010180	9/32	2.15/16	4.1/4
8108010190	19/64	3.1/16	4.3/8
8108010200	5/16	3.3/16	4.1/2
8108010210	21/64	3.5/16	4.5/8
8108010220	11/32	3.7/16	4.3/4
8108010230	23/64	3.1/2	4.7/8
8108010240	3/8	3.5/8	5"
8108010250	25/64	3.3/4	5.1/8
8108010260	13/32	3.7/8	5.1/4
8108010270	27/64	3.15/16	5.3/8
8108010280	7/16	4.1/16	5.1/2
8108010290	29/64	4.3/16	5.5/8
8108010300	15/32	4.5/16	5.3/4
8108010310	31/64	4.3/8	5.7/8
8108010320	1/2	4.1/2	6"

●: Excellent ○: Good

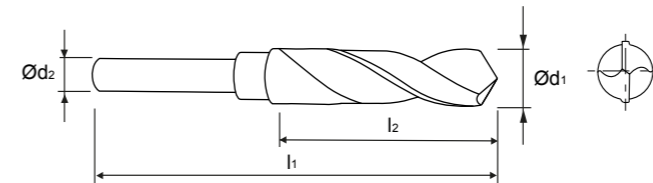
P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●				○	○								○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○					○	○	○			

BLACKSMITH DRILL



Series No. 821901

▶ cutting conditions : p.109



Surface treatment

Steam Tempered (Black Oxide Finish)

Application

With reduced 1/2" shank for use when chuck capacity is limited.

EUROPA CODE	Diameter d ₁	Flute Length l ₂	O/All Length l ₁	Shank Dia. d ₂
8219011300	13.0	75	150	1/2"
8219011350	13.5	75	150	1/2"
8219011400	14.0	75	150	1/2"
8219011450	14.5	75	150	1/2"
8219011500	15.0	75	150	1/2"
8219011550	15.5	75	150	1/2"
8219011600	16.0	75	150	1/2"
8219011650	16.5	75	150	1/2"
8219011700	17.0	75	150	1/2"
8219011750	17.5	75	150	1/2"
8219011800	18.0	75	150	1/2"
8219011850	18.5	75	150	1/2"
8219011900	19.0	75	150	1/2"
8219011950	19.5	75	150	1/2"
8219012000	20.0	75	150	1/2"
8219012100	21.0	75	150	1/2"
8219012200	22.0	75	150	1/2"
8219012300	23.0	75	150	1/2"
8219012400	24.0	75	150	1/2"
8219012500	25.0	75	150	1/2"

●: Excellent ○: Good

P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		○	○	○	○	○	○						○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○					○	○	○			

HSS LONG SERIES DRILLS

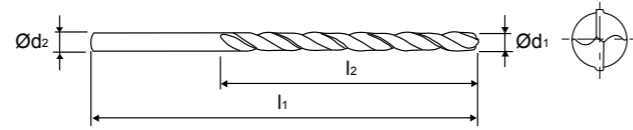


HSS DIN 340 118° STEAM TEMP



Series No. 820901

▶ cutting conditions : p.108



Surface treatment

Steam Tempered (Black Oxide Finish)
Bright Finish under 2.0mm

Application

Drilling steels, stainless steels, cast irons, titanium, aluminium and plastic.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8209010100	1.0	33	56
8209010120	1.2	41	65
8209010130	1.3	41	65
8209010140	1.4	45	70
8209010150	1.5	45	70
8209010160	1.6	50	76
8209010170	1.7	50	76
8209010180	1.8	53	80
8209010190	1.9	53	80
8209010200	2.0	56	85
8209010210	2.1	56	85
8209010220	2.2	59	90
8209010230	2.3	59	90
8209010240	2.4	62	95
8209010250	2.5	62	95
8209010260	2.6	62	95
8209010270	2.7	66	100
8209010280	2.8	66	100
8209010290	2.9	66	100
8209010300	3.0	66	100
8209010310	3.1	69	106
8209010320	3.2	69	106
8209010330	3.3	69	106
8209010340	3.4	73	112
8209010350	3.5	73	112
8209010360	3.6	73	112
8209010370	3.7	73	112
8209010380	3.8	78	119
8209010390	3.9	78	119
8209010400	4.0	78	119
8209010410	4.1	78	119
8209010420	4.2	78	119

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
○	○			○					○	○	○				

HSS LONG SERIES DRILLS

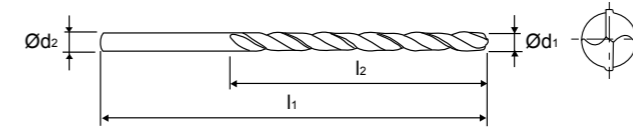


HSS DIN 340 118° STEAM TEMP



Series No. 820901

▶ cutting conditions : p.108



Surface treatment

Steam Tempered (Black Oxide Finish)
Bright Finish under 2.0mm

Application

Drilling steels, stainless steels, cast irons, titanium, aluminium and plastic.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8209010750	7.5	102	156
8209010760	7.6	109	165
8209010770	7.7	109	165
8209010780	7.8	109	165
8209010790	7.9	109	165
8209010800	8.0	109	165
8209010810	8.1	109	165
8209010820	8.2	109	165
8209010830	8.3	109	165
8209010840	8.4	109	165
8209010850	8.5	109	165
8209010860	8.6	115	175
8209010870	8.7	115	175
8209010880	8.8	115	175
8209010890	8.9	115	175
8209010900	9.0	115	175
8209010910	9.1	115	175
8209010920	9.2	115	175
8209010930	9.3	115	175
8209010940	9.4	115	175
8209010950	9.5	115	175
8209010960	9.6	121	184
8209010970	9.7	121	184
8209010980	9.8	121	184
8209010990	9.9	121	184
8209011000	10.0	121	184
8209011010	10.1	121	184
8209011020	10.2	121	184
8209011030	10.3	121	184
8209011040	10.4	121	184
8209011050	10.5	121	184
8209011060	10.6	121	184

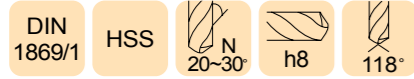
●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
○	○			○					○	○	○				

HSSCo, PM & HSS DRILLS

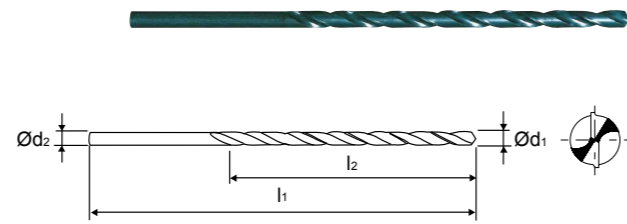
HSSCo, PM & HSS DRILLS

HSS EXTRA LONG SERIES DRILLS



Series No. 821001

▶ cutting conditions : p.108



Surface treatment

Steam Tempered (Black Oxide Finish)

Application

Designed for drilling deep holes or deeply located holes. Drilling steels, stainless steels, cast irons, titanium, aluminium and plastic.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8210010200	2.0	85	125
8210010250	2.5	95	140
8210010300	3.0	100	150
8210010350	3.5	115	165
8210010400	4.0	120	175
8210010450	4.5	125	185
8210010500	5.0	135	195
8210010550	5.5	140	205
8210010600	6.0	140	205
8210010650	6.5	150	215
8210010700	7.0	155	225
8210010750	7.5	155	225

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8210010800	8.0	165	240
8210010850	8.5	165	240
8210010900	9.0	175	250
8210010950	9.5	175	250
8210011000	10.0	185	265
8210011050	10.5	185	265
8210011100	11.0	195	280
8210011150	11.5	195	280
8210011200	12.0	205	295
8210011250	12.5	205	295
8210011300	13.0	205	295

●: Excellent ○: Good

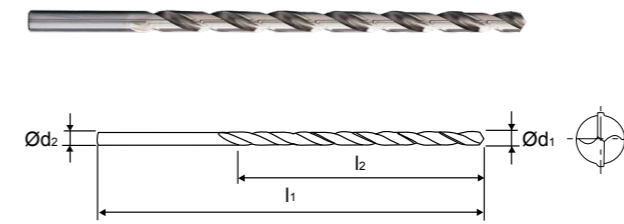
P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		○	○	○	○	○	○						○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○					○	○	○			

HSS EXTRA LONG SERIES DRILLS



Series No. 0162

▶ cutting conditions : p.108



Surface treatment

Bright finish

Application

Designed for drilling deep holes or deeply located holes. Drilling steels, stainless steels, cast irons, titanium, aluminium and plastic.

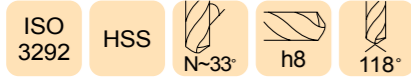
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
01620055	1.4	100	160
01620058	1.5	80	125
01620059	1.5	100	160
01620071	1.8	100	160
01620079	2.0	80	125
01620080	2.0	100	160
01620087	2.2	100	160
01620098	2.5	80	125
01620099	2.5	100	160
01620112	3.0	100	160
01620113	3.0	150	200
01620114	3.0	200	250
01620122	3.3	100	160
01620132	3.5	100	160
01620133	3.5	150	200
01620134	3.5	200	250
01620142	3.7	100	160
01620162	4.0	100	160
01620163	4.0	150	200
01620164	4.0	200	250
01620165	4.0	250	315

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
01620172	4.5	100	160
01620173	4.5	150	200
01620174	4.5	200	250
01620175	4.5	250	315
01620192	5.0	100	160
01620193	5.0	150	200
01620194	5.0	200	250
01620195	5.0	250	315
01620196	5.0	300	400
01620213	5.5	150	200
01620214	5.5	200	250
01620215	5.5	250	315
01620243	6.0	150	200
01620244	6.0	200	250
01620245	6.0	250	315
01620246	6.0	300	400
01620253	6.5	150	200
01620254	6.5	200	250
01620255	6.5	250	315

●: Excellent ○: Good

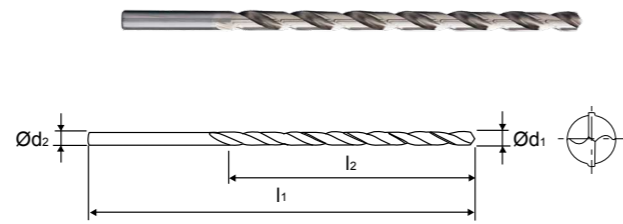
P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		○	○	○	○	○	○						○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○					○	○	○			

HSS EXTRA LONG SERIES DRILLS



Series No. 0162

▶ cutting conditions : p.108



Surface treatment
Bright finish.

Application
Designed for drilling deep holes or deeply located holes.
Drilling steels, stainless steels, cast irons, titanium, aluminium and plastic.

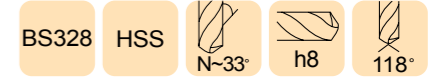
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
01620273	7.0	150	200
01620274	7.0	200	250
01620275	7.0	250	315
01620293	7.5	150	200
01620294	7.5	200	250
01620295	7.5	250	315
01620314	8.0	200	250
01620315	8.0	250	315
01620316	8.0	300	400
01620334	8.5	200	250
01620335	8.5	250	315
01620354	9.0	200	250
01620355	9.0	250	315
01620356	9.0	300	400
01620374	9.5	200	250
01620375	9.5	250	315

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
01620394	10.0	200	250
01620395	10.0	250	315
01620396	10.0	300	400
01620414	10.5	200	250
01620415	10.5	250	315
01620416	10.5	300	400
01620424	11.0	200	250
01620425	11.0	250	315
01620426	11.0	300	400
01620474	12.0	200	250
01620475	12.0	250	315
01620476	12.0	300	400
01620515	13.0	250	315
01620516	13.0	300	400
01620555	14.0	250	315
01620556	14.0	300	400

●: Excellent ○: Good

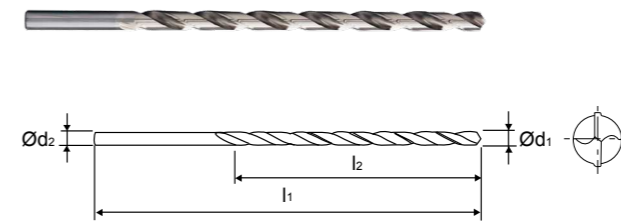
P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		○	○	○	○	○	○						○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○					○	○	○			

HSS EXTRA LONG SERIES DRILLS



Series No. 0161

▶ cutting conditions : p.108



Surface treatment
Bright finish

Application
Designed for drilling deep holes or deeply located holes.
Drilling steels, stainless steels, cast irons, titanium, aluminium and plastic.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
01610072	5/64	100	160
01610091	3/32	80	125
01610092	3/32	100	160
01610093	3/32	150	200
01610102	7/64	100	160
01610123	1/8	150	200
01610124	1/8	200	250
01610125	1/8	250	315
01610142	9/64	100	160
01610143	9/64	150	200
01610152	5/32	100	160
01610153	5/32	150	200
01610173	11/64	150	200
01610182	3/16	100	160
01610183	3/16	150	200
01610184	3/16	200	250
01610186	3/16	300	400

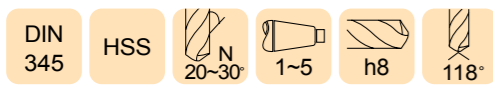
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
01610223	7/32	150	200
01610224	7/32	200	250
01610253	1/4	150	200
01610254	1/4	200	250
01610255	1/4	250	315
01610283	9/32	150	200
01610303	5/16	150	200
01610304	5/16	200	250
01610343	11/32	150	200
01610383	3/8	150	200
01610384	3/8	200	250
01610433	7/16	150	200
01610434	7/16	200	250
01610504	1/2	200	250

Imperial sizes available whilst stocks last

●: Excellent ○: Good

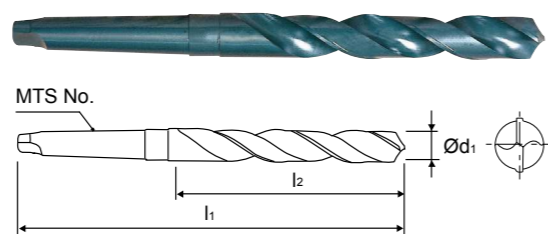
P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		○	○	○	○	○	○						○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○					○	○	○			

HSS MTS DRILL DIN345



Series No. 821601

▶ cutting conditions : p.109



Surface treatment

Steam Tempered (Black Oxide Finish)

Application

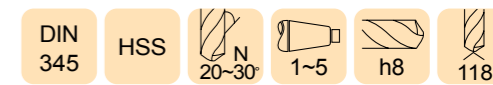
Drilling steels, stainless steels, cast irons, titanium, aluminium and plastic.

EUROPA CODE	O.D d ₁	FL l ₂	OAL l ₁	MTS No.
8216011300	13.0	101	182	1
8216011320	13.2	101	182	1
8216011325	13.25	108	189	1
8216011350	13.5	108	189	1
8216011375	13.75	108	189	1
8216011380	13.8	108	189	1
8216011400	14.0	108	189	1
8216011425	14.25	114	212	2
8216011450	14.5	114	212	2
8216011475	14.75	114	212	2
8216011500	15.0	114	212	2
8216011525	15.25	120	218	2
8216011550	15.5	120	218	2
8216011575	15.75	120	218	2
8216011600	16.0	120	218	2
8216011625	16.25	125	223	2
8216011650	16.5	125	223	2
8216011675	16.75	125	223	2
8216011700	17.0	125	223	2
8216011725	17.25	130	228	2
8216011750	17.5	130	228	2
8216011775	17.75	130	228	2
8216011800	18.0	130	228	2
8216011825	18.25	135	233	2
8216011850	18.5	135	233	2
8216011875	18.75	135	233	2
8216011900	19.0	135	233	2
8216011925	19.25	140	238	2
8216011950	19.5	140	238	2
8216011975	19.75	140	238	2
8216012000	20.0	140	238	2
8216012025	20.25	145	243	2

●: Excellent ○: Good

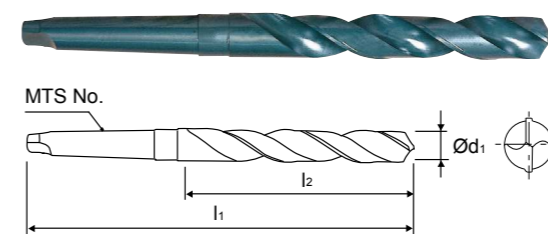
P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		○	○	○	○	○	○						○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○					○	○	○			

HSS MTS DRILL DIN345



Series No. 821601

▶ cutting conditions : p.109



Surface treatment

Steam Tempered (Black Oxide Finish)

Application

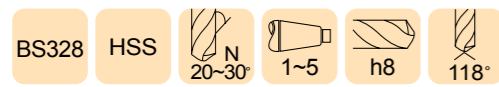
Drilling steels, stainless steels, cast irons, titanium, aluminium and plastic.

EUROPA CODE	O.D d ₁	FL l ₂	OAL l ₁	MTS No.
8216012850	28.5	175	296	3
8216012875	28.75	175	296	3
8216012900	29.0	175	296	3
8216012925	29.25	175	296	3
8216012950	29.5	175	296	3
8216012975	29.75	175	296	3
8216013000	30.0	175	296	3
8216013025	30.25	180	301	3
8216013050	30.5	180	301	3
8216013075	30.75	180	301	3
8216013100	31.0	180	301	3
8216013125	31.25	180	301	3
8216013150	31.5	180	301	3
8216013175	31.75	185	306	3
8216013200	32.0	185	334	4
8216013225	32.5	185	334	4
8216013300	33.0	185	334	4
8216013350	33.5	185	334	4
8216013400	34.0	190	339	4
8216013450	34.5	190	339	4
8216013500	35.0	190	339	4
8216013550	35.5	190	339	4
8216013600	36.0	195	344	4
8216013650	36.5	195	344	4
8216013700	37.0	195	344	4
8216013750	37.5	195	344	4
8216013800	38.0	200	349	4
8216013850	38.5	200	349	4
8216013900	39.0	200	349	4
8216013950	39.5	200	349	4
8216014000	40.0	200	349	4

●: Excellent ○: Good

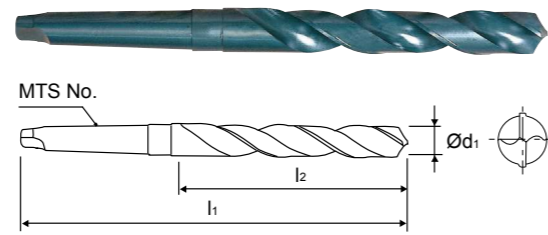
P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		○	○	○	○	○	○						○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○					○	○	○			

HSS MTS DRILL BS328



Series No. 3001

▶ cutting conditions : p.109



Surface treatment

Steam Tempered (Black Oxide Finish)

Application

Drilling steels, stainless steels, cast irons, titanium, aluminium and plastic.

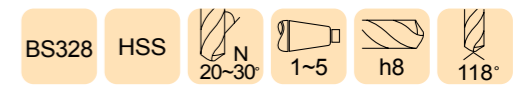
EUROPA CODE	O.D d ₁	FL l ₂	OAL l ₁	MTS No.
30010129	7/32	57	138	1
30010250	1/4	63	144	1
30010265	17/64	69	150	1
30010312	5/16	75	156	1
30010359	23/64	81	162	1
30010375	3/8	87	168	1
30010406	13/32	87	168	1
30010422	27/64	94	175	1
30010438	7/16	94	175	1
30010500	1/2	101	182	1
30010515	33/64	101	182	1
30010531	17/32	108	189	1
30010546	35/64	108	189	1
30010562	9/16	114	212	2
30010594	19/32	120	218	2
30010609	39/64	120	218	2
30010625	5/8	120	218	2
30010641	41/64	125	223	2
30010656	21/32	125	223	2

Imperial sizes available whilst stocks last

●: Excellent ○: Good

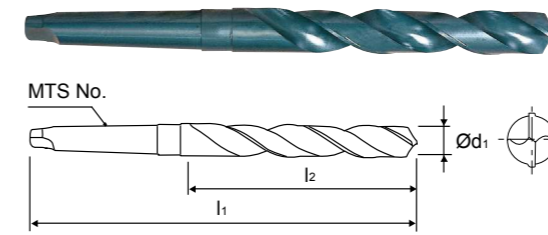
P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		○	○	○	○	○	○						○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○					○	○	○			

HSS MTS DRILL BS328



Series No. 3001

▶ cutting conditions : p.109



Surface treatment

Steam Tempered (Black Oxide Finish)

Application

Drilling steels, stainless steels, cast irons, titanium, aluminium and plastic.

EUROPA CODE	O.D d ₁	FL l ₂	OAL l ₁	MTS No.
30011141	1.9/64	175	296	3
30011156	1.5/32	175	296	3
30011172	1.11/64	175	296	3
30011187	1.13/64	180	301	3
30011218	1.7/32	180	301	3
30011234	1.15/64	180	301	3
30011266	1.17/64	185	334	4
30011281	1.9/32	185	334	4
30011312	1.5/16	185	334	4
30011328	1.21/64	190	339	4
30011359	1.23/64	190	339	4
30011375	1.3/8	190	339	4
30011391	1.25/64	190	339	4
30011406	1.13/32	195	344	4
30011438	1.7/16	195	344	4
30011469	1.15/32	195	344	4
30011484	1.31/64	200	349	4
30011500	1.1/2	200	349	4

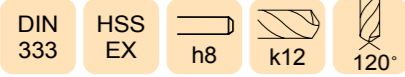
Imperial sizes available whilst stocks last

EUROPA CODE	O.D d ₁	FL l ₂	OAL l ₁	MTS No.
30011515	1.33/64	200	349	4
30011531	1.17/32	200	349	4
30011625	1.5/8	205	354	4
30011656	1.21/32	205	354	4
30011687	1.11/16	210	359	4
30011719	1.23/32	210	359	4
30011750	1.3/4	210	359	4
30011781	1.25/32	215	364	4
30011812	1.13/16	215	364	4
30011844	1.27/32	215	364	4
30011875	1.7/8	220	369	4
30011937	1.15/16	220	369	4
30012000	2"	225	374	4
30012187	2.3/16	230	417	5
30012250	2.1/4	235	422	5
30012500	2.1/2	245	432	5
30012750	2.3/4	250	437	5

●: Excellent ○: Good

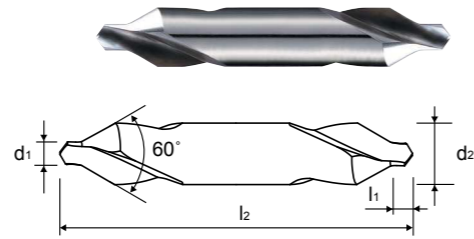
P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		○	○	○	○	○	○						○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○					○	○	○			

HSS CENTRE DRILL



Series No. 810334

▶ cutting conditions : p.109



FORM A (60°)

EUROPA CODE	Pilot Dia. d ₁	Body Dia. d ₂	Pilot Length l ₁	Overall l ₂
8103340050	0.5	3.15	0.8	25.0
8103340080	0.8	3.15	1.1	25.0
8103340100	1.0	3.15	1.3	31.5
8103340125	1.25	3.15	1.6	31.5
8103340160	1.6	4.0	2.0	35.5
8103340200	2.0	5.0	2.5	40.0
8103340250	2.5	6.3	3.1	45.0
8103340315	3.15	8.0	3.9	50.0
8103340400	4.0	10.0	5.0	56.0
8103340500	5.0	12.5	6.3	63.0
8103340630	6.3	16.0	8.0	71.0

▶ Under 1.0mm : Single End

●: Excellent ○: Good

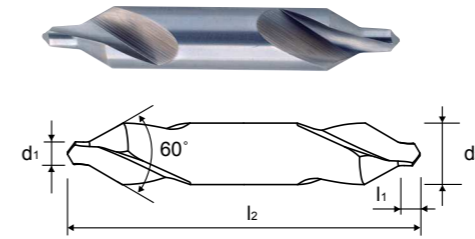
P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		○	○	○	○	○	○						○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○					○	○	○			

HSS CENTRE DRILL



Series No. 888301

▶ cutting conditions : p.109



EUROPA CODE	BS	Pilot Dia. d ₁	Body Dia. d ₂	Pilot Length l ₁ max	Pilot Length l ₁ min	Overall l ₂
8883010010	BS1	3/64"	1/8"	5/64"	1/16"	1.1/2"
8883010020	BS2	1/16"	3/16"	3/32"	5/64"	1.3/4"
8883010030	BS3	3/32"	1/4"	5/32"	1/8"	2"
8883010040	BS4	1/8"	5/16"	3/16"	5/32"	2.1/4"
8883010050	BS5	3/16"	7/16"	9/32"	1/4"	2.1/2"
8883010060	BS6	1/4"	5/8"	3/8"	5/16"	3"
8883010070	BS7	5/16"	3/4"	15/32"	13/32"	3.1/2"

●: Excellent ○: Good

P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		○	○	○	○	○	○						○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○				○					○	○	○			

DRILL SETS



HSSCo, PM & HSS DRILLS



820801SET4

820801SET3

820801SET1

10220025

810504SET1

EUROPA CODE	Set No.	No. of Drills	Diameter Range	Increments	Drill Style	Drill Type
810504SET2	19M	19	1.0 - 10.0	0.5	HSS GOLDEX	JOBBER DRILLS
810504SET1	25M	25	1.0 - 13.0	0.5	HSS GOLDEX	JOBBER DRILLS
810505SET2	19M	19	1.0 - 10.0	0.5	HSS-E GOLDEX	JOBBER DRILLS
810505SET1	25M	25	1.0 - 13.0	0.5	HSS-E GOLDEX	JOBBER DRILLS
10220025	25M	25	1.0 - 13.0	0.5	TWO TONE	JOBBER DRILLS
820801SET2	19M	19	1.0 - 10.0	0.5	HSS	JOBBER DRILLS
820801SET1	25M	25	1.0 - 13.0	0.5	HSS	JOBBER DRILLS
820801SET3	M4	50	1.0 - 5.9	0.1	HSS	JOBBER DRILLS
820801SET4	M5	41	6.0 - 10.0	0.1	HSS	JOBBER DRILLS
820702SET2	19M	19	1.0 - 10.0	0.5	HSSCo	JOBBER DRILLS
820702SET1	25M	25	1.0 - 13.0	0.5	HSSCo	JOBBER DRILLS

HSS DRILLS CUTTING DATA

HSS & HSSCo CUTTING CONDITION



820434, 810434 (HPD-SUS)



Material Group	vc (m/min)	fn (mm/rev)														
		ø1.0 -1.9	ø2.0 -2.9	ø3.0 -3.9	ø4.0 -4.9	ø5.0 -5.9	ø6.0 -6.9	ø7.0 -7.9	ø8.0 -9.9	ø10.0 -11.9	ø12.0 -13.5	ø14.0 -15.5	ø16.0 -17.5	ø18.0 -19.5	ø20.0	
P	11	35 (30-40)	-	0.08	0.13	0.14	0.16	0.18	0.20	0.22	0.26	0.32	0.36	0.40	0.45	0.47
	12		-	0.08	0.13	0.14	0.16	0.18	0.20	0.22	0.26	0.32	0.36	0.40	0.45	0.47
	13		-	0.08	0.13	0.14	0.16	0.18	0.20	0.22	0.26	0.32	0.36	0.40	0.45	0.47
M	21	18 (15-20)	-	0.07	0.08	0.10	0.15	0.18	0.21	0.24	0.30	0.36	0.44	0.48	0.50	0.53
	22		-	0.07	0.08	0.10	0.15	0.18	0.21	0.24	0.30	0.36	0.44	0.48	0.50	0.53
	23	15 (13-18)	-	0.03	0.04	0.06	0.08	0.09	0.10	0.12	0.15	0.18	0.23	0.26	0.29	0.33
	23		-	0.03	0.04	0.06	0.08	0.09	0.10	0.12	0.15	0.18	0.23	0.26	0.29	0.33
N	61	32 (30-35)	-	0.06	0.08	0.10	0.13	0.15	0.17	0.20	0.25	0.30	0.33	0.35	0.40	0.40
	62		-	0.06	0.08	0.10	0.13	0.15	0.17	0.20	0.25	0.30	0.33	0.35	0.40	0.40
	63		-	0.06	0.08	0.10	0.13	0.15	0.17	0.20	0.25	0.30	0.33	0.35	0.40	0.40
	64		-	0.06	0.08	0.10	0.13	0.15	0.17	0.20	0.25	0.30	0.33	0.35	0.40	0.40
	71		-	0.06	0.08	0.10	0.13	0.15	0.17	0.20	0.25	0.30	0.33	0.35	0.40	0.40
	72	80 (70-90)	-	0.09	0.13	0.18	0.22	0.26	0.30	0.34	0.40	0.50	0.55	0.62	0.70	0.75
	73		-	0.09	0.13	0.18	0.22	0.26	0.30	0.34	0.40	0.50	0.55	0.62	0.70	0.75
	74		-	0.09	0.13	0.18	0.22	0.26	0.30	0.34	0.40	0.50	0.55	0.62	0.70	0.75
	74		-	0.09	0.13	0.18	0.22	0.26	0.30	0.34	0.40	0.50	0.55	0.62	0.70	0.75
O	81	32 (30-35)	-	0.06	0.08	0.10	0.13	0.15	0.17	0.20	0.25	0.30	0.33	0.35	0.40	0.40
	82		-	0.06	0.08	0.10	0.13	0.15	0.17	0.20	0.25	0.30	0.33	0.35	0.40	0.40

► For 810434 drills reduce feed rate by 15%

810205 (HPD)



Material Group	vc (m/min)	fn (mm/rev)														
		ø2.0 -2.9	ø3.0 -3.9	ø4.0 -4.9	ø5.0 -5.9	ø6.0 -6.9	ø7.0 -7.9	ø8.0 -9.9	ø10.0 -11.9	ø12.0 -13.5	ø14.0 -15.5	ø16.0 -17.5	ø18.0 -19.5	ø20.0 -22.5	ø23.0 -25.0	
P	11	38 (35-40)	0.09	0.12	0.14	0.17	0.19	0.21	0.22	0.27	0.32	0.34	0.36	0.38	0.44	0.49
	12		0.07	0.11	0.12	0.13	0.14	0.16	0.18	0.21	0.25	0.30	0.32	0.37	0.42	0.45
	13		0.07	0.11	0.12	0.13	0.14	0.16	0.18	0.21	0.25	0.30	0.32	0.37	0.42	0.45
	14		0.07	0.11	0.12	0.13	0.14	0.16	0.18	0.21	0.25	0.30	0.32	0.37	0.42	0.45
K	31	38 (35-40)	0.09	0.12	0.14	0.17	0.19	0.21	0.22	0.27	0.32	0.34	0.36	0.38	0.44	0.49
	32		0.09	0.12	0.14	0.17	0.19	0.21	0.22	0.27	0.32	0.34	0.36	0.38	0.44	0.49
	33		0.09	0.12	0.14	0.17	0.19	0.21	0.22	0.27	0.32	0.34	0.36	0.38	0.44	0.49
N	71	90 (80-100)	0.14	0.21	0.25	0.30	0.36	0.38	0.40	0.48	0.57	0.61	0.65	0.68	0.80	0.87
	72		0.14	0.21	0.25	0.30	0.36	0.38	0.40	0.48	0.57	0.61	0.65	0.68	0.80	0.87
	73		0.14	0.21	0.25	0.30	0.36	0.38	0.40	0.48	0.57	0.61	0.65	0.68	0.80	0.87

vc - cutting speed (m/min)
n - RPM (rev/min)
fn - feed rate (mm/rev)
ø - drill diameter (mm)

To calculate RPM from cutting speed: $n = \frac{v_c \cdot 1000}{\pi \cdot \phi}$

To calculate cutting speed from RPM: $v_c = \frac{n \cdot \pi \cdot \phi}{1000}$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

HSS & HSSCo CUTTING CONDITION



820422 (Sabre HSS-PM)



Material Group	vc (m/min)	fn (mm/rev)														
		ø1.0 -1.9	ø2.0 -2.9	ø3.0 -3.9	ø4.0 -4.9	ø5.0 -5.9	ø6.0 -6.9	ø7.0 -7.9	ø8.0 -9.9	ø10.0 -11.9	ø12.0 -13.5	ø14.0 -15.5	ø16.0 -17.5	ø18.0 -19.5	ø20.0	
P	11	35 (30-40)	0.04	0.06	0.12	0.15	0.18	0.20	0.22	0.24	0.27	0.29	-	-	-	-
	12		0.04	0.06	0.12	0.15	0.18	0.20	0.22	0.24	0.27	0.29	-	-	-	-
	13	30 (25-35)	0.03	0.05	0.09	0.13	0.16	0.18	0.19	0.20	0.24	0.26	-	-	-	-
	14		0.03	0.05	0.09	0.13	0.16	0.18	0.19	0.20	0.24	0.26	-	-	-	-
H	15	15 (13-18)	0.03	0.04	0.05	0.07	0.09	0.10	0.12	0.14	0.17	0.20	-	-	-	-
M	21	18 (15-20)	0.06	0.08	0.09	0.11	0.17	0.19	0.22	0.26	0.33	0.39	-	-	-	-
	22		0.06	0.08	0.09	0.11	0.17	0.19	0.22	0.26	0.33	0.39	-	-	-	-
	23	15 (13-18)	0.03	0.04	0.05	0.07	0.09	0.10	0.12	0.14	0.17	0.20	-	-	-	-
	23		0.03	0.04	0.05	0.07	0.09	0.10	0.12	0.14	0.17	0.20	-	-	-	-
K	31	40 (35-45)	0.05	0.08	0.14	0.18	0.21	0.25	0.27	0.29	0.32	0.36	-	-	-	-
	32		0.05	0.08	0.14	0.18	0.21	0.25	0.27	0.29	0.32	0.36	-	-	-	-
	33		0.05	0.08	0.14	0.18	0.21	0.25	0.27	0.29	0.32	0.36	-	-	-	-
S	41	4 (3-6)	0.01	0.03	0.05	0.07	0.09	0.10	0.11	0.13	0.16	0.19	-	-	-	-
	42		0.01	0.03	0.05	0.07	0.09	0.10	0.11	0.13	0.16	0.19	-	-	-	-
	43		0.01	0.03	0.05	0.07	0.09	0.10	0.11	0.13	0.16	0.19	-	-	-	-
	51		0.01	0.03	0.05	0.07	0.09	0.10	0.11	0.13	0.16	0.19	-	-	-	-
	52	4 (3-6)	0.01	0.03	0.05	0.07	0.09	0.10	0.11	0.13	0.16	0.19	-	-	-	-
	53		0.01	0.03	0.05	0.07	0.09	0.10	0.11	0.13	0.16	0.19	-	-	-	-
	53		0.01	0.03	0.05	0.07	0.09	0.10	0.11	0.13	0.16	0.19	-	-	-	-
N	71	90 (80-100)	0.15	0.17	0.27	0.33	0.39	0.46	0.48	0.51	0.61	0.73	-	-	-	-
	72		0.15	0.17	0.27	0.33	0.39	0.46	0.48	0.51	0.61	0.73	-	-	-	-
	73		0.15	0.17	0.27	0.33	0.39	0.46	0.48	0.51	0.61	0.73	-	-	-	-

vc - cutting speed (m/min)
n - RPM (rev/min)
fn - feed rate (mm/rev)
ø - drill diameter (mm)

To calculate RPM from cutting speed: $n = \frac{v_c \cdot 1000}{\pi \cdot \phi}$

To calculate cutting speed from RPM: $v_c = \frac{n \cdot \pi \cdot \phi}{1000}$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

HSS & HSSCo CUTTING CONDITION



810504, 810505 (Goldex)



Material Group	vc (m/min)	fn (mm/rev)													
		ø1.0 -1.9	ø2.0 -2.9	ø3.0 -3.9	ø4.0 -4.9	ø5.0 -5.9	ø6.0 -6.9	ø7.0 -7.9	ø8.0 -9.9	ø10.0 -11.9	ø12.0 -13.5	ø14.0 -15.5	ø16.0 -17.5	ø18.0 -19.5	ø20.0
P	11 40 (35-45)	0.02	0.06	0.08	0.11	0.11	0.13	0.15	0.18	0.22	0.22	-	-	-	-
	12														
	13 23 (20-25)	0.02	0.06	0.08	0.10	0.10	0.12	0.14	0.15	0.18	0.20	-	-	-	-
M	21 23 (20-25)	0.02	0.06	0.08	0.10	0.10	0.12	0.14	0.15	0.18	0.20	-	-	-	-
	22														
S	41 23 (20-25)	0.02	0.06	0.08	0.09	0.10	0.12	0.14	0.15	0.18	0.20	-	-	-	-
	42														
N	71 90 (85-95)	0.02	0.06	0.10	0.11	0.12	0.14	0.16	0.18	0.23	0.23	-	-	-	-
	72														
	73														

811505 (Goldex Worm Pattern)



Material Group	vc (m/min)	fn (mm/rev)													
		ø1.0 -1.9	ø2.0 -2.9	ø3.0 -3.9	ø4.0 -4.9	ø5.0 -5.9	ø6.0 -6.9	ø7.0 -7.9	ø8.0 -9.9	ø10.0 -11.9	ø12.0 -13.5	ø14.0 -15.5	ø16.0 -17.5	ø18.0 -19.5	ø20.0
P	11 25 (23-28)	0.02	0.06	0.08	0.09	0.10	0.12	0.14	0.15	0.18	0.20	-	-	-	-
	12														
	13 18 (15-20)	0.02	0.06	0.08	0.10	0.10	0.12	0.14	0.15	0.18	0.20	-	-	-	-
M	21 18 (15-20)	0.02	0.06	0.08	0.10	0.10	0.12	0.14	0.15	0.18	0.20	-	-	-	-
	22														
K	31 45 (40-50)	0.02	0.07	0.11	0.14	0.14	0.18	0.20	0.22	0.28	0.28	-	-	-	-
	32														
	33 28 (25-30)	0.02	0.07	0.11	0.14	0.14	0.18	0.20	0.22	0.28	0.28	-	-	-	-
S	41 18 (15-20)	0.02	0.06	0.08	0.09	0.10	0.12	0.14	0.15	0.18	0.20	-	-	-	-
	42														
N	71 70 (65-75)	0.02	0.06	0.10	0.11	0.12	0.14	0.16	0.18	0.23	0.23	-	-	-	-
	72														
	73														

vc - cutting speed (m/min)
n - RPM (rev/min)
fn - feed rate (mm/rev)
ø - drill diameter (mm)

To calculate RPM from cutting speed: $n = \frac{v_c * 1000}{\pi * \phi}$

To calculate cutting speed from RPM: $v_c = \frac{n * \pi * \phi}{1000}$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

HSS & HSSCo CUTTING CONDITION



820502, 820702, 820902 (HSSCo Stub, Jobber, Long Series)



Material Group	vc (m/min)	fn (mm/rev)										
		ø1.0 -1.9	ø2.0 -2.9	ø3.0 -3.9	ø4.0 -4.9	ø5.0 -5.9	ø6.0 -6.9	ø7.0 -7.9	ø8.0 -9.9	ø10.0 -11.9	ø12.0 -13.5	
P	11 25 (22-27)	0.010	0.025	0.050	0.055	0.063	0.080	0.100	0.130	0.145	0.160	
	12											
	13 22 (20-25)	0.009	0.020	0.045	0.050	0.060	0.075	0.095	0.125	0.140	0.150	
M	21 18 (15-20)	0.010	0.025	0.050	0.055	0.063	0.080	0.100	0.130	0.145	0.160	
	22											
K	31 18 (15-20)	0.010	0.025	0.050	0.055	0.063	0.080	0.100	0.130	0.145	0.160	
	32											
	33											
S	41 10 (8-12)	0.08	0.020	0.025	0.031	0.038	0.045	0.060	0.075	0.090	0.100	
	42											
N	71 48 (45-50)	0.020	0.038	0.063	0.070	0.076	0.120	0.160	0.180	0.200	0.225	
	72											
	73											
O	81 23 (22-25)	0.010	0.025	0.050	0.055	0.063	0.080	0.100	0.130	0.145	0.160	
	82											

Material Group	vc (m/min)	fn (mm/rev)								
		ø14.0 -15.5	ø16.0 -17.5	ø18.0 -19.5	ø20.0 -21.5	ø22.0 -23.5	ø24.0 -25.5	ø26.0 -27.5	ø28.0 -29.5	ø30.0 -31.0
P	11 25 (22-27)	0.180	0.200	0.230	0.240	0.250	0.260	0.270	0.275	0.280
	12									
	13 22 (20-25)	0.170	0.210	0.220	0.230	0.240	0.250	0.260	0.265	0.270
M	21 18 (15-20)	0.180	0.200	0.230	0.240	0.250	0.260	0.270	0.275	0.280
	22									
K	31 18 (15-20)	0.180	0.200	0.230	0.240	0.250	0.260	0.270	0.275	0.280
	32									
	33									
S	41 10 (8-12)	0.110	0.120	0.130	0.140	0.150	0.160	0.170	0.175	0.180
	42									
N	71 48 (45-50)	0.250	0.275	0.300	0.325	0.350	0.360	0.370	0.375	0.380
	72									
	73									
O	81 23 (22-25)	0.180	0.200	0.230	0.240	0.250	0.260	0.270	0.275	0.280
	82									

vc - cutting speed (m/min)
n - RPM (rev/min)
fn - feed rate (mm/rev)
ø - drill diameter (mm)

To calculate RPM from cutting speed: $n = \frac{v_c * 1000}{\pi * \phi}$

To calculate cutting speed from RPM: $v_c = \frac{n * \pi * \phi}{1000}$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

HSS & HSSCo CUTTING CONDITION



HSSCo, PM & HSS DRILLS

820116, (HSSCo L/S Worm Pattern)



Material Group	vc (m/min)	fn (mm/rev)														
		ø1.0 -1.9	ø2.0 -2.9	ø3.0 -3.9	ø4.0 -4.9	ø5.0 -5.9	ø6.0 -6.9	ø7.0 -7.9	ø8.0 -9.9	ø10.0 -11.9	ø12.0 -13.5	ø14.0 -15.5	ø16.0 -17.5	ø18.0 -19.5	ø20.0	
P	11															
	12	15 (13-18)	-	0.03	0.05	0.06	0.06	0.08	0.09	0.10	0.12	0.13	-	-	-	-
	13															
	14															
H	15	10 (8-13)	-	0.02	0.04	0.05	0.05	0.06	0.08	0.10	0.12	0.13	-	-	-	-
	16															
K	31	22 (20-25)	-	0.06	0.10	0.13	0.13	0.16	0.18	0.20	0.23	0.25	-	-	-	-
	32															
	33	9 (7-12)	-	0.05	0.08	0.10	0.10	0.13	0.15	0.17	0.20	0.22	-	-	-	-
	34															

820601, 0000, 820801, 820901, 821001, 0162 (HSS Stub, Two Tone, Jobber, Long Series, Extra Long Series)



Material Group	vc (m/min)	fn (mm/rev)															
		ø1.0 -1.9	ø2.0 -2.9	ø3.0 -3.9	ø4.0 -4.9	ø5.0 -5.9	ø6.0 -6.9	ø7.0 -7.9	ø8.0 -9.9	ø10.0 -11.9	ø12.0 -13.5	ø14.0 -15.5	ø16.0 -17.5	ø18.0 -19.5	ø20.0		
P	11	25 (22-27)	0.010	0.025	0.050	0.055	0.063	0.080	0.100	0.130	0.145	0.160	0.180	0.200	0.230	0.240	
	12																
	13		22 (20-25)	0.009	0.020	0.045	0.050	0.060	0.075	0.095	0.125	0.140	0.150	0.170	0.210	0.220	0.230
14																	
M	21	18 (15-20)	0.010	0.025	0.050	0.055	0.063	0.080	0.100	0.130	0.145	0.160	0.180	0.200	0.230	0.240	
	22																
K	31	18 (15-20)	0.010	0.025	0.050	0.055	0.063	0.080	0.100	0.130	0.145	0.160	0.180	0.200	0.230	0.240	
	32																
	33																
S	41	10 (8-12)	0.08	0.020	0.025	0.031	0.038	0.045	0.060	0.075	0.090	0.100	0.110	0.120	0.130	0.140	
	42																
N	71	48 (45-50)	0.020	0.038	0.063	0.070	0.076	0.120	0.160	0.180	0.200	0.225	0.250	0.275	0.300	0.325	
	72																
	73																
O	81	23 (22-25)	0.010	0.025	0.050	0.055	0.063	0.080	0.100	0.130	0.145	0.160	0.180	0.200	0.230	0.240	
	82																

vc - cutting speed (m/min)
n - RPM (rev/min)
fn - feed rate (mm/rev)
ø - drill diameter (mm)

To calculate RPM from cutting speed: $n = \frac{v_c \cdot 1000}{\pi \cdot \phi}$

To calculate cutting speed from RPM: $v_c = \frac{n \cdot \pi \cdot \phi}{1000}$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

HSS & HSSCo CUTTING CONDITION



HSSCo, PM & HSS DRILLS

821901, 821601 (Blacksmith, MTS)



Material Group	vc (m/min)	fn (mm/rev)															
		ø13.0 -15.5	ø16.0 -18.5	ø19.0 -21.5	ø22.0 -24.5	ø25.0 -28.5	ø28.0 -31.5	ø32.0 -35.5	ø36.0 -39.5	ø40.0 -43.5	ø44.0 -47.5	ø48.0 -51.5	ø52.0 -55.5	ø56.0 -59.5	ø60.0		
P	11	20 (18-22)	0.17	0.20	0.23	0.24	0.25	0.26	0.28	0.30	0.31	0.32	0.33	0.35	0.38	0.40	
	12																
	13	15 (13-18)	0.15	0.18	0.21	0.22	0.23	0.24	0.26	0.28	0.29	0.30	0.31	0.33	0.36	0.38	
	14																
M	21	18 (15-20)	0.17	0.20	0.23	0.24	0.25	0.26	0.28	0.30	0.31	0.32	0.33	0.35	0.38	0.40	
	22																
K	31	18 (15-20)	0.17	0.20	0.23	0.24	0.25	0.26	0.28	0.30	0.31	0.32	0.33	0.35	0.38	0.40	
	32																
	33																
S	41	10 (8-12)	0.09	0.11	0.13	0.14	0.15	0.16	0.18	0.18	0.19	0.19	0.20	0.21	0.22	0.23	
	42																
N	71	45 (40-50)	0.26	0.28	0.30	0.32	0.34	0.36	0.38	0.40	0.42	0.44	0.46	0.48	0.49	0.50	
	72																
	73																
O	81	22 (20-25)	0.26	0.28	0.30	0.32	0.34	0.36	0.38	0.40	0.42	0.44	0.46	0.48	0.49	0.50	
	82																

810334, 888301, 821402, 8224002 (Centre Drills, Spotting Drills)



Material Group	vc (m/min)	fn (mm/rev)															
		ø1.0 -1.9	ø2.0 -2.9	ø3.0 -3.9	ø4.0 -4.9	ø5.0 -5.9	ø6.0 -6.9	ø7.0 -7.9	ø8.0 -9.9	ø10.0 -11.9	ø12.0 -13.5	ø14.0 -15.5	ø16.0 -17.5	ø18.0 -19.5	ø20.0		
P	11	20 (25-25)	0.010	0.025	0.050	0.055	0.063	0.080	0.100	0.130	0.145	0.160	0.180	0.200	0.230	0.240	
	12																
	13	18 (15-20)	0.009	0.020	0.045	0.050	0.060	0.075	0.095	0.125	0.140	0.150	0.170	0.210	0.220	0.230	
	14																
M	21	8 (6-10)	0.010	0.025	0.050	0.055	0.063	0.080	0.100	0.130	0.145	0.160	0.180	0.200	0.230	0.240	
	22																
K	31	8 (6-10)	0.010	0.025	0.050	0.055	0.063	0.080	0.100	0.130	0.145	0.160	0.180	0.200	0.230	0.240	
	32																
	33																
S	41	5 (4-6)	0.08	0.020	0.025	0.031	0.038	0.045	0.060	0.075	0.090	0.100	0.110	0.120	0.130	0.140	
	42																
N	71	40 (40-45)	0.020	0.038	0.063	0.070	0.076	0.120	0.160	0.180	0.200	0.225	0.250	0.275	0.300	0.325	
	72																
	73																
O	81	18 (15-20)	0.010	0.025	0.050	0.055	0.063	0.080	0.100	0.130	0.145	0.160	0.180	0.200	0.230	0.240	
	82																

vc - cutting speed (m/min)
n - RPM (rev/min)
fn - feed rate (mm/rev)
ø - drill diameter (mm)

To calculate RPM from cutting speed: $n = \frac{v_c \cdot 1000}{\pi \cdot \phi}$

To calculate cutting speed from RPM: $v_c = \frac{n \cdot \pi \cdot \phi}{1000}$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

SUPERIOR PERFORMANCE

4F POINT T15 - P40

Self-centering
four facet point
for less thrust force.

Multiple web thinning
gives improved stability
and hole straightness.

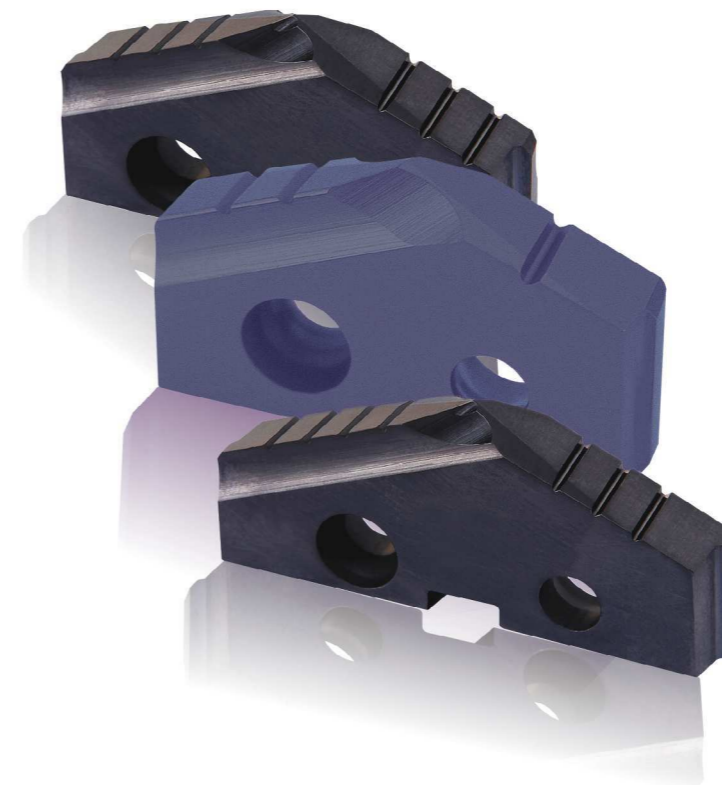
Radius back face
with wide chip
space.

Optimum point thinning
for reduced cutting load.

IDEAL FOR MATERIAL GROUPS



SPADE DRILL INSERTS & HOLDERS












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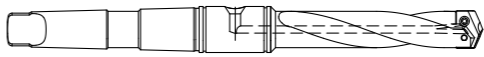
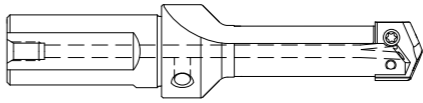
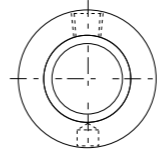
APPLICATION GUIDE

INDEX

●: Excellent ○: Good

P				H		M			K				S			N							O			INSERTS							
11	12	13	14	15	16	21	22	23	31	32	33	34	41	42	43	51	52	53	61	62	63	64	71	72	73	74	81	82	83	Code	Item	Description	Page No.
●	●	●	●	○	○	○	○		○	○	●	●				○	○	○					○	○	○					828327		Flat Bottom Insert Series Y to 2 HSS T15 TiAlN ø9.5mm to 35mm	P.114
		●	●	○	○						○	○				●	●	●												834327		4F- Point Insert Series Y to 3 HSS T15 TiAlN ø9.5mm - 47mm	P.116
●	●	●	●	●	●																									834523		4F-Point Insert Series Y to 3 Carbide P40 TiAlN ø9.5mm - 47mm	P.118
●	●	●	●			●	●	●	●	●													●	●	●					807304 807326		Standard Inserts Series 1 to 8 HSS M4 TiN and TiAlN ø17.86mm (45/64") - 114.3mm (4.1/2")	P.120
	●	●	○	○												●	●	●												808317 808327		Standard Inserts Series Y to 4 HSS T15 TiN and TiAlN ø9.5mm - 65.09mm (2.9/16")	P.126
	●	●	○	○							●	●				●	●	●												809305 809321		Standard Inserts Series Y to 2 HSS M48 TiN and TiAlN ø9.5mm - 35mm	P.130
									●	●	●	●																		832308 832323		Standard Inserts Series Y to 2 Carbide K10 TiN and TiAlN ø9.5mm - 35mm	P.133
						●	●	●	○	○	○	○				●	●	●					●	●	●					830308 830323		Standard Inserts Series Y to 2 Carbide K20 TiN and TiAlN ø9.5mm - 35mm	P.135
●	●	●	●	●	●																									831308 831323		Standard Inserts Series Y to 3 Carbide P40 TiN and TiAlN ø9.5mm - 47mm	P.137

HOLDERS AND ACCESSORIES

8Y215 to 89515		Taper Shank Holders Short, Intermediate, Standard, Extended	P.144
8Y115 to 87515		Straight Shank Holders Short, Intermediate, Standard, Extended	P.148
SP		Accessories Coolant Rings, Torx Screws, Torx Drivers	P.151
		Cutting Data	P.140

► For material group examples, refer to page 2

► For full material group tables, refer to pages 194-199

FLAT BOTTOM T15 SUPER HSS TiAIN



- For use in most materials, please refer to guide.
- Point angle 180°.

Series No. 828327

▶ cutting conditions : p.142

SERIES Y, Z, O

Series Min. to Max. (mm/inch)	Diameter		Width Metric (mm/inch)	EUROPA CODE
	Metric (mm)	Decimal (inch)		
Y 9.50(.374") to 11.07(.436")	9.50	.3740"	2.4 (3/32")	8283270950
	9.80	.3858"		8283270980
	10.00	.3937"		8283271000
	10.20	.4016"		8283271020
	10.50	.4134"		8283271050
	10.80	.4252"		8283271080
	11.00	.4331"		8283271100
Z 11.11(.437") to 12.95(.510")	11.50	.4528"	2.4 (3/32")	8283271150
	12.00	.4724"		8283271200
	12.50	.4921"		8283271250
O 12.98(.511") to 17.65(.695")	13.00	.5118"	3.2 (1/8")	8283271300
	13.50	.5315"		8283271350
	14.00	.5512"		8283271400
	14.50	.5709"		8283271450
	15.00	.5906"		8283271500
	15.50	.6102"		8283271550
	16.00	.6299"		8283271600
	16.50	.6496"		8283271650
	17.00	.6693"		8283271700
	17.50	.6890"		8283271750

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●	○	○	○	○	○										
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●	○			●	●	○	○	○	○	○	○	○			

FLAT BOTTOM T15 SUPER HSS TiAIN



- For use in most materials, please refer to guide.
- Point angle 180°.

Series No. 828327

▶ cutting conditions : p.142

SERIES 1, 2

Series Min. to Max. (mm/inch)	Diameter		Width Metric (mm/inch)	EUROPA CODE
	Metric (mm)	Decimal (inch)		
1 17.53(.690") to 24.38(.960")	18.00	.7087"	4.0 (5/32")	8283271800
	18.50	.7283"		8283271850
	19.00	.7480"		8283271900
	19.50	.7677"		8283271950
	20.00	.7874"		8283272000
	20.50	.8071"		8283272050
	21.00	.8268"		8283272100
	22.00	.8661"		8283272200
	23.00	.9055"		8283272300
	24.00	.9449"		8283272400
	25.00	.9843"		8283272500
	26.00	1.0236"		8283272600
2 24.41(.961") to 35.05(1.380")	27.00	1.0630"	4.8 (3/16")	8283272700
	28.00	1.1024"		8283272800
	29.00	1.1417"		8283272900
	30.00	1.1811"		8283273000
	31.00	1.2205"		8283273100
	32.00	1.2598"		8283273200
	33.00	1.2992"		8283273300
	34.00	1.3386"		8283273400
	35.00	1.3780"		8283273500

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●	○	○	○	○	○										
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●	○			●	●	○	○	○	○	○	○	○			

4F POINT T15 SUPER HSS TiAIN



- For use in high nickel alloy and materials over 280 Brinell.
- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available on request.

Series No. 834327

▶ cutting conditions : p.140

SERIES Y, Z, O, 1

Series Min. to Max. (mm/inch)	Width		EUROPA CODE	
	Metric (mm)	Decimal (inch)		
Y 9.50(.374") to 11.07(.436")	9.50	.3740"	2.4 (3/32")	8343270950
	9.80	.3860"		8343270980
	10.00	.3937"		8343271000
	10.20	.4016"		8343271020
	10.50	.4134"		8343271050
	10.80	.4252"		8343271080
	11.00	.4331"		8343271100
Z 11.11(.437") to 12.95(.510")	11.50	.4528"	2.4 (3/32")	8343271150
	12.00	.4724"		8343271200
	12.50	.4921"		8343271250
O 12.98(.511") to 17.65(.695")	13.00	.5118"	3.2 (1/8")	8343271300
	13.50	.5315"		8343271350
	14.00	.5512"		8343271400
	14.50	.5709"		8343271450
	15.00	.5906"		8343271500
	15.50	.6102"		8343271550
	16.00	.6299"		8343271600
	16.50	.6496"		8343271650
	17.00	.6693"		8343271700
	17.50	.6890"		8343271750
1 17.53(.690") to 24.38(.960")	18.00	.7087"	4.0 (5/32")	8343271800
	18.50	.7283"		8343271850
	19.00	.7480"		8343271900
	19.50	.7677"		8343271950
	20.00	.7874"		8343272000
	20.50	.8071"		8343272050
	21.00	.8268"		8343272100
	22.00	.8661"		8343272200
	23.00	.9055"		8343272300
	24.00	.9449"		8343272400

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
		○													
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
●	●	○			○	○	●	●	●						

4F POINT T15 SUPER HSS TiAIN



- For use in high nickel alloy and materials over 280 Brinell.
- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available on request.

Series No. 834327

▶ cutting conditions : p.140

SERIES 2, 3

Series Min. to Max. (mm/inch)	Width		EUROPA CODE			
	Metric (mm)	Decimal (inch)				
2 24.41(.961") to 35.05(1.380")	25.00	.9843"	4.8 (3/16")	8343272500		
	26.00	1.0236"		8343272600		
	27.00	1.0630"		8343272700		
	28.00	1.1024"		8343272800		
	29.00	1.1417"		8343272900		
	30.00	1.1811"		8343273000		
	31.00	1.2205"		8343273100		
	32.00	1.2598"		8343273200		
	33.00	1.2992"		8343273300		
	34.00	1.3386"		8343273400		
	35.00	1.3780"		8343273500		
	3 34.37(1.353") to 47.80(1.882")	36.00		1.4173"	6.4 (1/4")	8343273600
		37.00		1.4567"		8343273700
38.00		1.4961"	8343273800			
39.00		1.5354"	8343273900			
40.00		1.5748"	8343274000			
41.00		1.6142"	8343274100			
42.00		1.6535"	8343274200			
43.00		1.6929"	8343274300			
44.00		1.7323"	8343274400			
45.00		1.7717"	8343274500			
46.00		1.8110"	8343274600			
47.00		1.8504"	8343274700			

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
		○													
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
●	●	○			○	○	●	●	●						

4F POINT P40 CARBIDE TiAlN



- For use in carbon steel and alloy steel.
- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available on request.

Series No. 834523

► cutting conditions : p.141

SERIES Y, Z, O, 1

Series Min. to Max. (mm/inch)	Width		EUROPA CODE	
	Metric (mm)	Decimal (inch)		
Y 9.50(.374") to 11.07(.436")	9.50	.3740"	2.4 (3/32")	8345230950
	9.80	.3860"		8345230980
	10.00	.3937"		8345231000
	10.20	.4016"		8345231020
	10.50	.4134"		8345231050
	10.80	.4252"		8345231080
	11.00	.4331"		8345231100
Z 11.11(.437") to 12.95(.510")	11.50	.4528"	2.4 (3/32")	8345231150
	12.00	.4724"		8345231200
	12.50	.4921"		8345231250
O 12.98(.511") to 17.65(.695")	13.00	.5118"	3.2 (1/8")	8345231300
	13.50	.5315"		8345231350
	14.00	.5512"		8345231400
	14.50	.5709"		8345231450
	15.00	.5906"		8345231500
	15.50	.6102"		8345231550
	16.00	.6299"		8345231600
	16.50	.6496"		8345231650
	17.00	.6693"		8345231700
	17.50	.6890"		8345231750
1 17.53(.690") to 24.38(.960")	18.00	.7087"	4.0 (5/32")	8345231800
	18.50	.7283"		8345231850
	19.00	.7480"		8345231900
	19.50	.7677"		8345231950
	20.00	.7874"		8345232000
	20.50	.8071"		8345232050
	21.00	.8268"		8345232100
	22.00	.8661"		8345232200
	23.00	.9055"		8345232300
	24.00	.9449"		8345232400

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●	●													
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●	●													

4F POINT P40 CARBIDE TiAlN



- For use in carbon steel and alloy steel.
- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available on request.

Series No. 834523

► cutting conditions : p.141

SERIES 2, 3

Series Min. to Max. (mm/inch)	Width		EUROPA CODE			
	Metric (mm)	Decimal (inch)				
2 24.41(.961") to 35.05(1.380")	25.00	.9843"	4.8 (3/16")	8345232500		
	26.00	1.0236"		8345232600		
	27.00	1.0630"		8345232700		
	28.00	1.1024"		8345232800		
	29.00	1.1417"		8345232900		
	30.00	1.1811"		8345233000		
	31.00	1.2205"		8345233100		
	32.00	1.2598"		8345233200		
	33.00	1.2992"		8345233300		
	34.00	1.3386"		8345233400		
	35.00	1.3780"		8345233500		
	3 34.37(1.353") to 47.80(1.882")	36.00		1.4173"	6.4 (1/4")	8345233600
		37.00		1.4567"		8345233700
		38.00		1.4961"		8345233800
39.00		1.5354"	8345233900			
40.00		1.5748"	8345234000			
41.00		1.6142"	8345234100			
42.00		1.6535"	8345234200			
43.00		1.6929"	8345234300			
44.00		1.7323"	8345234400			
45.00		1.7717"	8345234500			
46.00		1.8110"	8345234600			
47.00		1.8504"	8345234700			

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●	●													
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●	●													

M4 HSS TiN & TiAlN



- For use in steel, stainless steel, cast iron and aluminium.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available on request.

Series No. 807304, 807326

▶ cutting conditions : p.140

SERIES 1

Series Min. to Max. (mm/inch)	Diameter			Width Metric (mm/inch)	EUROPA CODE	
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiAlN
1 17.53(.690") to 24.38(.960")	45/64"	17.86	.7031"	4.0 (5/32")	8073041786	8073261786
		18.00	.7087"		8073041800	8073261800
	23/32"	18.26	.7188"		8073041826	8073261826
		18.50	.7283"		8073041850	8073261850
	47/64"	18.65	.7344"		8073041865	8073261865
		19.00	.7480"		8073041900	8073261900
	3/4"	19.05	.7500"		8073041905	8073261905
	49/64"	19.45	.7656"		8073041945	8073261945
		19.50	.7677"		8073041950	8073261950
	25/32"	19.84	.7812"		8073041984	8073261984
		20.00	.7874"		8073042000	8073262000
	51/64"	20.24	.7969"		8073042024	8073262024
		20.50	.8071"		8073042050	8073262050
	13/16"	20.64	.8125"		8073042064	8073262064
		21.00	.8268"		8073042100	8073262100
	27/32"	21.43	.8438"		8073042143	8073262143
	55/64"	21.83	.8594"		8073042183	8073262183
		22.00	.8661"		8073042200	8073262200
	7/8"	22.23	.8750"		8073042223	8073262223
	57/64"	22.62	.8906"		8073042262	8073262262
	23.00	.9055"	8073042300	8073262300		
29/32"	23.02	.9062"	8073042302	8073262302		
59/64"	23.42	.9219"	8073042342	8073262342		
15/16"	23.81	.9375"	8073042381	8073262381		
	24.00	.9449"	8073042400	8073262400		

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		●	●	●	●									
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●		●							●	●	●			

M4 HSS TiN & TiAlN



- For use in steel, stainless steel, cast iron and aluminium.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available on request.

Series No. 807304, 807326

▶ cutting conditions : p.140

SERIES 2

Series Min. to Max. (mm/inch)	Diameter			Width Metric (mm/inch)	EUROPA CODE	
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiAlN
2 24.41(.961") to 35.05(1.380")	31/32"	24.61	.9688"	4.8 (3/16")	8073042461	8073262461
	63/64"	25.00	.9843"		8073042500	8073262500
	1"	25.40	1.0000"		8073042540	8073262540
	1-1/64"	25.80	1.0156"		8073042580	8073262580
		26.00	1.0236"		8073042600	8073262600
	1-1/32"	26.19	1.0312"		8073042619	8073262619
	1-3/64"	26.59	1.0469"		8073042659	8073262659
	1-1/16"	26.99	1.0625"		8073042699	8073262699
		27.00	1.0630"		8073042700	8073262700
	1-3/32"	27.78	1.0938"		8073042778	8073262778
		28.00	1.1024"		8073042800	8073262800
	1-7/64"	28.18	1.1094"		8073042818	8073262818
	1-1/8"	28.58	1.1250"		8073042858	8073262858
		29.00	1.1417"		8073042900	8073262900
	1-5/32"	29.37	1.1562"		8073042937	8073262937
		30.00	1.1811"		8073043000	8073263000
	1-3/16"	30.16	1.1875"		8073043016	8073263016
	1-7/32"	30.96	1.2188"		8073043096	8073263096
		31.00	1.2205"		8073043100	8073263100
	1-1/4"	31.75	1.2500"		8073043175	8073263175
		32.00	1.2598"		8073043200	8073263200
	1-9/32"	32.54	1.2812"		8073043254	8073263254
		33.00	1.2992"		8073043300	8073263300
	1-5/16"	33.34	1.3125"		8073043334	8073263334
		34.00	1.3386"		8073043400	8073263400
	1-11/32"	34.13	1.3438"		8073043413	8073263413
	1-3/8"	34.93	1.3750"		8073043493	8073263493
		35.00	1.3780"		8073043500	8073263500

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		●	●	●	●									
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●		●							●	●	●			

M4 HSS TiN & TiAlN



- For use in steel, stainless steel, cast iron and aluminium.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available on request.

Series No. 807304, 807326

▶ cutting conditions : p.140

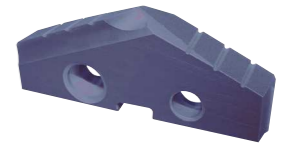
SERIES 3

Series Min. to Max. (mm/inch)	Diameter			Width Metric (mm/inch)	EUROPA CODE	
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiAlN
3 34.37(1.353") to 47.80(1.882")	1-13/32"	35.72	1.4062"	6.4 (1/4")	8073043572	8073263572
		36.00	1.4173"		8073043600	8073263600
	1-7/16"	36.51	1.4375"		8073043651	8073263651
		37.00	1.4567"		8073043700	8073263700
	1-15/32"	37.31	1.4688"		8073043731	8073263731
		38.00	1.4961"		8073043800	8073263800
	1-1/2"	38.10	1.5000"		8073043810	8073263810
	1-17/32"	38.89	1.5312"		8073043889	8073263889
		39.00	1.5354"		8073043900	8073263900
	1-9/16"	39.69	1.5625"		8073043969	8073263969
		40.00	1.5748"		8073044000	8073264000
	1-19/32"	40.48	1.5938"		8073044048	8073264048
		41.00	1.6142"		8073044100	8073264100
	1-5/8"	41.28	1.6250"		8073044128	8073264128
		42.00	1.6535"		8073044200	8073264200
	1-21/32"	42.07	1.6562"		8073044207	8073264207
	1-11/16"	42.86	1.6875"		8073044286	8073264286
		43.00	1.6929"		8073044300	8073264300
	1-23/32"	43.66	1.7188"		8073044366	8073264366
		44.00	1.7323"		8073044400	8073264400
	1-3/4"	44.45	1.7500"		8073044445	8073264445
		45.00	1.7717"		8073044500	8073264500
	1-25/32"	45.24	1.7812"		8073044524	8073264524
		46.00	1.8110"		8073044600	8073264600
	1-13/16"	46.04	1.8125"		8073044604	8073264604
	1-27/32"	46.83	1.8438"		8073044683	8073264683
		47.00	1.8504"		8073044700	8073264700
	1-7/8"	47.63	1.8750"		8073044763	8073264763

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●	●	●	●	●	●									
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
●	●	●	●	●	●	●	●	●	●	●	●	●	●		

M4 HSS TiN & TiAlN



- For use in steel, stainless steel, cast iron and aluminium.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available on request.

Series No. 807304, 807326

▶ cutting conditions : p.140

SERIES 4

Series Min. to Max. (mm/inch)	Diameter			Width Metric (mm/inch)	EUROPA CODE	
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiAlN
4 46.99(1.850") to 65.28(2.570")		48.00	1.8898"	7.9 (5/16")	8073044800	8073264800
		1-29/32"	48.42		1.9062"	8073044842
		49.00	1.9291"		8073044900	8073264900
		1-15/16"	49.21		1.9375"	8073044921
		50.00	1.9685"		8073045000	8073265000
		1-31/32"	50.01		1.9688"	8073045001
	2"	50.80	2.0000"		8073045080	8073265080
		51.00	2.0079"		8073045100	8073265100
	2-1/32"	51.59	2.0312"		8073045159	8073265159
		2-3/64"	52.00		2.0472"	8073045200
	2-1/16"	52.39	2.0625"		8073045239	8073265239
		53.00	2.0866"		8073045300	8073265300
	2-3/32"	53.18	2.0938"		8073045318	8073265318
		53.98	2.1250"		8073045398	8073265398
	2-5/32"	54.00	2.1260"		8073045400	8073265400
		54.79	2.1562"		8073045479	8073265479
	2-3/16"	55.00	2.1654"		8073045500	8073265500
		55.56	2.1875"		8073045556	8073265556
	2-7/32"	56.00	2.2047"		8073045600	8073265600
		56.36	2.2188"		8073045636	8073265636
	2-1/4"	57.00	2.2441"		8073045700	8073265700
		57.15	2.2500"		8073045715	8073265715
	2-9/32"	57.94	2.2812"		8073045794	8073265794
		58.00	2.2835"		8073045800	8073265800
	2-5/16"	58.74	2.3125"		8073045874	8073265874
		59.00	2.3228"		8073045900	8073265900
	2-11/32"	59.53	2.3438"		8073045953	8073265953
		60.00	2.3622"		8073046000	8073266000
	2-3/8"	60.33	2.3750"		8073046033	8073266033
		61.00	2.4016"		8073046100	8073266100
	2-13/32"	61.12	2.4062"		8073046112	8073266112
		61.91	2.4375"		8073046191	8073266191
	2-7/16"	62.00	2.4409"		8073046200	8073266200
		62.71	2.4688"		8073046271	8073266271
	2-15/32"	63.00	2.4803"		8073046300	8073266300
		63.50	2.5000"		8073046350	8073266350
	2-1/2"	64.00	2.5197"		8073046400	8073266400
		64.29	2.5312"		8073046429	8073266429
	2-17/32"	65.00	2.5591"		8073046500	8073266500
		65.09	2.5625"		8073046509	8073266509

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●	●	●	●	●	●									
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
●	●	●	●	●	●	●	●	●	●	●	●	●	●		

M4 HSS TiN & TiAlN



- For use in steel, stainless steel, cast iron and aluminium.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available on request.

Series No. 807304, 807326

► cutting conditions : p.140

SERIES 5, 6

Series Min. to Max. (mm/inch)	Diameter			Width Metric (mm/inch)	EUROPA CODE	
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiAlN
5 62.38(2.456") to 76.20(3.000")	2-1/2"	63.50	2.5000"	11.1 (7/16")	8073946350	8073966350
		64.00	2.5197"		8073946400	8073966400
	2-17/32"	64.29	2.5312"		8073946429	8073966429
	2-9/16"	65.09	2.5625"		8073946509	8073966509
	2-19/32"	65.88	2.5938"		8073046588	8073266588
		66.00	2.5984"		8073046600	8073266600
	2-5/8"	66.68	2.6250"		8073046668	8073266668
	2-21/32"	67.47	2.6562"		8073046747	8073266747
		68.00	2.6772"		8073046800	8073266800
	2-11/16"	68.26	2.6875"		8073046826	8073266826
	2-23/32"	69.05	2.7188"		8073046905	8073266905
	2-3/4"	69.85	2.7500"		8073046985	8073266985
		70.00	2.7559"		8073047000	8073267000
	2-25/32"	70.64	2.7812"		8073047064	8073267064
	2-13/16"	71.44	2.8125"		8073047144	8073267144
		72.00	2.8346"		8073047200	8073267200
	2-27/32"	72.23	2.8438"		8073047223	8073267223
	2-7/8"	73.03	2.8750"		8073047303	8073267303
	2-29/32"	73.82	2.9062"		8073047382	8073267382
		74.00	2.9134"		8073047400	8073267400
	2-15/16"	74.61	2.9375"		8073047461	8073267461
	2-31/32"	75.41	2.9688"		8073047541	8073267541
	76.00	2.9921"	8073047600	8073267600		
3"	76.20	3.0000"	8073047620	8073267620		
	76.99	3.0312"	8073047699	8073267699		
	77.79	3.0625"	8073047779	8073267779		
	78.00	3.0709"	8073047800	8073267800		
	78.58	3.0938"	8073047858	8073267858		
	79.38	3.1250"	8073047938	8073267938		
	80.00	3.1496"	8073048000	8073268000		
	80.17	3.1562"	8073048017	8073268017		
	80.96	3.1875"	8073048096	8073268096		
	81.76	3.2188"	8073048176	8073268176		
	82.00	3.2283"	8073048200	8073268200		
	82.55	3.2500"	8073048255	8073268255		
	83.34	3.2812"	8073048334	8073268334		
	84.00	3.3071"	8073048400	8073268400		
	84.14	3.3125"	8073048414	8073268414		
	84.93	3.3438"	8073048493	8073268493		
	85.73	3.3750"	8073048573	8073268573		
	86.00	3.3858"	8073048600	8073268600		
	86.52	3.4062"	8073048652	8073268652		
	87.31	3.4375"	8073048731	8073268731		
	88.00	3.4646"	8073048800	8073268800		
	88.11	3.4688"	8073048811	8073268811		
	88.90	3.5000"	8073048890	8073268890		

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●	●	●	●	●	●									
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●	●	●		●	●				●	●	●			

M4 HSS TiN & TiAlN



- For use in steel, stainless steel, cast iron and aluminium.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available on request.

Series No. 807304, 807326

► cutting conditions : p.140

SERIES 7, 8

Series Min. to Max. (mm/inch)	Diameter			Width Metric (mm/inch)	EUROPA CODE	
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiAlN
7 87.76(3.455") to 101.60(4.000")	3-17/32"	89.69	3.5312"	11.1 (7/16")	8073048969	8073268969
		90.00	3.5433"		8073049000	8073269000
	3-9/16"	90.49	3.5625"		8073049049	8073269049
	3-19/32"	91.28	3.5938"		8073049128	8073269128
		92.00	3.6221"		8073049200	8073269200
	3-5/8"	92.08	3.6250"		8073049208	8073269208
	3-21/32"	92.87	3.6562"		8073049287	8073269287
	3-11/16"	93.66	3.6875"		8073049366	8073269366
		94.00	3.7008"		8073049400	8073269400
	3-23/32"	94.46	3.7188"		8073049446	8073269446
	3-3/4"	95.25	3.7500"		8073049525	8073269525
		96.00	3.7795"		8073049600	8073269600
	3-25/32"	96.04	3.7812"		8073049604	8073269604
	3-13/16"	96.84	3.8125"		8073049684	8073269684
	3-27/32"	97.63	3.8438"		8073049763	8073269763
		98.00	3.8583"		8073049800	8073269800
	3-7/8"	98.43	3.8750"		8073049843	8073269843
	3-29/32"	99.22	3.9062"		8073049922	8073269922
		100.00	3.9370"		80730410000	80732610000
	3-15/16"	100.01	3.9375"		80730410001	80732610001
	3-31/32"	100.81	3.9688"		80730410081	80732610081
	4"	101.60	4.0000"		80730410160	80732610160
	102.00	4.0156"	80730410200	80732610200		
	103.19	4.0625"	80730410319	80732610319		
	104.00	4.0945"	80730410400	80732610400		
	104.78	4.1250"	80730410478	80732610478		
	106.00	4.1732"	80730410600	80732610600		
	106.36	4.1875"	80730410636	80732610636		
	107.95	4.2500"	80730410795	80732610795		
	108.00	4.2520"	80730410800	80732610800		
	109.54	4.3125"	80730410954	80732610954		
	110.00	4.3307"	80730411000	80732611000		
	111.13	4.3750"	80730411113	80732611113		
	112.00	4.4094"	80730411200	80732611200		
	112.71	4.4375"	80730411271	80732611271		
	114.00	4.4882"	80730411400	80732611400		
	114.30	4.5000"	80730411430	80732611430		

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
●	●		●	●	●	●									
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●		●							●	●	●			

T15 SUPER HSS TiN & TiAlN



- For use in high nickel alloy and materials over 280 Brinell.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available on request.

Series No. 808317, 808327

▶ cutting conditions : p.140

SERIES Y, Z, O

Series Min. to Max. (mm/inch)	Diameter			Width Metric (mm/inch)	EUROPA CODE	
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiAlN
Y 9.50(.374") to 11.07(.436")		9.50	.3740"	2.4 (3/32")	8083170950	8083270950
	3/8"	9.53	.3750"		8083170953	8083270953
		9.80	.3860"		8083170980	8083270980
	25/64"	9.92	.3906"		8083170992	8083270992
		10.00	.3937"		8083171000	8083271000
		10.20	.4016"		8083171020	8083271020
	13/32"	10.32	.4063"		8083171032	8083271032
		10.50	.4134"		8083171050	8083271050
	27/64"	10.72	.4219"		8083171072	8083271072
Z 11.11(.437") to 12.95(.510")		10.80	.4252"	2.4 (3/32")	8083171080	8083271080
		11.00	.4331"		8083171100	8083271100
	7/16"	11.11	.4375"		8083171111	8083271111
		11.50	.4528"		8083171150	8083271150
	29/64"	11.51	.4531"		8083171151	8083271151
	15/32"	11.91	.4688"		8083171191	8083271191
O 12.98(.511") to 17.65(.695")		12.00	.4724"	3.2 (1/8")	8083171200	8083271200
		12.30	.4844"		8083171230	8083271230
		12.50	.4921"		8083171250	8083271250
	1/2"	12.70	.5000"		8083171270	8083271270
		13.00	.5118"		8083171300	8083271300
	33/64"	13.10	.5156"		8083171310	8083271310
	17/32"	13.49	.5313"		8083171349	8083271349
		13.50	.5315"		8083171350	8083271350
	35/64"	13.89	.5469"		8083171389	8083271389
		14.00	.5512"		8083171400	8083271400
	9/16"	14.29	.5625"		8083171429	8083271429
		14.50	.5709"		8083171450	8083271450
	37/64"	14.68	.5781"		8083171468	8083271468
		15.00	.5906"		8083171500	8083271500
	19/32"	15.08	.5938"		8083171508	8083271508
	39/64"	15.48	.6094"		8083171548	8083271548
		15.50	.6102"		8083171550	8083271550
	5/8"	15.88	.6250"		8083171588	8083271588
		16.00	.6299"		8083171600	8083271600
	41/64"	16.27	.6406"		8083171627	8083271627
		16.50	.6496"		8083171650	8083271650
	21/32"	16.67	.6563"		8083171667	8083271667
	17.00	.6693"	8083171700	8083271700		
43/64"	17.07	.6719"	8083171707	8083271707		
11/16"	17.46	.6875"	8083171746	8083271746		
	17.50	.6890"	8083171750	8083271750		

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15	16	21	22	31	32	41	42	43	61	62	63	64	81	82
		○														
13	14	16	17	23	24	33	34	51	52	53	71	72	73	74	83	
●	●	○				○	○	●	●	●						

T15 SUPER HSS TiN & TiAlN



- For use in high nickel alloy and materials over 280 Brinell.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available on request.

Series No. 808317, 808327

▶ cutting conditions : p.140

SERIES 1, 2

Series Min. to Max. (mm/inch)	Diameter			Width Metric (mm/inch)	EUROPA CODE	
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiAlN
1 17.53(.690") to 24.38(.960")	45/64"	17.86	.7031"	4.0 (5/32")	8083171786	8083271786
		18.00	.7087"		8083171800	8083271800
	23/32"	18.26	.7188"		8083171826	8083271826
		18.50	.7283"		8083171850	8083271850
	47/64"	18.65	.7344"		8083171865	8083271865
		19.00	.7480"		8083171900	8083271900
	3/4"	19.05	.7500"		8083171905	8083271905
	49/64"	19.45	.7656"		8083171945	8083271945
		19.50	.7677"		8083171950	8083271950
	25/32"	19.84	.7813"		8083171984	8083271984
		20.00	.7874"		8083172000	8083272000
	51/64"	20.24	.7969"		8083172024	8083272024
		20.50	.8071"		8083172050	8083272050
	13/16"	20.64	.8125"		8083172064	8083272064
		21.00	.8268"		8083172100	8083272100
	27/32"	21.43	.8438"		8083172143	8083272143
	55/64"	21.83	.8594"		8083172183	8083272183
		22.00	.8661"		8083172200	8083272200
	7/8"	22.23	.8750"		8083172223	8083272223
	57/64"	22.62	.8906"		8083172262	8083272262
		23.00	.9055"		8083172300	8083272300
	29/32"	23.02	.9063"		8083172302	8083272302
59/64"	23.42	.9219"	8083172342	8083272342		
15/16"	23.81	.9375"	8083172381	8083272381		
	24.00	.9449"	8083172400	8083272400		
2 24.41(.961") to 35.05(1.380")	31/32"	24.61	.9688"	4.8 (3/16")	8083172461	8083272461
	63/64"	25.00	.9843"		8083172500	8083272500
	1"	25.40	1.0000"		8083172540	8083272540
	1-1/64"	25.80	1.0156"		8083172580	8083272580
		26.00	1.0236"		8083172600	8083272600
	1-1/32"	26.19	1.0313"		8083172619	8083272619
	1-3/64"	26.59	1.0469"		8083172659	8083272659
	1-1/16"	26.99	1.0625"		8083172699	8083272699
		27.00	1.0630"		8083172700	8083272700
	1-3/32"	27.78	1.0938"		8083172778	8083272778
		28.00	1.1024"		8083172800	8083272800
	1-7/64"	28.18	1.1094"		8083172818	8083272818
	1-1/8"	28.58	1.1250"		8083172858	8083272858
		29.00	1.1417"		8083172900	8083272900
	1-5/32"	29.37	1.1563"		8083172937	8083272937
		30.00	1.1811"		8083173000	8083273000
	1-3/16"	30.16	1.1875"		8083173016	8083273016
	1-7/32"	30.96	1.2188"		8083173096	8083273096
		31.00	1.2205"		8083173100	8083273100
	1-1/4"	31.75	1.2500"		8083173175	8083273175
		32.00	1.2598"		8083173200	8083273200
	1-9/32"	32.54	1.2813"		8083173254	8083273254
		33.00	1.2992"		8083173300	8083273300
	1-5/16"	33.34	1.3125"		8083173334	8083273334
	34.00	1.3386"	8083173400	8083273400		
1-11/32"	34.13	1.3438"	8083173413	8083273413		
1-3/8"	34.93	1.3750"	8083173493	8083273493		
	35.00	1.3780"	8083173500	8083273500		

MATERIAL APPLICATION GUIDE ON PREVIOUS PAGE

T15 SUPER HSS TiN & TiAlN



- For use in high nickel alloy and materials over 280 Brinell.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available on request.

Series No. 808317, 808327

▶ cutting conditions : p.140

SERIES 3

Series Min. to Max. (mm/inch)	Diameter			Width Metric (mm/inch)	EUROPA CODE	
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiAlN
3 34.37(1.353") to 47.80(1.882")	1-13/32"	35.72	1.4063"	6.4 (1/4")	8083173572	8083273572
		36.00	1.4173"		8083173600	8083273600
	1-7/16"	36.51	1.4375"		8083173651	8083273651
		37.00	1.4567"		8083173700	8083273700
	1-15/32"	37.31	1.4688"		8083173731	8083273731
		38.00	1.4961"		8083173800	8083273800
	1-1/2"	38.10	1.5000"		8083173810	8083273810
	1-17/32"	38.89	1.5313"		8083173889	8083273889
		39.00	1.5354"		8083173900	8083273900
	1-9/16"	39.69	1.5625"		8083173969	8083273969
		40.00	1.5748"		8083174000	8083274000
	1-19/32"	40.48	1.5938"		8083174048	8083274048
		41.00	1.6142"		8083174100	8083274100
	1-5/8"	41.28	1.6250"		8083174128	8083274128
		42.00	1.6535"		8083174200	8083274200
	1-21/32"	42.07	1.6563"		8083174207	8083274207
	1-11/16"	42.86	1.6875"		8083174286	8083274286
		43.00	1.6929"		8083174300	8083274300
	1-23/32"	43.66	1.7188"		8083174366	8083274366
		44.00	1.7323"		8083174400	8083274400
	1-3/4"	44.45	1.7500"		8083174445	8083274445
		45.00	1.7717"		8083174500	8083274500
	1-25/32"	45.24	1.7813"		8083174524	8083274524
		46.00	1.8110"		8083174600	8083274600
	1-13/16"	46.04	1.8125"		8083174604	8083274604
	1-27/32"	46.83	1.8438"		8083174683	8083274683
		47.00	1.8504"		8083174700	8083274700
	1-7/8"	47.63	1.8750"		8083174763	8083274763

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
		○													
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●	○			○	○	●	●	●						

T15 SUPER HSS TiN & TiAlN



- For use in high nickel alloy and materials over 280 Brinell.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available on request.

Series No. 808317, 808327

▶ cutting conditions : p.140

SERIES 4

Series Min. to Max. (mm/inch)	Diameter			Width Metric (mm/inch)	EUROPA CODE	
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiAlN
4 46.99(1.850") to 65.28(2.570")	1-29/32	48.00	1.8898"	7.9 (5/16")	8083174800	8083274800
		48.42	1.9062"		8083174842	8083274842
		49.00	1.9291"		8083174900	8083274900
		49.21	1.9375"		8083174921	8083274921
	1-15/16	49.21	1.9375"		8083175000	8083275000
		50.00	1.9685"		8083175001	8083275001
	1-31/32	50.01	1.9688"		8083175080	8083275080
	2	50.80	2.0000"		8083175100	8083275100
		51.00	2.0079"		8083175159	8083275159
	2-1/32	51.59	2.0312"		8083175200	8083275200
		52.00	2.0472"		8083175239	8083275239
	2-3/64	52.39	2.0625"		8083175300	8083275300
		53.00	2.0866"		8083175318	8083275318
	2-1/16	53.18	2.0938"		8083175398	8083275398
		53.98	2.1250"		8083175400	8083275400
	2-3/32	54.00	2.1260"		8083175479	8083275479
		54.79	2.1562"		8083175500	8083275500
	2-1/8	55.00	2.1654"		8083175556	8083275556
		55.56	2.1875"		8083175600	8083275600
	2-3/16	56.00	2.2047"		8083175636	8083275636
		56.36	2.2188"		8083175700	8083275700
	2-7/32	57.00	2.2441"		8083175715	8083275715
		57.15	2.2500"		8083175794	8083275794
	2-1/4	57.94	2.2812"		8083175800	8083275800
		58.00	2.2835"		8083175874	8083275874
	2-9/32	58.74	2.3125"		8083175900	8083275900
		59.00	2.3228"		8083175953	8083275953
	2-5/16	59.53	2.3438"		8083176000	8083276000
		60.00	2.3622"		8083176033	8083276033
	2-3/8	60.33	2.3750"		8083176100	8083276100
		61.00	2.4016"		8083176112	8083276112
	2-13/32	61.12	2.4062"		8083176191	8083276191
		61.91	2.4375"		8083176200	8083276200
	2-7/16	62.00	2.4409"		8083176271	8083276271
		62.71	2.4688"		8083176300	8083276300
	2-15/32	63.00	2.4803"		8083176350	8083276350
		63.50	2.5000"		8083176400	8083276400
	2-1/2	64.00	2.5197"		8083176429	8083276429
		64.29	2.5312"		8083176500	8083276500
	2-17/32	65.00	2.5591"		8083176509	8083276509
		65.09	2.5625"			

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
		○													
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●	○			○	○	●	●	●						

M48 PREMIUM HSS TiN & TiAlN



- For use in high temperature alloy and materials with 350~500 Brinell.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available on request.

Series No. 809305, 809321

▶ cutting conditions : p.140

SERIES Y, Z, O

Series Min. to Max. (mm/inch)	Diameter			Width Metric (mm/inch)	EUROPA CODE	
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiAlN
Y 9.50(.374") to 11.07(.436")		9.50	.3740"	2.4 (3/32")	8093050950	8093210950
	3/8"	9.53	.3750"		8093050953	8093210953
		9.80	.3858"		8093050980	8093210980
	25/64"	9.92	.3906"		8093050992	8093210992
		10.00	.3937"		8093051000	8093211000
		10.20	.4016"		8093051020	8093211020
	13/32"	10.32	.4062"		8093051032	8093211032
		10.50	.4134"		8093051050	8093211050
	27/64"	10.72	.4219"		8093051072	8093211072
		10.80	.4252"		8093051080	8093211080
	11.00	.4331"	8093051100	8093211100		
Z 11.11(.437") to 12.95(.510")	7/16"	11.11	.4375"	2.4 (3/32")	8093051111	8093211111
		11.50	.4528"		8093051150	8093211150
	29/64"	11.51	.4531"		8093051151	8093211151
	15/32"	11.91	.4688"		8093051191	8093211191
		12.00	.4724"		8093051200	8093211200
	31/64"	12.30	.4844"		8093051230	8093211230
	12.50	.4921"	8093051250	8093211250		
	12.70	.5000"	8093051270	8093211270		
O 12.98(.511") to 17.65(.695")		13.00	.5118"	3.2 (1/8")	8093051300	8093211300
	33/64"	13.10	.5156"		8093051310	8093211310
	17/32"	13.49	.5312"		8093051349	8093211349
		13.50	.5315"		8093051350	8093211350
	35/64"	13.89	.5469"		8093051389	8093211389
		14.00	.5512"		8093051400	8093211400
	9/16"	14.29	.5625"		8093051429	8093211429
		14.50	.5709"		8093051450	8093211450
	37/64"	14.68	.5781"		8093051468	8093211468
		15.00	.5906"		8093051500	8093211500
	19/32"	15.08	.5938"		8093051508	8093211508
	39/64"	15.48	.6094"		8093051548	8093211548
		15.50	.6102"		8093051550	8093211550
	5/8"	15.88	.6250"		8093051588	8093211588
		16.00	.6299"		8093051600	8093211600
	41/64"	16.27	.6406"		8093051627	8093211627
		16.50	.6496"		8093051650	8093211650
	21/32"	16.67	.6562"		8093051667	8093211667
		17.00	.6693"		8093051700	8093211700
	43/64"	17.07	.6719"		8093051707	8093211707
11/16"	17.46	.6875"	8093051746	8093211746		
	17.50	.6890"	8093051750	8093211750		

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
		○													
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●	○			●	●	●	●	●						

M48 PREMIUM HSS TiN & TiAlN



- For use in high temperature alloy and materials with 350~500 Brinell.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available on request.

Series No. 809305, 809321

▶ cutting conditions : p.140

SERIES 1

Series Min. to Max. (mm/inch)	Diameter			Width Metric (mm/inch)	EUROPA CODE	
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiAlN
1 17.53(.690") to 24.38(.960")	45/64"	17.86	.7031"	4.0 (5/32")	8093051786	8093211786
		18.00	.7087"		8093051800	8093211800
	23/32"	18.26	.7188"		8093051826	8093211826
		18.50	.7283"		8093051850	8093211850
	47/64"	18.65	.7344"		8093051865	8093211865
		19.00	.7480"		8093051900	8093211900
	3/4"	19.05	.7500"		8093051905	8093211905
	49/64"	19.45	.7656"		8093051945	8093211945
		19.50	.7677"		8093051950	8093211950
	25/32"	19.84	.7813"		8093051984	8093211984
		20.00	.7874"		8093052000	8093212000
	51/64"	20.24	.7969"		8093052024	8093212024
		20.50	.8071"		8093052050	8093212050
	13/16"	20.64	.8125"		8093052064	8093212064
		21.00	.8268"		8093052100	8093212100
	27/32"	21.43	.8438"		8093052143	8093212143
	55/64"	21.83	.8594"		8093052183	8093212183
		22.00	.8661"		8093052200	8093212200
	7/8"	22.23	.8750"		8093052223	8093212223
	57/64"	22.62	.8906"		8093052262	8093212262
	23.00	.9055"	8093052300	8093212300		
29/32"	23.02	.9063"	8093052302	8093212302		
59/64"	23.42	.9219"	8093052342	8093212342		
15/16"	23.81	.9375"	8093052381	8093212381		
	24.00	.9449"	8093052400	8093212400		

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
		○													
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●	○			●	●	●	●	●						

M48 PREMIUM HSS TiN & TiAlN



- For use in high temperature alloy and materials with 350~500 Brinell.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available on request.

Series No. 809305, 809321

▶ cutting conditions : p.140

SERIES 2

Series Min. to Max. (mm/inch)	Diameter			Width Metric (mm/inch)	EUROPA CODE	
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiAlN
2 24.41(.961") to 35.05(1.380")	31/32"	24.61	.9688"	4.8 (3/16")	8093052461	8093212461
	63/64"	25.00	.9843"		8093052500	8093212500
	1"	25.40	1.0000"		8093052540	8093212540
	1-1/64"	25.80	1.0156"		8093052580	8093212580
		26.00	1.0236"		8093052600	8093212600
	1-1/32"	26.19	1.0313"		8093052619	8093212619
	1-3/64"	26.59	1.0469"		8093052659	8093212659
	1-1/16"	26.99	1.0625"		8093052699	8093212699
		27.00	1.0630"		8093052700	8093212700
	1-3/32"	27.78	1.0938"		8093052778	8093212778
		28.00	1.1024"		8093052800	8093212800
	1-7/64"	28.18	1.1094"		8093052818	8093212818
	1-1/8"	28.58	1.1250"		8093052858	8093212858
		29.00	1.1417"		8093052900	8093212900
	1-5/32"	29.37	1.1563"		8093052937	8093212937
		30.00	1.1811"		8093053000	8093213000
	1-3/16"	30.16	1.1875"		8093053016	8093213016
	1-7/32"	30.96	1.2188"		8093053096	8093213096
		31.00	1.2205"		8093053100	8093213100
	1-1/4"	31.75	1.2500"		8093053175	8093213175
		32.00	1.2598"		8093053200	8093213200
	1-9/32"	32.54	1.2813"		8093053254	8093213254
		33.00	1.2992"		8093053300	8093213300
	1-5/16"	33.34	1.3125"		8093053334	8093213334
		34.00	1.3386"		8093053400	8093213400
	1-11/32"	34.13	1.3438"		8093053413	8093213413
	1-3/8"	34.93	1.3750"		8093053493	8093213493
		35.00	1.3780"		8093053500	8093213500

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
		○													
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
●	●	○			●	●	●	●	●						

K10 CARBIDE TiN & TiAlN



- High performance on grey cast iron over 220 Brinell and malleable cast iron with short chips.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available on request.

Series No. 832308, 832323

▶ cutting conditions : p.141

SERIES Y, Z, O

Series Min. to Max. (mm/inch)	Diameter		Width Metric (mm/inch)	EUROPA CODE	
	Metric (mm)	Decimal (inch)		TiN	TiAlN
Y 9.50(.374") to 11.07(.436")	9.50	.3740"	2.4 (3/32")	8323080950	8323230950
	9.80	.3858"		8323080980	8323230980
	10.00	.3937"		8323081000	8323231000
	10.20	.4016"		8323081020	8323231020
	10.50	.4134"		8323081050	8323231050
	10.80	.4252"		8323081080	8323231080
	11.00	.4331"		8323081100	8323231100
Z 11.11(.437") to 12.95(.510")	11.50	.4528"	2.4 (3/32")	8323081150	8323231150
	12.00	.4724"		8323081200	8323231200
	12.50	.4921"		8323081250	8323231250
O 12.98(.511") to 17.65(.695")	13.00	.5118"	3.2 (1/8")	8323081300	8323231300
	13.50	.5315"		8323081350	8323231350
	14.00	.5512"		8323081400	8323231400
	14.50	.5709"		8323081450	8323231450
	15.00	.5906"		8323081500	8323231500
	15.50	.6102"		8323081550	8323231550
	16.00	.6299"		8323081600	8323231600
	16.50	.6496"		8323081650	8323231650
	17.00	.6693"		8323081700	8323231700
	17.50	.6890"		8323081750	8323231750

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
			●	●											
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
			●	●											

K10 CARBIDE TiN & TiAlN



- High performance on grey cast iron over 220 Brinell and malleable cast iron with short chips.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available on request.

Series No. 832308, 832323

▶ cutting conditions : p.141

SERIES 1, 2

Series Min. to Max. (mm/inch)	Width		EUROPA CODE		
	Metric (mm)	Decimal (inch)	Metric (mm/inch)	TiN / TiAlN	
1 17.53(.690") to 24.38(.960")	18.00	.7087"	4.0 (5/32")	8323081800	8323231800
	18.50	.7283"		8323081850	8323231850
	19.00	.7480"		8323081900	8323231900
	19.50	.7677"		8323081950	8323231950
	20.00	.7874"		8323082000	8323232000
	20.50	.8071"		8323082050	8323232050
	21.00	.8268"		8323082100	8323232100
	22.00	.8661"		8323082200	8323232200
	23.00	.9055"		8323082300	8323232300
	24.00	.9449"		8323082400	8323232400
2 24.41(.961") to 35.05(1.380")	25.00	.9843"	4.8 (3/16")	8323082500	8323232500
	26.00	1.0236"		8323082600	8323232600
	27.00	1.0630"		8323082700	8323232700
	28.00	1.1024"		8323082800	8323232800
	29.00	1.1417"		8323082900	8323232900
	30.00	1.1811"		8323083000	8323233000
	31.00	1.2205"		8323083100	8323233100
	32.00	1.2598"		8323083200	8323233200
	33.00	1.2992"		8323083300	8323233300
	34.00	1.3386"		8323083400	8323233400
	35.00	1.3780"		8323083500	8323233500

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
			●	●											
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
			●		●										

K20 CARBIDE TiN & TiAlN



- For use in stainless steel, high-temperature alloy, grey cast iron up to 220 Brinell and aluminium.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available on request.

Series No. 830308, 830323

▶ cutting conditions : p.141

SERIES Y, Z, O

Series Min. to Max. (mm/inch)	Width		EUROPA CODE		
	Metric (mm)	Decimal (inch)	Metric (mm/inch)	TiN / TiAlN	
Y 9.50(.374") to 11.07(.436")	9.50	.3740"	2.4 (3/32")	8303080950	8303230950
	9.80	.3858"		8303080980	8303230980
	10.00	.3937"		8303081000	8303231000
	10.20	.4016"		8303081020	8303231020
	10.50	.4134"		8303081050	8303231050
	10.80	.4252"		8303081080	8303231080
	11.00	.4331"		8303081100	8303231100
Z 11.11(.437") to 12.95(.510")	11.50	.4528"	2.4 (3/32")	8303081150	8303231150
	12.00	.4724"		8303081200	8303231200
	12.50	.4921"		8303081250	8303231250
O 12.98(.511") to 17.65(.695")	13.00	.5118"	3.2 (1/8")	8303081300	8303231300
	13.50	.5315"		8303081350	8303231350
	14.00	.5512"		8303081400	8303231400
	14.50	.5709"		8303081450	8303231450
	15.00	.5906"		8303081500	8303231500
	15.50	.6102"		8303081550	8303231550
	16.00	.6299"		8303081600	8303231600
	16.50	.6496"		8303081650	8303231650
	17.00	.6693"		8303081700	8303231700
	17.50	.6890"		8303081750	8303231750

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
			●	●	○	○									
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
			●		○	○	●	●	●	●	●	●	●		

K20 CARBIDE TiN & TiAlN



- For use in stainless steel, high-temperature alloy, grey cast iron up to 220 Brinell and aluminium.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available on request.

Series No. 830308, 830323

▶ cutting conditions : p.141

SERIES 1, 2

Series Min. to Max. (mm/inch)	Width		EUROPA CODE		
	Metric (mm)	Decimal (inch)	Metric (mm/inch)	TiN / TiAlN	
1 17.53(.690") to 24.38(.960")	18.00	.7087"	4.0 (5/32")	8303081800	8303231800
	18.50	.7283"		8303081850	8303231850
	19.00	.7480"		8303081900	8303231900
	19.50	.7677"		8303081950	8303231950
	20.00	.7874"		8303082000	8303232000
	20.50	.8071"		8303082050	8303232050
	21.00	.8268"		8303082100	8303232100
	22.00	.8661"		8303082200	8303232200
	23.00	.9055"		8303082300	8303232300
	24.00	.9449"		8303082400	8303232400
2 24.41(.961") to 35.05(1.380")	25.00	.9843"	4.8 (3/16")	8303082500	8303232500
	26.00	1.0236"		8303082600	8303232600
	27.00	1.0630"		8303082700	8303232700
	28.00	1.1024"		8303082800	8303232800
	29.00	1.1417"		8303082900	8303232900
	30.00	1.1811"		8303083000	8303233000
	31.00	1.2205"		8303083100	8303233100
	32.00	1.2598"		8303083200	8303233200
	33.00	1.2992"		8303083300	8303233300
	34.00	1.3386"		8303083400	8303233400
	35.00	1.3780"		8303083500	8303233500

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
			●	●	○	○									
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
			●		○	○	●	●	●	●	●	●			

P40 CARBIDE TiN & TiAlN



- For general use in carbon steel and alloy steel.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available on request.

Series No. 831308, 831323

▶ cutting conditions : p.141

SERIES Y, Z, O, 1

Series Min. to Max. (mm/inch)	Width		EUROPA CODE		
	Metric (mm)	Decimal (inch)	Metric (mm/inch)	TiN / TiAlN	
Y 9.50(.374") to 11.07(.436")	9.50	.3740"	2.4 (3/32")	8313080950	8313230950
	9.80	.3858"		8313080980	8313230980
	10.00	.3937"		8313081000	8313231000
	10.20	.4016"		8313081020	8313231020
	10.50	.4134"		8313081050	8313231050
	10.80	.4252"		8313081080	8313231080
	11.00	.4331"		8313081100	8313231100
Z 11.11(.437") to 12.95(.510")	11.50	.4528"	2.4 (3/32")	8313081150	8313231150
	12.00	.4724"		8313081200	8313231200
	12.50	.4921"		8313081250	8313231250
O 12.98(.511") to 17.65(.695")	13.00	.5118"	3.2 (1/8")	8313081300	8313231300
	13.50	.5315"		8313081350	8313231350
	14.00	.5512"		8313081400	8313231400
	14.50	.5709"		8313081450	8313231450
	15.00	.5906"		8313081500	8313231500
	15.50	.6102"		8313081550	8313231550
	16.00	.6299"		8313081600	8313231600
	16.50	.6496"		8313081650	8313231650
	17.00	.6693"		8313081700	8313231700
	17.50	.6890"		8313081750	8313231750
1 17.53(.690") to 24.38(.960")	18.00	.7087"	4.0 (5/32")	8313081800	8313231800
	18.50	.7283"		8313081850	8313231850
	19.00	.7480"		8313081900	8313231900
	19.50	.7677"		8313081950	8313231950
	20.00	.7874"		8313082000	8313232000
	20.50	.8071"		8313082050	8313232050
	21.00	.8268"		8313082100	8313232100
	22.00	.8661"		8313082200	8313232200
	23.00	.9055"		8313082300	8313232300
	24.00	.9449"		8313082400	8313232400

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
			●	●	●										
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
			●		○	○	●	●	●	●	●	●			

P40 CARBIDE TiN & TiAlN



- For general use in carbon steel and alloys steel.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available on request.

Series No. 831308, 831323

▶ cutting conditions : p.141

SERIES 2, 3

Series Min. to Max. (mm/inch)	Diameter		Width Metric (mm/inch)	EUROPA CODE			
	Metric (mm)	Decimal (inch)		TiN	TiAlN		
2 24.41(.961") to 35.05(1.380")	25.00	.9843"	4.8 (3/16")	8313082500	8313232500		
	26.00	1.0236"		8313082600	8313232600		
	27.00	1.0630"		8313082700	8313232700		
	28.00	1.1024"		8313082800	8313232800		
	29.00	1.1417"		8313082900	8313232900		
	30.00	1.1811"		8313083000	8313233000		
	31.00	1.2205"		8313083100	8313233100		
	32.00	1.2598"		8313083200	8313233200		
	33.00	1.2992"		8313083300	8313233300		
	34.00	1.3386"		8313083400	8313233400		
	35.00	1.3780"		8313083500	8313233500		
	3 34.37(1.353") to 47.80(1.882")	36.00		1.4173"	6.4 (1/4")	8313083600	8313233600
		37.00		1.4567"		8313083700	8313233700
38.00		1.4961"	8313083800	8313233800			
39.00		1.5354"	8313083900	8313233900			
40.00		1.5748"	8313084000	8313234000			
41.00		1.6142"	8313084100	8313234100			
42.00		1.6535"	8313084200	8313234200			
43.00		1.6929"	8313084300	8313234300			
44.00		1.7323"	8313084400	8313234400			
45.00		1.7717"	8313084500	8313234500			
46.00		1.8110"	8313084600	8313234600			
47.00		1.8504"	8313084700	8313234700			

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●	●														
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●	●														

SPADE DRILL INSERTS CUTTING DATA

CUTTING CONDITIONS - FLAT BOTTOM



SPADE DRILL INSERTS

Material Group	Material Hardness		v _c (m/min)	f _n (mm/rev)				
	Bhn	HRc		TiAlN	∅ 9.5 - 12.5	∅ 13 - 17.5	∅ 18 - 24	∅ 25 - 35
P	11 Low Carbon Steel 1015, 1020, 1140 1025 etc	85-125		60	0.12	0.18	0.22	0.30
		125-175	>7	58	0.12	0.18	0.22	0.30
		175-225	7-20	55	0.10	0.15	0.19	0.27
		225-275	20-28	53	0.10	0.15	0.19	0.27
	12 Free machining Steel 12L13, 12L15 12L14, 1118 etc	100-150		67	0.13	0.18	0.25	0.32
		150-200	>13	65	0.13	0.18	0.25	0.32
		200-250	13-24	58	0.11	0.18	0.25	0.30
	13 Medium Carbon Steel 1035, 1050, 1045 1055, 1140 etc	125-175	>7	60	0.11	0.18	0.22	0.28
		175-225	7-20	55	0.10	0.15	0.18	0.27
		225-275	20-28	50	0.10	0.15	0.18	0.27
		275-325	28-34	46	0.08	0.14	0.17	0.22
	14 Structural Steel A36, A516, A182 etc	100-150		50	0.11	0.18	0.23	0.28
		150-250	>24	44	0.10	0.18	0.19	0.22
		250-350	24-37	36	0.08	0.16	0.18	0.19
Alloy Steel 8620, 4130, 4137 4140, 6150 etc		125-175	>7	50	0.12	0.16	0.19	0.29
		175-225	7-20	46	0.10	0.16	0.19	0.29
		225-275	20-28	45	0.10	0.13	0.18	0.28
		275-325	28-34	42	0.07	0.12	0.18	0.22
325-375		34-40	37	0.06	0.12	0.17	0.22	
H	15 Tool Steel H13, H21, A2, S1 etc	150-200	>13	29	0.07	0.12	0.15	0.20
		200-250	13-24	23	0.07	0.12	0.15	0.20
	16 High Strength Alloy 9840, 4340, 4330V etc	225-300	>32	28	0.10	0.14	0.18	0.19
		300-350	32-37	22	0.08	0.14	0.18	0.19
350-400	37-43	18	0.06	0.12	0.16	0.18		
M	21 22 Stainless Steel 310, 316, 410, 330 etc	135-185	>9	29	0.12	0.18	0.20	0.23
		185-275	9-28	25	0.09	0.15	0.18	0.22
K	31 32 33 34 Cast Iron / S.G. Iron A48-76 GR30/GR45 A536-72 60-40-18 A220-76 GR40010 etc	120-150		66	0.13	0.25	0.35	0.41
		150-200	>13	60	0.12	0.21	0.29	0.40
		200-220	13-19	51	0.12	0.20	0.25	0.36
		220-260	19-26	48	0.10	0.14	0.20	0.25
260-320	26-34	37	0.10	0.13	0.13	0.20		
S	51 52 53 High Temp. Alloy Hastelloy B, Inconel etc	150-200	>13	29	0.07	0.12	0.15	0.20
		220-310	13-24	23	0.07	0.12	0.15	0.20
N	71 72 73 Aluminium 2014, 6061, 7075 etc	30		213	0.17	0.28	0.36	0.43
		180	>8	121	0.17	0.28	0.36	0.41

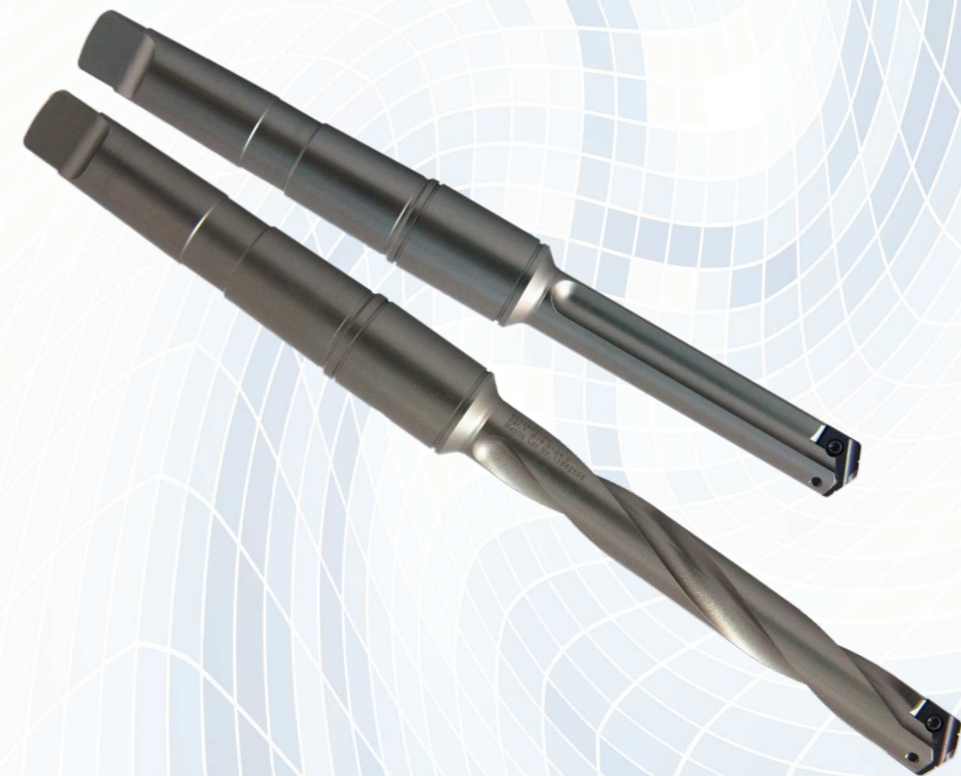
v_c - cutting speed (m/min)
n - RPM (rev/min)
f_n - feed rate (mm/rev)
∅ - drill diameter (mm)

To calculate RPM from cutting speed: $n = \frac{v_c * 1000}{\pi * \emptyset}$

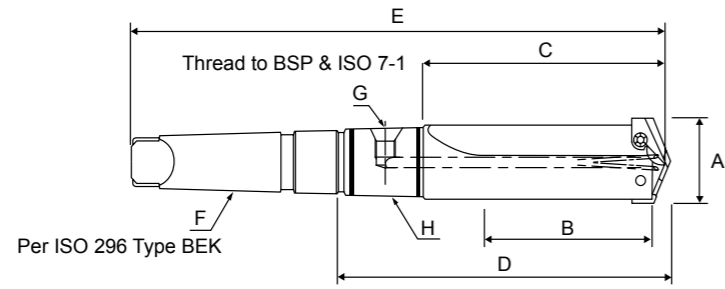
To calculate cutting speed from RPM: $v_c = \frac{n * \pi * \emptyset}{1000}$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points. Speed and feed reductions (20% reduction in speed and 10% reduction in feed) are recommended when using extended length tools.

SPADE DRILL HOLDERS TAPER SHANK



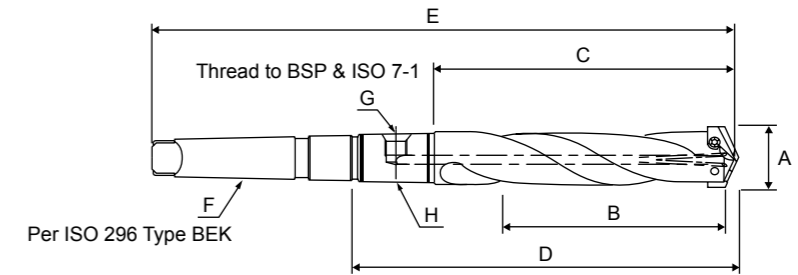
TAPER SHANK - SHORT Straight Flute



Series	EUROPA CODE	A	B	C	D	E	F	G	H
		Drill Insert Range	Max. Drill Depth	Flute Length	Ref. Length	Overall Length	MT	Pipe Tap	RCA
Y	8Y2150002M	9.5 ~ 11.0	31.7	51.5	88.0	160.3	#2	1/16"	SP0107
Z	8Z2150002M	11.5 ~ 12.5	31.7	51.5	88.0	160.3	#2	1/16"	SP0107
0	802150002M	13.0 ~ 17.5	34.9	55.5	92.4	164.3	#2	1/16"	SP0107
0.5	812150002M	15.5 ~ 17.5	34.9	55.5	92.4	164.3	#2	1/16"	SP0107
1	822150003M	18.0 ~ 24.0	69.8	98.4	142.5	232.5	#3	1/8"	SP0108
1.5	832150003M	22.0 ~ 24.0	69.8	98.4	142.5	232.5	#3	1/8"	SP0108
2	842150004M	25.0 ~ 35.0	85.7	114.3	160.4	273.8	#4	1/8"	SP0108
2.5	852150004M	30.0 ~ 35.0	85.7	114.3	167.6	281.0	#4	1/4"	SP0109
3	862150004M	36.0 ~ 47.0	120.6	152.4	206.4	319.1	#4	1/4"	SP0109
4	872150005M	48.0 ~ 65.0	130.1	165.1	219.1	363.5	#5	1/4"	SP0110
5	882150005M	64.0 ~ 88.0	171.1	215.9	287.3	430.2	#5	1/2"	SP0111
7	892150005M	90.0 ~ 114.0	171.1	225.4	296.8	439.7	#5	1/2"	SP0111

► Coolant ring can be applied for internal cooling, refer to page 151.

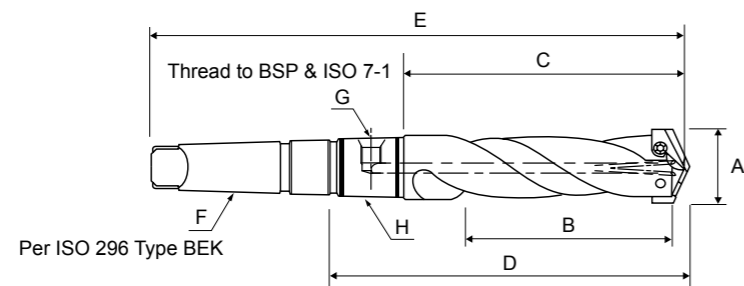
TAPER SHANK - STANDARD Spiral Flute



Series	EUROPA CODE	A	B	C	D	E	F	G	H
		Drill Insert Range	Max. Drill Depth	Flute Length	Ref. Length	Overall Length	MT	Pipe Tap	RCA
Y	8Y4250002M	9.5 ~ 11.0	60.3	80.2	116.7	188.9	#2	1/16"	SP0107
Z	8Z4250002M	11.5 ~ 12.5	60.3	80.2	116.7	188.9	#2	1/16"	SP0107
0	804250002M	13.0 ~ 17.5	63.5	84.1	121.0	192.9	#2	1/16"	SP0107
0.5	814250002M	15.5 ~ 17.5	63.5	84.1	121.0	192.9	#2	1/16"	SP0107
1	824250003M	18.0 ~ 24.0	171.5	200.0	244.1	334.2	#3	1/8"	SP0108
1.5	834250003M	22.0 ~ 24.0	171.5	200.0	244.1	334.2	#3	1/8"	SP0108
2	844250004M	25.0 ~ 35.0	187.3	215.9	262.0	375.4	#4	1/8"	SP0108
2.5	854250004M	30.0 ~ 35.0	187.3	215.9	269.2	382.6	#4	1/4"	SP0109
3	864250004M	36.0 ~ 47.0	209.5	241.3	295.3	408.0	#4	1/4"	SP0109
4	874250005M	48.0 ~ 65.0	231.8	266.7	320.7	465.1	#5	1/4"	SP0110
5	884250005M	64.0 ~ 88.0	273.1	317.5	388.9	531.8	#5	1/2"	SP0111
7	894250005M	90.0 ~ 114.0	273.1	327.0	398.5	541.3	#5	1/2"	SP0111

► Coolant ring can be applied for internal cooling, refer to page 151.

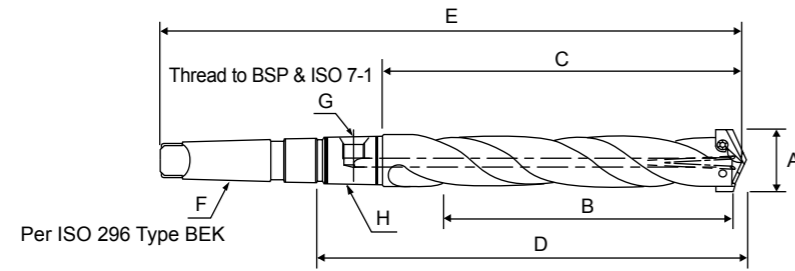
TAPER SHANK - INTERMEDIATE Spiral Flute



Series	EUROPA CODE	A	B	C	D	E	F	G	H
		Drill Insert Range	Max. Drill Depth	Flute Length	Ref. Length	Overall Length	MT	Pipe Tap	RCA
1	823250003M	18.0 ~ 24.0	120.7	149.2	193.3	283.3	#3	1/8"	SP0108
1.5	833250003M	22.0 ~ 24.0	120.7	149.2	193.3	283.3	#3	1/8"	SP0108
2	843250004M	25.0 ~ 35.0	136.5	165.1	211.2	324.6	#4	1/8"	SP0108
2.5	853250004M	30.0 ~ 35.0	136.5	165.1	218.4	331.8	#4	1/4"	SP0109
3	863250004M	36.0 ~ 47.0	165.1	196.9	250.9	363.6	#4	1/4"	SP0109

► Coolant ring can be applied for internal cooling, refer to page 151.

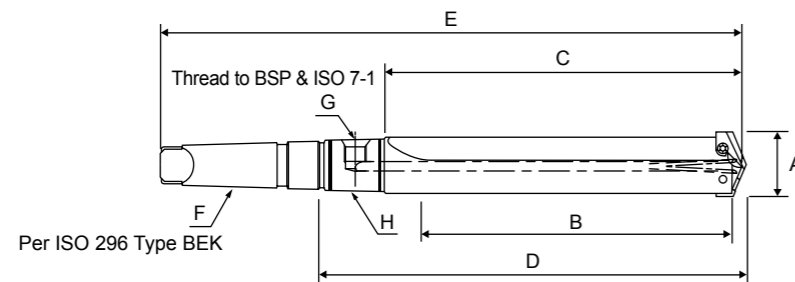
TAPER SHANK - EXTENDED Spiral Flute



Series	EUROPA CODE	A	B	C	D	E	F	G	H
		Drill Insert Range	Max. Drill Depth	Flute Length	Ref. Length	Overall Length	MT	Pipe Tap	RCA
Y	8Y5250002M	9.5 ~ 11.0	111.1	130.9	167.4	239.7	#2	1/16"	SP0107
Z	8Z5250002M	11.5 ~ 12.5	111.1	130.9	167.4	239.7	#2	1/16"	SP0107
0	805250002M	13.0 ~ 17.5	114.3	135.0	171.8	243.7	#2	1/16"	SP0107
0.5	815250002M	15.5 ~ 17.5	114.3	135.0	171.8	243.7	#2	1/16"	SP0107
1	825250003M	18.0 ~ 24.0	273.1	301.6	345.7	435.8	#3	1/8"	SP0108
1.5	835250003M	22.0 ~ 24.0	273.1	301.6	345.7	435.8	#3	1/8"	SP0108
2	845250004M	25.0 ~ 35.0	289.0	317.5	363.6	477.0	#4	1/8"	SP0108
2.5	855250004M	30.0 ~ 35.0	289.0	317.5	370.8	484.2	#4	1/4"	SP0109

► Coolant ring can be applied for internal cooling, refer to page 151.

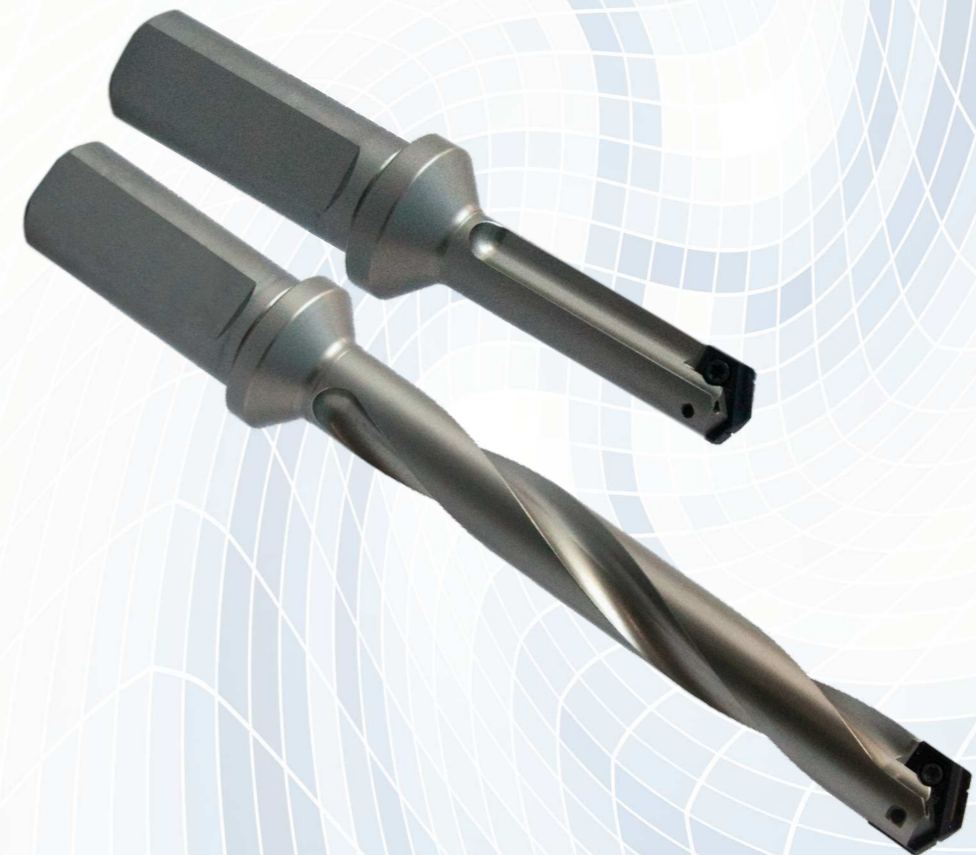
TAPER SHANK - EXTENDED Straight Flute



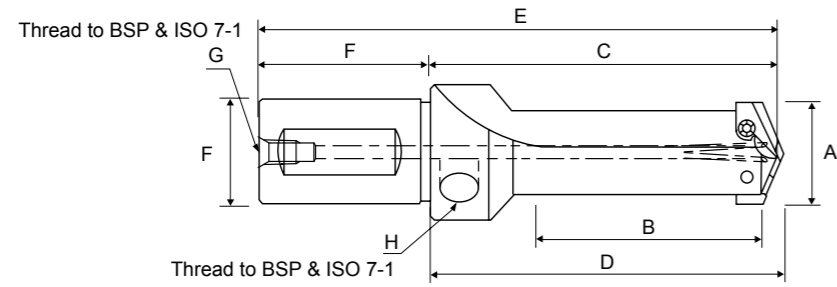
Series	EUROPA CODE	A	B	C	D	E	F	G	H
		Drill Insert Range	Max. Drill Depth	Flute Length	Ref. Length	Overall Length	MT	Pipe Tap	RCA
3	865150004M	36.0 ~ 47.0	349.3	381.0	435.0	547.7	#4	1/4"	SP0109
4	875150005M	48.0 ~ 65.0	422.3	457.2	511.2	655.6	#5	1/4"	SP0110
5	885150005M	64.0 ~ 88.0	463.6	508.0	579.4	722.3	#5	1/2"	SP0111
7	895150005M	90.0 ~ 114.0	555.6	609.6	681.1	823.9	#5	1/2"	SP0111

► Coolant ring can be applied for internal cooling, refer to page 151.

SPADE DRILL HOLDERS STRAIGHT SHANK

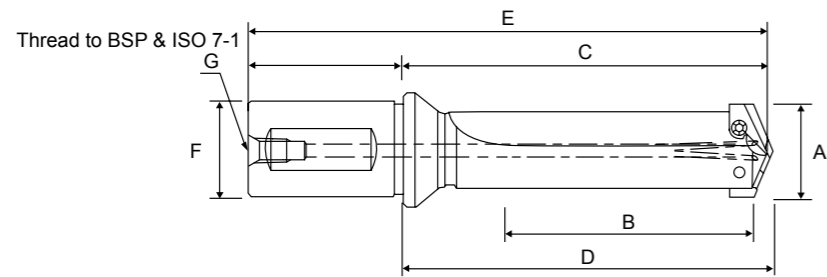


STRAIGHT SHANK - STUB Straight Flute



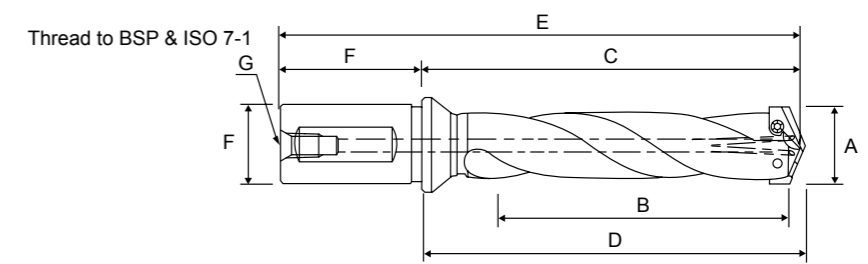
Series	EUROPA CODE	A	B	C	D	E	F		G		H
		Drill Insert Range	Max. Drill Depth	Flute Length	Ref. Length	Overall Length	Dia.	Length	Rear	Side	Pipe Tap
Y	8Y115016FM	9.5 ~ 11.0	19.1	47.6	50.0	89.5	16.0	41.9	1/16"	1/8"	
Z	8Z115016FM	11.5 ~ 12.5	19.1	47.6	50.0	89.5	16.0	41.9	1/16"	1/8"	
0	80115020FM	13.0 ~ 17.5	22.2	47.6	50.4	89.5	20.0	41.9	1/8"	1/8"	
0.5	81115020FM	15.5 ~ 17.5	22.2	47.6	50.4	89.5	20.0	41.9	1/8"	1/8"	
1	82115025FM	18.0 ~ 24.0	47.6	75.8	79.4	128.9	25.0	53.1	1/8"	1/8"	
1.5	83115025FM	22.0 ~ 24.0	57.2	88.5	92.1	141.6	25.0	53.1	1/8"	1/8"	
2	84115032FM	25.0 ~ 35.0	57.2	88.5	92.1	146.4	32.0	57.9	1/4"	1/8"	

STRAIGHT SHANK - SHORT Straight Flute



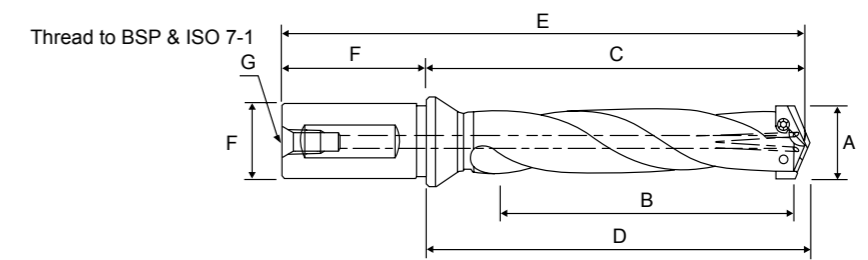
Series	EUROPA CODE	A	B	C	D	E	F		G
		Drill Insert Range	Max. Drill Depth	Flute Length	Ref. Length	Overall Length	Dia.	Length	Pipe Tap
Y	8Y215020FM	9.5 ~ 11.0	31.8	61.1	63.5	103.0	20.0	41.9	1/8"
Z	8Z215020FM	11.5 ~ 12.5	31.8	61.1	63.5	103.0	20.0	41.9	1/8"
0	80215020FM	13.0 ~ 17.5	34.9	63.5	66.3	105.4	20.0	41.9	1/8"
0.5	81215020FM	15.5 ~ 17.5	34.9	63.5	66.3	105.4	20.0	41.9	1/8"
1	82215025FM	18.0 ~ 24.0	66.7	107.2	110.7	160.2	25.0	53.1	1/8"
1.5	83215025FM	22.0 ~ 24.0	66.7	107.2	110.7	160.2	25.0	53.1	1/8"
2	84215032FM	25.0 ~ 35.0	85.7	128.6	132.2	186.5	32.0	57.9	1/4"
2.5	85215032FM	30.0 ~ 35.0	85.7	128.6	132.2	186.5	32.0	57.9	1/4"
3	86215040FM	36.0 ~ 47.0	120.7	173.0	177.8	243.1	40.0	70.1	1/4"
4	87215040FM	48.0 ~ 65.0	130.2	179.4	184.2	249.5	40.0	70.1	1/4"

STRAIGHT SHANK - INTERMEDIATE Spiral Flute



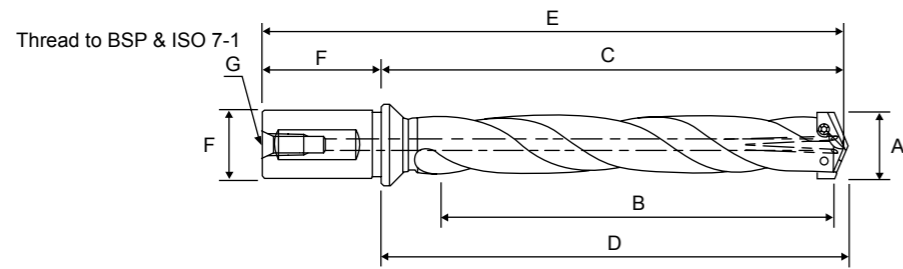
Series	EUROPA CODE	A	B	C	D	E	F		G
		Drill Insert Range	Max. Drill Depth	Flute Length	Ref. Length	Overall Length	Dia.	Length	Pipe Tap
1	82325025FM	18.0 ~ 24.0	117.5	154.8	158.4	207.9	25.0	53.1	1/8"
1.5	83325025FM	22.0 ~ 24.0	117.5	154.8	158.4	207.9	25.0	53.1	1/8"
2	84325032FM	25.0 ~ 35.0	136.5	179.4	183.0	237.3	32.0	57.9	1/4"
2.5	85325032FM	30.0 ~ 35.0	136.5	179.4	183.0	237.3	32.0	57.9	1/4"
3	86325040FM	36.0 ~ 47.0	165.1	217.5	222.3	287.6	40.0	70.1	1/4"

STRAIGHT SHANK - STANDARD Spiral Flute



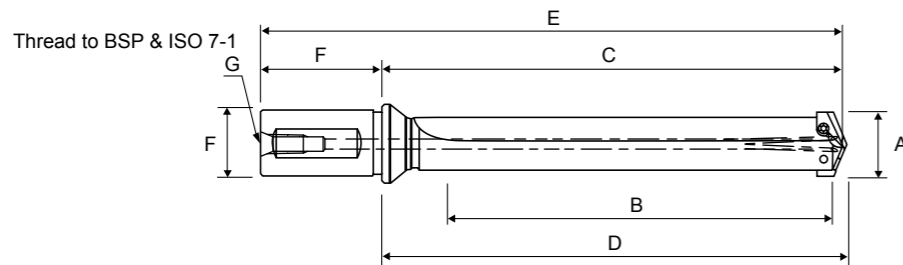
Series	EUROPA CODE	A	B	C	D	E	F		G
		Drill Insert Range	Max. Drill Depth	Flute Length	Ref. Length	Overall Length	Dia.	Length	Pipe Tap
Y	8Y325020FM	9.5 ~ 11.0	60.3	89.7	92.1	131.6	20.0	41.9	1/8"
Z	8Z425020FM	11.5 ~ 12.5	60.3	89.7	92.1	131.6	20.0	41.9	1/8"
0	80425020FM	13.0 ~ 17.5	63.5	92.1	94.9	134.0	20.0	41.9	1/8"
0.5	81425020FM	15.5 ~ 17.5	63.5	92.1	94.9	134.0	20.0	41.9	1/8"
1	82425025FM	18.0 ~ 24.0	168.3	205.6	209.2	258.7	25.0	53.1	1/8"
1.5	83425025FM	22.0 ~ 24.0	168.3	205.6	209.2	258.7	25.0	53.1	1/8"
2	84425032FM	25.0 ~ 35.0	187.3	230.2	233.8	288.1	32.0	57.9	1/4"
2.5	85425032FM	30.0 ~ 35.0	187.3	230.2	233.8	288.1	32.0	57.9	1/4"
3	86425040FM	36.0 ~ 47.0	209.6	261.9	266.7	332.0	40.0	70.1	1/4"
4	87425040FM	48.0 ~ 65.0	231.8	281.0	285.8	351.1	40.0	70.1	1/4"

STRAIGHT SHANK - EXTENDED Spiral Flute



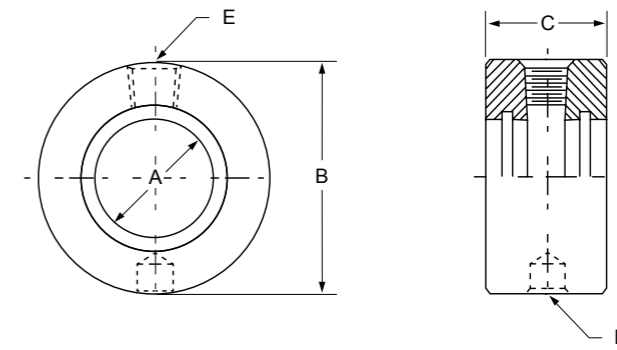
Series	EUROPA CODE	A	B	C	D	E	Shank		Pipe Tap
		Drill Insert Range	Max. Drill Depth	Flute Length	Ref. Length	Overall Length	Dia.	Length	
Y	8Y425020FM	9.5 ~ 11.0	111.1	140.5	142.9	182.4	20.0	41.9	1/8"
Z	8Z525020FM	11.5 ~ 12.5	111.1	140.5	142.9	182.4	20.0	41.9	1/8"
0	80525020FM	13.0 ~ 17.5	114.3	142.9	145.7	184.8	20.0	41.9	1/8"
0.5	81525020FM	15.5 ~ 17.5	114.3	142.9	145.7	184.8	20.0	41.9	1/8"
1	82525025FM	18.0 ~ 24.0	269.9	307.2	310.8	360.3	25.0	53.1	1/8"
1.5	83525025FM	22.0 ~ 24.0	269.9	307.2	310.8	360.3	25.0	53.1	1/8"
2	84525032FM	25.0 ~ 35.0	288.9	331.8	335.4	389.7	32.0	57.9	1/4"
2.5	85525032FM	30.0 ~ 35.0	288.9	331.8	335.4	389.7	32.0	57.9	1/4"

STRAIGHT SHANK - EXTENDED Straight Flute



Series	EUROPA CODE	A	B	C	D	E	Shank		Pipe Tap
		Drill Insert Range	Max. Drill Depth	Flute Length	Ref. Length	Overall Length	Dia.	Length	
3	86515040FM	36.0 ~ 47.0	349.3	401.6	406.4	471.7	40.0	70.1	1/4"
4	87515040FM	48.0 ~ 65.0	422.3	471.5	476.3	541.6	40.0	70.1	1/4"

HOLDER ACCESSORIES



Coolant Rings

Item No.	A	B	C	D	E
	I.D.	O.D.	Length	Thread for Driving Rod	Pipe Tap
SP0107	19.05	44.45	22.23	M8 X 1.25	1/8"
SP0108	25.40	53.97	28.57	M8 X 1.25	1/8"
SP0109	31.75	63.50	34.92	M10 X 1.5	1/4"
SP0110	44.45	76.20	34.92	M10 X 1.5	1/4"
SP0111	57.15	95.27	44.45	M12 X 1.75	1/2"

Thread to BSP & ISO 7-1

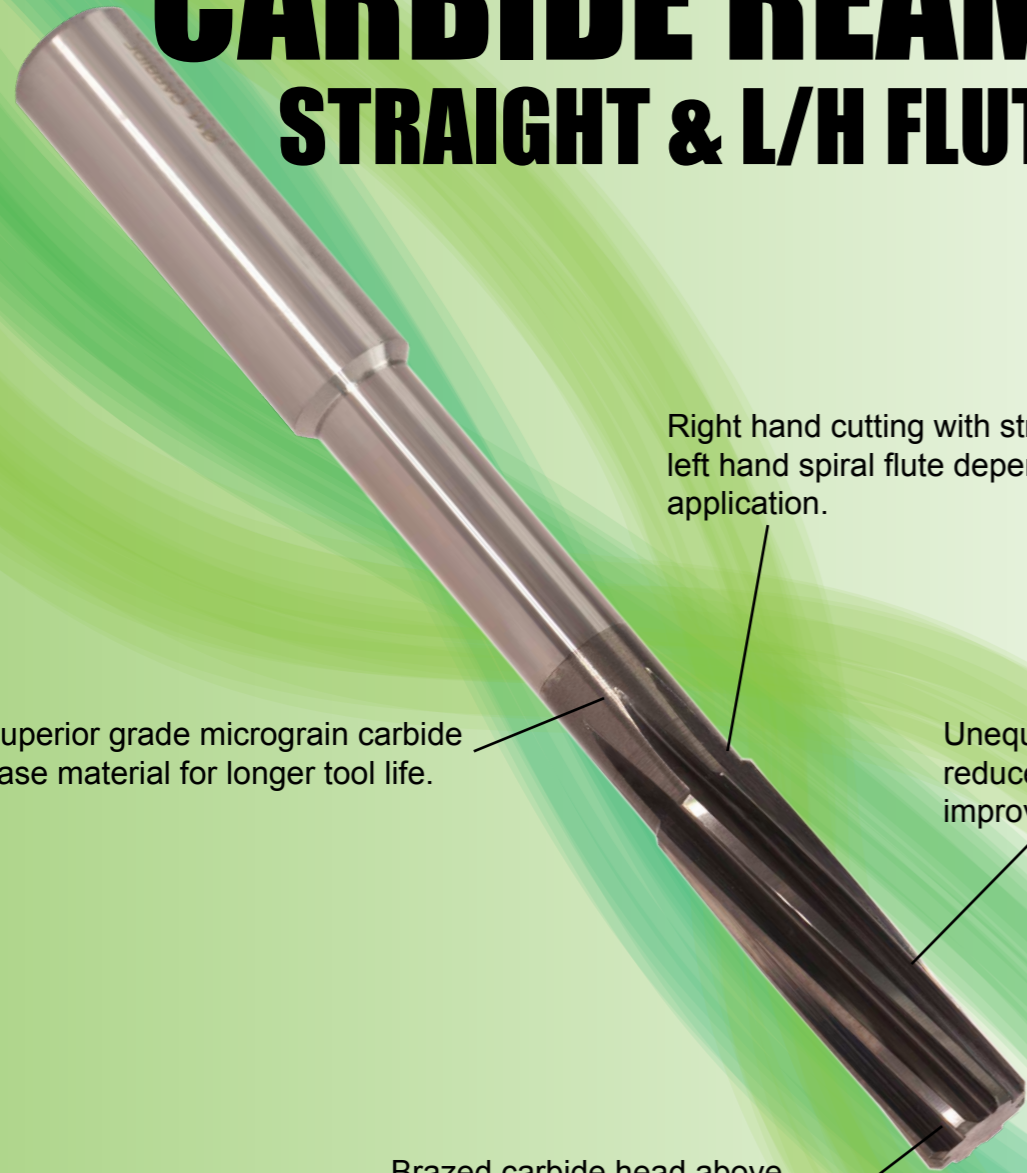
Torx Screws / Drivers

Holder Series	TORX Screw	TORX Hand Driver	Drill Range Used With
Y	SP0156	SP0157	9.5 mm ~ 11.0 mm
Z	SP0105	SP0158	11.5 mm ~ 12.5 mm
0	SP0114	SP0159	13.0 mm ~ 17.5 mm
0.5	SP1039	SP0159	15.5 mm ~ 17.5 mm
1	SP0106	SP0160	18.0 mm ~ 24.0 mm
1.5	SP0115	SP0160	22.0 mm ~ 24.0 mm
2	SP0116	SP0161	25.0 mm ~ 35.0 mm
2.5	SP1040	SP0161	30.0 mm ~ 35.0 mm
3,4	SP0119	SP0120	36.0 mm ~ 65.0 mm
5 ~ 8	SP0117	SP0162	64.0 mm ~ 114.0 mm

** Note : Replacement screws sold in packs of 10

SUPERIOR PERFORMANCE

CARBIDE REAMER STRAIGHT & L/H FLUTE



Right hand cutting with straight or left hand spiral flute depending on application.

Superior grade micrograin carbide base material for longer tool life.

Unequal flute spacing for reduced vibration and improved surface finish.

Brazed carbide head above 12.0mm for increased economy.

IDEAL FOR MATERIAL GROUPS



CARBIDE, HSSCo & HSS REAMERS





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APPLICATION GUIDE

INDEX



●: Excellent ○: Good

P				H		M			K				S				N				O			CARBIDE MACHINE REAMERS									
11	12	13	14	15	16	21	22	23	31	32	33	34	41	42	43	51	52	53	61	62	63	64	71	72	73	74	81	82	83	Code	Item	Description	Page No.
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	452303		Straight Flute ø2.0mm - 20.0mm	P.156
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	453303		L/H Spiral Flute ø2.0mm - 20.0mm	P.157

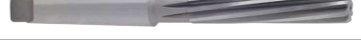
HSS-E CHUCKING REAMERS S/S

●	●	●	○	○	○	○	○	○	○	○	○	○						○	○	○	○	○	○	○	○	○	○		452302		Straight Flute ø2.0mm - 20.0mm	P.158
●	●	●	○	○	○	○	○	○	○	○	○	○						○	○	○	○	○	○	○	○	○	○		453302		L/H Spiral Flute ø2.0mm - 20.0mm	P.160
○	○	○	○															○	○	○	○	○	○	○	○	○	○		454302		L/H Quick Spiral Flute ø4.0mm - 20.0mm	P.162




HSS-E CHUCKING REAMERS MTS

●	●	●	○	○	○	○	○	○	○	○	○	○						○	○	○	○	○	○	○	○	○	○		455302		Straight Flute ø10.0mm - 50.0mm	P.164
●	●	●	○	○	○	○	○	○	○	○	○	○						○	○	○	○	○	○	○	○	○	○		456302		L/H Spiral Flute ø10.0mm - 50.0mm	P.166

HSS MACHINE REAMERS MTS

●	●	●	○	○	○	○	○	○	○	○	○	○						○	○	○	○	○	○	○	○	○	○		457301		L/H Spiral Flute ø3.0mm - 32.0mm	P.168
---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--	---	---	---	---	---	---	---	---	---	---	--	--------	---	-------------------------------------	-------

HSS HAND REAMERS

○	○	○	○	○	○	○	○	○	○	○	○	○						○	○	○	○	○	○	○	○	○	○		450301		Straight Flute ø2.0mm - 60.0mm	P.170
○	○	○	○	○	○	○	○	○	○	○	○	○						○	○	○	○	○	○	○	○	○	○		451301		L/H Spiral Flute ø2.0mm - 60.0mm	P.172
																															Cutting Data	P.174

► For material group examples, refer to page 2

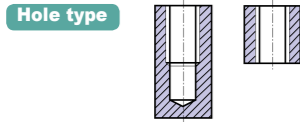
► For full material group tables, refer to pages 194-199

CARBIDE MACHINE REAMER STRAIGHT FLUTE

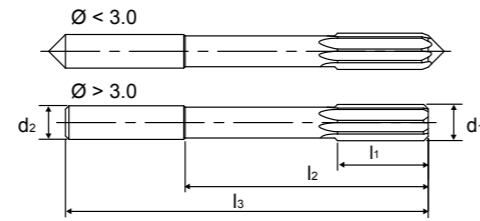


Series No. 452303

▶ cutting conditions : p.174



O.D. Tolerances : DIN 1420 for H7
Shank : DIN6535-HA
Chamfer angle - Up to 3.0 : 15°
- Over 3.0 : 45°



Material - Up to 12.0 : Solid carbide
- Over 12.0 : Brazed carbide head
Straight Flute / Right Hand Cut
Unequal flute spacing

EUROPA CODE	NOMINAL SIZE d1	SHANK DIAMETER d2	CUTTING LENGTH l1	NECK LENGTH l2	OVERALL LENGTH l3	NO.OF FLUTES
4523030200	2.0	4	11	20	50	4
4523030250	2.5	4	14	26	57	4
4523030300	3.0	4	15	31	61	6
4523030350	3.5	4	18	36	70	6
4523030400	4.0	4	19	42	75	6
4523030450	4.5	6	21	46	80	6
4523030500	5.0	6	23	51	86	6
4523030550	5.5	6	26	56	93	6
4523030600	6.0	6	26	56	93	6
4523030650	6.5	8	28	62	101	6
4523030700	7.0	8	31	68	109	6
4523030750	7.5	8	31	68	109	6
4523030800	8.0	8	33	74	117	6
4523030850	8.5	10	33	74	117	6
4523030900	9.0	10	36	80	125	6
4523030950	9.5	10	36	80	125	6
4523031000	10.0	10	38	86	133	6
4523031050	10.5	12	38	86	133	6
4523031100	11.0	12	41	95	142	6
4523031200	12.0	12	44	104	151	6
4523031300	13.0	16	44	104	151	6
4523031400	14.0	16	47	108	160	8
4523031500	15.0	16	50	110	162	8
4523031600	16.0	16	52	118	170	8
4523031700	17.0	20	54	121	175	8
4523031800	18.0	20	56	128	182	8
4523031900	19.0	20	58	129	189	8
4523032000	20.0	20	60	135	195	8

●: Excellent ○: Good

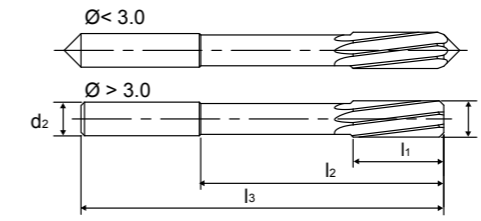
P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
○	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
○	○	●	●	●	●	●	●	●	●	●	●	●	●		

CARBIDE MACHINE REAMER L/H SPIRAL FLUTE



Series No. 453303

▶ cutting conditions : p.174



O.D. Tolerances : DIN 1420 for H7
Shank : DIN6535-HA
Chamfer angle - Up to 3.0 : 15°
- Over 3.0 : 45°

Material - Up to 12.0 : Solid carbide
- Over 12.0 : Brazed carbide head
L/H Spiral Flute / Right Hand Cut
Unequal flute spacing

EUROPA CODE	NOMINAL SIZE d1	SHANK DIAMETER d2	CUTTING LENGTH l1	NECK LENGTH l2	OVERALL LENGTH l3	NO.OF FLUTES
4533030200	2.0	4	11	20	50	4
4533030250	2.5	4	14	26	57	4
4533030300	3.0	4	15	31	61	6
4533030350	3.5	4	18	36	70	6
4533030400	4.0	4	19	42	75	6
4533030450	4.5	6	21	46	80	6
4533030500	5.0	6	23	51	86	6
4533030550	5.5	6	26	56	93	6
4533030600	6.0	6	26	56	93	6
4533030650	6.5	8	28	62	101	6
4533030700	7.0	8	31	68	109	6
4533030750	7.5	8	31	68	109	6
4533030800	8.0	8	33	74	117	6
4533030850	8.5	10	33	74	117	6
4533030900	9.0	10	36	80	125	6
4533030950	9.5	10	36	80	125	6
4533031000	10.0	10	38	86	133	6
4533031050	10.5	12	38	86	133	6
4533031100	11.0	12	41	95	142	6
4533031200	12.0	12	44	104	151	6
4533031300	13.0	16	44	104	151	6
4533031400	14.0	16	47	108	160	8
4533031500	15.0	16	50	110	162	8
4533031600	16.0	16	52	118	170	8
4533031700	17.0	20	54	121	175	8
4533031800	18.0	20	56	128	182	8
4533031900	19.0	20	58	129	189	8
4533032000	20.0	20	60	135	195	8

●: Excellent ○: Good

P	H	M	K	S	N	O									
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
○	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●
13	14	16	23	33	34	51	52	53	71	72	73	74	83		
○	○	●	●	●	●	●	●	●	●	●	●	●	●		

STRAIGHT SHANK CHUCKING REAMER STRAIGHT FLUTE

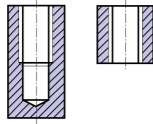


HSS-E DIN 212 H7
 15° up to Ø3.75
 45° over Ø3.75

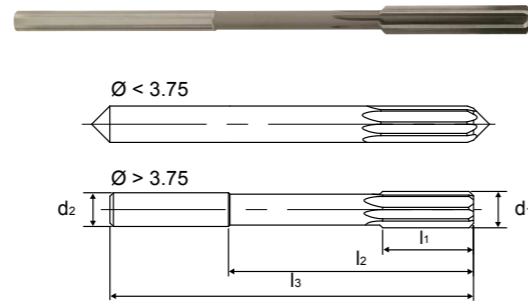
Series No. 452302

▶ cutting conditions : p.175

Hole type



O.D. Tolerances : DIN 1420 for H7
 Shank Diameter tolerances: h8
 Straight Flute / Right Hand Cut



Chamfer angle - Up to 3.75 : 15° (DIN212-A)
 - Over 3.75 : 45° (DIN212-C)

EUROPA CODE	NOMINAL SIZE d1	SHANK DIAMETER d2	CUTTING LENGTH l1	NECK LENGTH l2	OVERALL LENGTH l3	NO.OF FLUTES
4523020200	2.0	2	11	-	49	4
4523020220	2.2	2.2	12	-	53	4
4523020250	2.5	2.5	14	-	57	4
4523020260	2.6	2.6	14	-	57	4
4523020280	2.8	2.8	15	-	61	4
4523020300	3.0	3	15	-	61	6
4523020310	3.1	3.1	16	-	65	6
4523020320	3.2	3.2	16	-	65	6
4523020350	3.5	3.5	18	-	70	6
4523020360	3.6	3.6	18	-	70	6
4523020370	3.7	3.7	18	-	70	6
4523020400	4.0	4	19	42	75	6
4523020430	4.3	4.5	21	46	80	6
4523020450	4.5	4.5	21	46	80	6
4523020460	4.6	4.5	21	46	80	6
4523020500	5.0	5	23	51	86	6
4523020550	5.5	5.6	26	56	93	6
4523020560	5.6	5.6	26	56	93	6
4523020600	6.0	5.6	26	56	93	6
4523020650	6.5	6.3	28	62	101	6

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●	○	○	○	○	○				○	○	○	○	●	●	
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●	○	○		○	○				○	○	○	○			

STRAIGHT SHANK CHUCKING REAMER STRAIGHT FLUTE

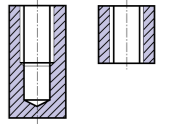


HSS-E DIN 212 H7
 15° up to Ø3.75
 45° over Ø3.75

Series No. 452302

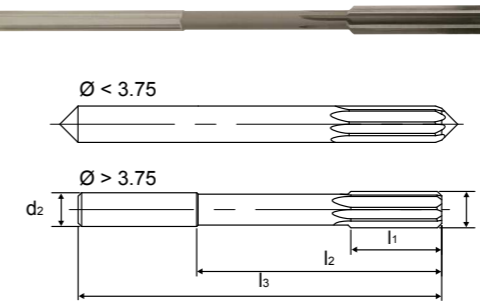
▶ cutting conditions : p.175

Hole type



O.D. Tolerances : DIN 1420 for H7
 Shank Diameter tolerances: h8
 Straight Flute / Right Hand Cut

Chamfer angle - Up to 3.75 : 15° (DIN212-A)
 - Over 3.75 : 45° (DIN212-C)

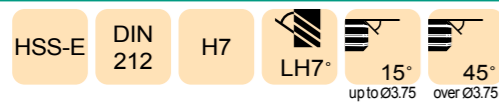


EUROPA CODE	NOMINAL SIZE d1	SHANK DIAMETER d2	CUTTING LENGTH l1	NECK LENGTH l2	OVERALL LENGTH l3	NO.OF FLUTES
4523020700	7.0	7.1	31	68	109	6
4523230720	7.2	7.1	31	68	109	6
4523020800	8.0	8	33	74	117	6
4523020830	8.3	8	33	74	117	6
4523020850	8.5	8	33	74	117	6
4523020900	9.0	9	36	80	125	6
4523020950	9.5	9	36	80	125	6
4523021000	10.0	10	38	86	133	6
4523021050	10.5	10	38	86	133	6
4523021100	11.0	10	41	95	142	6
4523021200	12.0	10	44	104	151	6
4523021300	13.0	10	44	104	151	6
4523021400	14.0	12.5	47	108	160	8
4523021500	15.0	12.5	50	110	162	8
4523021600	16.0	12.5	52	118	170	8
4523021700	17.0	14	54	121	175	8
4523021800	18.0	14	56	128	182	8
4523021900	19.0	16	58	129	189	8
4523022000	20.0	16	60	135	195	8

●: Excellent ○: Good

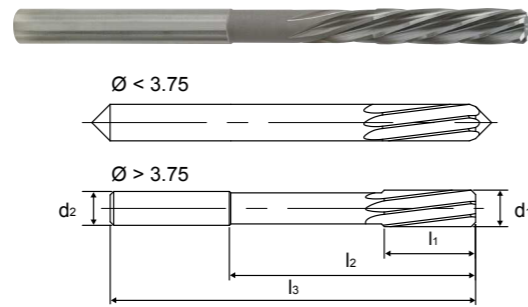
P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●	○	○	○	○	○				○	○	○	○	●	●	
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●	○	○		○	○				○	○	○	○			

STRAIGHT SHANK CHUCKING REAMER L/H SPIRAL FLUTE



Series No. 453302

▶ cutting conditions : p.175



Chamfer angle - Up to 3.75 : 15° (DIN212-B)
- Over 3.75 : 45° (DIN212-D)

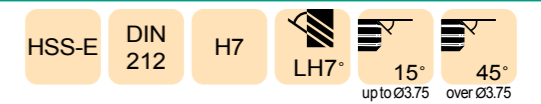
O.D. Tolerances : DIN 1420 for H7
Shank Diameter tolerances: h8
L/H Spiral Flute / Right Hand Cut

EUROPA CODE	NOMINAL SIZE d1	SHANK DIAMETER d2	CUTTING LENGTH l1	NECK LENGTH l2	OVERALL LENGTH l3	NO.OF FLUTES
4533020200	2.0	2	11	-	49	4
4533020220	2.2	2.2	12	-	53	4
4533020250	2.5	2.5	14	-	57	4
4533020260	2.6	2.6	14	-	57	4
4533020280	2.8	2.8	15	-	61	4
4533020300	3.0	3	15	-	61	6
4533020310	3.1	3.1	16	-	65	6
4533020320	3.2	3.2	16	-	65	6
4533020350	3.5	3.5	18	-	70	6
4533020360	3.6	3.6	18	-	70	6
4533020370	3.7	3.7	18	-	70	6
4533020400	4.0	4	19	42	75	6
4533020430	4.3	4.5	21	46	80	6
4533020450	4.5	4.5	21	46	80	6
4533020460	4.6	4.5	21	46	80	6
4533020500	5.0	5	23	51	86	6
4533020550	5.5	5.6	26	56	93	6
4533020560	5.6	5.6	26	56	93	6
4533020600	6.0	5.6	26	56	93	6
4533020650	6.5	6.3	28	62	101	6

●: Excellent ○: Good

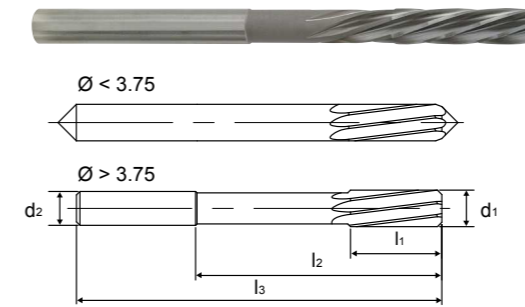
P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●	○	○	○	○	○				○	○	○	○	●	●	
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●	○	○		○	○				○	○	○	○			

STRAIGHT SHANK CHUCKING REAMER L/H SPIRAL FLUTE



Series No. 453302

▶ cutting conditions : p.175



Chamfer angle - Up to 3.75 : 15° (DIN212-B)
- Over 3.75 : 45° (DIN212-D)

O.D. Tolerances : DIN 1420 for H7
Shank Diameter tolerances: h8
L/H Spiral Flute / Right Hand Cut

EUROPA CODE	NOMINAL SIZE d1	SHANK DIAMETER d2	CUTTING LENGTH l1	NECK LENGTH l2	OVERALL LENGTH l3	NO.OF FLUTES
4533020700	7.0	7.1	31	68	109	6
4533020720	7.2	7.1	31	68	109	6
4533020800	8.0	8	33	74	117	6
4533020830	8.3	8	33	74	117	6
4533020850	8.5	8	33	74	117	6
4533020900	9.0	9	36	80	125	6
4533020950	9.5	9	36	80	125	6
4533021000	10.0	10	38	86	133	6
4533021050	10.5	10	38	86	133	6
4533021100	11.0	10	41	95	142	6
4533021200	12.0	10	44	104	151	6
4533021300	13.0	10	44	104	151	6
4533021400	14.0	12.5	47	108	160	8
4533021500	15.0	12.5	50	110	162	8
4533021600	16.0	12.5	52	118	170	8
4533021700	17.0	14	54	121	175	8
4533021800	18.0	14	56	128	182	8
4533021900	19.0	16	58	129	189	8
4533022000	20.0	16	60	135	195	8

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●	○	○	○	○	○				○	○	○	○	●	●	
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●	○	○		○	○				○	○	○	○			

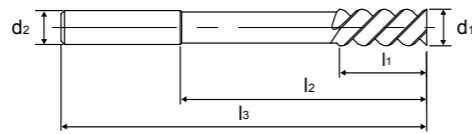
STRAIGHT SHANK CHUCKING REAMER L/H QUICK SPIRAL



HSS-E DIN 212 H7 LH45° FORM E

Series No. 454302

▶ cutting conditions : p.175



O.D. Tolerances : DIN 1420 for H7
Shank Diameter tolerances: h8
L/H Quick Spiral Flute / Right Hand Cut

Chamfer angle : Tapered (DIN212-E)

EUROPA CODE	NOMINAL SIZE d1	SHANK DIAMETER d2	CUTTING LENGTH l1	NECK LENGTH l2	OVERALL LENGTH l3	NO.OF FLUTES
4543020400	4.0	4	19	42	75	3
4543020450	4.5	4.5	21	46	80	3
4543020500	5.0	5	23	51	86	3
4543020550	5.5	5.6	26	56	93	3
4543020600	6.0	5.6	26	56	93	3
4543020650	6.5	6.3	28	62	101	3
4543020700	7.0	7.1	31	68	109	3
4543020800	8.0	8	33	74	117	3
4543020850	8.5	8	33	74	117	3
4543020900	9.0	9	36	80	125	3
4543020950	9.5	9	36	80	125	3
4543021000	10.0	10	38	86	133	3

●: Excellent ○: Good

P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
○	○									●	●	●	●	○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○									●	●	●	●		

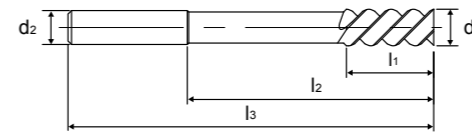
STRAIGHT SHANK CHUCKING REAMER L/H QUICK SPIRAL



HSS-E DIN 212 H7 LH45° FORM E

Series No. 454302

▶ cutting conditions : p.175



O.D. Tolerances : DIN 1420 for H7
Shank Diameter tolerances: h8
L/H Quick Spiral Flute / Right Hand Cut

Chamfer angle : Tapered (DIN212-E)

EUROPA CODE	NOMINAL SIZE d1	SHANK DIAMETER d2	CUTTING LENGTH l1	NECK LENGTH l2	OVERALL LENGTH l3	NO.OF FLUTES
4543021100	11.0	10	41	95	142	3
4543021200	12.0	10	44	104	151	3
4543021300	13.0	10	44	104	151	3
4543021400	14.0	12.5	47	108	160	4
4543021500	15.0	12.5	50	110	162	4
4543021600	16.0	12.5	52	118	170	4
4543021700	17.0	14	54	121	175	4
4543021800	18.0	14	56	128	182	4
4543021900	19.0	16	58	129	189	4
4543022000	20.0	16	60	135	195	4

●: Excellent ○: Good

P		H		M		K		S		N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82
○	○									●	●	●	●	○	○
13	14	16	23		33	34	51	52	53	71	72	73	74	83	
○	○									●	●	●	●		

TAPER SHANK CHUCKING REAMER STRAIGHT FLUTE

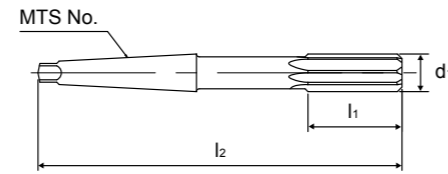
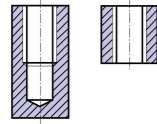


HSS-E DIN 208 H7 45°

Series No. 455302

▶ cutting conditions : p.175

Hole type



O.D. Tolerances : DIN 1420 for H7
Straight Flute / Right Hand Cut
Chamfer angle : 45° (DIN208-A)

EUROPA CODE	NOMINAL SIZE d1	MTS No.	CUTTING LENGTH l1	OVERALL LENGTH l2	NO.OF FLUTES
4553021000	10.0	1	38	168	6
4553021100	11.0	1	41	175	6
4553021200	12.0	1	44	182	6
4553021300	13.0	1	44	182	6
4553021400	14.0	1	47	189	8
4553021500	15.0	2	50	204	8
4553021600	16.0	2	52	210	8
4553021700	17.0	2	54	214	8
4553021800	18.0	2	56	219	8
4553021900	19.0	2	58	223	8
4553022000	20.0	2	60	228	8
4553022100	21.0	2	62	232	8
4553022200	22.0	2	64	237	8
4553022300	23.0	2	66	241	8
4553022400	24.0	3	68	268	8
4553022500	25.0	3	68	268	8
4553022600	26.0	3	70	273	8
4553022700	27.0	3	71	277	10
4553022800	28.0	3	71	277	10

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●	○	○	○	○	○				○	○	○	○	●	●	
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●	○	○		○	○				○	○	○	○			

TAPER SHANK CHUCKING REAMER STRAIGHT FLUTE

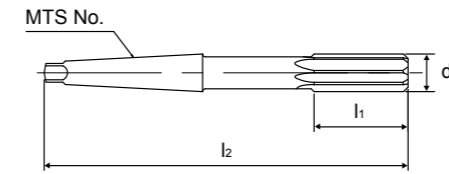
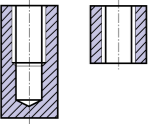


HSS-E DIN 208 H7 45°

Series No. 455302

▶ cutting conditions : p.175

Hole type



O.D. Tolerances : DIN 1420 for H7
Straight Flute / Right Hand Cut
Chamfer angle : 45° (DIN208-A)

EUROPA CODE	NOMINAL SIZE d1	MTS No.	CUTTING LENGTH l1	OVERALL LENGTH l2	NO.OF FLUTES
4553022900	29.0	3	73	281	10
4553023000	30.0	3	73	281	10
4553023100	31.0	3	75	285	10
4553023200	32.0	4	77	317	10
4553023400	34.0	4	78	321	10
4553023500	35.0	4	78	321	10
4553023600	36.0	4	79	325	10
4553023800	38.0	4	81	329	10
4553024000	40.0	4	81	329	10
4553024100	41.0	4	82	333	12
4553024200	42.0	4	82	333	12
4553024300	43.0	4	83	336	12
4553024400	44.0	4	83	336	12
4553024500	45.0	4	83	336	12
4553024600	46.0	4	84	340	12
4553024700	47.0	4	84	340	12
4553024800	48.0	4	86	344	12
4553025000	50.0	4	86	344	12

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●	○	○	○	○	○				○	○	○	○	●	●	
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●	○	○		○	○				○	○	○	○			

TAPER SHANK CHUCKING REAMER L/H SPIRAL FLUTE

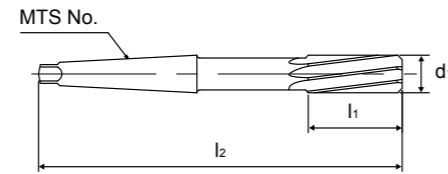


HSS-E DIN 208 H7 LH7° 45°



Series No. 456302

▶ cutting conditions : p.175



O.D. Tolerances : DIN 1420 for H7
L/H Spiral Flute / Right Hand Cut
Chamfer angle : 45° (DIN208-B)

EUROPA CODE	NOMINAL SIZE d1	MTS No.	CUTTING LENGTH l1	OVERALL LENGTH l2	NO.OF FLUTES
4563021000	10.0	1	38	168	6
4563021100	11.0	1	41	175	6
4563021200	12.0	1	44	182	6
4563021300	13.0	1	44	182	6
4563021400	14.0	1	47	189	8
4563021500	15.0	2	50	204	8
4563021600	16.0	2	52	210	8
4563021700	17.0	2	54	214	8
4563021800	18.0	2	56	219	8
4563021900	19.0	2	58	223	8
4563022000	20.0	2	60	228	8
4563022100	21.0	2	62	232	8
4563022200	22.0	2	64	237	8
4563022300	23.0	2	66	241	8
4563022400	24.0	3	68	268	8
4563022500	25.0	3	68	268	8
4563022600	26.0	3	70	273	8
4563022700	27.0	3	71	277	10
4563022800	28.0	3	71	277	10

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●	○	○	○	○	○				○	○	○	○	●	●	
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●	○	○		○	○				○	○	○	○			

TAPER SHANK CHUCKING REAMER L/H SPIRAL FLUTE

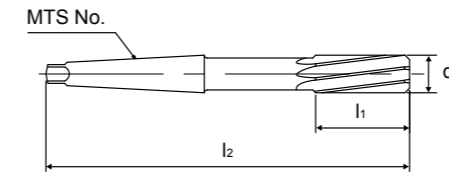


HSS-E DIN 208 H7 LH7° 45°



Series No. 456302

▶ cutting conditions : p.175



O.D. Tolerances : DIN 1420 for H7
L/H Spiral Flute / Right Hand Cut
Chamfer angle : 45° (DIN208-B)

EUROPA CODE	NOMINAL SIZE d1	MTS No.	CUTTING LENGTH l1	OVERALL LENGTH l2	NO.OF FLUTES
4563022900	29.0	3	73	281	10
4563023000	30.0	3	73	281	10
4563023100	31.0	3	75	285	10
4563023200	32.0	4	77	317	10
4563023400	34.0	4	78	321	10
4563023500	35.0	4	78	321	10
4563023600	36.0	4	79	325	10
4563023800	38.0	4	81	329	10
4563024000	40.0	4	81	329	10
4563024100	41.0	4	82	333	12
4563024200	42.0	4	82	333	12
4563024300	43.0	4	83	336	12
4563024400	44.0	4	83	336	12
4563024500	45.0	4	83	336	12
4563024600	46.0	4	84	340	12
4563024700	47.0	4	84	340	12
4563024800	48.0	4	86	344	12
4563025000	50.0	4	86	344	12

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●	○	○	○	○	○				○	○	○	○	●	●	
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●	○	○		○	○				○	○	○	○			

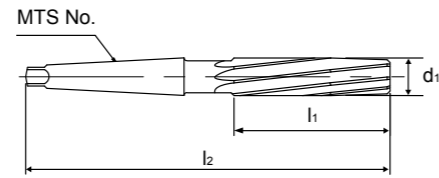
TAPER SHANK MACHINE REAMER



HSS DIN 338 H7 LH7*

Series No. 457301

▶ cutting conditions : p.175



O.D. Tolerances : DIN 1420 for H7
L/H Spiral Flute / Right Hand Cut
Chamfer angle : 45° (DIN208-B)

EUROPA CODE	NOMINAL SIZE d1	MTS No.	CUTTING LENGTH l1	OVERALL LENGTH l2
4573010300	3.0	1	31	104
4573010350	3.5	1	35	108
4573010400	4.0	1	38	112
4573010450	4.5	1	41	115
4573010500	5.0	1	44	118
4573010550	5.5	1	48	125
4573010600	6.0	1	48	125
4573010650	6.5	1	50	130
4573010700	7.0	1	54	134
4573010750	7.5	1	54	134
4573010800	8.0	1	58	138
4573010850	8.5	1	58	138
4573010900	9.0	1	62	141
4573010950	9.5	1	62	141
4573011000	10.0	1	67	146
4573011050	10.5	1	67	146
4573011100	11.0	1	71	151
4573011150	11.5	1	71	151
4573011200	12.0	1	76	156

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●	○	○	○	○	○				○	○	○	○	●	●	
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●	○	○		○	○				○	○	○	○			

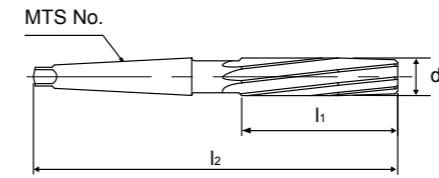
TAPER SHANK MACHINE REAMER



HSS DIN 338 H7 LH7*

Series No. 457301

▶ cutting conditions : p.175



O.D. Tolerances : DIN 1420 for H7
L/H Spiral Flute / Right Hand Cut
Chamfer angle : 45° (DIN208-B)

EUROPA CODE	NOMINAL SIZE d1	MTS No.	CUTTING LENGTH l1	OVERALL LENGTH l2
4573011250	12.5	1	76	156
4573011300	13.0	1	76	156
4573011400	14.0	1	81	160
4573011500	15.0	2	81	181
4573011600	16.0	2	87	187
4573011700	17.0	2	87	187
4573011800	18.0	2	94	194
4573011900	19.0	2	94	194
4573012000	20.0	2	100	200
4573012100	21.0	2	100	200
4573012200	22.0	2	106	206
4573012300	23.0	2	106	206
4573012400	24.0	3	114	241
4573012500	25.0	3	114	241
4573012600	26.0	3	114	241
4573012700	27.0	3	124	251
4573012800	28.0	3	124	251
4573012900	30.0	3	124	251
4573013000	32.0	4	133	294

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●	○	○	○	○	○				○	○	○	○	●	●	
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●	○	○		○	○				○	○	○	○			

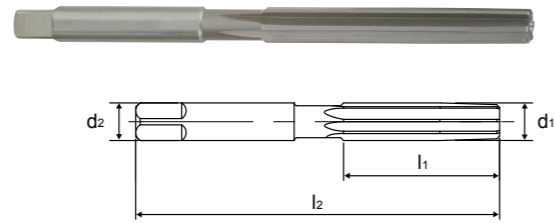
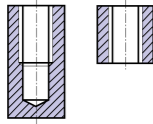
HAND REAMER STRAIGHT FLUTE



HSS DIN 206 H7

Series No. 450301

Hole type



O.D. Tolerances : DIN 1420 for H7
Shank Diameter = Nominal Reamer Diameter
Straight Flutes / Right Hand Cut

Chamfer Angle - tapered
Type of centre - Up to Ø3.75 : external centres
- Over Ø3.75 : internal centres

EUROPA CODE	NOMINAL SIZE d1 = d2	FLUTE LENGTH l1	OVERALL LENGTH l2	NO.OF FLUTES
4503010200	2.0	25	50	4
4503010220	2.2	27	54	4
4503010250	2.5	29	58	4
4503010280	2.8	31	62	4
4503010300	3.0	31	62	6
4503010320	3.2	33	66	6
4503010350	3.5	35	71	6
4503010400	4.0	38	76	6
4503010450	4.5	41	81	6
4503010500	5.0	44	87	6
4503010550	5.5	47	93	6
4503010600	6.0	47	93	6
4503010700	7.0	54	107	6
4503010800	8.0	58	115	6
4503010900	9.0	62	124	6
4503011000	10.0	66	133	6
4503011100	11.0	71	142	6
4503011200	12.0	76	152	6
4503011300	13.0	76	152	6
4503011400	14.0	81	163	8
4503011500	15.0	81	163	8
4503011600	16.0	87	175	8
4503011700	17.0	87	175	8
4503011800	18.0	93	188	8
4503011900	19.0	93	188	8
4503012000	20.0	100	201	8
4503012200	22.0	107	215	8
4503012400	24.0	115	231	8

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
○	○	○	○	○	○	○				○	○	○	○	○	○	
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
○	○	○	○		○	○				○	○	○	○			

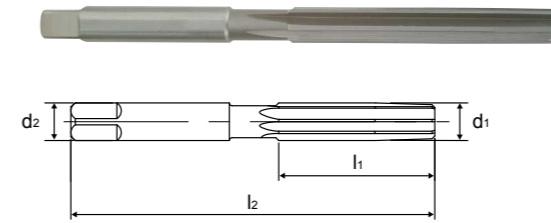
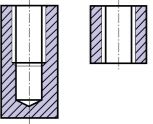
HAND REAMER STRAIGHT FLUTE



HSS DIN 206 H7

Series No. 450301

Hole type



O.D. Tolerances : DIN 1420 for H7
Shank Diameter = Nominal Reamer Diameter
Straight Flutes / Right Hand Cut

Chamfer Angle - Tapered
Type of centre - Up to Ø3.75 : external centres
- Over Ø3.75 : internal centres

EUROPA CODE	NOMINAL SIZE d1 = d2	FLUTE LENGTH l1	OVERALL LENGTH l2	NO.OF FLUTES
4503012500	25.0	115	231	8
4503012600	26.0	115	231	8
4503012700	27.0	124	247	10
4503012800	28.0	124	247	10
4503012900	29.0	124	247	10
4503013000	30.0	124	247	10
4503013100	31.0	133	265	10
4503013200	32.0	133	265	10
4503013300	33.0	133	265	10
4503013400	34.0	142	284	10
4503013500	35.0	142	284	10
4503013600	36.0	142	284	10
4503013700	37.0	142	284	10
4503013800	38.0	152	305	10
4503013810	38.1	152	305	10
4503013900	39.0	152	305	10
4503014000	40.0	152	305	10
4503014100	41.0	152	305	12
4503014200	42.0	152	305	12
4503014300	43.0	163	326	12
4503014400	44.0	163	326	12
4503014500	45.0	163	326	12
4503014600	46.0	163	326	12
4503014700	47.0	163	326	12
4503014800	48.0	174	347	12
4503014900	49.0	174	347	12
4503015200	52.0	174	347	12
4503016000	60.0	184	367	12

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
○	○	○	○	○	○	○				○	○	○	○	○	○	
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
○	○	○	○		○	○				○	○	○	○			

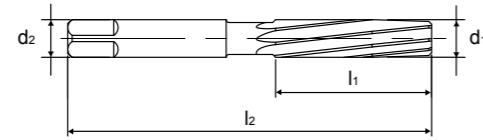
HAND REAMER L/H SPIRAL FLUTE



HSS DIN 206 H7 LH7*

Series No. 451301

Hole type



O.D. Tolerances : DIN 1420 for H7
Shank Diameter = Nominal Reamer Diameter
L/H Spiral Flutes / Right Hand Cut

Chamfer Angle - Tapered
Type of centre - Up to Ø3.75 : external centres
- Over Ø3.75 : internal centres

EUROPA CODE	NOMINAL SIZE d1 = d2	FLUTE LENGTH l1	OVERALL LENGTH l2	NO.OF FLUTES
4513010200	2.0	25	50	4
4513010220	2.2	27	54	4
4513010250	2.5	29	58	4
4513010280	2.8	31	62	4
4513010300	3.0	31	62	6
4513010320	3.2	33	66	6
4513010350	3.5	35	71	6
4513010400	4.0	38	76	6
4513010450	4.5	41	81	6
4513010500	5.0	44	87	6
4513010550	5.5	47	93	6
4513010600	6.0	47	93	6
4513010700	7.0	54	107	6
4513010800	8.0	58	115	6
4513010900	9.0	62	124	6
4513011000	10.0	66	133	6
4513011100	11.0	71	142	6
4513011200	12.0	76	152	6
4513011300	13.0	76	152	6
4513011400	14.0	81	163	8
4513011500	15.0	81	163	8
4513011600	16.0	87	175	8
4513011700	17.0	87	175	8
4513011800	18.0	93	188	8
4513011900	19.0	93	188	8
4513012000	20.0	100	201	8
4513012200	22.0	107	215	8
4513012400	24.0	115	231	8

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15		21	22	31	32	41	42	43	61	62	63	64	81	82
○	○	○	○	○	○	○	○				○	○	○	○	○	○
13	14	16		23		33	34	51	52	53	71	72	73	74	83	
○	○	○	○	○		○	○				○	○	○	○		

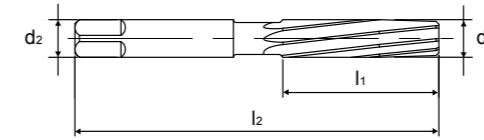
HAND REAMER L/H SPIRAL FLUTE



HSS DIN 206 H7 LH7*

Series No. 451301

Hole type



O.D. Tolerances : DIN 1420 for H7
Shank Diameter = Nominal Reamer Diameter
L/H Spiral Flutes / Right Hand Cut

Chamfer Angle - Tapered
Type of centre - Up to Ø3.75 : external centres
- Over Ø3.75 : internal centres

EUROPA CODE	NOMINAL SIZE d1 = d2	FLUTE LENGTH l1	OVERALL LENGTH l2	NO.OF FLUTES
4513012500	25.0	115	231	8
4513012600	26.0	115	231	8
4513012700	27.0	124	247	10
4513012800	28.0	124	247	10
4513012900	29.0	124	247	10
4513013000	30.0	124	247	10
4513013100	31.0	133	265	10
4513013200	32.0	133	265	10
4513013300	33.0	133	265	10
4513013400	34.0	142	284	10
4513013500	35.0	142	284	10
4513013600	36.0	142	284	10
4513013700	37.0	142	284	10
4513013800	38.0	152	305	10
4513013810	38.1	152	305	10
4513013900	39.0	152	305	10
4513014000	40.0	152	305	10
4513014100	41.0	152	305	12
4513014200	42.0	152	305	12
4513014300	43.0	163	326	12
4513014400	44.0	163	326	12
4513014500	45.0	163	326	12
4513014600	46.0	163	326	12
4513014700	47.0	163	326	12
4513014800	48.0	174	347	12
4513014900	49.0	174	347	12
4513015200	52.0	174	347	12
4513016000	60.0	184	367	12

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15		21	22	31	32	41	42	43	61	62	63	64	81	82
○	○	○	○	○	○	○	○				○	○	○	○	○	○
13	14	16		23		33	34	51	52	53	71	72	73	74	83	
○	○	○	○	○		○	○				○	○	○	○		

REAMER CUTTING CONDITIONS



452303, 453303 (Carbide Chucking)

Material Group	vc (m/min)	fn (mm/rev)					
		ø2.0 -4.9	ø5.0 -8.9	ø9.0 -12.9	ø13.0 -19.9	ø20.0 -30.0	>ø30.0
P	11 16 (14-18)	0.11 (0.10-0.12)	0.16 (0.12-0.20)	0.23 (0.20-0.25)	0.28 (0.25-0.30)	0.35 (0.30-0.40)	-
	12						
H	13 13 (12-14)	0.09 (0.08-0.10)	0.13 (0.10-0.16)	0.18 (0.16-0.20)	0.23 (0.20-0.25)	0.28 (0.25-0.30)	-
	14						
M	15 11 (10-12)	0.09 (0.08-0.10)	0.13 (0.10-0.16)	0.18 (0.16-0.20)	0.25 (0.20-0.30)	0.28 (0.25-0.30)	-
	16						
K	21 7 (6-8)	0.09 (0.08-0.10)	0.13 (0.10-0.16)	0.18 (0.16-0.20)	0.25 (0.20-0.30)	0.28 (0.25-0.30)	-
	22						
S	23 18 (15-20)	0.11 (0.10-0.12)	0.16 (0.12-0.20)	0.23 (0.20-0.25)	0.28 (0.25-0.30)	0.35 (0.30-0.40)	-
	31						
N	32 13 (11-15)	0.11 (0.10-0.12)	0.16 (0.12-0.20)	0.23 (0.20-0.25)	0.28 (0.25-0.30)	0.35 (0.30-0.40)	-
	33						
O	34 14 (12-16)	0.11 (0.10-0.12)	0.16 (0.12-0.20)	0.23 (0.20-0.25)	0.28 (0.25-0.30)	0.35 (0.30-0.40)	-
	41						
N	42 10 (8-12)	0.09 (0.08-0.10)	0.13 (0.10-0.16)	0.18 (0.16-0.20)	0.23 (0.20-0.25)	0.28 (0.25-0.30)	-
	43						
O	51 23 (20-25)	0.11 (0.10-0.12)	0.16 (0.12-0.20)	0.23 (0.20-0.25)	0.28 (0.25-0.30)	0.35 (0.30-0.40)	-
	52						
O	53 50 (40-60)	0.14 (0.12-0.16)	0.20 (0.16-0.25)	0.28 (0.25-0.30)	0.35 (0.30-0.40)	0.45 (0.40-0.50)	-
	61						
O	62 25 (20-30)	0.14 (0.12-0.16)	0.20 (0.16-0.25)	0.28 (0.25-0.30)	0.35 (0.30-0.40)	0.45 (0.40-0.50)	-
	63						
O	64 18 (15-20)	0.14 (0.12-0.16)	0.20 (0.16-0.25)	0.28 (0.25-0.30)	0.35 (0.30-0.40)	0.45 (0.40-0.50)	-
	71						
O	72 18 (16-18)	0.15 (0.10-0.20)	0.20 (0.15-0.25)	0.25 (0.20-0.30)	0.32 (0.25-0.40)	0.42 (0.35-0.50)	0.50 (0.40-0.60)
	73						
O	74 18 (16-20)	0.15 (0.10-0.20)	0.20 (0.15-0.25)	0.25 (0.20-0.30)	0.32 (0.25-0.40)	0.42 (0.35-0.50)	0.50 (0.40-0.60)
	81						
O	82 10 (8-12)	0.15 (0.10-0.20)	0.25 (0.20-0.30)	0.35 (0.30-0.40)	0.45 (0.40-0.50)	0.55 (0.50-0.60)	0.70 (0.60-0.80)
	82						

vc - cutting speed (m/min)
n - RPM (rev/min)
fn - feed rate (mm/rev)
ø - reamer diameter (mm)

$$\text{To calculate RPM from cutting speed: } n = \frac{v_c \cdot 1000}{\pi \cdot \phi}$$

$$\text{To calculate cutting speed from RPM: } v_c = \frac{n \cdot \pi \cdot \phi}{1000}$$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

REAMER CUTTING CONDITIONS



452302, 453302, 455302, 456302, 457301 (HSS-E Chucking, HSS & HSS-E Morse Taper)



Material Group	vc (m/min)	fn (mm/rev)					
		ø2.0 -4.9	ø5.0 -8.9	ø9.0 -12.9	ø13.0 -19.9	ø20.0 -30.0	>ø30.0
P	11 14 (12-16)	0.10 (0.05-0.15)	0.15 (0.10-0.20)	0.20 (0.15-0.25)	0.25 (0.20-0.30)	0.32 (0.25-0.40)	0.42 (0.35-0.50)
	12						
H	13 11 (10-12)	0.08 (0.05-0.10)	0.12 (0.08-0.16)	0.15 (0.10-0.20)	0.20 (0.15-0.25)	0.25 (0.20-0.30)	0.35 (0.30-0.40)
	14						
M	15 5 (4-6)	0.06 (0.03-0.08)	0.08 (0.06-0.10)	0.12 (0.08-0.15)	0.15 (0.10-0.20)	0.20 (0.15-0.25)	0.25 (0.20-0.30)
	16						
K	21 5 (4-6)	0.06 (0.03-0.08)	0.08 (0.06-0.10)	0.12 (0.08-0.15)	0.15 (0.10-0.20)	0.20 (0.15-0.25)	0.25 (0.20-0.30)
	22						
N	23 13 (12-14)	0.10 (0.05-0.15)	0.15 (0.10-0.20)	0.20 (0.15-0.25)	0.25 (0.20-0.30)	0.32 (0.25-0.40)	0.42 (0.35-0.50)
	31						
O	32 11 (10-12)	0.08 (0.05-0.10)	0.12 (0.08-0.16)	0.15 (0.10-0.20)	0.20 (0.15-0.25)	0.25 (0.20-0.30)	0.35 (0.30-0.40)
	33						
N	34 17 (16-18)	0.15 (0.10-0.20)	0.20 (0.15-0.25)	0.25 (0.20-0.30)	0.32 (0.25-0.40)	0.42 (0.35-0.50)	0.50 (0.40-0.60)
	61						
N	62 18 (16-20)	0.15 (0.10-0.20)	0.20 (0.15-0.25)	0.25 (0.20-0.30)	0.32 (0.25-0.40)	0.42 (0.35-0.50)	0.50 (0.40-0.60)
	63						
O	64 10 (8-12)	0.15 (0.10-0.20)	0.25 (0.20-0.30)	0.35 (0.30-0.40)	0.45 (0.40-0.50)	0.55 (0.50-0.60)	0.70 (0.60-0.80)
	71						
O	72 13 (12-14)	0.15 (0.10-0.20)	0.25 (0.20-0.30)	0.35 (0.30-0.40)	0.50 (0.40-0.60)	0.50 (0.40-0.60)	-
	73						
O	74 13 (12-14)	0.15 (0.10-0.20)	0.25 (0.20-0.30)	0.35 (0.30-0.40)	0.50 (0.40-0.60)	0.50 (0.40-0.60)	-
	81						
O	82 13 (12-14)	0.15 (0.10-0.20)	0.25 (0.20-0.30)	0.35 (0.30-0.40)	0.50 (0.40-0.60)	0.50 (0.40-0.60)	-
	82						

454302 (HSS-E Quick Spiral)



Material Group	vc (m/min)	fn (mm/rev)					
		ø2.0 -4.9	ø5.0 -8.9	ø9.0 -12.9	ø13.0 -19.9	ø20.0 -30.0	>ø30.0
P	11 17 (16-18)	0.12 (0.08-0.16)	0.21 (0.16-0.25)	0.25 (0.20-0.30)	0.35 (0.30-0.40)	0.35 (0.30-0.40)	-
	12						
N	13 15 (14-16)	0.12 (0.08-0.16)	0.21 (0.16-0.25)	0.25 (0.20-0.30)	0.35 (0.30-0.40)	0.35 (0.30-0.40)	-
	14						
N	61 18 (16-20)	0.12 (0.08-0.16)	0.21 (0.16-0.25)	0.25 (0.20-0.30)	0.35 (0.30-0.40)	0.35 (0.30-0.40)	-
	62						
O	63 20 (18-22)	0.15 (0.10-0.20)	0.25 (0.20-0.30)	0.35 (0.30-0.40)	0.50 (0.40-0.60)	0.50 (0.40-0.60)	-
	64						
O	71 13 (12-14)	0.15 (0.10-0.20)	0.25 (0.20-0.30)	0.35 (0.30-0.40)	0.50 (0.40-0.60)	0.50 (0.40-0.60)	-
	72						
O	73 13 (12-14)	0.15 (0.10-0.20)	0.25 (0.20-0.30)	0.35 (0.30-0.40)	0.50 (0.40-0.60)	0.50 (0.40-0.60)	-
	74						
O	81 13 (12-14)	0.15 (0.10-0.20)	0.25 (0.20-0.30)	0.35 (0.30-0.40)	0.50 (0.40-0.60)	0.50 (0.40-0.60)	-
	82						

SUPERIOR PERFORMANCE

COUNTERSINK THREE FLUTE



IDEAL FOR MATERIAL GROUPS






HSSCo & HSS COUNTERBORES & COUNTERSINKS



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●: Excellent ○: Good

P				H		M			K				S				N				O			HSS COUNTERBORES									
11	12	13	14	15	16	21	22	23	31	32	33	34	41	42	43	51	52	53	61	62	63	64	71	72	73	74	81	82	83	Code	Item	Description	Page No.
●	●	●	●			○	○		○	○	○		○	○		○	○		○	○	○		●	●	●		●	●		151201		Screwed Shank M4 - M20, 1/4" - 1"	P.180
HSSCo & HSS COUNTERSINKS																																	
●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○		○	○	○		●	●		702302		HSSCo 90° ø4.3mm - 31.0mm	P.182
●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○		○	○	○		●	●		702301		HSS 90° ø4.3mm - 31.0mm	P.183
DEBURRING COUNTERSINK																																	
●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○		○	○	○		●	●		702402		HSSCo Single Hole ø10.0mm - 50.0mm	P.184
																																Cutting Data	P.185

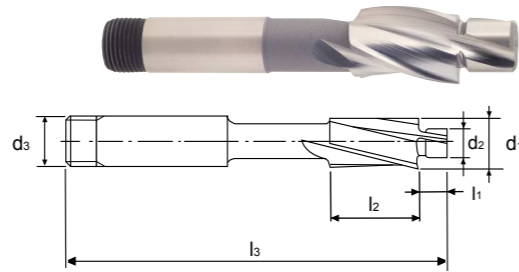
▶ For material group examples, refer to page 2
 ▶ For full material group tables, refer to pages 194-199

SCREWED SHANK COUNTERBORE

HSS EUROPA STD FLUTE 3

Series No. 151201

▶ cutting conditions : p.185



Application

For producing recesses for cap screws.

EUROPA CODE	To suit Thread	Outside Diameter	Pilot Diameter	Shank Diameter	Pilot Length	Length Of Cut	Overall Length	Clarkson Code
1512010400	M4	8	4.3	6	5.5	12.5	65	29M04
1512010500	M5	10	5.3	6	6.5	12.5	70	29M05
1512010600	M6	11	6.4	6	8	12.5	76	29M06
1512010800	M8	15	8.4	10	9.5	19	87.3	29M08
1512011000	M10	18	10.5	10	11	19	89	29M10
1512011200	M12	20	13.0	12	13.5	25.5	108	29M12
1512011400	M14	24	15.0	16	16.5	31.5	121	29M14
1512011600	M16	26	17.0	16	19	38	124	29M16
1512011800	M18	30	19.0	25	19	44.5	147	29M18
1512012000	M20	33	21.0	25	21.5	44.5	149	29M20

●: Excellent ○: Good

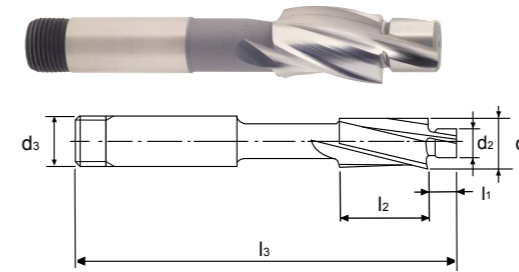
P		H			M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82		
●	●		○	○	○	○	○	○		○	○	○		●	●		
13	14	16	23		33	34	51	52	53	71	72	73	74	83			
●	●				○		○	○		●	●	●					

SCREWED SHANK COUNTERBORE

HSS EUROPA STD FLUTE 3

Series No.151201

▶ cutting conditions : p.185



Application

For producing recesses for cap screws.

EUROPA CODE	To suit Thread	Outside Diameter d1	Pilot Diameter d2	Shank Diameter d3	Pilot Length l1	Length Of Cut l2	Overall Length l3	Clarkson Code
15120102BA	2BA	0.344"	0.200"	1/4"	7/32"	1/2"	2.1/2"	29002
15120104BA	4BA	0.251"	0.156"	1/4"	7/32"	7/16"	2.1/2"	29004
1512010250	1/4"	13/32"	9/32"	1/4"	5/16"	1/2"	3"	29016
1512010200	5/16"	15/32"	11/32"	3/8"	3/8"	5/8"	3.1/4"	29020
1512010240	3/8"	19/32"	13/32"	3/8"	7/16"	3/4"	3.1/2"	29024
1512010280	7/16"	21/32"	15/32"	1/2"	17/32"	7/8"	4	29028
1512010320	1/2"	25/32"	17/32"	1/2"	17/32"	1"	4.1/4"	29032
1512010360	9/16"	27/32"	19/32"	5/8"	19/32"	1.1/8"	4.17/32"	29036
1512019400	5/8"	29/32"	21/32"	5/8"	21/32"	1.1/4"	4.25/32"	29040
1512010480	3/4"	1.1/32"	25/32"	1"	25/32"	1.1/2"	5.7/16"	29048
1512010560	7/8"	1.5/32"	29/32"	1"	29/32"	1.3/4"	5.15/16"	29056
1512010640	1"	1.11/32"	1.1/32"	1"	1.1/32"	2"	6.7/16"	29064

●: Excellent ○: Good

P		H			M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82		
●	●		○	○	○	○	○	○		○	○	○		●	●		
13	14	16	23		33	34	51	52	53	71	72	73	74	83			
●	●				○		○	○		●	●	●					

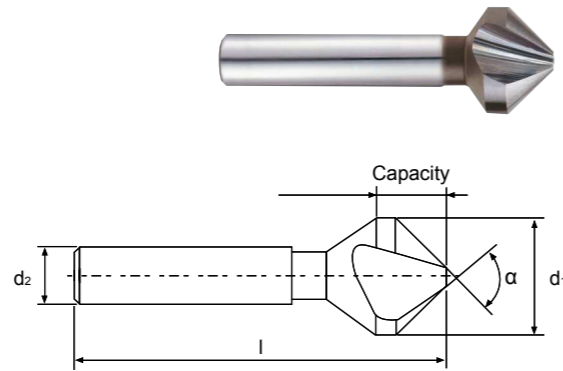
HSSCo 3-FL COUNTERSINK 90°



HSSCo DIN 335C FLUTE 3

Series No. 702302

▶ cutting conditions : p.186



Application

For producing countersinks for cap screws.
Self centering and chatter free.
Can be used for chamfering.

EUROPA CODE	Nominal Diameter D ₁	Shank Diameter D ₂	Overall Length L(±1)	Capacity min/max	Angle α(-1°)
7023020430	4.3	4	40	1.3 - 4.3	90°
7023020500	5.0	4	40	1.5 - 5.0	90°
7023020600	6.0	5	45	1.5 - 6.0	90°
7023020630	6.3	5	45	1.5 - 6.3	90°
7023020700	7.0	6	50	1.8 - 7.0	90°
7023020800	8.0	6	50	2.0 - 8.0	90°
7023020830	8.3	6	50	2.0 - 8.3	90°
7023021000	10.0	6	50	2.5 - 10.0	90°
7023021040	10.4	6	50	2.5 - 10.4	90°
7023021150	11.5	8	56	2.8 - 11.5	90°
7023021240	12.4	8	56	2.8 - 12.4	90°
7023021500	15.0	10	60	3.2 - 15.0	90°
7023021650	16.5	10	60	3.2 - 16.5	90°
7023021900	19.0	10	63	3.5 - 19.0	90°
7023022050	20.5	10	63	3.5 - 20.5	90°
7023022300	23.0	10	67	3.8 - 23.0	90°
7023022500	25.0	10	67	3.8 - 25.0	90°
7023023000	30.0	12	71	4.2 - 30.0	90°
7023023100	31.0	12	71	4.2 - 31.0	90°

▶ TiN & TiAlN coating are available on request.

Nominal Dia. Tolerance(mm)	Shank Dia. Tolerance(mm)
±0.05	h9

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●	○	○	○	○	○	○	○	○	○	○	○	○	●	●	
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●	○	○		○	○	○	○	○	○	○	○	○			

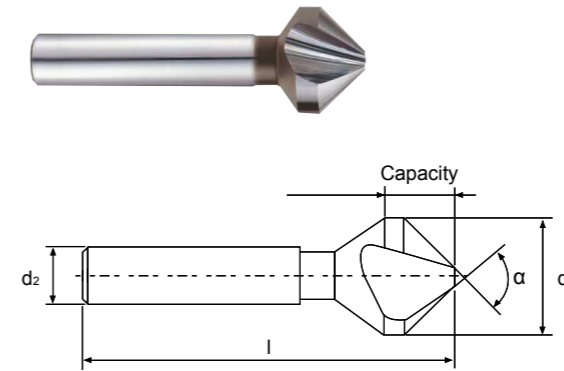
HSS 3-FL COUNTERSINK 90°



HSS DIN 335C FLUTE 3

Series No.702301

▶ cutting conditions : p.186



Application

For producing countersinks for cap screws.
Self centering and chatter free.
Can be used for chamfering.

EUROPA CODE	Nominal Diameter d ₁	Shank Diameter d ₂	Overall Length l(±1)	Capacity min/max	Angle α(-1°)
7023010430	4.3	4	40	1.3 - 4.3	90°
7023010500	5.0	4	40	1.5 - 5.0	90°
7023010600	6.0	5	45	1.5 - 6.0	90°
7023010630	6.3	5	45	1.5 - 6.3	90°
7023010700	7.0	6	50	1.8 - 7.0	90°
7023010800	8.0	6	50	2.0 - 8.0	90°
7023010830	8.3	6	50	2.0 - 8.3	90°
7023011000	10.0	6	50	2.5 - 10.0	90°
7023011040	10.4	6	50	2.5 - 10.4	90°
7023011150	11.5	8	56	2.8 - 11.5	90°
7023011240	12.4	8	56	2.8 - 12.4	90°
7023011500	15.0	10	60	3.2 - 15.0	90°
7023011650	16.5	10	60	3.2 - 16.5	90°
7023011900	19.0	10	63	3.5 - 19.0	90°
7023012050	20.5	10	63	3.5 - 20.5	90°
7023012300	23.0	10	67	3.8 - 23.0	90°
7023012500	25.0	10	67	3.8 - 25.0	90°
7023013000	30.0	12	71	4.2 - 30.0	90°
7023013100	31.0	12	71	4.2 - 31.0	90°

▶ TiN & TiAlN coating are available on request.

▶ 60° and 120° are available on request.

Nominal Dia. Tolerance(mm)	Shank Dia. Tolerance(mm)
±0.05	h9

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●	○	○	○	○	○	○	○	○	○	○	○	○	●	●	
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●	○	○		○	○	○	○	○	○	○	○	○			

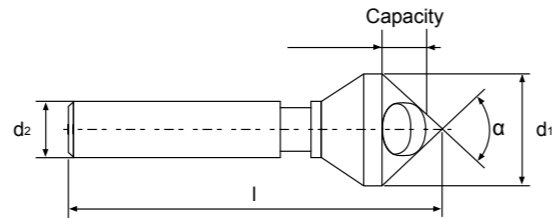
DEBURRING COUNTERSINK 90°



HSSCo

Series No. 702402

▶ cutting conditions : p.187



Application
For deburring most materials and small chamfering of light metals and plastics.
Chatter free for excellent surface finish.

EUROPA CODE	Nominal Diameter d ₁	Shank Diameter d ₂	Overall Length l(±1)	Capacity min/max	Angle α(-1°)
7024021000	10.0	6	45	2.0 - 5.0	90°
7024021500	15.0	8	55	6.0 - 14.0	90°
7024022000	20.0	10	65	8.0 - 18.0	90°
7024022500	25.0	12	78	10.0 - 23.0	90°
7024023000	30.0	12	88	12.0 - 28.0	90°
7024023500	35.0	16	110	14.0 - 33.0	90°
7024024000	40.0	16	115	16.0 - 38.0	90°
7024024500	45.0	16	120	18.0 - 43.0	90°
7024025000	50.0	16	130	20.0 - 48.0	90°

Nominal Dia. Tolerance(mm)	Shank Dia. Tolerance(mm)
+0.3	h9

●: Excellent ○: Good

P		H		M		K		S			N				O	
11	12	15	21	22	31	32	41	42	43	61	62	63	64	81	82	
●	●	○	○	○	○	○	○	○		○	○	○	○	●	●	
13	14	16	23		33	34	51	52	53	71	72	73	74	83		
●	●	○	○		○	○	○	○		○	○	○	○			

COUNTERBORE & COUNTERSINK CUTTING CONDITIONS



151201 (HSS Counterbore)



Material Group	v _c (m/min)	f _n (mm/rev)					
		ø8.0 -10.0	ø11.0 -15.0	ø18.0 -20.0	ø24.0 -26.0	ø30.0 -33.0	
P	11	28 (25-30)	0.11 (0.10-0.12)	0.14 (0.12-0.16)	0.17 (0.16-0.18)	0.20 (0.18-0.22)	0.25 (0.23-0.27)
	12						
	13	18 (15-20)	0.09 (0.08-0.10)	0.12 (0.10-0.14)	0.14 (0.13-0.15)	0.18 (0.16-0.20)	0.20 (0.18-0.22)
	14						
H	15	8 (5-10)	0.07 (0.06-0.08)	0.10 (0.08-0.12)	0.12 (0.11-0.13)	0.14 (0.12-0.16)	0.16 (0.14-0.18)
	16						
M	21	7 (6-8)	0.07 (0.06-0.08)	0.10 (0.08-0.12)	0.12 (0.11-0.13)	0.14 (0.12-0.16)	0.16 (0.14-0.18)
	22						
K	31	20 (15-25)	0.11 (0.10-0.12)	0.14 (0.12-0.16)	0.17 (0.16-0.18)	0.20 (0.18-0.22)	0.25 (0.23-0.27)
	32						
	33	10 (8-12)	0.09 (0.08-0.10)	0.12 (0.10-0.14)	0.14 (0.13-0.15)	0.18 (0.16-0.20)	0.20 (0.18-0.22)
S	41	11 (10-12)	0.11 (0.10-0.12)	0.14 (0.12-0.16)	0.17 (0.16-0.18)	0.20 (0.18-0.22)	0.25 (0.23-0.27)
	42						
	51	10 (8-12)	0.09 (0.08-0.10)	0.12 (0.10-0.14)	0.14 (0.13-0.15)	0.18 (0.16-0.20)	0.20 (0.18-0.22)
	52						
N	61	23 (20-25)	0.07 (0.06-0.08)	0.10 (0.08-0.12)	0.12 (0.11-0.13)	0.14 (0.12-0.16)	0.16 (0.14-0.18)
	62						
	63						
	71	28 (25-30)	0.14 (0.12-0.16)	0.16 (0.14-0.18)	0.19 (0.18-0.20)	0.22 (0.20-0.24)	0.26 (0.24-0.28)
	72						
	73	20 (18-22)	0.11 (0.10-0.12)	0.14 (0.12-0.16)	0.17 (0.16-0.18)	0.20 (0.18-0.22)	0.25 (0.23-0.27)
O	81	25 (20-30)	0.07 (0.06-0.08)	0.10 (0.08-0.12)	0.12 (0.11-0.13)	0.14 (0.12-0.16)	0.16 (0.14-0.18)
	82						

v_c - cutting speed (m/min)
n - RPM (rev/min)
f_n - feed rate (mm/rev)
ø - tool diameter (mm)

$$\text{To calculate RPM from cutting speed: } n = \frac{v_c \cdot 1000}{\pi \cdot \phi}$$

$$\text{To calculate cutting speed from RPM: } v_c = \frac{n \cdot \pi \cdot \phi}{1000}$$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

COUNTERBORE & COUNTERSINK CUTTING CONDITIONS



702302, 702301 (HSSCo & HSS Countersink)



Material Group	v _c (m/min)	f _n (mm/rev)				
		ø4.3 -6.3	ø7.0 -10.0	ø10.4 -15.0	ø16.5 -23.0	ø25.0 -31.0
P	11 28 (25-30)	0.08 (0.06-0.10)	0.10 (0.08-0.12)	0.15 (0.13-0.17)	0.18 (0.16-0.20)	0.23 (0.22-0.25)
	13 18 (15-20)	0.06 (0.04-0.08)	0.08 (0.06-0.10)	0.12 (0.10-0.14)	0.15 (0.13-0.17)	0.18 (0.16-0.20)
H	15 8 (5-10)	0.05 (0.04-0.06)	0.06 (0.04-0.08)	0.10 (0.08-0.12)	0.12 (0.10-0.14)	0.14 (0.12-0.16)
	21 7 (6-8)	0.05 (0.04-0.06)	0.06 (0.04-0.08)	0.10 (0.08-0.12)	0.12 (0.10-0.14)	0.14 (0.12-0.16)
K	31 20 (15-25)	0.08 (0.06-0.10)	0.10 (0.08-0.12)	0.15 (0.13-0.17)	0.18 (0.16-0.20)	0.23 (0.22-0.25)
	33 10 (8-12)	0.06 (0.04-0.08)	0.08 (0.06-0.10)	0.12 (0.10-0.14)	0.15 (0.13-0.17)	0.18 (0.16-0.20)
S	41 11 (10-12)	0.08 (0.06-0.10)	0.10 (0.08-0.12)	0.15 (0.13-0.17)	0.18 (0.16-0.20)	0.23 (0.22-0.25)
	51 10 (8-12)	0.06 (0.04-0.08)	0.08 (0.06-0.10)	0.12 (0.10-0.14)	0.15 (0.13-0.17)	0.18 (0.16-0.20)
N	61 23 (20-25)	0.05 (0.04-0.06)	0.06 (0.04-0.08)	0.10 (0.08-0.12)	0.12 (0.10-0.14)	0.14 (0.12-0.16)
	71 28 (25-30)	0.10 (0.08-0.12)	0.12 (0.10-0.14)	0.16 (0.14-0.18)	0.20 (0.18-0.22)	0.22 (0.20-0.24)
	73 20 (18-22)	0.08 (0.06-0.10)	0.10 (0.08-0.12)	0.15 (0.13-0.17)	0.18 (0.16-0.20)	0.23 (0.22-0.25)
O	81 25 (20-30)	0.05 (0.04-0.06)	0.06 (0.04-0.08)	0.10 (0.08-0.12)	0.12 (0.10-0.14)	0.14 (0.12-0.16)
	82					

v_c - cutting speed (m/min)
n - RPM (rev/min)
f_n - feed rate (mm/rev)
ø - tool diameter (mm)

To calculate RPM from cutting speed: $n = \frac{v_c \cdot 1000}{\pi \cdot \phi}$

To calculate cutting speed from RPM: $v_c = \frac{n \cdot \pi \cdot \phi}{1000}$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

COUNTERBORE & COUNTERSINK CUTTING CONDITIONS



702402 (Deburring countersink)



Material Group	v _c (m/min)	f _n (mm/rev)				
		ø10.0 -15.0	ø20.0 -25.0	ø30.0 -35.0	ø40.0 -45.0	ø50.0
P	11 28 (25-30)	0.11 (0.10-0.12)	0.17 (0.15-0.18)	0.20 (0.18-0.22)	0.22 (0.20-0.24)	0.23 (0.21-0.25)
	13 18 (15-20)	0.09 (0.08-0.10)	0.13 (0.12-0.14)	0.16 (0.15-0.17)	0.18 (0.17-0.19)	0.19 (0.18-0.20)
H	15 8 (5-10)	0.06 (0.05-0.07)	0.08 (0.07-0.09)	0.10 (0.09-0.11)	0.12 (0.11-0.13)	0.13 (0.12-0.14)
	21 7 (6-8)	0.06 (0.05-0.07)	0.08 (0.07-0.09)	0.10 (0.09-0.11)	0.12 (0.11-0.13)	0.13 (0.12-0.14)
K	31 20 (15-25)	0.11 (0.10-0.12)	0.17 (0.15-0.18)	0.20 (0.18-0.22)	0.22 (0.20-0.24)	0.23 (0.21-0.25)
	33 10 (8-12)	0.09 (0.08-0.10)	0.13 (0.12-0.14)	0.16 (0.15-0.17)	0.18 (0.17-0.19)	0.19 (0.18-0.20)
S	41 11 (10-12)	0.11 (0.10-0.12)	0.17 (0.15-0.18)	0.20 (0.18-0.22)	0.22 (0.20-0.24)	0.23 (0.21-0.25)
	51 10 (8-12)	0.09 (0.08-0.10)	0.13 (0.12-0.14)	0.16 (0.15-0.17)	0.18 (0.17-0.19)	0.19 (0.18-0.20)
N	61 23 (20-25)	0.06 (0.05-0.07)	0.08 (0.07-0.09)	0.10 (0.09-0.11)	0.12 (0.11-0.13)	0.13 (0.12-0.14)
	62					
	63					
	71 28 (25-30)	0.11 (0.10-0.12)	0.17 (0.15-0.18)	0.20 (0.18-0.22)	0.22 (0.20-0.24)	0.23 (0.21-0.25)
O	81 25 (20-30)	0.11 (0.10-0.12)	0.17 (0.15-0.18)	0.20 (0.18-0.22)	0.22 (0.20-0.24)	0.23 (0.21-0.25)
	82					

v_c - cutting speed (m/min)
n - RPM (rev/min)
f_n - feed rate (mm/rev)
ø - tool diameter (mm)

To calculate RPM from cutting speed: $n = \frac{v_c \cdot 1000}{\pi \cdot \phi}$

To calculate cutting speed from RPM: $v_c = \frac{n \cdot \pi \cdot \phi}{1000}$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.



TECHNICAL DATA

- **ICON GUIDE**
- **COOLANT GUIDE**
- **GENERAL DATA**
- **TROUBLESHOOTING**
- **MATERIAL CHARTS**

ICON GUIDE



TOOL MATERIALS

MG	PREMIUM HSS-PM	HSS-EX	HSS-E	HSS Co8	HSS
Micro grain carbide	Powder metallurgy steel	5% Vanadium steel	5% Cobalt steel	8% Cobalt steel	High speed steel

DRILLING ICONS

Point angle	140°	135°	130°	120°	118°	90°
Point type and helix angle	N 38°	N ≈ 33°	N 30°	N 20-30°	W 38°	
Standards	DIN 6537	DIN 6535-HA	DIN 340	DIN 338	DIN 1869/1	ISO 3292 BS328
Shank tolerance	h6	h7				
Drill body tolerance	m7	h8				
Morse taper size	1~5					

REAMING ICONS

Helix type and angle	LH7°	LH45°
Standard	DIN 212	
Reamer tolerance	H7	
Chamfer angle	15°	45°

COUNTERBORE/COUNTERSINK ICONS

Number of flutes	FLUTE 3
Standards	DIN 335C EUROPA STD

COOLANT GUIDE



Coolant Pressure for carbide drills.

Recommended guidelines for through coolant carbide drills.

Type	Size					
Inox Standard Alu-XP	<ø3.0	ø3.0 -5.0	ø5.0 -8.0	ø8.0 -12.0	ø12.0 -16.0	ø16.0 -20.0
3xD to 5xD	60 bar	50 bar	30 bar	25 bar	20 bar	15 bar
8xD	80 bar	60 bar	40 bar	30 bar	25 bar	20 bar

Coolant Pressure for minimum quantity lubrication.

Recommended guidelines for MQL type drills.

Type	Size					
MQL	<ø3.0	ø3.0 -5.0	ø5.0 -8.0	ø8.0 -12.0	ø12.0 -16.0	ø16.0 -20.0
10xD to 30xD	14 bar	12 bar	10 bar	9 bar	9 bar	8 bar

Recommended coolant type by material.

Please refer to oil manufacturers guidelines for concentrations.

MATERIAL GROUP	DRILLING	REAMING	COUNTERSINKING
P Steel	Emulsion	Neat oil or Emulsion	Emulsion
H Hardened steel	Neat oil or Emulsion	Neat oil or Emulsion	Neat oil or Emulsion
M Stainless steel	Neat oil	Neat oil	Neat oil
K Cast iron	Dry or Emulsion	Neat oil or Emulsion	Dry or Emulsion
S Titanium Nickel alloys	Neat oil	Neat oil	Neat oil
N Copper alloys Aluminium	Emulsion	Neat oil or Emulsion	Emulsion
O Synthetic materials	Dry or Emulsion	Dry or Emulsion	Dry or Emulsion

All recommendations are for guidance only. Adjustments may need to be made according to your set-up.

GENERAL INFORMATION



Drilling guide.

Recommendations for use.

Ensure workpiece is firmly and securely fastened.

Avoid excess lateral loads.

Ensure collets and drill chucks are in good condition and will not allow drill slippage. Both drill and component damage can occur.

When using taper shank drills ensure all taper sleeves are clean and in good condition. Never allow the drill to drive off the tang. This is an indication that either the drill, the sleeve, or both are damaged. Use only soft faced hammers to drive the taper shank into the sleeve. Use a proper drift key to remove the shank from the sleeve.

Ensure drill is kept sharp, and sharpen before point of failure. If allowed to become blunt extra grinding will be needed to bring the drill back to optimum performance.

Keep the flutes free from swarf. Clogged flutes will hamper drill performance.

Use adequate coolant, particularly at the drill point.

Avoid excessive speed and feed rates. Use the charts in this catalogue. If unsure of the correct speed or feed rate to use, it is generally better to start at low speeds and feeds, and build up as appropriate.

When resharping it is important that all wear is removed, and the correct point geometry is maintained. Do not overheat or burn the drill when grinding.

Ensure correct drill is chosen for application and material type, particularly with deeper holes to avoid pecking where possible.

Reaming guide.

Recommendations for use.

Ensure workpiece is firmly and securely fastened. Bending and moving may break reamer.

When using taper shank reamers ensure all taper sleeves are clean and in good condition.

Reamers must be kept sharp. As reamers only cut on the bevel lead, only the bevel, and the taper lead in the case of hand reamers, require regrinding. A blunt reamer wears on the outer corners on the bevel lead, resulting in a poor finish, undersized holes and increased torque.

When reaming, ensure that swarf is not allowed to build up in the flutes.

Adequate lubricant must be directed to the cutting area. When reaming high tensile materials, an improved finish can be achieved by using chlorinated or sulphurised oils.

The correct amount of stock must be left in the hole after drilling or coring to obtain the required hole size and finish, and eliminate excessive reamer wear. If too little stock is left for removal by reaming the reamer will rub in the hole giving rise to premature wear and loss of size. The table below shows approximate amounts of stock to be removed by reaming. This is **for guidance only**, as the amount of stock to be left depends greatly on the type of material being reamed and the type of reamer used.

When hand reaming, leave approximately two thirds of machine reaming allowance.

Stock removal.

Amount of material to be left in prior to reaming.

Operation	Finish Reamed Size					
	<ø1.5	ø1.5 -3.0	ø3.0 -6.0	ø6.0 -16.0	ø16.0 -25.0	ø25.0 -50.0
Pre Drilled	0.20	0.20	0.20	0.30	0.30	0.40
Pre Core Drilled or Bored	0.10	0.10	0.10	0.20	0.20	0.30

All recommendations are for guidance only. Adjustments may need to be made according to your set-up.

TECHNICAL DATA

TROUBLESHOOTING



Troubleshooting - Drilling

Problem	Probable causes	Suggested actions
Drill will not enter work	Drill is dull	Regrind lip relief
	Lip relief too small	Regrind web thinning
	Web too thick	Select drill with narrow web
Cutting lip breaks	Lip relief too large	Regrind lip relief
	Feed too high	Choose correct data from cutting charts
Tang breaks	Bad fit in taper shank socket	Ensure socket is clean
	Burred or badly worn socket	Replace socket
Drill centre chipped	Lip relief too large	Regrind lip relief
	Feed too high	Choose correct data from cutting charts
Oversize hole	Unequal cutting edge length or angle	Resharpener drill point
	Tool not held tight	Tighten collet or chuck
Outer edges chipped	Cutting speed too high	Choose correct data from cutting charts
	Flutes clogged	Choose correct drill from application guide
	Drill worn	Replace or regrind drill
	Hard spots in work material	Choose correct drill from application guide
Poor surface finish	Incorrect grinding of drill point	Replace or regrind drill
	Insufficient coolant supply	Ensure coolant is targetted correctly
	Feed too high	Choose correct data from cutting charts
	Workpiece not held securely	Replace or tighten fixture or vice

Troubleshooting - Reaming

Problem	Probable causes	Suggested actions
Chattering	Workpiece not held securely	Replace or tighten fixture or vice
	Incorrect speed or feed	Choose correct data from cutting charts
	Incorrect reamer	Select reduced vibration carbide reamer
Rapid wear	Incorrect size of pre-drilled hole	Choose correct data from reaming guide
	Incorrect speed or feed	Choose correct data from cutting charts
Tapering or Bell mouting	Machine spindle/bearings worn	Replace/repair equipment
	Reamer and hole mis-aligned	Check set-up and re-align
Rubbing	Incorrect size of pre-drilled hole	Choose correct data from reaming guide
	Incorrect bevel lead on reamer	Replace or regrind reamer
Oversize hole	Excessive run-out in collet/chuck	Replace collet/chuck
	Incorrect size of pre-drilled hole	Choose correct data from reaming guide
Poor surface finish	Incorrect speed or feed	Choose correct data from cutting charts
	Reamer worn or damaged	Replace or regrind reamer
	Insufficient coolant supply	Ensure coolant is targetted correctly

TECHNICAL DATA

MATERIAL CHART



Please note: These charts are not cross-reference charts.
Materials are grouped according to machinability and are not necessarily identical in chemical composition.

ISO GROUP	STANDARDS					
	GERMANY		FRANCE	GREAT BRITAIN	EN & OTHER	U.S.A.
	W.Nr	DIN	AFNOR	B.S.	CLASSIFICATIONS	AISI
10 STEEL P	11. Magnetic soft steels - Hardness < 120 HB 30 - Tensile strength < 400 N/mm²					
	1.1013	RFe 100		OSOA12	EN2	
	1.1014	RFe 80				
	1.1015	RFe 60		230Mo7	EN1	
	1.0718	9 S MnPb 28				
	12. Structural steels - Hardness < 200 HB 30 - Tensile strength < 700 N/mm²					
	12.1 - Structural steels					
	1.0034	RSt 34-2	A34-2 EN	1449 34/20 HR		
	1.0035	St 33	A33	Fe 310-0		
	1.0036	St 37-2		060A35	EN3A,4,5,6,7,8	
1.0037	RSt 37-2			EN3B		
1.0044	St 44-2					
1.0050	St 50-2		4360-50B	EN 207		
1.0060	St 60-2					
1.0070	St 70-2					
1.0116	St 37-3					
1.0144	St 44-3					
12.2 - Case carburizing steels						
1.0301	C 10	AF 34 C 10	040 A 10		M 1010	
1.0401	C 15	AF 37 C 12	080 A 15		M 1015	
1.1121	Ck 10	XC 10	040 A 10		1010	
1.1141	Ck 15	XC 12	040 A 15		1015	
1.5732	14 Ni Cr 10	14 NC 11			3415	
1.7015	15 Cr 3	12 C 3	523 M 15		5015	
1.7131	16 Mn Cr 5	16 MC 4	527 M 17	EN 32	5115	
1.7147	20 Mn Cr 5	20 MC 5			5120	
12.3 - Free machining steels						
1.0710	15 S 10					
1.0715	9 S Mn 28	S 250	230 M 07		1213	
1.0718	9 S Mn Pb 28	S 250 Pb			12 L 13	
1.0721	10 S 20	10 F1	210 M 15		1108 1109	
1.0722	10 S Pb 20	10 Pb F 2			11 L 08	
1.0723	15 S 20		210 A 15			
1.0726	35 S 20	35 MF 6	212 M 36		1140	
1.0727	45 S 20	45 MF 4			1146	
1.0736	9 S Mn 36	S 300			1215	
1.0737	9 S Mn Pb 36	S 300 P			12 L 14	
12.4 - Cast structural steels						
1.0416	GS - 38					
1.0446	GS - 45					
1.0552	GS - 52					
1.0553	GS - 60	E 36 - 3				
1.0554	GS - 70					
13. Plain carbon steels - tempered						
13.1 - Steels, tempered - Hardness < 250 HB 30 - Tensile strength < 850 N/mm ²						
1.0402	C 22	1 C 22	070 M 20		M 1023	
1.0501	C 35	1 C 35	080 A 32		1035	
1.0503	C 45	1 C 45	060 A 47		1045	
1.0535	C 55	1 C 55	070 M 55		1055	
1.0601	C 60	1 C 60	060 A 62	EN 43	1060	
1.1157	40 Mn 4	35 M 5	150 M 36		1035 1041	
1.1151	Ck 22	2 C 22	055 M 15		1020 1023	
1.1181	Ck 35	2 C 35	080 A 35		1035 1038	
1.1191	Ck 45	2 C 45	080 M 46	EN 9, 10	1045	
1.1203	Ck 55	2 C 55	060 A 57		1055	
1.1221	Ck 60	2 C 60	060 A 62		1060 1064	

TECHNICAL DATA

MATERIAL CHART



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ISO GROUP	STANDARDS					
	GERMANY		FRANCE	GREAT BRITAIN	EN & OTHER	U.S.A.
	W.Nr	DIN	AFNOR	B.S.	CLASSIFICATIONS	AISI
10 STEEL P	14. Alloy steels - Hardness < 250 HB 30, < 25 HRC - Tensile strength < 850 N/mm²					
	14.1 - Cold work tool steels					
	1.2056	90 Cr 3				
	1.2067	100 Cr 6	Y 100 C 6	BL 3		L 1 L 3
	1.2080	X 210 Cr 12	Z 200 C 12	BD 3		D3
	1.2083	X 42 Cr 13	Z 40 C 14			420
	1.2363	X 100 CrMoV5 1	Z 100 CDV 5	BA 2		A 2
	1.2379	X 155 CrVMo 12 1	Z 160 CDV 12	BD 2		D 2
	1.2510	100 MnCrW 4	90 MWCV 5	BO 1		O1
	1.2550	60 WCrV 7	55WC 20	BS 1		S1
1.2823	70 Si 7					
1.2826	60 Mn Si Cr 4					
1.2842	90 MnCrV 8	90 MV 8	BO 2		O 2	
14.2 - High speed steels						
1.3202	S 12-4-4-5	Z130WKCV 12-05-04-04	BT 15		T 15	
1.3207	S 10-4-3-10	Z130WKCDV10-10-04-04-03	BT 42		T 42	
1.3243	S 6-5-2-5	Z85WDCV 06-05-04-02	BM 35		M 35	
1.3247	S 2-10-1-8	Z110DKCW 09-08-04-02-01	BM 42		M 42	
1.3343	S 6-5-2	Z85WDCV 06-05-04-02	BM 2		M 2	
1.3344	S 6-5-3	Z120WDCV 06-05-04-03			M 3 / 2	
1.3348	S 2-9-2	Z100DCWV 09-04-02-02			M 7	
ASP 23	(S 6-5-3)					
ASP 30						
ASP 60						
14.3 - Tempered steels						
1.0503	C 45	1 C 45	060 A 47		1045	
1.7220	34 Cr Mo 4	34 Cr Mo 4	708 A 37		4135, 4137	
1.7225	42 Cr Mo 4	42 CD 4	708 A 42	EN 16, 17, 19	4140, 4142	
1.7228	50 Cr Mo 4	50 Cr Mo 4	708 A 47		4150	
14.4 - Nitriding steels						
1.7779	20 Cr Mo V 13.5					
1.8504	34 Cr Al 6					
1.8506	34 Cr Al S 5					
1.8507	34 Cr Al Mo 5	30 CAD 6.12			A 355 Cl.D	
1.8509	41 Cr Al Mo 7	40 CAD 6.12	905 M 39		A 355 Cl.A	
1.8515	31 Cr Mo 12	30 CD 12	722 M 24			
10 HARDENED STEEL H	15. Alloy steels / Tempered steels - Hardness 250-350 HB 30, 25-38 HRC - Tensile strength 850-1,200 N/mm²					
	15.1 - Alloy steels for tools					
	1.2311	40 Cr Mn Mo 7				
	1.2312	40 Cr Mn Mo S 86				
	1.2436	X 210 Cr W 12	Z 200 CW 12			
	1.2711	54 Ni Cr Mo V 6				
	1.2713	55 Ni Cr Mo V 6	55 NCDV 7	826 M 40	S 95, S 97, S 98	L 6
	1.2714	56 Ni Cr Mo V 7				
	1.2743	60 Ni Cr Mo V 12 4				
	1.2766	35 Ni Cr Mo 16				
15.2 - Alloy steels for hot work						
1.2343	X 38 Cr Mo V 5 1	Z 38 CDV 5	BH 11		H 11	
1.2344	X 40 Cr Mo V 5 1	Z 40 CDV 5	BH 13		H 13	
1.2365	X 32 Cr Mo V 3 3	32 DCV 28	BH 10		H 10	
1.2367	X 40 Cr Mo V 5 3	Z 38 CDV 5.3				
1.2581	X 30 W Cr V 9 3	Z 30 WCV 9.3	BH 21		H 21	
1.2622	X 60 W Cr Mo V 9					
1.2678	X 45 CoCrWV 5 5 5					
1.2550	60 WCr V 7	55 WC 20	BS 1		S 1	
1.2567	X 30 W Cr V 5 3	Z 32 WCV 5				

TECHNICAL DATA

MATERIAL CHART



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ISO GROUP	STANDARDS					
	GERMANY		FRANCE	GREAT BRITAIN	EN & OTHER	U.S.A.
	W.Nr	DIN	AFNOR	B.S.	CLASSIFICATIONS	AISI
10 HARDENED STEEL H	15.3 -Hardened tempered steels - Hardness may differ according to presentation and dimensions of material					
	1.5864	35 Ni Cr 18				
	1.6580	30 Cr Ni Mo 8	30 Cr Ni Mo 8		S99	
	1.7361	32 Cr Mo 12	30 CD 12	722 M 24		
	1.7707	30 Cr Mo V 9				
	1.8161	58 Cr V 4				
	15.4 - Nitriding steels					
	1.8515	31 Cr Mo 12	30 CD 12	722 M 24		
	1.8519	31 Cr Mo V 9		830 M 31		
	1.8523	39 Cr Mo V 13 9		897 M 39		
	1.8550	34 Cr Al Ni 7		826 M 40		
	16. Alloy steels / Hardened tempered steels - Hardness > 38 HRC - Tensile strength > 1,200 N/mm² To this group belong most of the materials of group 15, but present a higher tensile strength					
	1.2713	100 Mn Cr W 12			Hardox 400	M42
	1.3247	X 210 Cr 12			Hardox 500	4140
	1.2080				Hardox 600	8130
	1.3343				P20	
20 STAINLESS STEEL M	21. Free machining stainless steels - Hardness < 250 HB 30 - Tensile strength < 850 N/mm²					
	1.4104	X 12 Cr Mo S 17	Z 13 CF 17	416 S 37	EN 56	430 F
	1.4305	X 10 Cr Ni S 18 09	Z 8 CNF 18-09	303 S 21	EN 60	303
	22. Austenitic stainless steels - Hardness < 250 HB 30 - Tensile strength < 850 N/mm²					
	1.4300	X 12 Cr Ni 18 8		320 S 12		
	1.4301	X 5 Cr Ni 18 10	Z 6 CN 18-09	304 S 15	EN 80, EN 58 + C	304
	1.4311	X 2 CrNi 18 10	Z 3 CN 18-07 Az	304 S 61		304 LN
	1.4406	X 2 CrNiMoN 17 12 2	Z 3 CND 17 11 02	316 S 61		316 LN
	1.4433	X 2 CrNiMo 18 15		316 S		
	1.4435	X 2 CrNiMo 18 14 3	Z3 CND 17-12-03	316 S 11		316 L
	1.4539	X 1 CrNiMoCu 25 20 5	Z 1 NCDU 25-20	321 S 17		UNS N08904
	1.4541	X 6 CrNiTi 18 10	Z 6 CNT 18 10	321 S 18	EN 58 J, 316	321
	1.4571	X 6 CrNiMoTi 17 12 2	Z 6 CNDT 17 12	320 S 18		316 Ti
	1.4573	X 10 CrNiMoTi 18 12		320 S 33		
	1.4828	X 15 CrNiSi 20 12	Z 15 CNS 20-12	309 S 24		309
	22.1 - Cast austenitic stainless steels					
	1.4308	G-X 6 CrNi 18 9	Z 6 CN 18.10 M	304 C 15(LT196)		CF-8
	1.4313	G-X 5 CrNi 13 4	Z 8 CD 17-01	425 C 12		CA 6 -NM
	1.4408	G-X 6 CrNiMo 18 10		316 C 16(LT196)		CF-8M
	1.4581	G-X 5 CrNiMoNb 18 10	Z 4 CNDNb 18.12M	318 C 17		
	23. Martensitic stainless steels - Hardness < 320 HB 30 - Tensile strength < 1,100 N/mm²					
	1.4021	X 20 Cr 13	Z 20 C 13	420 S 37		420
	1.4034	X 46 Cr 13	Z 44 C 14	(420 S 45)		
	1.4057	X 20 CrNi 17 2	Z 15 CN 16-02	431 S 29		431
	1.4112	X 90 CrMoV 18				
	1.4116	X 45 CrMoV 15			EN 58, b.e.j.t	
	1.4125	X 105 CrMo 17	Z 100 CD 17		Duplex alloys	440 C
	1.4718	X 45 CrSi 9 3	Z 45 CS 9	401 S 45		HNV 3
	1.4747	X 80 CrNiSi 20	Z 80 CSN 20-02	443 S 65		HNV 6
	1.4086	G-X 120 Cr 29				
	1.4106	G-X 10 CrMo 13				
	1.4138	G-X 120 CrMo 29 2				
	23.1 Ferritic stainless steels - Hardness < 320 HB 30 - Tensile strength < 1,100 N/mm²					
	1.4002	X 6 Cr Al 13	Z 8 CA 12	405 S 17		405
	1.4006	X 10 Cr 13	Z 10 C 13	410 C 21	Super Duplex	410
	1.4016	X 6 Cr 17	Z 8 C 17	430 S 17		430
	1.4510	X 6 Cr Ti 17	Z 8 CT 17			430 Ti
	1.4512	X 6 Cr Ti 12	Z 6 CT 12	409 S 19		409
	23.2 Ferritic-Austenitic stainless steels - Hardness < 320 HB 30 - Tensile strength < 1,100 N/mm²					
	1.4460	X 8 CrNiMo 27 5	Z 5 CND 27-05 Az			329
	1.4582	X 4 CrNiMoNb 25 7				
	1.4821	X 20 CrNiSi 25 4				17-4PH

MATERIAL CHART



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ISO GROUP	STANDARDS					
	GERMANY		FRANCE	GREAT BRITAIN	EN & OTHER	U.S.A.
	W.Nr	DIN	AFNOR	B.S.	CLASSIFICATIONS	AISI
30 CAST IRON K	31. Grey graphite cast irons - Hardness < 150 HB 30 - Tensile strength < 500 N/mm²					
	0.6010	GG-10	Ft 10 D			A 48-20 B
	0.6015	GG-15	Ft 20 D	Grade 150	Grey cast iron soft	A 48-25 B
	0.6020	GG-20	Ft 25 D	Grade 220		A 48-30 B
	0.6025	GG-25	Ft 30 D	Grade 260		A 48-40 B
	0.6030	GG-30	Ft 30 D	Grade 300		A 48-45 B
	0.6035	GG-35	Ft 35 D	Grade 350		A 48-50 B
	0.6040	GG-40	Ft 40 D	Grade 400		A 48-60 B
	31.1 - Meehanite - Hardness < 150 HB 30 - Tensile strength < 500 N/mm ²					
		GF - 150				
		GD - 260				
	32. Grey graphite cast irons - Hardness 150 - 300 HB 30 - Tensile strength 500 - 1,000 N/mm²					
	0.6020	GG - 20	Ft 25 D	Grade 220	Grey cast iron hard	A 48-30 B
	0.6025	GG - 25	Ft 30 D	Grade 260		A 48-40 B
	0.6030	GG - 30	Ft 30 D	Grade 300		A 48-45 B
	0.6035	GG - 35	Ft 35 D	Grade 350		A 48-50 B
	0.6040	GG - 40	Ft 40 D	Grade 400		A 48-60 B
	32.1 - Meehanite - Hardness 150-300 HB 30 - Tensile strength 500-1,000 N/mm ²					
		GF - 150				
		GD - 260				
	33. Nodular graphite, malleable cast irons - Hardness < 200 HB 30 - Tensile strength < 700 N/mm²					
	0.7033	GGG-35.3				
	0.7040	GGG-40	FGS 400-12	420 / 12		60-40-18
	0.7043	GGG-40.3	FGS 370-17	370 / 17		
	0.7050	GGG-50	FGS 500-7	500 / 7		
	0.7060	GGG-60	FGS 600-3	600 / 3	S.G.iron, Meehanite	65-45-12
	0.8035	GTW-35		700/2,30g/72	Black & White Heart	80-55-06
	0.8040	GTW-40				
	0.8045	GTW-45				
	0.8065	GTW-65				
	0.8135	GTS-35				
	0.8145	GTS-45				
	0.8155	GTS-55				
	0.8165	GTS-65				
	33.1 - Meehanite - Hardness < 200 HB 30 -Tensile strength < 700 N/mm ²					
		SF 400				
	SPF 600					
34. Nodular graphite, tempered malleable cast irons - Hardness 200-300 HB 30 - Tensile strength 700-1,000 N/mm² Also materials from Group 33 tempered						
0.7070	GGG-70	FGS 700-2	700 / 2	S.G.iron,Meehanite	100-70-03	
0.7080	GGG-80	FGS 800-2	800 / 2	Black & White Heart	120-90-02	
34.1 - Meehanite - Hardness 200-300 HB 30 - Tensile strength 700-1,000 N/mm ²						
	SH 800		420/12, P 440/7			
	SH 1000					
40 TITANIUM S	41. Titanium, unalloyed - Hardness < 200 HB 30 - Tensile strength < 700 N/mm²					
	3.7024.1LN	Ti 99.5				
	3.7034.1LN	Ti 99.7				
	3.7035	Ti 2				
	3.7055	Ti 99.4		TA 1-9	Ti 99,0	
	3.7064.1LN	Ti 99.2				
	3.7065	Ti 4				
	3.7255	Ti 3 Pd				
	42. Titanium alloys - Hardness < 270 HB 30 - Tensile strength < 900 N/mm²					
	3.7144 LN	Ti4Al4 Mn				
	3.7124 LN	Ti5Al2Sn				
	3.7164 LN	Ti2Cu		TA 10-14, TA 17	Ti - 2AL	
	3.7174 LN	Ti6Al4V		TA 18		
		Ti6Al6V2Sn				
	Ti6Al2Sn4Zr2Mo					
	Ti4Al4Mo2Sn0.5Si					

MATERIAL CHART



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TECHNICAL DATA

ISO GROUP	STANDARDS					
	GERMANY		FRANCE	GREAT BRITAIN	EN & OTHER	U.S.A.
	W.Nr	DIN	AFNOR	B.S.	CLASSIFICATIONS	AISI
40 TITANIUM S	43. Titanium alloys - Hardness 270-300 HB 30 - Tensile strength 900-1,300 N/mm²					
		Ti10Al2Fe3Al				
		Ti5Al5V5Mo3Cr			Ti AL	
		Ti7Al4Mo		TA 10-13, TA 28		
		Ti3Al8V6Cr4Zr4Mo				
		Ti6Al6V6Sn				
	Ti15V3Cr3Sn3Al					
50 NICKEL ALLOYS S	51. Nickel, unalloyed - Hardness < 150 HB 30 - Tensile strength < 500 N/mm²					
	2.1504 LN	Ni Al Bz				
	2.4042	Ni 99 CSi		NA 11, NA 12	Nickel 200	
	2.4060	Ni 99.6			Nickel 270	
	2.4062	Ni 99.4 Fe				
	52. Heat resisting nickel alloys - Hardness < 270 HB 30 - Tensile strength < 900 N/mm²					
	2.4360 LN	Monel 400				
	2.4374 LN	Monel 500				
	2.4617	Hastelloy B 2			Nimonic 75	
	2.4665	Hastelloy X		HR 203		
	2.4812	Hastelloy C		3027-76	Hastelloy C	
	2.4816	Inconel 600, 617, 625			Haynes Alloys 263	
	1.4876	Incoloy 800, 825				
	2.4983	Udimet 500				
	53. Heat resisting nickel alloys - Hardness 270-410 HB 30 - Tensile strength 900-1,400 N/mm²					
	2.4631	Nimonic 80 A			Nimonic 80	
	2.4632	Nimonic 90				
	2.4634	Nimonic 105				
	2.4662	Nimonic 901		HR 8		
	2.4668	Inconel 718		HR 401, 601	Rene 41	
2.4669	Inconel 750-X					
2.4670 LN	Nimocast 713			Incoloy 925		
2.4674 LN	Nimocast PK 24					
2.4856	Inconel 625			Monel K-500		
2.6554 LN	Waspaloy					
60 COPPER N	61. Copper, unalloyed - Hardness < 100 HB 30 - Tensile strength < 350 N/mm²					
	2.0060	E - Cu 57				
	2.0070	SE - Cu			Commerially Pure	
	2.0090	SF - Cu		C 101		
	2.1356	Cu Mn 3				
	2.1522	Cu Si 2 Mn				
	62. Short chip copper alloys - Hardness < 200 HB 30 - Tensile strength < 700 N/mm²					
	62.1 - Brass					
	2.0360	Cu Zn 40(MS 60)				
	2.0380	Cu Zn 39 Pb 2 (MS 58)		CZ120, CZ109		
	2.0410	Cu Zn 44 Pb 2		PB104		
	2.0561	Cu Zn 40 Al 1			2.1030, 2.1080	
	2.0580	Cu Zn 40 Mn 1 Pb				
	2.0771	Cu Ni 7 Zn 39 Mn 5 Pb3				
	62.2 - Bronzes					
	2.1086	G-Cu Sn 10 Zn				
	2.1093	G-Cu Sn 6 Zn Ni				
	2.1096	G-Cu Sn 5 Zn Pb				
	63. Long chip copper alloys - Hardness < 200 HB 30 - Tensile strength < 700 N/mm²					
	63.1 - Brass					
	2.0250	Cu Zn 20				
	2.0265	Cu Zn 30				
	2.0321	Cu Zn 37		CZ108, CZ106		
	2.0335	Cu Zn 36 (Ms 63)				

MATERIAL CHART



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TECHNICAL DATA

ISO GROUP	STANDARDS					
	GERMANY		FRANCE	GREAT BRITAIN	EN & OTHER	U.S.A.
	W.Nr	DIN	AFNOR	B.S.	CLASSIFICATIONS	AISI
60 COPPER N	63.2 - Bronzes					
	2.1020	Cu Sn 6				
	2.1030	Cu Sn 8				
	2.1080	Cu Sn 6 Zn 6				
	63.3 - Copper alloys tempered by forging					
	2.1245	Cu Be 1.7				
	2.1247	Cu Be 2				
	2.1293	Cu Cr Zr				
	64. Cu - Al - Fe alloys Hardness < 440 HB 30 - Tensile strength < 1,500 N/mm²					
	64.1 - Ampco					
		Ampco 18			Ampco 18	
		Ampco 20		AB 1 type		
		Ampco 25			Ampco 26	
70 ALUMINIUM N	71. Aluminium - Magnesium, unalloyed - Hardness < 100 HB 30 - Tensile strength < 350 N/mm²					
	3.0250	Al 99.5 H		LM0, 1B		
	3.0280	Al 99.8 H				
	3.0305	Al 99.9				
	3.3308	Al 99.9 Mg 0.5				
	72. Aluminium alloys, Si < 0.5% - Hardness < 180 HB 30 - Tensile strength < 600 N/mm²					
	72.1 - Forging aluminium alloys					
	3.0515	Al Mn 1		LM5, 10, 12		
	3.0516	S-Al Mn				
	3.0525	Al Mn 1 Mg 0.5			6061	
	3.0615	Al Mg Si Pb				
	3.1325	Al Cu Mg 1				
	3.1355	Al Cu Mg 2				
	3.3315	Al Mg 1				
	3.3535	Al Mg 3				
	3.4365	Al Zn Mg Cu 1.5				
	72.2 - Cast aluminium alloys					
	3.1841	G - Al Cu 4 Ti				
	3.3241	G - Al Mg 3 Si				
	3.3292	GD - Al Mg 9				
	73. Aluminium alloys, 0.5-10% Si - Hardness < 180 HB 30 - Tensile strength < 600 N/mm²					
	73.1 - Cast aluminium alloys					
	3.2134	G - AL SI 5 CU 1 MG		LM2, 4	6063	
	3.2152	GD - Al Si 6 Cu 4		LM16, 18, 21	6082	
	3.2162	GD - AL SI 8 CU 3		LM22, 24, 25		
	3.2373	G - AL SI 9 MG		LM26, 27		
	74. Aluminium alloys, Si > 10% - Hardnes < 180 HB 30 - Tensile strength < 600 N/mm²					
	74.1 - Cast aluminium alloys					
	3.2381	G - AL SI 10 MG		LM6,12,13		
	3.2383	G - AL SI 10 MG (CU)		LM20,28		
	3.2581	G - AL SI 12		LM29, 30		
3.2583	G - AL SI 12 (CU)					
3.2982	GD - AL SI 12 (CU)					
74.2 - Cast aluminium - magnesium alloys						
3.5106	G - MG AG 3 SE 2 ZR 1					
3.5662	G - MG AL 6					
3.5812	G - MG AL 8 ZN 1					
3.5912	G - MG AL 9 ZN 1					
80 SYNTHETIC MATERIAL O	81. Thermoplastics					
				Nylon	Nylon	
				PVC Cellulose	PVC	
				Acetate	Acetal	
	82. Thermosetting Plastics					
				Tufnol		
				Bakelite	Bakelite	
	83. Reinforced Plastics					
				CFRP, GFRP		
				Printed Circuit Board		
				Kevlar	Kevlar	