

11th Edition

Cutting Tools Manufacturing



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11th Edition



Europa Tool Co.,Ltd

OUR AIM IS YOUR SUCCESS

11th Edition



- Milling
- Drilling
- Threading

TOOL NO. STRUCTURE

1 0 1 1 2 3 0 6 0 0

● Outside Diameter

Eg) Metric Size

6.0mm → 0600 30.5mm → 3050
 6.75mm → 0675 40.75mm → 4075
 20.0mm → 2000 50.0mm → 5000

* In case of End mills having different sizes of shank diameter with the same outside diameter, designate first digit number as "9" and then give numbers from 1 to 999 in ascending order.

Eg) Metric Size

0.D 6mm x S.H 6mm → 0600
 0.D 6mm x S.H 8mm → 9001
 0.D 6mm x S.H 10mm → 9002

● Material / Coating

Material	UNCOATED	TIN	TiCN	TiAIN	ALCRN	STEAM TEMPER	NITRIDED	HARDSLICK
M2	01	04	06	26	-	-	-	-
M42	02	05	07	21	44	-	-	-
CARBIDE K30	03	08	09	23	42	-	-	-
ASP 30	10	11	12	-	28	-	-	-
ASP 60	13	14	15	22	40	-	-	-
M35 (HSS Co5)	16	17	18	27	-	30	31	53
PULSAR	19	-	-	20	-	-	-	-
DIAMOND COATED	-	-	-	25	-	-	-	-
PULSAR BLUE	-	-	-	-	50	-	-	-
HSSE-EX	60	34	-	-	-	-	-	-

NOT APPLICABLE TO SPADE INSERT & SOME OSBORN PRODUCTS.

● SHANK TYPE

- 1 → FLAT(WELDON) SHANK
- 2 → SCREWED(THREAD) SHANK
- 3 → STRAIGHT(PLAIN) SHANK

● SERIES No.

- 100 ~ 199 → ISO/DIN METRIC
- 200 ~ 299 → MILLING INSERT
- 300 ~ 399 → BS STANDARD METRIC
- 500 ~ 599 → BS INCH
- 600 ~ 699 → REAMERS
- 700 ~ 799 → ROTARY BURRS
- 800 ~ 899 → DRILLS

CONTENTS



MILLING.	
	PULSAR-IDX 6-15
	PULSAR- BLUE 16-55
	PULSAR 56-103
	ET1 104-115
	SPHERE & DIAMOND COATED 116-121
	HX2 & HX2S STAGGERED HELIX CARBIDE 122-143
	ALU-XP CARBIDE MILLING 144-162
	STANDARD SOLID CARBIDE MILLING 164-233
	SABRE ROUGHING TOOLS 234-241
	COBALT MILLING CUTTER (FLATTED SHANK) 242-299
	HSS & COBALT MILLING CUTTERS [SCREWED SHANK] 300-345
	APPLICATION FORM CUTTER 346-353
DRILLING.	
	THROW-AWAY DRILL INSERTS & HOLDERS 356-395
	SOLID CARBIDE DRILLS 396-431
	COBALT AND HSS TWIST DRILLS 432-479
	HSS & COBALT REAMERS 480-492
	HSS COUNTERSINKS 494-497
	HSS TOOLBITS 498-501
THREADING.	
	SOLID CARBIDE TIALN THREAD MILLS 502-513
	APPLICATION MACHINE TAPS 517-587
	HAND AND ISO TAPS 588-601
	CIRCULAR DIES & DIENUTS 602-615
	ANCILLARY PRODUCTS 616-619
EDP / CODE NUMBER INDEX.	



**EUROPA TOOL COMPANY
THE DISTRIBUTORS TRUE
CUTTING TOOL PARTNER**

Our Aim Is Your Success



MILLING. INDEX



PULSAR-IDX END MILL CONTENTS










(Available for General Steels and for Hardened Steels up to HRc65)

Europa Tool 11th Edition

PULSAR-IDX END MILLS



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PRODUCTS	SERIES	DESCRIPTION	PAGE
	200320	GENERAL BALL INSERT MATERIALS UP TO HRC50	8
	200351	HARD METAL BALL INSERT MATERIALS HRC40 TO HRC65	8
	202350	TAPER NECK SHORT AND REGULAR LENGTH HOLDERS	9
	203350	STRAIGHT NECK SHORT AND REGULAR LENGTH HOLDERS	9
	204350	STRAIGHT SHANK LONG CARBIDE HOLDER	10
	200120	GENERAL CORNER RADIUS INSERT MATERIALS UP TO HRC50	11
	200151	HARD METAL CORNER RADIUS INSERT MATERIALS HRC40 TO HRC65	11
	205350	TAPER NECK REGULAR & LONG LENGTH HOLDER	12
	206350	STRAIGHT NECK REGULAR AND INTERMEDIATE LENGTH HOLDER	12
CUTTING DATA			13 ~ 15

CARBIDE BALL INSERTS



Series No. 200320, 200351

▶ cutting conditions : p.14



Indexable Ball End Mill for economic use
Two Types of Inserts are available - For General Purpose (~HRc50) & For Hardened Material (HRc40~HRc65)
Special Geometry and Coating for Excellent Performance

EUROPA CODE		MILL DIAMETER	RADIUS	HEIGHT	THICKNESS
GENERAL	HARD				
2003200800	2003510800	8	R4.0	8	2.4
2003201000	2003511000	10	R5.0	9.5	2.7
2003201200	2003511200	12	R6.0	11	3.2
2003201600	2003511600	16	R8.0	13	4.2
2003202000	2003512000	20	R10.0	16	5.2
2003202500	2003512500	25	R12.5	19.5	6.2
2003203000	2003513000	30	R15.0	23.5	7.2
2003203200	2003513200	32	R16.0	24.5	7.2

▶ The ball radius tolerance is ±0.01mm and the set-up accuracy is ±0.02mm

STEEL HOLDER FOR BALL INSERT



TAPER NECK

Series No. 202350



Premium alloy steel with excellent strength.
Precise shank, Tolerance (h6).
Black oxide treated, to prevent corrosion and improve lubricity.

EUROPA CODE	MILL DIAMETER	SHANK DIAMETER	NECK DIAMETER	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH	LENGTH TYPE	WRENCH	SCREW
202350080S	8	12	7.2	12	35	90	SHORT	SP1042	SP1032
202350080R	8	12	7.2	25	55	110	REGULAR	SP1042	SP1032
202350100S	10	12	9	15	35	90	SHORT	SP1043	SP1033
202350100R	10	12	9	30	55	110	REGULAR	SP1043	SP1033
202350120S	12	16	10.5	17	55	110	SHORT	SP1044	SP1034
202350160S	16	20	14.5	20	65	125	SHORT	SP1045	SP1035
202350200S	20	25	18	25	75	145	SHORT	●SP1046	SP1036
202350250S	25	32	22.5	30	90	170	SHORT	●SP1047	SP1037
202350300S	30 & 32	32	27	40	110	195	SHORT	●SP1048	SP1038

▶ ● Need to use SP1049 (T-HANDLE)

STRAIGHT NECK

Series No. 203350



Premium alloy steel with excellent strength.
Precise shank, Tolerance (h6).
Black oxide treated, to prevent corrosion and improve lubricity.

EUROPA CODE	MILL DIAMETER	SHANK DIAMETER	NECK DIAMETER	LENGTH BELOW SHANK	OVERALL LENGTH	LENGTH TYPE	WRENCH	SCREW
203350120S	12	12	10.5	35	90	SHORT	SP1044	SP1034
203350120R	12	12	10.5	55	110	REGULAR	SP1044	SP1034
203350160S	16	16	14.5	35	95	SHORT	SP1045	SP1035
203350160R	16	16	14.5	65	125	REGULAR	SP1045	SP1035
203350200S	20	20	18	40	110	SHORT	●SP1046	SP1036
203350200R	20	20	18	75	145	REGULAR	●SP1046	SP1036
203350250S	25	25	22.5	45	125	SHORT	●SP1047	SP1037
203350250R	25	25	22.5	90	170	REGULAR	●SP1047	SP1037
203350300S	30 & 32	32	27	55	140	SHORT	●SP1048	SP1038
203350300R	30 & 32	32	27	55	195	REGULAR	●SP1048	SP1038

▶ ● Need to use SP1049 (T-HANDLE)

CARBIDE HOLDER FOR BALL INSERT



Series No. 204350

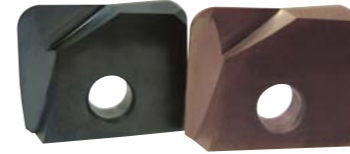


Equal tool rigidity with solid carbide end mill makes the stable and high finishing machining with the less vibration.
The high finishing machining for the deeper part of mold.
The tool's life of carbide ball holders is longer than steel holder.
Shrink Fit Holding system can be applied.
Upon request, the worn holder is able to be fixed.

EUROPA CODE	MILL DIAMETER	SHANK DIAMETER	NECK DIAMETER	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH	LENGTH TYPE	WRENCH	SCREW
204350080L	8	8	7.7	12	25	130	Long	SP1042	SP1032
204350100L	10	10	9.7	15	30	140	Long	SP1043	SP1033
204350120L	12	12	11.7	17	35	150	Long	SP1044	SP1034
204350160L	16	16	15.7	20	50	200	Long	●SP1045	SP1035
204350200L	20	20	19.7	25	60	200	Long	●SP1046	SP1036
204350250L	25	25	24.7	30	75	200	Long	●SP1047	SP1037
204350300L	30 & 32	32	29.7	40	90	250	Long	●SP1048	SP1038

► ● Need to use SP1049 (T-HANDLE)

CARBIDE CORNER RADIUS INSERTS



Series No. 200120, 200151

► cutting conditions : p.15

The optimum geometry of the tool to achieve the better reliability and less vibration and cutting load.
Interchangeability with i-Xmill ball holder, but the precise cutting is possible with i-Xmill corner radius holder due to higher stability and strength of tool.
The various and wide cutting range makes it possible to machine over the roughing and finishing.
Special coating makes high hardness with high thermal stability against oxidation. Two Types of Inserts are available - For General Purpose (~HRC50) & For Hardened Material (HRC40~HRC65)

EUROPA CODE		MILL DIAMETER	RADIUS	HEIGHT	THICKNESS
GENERAL	HARD				
2001200803	2001510803	8	0.3	8	2.4
2001200805	2001510805	8	0.5	8	2.4
2001200801	2001510801	8	1.0	8	2.4
2001201005	2001511005	10	0.5	9.5	2.7
2001201001	2001511001	10	1.0	9.5	2.7
2001201002	2001511002	10	2.0	9.5	2.7
2001201205	2001511205	12	0.5	11	3.2
2001201201	2001511201	12	1.0	11	3.2
2001201202	2001511202	12	2.0	11	3.2
2001201305	2001511305	13	0.5	11.2	3.2
2001201301	2001511301	13	1.0	11.2	3.2
2001201302	2001511302	13	2.0	11.2	3.2
2001201605	2001511605	16	0.5	13	4.2
2001201601	2001511601	16	1.0	13	4.2
2001201602	2001511602	16	2.0	13	4.2
2001201705	2001511705	17	0.5	13	4.2
2001201701	2001511701	17	1.0	13	4.2
2001201702	2001511702	17	2.0	13	4.2
2001202005	2001512005	20	0.5	16	5.2
2001202001	2001512001	20	1.0	16	5.2
2001202002	2001512002	20	2.0	16	5.2
2001202105	2001512105	21	0.5	16	5.2
2001202101	2001512101	21	1.0	16	5.2
2001202102	2001512102	21	2.0	16	5.2
2001202505	2001512505	25	0.5	19.5	6.2
2001202501	2001512501	25	1.0	19.5	6.2
2001202502	2001512502	25	2.0	19.5	6.2
2001202605	2001512605	26	0.5	19.5	6.2
2001202601	2001512601	26	1.0	19.5	6.2
2001202602	2001512602	26	2.0	19.5	6.2
2001203005	2001513005	30	0.5	23.5	7.2
2001203001	2001513001	30	1.0	23.5	7.2
2001203002	2001513002	30	2.0	23.5	7.2
2001203205	2001513205	32	0.5	23.5	7.2
2001203201	2001513201	32	1.0	23.5	7.2
2001203202	2001513202	32	2.0	23.5	7.2

► The corner radius tolerance is ±0.015mm and the set-up accuracy is ±0.02mm

STEEL HOLDER FOR CORNER RAD INSERT



TAPER NECK

Series No. 205350



Premium alloy steel with excellent strength.
Precise shank, Tolerance (h6).
Black oxide treated, to prevent corrosion and improve lubricity.

EUROPA CODE	MILL DIAMETER	SHANK DIAMETER	NECK DIAMETER	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH	INTER-FERENCE ANGLE	LENGTH TYPE	WRENCH	SCREW
205350080R	8	12	6.7	10.0	22	100	9°	Regular	SP1042	SP1032
205350080L	8	12	6.7	10.0	50	130	2°43'	Long	SP1042	SP1032
205350100R	10	12	8.6	13.0	25	100	4°45'	Regular	SP1043	SP1033
205350100L	10	12	8.6	13.0	50	150	1°32'	Long	SP1043	SP1033
205350120L	12	16	10.2	15.0	60	160	2°32'	Long	SP1044	SP1034

STRAIGHT NECK

Series No. 206350



Premium alloy steel with excellent strength.
Precise shank, Tolerance (h6).
Black oxide treated, to prevent corrosion and improve lubricity.

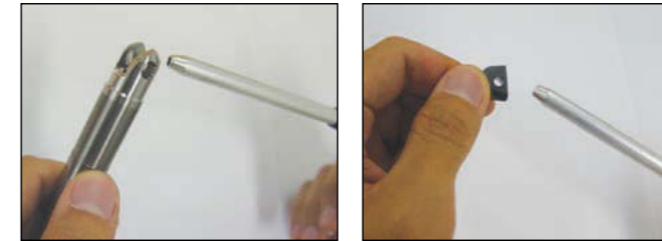
EUROPA CODE	MILL DIAMETER	SHANK DIAMETER	NECK DIAMETER	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH	LENGTH TYPE	WRENCH	SCREW
206350120R	12, 13	12	11	13	30	110	Regular	SP1044	SP1034
206350160R	16, 17	16	15	15	50	130	Regular	SP1045	SP1035
206350160I	16, 17	16	15	15	65	165	Intermediate	SP1045	SP1035
206350200R	20, 21	20	19	18	60	140	Regular	●SP1046	SP1036
206350200I	20, 21	20	19	18	80	180	Intermediate	●SP1046	SP1036
206350250R	25, 26	25	24	23	70	150	Regular	●SP1047	SP1037
206350250I	25, 26	25	24	23	90	200	Intermediate	●SP1047	SP1037
206350300R	30	32	29	27	80	160	Regular	●SP1048	SP1038
206350300I	30	32	29	27	100	220	Intermediate	●SP1048	SP1038
206350320R	32	32	31	28	80	160	Regular	●SP1048	SP1038
206350320I	32	32	31	28	100	220	Intermediate	●SP1048	SP1038

► ● Need to use SP1049 (T-HANDLE)

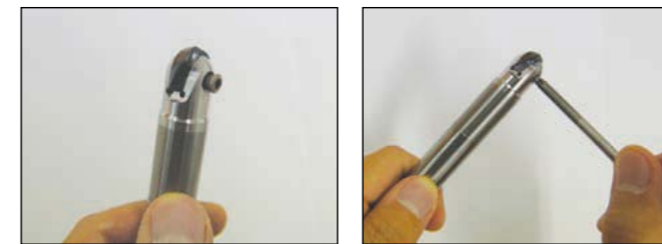
PULSAR-IDX CUTTING CONTENTS



ASSEMBLY OF PULSAR-IDX



► Make sure to clean the insert and insert seat.

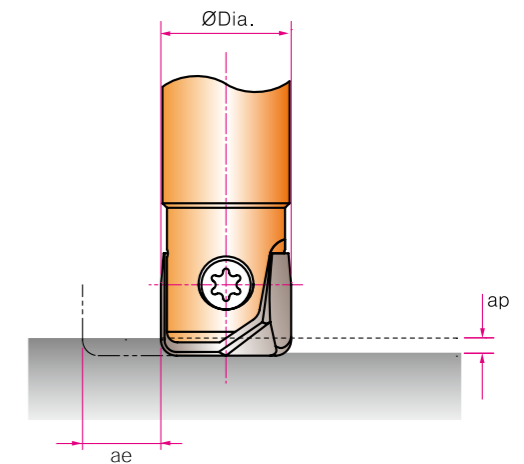
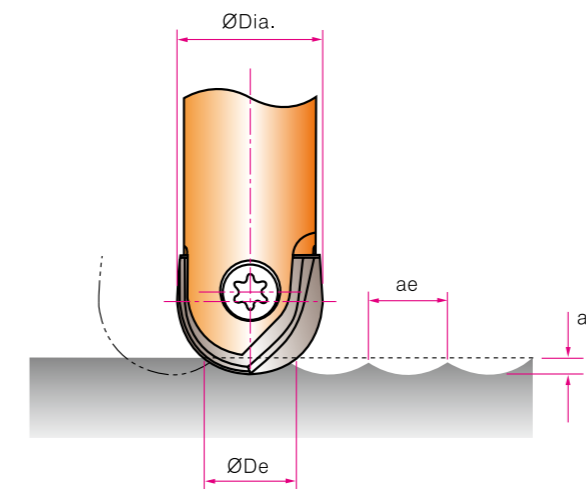


► Slide the insert into the slot of the holder.
Tighten the screw using anti-seize compound.

SIZE (Ø D)	CLAMPING TORQUE [N · m]
8	1.0
10	1.5
12, 13	2.5
16, 17	3.5
20, 21	5.0
25, 26	6.0
30, 32	6.5

* When the screw is worn out, please change the new screw.
* Please tighten up the screw with recommended torque. (Please refer to the table)
* Don't press down the insert, when the screw is tightened.

CUTTING CONDITION



RPM = revolution per minute (rev/min)
Vc = surface meter per minute (M/min)
Dia. = diameter of insert (mm)
Vf = feed speed (mm/min)
f = feed per revolution (mm/rev)
De = effective tool diameter (mm)
ap = axial depth of cut (mm)
ae = radial depth of cut (mm)

$$Vc [M/min] = \frac{(RPM) \cdot (\pi) \cdot (Dia.)}{1000}$$

$$Vf [mm/min] = (RPM) \cdot (f)$$

$$RPM [rev/min] = \frac{(Vc) \cdot (1000)}{(\pi) \cdot (Dia.)}$$

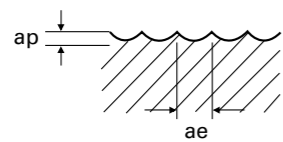
$$De [mm] = 2 \sqrt{(ap) \cdot (Dia. - ap)}$$

PULSAR-IDX BALL INSERTS

200320, 200351

WORK MATERIAL		NON-ALLOYED STEELS ALLOY STEELS CAST IRON				ALLOY STEELS HEAT RESISTANT STEELS			
HARDNESS	HB	~280				280~380			
	HRc	~30				30~40			
STRENGTH	N/mm ²	~1000				1000~1250			
<i>i</i> -Xmill Type		XMB110A				XMB110A			
CUTTING CONDITION Roughing~Finishing		RPM [rev/min]	Feed (Vf) [mm/min]	Vc [m/min]	fz [mm/t]	RPM [rev/min]	Feed (Vf) [mm/min]	Vc [m/min]	fz [mm/t]
8.0		6370~12730	2550~5090	160~320	0.20~0.20	4770~11140	1910~4460	120~280	0.20~0.20
10.0		5090~11460	2040~4580	160~360	0.20~0.20	3820~9550	1530~3820	120~300	0.20~0.20
12.0, 13.0		4240~10080	1700~4030	160~380	0.20~0.20	3180~9280	1270~3710	120~350	0.20~0.20
16.0, 17.0		3180~9550	1590~5730	160~480	0.25~0.30	2390~7560	1190~4540	120~380	0.25~0.30
20.0, 21.0		2550~9230	1270~7380	160~580	0.25~0.40	1910~6680	950~5350	120~420	0.25~0.40
25.0, 26.0		2040~7640	1020~7640	160~600	0.25~0.50	1530~6110	760~6110	120~480	0.25~0.50
30.0, 32.0		1700~7430	850~8910	160~700	0.25~0.60	1270~5840	640~7000	120~550	0.25~0.60

WORK MATERIAL		DIE TOOL STEELS PRE-HARDENED				HARDENED STEELS			
HARDNESS	HB	380~480				480~740			
	HRc	40~50				50~65			
STRENGTH	N/mm ²	1250~1500				1500~			
<i>i</i> -Xmill Type		XMB110A XMB120C				XMB120C			
CUTTING CONDITION Roughing~Finishing		RPM [rev/min]	Feed (Vf) [mm/min]	Vc [m/min]	fz [mm/t]	RPM [rev/min]	Feed (Vf) [mm/min]	Vc [m/min]	fz [mm/t]
8.0		3980~8750	1190~3500	100~220	0.15~0.20	3180~7160	640~2860	80~180	0.10~0.20
10.0		3180~8280	950~3310	100~260	0.15~0.20	2550~6370	510~2550	80~200	0.10~0.20
12.0, 13.0		2650~7430	800~2970	100~280	0.15~0.20	2120~5840	420~2330	80~220	0.10~0.20
16.0, 17.0		1990~6960	800~4180	100~350	0.20~0.30	1590~5170	480~3100	80~260	0.15~0.30
20.0, 21.0		1590~6370	640~5090	100~400	0.20~0.40	1270~5090	380~4070	80~320	0.15~0.40
25.0, 26.0		1270~5730	510~5730	100~450	0.20~0.50	1020~4580	310~4580	80~360	0.15~0.50
30.0, 32.0		1060~5310	420~6370	100~500	0.20~0.60	850~4240	250~5090	80~400	0.15~0.60



ae : Roughing - 0.1 x D
 Finishing - Under Ø12 : 0.25mm
 Ø12~Ø17 : 0.30mm
 From Ø20 : 0.40mm
 ap : Roughing - Under Ø16 : 0.025 x D
 From Ø16 : 0.05 x D
 Finishing - 0.1mm

► Recommend to reduce the feed rate to 70 ~ 85% when you use long tools.

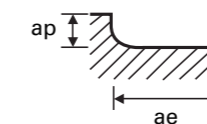
RPM = rev./min.
 FEED = mm/min.
 Vc = m/min.
 fz = mm/t

PULSAR-IDX CORNER RADIUS INSERTS

200120, 200151

WORK MATERIAL		NON-ALLOYED STEELS ALLOY STEELS CAST IRON				ALLOY STEELS HEAT RESISTANT STEELS			
HARDNESS	HB	~280				280~380			
	HRc	~30				30~40			
STRENGTH	N/mm ²	~1000				1000~1250			
<i>i</i> -Xmill Type		XMR110A				XMR110A			
CUTTING CONDITION Roughing~Finishing		RPM [rev/min]	Feed (Vf) [mm/min]	Vc [m/min]	fz [mm/t]	RPM [rev/min]	Feed (Vf) [mm/min]	Vc [m/min]	fz [mm/t]
8.0		6370~11940	2550~3580	160~300	0.20~0.15	4770~11140	1910~3340	120~280	0.20~0.15
10.0		5090~9550	2040~2860	160~300	0.20~0.15	3820~8910	1530~2670	120~280	0.20~0.15
12.0, 13.0		4240~7960	1700~2390	160~300	0.20~0.15	3180~7430	1270~2230	120~280	0.20~0.15
16.0, 17.0		3180~5970	1590~2390	160~300	0.25~0.20	2390~5570	1190~2230	120~280	0.25~0.20
20.0, 21.0		2550~4770	1270~1910	160~300	0.25~0.20	1910~4460	950~1780	120~280	0.25~0.20
25.0, 26.0		2040~3820	1020~1530	160~300	0.25~0.20	1530~3570	760~1430	120~280	0.25~0.20
30.0, 32.0		1700~3180	850~1270	160~300	0.25~0.20	1270~2970	640~1190	120~280	0.25~0.20

WORK MATERIAL		DIE TOOL STEELS PRE-HARDENED				HARDENED STEELS			
HARDNESS	HB	380~480				480~740			
	HRc	40~50				50~65			
STRENGTH	N/mm ²	1250~1500				1500~			
<i>i</i> -Xmill Type		XMR110A XMR120C				XMR120C			
CUTTING CONDITION Roughing~Finishing		RPM [rev/min]	Feed (Vf) [mm/min]	Vc [m/min]	fz [mm/t]	RPM [rev/min]	Feed (Vf) [mm/min]	Vc [m/min]	fz [mm/t]
8.0		3980~11140	990~1340	100~280	0.12~0.06	3180~8750	640~880	80~220	0.10~0.05
10.0		3180~8910	800~1070	100~280	0.13~0.06	2550~7000	510~700	80~220	0.10~0.05
12.0, 13.0		2650~7430	660~890	100~280	0.12~0.06	2120~5840	420~580	80~220	0.10~0.05
16.0, 17.0		1990~5570	600~840	100~280	0.15~0.08	1590~4380	420~530	80~220	0.15~0.06
20.0, 21.0		1590~4460	480~670	100~280	0.15~0.08	1270~3500	380~420	80~220	0.15~0.06
25.0, 26.0		1270~3570	380~530	100~280	0.15~0.07	1020~2800	310~340	80~220	0.15~0.06
30.0, 32.0		1060~2970	320~450	100~280	0.15~0.08	850~2330	250~280	80~220	0.15~0.06



ae : Roughing - 0.1 x D
 Finishing - 0.2mm
 ap : Roughing - Under Ø16 : 0.025 x D
 From Ø16 : 0.05 x D
 Finishing - Under Ø16 : 0.1mm
 From Ø16 : 0.2mm

► Recommend to reduce the feed rate to 70 ~ 85% when you use long tools.

RPM = rev./min.
 FEED = mm/min.
 Vc = m/min.
 fz = mm/t

PULSAR BLUE END MILL CONTENTS

(Carbide high speed & dry cutting condition materials up to HRc 70)

Europa Tool 11th Edition





















PULSAR BLUE END MILLS



Designed
Specifically For
Use In Dry Cutting
Conditions



www.europatool.co.uk

PRODUCTS	SERIES	DESCRIPTION	PAGE
	100350	2 FLUTE MINIATURE END MILLS	18
	100450	2 FLUTE RIB PROCESSING	19
	101350	2 FLUTE STUB CUT WITH EXTENDED NECK	22
	101450	2 FLUTE END MILLS	23
	102350	2 FLUTE CORNER RADIUS END MILLS FOR RIB PROCESSING	24
	104350	2 FLUTE BALL NOSE MINIATURE END MILLS	25
	105350	2 FLUTE STUB CUT LENGTH BALL NOSE WITH EXTENDED NECK	26
	106350	2 FLUTE BALL NOSE END MILLS FOR RIB PROCESSING	27
	109350	2 FLUTE BALL NOSE FOR RIB PROCESSING	28
	107350	3 FLUTE LONG LENGTH BALL NOSE END MILLS	31
	101550	4 FLUTE END MILLS	32
	103350	4 FLUTE STUB CUT LENGTH WITH EXTENDED NECK	33
	101650	4 FLUTE CORNER RADIUS END MILLS	34
	101750	4 FLUTE CORNER RADIUS END MILLS WITH EXTENDED NECK	35
	101950	4 FLUTE BALL NOSE END MILLS - CENTRE MATCH	36
	110350	4 FLUTE HIGH FEED BLUE CORNER RADIUS END MILLS	37
	111350	4 FLUTE LONG REACH HIGH FEED BLUE CORNER RADIUS END MILLS	38
	102950	MULTI FLUTE 45 DEG.HELIX LONG SERIES END MILLS	39
	103950	MULTI FLUTE 45 DEG.HELIX EXTRA LONG SERIES END MILLS	40
	108350	6 FLUTE 45 DEG.HELIX WITH CORNER RADIUS END MILLS	41
CUTTING DATA			42 ~ 55

2 FLUTE, MINIATURE



Series No. 100350



► cutting conditions : p.49

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

EUROPA CODE	CORNER RADIUS	O.D	S.D	LOC	OAL
1003500030	-	0.3	6	0.45	50
1003500040	-	0.4	6	0.6	50
1003500050	0.05	0.5	6	0.7	50
1003500060	0.05	0.6	6	0.9	50
1003500080	0.05	0.8	6	1.2	50
1003500100	0.10	1	6	1.5	50
1003500120	0.10	1.2	6	1.8	50
1003500150	0.15	1.5	6	2.2	50
1003500200	0.15	2	6	2.2	50

► Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

MILL DIA TOLERANCE(mm)	CORNER R TOLERANCE	SHANK DIA TOLERANCE
0~-0.012	±0.010	h6

2 FLUTE for RIB PROCESSING



Series No. 100450



► cutting conditions : p.42

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

EUROPA CODE	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH	NECK DIAMETER
1004500010	0.1	4	0.15	0.3	45	0.085
1004500011	0.1	4	0.15	0.5	45	0.085
1004500020	0.2	4	0.3	0.5	45	0.17
1004500021	0.2	4	0.3	1	45	0.17
1004500022	0.2	4	0.3	1.5	45	0.17
1004500030	0.3	4	0.45	1	45	0.27
1004500031	0.3	4	0.45	1.5	45	0.27
1004500032	0.3	4	0.45	2	45	0.27
1004500033	0.3	4	0.45	3	45	0.27
1004500034	0.3	4	0.45	4	45	0.27
1004500040	0.4	4	0.6	1	45	0.37
1004500041	0.4	4	0.6	2	45	0.37
1004500042	0.4	4	0.6	3	45	0.37
1004500043	0.4	4	0.6	4	45	0.37
1004500044	0.4	4	0.6	5	45	0.37
1004500050	0.5	4	0.7	2	45	0.45
1004500051	0.5	4	0.7	2.5	45	0.45
1004500052	0.5	4	0.7	4	45	0.45
1004500053	0.5	4	0.7	6	45	0.45
1004500054	0.5	4	0.7	8	45	0.45
1004500060	0.6	4	0.9	2	45	0.55
1004500061	0.6	4	0.9	3	45	0.55
1004500062	0.6	4	0.9	4	45	0.55
1004500063	0.6	4	0.9	6	45	0.55
1004500064	0.6	4	0.9	8	45	0.55
1004500065	0.6	4	0.9	10	45	0.55
1004500080	0.8	4	1.2	2	45	0.75
1004500081	0.8	4	1.2	4	45	0.75
1004500082	0.8	4	1.2	6	45	0.75

► Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.012	h6

2 FLUTE for RIB PROCESSING



Series No. 100450



▶ cutting conditions : p.42

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

EUROPA CODE	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH	NECK DIAMETER
100450083	0.8	4	1.2	8	45	0.75
100450084	0.8	4	1.2	10	45	0.75
100450085	0.8	4	1.2	12	45	0.75
1004500100	1.0	4	1.5	4	45	0.95
1004500101	1.0	4	1.5	6	45	0.95
1004500102	1.0	4	1.5	8	45	0.95
1004500103	1.0	4	1.5	10	45	0.95
1004500104	1.0	4	1.5	12	45	0.95
1004500105	1.0	4	1.5	16	50	0.95
1004500106	1.0	4	1.5	20	55	0.95
1004500120	1.2	4	1.8	6	45	1.15
1004500121	1.2	4	1.8	8	45	1.15
1004500122	1.2	4	1.8	10	45	1.15
1004500123	1.2	4	1.8	12	45	1.15
1004500124	1.2	4	1.8	16	50	1.15
1004500150	1.5	4	2.3	6	45	1.45
1004500151	1.5	4	2.3	8	45	1.45
1004500152	1.5	4	2.3	10	45	1.45
1004500153	1.5	4	2.3	12	45	1.45
1004500154	1.5	4	2.3	14	50	1.45
1004500155	1.5	4	2.3	16	50	1.45
1004500156	1.5	4	2.3	18	55	1.45
1004500157	1.5	4	2.3	20	55	1.45
1004500200	2.0	4	3.0	6	45	1.95
1004500201	2.0	4	3.0	8	45	1.95
1004500202	2.0	4	3.0	10	45	1.95
1004500203	2.0	4	3.0	12	45	1.95
1004500204	2.0	4	3.0	14	50	1.95
1004500205	2.0	4	3.0	16	50	1.95

▶ Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.012	h6

2 FLUTE for RIB PROCESSING



Series No. 100450



▶ cutting conditions : p.42

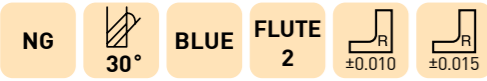
Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

EUROPA CODE	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH	NECK DIAMETER
1004500206	2.0	4	3.0	18	55	1.95
1004500207	2.0	4	3.0	20	55	1.95
1004500208	2.0	4	3.0	25	60	1.95
1004500209	2.0	4	3.0	30	70	1.95
1004500300	3.0	6	4.5	10	45	2.85
1004500301	3.0	6	4.5	12	45	2.85
1004500302	3.0	6	4.5	14	50	2.85
1004500303	3.0	6	4.5	16	55	2.85
1004500304	3.0	6	4.5	18	55	2.85
1004500305	3.0	6	4.5	20	60	2.85
1004500306	3.0	6	4.5	25	65	2.85
1004500307	3.0	6	4.5	30	70	2.85
1004500308	3.0	6	4.5	35	80	2.85
1004500309	3.0	6	4.5	40	90	2.85
1004500400	4.0	6	6	12	50	3.85
1004500401	4.0	6	6	16	60	3.85
1004500402	4.0	6	6	20	60	3.85
1004500403	4.0	6	6	25	70	3.85
1004500404	4.0	6	6	30	70	3.85
1004500405	4.0	6	6	35	80	3.85
1004500406	4.0	6	6	40	90	3.85
1004500407	4.0	6	6	45	90	3.85
1004500408	4.0	6	6	50	100	3.85

▶ Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.012	h6

2 FLUTE, STUB CUT LENGTH, with CORNER RADIUS



Series No. 101350

▶ cutting conditions : p.50

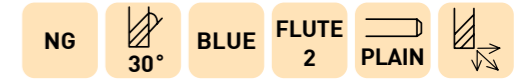
Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

EUROPA CODE	CORNER RADIUS	O.D	S.D	LOC	LENGTH BELOW SHANK	OAL	NECK DIA
1013500030	-	0.3	3	0.45	-	40	-
1013500040	-	0.4	3	0.6	-	40	-
1013500050	0.05	0.5	3	0.7	-	40	-
1013500060	0.05	0.6	3	0.9	-	40	-
1013500080	0.05	0.8	3	1.2	-	40	-
1013500100	0.10	1	3	1.5	-	40	-
1013500901	0.10	1	4	1.5	-	40	-
1013500150	0.10	1.5	3	2.2	-	40	-
1013500200	0.10	2	3	3	6	40	1.9
1013500902	0.10	2	4	3	6	40	1.9
1013500250	0.10	2.5	3	4	6	40	2.4
1013500300	0.10	3	6	4	7	45	2.9
1013500350	0.10	3.5	6	5	9	45	3.3
1013500400	0.10	4	6	5	9	45	3.8
1013500450	0.10	4.5	6	6	10	45	4.3
1013500500	0.20	5	6	6	11	50	4.8
1013500600	0.20	6	6	7	14	50	5.8
1013500800	0.20	8	8	9	18	60	7.8
1013501000	0.20	10	10	12	25	75	9.7
1013501200	0.30	12	12	15	30	75	11.7
1013501600	0.30	16	16	18	38	90	15.7
1013502000	0.30	20	20	24	45	100	19.7

▶ Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

MILL DIA TOLERANCE(mm)	CORNER R TOLERANCE	SHANK DIA TOLERANCE
0~-0.012(up to Ø6) 0~-0.015(over Ø6)	±0.010(up to Ø6) ±0.015(over Ø6)	h6

2 FLUTE with EXTENDED NECK



NEW

Series No. 101450

▶ cutting conditions : p.50

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

EUROPA CODE	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH	NECK DIAMETER
1014500010	0.1	4	0.2	-	40	-
1014500020	0.2	4	0.4	-	40	-
1014500030	0.3	4	0.6	-	40	-
1014500040	0.4	4	0.8	-	40	-
1014500050	0.5	4	1	-	40	-
1014500060	0.6	4	1.2	-	40	-
1014500070	0.7	4	1.4	-	40	-
1014500080	0.8	4	1.6	-	40	-
1014500090	0.9	4	2	-	40	-
1014500100	1.0	6	1.5	3	50	0.95
1014500150	1.5	6	1.7	4	50	1.45
1014500200	2.0	6	2	5	50	1.95
1014500250	2.5	6	2.5	6	55	2.4
1014500300	3.0	6	3	8	55	2.85
1014500350	3.5	6	3.5	9	55	3.35
1014500400	4.0	6	4	10	55	3.85
1014500500	5.0	6	5	13	55	4.85
1014500600	6.0	6	6	15	55	5.85
1014500800	8.0	8	8	20	65	7.7
1014501000	10.0	10	10	25	75	9.7
1014501200	12.0	12	12	28	85	11.7
1014501600	16.0	16	16	32	90	15.7
1014502000	20.0	20	20	40	105	19.7

▶ Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.012(up to Ø6) 0~-0.015(over Ø6)	h6

2FLUTE, CORNER RADIUS END MILLS for RIB PROCESSING



CAT No. 102350

► cutting conditions : p.48

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.



EUROPA CODE	CORNER RADIUS R	O.D	S.D	LOC	LENGTH BELOW SHANK	OAL	NECK DIA
1023500050	0.05	0.5	6	0.7	1.5	50	0.45
1023500901	0.05	0.5	6	0.7	3.3	50	0.45
1023500060	0.05	0.6	6	0.9	2.0	50	0.55
1023500902	0.05	0.6	6	0.9	4.0	50	0.55
1023500080	0.05	0.8	6	1.2	2.5	50	0.75
1023500903	0.05	0.8	6	1.2	5.5	50	0.42
1023500100	0.10	1	6	1.5	3.3	50	0.95
1023500904	0.10	1	6	1.5	6.7	50	0.95
1023500120	0.10	1.2	6	1.8	4.4	50	1.15
1023500905	0.10	1.2	6	1.8	8.0	50	1.15
1023500150	0.15	1.5	6	2.2	5.0	50	1.40
1023500906	0.15	1.5	6	2.2	9.7	50	1.40
1023500200	0.15	2	6	2.2	6.0	50	1.90
1023500907	0.15	2	6	2.2	13.0	50	1.90

► Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

MILL DIA TOLERANCE(mm)	CORNER R TOLERANCE	SHANK DIA TOLERANCE
0--0.012	±0.010	h6

2FLUTE, MINIATURE, BALL NOSE



CAT No. 104350

► cutting conditions : p.46, 47

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

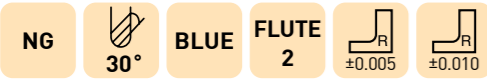


EUROPA CODE	RADIUS	O.D	S.D	LOC	OAL
1043500040	0.20	0.4	6	0.4	50
1043500050	0.25	0.5	6	0.5	50
1043500060	0.30	0.6	6	0.6	50
1043500080	0.40	0.8	6	0.8	50
1043500100	0.50	1	6	1.0	50
1043500120	0.60	1.2	6	1.2	50
1043500150	0.75	1.5	6	1.5	50
1043500200	1.00	2	6	2.0	50

► Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

RADIUS TOLERANCE	SHANK DIA TOLERANCE
±0.005	h6

2 FLUTE, STUB CUT LENGTH BALL NOSE, with EXTENDED NECK



Series No. 105350



► cutting conditions : p.46, 47

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

EUROPA CODE	RADIUS	O.D	S.D	LOC	LENGTH BELOW SHANK	OAL	NECK DIA
1053500100	0.50	1	4	1.0	2.2	50	0.95
1053500120	0.60	1.2	4	1.2	2.6	50	1.1
1053500150	0.75	1.5	4	1.5	3.0	50	1.4
1053500200	1.00	2	6	2	4.0	50	1.9
1053500300	1.50	3	6	3	6.0	60	2.9
1053500400	2.00	4	6	4	8.0	70	3.9
1053500500	2.50	5	6	5	10.0	80	4.9
1053500600	3.00	6	6	6	12.0	90	5.9
1053500700	3.50	7	8	7	14.0	90	6.9
1053500800	4.00	8	8	8	16.0	100	7.9
1053500900	4.50	9	10	9	18.0	100	8.9
1053501000	5.00	10	10	10	20.0	100	9.9
1053501200	6.00	12	12	12	24.0	110	11.9
1053501400	7.00	14	14	14	28.0	110	13.8
1053501600	8.00	16	16	16	32.0	140	15.8
1053501800	9.00	18	18	18	36.0	140	17.8
1053502000	10.00	20	20	20	40.0	160	19.8
1053502500	12.50	25	25	25	50.0	180	24.8

► Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

RADIUS TOLERANCE	SHANK DIA TOLERANCE
±0.005(up to R6) ±0.010(over R6)	h6

2FLUTE, BALL NOSE END MILLS for RIB PROCESSING



CAT No. 106350



► cutting conditions : p.43

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

EUROPA CODE	RADIUS	O.D	S.D	LOC	LENGTH BELOW SHANK	OAL	NECK DIA
1063500050	0.25	0.5	6	0.5	1.5	50	0.45
10635000901	0.25	0.5	6	0.5	3.3	50	0.45
1063500060	0.30	0.6	6	0.6	2.0	50	0.55
1063500902	0.30	0.6	6	0.6	4.0	50	0.55
1063500080	0.40	0.8	6	0.8	2.5	50	0.75
1063500903	0.40	0.8	6	0.8	5.5	50	0.75
1063500100	0.50	1	6	1	3.3	50	0.95
1063500904	0.50	1	6	1	6.7	50	0.95
1063500905	0.50	1	6	1	12.0	50	0.95
1063500120	0.60	1.2	6	1.2	4.4	50	1.15
1063500906	0.60	1.2	6	1.2	8.0	50	1.15
1063500150	0.75	1.5	6	1.5	5.0	50	1.45
1063500907	0.75	1.5	6	1.5	9.7	50	1.45
1063500908	0.75	1.5	6	1.5	15.0	50	1.45
1063500200	1.00	2	6	2	6.0	50	1.95
1063500909	1.00	2	6	2	13.0	50	1.95
1063500910	1.00	2	6	2	20.0	60	1.95

► Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

RADIUS TOLERANCE	SHANK DIA TOLERANCE
±0.005	h6

2 FLUTE BALL NOSE for RIB PROCESSING



Series No. 109350

▶ cutting conditions : p.43

Designed to machine high hardened materials
 Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
 Excellent workpiece finish.
 Designed for high precision milling operation.
 Higher wear-resistance.

EUROPA CODE	RADIUS	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH	NECK DIAMETER
1093500010	0.05	0.1	4	0.1	0.3	45	0.085
1093500011	0.05	0.1	4	0.1	0.5	45	0.085
1093500020	0.1	0.2	4	0.2	0.5	45	0.17
1093500021	0.1	0.2	4	0.2	1	45	0.17
1093500022	0.1	0.2	4	0.2	1.5	45	0.17
1093500030	0.15	0.3	4	0.3	1	45	0.27
1093500031	0.15	0.3	4	0.3	2	45	0.27
1093500032	0.15	0.3	4	0.3	3	45	0.27
1093500040	0.2	0.4	4	0.4	1	45	0.37
1093500041	0.2	0.4	4	0.4	2	45	0.37
1093500042	0.2	0.4	4	0.4	3	45	0.37
1093500043	0.2	0.4	4	0.4	4	45	0.37
1093500044	0.2	0.4	4	0.4	5	45	0.37
1093500050	0.25	0.5	4	0.4	2	45	0.45
1093500051	0.25	0.5	4	0.4	2.5	45	0.45
1093500052	0.25	0.5	4	0.4	4	45	0.45
1093500053	0.25	0.5	4	0.4	6	45	0.45
1093500054	0.25	0.5	4	0.4	8	45	0.45
1093500060	0.3	0.6	4	0.5	2	45	0.55
1093500061	0.3	0.6	4	0.5	3	45	0.55
1093500062	0.3	0.6	4	0.5	4	45	0.55
1093500063	0.3	0.6	4	0.5	5	45	0.55
1093500064	0.3	0.6	4	0.5	6	45	0.55
1093500065	0.3	0.6	4	0.5	8	45	0.55
1093500066	0.3	0.6	4	0.5	10	45	0.55
1093500080	0.4	0.8	5	0.6	2	45	0.75
1093500081	0.4	0.8	5	0.6	4	45	0.75
1093500082	0.4	0.8	6	0.6	6	45	0.75
1093500083	0.4	0.8	4	0.6	8	45	0.75

▶ Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0 ~ -0.012	h6

2 FLUTE BALL NOSE for RIB PROCESSING



Series No. 109350

▶ cutting conditions : p.43

Designed to machine high hardened materials
 Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
 Excellent workpiece finish.
 Designed for high precision milling operation.
 Higher wear-resistance.

EUROPA CODE	RADIUS	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH	NECK DIAMETER
1093500084	0.4	0.8	4	0.6	10	45	0.75
1093500100	0.5	1.0	4	0.8	3	45	0.95
1093500101	0.5	1.0	4	0.8	4	45	0.95
1093500102	0.5	1.0	4	0.8	5	45	0.95
1093500103	0.5	1.0	4	0.8	6	45	0.95
1093500104	0.5	1.0	4	0.8	7	45	0.95
1093500105	0.5	1.0	4	0.8	8	45	0.95
1093500106	0.5	1.0	4	0.8	9	45	0.95
1093500107	0.5	1.0	4	0.8	10	45	0.95
1093500108	0.5	1.0	4	0.8	12	45	0.95
1093500109	0.5	1.0	4	0.8	14	50	0.95
1093500110	0.5	1.0	4	0.8	16	50	0.95
1093500112	0.5	1.0	4	0.8	20	55	0.95
1093500120	0.6	1.2	4	1.0	6	45	1.15
1093500121	0.6	1.2	4	1.0	8	45	1.15
1093500122	0.6	1.2	4	1.0	10	45	1.15
1093500123	0.6	1.2	4	1.0	12	45	1.15
1093500150	0.75	1.5	4	1.2	6	45	1.45
1093500151	0.75	1.5	4	1.2	8	45	1.45
1093500152	0.75	1.5	4	1.2	10	45	1.45
1093500153	0.75	1.5	4	1.2	12	45	1.45
1093500154	0.75	1.5	4	1.2	14	50	1.45
1093500155	0.75	1.5	4	1.2	16	50	1.45
1093500156	0.75	1.5	4	1.2	20	55	1.45
1093500200	1.0	2.0	4	1.6	4	45	1.95
1093500201	1.0	2.0	4	1.6	6	45	1.95
1093500202	1.0	2.0	4	1.6	8	45	1.95
1093500203	1.0	2.0	4	1.6	10	45	1.95
1093500204	1.0	2.0	4	1.6	12	50	1.95

▶ Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0 ~ -0.012	h6

2 FLUTE BALL NOSE for RIB PROCESSING



Series No. 109350

► cutting conditions : p.43

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

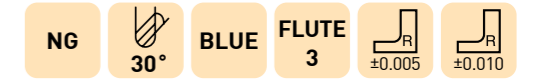


EUROPA CODE	RADIUS	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH	NECK DIAMETER
1093500205	1.0	2.0	4	1.6	14	50	1.95
1093500206	1.0	2.0	4	1.6	16	50	1.95
1093500207	1.0	2.0	4	1.6	18	55	1.95
1093500208	1.0	2.0	4	1.6	20	55	1.95
1093500209	1.0	2.0	4	1.6	22	60	1.95
1093500210	1.0	2.0	4	1.6	25	60	1.95
1093500211	1.0	2.0	4	1.6	30	70	1.95
1093500300	1.5	3.0	6	2.4	12	50	2.85
1093500301	1.5	3.0	6	2.4	14	55	2.85
1093500302	1.5	3.0	6	2.4	16	55	2.85
1093500303	1.5	3.0	6	2.4	18	60	2.85
1093500304	1.5	3.0	6	2.4	20	60	2.85
1093500305	1.5	3.0	6	2.4	25	65	2.85
1093500306	1.5	3.0	6	2.4	30	70	2.85
1093500307	1.5	3.0	6	2.4	35	80	2.85
1093500400	2.0	4.0	6	3.2	12	60	3.85
1093500401	2.0	4.0	6	3.2	16	60	3.85
1093500402	2.0	4.0	6	3.2	20	65	3.85
1093500403	2.0	4.0	6	3.2	25	70	3.85
1093500404	2.0	4.0	6	3.2	30	70	3.85
1093500405	2.0	4.0	6	3.2	35	80	3.85
1093500406	2.0	4.0	6	3.2	40	90	3.85
1093500407	2.0	4.0	6	3.2	45	90	3.85
1093500408	2.0	4.0	6	3.2	50	100	3.85

► Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0 ~ -0.012	h6

3FLUTE, BALL NOSE, LONG LENGTH



Series No. 107350

► cutting conditions : p.44

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

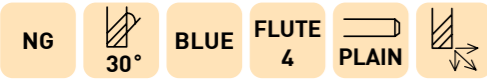


EUROPA CODE	RADIUS	O.D	S.D	LOC	OAL
1073500300	1.5	3	6	8	60
1073500400	2.0	4	6	8	70
1073500500	2.5	5	6	10	80
1073500600	3.0	6	6	12	90
1073500800	4.0	8	8	14	100
1073501000	5.0	10	10	18	100
1073501200	6.0	12	12	22	110
1073501600	8.0	16	16	30	140
1073502000	10.0	20	20	38	160

► Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

RADIUS TOLERANCE	SHANK DIA TOLERANCE
±0.005(up to R3) ±0.010(over R3)	h6

4 FLUTE with EXTENDED NECK



Series No. 101550



▶ cutting conditions : p.52

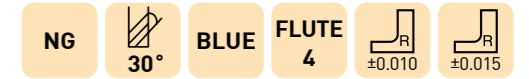
Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

EUROPA CODE	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH	NECK DIAMETER
1015500100	1.0	6	1.5	3	50	0.95
1015500200	2.0	6	2	5	50	1.95
1015500300	3.0	6	3	8	55	2.85
1015500400	4.0	6	4	10	55	3.85
1015500500	5.0	6	5	13	55	4.85
1015500600	6.0	6	6	15	55	5.85
1015500800	8.0	8	8	20	65	7.7
1015501000	10.0	10	10	25	75	9.7
1015501200	12.0	12	12	28	85	11.7
1015501600	16.0	16	16	32	90	15.7
1015502000	20.0	20	20	40	105	19.7

▶ Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.012(up to Ø6)	h6
0~-0.015(over Ø6)	

4FLUTE, STUB CUT LENGTH, with EXTENDED NECK



Series No. 103350



▶ cutting conditions : p.52

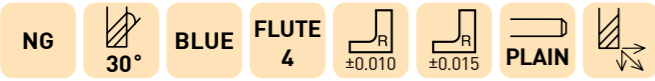
Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

EUROPA CODE	CORNER RADIUS	O.D	S.D	LOC	LENGTH BELOW SHANK	OAL	NECK DIA
1033500100	0.10	1	3	1.5	-	40	-
1033500150	0.10	1.5	3	2.2	-	40	-
1033500200	0.10	2	3	3	6	40	1.9
1033500250	0.10	2.5	3	4	6	40	2.4
1033500300	0.10	3	6	4	7	45	2.9
1033500350	0.10	3.5	6	5	9	45	3.3
1033500400	0.10	4	6	5	9	45	3.8
1033500450	0.10	4.5	6	6	10	45	4.3
1033500500	0.20	5	6	6	11	50	4.8
1033500600	0.20	6	6	7	14	50	5.8
1033500800	0.20	8	8	9	18	60	7.8
1033501000	0.20	10	10	12	25	75	9.7
1033501200	0.30	12	12	15	30	75	11.7
1033501600	0.30	16	16	18	38	90	15.7
1033502000	0.30	20	20	24	45	100	19.7

▶ Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

MILL DIA TOLERANCE(mm)	CORNER R TOLERANCE	SHANK DIA TOLERANCE
0~-0.012(up to Ø6)	±0.010(up to Ø6)	h6
0~-0.015(over Ø6)		

4 FLUTE CORNER RADIUS with EXTENDED NECK



Series No. 101650

▶ cutting conditions : p.49

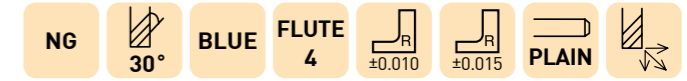
Designed to machine high hardened materials
 Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
 Excellent workpiece finish. Deep slotting is possible by reduced neck.
 Corner radius for preventing the chipping in high speed machining.
 Higher wear-resistance.

EUROPA CODE	CORNER RADIUS	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH	NECK DIAMETER
1016500300	0.3	3.0	6	4	12	55	2.85
1016500901	0.3	3.0	6	4	16	55	2.85
1016500902	0.3	3.0	6	4	20	55	2.85
1016500903	0.5	3.0	6	4	10	55	2.85
1016500904	0.5	3.0	6	4	16	55	2.85
1016500905	0.5	3.0	6	4	20	55	2.85
1016500400	0.3	4.0	6	5	12	55	3.85
1016500906	0.3	4.0	6	5	16	55	3.85
1016500907	0.3	4.0	6	5	20	55	3.85
1016500908	0.5	4.0	6	5	12	55	3.85
1016500909	0.5	4.0	6	5	16	55	3.85
1016500910	0.5	4.0	6	5	20	55	3.85
1016500911	1.0	4.0	6	5	12	55	3.85
1016500600	0.5	6.0	6	7	20	60	5.85
1016500601	1.0	6.0	6	7	20	60	5.85
1016500912	1.5	6.0	6	7	20	60	5.85
1016500800	0.5	8.0	8	9	25	60	7.7
1016500913	1.0	8.0	8	9	25	60	7.7
1016500914	1.5	8.0	8	9	25	60	7.7
1016500915	2.0	8.0	8	9	25	60	7.7
1016501000	0.5	10.0	10	11	32	70	9.7
1016500916	1.0	10.0	10	11	32	70	9.7
1016500917	1.5	10.0	10	11	32	70	9.7
1016500918	2.0	10.0	10	11	32	70	9.7
1016501200	0.5	12.0	12	12	38	80	11.7
1016500919	1.0	12.0	12	12	38	80	11.7
1016500920	1.5	12.0	12	12	38	80	11.7
1016500921	2.0	12.0	12	12	38	80	11.7

▶ Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

MILL DIA TOLERANCE(mm)	CORNER R TOLERANCE	SHANK DIA TOLERANCE
0~-0.012(up to Ø6)	±0.010(up to Ø6)	h6
0~-0.015(over Ø6)	±0.015(over Ø6)	

4 FLUTE CORNER RADIUS with EXTENDED NECK



Series No. 101750

▶ cutting conditions : p.49

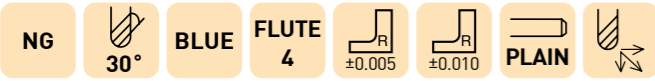
Designed to machine high hardened materials
 Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
 Excellent workpiece finish. Deep slotting is possible by reduced neck.
 Corner radius for preventing the chipping in high speed machining.
 Higher wear-resistance.

EUROPA CODE	CORNER RADIUS	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH	NECK DIAMETER
1017500605	0.5	6.0	6	9	20	90	5.85
1017600601	1.0	6.0	6	9	20	90	5.85
1017500805	0.5	8.0	8	12	25	100	7.7
1017500801	1.0	8.0	8	12	25	100	7.7
1017501005	0.5	10.0	10	15	32	100	9.7
1017501001	1.0	10.0	10	15	32	100	9.7
1017501002	2.0	10.0	10	15	32	100	9.7
1017501205	0.5	12.0	12	18	38	110	11.7
1017501201	1.0	12.0	12	18	38	110	11.7
1017501202	2.0	12.0	12	18	38	110	11.7

▶ Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

MILL DIA TOLERANCE(mm)	CORNER R TOLERANCE	SHANK DIA TOLERANCE
0~-0.012(up to Ø6)	±0.010(up to Ø6)	h6
0~-0.015(over Ø6)	±0.015(over Ø6)	

4 FLUTE BALL NOSE - CENTRE MATCH



Series No. 101950

► cutting conditions : p.45

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

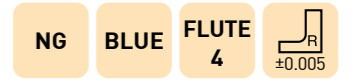


EUROPA CODE	RADIUS	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
1019500300	1.5	3	6	8	60
1019500400	2.0	4	6	8	70
1019500500	2.5	5	6	10	80
1019500600	3.0	6	6	12	90
1019500800	4.0	8	8	14	100
1019501000	5.0	10	10	18	100
1019501200	6.0	12	12	22	110
1019501600	8.0	16	16	30	140
1019502000	10.0	20	20	38	160

► Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

MILL DIA TOLERANCE(mm)	RADIUS TOLERANCE	SHANK DIA TOLERANCE
0~-0.012(up to R3)	±0.005(up to R3)	h6
0~-0.015(over R4)	±0.010(over R3)	

4FLUTE HIGH FEED BLUE CORNER RADIUS END MILLS



Series No. 110350

► cutting conditions : p.54

Excellent wear resistance at heavy feed rates on high hardened material.
Designed with reduced clearance angles and short flutes for strength.
High hardness & heat resistance coating for long life in dry applications.

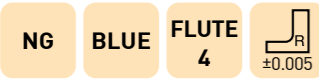


EUROPA CODE	CORNER RADIUS	CUTTING DIAMETER	SHANK DIAMETER	LENGTH OF CUT	EFFECTIVE LENGTH	OVERALL LENGTH	NECK DIAMETER
1103500200	0.5	2	6	1	6	50	1.8
1103500300	0.5	3	6	1.2	8	50	2.8
1103500400	0.5	4	6	1.5	10	50	3.8
1103500600	0.5	6	6	2.5	12	60	5.4
1103500601	1	6	6	2.5	12	60	5.4
1103500800	1	8	8	3.5	16	60	7.2
1103500802	2	8	8	3.5	16	60	7.2
1103501000	1	10	10	4	20	70	9
1103501002	2	10	10	4	20	70	9
1103501200	2	12	12	5	25	80	11
1103501203	3	12	12	5	25	80	11

► Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

MILL DIA TOLERANCE(mm)	CORNER R TOLERANCE	SHANK DIA TOLERANCE
0~-0.02	±0.005	h6

4FLUTE HIGH FEED BLUE CORNER RADIUS END MILLS



Series No. 111350

▶ cutting conditions : p.54

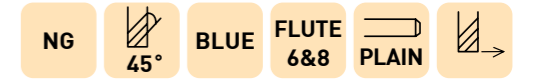
Excellent wear resistance at heavy feed rates on high hardened material.
Designed with reduced clearance angles and short flutes for strength.
High hardness & heat resistance coating for long life in dry applications.

EUROPA CODE	CORNER RADIUS	CUTTING DIAMETER	SHANK DIAMETER	LENGTH OF CUT	EFFECTIVE LENGTH	OVERALL LENGTH	NECK DIAMETER
1113500200	0.5	2	6	1	6	70	1.8
1113500300	0.5	3	6	1.2	8	70	2.8
1113500400	0.5	4	6	1.5	10	70	3.8
1113500500	0.5	5	6	2	10	70	4.6
1113500600	0.5	6	6	2.5	12	90	5.4
1113500601	1	6	6	2.5	12	90	5.4
1113500800	1	8	8	3.5	16	100	7.2
1113500802	2	8	8	3.5	16	100	7.2
1113501000	1	10	10	4	20	100	9
1113501002	2	10	10	4	20	100	9
1113501200	2	12	12	5	25	110	11
1113501203	3	12	12	5	25	110	11
1113501600	3	16	16	6.5	30	110	15

▶ Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

MILL DIA TOLERANCE(mm)	CORNER R TOLERANCE	SHANK DIA TOLERANCE
0~-0.02	±0.005	h6

6 & 8 FLUTE, 45 DEG HELIX LONG SERIES



Series No. 102950

▶ cutting conditions : p.55

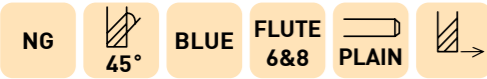
Designed to machine high hardened materials.
Designed for high abrasion resistance thanks to negative rake angle.
Excellent side-cutting of press mold field.

EUROPA CODE	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
1029500600	6.0	6	13	57	6
1029500800	8.0	8	19	63	6
1029501000	10.0	10	22	72	6
1029501200	12.0	12	26	83	6
1029501400	14.0	14	26	83	6
1029501600	16.0	16	32	92	6
1029501800	18.0	18	32	92	8
1029502000	20.0	20	38	104	8
1029502500	25.0	25	44	104	8

▶ Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0 ~ -0.02	h6

6 & 8 FLUTE, 45 DEG HELIX EXTRA LONG SERIES



Series No. 103950



▶ cutting conditions : p.55

Designed to machine high hardened materials.
Designed for high abrasion resistance thanks to negative rake angle.
Excellent side-cutting of press mold field.

EUROPA CODE	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	NO. OF FLUTE
1039500600	6.0	6	26	70	6
1039500800	8.0	8	36	90	6
1039501000	10.0	10	46	100	6
1039501200	12.0	12	56	110	6
1039501600	16.0	16	66	130	6
1039502000	20.0	20	76	140	8
1039502500	25.0	25	92	180	8

▶ Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

6FLUTE, 45° HELIX, with CORNER RADIUS



CAT No. 108350



▶ cutting conditions : p.53

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting thanks to newly developed raw-material and new coating.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

EUROPA CODE	CORNER RADIUS	O.D	S.D	LOC	LENGTH BELOW SHANK	OAL	NECK DIA
1083500600	0.5	6	6	6	14	50	5.7
1083500800	0.5	8	8	8	24	60	7.65
1083501000	1.0	10	10	10	30	70	9.65
1083501200	1.0	12	12	12	30	75	11.6

EUROPA CODE	CORNER RADIUS	O.D	S.D	LOC	LENGTH BELOW SHANK	OAL	NECK DIA
1083500901	0.5	6	6	13	-	70	-
1083500910	0.5	6	6	26	-	70	-
1083500902	0.5	8	8	19	-	90	-
1083500911	0.5	8	8	36	-	90	-
1083500903	0.5	10	10	22	-	100	-
1083500904	1.0	10	10	22	-	100	-
1083500912	1.0	10	10	46	-	100	-
1083500905	0.5	12	12	26	-	110	-
1083500906	1.0	12	12	26	-	110	-
1083500913	1.0	12	12	56	-	110	-
1083501600	1.0	16	16	32	-	130	-
1083500907	1.5	16	16	32	-	130	-
1083500914	1.5	16	16	66	-	130	-
1083502000	1.0	20	20	38	-	140	-
1083500908	1.5	20	20	38	-	140	-
1083500909	2.0	20	20	38	-	140	-
1083500915	2.0	20	20	76	-	140	-

▶ Due to the characteristics of blue decoration layer which might be erased during short term using, the color layer might not be uniform moreover. However, it doesn't effect on performance of tool.

MILL DIA TOLERANCE(mm)	CORNER R TOLERANCE	SHANK DIA TOLERANCE
0~-0.02 (Extra Long Type: 0~-0.03)	±0.010(up to Ø6) ±0.015(over Ø6)	h6

PULSAR BLUE CUTTING CONTENTS

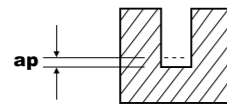


CARBIDE, 2 FLUTE for RIB PROCESSING

100450

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS					HARDENED STEELS				
HARDNESS	HRc 30 ~ HRc 45					HRc 45 ~ HRc 55				
DIAMETER	RPM	FEED	Ae (mm)	Vc	fz	RPM	FEED	Ae (mm)	Vc	fz
0.2	50000	300~350	0.006~0.016	31	0.003~0.004	50000	265~310	0.005~0.013	31	0.003~0.003
0.3	43000~50000	330~420	0.006~0.015	41~47	0.004~0.004	39900~46200	265~310	0.004~0.011	38~44	0.003~0.003
0.4	31400~50000	350~590	0.005~0.028	39~63	0.006~0.006	30500~35200	295~340	0.003~0.020	38~44	0.005~0.005
0.5	25650~33000	370~470	0.006~0.035	40~52	0.007~0.007	23750~26000	285~315	0.004~0.025	37~41	0.006~0.006
0.6	20900~35200	330~560	0.007~0.030	39~66	0.008~0.008	19900~22000	260~290	0.005~0.021	38~41	0.007~0.007
0.8	16150~26400	360~590	0.009~0.040	41~66	0.011~0.011	15200~16700	280~310	0.006~0.028	38~42	0.009~0.009
1.0	12300~18700	350~540	0.011~0.028	39~59	0.014~0.014	10500~11500	250~280	0.008~0.020	33~36	0.012~0.012
1.2	10450~17600	350~590	0.025~0.070	39~66	0.017~0.017	9100~10000	250~280	0.015~0.042	34~38	0.014~0.014
1.5	9100~17600	430~830	0.017~0.077	43~83	0.024~0.024	7000~8000	250~280	0.012~0.055	33~38	0.018~0.018
2.0	6350~10550	340~570	0.021~0.140	40~66	0.027~0.027	6100~6700	270~300	0.015~0.100	38~42	0.022~0.022
3.0	4300~7050	550~900	0.056~0.210	41~66	0.064~0.064	3990~4600	445~515	0.040~0.150	38~43	0.056~0.056
4.0	3200~5300	400~675	0.074~0.280	40~67	0.063~0.064	3000~3400	335~380	0.053~0.200	38~43	0.056~0.056

MATERIAL	HARDENED STEELS					COPPER				
HARDNESS	HRc 55 ~ HRc 65									
DIAMETER	RPM	FEED	Ae (mm)	Vc	fz	RPM	FEED	Ae (mm)	Vc	fz
0.2	50000	225~265	0.005~0.012	31	0.002~0.003	50000	455~530	0.010~0.022	31	0.005~0.005
0.3	23900~32300	105~185	0.003~0.007	23~30	0.002~0.003	48000~50000	550~640	0.010~0.025	45~47	0.006~0.006
0.4	18300~24600	120~200	0.002~0.012	23~31	0.003~0.004	48000~50000	790~920	0.008~0.048	60~63	0.008~0.009
0.5	14200~18000	115~130	0.003~0.015	22~28	0.004~0.004	44000~50000	800~1150	0.010~0.060	69~79	0.009~0.012
0.6	11900~15500	100~120	0.003~0.013	22~29	0.004~0.004	37500~50000	770~1250	0.011~0.051	71~94	0.01~0.013
0.8	9000~11700	110~125	0.004~0.017	23~29	0.006~0.005	28500~47000	770~1300	0.015~0.068	72~118	0.014~0.014
1.0	6300~8050	100~115	0.005~0.012	20~25	0.008~0.007	22500~34000	810~1300	0.018~0.048	71~107	0.018~0.019
1.2	5400~7000	100~115	0.009~0.026	20~26	0.009~0.008	22500~31500	950~1350	0.036~0.101	85~119	0.021~0.021
1.5	4300~5500	100~115	0.007~0.033	20~26	0.012~0.01	14500~25000	770~1320	0.028~0.132	68~118	0.027~0.026
2.0	3600~4700	100~120	0.009~0.060	23~30	0.014~0.013	11500~18500	770~1250	0.036~0.240	72~116	0.033~0.034
3.0	2400~3200	105~310	0.024~0.090	23~30	0.022~0.048	9000~13000	1400~2110	0.096~0.360	85~123	0.078~0.081
4.0	1800~2400	75~230	0.032~0.120	23~30	0.021~0.048	6750~9750	1050~1575	0.128~0.480	85~123	0.078~0.081



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

PULSAR BLUE CUTTING CONTENTS

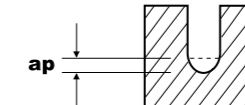


2 FLUTE BALL NOSE ENDMILL for RIB PROCESSING

106350, 109350

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS					HARDENED STEELS				
HARDNESS	HRc 30 ~ HRc 45					HRc 45 ~ HRc 55				
DIAMETER	RPM	FEED	Ae (mm)	Vc	fz	RPM	FEED	Ae (mm)	Vc	fz
R0.1 x 0.2	50000	300~350	0.006~0.016	31	0.012~0.014	50000	265~310	0.005~0.013	31	0.011~0.012
R0.15 x 0.3	48000~50000	480~520	0.010~0.017	45~47	0.020~0.021	48000~50000	440~460	0.008~0.014	45~47	0.018~0.018
R0.2 x 0.4	48000~50000	720~790	0.013~0.032	60~63	0.030~0.032	48000~50000	450~550	0.011~0.026	60~63	0.019~0.022
R0.25 x 0.5	34100~49500	600~870	0.007~0.028	54~78	0.035~0.035	31900~35200	490~540	0.005~0.023	50~55	0.031~0.031
R0.3 x 0.6	28600~40700	590~850	0.007~0.034	54~77	0.041~0.042	26400~29700	480~540	0.006~0.028	50~56	0.036~0.036
R0.4 x 0.8	22000~30800	640~890	0.016~0.064	55~77	0.058~0.058	19800~22000	490~550	0.013~0.052	50~55	0.049~0.05
R0.5 x 1.0	17600~24200	600~850	0.008~0.080	55~76	0.068~0.070	15400~17600	470~540	0.007~0.065	48~55	0.061~0.061
R0.6 x 1.2	14300~18700	590~780	0.024~0.032	54~70	0.083~0.083	12000~14000	480~540	0.020~0.026	45~53	0.080~0.077
R0.75 x 1.5	11000~14300	580~760	0.031~0.048	52~67	0.105~0.106	10000~11500	480~540	0.025~0.039	47~54	0.096~0.094
R1.0 x 2.0	8500~11000	590~800	0.024~0.160	53~69	0.139~0.145	7900~8800	470~530	0.020~0.130	50~55	0.119~0.12
R1.5 x 3.0	5700~8200	730~1000	0.064~0.240	54~77	0.256~0.244	5300~5800	590~650	0.052~0.195	50~55	0.223~0.224
R2.0 x 4.0	4300~6200	680~990	0.080~0.320	54~78	0.316~0.319	3950~4400	550~620	0.065~0.260	50~55	0.299~0.282

MATERIAL	HARDENED STEELS					COPPER				
HARDNESS	HRc 55 ~ HRc 65									
DIAMETER	RPM	FEED	Ae (mm)	Vc	fz	RPM	FEED	Ae (mm)	Vc	fz
R0.1 x 0.2	50000	225~265	0.005~0.012	31~31	0.009~0.011	50000	455~530	0.010~0.022	31~31	0.018~0.021
R0.15 x 0.3	46000~50000	390~420	0.007~0.013	43~47	0.017~0.017	48000~50000	690~790	0.002~0.023	45~47	0.029~0.032
R0.2 x 0.4	46000~50000	400~460	0.010~0.024	58~63	0.017~0.018	48000~50000	1000~1150	0.019~0.048	60~63	0.042~0.046
R0.25 x 0.5	31900~35200	440~480	0.005~0.021	50~55	0.028~0.027	49000~50000	1100~1400	0.010~0.042	77~79	0.045~0.056
R0.3 x 0.6	26400~29700	400~480	0.006~0.025	50~56	0.030~0.032	42000~50000	1100~1700	0.011~0.050	79~94	0.052~0.068
R0.4 x 0.8	19800~22000	440~500	0.012~0.048	50~55	0.044~0.045	31000~50000	1100~2250	0.024~0.096	78~126	0.071~0.090
R0.5 x 1.0	15400~17600	440~500	0.006~0.060	48~55	0.057~0.057	24000~49500	1100~2200	0.012~0.120	75~156	0.092~0.089
R0.6 x 1.2	12000~14000	420~480	0.018~0.024	45~53	0.070~0.069	28500~38500	1480~1950	0.036~0.048	107~145	0.104~0.101
R0.75 x 1.5	10000~11500	420~480	0.023~0.036	47~54	0.084~0.083	17000~28500	1100~1950	0.046~0.072	80~134	0.129~0.137
R1.0 x 2.0	7900~8800	440~480	0.018~0.120	50~55	0.111~0.109	12600~24000	1100~2150	0.036~0.240	79~151	0.175~0.179
R1.5 x 3.0	5300~5800	550~620	0.048~0.120	50~55	0.208~0.214	11900~17000	1850~2700	0.096~0.360	112~160	0.311~0.318
R2.0 x 4.0	3850~4400	530~570	0.060~0.240	48~55	0.275~0.259	6600~12500	1260~2500	0.120~0.480	83~157	0.382~0.400



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

PULSAR BLUE CUTTING CONTENTS

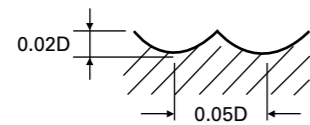


3 FLUTE LONG LENGTH BALL NOSE END MILLS

107350

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS							
	HRc 30 ~ HRc 45				HRc 45 ~ HRc 55				HRc 55 ~ HRc 60			
HARDNESS	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R1.5 x 3.0	32000	8600	300	0.090	26840	5800	255	0.072	19840	4280	185	0.072
R2.0 x 4.0	24080	7700	305	0.107	20130	5430	255	0.090	14880	3880	185	0.087
R2.5 x 5.0	20000	7250	315	0.121	16780	5430	265	0.108	12400	3690	195	0.099
R3.0 x 6.0	18000	8570	340	0.159	15200	6220	285	0.136	12200	4500	230	0.123
R4.0 x 8.0	13500	7350	340	0.181	11300	5250	285	0.155	9200	3980	230	0.144
R5.0 x 10.0	10800	6530	340	0.202	9100	4590	285	0.168	7350	3450	230	0.156
R6.0 x 12.0	9050	6100	340	0.225	7590	4260	285	0.187	6130	3190	230	0.173
R8.0 x 16.0	6700	4600	335	0.229	5690	3250	285	0.190	4600	2480	230	0.180
R10.0 x 20.0	5400	3600	340	0.222	4550	2620	285	0.192	3670	1980	230	0.180

MATERIAL	HARDENED STEELS							
	HRc 60 ~ HRc 65				HRc 65 ~ HRc 70			
HARDNESS	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R1.5 x 3.0	18680	4040	175	0.072	12780	2760	120	0.072
R2.0 x 4.0	14220	3650	180	0.086	9580	2500	120	0.087
R2.5 x 5.0	11670	3470	185	0.099	8000	2370	125	0.099
R3.0 x 6.0	11100	3830	210	0.115	7590	2460	145	0.108
R4.0 x 8.0	8320	3350	210	0.134	5690	2130	145	0.125
R5.0 x 10.0	6660	2870	210	0.144	4550	1960	145	0.144
R6.0 x 12.0	5530	2400	210	0.145	3800	1640	145	0.144
R8.0 x 16.0	4160	1800	210	0.144	2850	1230	145	0.144
R10.0 x 20.0	3300	1440	205	0.145	2280	980	145	0.143



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

PULSAR BLUE CUTTING CONTENTS

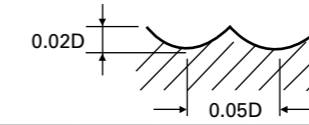


4 FLUTE BALL NOSE END MILLS

101950

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS							
	HRc 30 ~ HRc 45				HRc 45 ~ HRc 55				HRc 55 ~ HRc 60			
HARDNESS	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R1.5 x 3.0	36100	10200	340	0.071	30250	7300	285	0.060	24440	4880	230	0.050
R2.0 x 4.0	27050	8700	340	0.080	22650	6350	285	0.070	18300	4400	230	0.060
R2.5 x 5.0	21600	7800	340	0.090	17820	5750	280	0.081	14650	4150	230	0.071
R3.0 x 6.0	18040	7320	340	0.101	15180	5560	285	0.092	12210	4020	230	0.082
R4.0 x 8.0	13530	6270	340	0.116	11330	4680	285	0.103	9190	3520	230	0.096
R5.0 x 10.0	10840	5560	340	0.128	9130	4070	285	0.111	7370	3080	230	0.104
R6.0 x 12.0	9020	5230	340	0.145	7590	3800	285	0.125	6110	2810	230	0.115
R8.0 x 16.0	6770	3910	340	0.144	5670	2920	285	0.129	4620	2200	230	0.119
R10.0 x 20.0	5450	3140	340	0.144	4570	2310	285	0.126	3690	1760	230	0.119

MATERIAL	HARDENED STEELS							
	HRc 60 ~ HRc 65				HRc 65 ~ HRc 70			
HARDNESS	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R1.5 x 3.0	22280	4010	210	0.045	15170	2430	145	0.040
R2.0 x 4.0	16710	3680	210	0.055	11380	2280	145	0.050
R2.5 x 5.0	13370	3590	210	0.067	9100	2260	145	0.062
R3.0 x 6.0	11110	3410	210	0.077	7590	2200	145	0.072
R4.0 x 8.0	8310	2970	210	0.089	5670	1870	145	0.082
R5.0 x 10.0	6660	2530	210	0.095	4570	1760	145	0.096
R6.0 x 12.0	5560	2150	210	0.097	3800	1430	145	0.094
R8.0 x 16.0	4180	1600	210	0.096	2860	1100	145	0.096
R10.0 x 20.0	3300	1270	205	0.096	2260	880	140	0.097



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

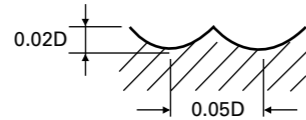
PULSAR BLUE CUTTING CONTENTS



2 FLUTE BALL NOSE END MILLS

104350, 105350

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS											
	HARDNESS				HRc 30 ~ HRc 40				HRc 40 ~ HRc 50				HRc 50 ~ HRc 55			
	DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz			
R0.1 x 0.2	50000	1200	30	0.012	50000	1050	30	0.011	45000	960	30	0.011				
R0.15 x 0.3	50000	1500	45	0.015	50000	1350	45	0.014	45000	1200	40	0.013				
R0.2 x 0.4	50000	1900	65	0.019	50000	1700	65	0.017	45000	1500	55	0.017				
R0.25 x 0.5	50000	2400	80	0.024	50000	2100	80	0.021	45000	1900	70	0.021				
R0.3 x 0.6	50000	2900	95	0.029	50000	2500	95	0.025	45000	2200	85	0.024				
R0.4 x 0.8	50000	3900	125	0.039	50000	3300	125	0.033	45000	3000	115	0.033				
R0.5 x 1.0	50000	4800	155	0.048	50000	4200	155	0.042	45000	3800	140	0.042				
R0.6 x 1.2	50000	5100	190	0.051	48000	4300	180	0.045	43000	3850	160	0.045				
R0.75 x 1.5	50000	5400	235	0.054	48000	4500	225	0.047	43000	4000	205	0.047				
R1.0 x 2.0	49700	5700	310	0.057	47800	4800	300	0.050	40000	4000	250	0.050				
R1.5 x 3.0	33100	6000	310	0.091	31800	5300	300	0.083	26500	4000	250	0.075				
R2.0 x 4.0	24900	6000	315	0.120	23900	5300	300	0.111	20000	4000	250	0.100				
R2.5 x 5.0	18600	5800	290	0.156	17800	4900	280	0.138	15000	3750	235	0.125				
R3.0 x 6.0	13900	4850	260	0.174	13400	4100	255	0.153	11000	3100	205	0.141				
R4.0 x 8.0	11100	4200	280	0.189	10700	3500	270	0.164	9000	2700	225	0.150				
R5.0 x 10.0	9300	3700	290	0.199	8900	3100	280	0.174	7500	2400	235	0.160				
R6.0 x 12.0	6950	2950	260	0.212	6680	2500	250	0.187	5600	1900	210	0.170				
R8.0 x 16.0	5570	2650	280	0.238	5350	2200	270	0.206	4500	1700	225	0.189				
R10.0 x 20.0	4450	2350	280	0.264	4300	1950	270	0.227	3600	1500	225	0.208				



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

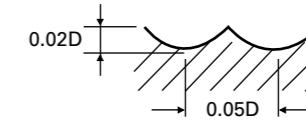
PULSAR BLUE CUTTING CONTENTS



2 FLUTE BALL NOSE END MILLS

104350, 105350

MATERIAL	HARDENED STEELS															
	HARDNESS				HRc 55 ~ HRc 60				HRc 60 ~ HRc 65				HRc 65 ~ HRc 70			
	DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz			
R0.1 x 0.2	40000	770	25	0.010	35000	674	20	0.010	31500	570	20	0.009				
R0.15 x 0.3	40000	965	40	0.012	35000	840	35	0.012	31500	700	30	0.011				
R0.2 x 0.4	40000	1200	50	0.015	35000	1050	45	0.015	31500	890	40	0.014				
R0.25 x 0.5	40000	1500	65	0.019	35000	1300	55	0.019	31500	1100	50	0.017				
R0.3 x 0.6	40000	1800	75	0.023	35000	1600	65	0.023	31500	1400	60	0.022				
R0.4 x 0.8	40000	2400	100	0.030	35000	2100	90	0.030	31500	1800	80	0.029				
R0.5 x 1.0	40000	3000	125	0.038	35000	2600	110	0.037	35000	2300	110	0.033				
R0.6 x 1.2	38000	3000	145	0.039	34000	2700	130	0.040	30600	2300	115	0.038				
R0.75 x 1.5	37000	3100	175	0.042	33000	2700	155	0.041	29700	2300	140	0.039				
R1.0 x 2.0	35000	3150	220	0.045	32000	2800	200	0.044	28500	2300	180	0.040				
R1.5 x 3.0	23500	3150	220	0.067	21000	2800	200	0.067	19000	2300	180	0.061				
R2.0 x 4.0	17500	3150	220	0.090	16000	2800	200	0.088	14500	2300	180	0.079				
R2.5 x 5.0	13500	3050	210	0.113	11500	2550	180	0.111	10500	2100	165	0.100				
R3.0 x 6.0	10000	2500	190	0.125	8800	2150	165	0.122	8000	1750	150	0.109				
R4.0 x 8.0	8000	2150	200	0.134	7000	1850	175	0.132	6500	1550	165	0.119				
R5.0 x 10.0	6600	1900	205	0.144	5800	1650	180	0.142	5300	1380	165	0.130				
R6.0 x 12.0	5000	1550	190	0.155	4400	1250	165	0.142	4000	1050	150	0.131				
R8.0 x 16.0	4000	1350	200	0.169	3500	1000	175	0.143	3200	850	160	0.133				
R10.0 x 20.0	3200	1200	200	0.188	2800	800	175	0.143	2550	660	160	0.129				



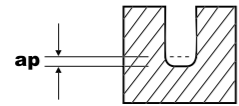
RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

2 FLUTE CORNER RADIUS ENDMILL for RIB PROCESSING

102350

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS					HARDENED STEELS				
	HRc 30 ~ HRc 45					HRc 45 ~ HRc 55				
HARDNESS	RPM	FEED	Ae (mm)	Vc	fz	RPM	FEED	Ae (mm)	Vc	fz
0.5	25650~33000	370~470	0.0056~0.0350	40~52	0.029~0.028	23750~26000	285~315	0.0040~0.0250	37~41	0.024~0.024
0.6	20900~35200	330~560	0.0063~0.0294	39~66	0.032~0.032	19900~22000	260~290	0.0450~0.0210	38~41	0.026~0.026
0.8	16150~26400	360~590	0.0084~0.0392	41~66	0.045~0.045	15200~16700	280~310	0.0060~0.0280	38~42	0.037~0.037
1.0	12300~18700	350~540	0.0105~0.0280	39~59	0.057~0.058	10500~11500	250~280	0.0075~0.0200	33~36	0.048~0.049
1.2	10450~17600	350~590	0.0245~0.0700	39~66	0.067~0.067	9100~10000	250~280	0.0150~0.0420	34~38	0.055~0.056
1.5	9100~17600	430~830	0.0161~0.0770	43~83	0.095~0.094	7000~8000	250~280	0.0115~0.0550	33~38	0.071~0.070
2.0	6350~10550	340~570	0.0210~0.1400	40~66	0.107~0.108	6100~6700	270~300	0.0150~0.1000	38~42	0.089~0.090

MATERIAL	HRc 55 ~ HRc 60				
HARDNESS	RPM	FEED	Ae (mm)	Vc	fz
0.5	14200~18000	115~130	0.0024~0.0150	22~28	0.016~0.014
0.6	11900~15500	100~120	0.0027~0.0126	22~29	0.017~0.015
0.8	9000~11700	110~125	0.0036~0.0168	23~29	0.024~0.021
1.0	6300~8050	100~115	0.0045~0.0120	20~25	0.032~0.029
1.2	5400~7000	100~115	0.0090~0.0252	20~26	0.037~0.033
1.5	4300~5500	100~115	0.0069~0.0330	20~26	0.047~0.042
2.0	3600~4700	100~120	0.0090~0.0600	23~30	0.056~0.051

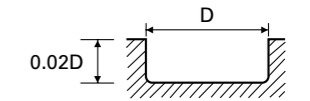
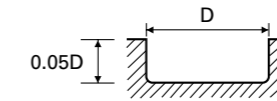


RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

2 FLUTE MINIATURE END MILLS

100350

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS															
	HRc 30 ~ HRc 40				HRc 40 ~ HRc 50				HRc 50 ~ HRc 55				HRc 55 ~ HRc 60				HRc 60 ~ HRc 65			
HARDNESS	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
0.3	50000	190	45	0.002	45000	140	40	0.002	40000	115	40	0.001	33000	70	30	0.001	25000	40	25	0.001
0.4	50000	235	65	0.002	45000	180	55	0.002	40000	140	50	0.002	33000	90	40	0.001	25000	55	30	0.001
0.5	50000	370	80	0.004	45000	280	70	0.003	40000	220	65	0.003	33000	140	50	0.002	25000	85	40	0.002
0.6	50000	470	95	0.005	45000	360	85	0.004	40000	285	75	0.004	30000	160	55	0.003	25000	105	45	0.002
0.8	50000	600	125	0.006	40000	440	100	0.006	30000	295	75	0.005	25000	185	65	0.004	19000	110	50	0.003
1.0	48000	750	150	0.008	38000	570	120	0.008	25500	360	80	0.007	20500	215	65	0.005	16000	135	50	0.004
1.2	42000	790	160	0.009	34000	640	130	0.009	22500	380	85	0.008	20000	250	75	0.006	14500	145	55	0.005
1.5	37000	800	175	0.011	30500	670	145	0.011	21000	410	100	0.010	17000	250	80	0.007	13000	155	60	0.006
2.0	33300	850	210	0.013	26000	680	165	0.013	17500	420	110	0.012	14500	260	90	0.009	11000	160	70	0.007

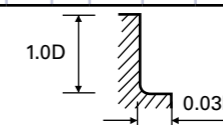


RPM= rev. / min. , FEED= mm / min.
Vc= m / min. , fz= mm / t

4 FLUTE CORNER RADIUS END MILLS

101650, 101750

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS																			
	HRc 30 ~ HRc 40				HRc 40 ~ HRc 50				HRc 50 ~ HRc 55				HRc 55 ~ HRc 60				HRc 60 ~ HRc 65				HRc 65 ~ HRc 70			
HARDNESS	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz				
1.0	48000	1184	150	0.006	38000	840	120	0.006	25500	568	80	0.006	20500	344	65	0.004	16000	216	50	0.003	12500	140	40	0.700
2.0	33300	1400	210	0.011	26000	1000	165	0.010	17500	672	110	0.010	14500	416	90	0.007	11000	256	70	0.006	9500	184	60	0.657
3.0	21800	1400	205	0.016	17300	1000	165	0.014	11500	672	110	0.015	9500	416	90	0.011	7500	256	70	0.009	6400	184	60	0.657
4.0	16700	1440	210	0.022	13200	1040	165	0.020	8800	704	110	0.020	7200	432	90	0.015	5600	268	70	0.012	4750	192	60	0.686
5.0	15700	1600	245	0.025	12500	1200	195	0.024	8300	800	130	0.024	6400	464	100	0.018	5100	296	80	0.015	4450	216	70	0.675
6.0	13100	1560	245	0.030	10350	1120	195	0.027	6900	760	130	0.028	5300	448	100	0.021	4200	280	80	0.017	3700	208	70	0.650
8.0	9880	1504	250	0.038	7800	1080	195	0.035	5200	720	130	0.035	4000	416	100	0.026	3200	264	80	0.021	2800	192	70	0.600
10.0	7800	1400	245	0.045	6150	1008	195	0.041	4100	672	130	0.041	3200	384	100	0.030	2550	248	80	0.024	2200	176	70	0.550
12.0	6650	1400	250	0.053	5250	1008	200	0.048	3500	672	130	0.048	2650	384	100	0.036	2100	240	80	0.029	1860	176	70	0.550
16.0	4900	1200	245	0.061	3900	880	195	0.056	2600	584	130	0.056	2000	336	100	0.042	1600	216	80	0.034	1400	160	70	0.500
20.0	3900	1040	245	0.067	3100	776	195	0.063	2050	520	130	0.063	1600	304	100	0.048	1300	200	80	0.038	1100	144	70	0.450



RPM= rev. / min. , FEED= mm / min.
Vc= m / min. , fz= mm / t



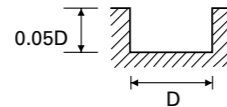
2 FLUTE STUB CUT LENGTH with EXTENDED NECK

101350, 101450

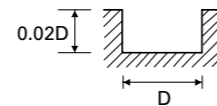
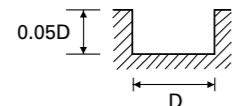


SLOTTING

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS							
	HRc 30 ~ HRc 40				HRc 40 ~ HRc 50				HRc 50 ~ HRc 55			
HARDNESS	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
0.2	50000	130	30	0.001	45000	115	30	0.001	40000	95	25	0.001
0.3	50000	190	45	0.002	45000	140	40	0.002	40000	115	40	0.001
0.4	50000	235	65	0.002	45000	180	55	0.002	40000	140	50	0.002
0.5	50000	370	80	0.004	45000	280	70	0.003	40000	220	65	0.003
0.6	50000	470	95	0.005	45000	360	85	0.004	40000	285	75	0.004
0.8	50000	600	125	0.006	40000	440	100	0.006	30000	295	75	0.005
0.9	49000	655	140	0.007	39000	520	110	0.007	27800	330	80	0.006
1.0	48000	750	150	0.008	38000	570	120	0.008	25500	360	80	0.007
2.0	33300	850	210	0.013	26000	680	165	0.013	17500	420	110	0.012
3.0	21800	850	205	0.019	17300	680	165	0.020	11500	420	110	0.018
4.0	16700	880	210	0.026	13200	700	165	0.027	8800	440	110	0.025
5.0	15700	1000	245	0.032	12500	805	195	0.032	8300	500	130	0.030
6.0	13100	950	245	0.036	10350	770	195	0.037	6900	480	130	0.035
8.0	9880	930	250	0.047	7800	720	195	0.046	5200	445	130	0.043
10.0	7800	850	245	0.054	6150	680	195	0.055	4100	415	130	0.051
12.0	6650	850	250	0.064	5250	680	200	0.065	3500	415	130	0.059
16.0	4900	730	245	0.074	3900	580	195	0.074	2600	365	130	0.070
20.0	3900	660	245	0.085	3100	525	195	0.085	2050	335	130	0.082



MATERIAL	HARDENED STEELS											
	HRc 55 ~ HRc 60				HRc 60 ~ HRc 65				HRc 65 ~ HRc 70			
HARDNESS	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
0.2	33000	60	20	0.001	33000	45	20	0.001	26400	30	15	0.750
0.3	33000	70	30	0.001	25000	50	25	0.001	20000	35	20	0.700
0.4	33000	90	40	0.001	25000	55	30	0.001	20000	40	25	0.667
0.5	33000	140	50	0.002	25000	85	40	0.002	20000	60	30	0.750
0.6	30000	160	55	0.003	25000	105	45	0.002	20000	75	40	0.833
0.8	25000	185	65	0.004	19000	110	50	0.003	15200	80	40	0.800
0.9	22700	205	65	0.005	17500	125	50	0.004	14000	90	40	0.900
1.0	20500	215	65	0.005	16000	135	50	0.004	12500	85	40	0.850
2.0	14500	260	90	0.009	11000	160	70	0.007	9500	115	60	0.821
3.0	9500	260	90	0.014	7500	160	70	0.011	6400	115	60	0.821
4.0	7200	270	90	0.019	5600	170	70	0.015	4750	118	60	0.843
5.0	6400	285	100	0.022	5100	180	80	0.018	4450	132	70	0.825
6.0	5300	280	100	0.026	4200	180	80	0.021	3700	130	70	0.813
8.0	4000	255	100	0.032	3200	165	80	0.026	2800	120	70	0.750
10.0	3200	240	100	0.038	2550	155	80	0.030	2200	112	70	0.700
12.0	2650	240	100	0.045	2100	155	80	0.037	1860	112	70	0.700
16.0	2000	210	100	0.053	1600	135	80	0.042	1400	95	70	0.594
20.0	1600	195	100	0.061	1300	125	80	0.048	1100	85	70	0.531



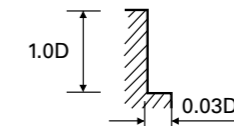
RPM= rev. / min. , FEED= mm / min.
Vc= m / min. , fz= mm / t



SIDE CUTTING

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS							
	HRc 30 ~ HRc 40				HRc 40 ~ HRc 50				HRc 50 ~ HRc 55			
HARDNESS	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
1.0	48000	1050	150	0.011	38000	820	120	0.011	25500	510	80	0.010
2.0	33300	1200	210	0.018	26000	970	165	0.019	17500	600	110	0.017
3.0	21800	1200	205	0.028	17300	970	165	0.028	11500	600	110	0.026
4.0	16700	1250	210	0.037	13200	1000	165	0.038	8800	625	110	0.036
5.0	15700	1450	245	0.046	12500	1150	195	0.046	8300	710	130	0.043
6.0	13100	1350	245	0.052	10350	1100	195	0.053	6900	690	130	0.050
8.0	9880	1320	250	0.067	7800	1030	195	0.066	5200	635	130	0.061
10.0	7800	1200	245	0.077	6150	970	195	0.079	4100	590	130	0.072
12.0	6650	1200	250	0.090	5250	970	200	0.092	3500	590	130	0.084
16.0	4900	1050	245	0.107	3900	840	195	0.108	2600	520	130	0.100
20.0	3900	950	245	0.122	3100	750	195	0.121	2050	475	130	0.116

MATERIAL	HARDENED STEELS											
	HRc 55 ~ HRc 60				HRc 60 ~ HRc 65				HRc 65 ~ HRc 70			
HARDNESS	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
1.0	20500	310	65	0.008	16000	190	50	0.006	12500	125	40	1.250
2.0	14500	370	90	0.013	11000	230	70	0.010	9500	165	60	1.179
3.0	9500	370	90	0.019	7500	230	70	0.015	6400	165	60	1.179
4.0	7200	385	90	0.027	5600	240	70	0.021	4750	170	60	1.214
5.0	6400	410	100	0.032	5100	260	80	0.025	4450	190	70	1.188
6.0	5300	400	100	0.038	4200	255	80	0.030	3700	185	70	1.156
8.0	4000	365	100	0.046	3200	235	80	0.037	2800	170	70	1.063
10.0	3200	340	100	0.053	2550	220	80	0.043	2200	160	70	1.000
12.0	2650	340	100	0.064	2100	220	80	0.052	1860	160	70	1.000
16.0	2000	300	100	0.075	1600	190	80	0.059	1400	140	70	0.875
20.0	1600	275	100	0.086	1300	175	80	0.067	1100	125	70	0.781



RPM= rev. / min. , FEED= mm / min.
Vc= m / min. , fz= mm / t

PULSAR BLUE CUTTING CONTENTS



4 FLUTE STUB CUT LENGTH with EXTENDED NECK

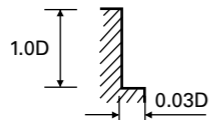
103350, 101550



SIDE CUTTING

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS							
	HRc 30 ~ HRc 40				HRc 40 ~ HRc 50				HRc 50 ~ HRc 55			
HARDNESS	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
1.0	48000	1480	150	0.008	38000	1050	120	0.007	25500	710	80	0.007
2.0	33300	1750	210	0.013	26000	1250	165	0.012	17500	840	110	0.012
3.0	21800	1750	205	0.020	17300	1250	165	0.018	11500	840	110	0.018
4.0	16700	1800	210	0.027	13200	1300	165	0.025	8800	880	110	0.025
5.0	15700	2000	245	0.032	12500	1500	195	0.030	8300	1000	130	0.030
6.0	13100	1950	245	0.037	10350	1400	195	0.034	6900	950	130	0.034
8.0	9880	1880	250	0.048	7800	1350	195	0.043	5200	900	130	0.043
10.0	7800	1750	245	0.056	6150	1260	195	0.051	4100	840	130	0.051
12.0	6650	1750	250	0.066	5250	1260	200	0.060	3500	840	130	0.060
16.0	4900	1500	245	0.077	3900	1100	195	0.071	2600	730	130	0.070
20.0	3900	1300	245	0.083	3100	970	195	0.078	2050	650	130	0.079

MATERIAL	HARDENED STEELS											
	HRc 55 ~ HRc 60				HRc 60 ~ HRc 65				HRc 65 ~ HRc 70			
HARDNESS	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
1.0	20500	430	65	0.005	16000	270	50	0.004	12500	175	40	0.875
2.0	14500	520	90	0.009	11000	320	70	0.007	9500	230	60	0.821
3.0	9500	520	90	0.014	7500	320	70	0.011	6400	230	60	0.821
4.0	7200	540	90	0.019	5600	335	70	0.015	4750	240	60	0.857
5.0	6400	580	100	0.023	5100	370	80	0.018	4450	270	70	0.844
6.0	5300	560	100	0.026	4200	350	80	0.021	3700	260	70	0.813
8.0	4000	520	100	0.033	3200	330	80	0.026	2800	240	70	0.750
10.0	3200	480	100	0.038	2550	310	80	0.030	2200	220	70	0.688
12.0	2650	480	100	0.045	2100	300	80	0.036	1860	220	70	0.688
16.0	2000	420	100	0.053	1600	270	80	0.042	1400	200	70	0.625
20.0	1600	380	100	0.059	1300	250	80	0.048	1100	180	70	0.563



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

PULSAR BLUE CUTTING CONTENTS

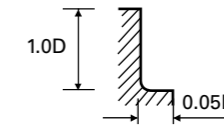


6 FLUTE 45° HELIX with CORNER RADIUS END MILLS

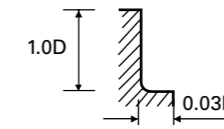
108350



MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS							
	HRc 30 ~ HRc 40				HRc 40 ~ HRc 50				HRc 50 ~ HRc 55			
HARDNESS	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	24800	5350	465	0.036	23500	4900	445	0.035	16000	4900	300	0.051
8.0	20000	5500	505	0.046	19000	5000	480	0.044	12000	4600	300	0.064
10.0	16000	4900	505	0.051	15500	4500	485	0.048	9500	4100	300	0.072
12.0	13000	4500	490	0.058	12500	4100	470	0.055	8000	3800	300	0.079
16.0	10000	4000	505	0.067	9700	3700	490	0.064	6000	3400	300	0.094
20.0	8000	3350	505	0.070	7800	3400	490	0.073	4800	3200	300	0.111



MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS							
	HRc 55 ~ HRc 60				HRc 60 ~ HRc 65				HRc 65 ~ HRc 70			
HARDNESS	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	13500	3300	255	0.041	10500	2100	200	0.033	8000	1450	150	1.208
8.0	10000	3100	250	0.052	8000	2000	200	0.042	6000	1400	150	1.167
10.0	8000	2900	250	0.060	6400	1800	200	0.047	4800	1300	150	1.083
12.0	6600	2500	250	0.063	5300	1600	200	0.050	4000	1150	150	0.958
16.0	5000	2300	250	0.077	4000	1250	200	0.052	3000	870	150	0.725
20.0	4000	2100	250	0.088	3200	1020	200	0.053	2400	690	150	0.575



※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

PULSAR END MILL CONTENTS

(Carbide high speed & dry cutting condition materials up to HRc 65)

Europa Tool 11th Edition













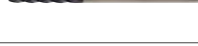



PULSAR END MILLS



Designed
Specifically For
Use In Dry Cutting
Conditions











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PRODUCTS	SERIES	DESCRIPTION	PAGE
	100120 100320	2 FLUTE SHORT PULSAR END MILLS	59
	102120 102320	2 FLUTE LONG PULSAR END MILLS	60
	155120 155320	2 FLUTE CORNER RADIUS LONG PULSAR END MILLS	61
	112120 112320	2 FLUTE BALL NOSE LONG PULSAR END MILLS	62
	118120 118320	2 FLUTE BALL NOSE SHORT PULSAR END MILLS	63
	114320	2 FLUTE BALL NOSE LONG REACH PULSAR END MILLS	64
	103120 103320	3 FLUTE MINIATURE PULSAR END MILLS	65
	109120 109320	4 FLUTE SHORT PULSAR END MILLS	66
	111120 111320	4 FLUTE LONG PULSAR END MILLS	67
	157120 157320	4 FLUTE CORNER RADIUS LONG PULSAR END MILLS	68
	156120 156320	4 FLUTE CORNER RADIUS STUB CUT PULSAR END MILLS	69
	116120 116320	2 FLUTE BALL NOSE STUB CUT LENGTH FOR OVER HRC55	70
	115120 115320	4 FLUTE BALL NOSE LONG PULSAR END MILLS	71
	149120 149320	6&8 FLUTE 45 DEG HELIX LONG PULSAR END MILLS	72
	150120 150320	6 FLUTE 45 DEG HELIX EXTRA LONG PULSAR END MILLS	73
	158120 158320	6 FLUTE 45 DEG HELIX CORNER RADIUS LONG PULSAR END MILLS	74
	148120 148320	MULTI FLUTE ROUGHING SHORT PULSAR END MILLS	75

PULSAR END MILL CONTENTS

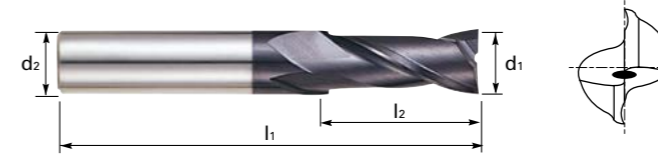
(Carbide high speed & dry cutting condition materials up to HRc 65)

PRODUCTS	SERIES	DESCRIPTION	PAGE
	147120 147320	MULTI FLUTE ROUGHING LONG PULSAR END MILLS	76
	145120 145320	3&4 FLUTE ROUGHING BALL NOSE LONG LENGTH END MILLS	77
	100320	2 FLUTE MINIATURE PULSAR END MILLS	78
	105320	2 FLUTE BALL NOSE MINIATURE PULSAR END MILLS	79
	143320	2 FLUTE BALL NOSE PULSAR END MILLS FOR RIB PROCESSING	80
	107320 108320	2 FLUTE PULSAR END MILLS FOR RIB PROCESSING	81
	120320	4 FLUTE PULSAR END MILLS FOR RIB PROCESSING	82
	130320	4 FLUTE BALL NOSE PULSAR END MILLS FOR RIB PROCESSING	84
CUTTING DATA			86 ~ 103

2 FLUTE, SHORT LENGTH



MG < .5 μ m 30° N FLUTE 2 PLAIN FLAT



Series No. 100120, 100320

▶ cutting conditions : p.86

Designed to machine tool steels, alloy steels, mold steels and other hardened materials.
Superior workpiece finishes.
Increased feed rates.

EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁
-	1003200100	1.0	4	2.5	40
-	1003200150	1.5		4	
-	1003200200	2.0		6	
-	1003200250	2.5		8	
1001200300	1003200300	3.0	6	8	45
1001200350	1003200350	3.5		10	
1001200400	1003200400	4.0		11	
1001200450	1003200450	4.5		11	
1001200500	1003200500	5.0		13	
1001200550	1003200550	5.5	8	13	50
1001200600	1003200600	6.0		13	
1001200650	1003200650	6.5		16	
1001200700	1003200700	7.0		16	
1001200750	1003200750	7.5		16	
1001200800	1003200800	8.0	10	19	70
1001200850	1003200850	8.5		19	
1001200900	1003200900	9.0		19	
1001200950	1003200950	9.5		19	
1001201000	1003201000	10.0		22	
1001201050	1003201050	10.5	12	22	75
1001201100	1003201100	11.0		22	
1001201150	1003201150	11.5		22	
1001201200	1003201200	12.0		26	
1001201300	1003201300	13.0		26	
1001201400	1003201400	14.0	14	26	85
1001201500	1003201500	15.0	16	26	90
1001201600	1003201600	16.0		32	
1001201700	1003201700	17.0		32	
1001201800	1003201800	18.0	18	32	100
1001201900	1003201900	19.0	20	32	105
1001202000	1003202000	20.0		38	
1001202200	1003202200	22.0		38	
1001202400	1003202400	24.0	25	45	120
1001202500	1003202500	25.0		45	

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

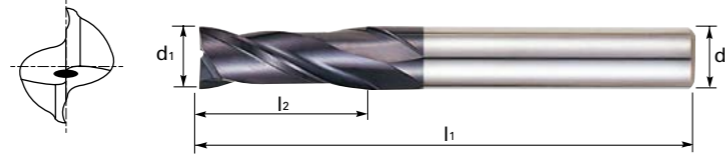
PULSAR DESIGNED SPECIFICALLY FOR USE IN DRY CUTTING CONDITIONS

2 FLUTE, LONG LENGTH



Series No. 102120, 102320

▶ cutting conditions : p.87



Designed to machine tool steels, alloy steels, mold steels and other hardened materials.
Superior workpiece finishes.
Increased feed rates.

EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁
-	1023200200	2.0	4	8	40
1021200300	1023200300	3.0	6	12	50
1021200400	1023200400	4.0		15	
1021200500	1023200500	5.0		20	
1021200600	1023200600	6.0	8	20	60
1021200800	1023200800	8.0		25	
1021201000	1023201000	10.0		30	
1021201200	1023201200	12.0	12	30	90
1021201400	1023201400	14.0		40	
1021201600	1023201600	16.0		50	
1021201800	1023201800	18.0	20	50	110
1021202000	1023202000	20.0		55	
1021202500	1023202500	25.0		75	

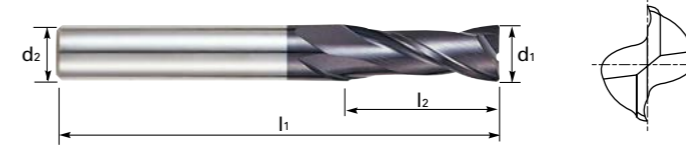
MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

2 FLUTE, CORNER RADIUS, LONG LENGTH



Series No. 155120, 155320

▶ cutting conditions : p.87



Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁
1551209011	1553209011	4 x R0.5	6	15	50
1551209012	1553209012	5 x R0.5		20	
1551209013	1553209013	6 x R0.3		20	
1551200600	1553200600	6 x R0.5	8	20	60
1551209001	1553209001	6 x R1		20	
1551209014	1553209014	8 x R0.3		25	
1551200800	1553200800	8 x R0.5	10	25	70
1551209002	1553209002	8 x R1		25	
1551209003	1553209003	8 x R1.5		25	
1551209004	1553209004	8 x R2	12	25	90
1551209016	1553209016	10 x R0.3		30	
1551201000	1553201000	10 x R0.5		30	
1551209005	1553209005	10 x R1	16	30	110
1551209006	1553209006	10 x R1.5		30	
1551209007	1553209007	10 x R2		30	
1551201200	1553201200	12 x R0.5	20	30	90
1551209008	1553209008	12 x R1		30	
1551209009	1553209009	12 x R1.5		30	
1551209010	1553209010	12 x R2	16	30	110
1551201600	1553201600	16 x R0.5		50	
1551209017	1553209017	16 x R1		50	
1551209018	1553209018	16 x R1.5	20	50	110
1551209019	1553209019	16 x R2		50	
1551209020	1553209020	20 x R1		55	
1551209021	1553209021	20 x R1.5	20	55	110
1551209022	1553209022	20 x R2		55	
1551202000	1553202000	20 x R0.5		55	

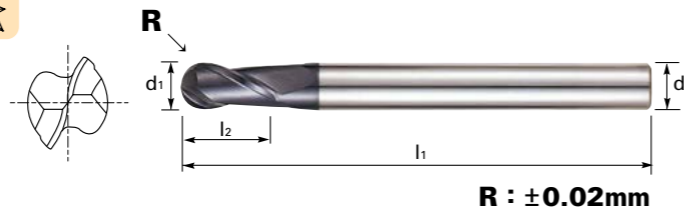
MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

2 FLUTE, BALL NOSE, LONG LENGTH



Series No. 112120, 112320

▶ cutting conditions : p.88



Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁
-	1123200100	1.0	4	2.5	50
-	1123200120	1.2			
-	1123200150	1.5			
1121200200	1123200200	2.0	6	5	60
1121200300	1123200300	3.0			
1121200400	1123200400	4.0			
1121200500	1123200500	5.0	8	8	70
1121200600	1123200600	6.0			
1121200700	1123200700	7.0			
1121200800	1123200800	8.0	10	10	80
1121200900	1123200900	9.0			
1121201000	1123201000	10.0			
1121201200	1123201200	12.0	12	12	90
1121201400	1123201400	14.0			
1121201600	1123201600	16.0			
1121201800	1123201800	18.0	14	14	100
1121202000	1123202000	20.0			
1121202500	1123202500	25.0			
			16	18	110
			18	22	140
			20	26	160
			25	30	180

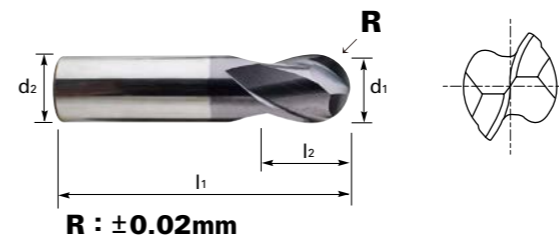
MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

2 FLUTE BALL NOSE, SHORT LENGTH



Series No. 118120, 118320

▶ cutting conditions : p.90



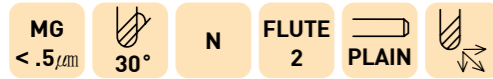
Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁
1181200300	1183200300	3	6	4	50
1181200400	1183200400	4			
1181200500	1183200500	5			
1181200600	1183200600	6	8	6	54
1181200700	1183200700	7			
1181200800	1183200800	8			
1181200900	1183200900	9	10	8	58
1181201000	1183201000	10			
1181201200	1183201200	12			
1181201400	1183201400	14	12	9	66
1181201600	1183201600	16			
1181201800	1183201800	18			
1181202000	1183202000	20	14	10	73
			16	11	75
			18	12	82
			20	13	84
			20	14	84
			20	15	84
			20	16	84
			20	17	84
			20	18	84
			20	19	84
			20	20	84

▶ Radius Tolerance: ±0.02

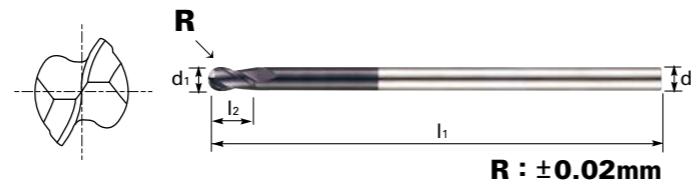
MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

2 FLUTE, BALL NOSE, LONG REACH



Series No. 114320

▶ cutting conditions : p.91



Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

EUROPA CODE PLAIN	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁
1143200200	2	3	6	80
1143200300	3		8	
1143200400	4	4	8	100
1143200500	5	6	10	120
1143200600	6		10	
1143200800	8	8	14	140
1143201000	10	10	18	180
1143201200	12	12	22	200
1143201600	16	16	30	250
1143202000	20	20	38	

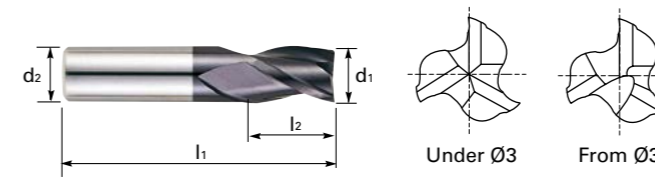
MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

3 FLUTE, MINIATURE



Series No. 103120, 103320

▶ cutting conditions : p.92



The Miniature end mill is universally adopted as the most cost effective system for small milling cutters and possesses the advantage of 2 flute and 4 flute end mill.

EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁
-	1033200100	1	4	2	35
-	1033200200	2		4	
1031200300	1033200300	3	6	5	36
1031200400	1033200400	4		7	38
1031200500	1033200500	5		8	39
1031200600	1033200600	6	8		
1031200800	1033200800	8	8	11	43
1031201000	1033201000	10	10	13	50
1031201200	1033201200	12	12	15	55
1031201400	1033201400	14	14	15	58
1031201600	1033201600	16	16	18	62
1031201800	1033201800	18	18	20	70
1031202000	1033202000	20	20	22	75

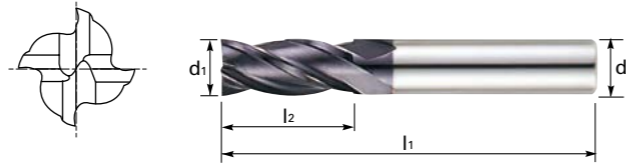
MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

4 FLUTE, SHORT LENGTH



Series No. 109120, 109320

▶ cutting conditions : p.93



Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
4 Flute allows for better workpiece finishes.

EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁
-	1093200200	2.0	4	6	40
-	1093200250	2.5		8	
1091200300	1093200300	3.0	6	8	45
1091200350	1093200350	3.5		10	
1091200400	1093200400	4.0		11	
1091200450	1093200450	4.5		11	
1091200500	1093200500	5.0	8	13	50
1091200550	1093200550	5.5		13	
1091200600	1093200600	6.0		13	
1091200650	1093200650	6.5		16	
1091200700	1093200700	7.0	10	16	60
1091200750	1093200750	7.5		16	
1091200800	1093200800	8.0		19	
1091200850	1093200850	8.5	12	19	70
1091200900	1093200900	9.0		19	
1091200950	1093200950	9.5		19	
1091201000	1093201000	10.0		22	
1091201050	1093201050	10.5	14	22	75
1091201100	1093201100	11.0		22	
1091201150	1093201150	11.5		22	
1091201200	1093201200	12.0	16	26	85
1091201300	1093201300	13.0		26	
1091201400	1093201400	14.0		26	
1091201500	1093201500	15.0	18	26	90
1091201600	1093201600	16.0		32	
1091201700	1093201700	17.0		32	
1091201800	1093201800	18.0	20	32	100
1091201900	1093201900	19.0		32	
1091202000	1093202000	20.0		38	
1091202200	1093202200	22.0	25	38	105
1091202400	1093202400	24.0		45	
1091202500	1093202500	25.0		45	

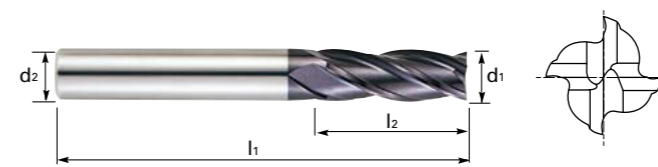
MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

4 FLUTE, LONG LENGTH



Series No. 111120, 111320

▶ cutting conditions : p.93



Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
4 Flute allows for better workpiece finishes.

EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁
-	1113200200	2.0	4	8	40
1111200300	1113200300	3.0	6	12	50
1111200400	1113200400	4.0		15	
1111200500	1113200500	5.0		20	60
1111200600	1113200600	6.0	8	20	70
1111200800	1113200800	8.0		25	
1111201000	1113201000	10.0		30	
1111201200	1113201200	12.0	10	30	90
1111201400	1113201400	14.0	12	40	
1111201600	1113201600	16.0	16	50	110
1111201800	1113201800	18.0		50	
1111202000	1113202000	20.0		55	
1111202500	1113202500	25.0	20	75	140

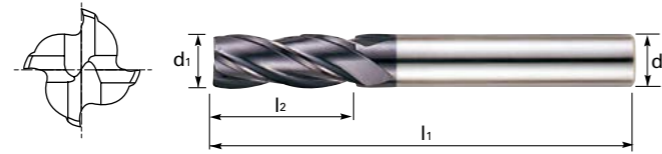
MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

4 FLUTE, CORNER RADIUS, LONG LENGTH



Series No. 157120, 157320

▶ cutting conditions : p.94



Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁
1571200300	1573200300	3 x R0.3	6	12	50
1571200400	1573200400	4 x R0.3	6	15	50
1571209012	1573209012	4 x R0.5	6	15	50
1571200500	1573200500	5 x R0.3	6	20	60
1571209013	1573209013	5 x R0.5	6	20	60
1571209011	1573209011	6 x R0.3	6	20	60
1571200600	1573200600	6 x R0.5	6	20	60
1571209001	1573209001	6 x R1	6	20	60
1571200800	1573200800	8 x R0.5	8	25	70
1571209002	1573209002	8 x R1	8	25	70
1571209003	1573209003	8 x R1.5	8	25	70
1571209004	1573209004	8 x R2	8	25	70
1571201000	1573201000	10 x R0.5	10	30	90
1571209005	1573209005	10 x R1	10	30	90
1571209006	1573209006	10 x R1.5	10	30	90
1571209007	1573209007	10 x R2	10	30	90
1571201200	1573201200	12 x R0.5	12	30	90
1571209008	1573209008	12 x R1	12	30	90
1571209009	1573209009	12 x R1.5	12	30	90
1571209010	1573209010	12 x R2	12	30	90
1571201600	1573201600	16 x R0.5	16	50	110
1571209020	1573209020	16 x R1	16	50	110
1571209021	1573209021	16 x R2	16	50	110

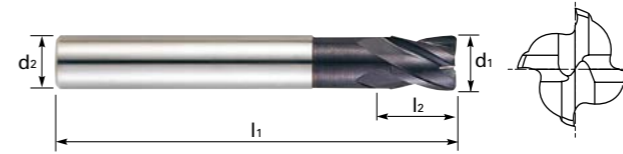
MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

4 FLUTE, CORNER RADIUS, STUB CUT LENGTH



Series No. 156120, 156320

▶ cutting conditions : p.94



Designed to machine tool steels, alloy steels, mold steels and other hardened materials.
Superior workpiece finishes.
Increased feed rates.

EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁
1561200200	1563200200	2 x R0.2	6	2.5	50
1561200250	1563200250	2.5 x R0.25		3	
1561200300	1563200300	3 x R0.3		4	
1561200350	1563200350	3.5 x R0.35		4.5	
1561200400	1563200400	4 x R0.4		5	
1561209001	1563209001	4 x R0.5		5	
1561200500	1563200500	5 x R0.5		6	
1561209002	1563209002	6 x R0.5	7	55	
1561200600	1563200600	6 x R0.6	7	55	
1561200800	1563200800	8 x R0.8	8	10	60
1561201000	1563201000	10 x R1	10	12	70
1561201200	1563201200	12 x R1.2	12	15	80
1561201600	1563201600	16 x R1.6	16	18	90

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

2 FLUTE, BALL NOSE, STUB CUT LENGTH for OVER HRc55



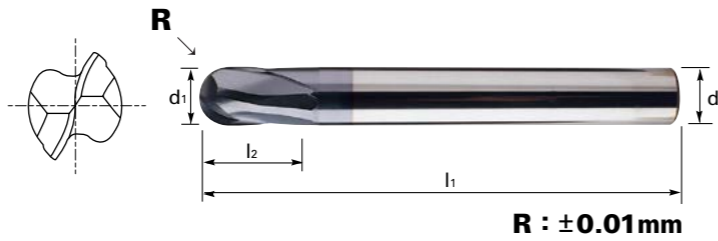
MG < .5/μm 15° FLUTE 2 PLAIN FLAT

Series No. 116120, 116320

▶ cutting conditions : p.89

HRc55
~HRc65

Suitable for HRc55~HRc65 high hardened materials.
Strong cutting edges and higher tool rigidity.
Radius tolerance ±0.01mm.



EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁
-	1163200100	1.0	4	1	50
-	1163200120	1.2		1.2	
-	1163200150	1.5		1.5	
1161200200	1163200200	2.0	6	2	60
1161200300	1163200300	3.0		3	
1161200400	1163200400	4.0		4	
1161200500	1163200500	5.0	8	5	70
1161200600	1163200600	6.0		6	
1161200700	1163200700	7.0		7	
1161200800	1163200800	8.0	10	8	80
1161200900	1163200900	9.0		9	
1161201000	1163201000	10.0		10	
1161201200	1163201200	12.0	12	12	90
1161201400	1163201400	14.0		14	
1161201600	1163201600	16.0		16	
1161201800	1163201800	18.0	18	18	100
1161202000	1163202000	20.0		20	
1161202500	1163202500	25.0		25	

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

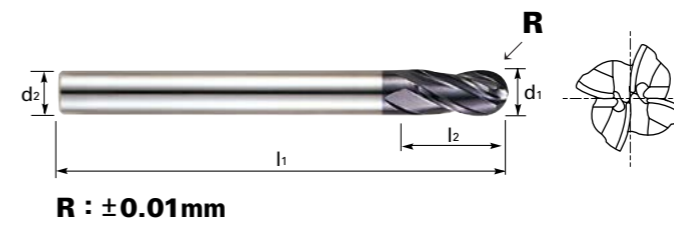
4 FLUTE, BALL NOSE, LONG LENGTH



MG < .5/μm 30° N FLUTE 4 PLAIN FLAT

Series No. 115120, 115320

▶ cutting conditions : p.95



R : ±0.01mm

Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
For copy - milling machines

EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁
-	1153200100	1.0	4	2.5	50
-	1153200150	1.5		4	
1151200200	1153200200	2.0		5	
1151200300	1153200300	3.0	6	8	60
1151200400	1153200400	4.0		8	
1151200500	1153200500	5.0		10	
1151200600	1153200600	6.0	8	12	70
1151200700	1153200700	7.0		14	
1151200800	1153200800	8.0		14	
1151200900	1153200900	9.0	10	18	80
1151201000	1153201000	10.0		18	
1151201200	1153201200	12.0		22	
1151201400	1153201400	14.0	12	26	90
1151201600	1153201600	16.0		30	
1151201800	1153201800	18.0		34	
1151202000	1153202000	20.0	14	38	100
1151202500	1153202500	25.0		50	
1151202500	1153202500	25.0		25	
1151201600	1153201600	16.0	16	30	140
1151201800	1153201800	18.0		34	
1151202000	1153202000	20.0		38	
1151202500	1153202500	25.0	18	50	160
1151202500	1153202500	25.0		25	
1151202500	1153202500	25.0		25	

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

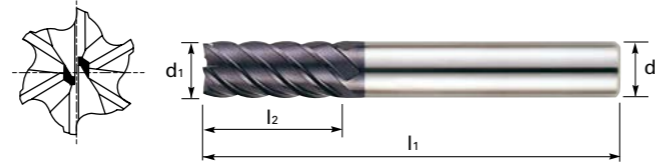
6,8 FLUTE, 45° HELIX, LONG LENGTH



MG < .5/μm 45° N FLUTE 6&8 PLAIN FLAT

Series No. 149120, 149320

▶ cutting conditions : p.96



Designed to machine tool steel, alloy steel, mold steel and other high hardened materials. High speed cutting and finish milling with high feed rates.

EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁	NO. OF FLUTE
1491200600	1493200600	6.0	6	13	57	6
1491200700	1493200700	7.0	8	16	63	6
1491200800	1493200800	8.0		19		6
1491200900	1493200900	9.0	10	19	72	6
1491201000	1493201000	10.0		22		6
1491201200	1493201200	12.0	12	26	83	6
1491201400	1493201400	14.0	14	26		6
1491201600	1493201600	16.0	16	32	92	6
1491201800	1493201800	18.0	18	32		8
1491202000	1493202000	20.0	20	38	104	8
1491202500	1493202500	25.0	25	44		8

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

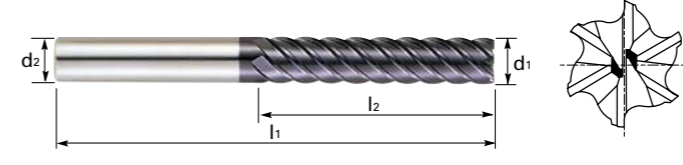
6 FLUTE, 45° HELIX, EXTRA LONG LENGTH



MG < .5/μm 45° N FLUTE 6 PLAIN FLAT

Series No. 150120, 150320

▶ cutting conditions : p.97



Designed to machine tool steel, alloy steel, mold steel and other high hardened materials. High speed cutting and finish milling with high feed rates.

EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁	NO. OF FLUTE
1501200600	1503200600	6.0	6	26	70	6
1501200800	1503200800	8.0	8	36	90	6
1501201000	1503201000	10.0	10	46	100	6
1501201200	1503201200	12.0	12	56	110	6
1501201600	1503201600	16.0	16	66	130	6
1501202000	1503202000	20.0	20	76	140	6
1501202500	1503202500	25.0	25	92	180	6

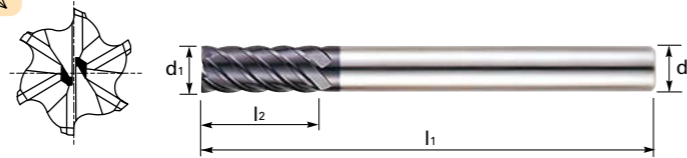
MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

6 FLUTE, 45° HELIX, CORNER RADIUS, LONG LENGTH



Series No. 158120, 158320

▶ cutting conditions : p.97

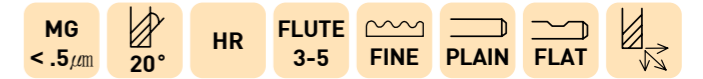


Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
High speed cutting and finish milling with high feed rates.

EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁	NO. OF FLUTE
1581200600	1583200600	6 × R0.5	6	13	70	6
1581200800	1583200800	8 × R0.5	8	19	90	6
1581201000	1583201000	10 × R0.5	10	22	100	6
1581209001	1583209001	10 × R1.0		22		6
1581201200	1583201200	12 × R0.5	12	26	110	6
1581209002	1583209002	12 × R1.0		26		6
1581201600	1583201600	16 × R1.0	16	32	130	6
1581209003	1583209003	16 × R1.5		32		6
1581202000	1583202000	20 × R1.0	20	38	140	6
1581209004	1583209004	20 × R1.5		38		6
1581209005	1583209005	20 × R2.0		38		6

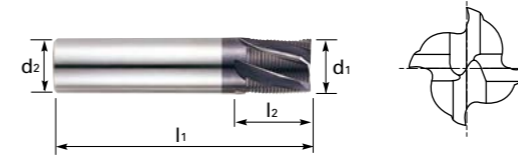
MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

MULTI FLUTE, 20° HELIX, ROUGHING, SHORT LENGTH



Series No. 148120, 148320

▶ cutting conditions : p.98



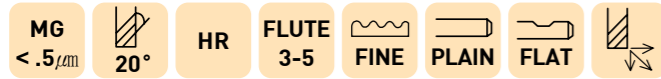
Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
High velocity milling of hardened steels.

EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER h10(d ₁)	SHANK DIAMETER h6(d ₂)	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁	NO. OF FLUTE
1481200600	1483200600	6.0	6	7	54	3
1481200700	1483200700	7.0	8	8	58	3
1481200800	1483200800	8.0		9		3
1481200900	1483200900	9.0	10	13	66	4
1481201000	1483201000	10.0		14		4
1481201200	1483201200	12.0	12	16	73	4
1481201400	1483201400	14.0	14	18	75	4
1481201600	1483201600	16.0	16	22	82	4
1481201800	1483201800	18.0	18	24	84	4
1481202000	1483202000	20.0	20	26	92	4
1481202500	1483202500	25.0	25	25	110	5

Tolerances according to DIN h10 not e8 Toleranzen nach DIN 7160 & 7161

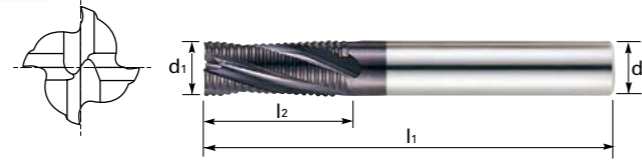
Toleranzwerte in μm / Tolerance range in μm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

MULTI FLUTE, ROUGHING, LONG LENGTH



Series No. 147120, 147320

▶ cutting conditions : p.98



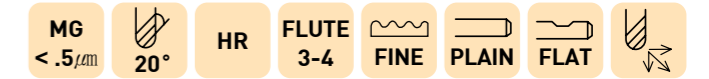
Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
High velocity milling of hardened steels.

EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER h10(d ₁)	SHANK DIAMETER h6(d ₂)	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁	NO. OF FLUTE
1471200600	1473200600	6.0	6	16	57	3
1471200700	1473200700	7.0	8	16	63	3
1471200800	1473200800	8.0		16		3
1471200900	1473200900	9.0	10	19	72	4
1471201000	1473201000	10.0		22		4
1471201200	1473201200	12.0	12	26	83	4
1471201400	1473201400	14.0	14	26		4
1471201600	1473201600	16.0	16	32	92	4
1471201800	1473201800	18.0	18	32		4
1471202000	1473202000	20.0	20	38	104	4
1471202500	1473202500	25.0	25	45	121	5

Tolerances according to DIN h10 not e8 Toleranzen nach DIN 7160 & 7161

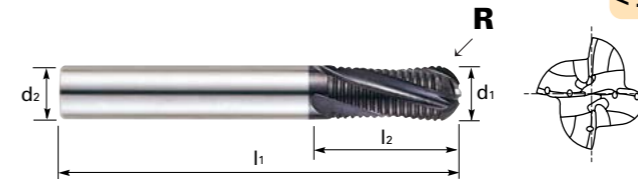
Toleranzwerte in μm / Tolerance range in μm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

3, 4 FLUTE, ROUGHING BALL NOSE, LONG LENGTH



Series No. 145120, 145320

▶ cutting conditions : p.99



R : ±0.02mm

EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER h10(d ₁)	SHANK DIAMETER h6(d ₂)	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁	NO. OF FLUTE
1451200600	1453200600	6.0	6	16	57	3
1451200800	1453200800	8.0	8	16	63	3
1451201000	1453201000	10.0	10	22	72	4
1451201200	1453201200	12.0	12	26	83	4
1451201400	1453201400	14.0	14	26		4
1451201600	1453201600	16.0	16	32	92	4
1451201800	1453201800	18.0	18	32		4
1451202000	1453202000	20.0	20	38	104	4

Tolerances according to DIN h10 not e8 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in μm / Tolerance range in μm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

2 FLUTE, MINIATURE



Series No. 100320

▶ cutting conditions : p.100



High precision milling in medical, optical, electronics and aero space industries.
Excellent performance on hardened steel

EUROPA CODE PLAIN	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
1003200040	0.4	3	0.8	40
1003200050	0.5	3	1.0	40
1003200060	0.6	3	1.2	40
1003200070	0.7	3	1.4	40
1003200080	0.8	3	1.6	40
1003200090	0.9	3	2.0	40
1003200100	1.0	4	2.5	40
1003200110	1.1	4	2.5	40
1003200120	1.2	4	4.0	40
1003200130	1.3	4	4.0	40
1003200140	1.4	4	4.0	40
1003200150	1.5	4	4.0	40

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

2 FLUTE, MINIATURE BALL NOSE



Series No. 105320

▶ cutting conditions : p.100



R : ±0.01mm

High precision milling in medical, optical, electronics and aero space industries.
Excellent performance on hardened steel

EUROPA CODE PLAIN	RADIUS	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH
1053200060	R0.30	0.6	3	1.1	40
1053200070	R0.35	0.7	3	1.5	40
1053200080	R0.40	0.8	3	2.0	40
1053200090	R0.45	0.9	3	2.2	40
1053200100	R0.50	1.0	3	2.5	40
1053200110	R0.55	1.1	3	3.0	40
1053200120	R0.60	1.2	3	3.0	40
1053200130	R0.65	1.3	3	3.5	40
1053200140	R0.70	1.4	3	3.5	40
1053200150	R0.75	1.5	3	4.0	40

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

2 FLUTE, BALL NOSE for RIB PROCESSING



Series No. 143320

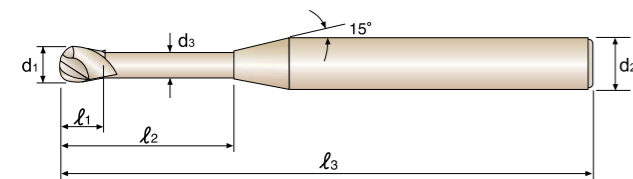
▶ cutting conditions : p.102



R : ±0.01mm

Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

EUROPA CODE PLAIN	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₁	LENGTH BELOW SHANK l ₂	OVERALL LENGTH l ₃	NECK DIAMETER d ₃
1433200060	0.6	3	0.9	6	35	0.55
1433200080	0.8	4	1.2	6	45	0.75
1433200081	0.8	4	1.2	8	45	0.75
1433200100	1.0	4	1.5	6	45	0.97
1433200101	1.0	4	1.5	8	45	0.95
1433200102	1.0	4	1.5	12	45	0.93
1433200120	1.2	4	1.8	8	45	1.15
1433200121	1.2	4	1.8	12	45	1.13
1433200140	1.4	4	2.1	12	45	1.33
1433200150	1.5	4	2.3	8	45	1.45
1433200151	1.5	4	2.3	12	45	1.43
1433200152	1.5	4	2.3	16	50	1.41
1433200160	1.6	4	2.4	16	50	1.51
1433200180	1.8	4	2.7	16	50	1.71
1433200200	2.0	4	3.0	8	45	1.95
1433200201	2.0	4	3.0	16	50	1.91
1433200202	2.0	4	3.0	20	55	1.89
1433200300	3.0	6	4.5	16	55	2.85
1433200301	3.0	6	4.5	20	60	2.85
1433200400	4.0	6	6.0	16	60	3.85
1433200401	4.0	6	6.0	20	65	3.85



MILL DIA. TOLERANCE(mm)	SHANK DIA. TOLERANCE
0~-0.02	h6

2 FLUTE END MILLS for RIB PROCESSING



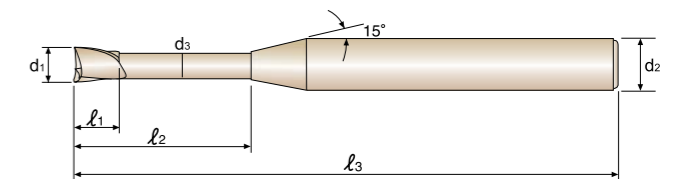
Series No. 107320, 108320

▶ cutting conditions : p.101



Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

EUROPA CODE PLAIN	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₁	LENGTH BELOW SHANK l ₂	OVERALL LENGTH l ₃	NECK DIAMETER d ₃
1073200080	0.8	4	1.2	6	45	0.75
1083200080	0.8	4	1.2	8	45	0.75
1073200100	1.0	4	1.5	6	45	0.97
1083200100	1.0	4	1.5	8	45	0.95
1073200102	1.0	4	1.5	12	45	0.93
1073200120	1.2	4	1.8	8	45	1.15
1083200120	1.2	4	1.8	12	45	1.13
1073200140	1.4	4	2.1	12	45	1.33
1073200150	1.5	4	2.3	8	45	1.45
1083200150	1.5	4	2.3	10	45	1.45
1073200152	1.5	4	2.3	12	45	1.43
1073200153	1.5	4	2.3	16	50	1.41
1073200160	1.6	4	2.4	12	45	1.53
1073200180	1.8	4	2.7	12	45	1.73
1073200200	2.0	4	3.0	12	45	1.93
1083200200	2.0	4	3.0	16	50	1.91
1073200250	2.5	4	3.7	12	45	2.40
1083200250	2.5	4	3.7	16	55	2.40
1073200300	3.0	6	4.5	14	50	2.85
1083200300	3.0	6	4.5	18	55	2.85



Unit : mm

MILL DIA. TOLERANCE	SHANK DIA. TOLERANCE
0 - 0.015	h6

4 FLUTE, 25° HELIX, TAPER for RIB PROCESSING



Series No. 120320

▶ cutting conditions : p.103



Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

EUROPA CODE PLAIN	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	TAPER ANGLE (per side)	OVERALL LENGTH
1203200100	1.0	4	8	30'	45
1203200101	1.0	4	12	30'	45
1203200102	1.0	4	8	1°	45
1203200103	1.0	4	12	1°	45
1203200104	1.0	4	8	1° 30'	45
1203200105	1.0	4	12	1° 30'	45
1203200106	1.0	4	8	2°	45
1203200107	1.0	4	12	2°	45
1203200120	1.2	4	8	30'	45
1203200121	1.2	4	12	30'	45
1203200122	1.2	4	8	1°	45
1203200123	1.2	4	12	1°	45
1203200124	1.2	4	8	1° 30'	45
1203200125	1.2	4	12	1° 30'	45
1203200126	1.2	4	8	2°	45
1203200127	1.2	4	12	2°	45
1203200150	1.5	4	8	30'	45
1203209001	1.5	4	12	30'	45
1203209002	1.5	4	16	30'	50
1203209003	1.5	4	8	1°	45

MILL DIA. TOLERANCE(mm)	0 - 0.015
TAPER ANGLE TOLERANCE	± 5'
SHANK DIA. TOLERANCE(mm)	0 - 0.008

4 FLUTE, 25° HELIX, TAPER for RIB PROCESSING



Series No. 120320

▶ cutting conditions : p.103



Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

EUROPA CODE PLAIN	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	TAPER ANGLE (per side)	OVERALL LENGTH
1203209004	1.5	4	12	1°	45
1203209005	1.5	4	16	1°	50
1203209006	1.5	4	8	1° 30'	45
1203209007	1.5	4	12	1° 30'	45
1203209008	1.5	4	16	1° 30'	50
1203209009	1.5	4	8	2°	45
1203209010	1.5	4	12	2°	45
1203209011	1.5	4	16	2°	50
1203200200	2.0	4	12	30'	45
1203200201	2.0	4	16	30'	50
1203200202	2.0	4	12	1°	45
1203200203	2.0	4	16	1°	50
1203200204	2.0	4	12	1° 30'	45
1203200205	2.0	4	16	1° 30'	50
1203200206	2.0	4	12	2°	45
120300207	2.0	4	16	2°	50

MILL DIA. TOLERANCE(mm)	0 - 0.015
TAPER ANGLE TOLERANCE	± 5'
SHANK DIA. TOLERANCE(mm)	0 - 0.008

4 FLUTE, 25° HELIX, TAPER BALL NOSE for RIB PROCESSING



Series No. 130320

▶ cutting conditions : p.103



R : ±0.01mm

Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

EUROPA CODE PLAIN	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	TAPER ANGLE (per side)	OVERALL LENGTH
1303200100	1.0	4	8	30'	45
1303200101	1.0	4	12	30'	45
1303200102	1.0	4	8	1°	45
1303200103	1.0	4	12	1°	45
1303200104	1.0	4	8	1° 30'	45
1303200105	1.0	4	12	1° 30'	45
1303200106	1.0	4	8	2°	45
1303200107	1.0	4	12	2°	45
1303200120	1.2	4	8	30'	45
1303200121	1.2	4	12	30'	45
1303200122	1.2	4	8	1°	45
1303200123	1.2	4	12	1°	45
1303200124	1.2	4	8	1° 30'	45
1303200125	1.2	4	12	1° 30'	45
1303200126	1.2	4	8	2°	45
1303200127	1.2	4	12	2°	45
1303200150	1.5	4	8	30'	45
1303209001	1.5	4	12	30'	45
1303209002	1.5	4	16	30'	50
1303209003	1.5	4	8	1°	45

MILL DIA. TOLERANCE(mm)	0 - 0.015
TAPER ANGLE TOLERANCE	± 5'
SHANK DIA. TOLERANCE(mm)	0 - 0.008

4 FLUTE, 25° HELIX, TAPER BALL NOSE for RIB PROCESSING



Series No. 130320

▶ cutting conditions : p.103



R : ±0.01mm

Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.

EUROPA CODE PLAIN	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	TAPER ANGLE (per side)	OVERALL LENGTH
1303209004	1.5	4	12	1°	45
1303209005	1.5	4	16	1°	50
1303209006	1.5	4	8	1° 30'	45
1303209007	1.5	4	12	1° 30'	45
1303209008	1.5	4	16	1° 30'	50
1303209009	1.5	4	8	2°	45
1303209010	1.5	4	12	2°	45
1303209011	1.5	4	16	2°	50
1303200200	2.0	4	12	30'	45
1303200201	2.0	4	16	30'	50
1303200202	2.0	4	12	1°	45
1303200203	2.0	4	16	1°	50
1303200204	2.0	4	12	1° 30'	45
1303200205	2.0	4	16	1° 30'	50
1303200206	2.0	4	12	2°	45
1303200207	2.0	4	16	2°	50

MILL DIA. TOLERANCE(mm)	0 - 0.015
TAPER ANGLE TOLERANCE	± 5'
SHANK DIA. TOLERANCE(mm)	0 - 0.008

PULSAR cutting condition



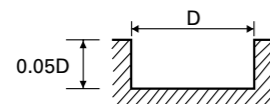
2 FLUTE, SHORT, SLOTTING

100120, 100320 

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				ALLOY STEELS HEAT RESISTANT STEELS				STAINLESS STEELS			
HARDNESS	~HRc30				HRc30 ~ HRc45							
STRENGTH	~1000N/mm ²				1000 ~ 1500N/mm ²							
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	9250	190	60	0.010	6050	120	40	0.010	5050	90	30	0.009
3.0	7150	210	65	0.015	4450	140	40	0.016	3700	120	35	0.016
4.0	6050	300	75	0.025	3700	180	45	0.024	3100	150	40	0.024
5.0	5050	320	80	0.032	3020	190	45	0.031	2530	160	40	0.032
6.0	4450	350	85	0.039	2690	220	50	0.041	2270	180	45	0.040
8.0	3360	380	85	0.057	2020	200	50	0.050	1680	180	40	0.054
10.0	2600	330	80	0.063	1600	160	50	0.050	1350	160	40	0.059
12.0	2200	280	85	0.064	1350	130	50	0.048	1090	130	40	0.060
16.0	1760	220	90	0.063	1090	110	55	0.050	850	110	45	0.065
20.0	1350	170	85	0.063	850	80	55	0.047	670	80	40	0.060
25.0	1090	130	85	0.060	670	70	55	0.052	550	60	45	0.055



MATERIAL	HARDENED STEELS							
HARDNESS	HRc45 ~ HRc55				HRc55 ~ HRc65			
STRENGTH	1500 ~ 2000N/mm ²				2000N/mm ² ~			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	4030	35	25	0.004				
3.0	2690	40	25	0.007	1900	40	20	0.011
4.0	2350	40	30	0.009	1480	40	20	0.014
5.0	1860	50	30	0.013	1260	40	20	0.016
6.0	1600	55	30	0.017	1100	40	20	0.018
8.0	1350	75	35	0.028	840	40	20	0.024
10.0	1090	60	35	0.028	680	35	20	0.026
12.0	930	55	35	0.030	560	35	20	0.031
16.0	720	40	35	0.028	440	20	20	0.023
20.0	550	30	35	0.027	320	20	20	0.031
25.0	430	20	35	0.023	260	15	20	0.029



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

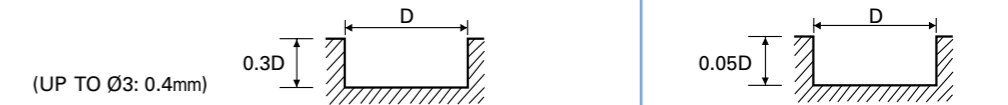
PULSAR cutting condition



2 FLUTE, LONG, SLOTTING

102120, 102320 

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS			
HARDNESS	~HRc30				HRc30 ~ HRc45				HRc45 ~ HRc55			
STRENGTH	~1000N/mm ²				1000 ~ 1500N/mm ²				1500 ~ 2000N/mm ²			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	7560	70	50	0.005	6050	60	40	0.005	3780	30	25	0.004
3.0	5290	85	50	0.008	4280	70	40	0.008	2640	35	25	0.007
4.0	4280	100	55	0.012	3410	85	45	0.012	2150	40	25	0.009
5.0	3660	125	55	0.017	2900	100	45	0.017	1900	45	30	0.012
6.0	3160	150	60	0.024	2520	125	50	0.025	1640	60	30	0.018
8.0	2400	160	60	0.033	1900	125	50	0.033	1260	60	30	0.024
10.0	2020	160	65	0.040	1640	125	50	0.038	1010	60	30	0.030
12.0	1640	125	60	0.038	1390	115	50	0.041	840	45	30	0.027
16.0	1390	115	70	0.041	1070	90	55	0.042	670	40	35	0.030
20.0	1010	85	65	0.042	820	60	50	0.037	500	30	30	0.030



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

2 FLUTE, CORNER RADIUS, LONG, SLOTTING

155120, 155320 

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS				HARDENED STEELS			
HARDNESS	~HRc30				HRc30 ~ HRc45				HRc45 ~ HRc55				HRc55 ~ HRc65			
STRENGTH	~1000N/mm ²				1000 ~ 1500N/mm ²				1500 ~ 2000N/mm ²				2000N/mm ² ~			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
3.0	6620	140	60	0.011	4280	70	40	0.008	2640	35	25	0.007	1870	18	20	0.005
4.0	5360	170	65	0.016	3410	85	45	0.012	2150	40	25	0.009	1470	20	20	0.007
5.0	4580	210	70	0.023	2900	100	45	0.017	1900	50	30	0.013	1260	25	20	0.010
6.0	3950	250	75	0.032	2520	125	50	0.025	1640	60	30	0.018	1160	35	20	0.015
8.0	3000	270	75	0.045	1900	125	50	0.033	1260	60	30	0.024	840	35	20	0.021
10.0	2520	270	80	0.054	1640	125	50	0.038	1010	60	30	0.030	670	35	20	0.026
12.0	2060	210	80	0.051	1390	115	50	0.041	840	50	30	0.030	550	25	20	0.023
16.0	1740	190	85	0.055	1070	90	55	0.042	670	40	35	0.030	440	20	20	0.023
20.0	1260	140	80	0.056	820	60	50	0.037	500	30	30	0.030	340	15	20	0.022



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

PULSAR cutting condition

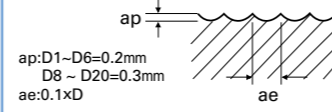
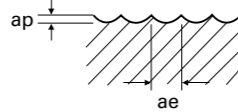


2 FLUTE, BALL NOSE

118120, 118320  NORMAL SPEED

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS			
HARDNESS	~HRc30				HRc30 ~ HRc40				HRc45 ~ HRc65			
STRENGTH	~1000N/mm ²				1000 ~ 1250N/mm ²				1500N/mm ² ~			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R0.5 x 1.0	15760	250	50	0.008	12720	200	40	0.008	5800	90	20	0.008
R0.75 x 1.5	15760	350	75	0.011	12140	270	55	0.011	5320	120	25	0.011
R1.0 x 2.0	14400	750	90	0.026	10700	490	65	0.023	4680	150	30	0.016
R1.25 x 2.5	14400	750	115	0.026	10700	490	85	0.023	4680	150	35	0.016
R1.5 x 3.0	13100	680	125	0.026	10000	460	95	0.023	4520	150	45	0.017
R2.0 x 4.0	10500	740	130	0.035	8400	530	105	0.032	4200	180	55	0.021
R2.5 x 5.0	9140	820	145	0.045	7300	580	115	0.040	3680	180	60	0.024
R3.0 x 6.0	8490	1020	160	0.060	6900	830	130	0.060	3180	190	60	0.030
R4.0 x 8.0	7160	1290	180	0.090	5770	920	145	0.080	2470	220	62	0.045
R5.0 x 10.0	6370	1530	200	0.120	5090	1020	160	0.100	2040	225	65	0.055
R6.0 x 12.0	5840	1750	220	0.150	4640	1110	175	0.120	1750	245	65	0.070
R8.0 x 16.0	4770	1720	240	0.180	3780	1060	190	0.140	1350	245	70	0.091
R10.0 x 20.0	4140	1660	260	0.200	3260	1040	205	0.160	1110	250	70	0.113

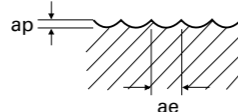
ap : D1 ~ D6=0.2mm
D8 ~ D20=0.3mm
ae : 0.2 x D



HIGH SPEED CUTTING

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				HARDENED STEELS			
HARDNESS	~HRc45				HRc45 ~ HRc65			
STRENGTH	~1500N/mm ²				1500N/mm ² ~			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R0.5 x 1.0	25000	1300	80	0.026	25000	800	80	0.016
R0.75 x 1.5	23000	1400	110	0.030	23000	860	110	0.019
R1.0 x 2.0	21000	1480	130	0.035	21000	940	130	0.022
R1.25 x 2.5	21000	1760	165	0.042	19000	980	150	0.026
R1.5 x 3.0	21000	2000	200	0.048	17000	1040	160	0.031
R2.0 x 4.0	21000	2940	265	0.070	13660	1160	170	0.042
R2.5 x 5.0	21000	3600	330	0.086	12000	1200	190	0.050
R3.0 x 6.0	21000	4000	395	0.095	10500	1250	200	0.060
R4.0 x 8.0	16700	4000	420	0.120	8360	1250	210	0.075
R5.0 x 10.0	14000	3900	440	0.139	7000	1200	220	0.086
R6.0 x 12.0	12200	3900	460	0.160	6100	1160	230	0.095
R8.0 x 16.0	9550	3450	480	0.181	4770	1000	240	0.105
R10.0 x 20.0	7960	3180	500	0.200	3980	920	250	0.116

ap : D1 ~ D6=0.2mm
D8 ~ D20=0.3mm
ae : 0.05 x D



RPM= rev. / min. , FEED= mm / min.
Vc= m / min. , fz= mm / t

PULSAR cutting condition

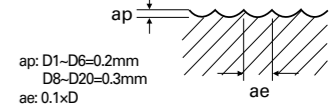
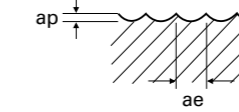


2 FLUTE, BALL NOSE LONG REACH

114320  NORMAL SPEED

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS			
HARDNESS	~HRc30				HRc30 ~ HRc40				HRc45 ~ HRc65			
STRENGTH	~1000N/mm ²				1000 ~ 1250N/mm ²				1500N/mm ² ~			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R0.5 x 1.0	12600	200	40	0.008	10180	160	30	0.008	4640	70	15	0.008
R0.75 x 1.5	12600	280	60	0.011	9710	220	45	0.011	4250	95	20	0.011
R1.0 x 2.0	12600	420	80	0.017	9250	260	60	0.014	3870	90	25	0.012
R1.25 x 2.5	11520	600	90	0.026	8560	390	65	0.023	3740	120	30	0.016
R1.5 x 3.0	10500	540	100	0.026	8000	370	75	0.023	3620	120	35	0.017
R2.0 x 4.0	8400	590	105	0.035	6720	420	85	0.031	3360	140	40	0.021
R2.5 x 5.0	7310	660	115	0.045	5840	460	90	0.039	2940	140	45	0.024
R3.0 x 6.0	6800	820	130	0.060	5500	600	105	0.055	2550	150	50	0.029
R4.0 x 8.0	5700	1030	145	0.090	4600	740	115	0.080	2000	175	50	0.044
R5.0 x 10.0	5100	1220	160	0.120	4070	820	130	0.101	1650	180	50	0.055
R6.0 x 12.0	4700	1400	175	0.149	3700	890	140	0.120	1400	195	55	0.070
R8.0 x 16.0	3800	1380	190	0.182	3000	850	150	0.142	1100	195	55	0.089
R10.0 x 20.0	3300	1330	205	0.202	2600	830	165	0.160	890	200	55	0.112

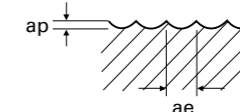
ap : D1 ~ D6=0.2mm
D8 ~ D20=0.3mm
ae : 0.2 x D



HIGH SPEED CUTTING

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				HARDENED STEELS			
HARDNESS	~HRc45				HRc45 ~ HRc65			
STRENGTH	~1500N/mm ²				1500N/mm ² ~			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R0.5 x 1.0	20000	1040	65	0.026	20000	640	65	0.016
R0.75 x 1.5	18400	1100	85	0.030	18400	690	85	0.019
R1.0 x 2.0	16800	1200	105	0.036	16800	750	105	0.022
R1.25 x 2.5	16800	1400	130	0.042	15200	780	120	0.026
R1.5 x 3.0	16800	1600	160	0.048	13600	830	130	0.031
R2.0 x 4.0	16800	2350	210	0.070	10930	930	135	0.043
R2.5 x 5.0	16800	2880	265	0.086	9600	960	150	0.050
R3.0 x 6.0	16800	3200	315	0.095	8400	1000	160	0.060
R4.0 x 8.0	13400	3200	335	0.119	6700	1000	170	0.075
R5.0 x 10.0	11200	3100	350	0.138	5600	960	175	0.086
R6.0 x 12.0	9800	3100	370	0.158	4900	930	185	0.095
R8.0 x 16.0	7600	2750	380	0.181	3800	800	190	0.105
R10.0 x 20.0	6400	2550	400	0.199	3200	740	200	0.116

ap : D1 ~ D6 = 0.2mm
D8 ~ D20 = 0.3mm
ae : 0.05 x D



RPM= rev. / min. , FEED= mm / min.
Vc= m / min. , fz= mm / t

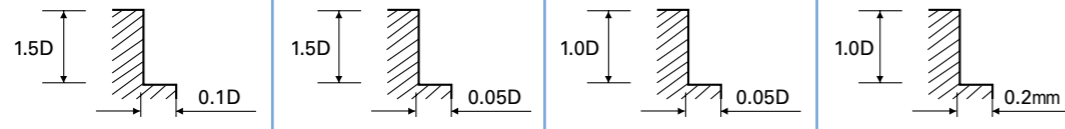
PULSAR cutting condition



6 & 8 FLUTE, 45° HELIX, LONG, SIDE CUTTING

149120, 149320 NORMAL SPEED

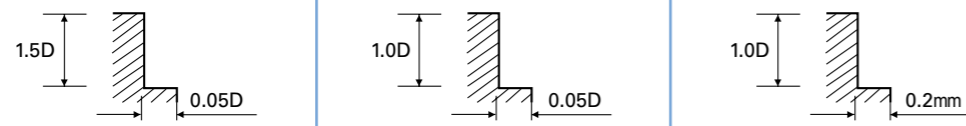
MATERIAL	NON-ALLOYED STEELS ALLOY STEELS				ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS							
	~HRc30				HRc30 ~ HRc50				HRc50 ~ HRc60				HRc60 ~ HRc65			
HARDNESS																
STRENGTH	~1000N/mm ²				1000 ~ 1750N/mm ²				1750 ~ 2080N/mm ²				2080N/mm ² ~			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	5560	2000	105	0.060	3880	1370	75	0.059	1580	210	30	0.022	1100	130	20	0.020
8.0	4200	2000	105	0.079	2940	1370	75	0.078	1160	210	30	0.030	840	130	20	0.026
10.0	3360	2000	105	0.099	2320	1370	75	0.098	1000	210	30	0.035	680	130	20	0.032
12.0	2840	1680	105	0.099	2000	1160	75	0.097	840	180	30	0.036	560	110	20	0.033
16.0	2100	1260	105	0.100	1480	880	75	0.099	640	130	30	0.034	420	70	20	0.028
20.0	1680	1010	105	0.075	1160	690	75	0.074	500	110	30	0.028	320	60	20	0.023
25.0	1500	900	120	0.075	1100	600	85	0.068	430	90	35	0.026	260	50	20	0.024



RPM= rev. / min. , FEED= mm / min.
Vc= m / min. , fz= mm / t

149120, 149320 HIGH SPEED

MATERIAL	HEAT RESISTANT STEELS HARDENED STEELS				HARDENED STEELS							
	~HRc50				HRc50 ~ HRc60				HRc60 ~ HRc65			
HARDNESS												
STRENGTH	~1750N/mm ²				1750 ~ 2080N/mm ²				2080N/mm ² ~			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	16800	6090	315	0.060	8400	3050	160	0.061	4200	1470	80	0.058
8.0	12600	6090	315	0.081	6300	3050	160	0.081	3160	1470	80	0.078
10.0	9980	5990	315	0.100	5040	3050	160	0.101	2520	1470	80	0.097
12.0	8400	5040	315	0.100	4200	2520	160	0.100	2100	1260	80	0.100
16.0	6300	3780	315	0.100	3160	1890	160	0.100	1580	950	80	0.100
20.0	5040	3050	315	0.076	2520	1470	160	0.073	1260	760	80	0.075
25.0	4500	2700	355	0.075	2200	1300	175	0.074	1120	670	90	0.075



RPM= rev. / min. , FEED= mm / min.
Vc= m / min. , fz= mm / t

PULSAR cutting condition



6 FLUTE, 45° HELIX, EXTRA LONG, SIDE CUTTING

150120, 150320

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS				ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS							
	~HRc40				HRc40 ~ HRc50				HRc50 ~ HRc60				HRc60 ~ HRc65			
HARDNESS																
STRENGTH	~1250N/mm ²				1250 ~ 1750N/mm ²				1750 ~ 2080N/mm ²				2080N/mm ² ~			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	2230	470	40	0.035	1670	350	30	0.035	1390	250	25	0.030	1110	200	20	0.030
8.0	1670	450	40	0.045	1250	330	30	0.044	1050	240	25	0.038	840	180	20	0.036
10.0	1330	440	40	0.055	1000	300	30	0.050	840	230	25	0.046	680	160	20	0.039
12.0	1110	400	40	0.060	840	270	30	0.054	690	210	25	0.051	560	150	20	0.045
16.0	840	330	40	0.065	630	230	30	0.061	530	170	25	0.053	420	130	20	0.052
20.0	670	280	40	0.070	500	200	30	0.067	420	150	25	0.060	320	120	20	0.063
25.0	540	240	40	0.074	400	170	30	0.071	340	130	25	0.064	270	95	20	0.059

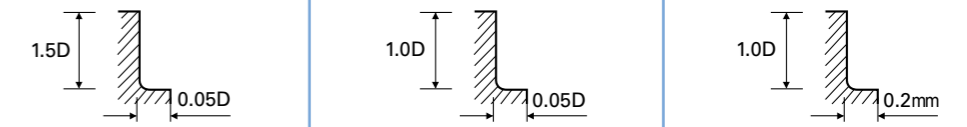


RPM= rev. / min. , FEED= mm / min.
Vc= m / min. , fz= mm / t

6 FLUTE, 45° HELIX, CORNER RADIUS, SIDE CUTTING

158120, 158320 HIGH SPEED

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS							
	~HRc50				HRc50 ~ HRc60				HRc60 ~ HRc65			
HARDNESS												
STRENGTH	~1750N/mm ²				1750 ~ 2080N/mm ²				2080N/mm ² ~			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	16800	6090	315	0.060	8400	3050	160	0.061	4200	1470	80	0.058
8.0	12600	6090	315	0.081	6300	3050	160	0.081	3150	1470	80	0.078
10.0	9980	5990	315	0.100	5040	3050	160	0.101	2520	1470	80	0.097
12.0	8400	5040	315	0.100	4200	2520	160	0.100	2100	1260	80	0.100
16.0	6300	3780	315	0.100	3150	1890	160	0.100	1580	950	80	0.100
20.0	5040	3050	315	0.101	2520	1470	160	0.097	1260	760	80	0.101



RPM= rev. / min. , FEED= mm / min.
Vc= m / min. , fz= mm / t

PULSAR cutting condition

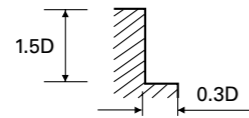


MULTI. FLUTE, ROUGHING, SIDE CUTTING

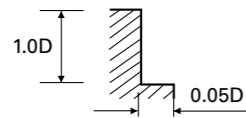
148120, 148320, 147120, 147320



MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				ALLOY STEELS HEAT RESISTANT STEELS				STAINLESS STEELS			
HARDNESS	~HRc30				HRc30 ~ HRc38				HRc38 ~ HRc45			
STRENGTH	~1000N/mm ²				1000 ~ 1200N/mm ²				1200 ~ 1400N/mm ²			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	15600	2320	295	0.050	12400	840	235	0.023	8400	570	160	0.023
8.0	11600	2320	290	0.067	9200	840	230	0.030	6300	570	160	0.030
10.0	9200	2320	290	0.063	7600	840	240	0.028	5100	570	160	0.028
12.0	8000	2400	300	0.075	6000	800	225	0.033	4200	570	160	0.034
14.0	6800	2400	300	0.088	5200	840	230	0.040	3600	570	160	0.040
16.0	6000	2400	300	0.100	4800	760	240	0.040	3300	510	165	0.039
18.0	5200	2320	295	0.112	4400	720	250	0.041	2700	420	155	0.039
20.0	4800	2160	300	0.113	3600	560	225	0.039	2400	360	150	0.038
25.0	4300	2150	340	0.100	3200	620	250	0.039	2160	410	170	0.038



MATERIAL	HARDENED STEELS							
HARDNESS	HRc45 ~ HRc55				HRc55 ~ HRc65			
STRENGTH	1400 ~ 2000N/mm ²				2000N/mm ² ~			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	3400	260	65	0.025	2400	190	45	0.026
8.0	2400	240	60	0.033	1800	180	45	0.033
10.0	2000	290	65	0.036	1300	190	40	0.037
12.0	1680	260	65	0.039	1200	190	45	0.040
14.0	1400	200	60	0.036	900	130	40	0.036
16.0	1200	160	60	0.033	800	110	40	0.034
18.0	1100	150	60	0.034	700	100	40	0.036
20.0	1000	150	65	0.038	660	100	40	0.038
25.0	900	160	70	0.036	600	100	45	0.033



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

PULSAR cutting condition

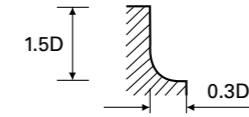


3&4 FLUTE, ROUGHING BALL NOSE, SIDE CUTTING

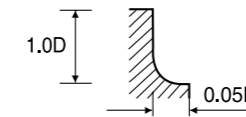
145120, 145320



MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				ALLOY STEELS HEAT RESISTANT STEELS				STAINLESS STEELS			
HARDNESS	~HRc30				HRc30 ~ HRc38				HRc38 ~ HRc45			
STRENGTH	~1000N/mm ²				1000 ~ 1200N/mm ²				1200 ~ 1400N/mm ²			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R1.5 x 3.0	15600	2320	295	0.050	12400	840	235	0.023	8400	570	160	0.023
R2.0 x 4.0	11600	2320	290	0.067	9200	840	230	0.030	6300	570	160	0.030
R2.5 x 5.0	9200	2320	290	0.063	7600	840	240	0.028	5100	570	160	0.028
R3.0 x 6.0	8000	2400	300	0.075	6000	800	225	0.033	4200	570	160	0.034
R4.0 x 8.0	6800	2400	300	0.088	5200	840	230	0.040	3600	570	160	0.040
R5.0 x 10.0	6000	2400	300	0.100	4800	760	240	0.040	3300	510	165	0.039
R6.0 x 12.0	5200	2320	295	0.112	4400	720	250	0.041	2700	420	155	0.039
R8.0 x 16.0	4800	2160	300	0.113	3600	560	225	0.039	2400	360	150	0.038



MATERIAL	HARDENED STEELS							
HARDNESS	HRc45 ~ HRc55				HRc55 ~ HRc65			
STRENGTH	1400 ~ 2000N/mm ²				2000N/mm ² ~			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R1.5 x 3.0	3400	260	65	0.025	2400	190	45	0.026
R2.0 x 4.0	2400	240	60	0.033	1800	180	45	0.033
R2.5 x 5.0	2000	290	65	0.036	1300	190	40	0.037
R3.0 x 6.0	1680	260	65	0.039	1200	190	45	0.040
R4.0 x 8.0	1400	200	60	0.036	900	130	40	0.036
R5.0 x 10.0	1200	160	60	0.033	800	110	40	0.034
R6.0 x 12.0	1100	150	60	0.034	700	100	40	0.036
R8.0 x 16.0	1000	150	65	0.038	660	100	40	0.038



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

PULSAR cutting condition



2 FLUTE, MINIATURE BALL NOSE

105320

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				HARDENED STEELS			
HARDNESS	HRc30 ~ HRc45				HRc45 ~ HRc55			
STRENGTH	1000 ~ 1500N/mm ²				1500 ~ 2000N/mm ²			
DIAMETER	RPM	FEED	V _c	f _z	RPM	FEED	V _c	f _z
R0.3 × 0.6	30000	510	55	0.009	30000	360	55	0.006
R0.4 × 0.8	27000	560	70	0.010	27000	330	70	0.006
R0.5 × 1.0	25000	560	80	0.011	25000	340	80	0.007
R0.6 × 1.2	24000	570	90	0.012	24000	350	90	0.007
R0.75 × 1.5	23000	600	110	0.013	23000	370	110	0.008
R1.0 × 2.0	19000	570	120	0.015	19000	320	120	0.008
R1.5 × 3.0	14000	480	130	0.017	14000	280	130	0.010

D < 1
ap = 0.05 × D
ae = 0.15 × D
D ≥ 1
ap = 0.075 × D
ae = 0.15 × D

D < 1
ap = 0.05 × D
ae = 0.1 × D
D ≥ 1
ap = 0.05 × D
ae = 0.15 × D

RPM= rev. / min.
FEED= mm / min.
V_c= m / min.
f_z= mm / t

2FLUTE, MINIATURE, SLOTTING

100320

MATERIAL	ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS			
HARDNESS	HRc30 ~ HRc45				HRc45 ~ HRc55			
STRENGTH	1000 ~ 1500N/mm ²				1500 ~ 2000N/mm ²			
DIAMETER	RPM	FEED	V _c	f _z	RPM	FEED	V _c	f _z
0.4	30000	90	40	0.002	23000	50	30	0.001
0.8	24000	150	60	0.003	18000	65	45	0.002
1.0	20000	160	65	0.004	15000	75	45	0.003
1.2	16000	160	60	0.005	12000	75	45	0.003
1.5	12000	150	55	0.006	9000	70	40	0.004

D < 1
Depth = 0.15 × D
D ≥ 1
Depth = 0.25 × D

D < 1
Depth = 0.02 × D
D ≥ 1
Depth = 0.05 × D

RPM= rev. / min.
FEED= mm / min.
V_c= m / min.
f_z= mm / t

PULSAR cutting condition



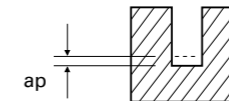
2 FLUTE for RIB PROCESSING

107320, 108320

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON					ALLOY STEELS HEAT RESISTANT STEELS				
HARDNESS	~HRc30					HRc30 ~ HRc45				
STRENGTH	~ 1000N/mm ²					1000 ~ 1500N/mm ²				
DIAMETER	RPM	FEED	ap(mm)	V _c	f _z	RPM	FEED	ap(mm)	V _c	f _z
0.4	31000~40000	200~440	0.007~0.018	39~50	0.003~0.006	22500~28000	85~340	0.007~0.018	28~35	0.002~0.006
0.5	31000~40000	200~440	0.009~0.022	49~63	0.003~0.006	22500~28000	85~340	0.009~0.022	35~44	0.002~0.006
0.6	31000~40000	250~570	0.011~0.026	58~75	0.004~0.007	22500~28000	110~430	0.011~0.026	42~53	0.002~0.008
0.7	31000~40000	250~570	0.012~0.031	68~88	0.004~0.007	22500~28000	110~430	0.012~0.031	49~62	0.002~0.008
0.8	27000~35000	280~630	0.014~0.035	68~88	0.005~0.009	19500~24500	120~480	0.014~0.035	49~62	0.003~0.010
0.9	25000~31500	280~720	0.030~0.060	71~98	0.006~0.010	17500~22500	160~540	0.030~0.060	49~64	0.005~0.012
1.0	22500~28000	280~810	0.045~0.090	71~88	0.006~0.014	15700~20000	190~600	0.045~0.090	49~63	0.006~0.015
1.2	18500~22500	280~900	0.055~0.100	70~85	0.008~0.020	13000~16500	190~600	0.055~0.100	49~62	0.007~0.018
1.4	16000~20000	280~900	0.062~0.125	70~88	0.009~0.023	11500~14000	190~600	0.062~0.125	51~62	0.008~0.021
1.5	14500~18500	280~900	0.070~0.135	68~87	0.010~0.024	10500~13500	190~600	0.070~0.135	49~64	0.009~0.022
1.6	14000~18000	280~900	0.075~0.145	70~90	0.010~0.025	10200~12800	190~600	0.075~0.145	51~64	0.009~0.023
1.8	13000~16500	280~900	0.080~0.160	74~93	0.011~0.027	9200~11500	190~600	0.080~0.160	52~65	0.010~0.026
2.0	12000~14500	280~900	0.090~0.180	75~91	0.012~0.031	8300~10500	190~600	0.090~0.180	52~66	0.011~0.029
2.5	9500~12000	280~900	0.112~0.235	75~94	0.015~0.038	6700~8500	190~600	0.112~0.235	53~67	0.014~0.035
3.0	8000~10000	280~900	0.135~0.270	75~94	0.018~0.045	5500~7000	190~600	0.135~0.270	52~66	0.017~0.043
4.0	6000~7500	280~900	0.180~0.360	75~94	0.023~0.060	4100~5300	190~600	0.180~0.360	52~67	0.023~0.057
5.0	4800~6000	280~900	0.225~0.450	75~94	0.029~0.075	3300~4200	190~600	0.225~0.450	52~66	0.029~0.071
6.0	4000~5000	280~900	0.270~0.540	75~94	0.035~0.090	2800~3500	190~600	0.270~0.540	53~66	0.034~0.086

MATERIAL	HARDENED STEELS				
HARDNESS	HRc45 ~ HRc55				
STRENGTH	1500 ~ 2000N/mm ²				
DIAMETER	RPM	FEED	ap(mm)	V _c	f _z
0.4	14300~17000	30~90	0.004~0.008	18~21	0.001~0.003
0.5	14300~17000	30~90	0.004~0.009	22~27	0.001~0.003
0.6	14300~17000	40~110	0.005~0.011	27~32	0.001~0.003
0.7	14300~17000	40~110	0.006~0.013	31~37	0.001~0.003
0.8	12500~14800	45~125	0.007~0.015	31~37	0.002~0.004
0.9	11000~12500	55~130	0.008~0.016	31~35	0.003~0.005
1.0	10000~12500	65~130	0.009~0.018	31~39	0.003~0.005
1.2	8300~10500	65~130	0.010~0.022	31~40	0.004~0.006
1.4	7200~9000	65~130	0.012~0.025	32~40	0.005~0.007
1.5	6700~8200	65~130	0.014~0.028	32~39	0.005~0.008
1.6	6400~8000	65~130	0.015~0.030	32~40	0.005~0.008
1.8	5700~7200	65~130	0.016~0.032	32~41	0.006~0.009
2.0	5300~6600	65~130	0.018~0.035	33~41	0.006~0.010
2.5	4300~5300	65~130	0.022~0.045	34~42	0.008~0.012
3.0	3500~4400	65~130	0.028~0.055	33~41	0.009~0.015
4.0	2600~3300	65~130	0.036~0.072	33~41	0.013~0.020
5.0	2100~2600	65~130	0.045~0.090	33~41	0.015~0.025
6.0	1750~2600	65~130	0.054~0.108	33~49	0.019~0.025

(Depth of Cut per one pass)



RPM= rev. / min. , FEED= mm / min.
V_c= m / min. , f_z= mm / t

PULSAR cutting condition

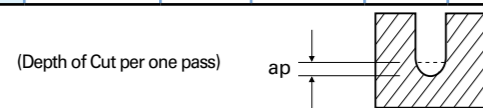


2 FLUTE, BALL NOSE for RIB PROCESSING

143320 

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON					ALLOY STEELS HEAT RESISTANT STEELS				
HARDNESS	~HRc30					HRc30 ~ HRc45				
STRENGTH	~ 1000N/mm ²					1000 ~ 1500N/mm ²				
DIAMETER	RPM	FEED	ap(mm)	Vc	fz	RPM	FEED	ap(mm)	Vc	fz
0.4	31000~40000	175~490	0.018~0.036	39~50	0.003~0.006	22500~28500	88~270	0.018~0.036	28~36	0.002~0.005
0.5	31000~40000	175~490	0.023~0.045	49~63	0.003~0.006	22500~28500	88~270	0.023~0.045	35~45	0.002~0.005
0.6	31000~40000	225~630	0.027~0.054	58~75	0.004~0.008	22500~28500	110~350	0.027~0.054	42~54	0.002~0.006
0.8	31000~40000	225~630	0.036~0.072	78~101	0.004~0.008	22500~28500	110~350	0.036~0.072	57~72	0.002~0.006
1.0	29000~36500	250~700	0.045~0.090	91~115	0.004~0.010	20500~26000	125~390	0.045~0.090	64~82	0.003~0.008
1.2	24000~30500	250~780	0.055~0.100	90~115	0.005~0.013	17000~21500	125~390	0.055~0.100	64~81	0.004~0.009
1.4	21000~26000	250~780	0.062~0.125	92~114	0.006~0.015	15000~18000	125~390	0.062~0.125	66~79	0.004~0.011
1.5	19000~24000	250~780	0.070~0.135	90~113	0.007~0.016	13500~17500	125~390	0.070~0.135	64~82	0.005~0.011
1.6	18000~23500	250~780	0.075~0.145	90~118	0.007~0.017	13200~16500	125~390	0.075~0.145	66~83	0.005~0.012
1.8	17000~21500	250~780	0.080~0.160	96~122	0.007~0.018	12000~15000	125~390	0.080~0.160	68~85	0.005~0.013
2.0	15500~19000	250~780	0.090~0.180	97~119	0.008~0.021	11000~13500	125~390	0.090~0.180	69~85	0.006~0.014
3.0	10500~13000	250~780	0.135~0.270	99~123	0.012~0.030	7000~9000	125~390	0.135~0.270	66~85	0.009~0.022
4.0	8500~11000	250~780	0.180~0.360	107~138	0.015~0.035	5800~7800	125~390	0.180~0.360	73~98	0.011~0.025
5.0	6800~8800	250~780	0.225~0.450	107~138	0.018~0.044	4600~6200	125~390	0.225~0.450	72~97	0.014~0.031
6.0	5700~7300	250~780	0.270~0.540	107~138	0.022~0.053	3900~5200	125~390	0.270~0.540	74~98	0.016~0.038

MATERIAL	HARDENED STEELS				
HARDNESS	HRc45 ~ HRc55				
STRENGTH	1500 ~ 2000N/mm ²				
DIAMETER	RPM	FEED	ap(mm)	Vc	fz
0.4	14300~18000	88~175	0.004~0.007	18~23	0.003~0.005
0.5	14300~18000	88~175	0.005~0.009	22~28	0.003~0.005
0.6	14300~18000	110~225	0.005~0.011	27~34	0.004~0.006
0.8	14300~18000	110~225	0.007~0.014	36~45	0.004~0.006
1.0	13000~16300	125~250	0.009~0.018	41~51	0.005~0.008
1.2	10800~13700	125~250	0.010~0.022	41~52	0.006~0.009
1.4	9400~11700	125~250	0.012~0.025	41~51	0.007~0.011
1.5	8700~10700	125~250	0.014~0.028	41~50	0.007~0.012
1.6	8300~10400	125~250	0.015~0.030	42~52	0.008~0.012
1.8	7400~9400	125~250	0.016~0.032	42~53	0.008~0.013
2.0	6900~8600	125~250	0.018~0.035	43~54	0.009~0.015
3.0	4600~5700	125~250	0.028~0.055	43~54	0.014~0.022
4.0	3900~4900	125~250	0.035~0.070	49~62	0.016~0.026
5.0	3100~3900	125~250	0.044~0.088	49~61	0.020~0.032
6.0	2600~3300	125~250	0.053~0.105	49~62	0.024~0.038



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

PULSAR cutting condition

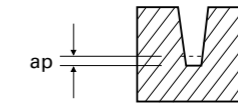


4 FLUTE, TAPER for RIB PROCESSING

120320 


MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON					ALLOY STEELS HEAT RESISTANT STEELS					HARDENED STEELS				
HARDNESS	~ HRc 30					HRc 30 ~ HRc 45					HRc 45 ~ HRc 55				
STRENGTH	~ 1000N/mm ²					1000 ~ 1500N/mm ²					1500 ~ 2000N/mm ²				
DIAMETER	RPM	FEED	ap(mm)	Vc	fz	RPM	FEED	ap(mm)	Vc	fz	RPM	FEED	ap(mm)	Vc	fz
1.0	20000	700	0.020~0.040	65	0.009	15000	500	0.020~0.030	45	0.008	10000	300	0.010~0.020	30	0.008
1.2	16000	700	0.025~0.050	60	0.011	13000	500	0.025~0.040	50	0.010	8000	300	0.012~0.025	30	0.009
1.5	13000	700	0.030~0.060	60	0.013	10000	500	0.030~0.050	45	0.013	6500	300	0.015~0.030	30	0.012
2.0	10000	700	0.040~0.080	65	0.018	8000	500	0.040~0.060	50	0.016	5000	300	0.020~0.040	30	0.015

(Depth of Cut per one pass)



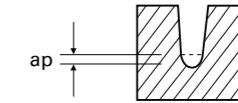
RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

4 FLUTE, TAPER BALL NOSE for RIB PROCESSING

130320 

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON					ALLOY STEELS HEAT RESISTANT STEELS					HARDENED STEELS				
HARDNESS	~ HRc 30					HRc 30 ~ HRc 45					HRc 45 ~ HRc 55				
STRENGTH	~ 1000N/mm ²					1000 ~ 1500N/mm ²					1500 ~ 2000N/mm ²				
DIAMETER	RPM	FEED	ap(mm)	Vc	fz	RPM	FEED	ap(mm)	Vc	fz	RPM	FEED	ap(mm)	Vc	fz
R0.5 x 1.0	20000	700	0.020~0.040	65	0.009	15000	500	0.020~0.030	45	0.008	10000	300	0.010~0.020	30	0.008
R0.6 x 1.2	16000	700	0.025~0.050	60	0.011	13000	500	0.025~0.040	50	0.010	8000	300	0.012~0.025	30	0.009
R0.75 x 1.5	13000	700	0.030~0.060	60	0.013	10000	500	0.030~0.050	45	0.013	6500	300	0.015~0.030	30	0.012
R1.0 x 2.0	10000	700	0.040~0.080	65	0.018	8000	500	0.040~0.060	50	0.016	5000	300	0.020~0.040	30	0.015

(Depth of Cut per one pass)



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

ET1 END MILL CONTENTS

(Carbide for Stainless, Titanium, Inconel)

Europa Tool 11th Edition






ET1 END MILLS



Designed
For Stainless Steel,
Titanium,
Inconel



www.europatool.co.uk

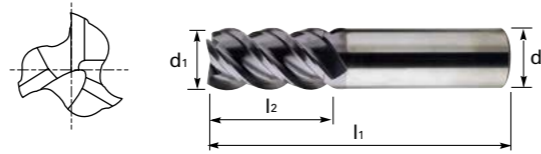
PRODUCTS	SERIES	DESCRIPTION	PAGE
	132123 132323	ET1 3&4 FLUTE 50 DEG HELIX CARBIDE TiAIN COATED END MILLS	106
	320123 320323	ET1 MULTI FLUTE 30 DEG HELIX SHORT ROUGHING CARBIDE TiAIN COATED END MILLS	107
	118123 118323	ET1 MULTI FLUTE 30 DEG HELIX LONG CARBIDE TiAIN COATED END MILLS	108
	107122	ET1 4&6 FLUTE 30 DEG HELIX SHORT ASP60 TiAIN COATED END MILLS	109
	117323	ET1 6&8 FLUTE 45 DEG HELIX LONG CARBIDE TiAIN COATED END MILLS	110
CUTTING DATA			111 ~ 115

3&4 FLUTE 50° HELIX CARBIDE TiAlN COATED END MILLS



Series No. 132123, 132323

▶ cutting conditions : p.111



For Stainless Steel, Titanium, Inconel

EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁	NO. OF FLUTE
1321230600	1323230600	6.0	6.0	13.0	50.0	3
1321230800	1323230800	8.0	8.0	19.0	60.0	
1321231000	1323231000	10.0	10.0	22.0	70.0	
1321231200	1323231200	12.0	12.0	25.0	75.0	
1321231600	1323231600	16.0	16.0	32.0	90.0	
1321231800	1323231800	18.0	18.0	32.0	90.0	4
1321232000	1323232000	20.0	20.0	38.0	100.0	
1321232500	1323232500	25.0	25.0	45.0	120.0	

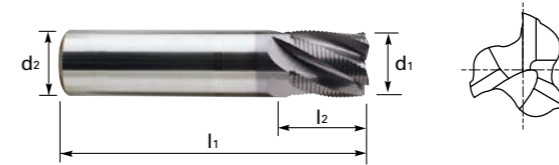
MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

MULTI FLUTE 30° HELIX SHORT ROUGHING CARBIDE TiAlN COATED END MILLS



Series No. 320123, 320323

▶ cutting conditions : p.112



For Stainless Steel, Titanium, Inconel

EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER h10(d ₁)	SHANK DIAMETER h6(d ₂)	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁	NO. OF FLUTE
3201230600	3203230600	6.0	6.0	7.0	54.0	3
3201230700	3203230700	7.0	8.0	8.0	58.0	
3201230800	3203230800	8.0		9.0		
3201230900	3203230900	9.0	10.0	13.0	66.0	4
3201231000	3203231000	10.0		14.0		
3201231200	3203231200	12.0	12.0	16.0	73.0	
3201231400	3203231400	14.0	14.0	18.0	75.0	
3201231600	3203231600	16.0	16.0	22.0	82.0	
3201231800	3203231800	18.0	18.0	24.0	84.0	5
3201232000	3203232000	20.0	20.0	26.0	92.0	
3201232500	3203232500	25.0	25.0	25.0	110.0	

Tolerances according to DIN h10 not e8
Toleranzen nach DIN 7160 & 7161

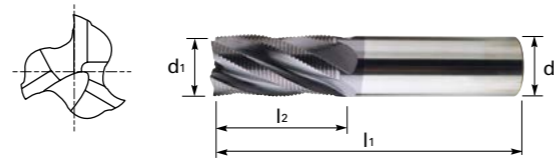
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

MULTI FLUTE 30° HELIX LONG ROUGHING CARBIDE TiAlN COATED END MILLS



Series No. 118123, 118323

▶ cutting conditions : p.112, 113



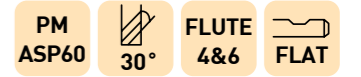
For Stainless Steel, Titanium, Inconel

EUROPA CODE FLAT	EUROPA CODE PLAIN	MILL DIAMETER h10(d ₁)	SHANK DIAMETER h6(d ₂)	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁	NO. OF FLUTE
1181230600	1183230600	6.0	6.0	16.0	57.0	3
1181230700	1183230700	7.0	8.0	16.0	63.0	
1181230800	1183230800	8.0		16.0		
1181230900	1183230900	9.0	10.0	19.0	72.0	4
1181231000	1183231000	10.0		22.0		
1181231200	1183231200	12.0	12.0	26.0	83.0	
1181231400	1183231400	14.0	14.0	26.0		
1181231600	1183231600	16.0	16.0	32.0	92.0	
1181231800	1183231800	18.0	18.0	32.0		
1181232000	1183232000	20.0	20.0	38.0	104.0	5
1181232500	1183232500	25.0	25.0	45.0	121.0	

Tolerances according to DIN h10 not e8
Toleranzen nach DIN 7160 & 7161

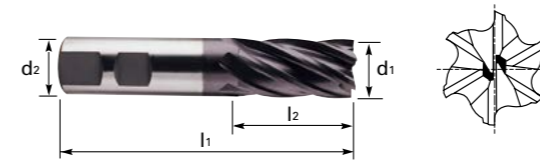
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

4&6 FLUTE 30° HELIX SHORT ASP60 TiAlN COATED END MILLS



Series No. 107122

▶ cutting conditions : p.114



For Stainless Steel, Titanium, Inconel

EUROPA CODE FLAT	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁	NO. OF FLUTE
1071220300	3.0	6.0	8.0	52.0	4
1071220400	4.0		11.0	55.0	
1071220500	5.0		13.0	57.0	
1071220600	6.0	13.0			
1071220800	8.0	10.0	19.0	69.0	
1071221000	10.0		22.0	72.0	
1071221200	12.0	12.0	26.0	83.0	6
1071221400	14.0		26.0		
1071221600	16.0	16.0	32.0	92.0	
1071221800	18.0		32.0		
1071222800	20.0	20.0	38.0	104.0	
1071222500	25.0	25.0	45.0	121.0	

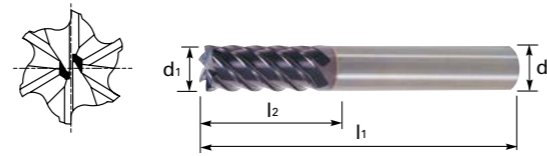
MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0 ~ +0.03	h6

ET1 6 & 8 FL 45° LONG CARBIDE TiAlN COATED ENDMILLS



Series No. 117323

▶ cutting conditions : p.115



For Stainless Steel, Titanium, Inconel

EUROPA CODE FLAT	MILL DIAMETER d ₁	SHANK DIAMETER d ₂	LENGTH OF CUT l ₂	OVERALL LENGTH l ₁	NO. OF FLUTE
1173230600	6	6	13	57	6
1173230700	7	8	16	63	
1173230800	8		19		
1173230900	9	10	19	72	
1173231000	10		22		
1173231200	12	12	26	83	
1173231400	14	14	32		
1173231600	16	16	32	92	
1173231800	18	18	38		
1173232000	20	20	44		104
1173232500	25	25	44		

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

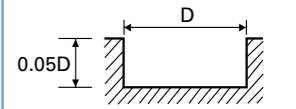
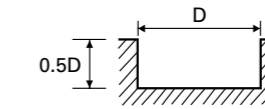
ET1 CUTTING CONDITION



3 & 4 FLUTE ET1 50° HIGH HELIX - SLOTTING

132123, 132323

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS								STAINLESS STEELS TITANIUM ALLOY				INCONEL			
HARDNESS	~ HRc30				HRc30 ~ HRc45											
STRENGTH	1000N/mm ²				1000 ~ 1500N/mm ²											
DIAMETER	RPM	FEED	V _c	f _z	RPM	FEED	V _c	f _z	RPM	FEED	V _c	f _z	RPM	FEED	V _c	f _z
6.0	5560	310	105	0.019	3360	200	65	0.020	2840	160	55	0.019	1160	40	20	0.011
8.0	4200	340	105	0.027	2520	180	65	0.024	2100	160	55	0.025	840	40	20	0.016
10.0	3260	300	100	0.031	2000	140	65	0.023	1680	140	55	0.028	670	40	20	0.020
12.0	2740	250	105	0.030	1680	120	65	0.024	1370	120	50	0.029	560	30	20	0.018
16.0	2200	200	110	0.030	1360	100	70	0.025	1050	100	55	0.032	420	25	20	0.020
18.0	1940	175	110	0.030	1210	85	70	0.023	950	85	55	0.030	370	20	20	0.018
20.0	1680	150	105	0.022	1060	70	65	0.017	840	70	55	0.021	320	20	20	0.016
25.0	1360	115	105	0.021	840	60	65	0.018	670	60	55	0.022	270	15	20	0.014

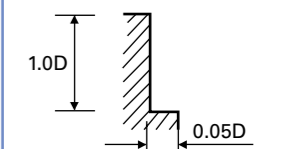
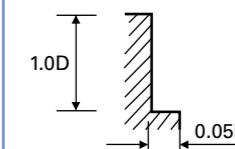
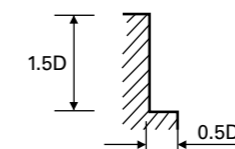


RPM= rev. / min.
FEED= mm / min.
V_c= m / min.
f_z= mm / t

3 & 4 FLUTE ET1 50° HIGH HELIX - SIDE CUTTING

132123, 132323

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS								STAINLESS STEELS TITANIUM ALLOY				INCONEL			
HARDNESS	~ HRc30				HRc30 ~ HRc45											
STRENGTH	1000N/mm ²				1000 ~ 1500N/mm ²											
DIAMETER	RPM	FEED	V _c	f _z	RPM	FEED	V _c	f _z	RPM	FEED	V _c	f _z	RPM	FEED	V _c	f _z
6.0	5560	400	105	0.024	3360	250	65	0.025	2840	250	55	0.029	1050	55	20	0.017
8.0	4200	420	105	0.033	2520	230	65	0.030	2100	265	55	0.042	840	50	20	0.020
10.0	3260	370	100	0.038	2000	180	65	0.030	1680	230	55	0.046	680	50	20	0.025
12.0	2740	310	105	0.038	1680	150	65	0.030	1370	180	50	0.044	560	45	20	0.027
16.0	2200	250	110	0.038	1360	120	70	0.029	1050	150	55	0.048	420	35	20	0.028
18.0	1940	220	110	0.038	1210	110	70	0.030	950	130	55	0.046	370	30	20	0.027
20.0	1680	190	105	0.028	1060	95	65	0.022	840	115	55	0.034	340	30	20	0.022
25.0	1360	150	105	0.028	840	75	65	0.022	670	90	55	0.034	270	25	20	0.023



RPM= rev. / min.
FEED= mm / min.
V_c= m / min.
f_z= mm / t

ET1 CUTTING CONDITION

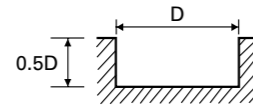


MULTI FLUTE ET1 ROUGHING - SLOTTING

320323, 320123, 118123, 118323

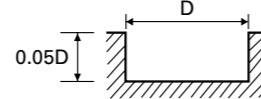
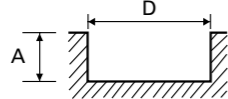


MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS							
HARDNESS	~ HRc30				HRc30 ~ HRc45			
STRENGTH	1000N/mm ²				1000 ~ 1500N/mm ²			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	15600	1390	294	0.030	12400	500	234	0.013
8.0	11600	1390	292	0.040	9200	500	231	0.018
10.0	9200	1390	289	0.038	7600	500	239	0.016
12.0	8000	1440	302	0.045	6000	480	226	0.020
14.0	6800	1440	299	0.053	5200	500	229	0.024
16.0	6000	1440	302	0.060	4800	460	241	0.024
18.0	5200	1390	294	0.067	4400	430	249	0.024
20.0	4800	1300	302	0.068	3600	340	226	0.024
25.0	4300	1290	338	0.060	3200	370	251	0.023



MATERIAL	STAINLESS STEELS TITANIUM ALLOY				INCONEL			
HARDNESS								
STRENGTH								
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	8400	340	158	0.013	2400	115	45	0.016
8.0	6300	340	158	0.018	1800	110	45	0.020
10.0	5100	340	160	0.017	1300	115	41	0.022
12.0	4200	340	158	0.020	1200	115	45	0.024
14.0	3600	340	158	0.024	900	80	40	0.022
16.0	3300	310	166	0.023	800	65	40	0.020
18.0	2700	250	153	0.023	700	60	40	0.021
20.0	2400	220	151	0.023	660	60	41	0.023
25.0	2160	250	170	0.023	600	65	47	0.022

A : Ø4 - Ø10:0.25 x D
Ø12 - Ø16:0.15 x D
Ø18 - Ø25:0.10 x D



※ The FEED, in long & long reach types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

ET1 CUTTING CONDITION

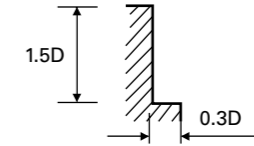


MULTI FLUTE ET1 ROUGHING - SIDE CUTTING

320323, 320123, 118123, 118323

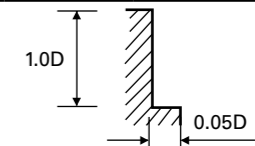
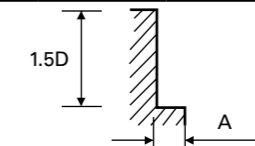


MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS							
HARDNESS	~ HRc30				HRc30 ~ HRc45			
STRENGTH	1000N/mm ²				1000 ~ 1500N/mm ²			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	15600	2320	294	0.050	12400	840	234	0.023
8.0	11600	2320	292	0.067	9200	840	231	0.030
10.0	9200	2320	289	0.063	7600	840	239	0.028
12.0	8000	2400	302	0.075	6000	800	226	0.033
14.0	6800	2400	299	0.088	5200	840	229	0.040
16.0	6000	2400	302	0.100	4800	760	241	0.040
18.0	5200	2320	294	0.112	4400	720	249	0.041
20.0	4800	2160	302	0.113	3600	560	226	0.039
25.0	4300	2150	338	0.100	3200	620	251	0.039



MATERIAL	STAINLESS STEELS TITANIUM ALLOY				INCONEL			
HARDNESS								
STRENGTH								
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	8400	570	158	0.023	2400	190	45	0.026
8.0	6300	570	158	0.030	1800	180	45	0.033
10.0	5100	570	160	0.028	1300	190	41	0.037
12.0	4200	570	158	0.034	1200	190	45	0.040
14.0	3600	570	158	0.040	900	130	40	0.036
16.0	3300	510	166	0.039	800	110	40	0.034
18.0	2700	420	153	0.039	700	100	40	0.036
20.0	2400	360	151	0.038	660	100	41	0.038
25.0	2160	410	170	0.038	600	110	47	0.037

A : Ø4 - Ø10:0.15 x D
Ø12 - Ø16:0.10 x D
Ø18 - Ø25:0.05 x D



※ The FEED, in long & long reach types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

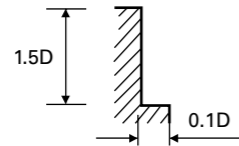
ET1 CUTTING CONDITION



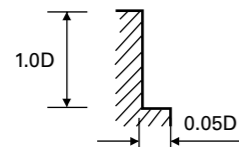
4 & 6 FLUTE ET1 ASP60 - SIDE CUTTING

107122 

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS								STAINLESS STEELS TITANIUM ALLOY			
	~ HRc30				HRc30 ~ HRc45							
HARDNESS												
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
3.0	4400	185	40	0.011	1100	23	10	0.005	2200	110	20	0.013
4.0	3600	210	45	0.015	900	31	10	0.009	1800	125	25	0.017
5.0	3000	225	45	0.019	750	30	10	0.010	1500	135	25	0.023
6.0	2600	235	50	0.023	600	29	10	0.012	1300	140	25	0.027
8.0	2000	250	50	0.031	500	28	15	0.014	1000	150	25	0.038
10.0	1600	285	50	0.045	410	30	15	0.018	800	170	25	0.053
12.0	1320	250	50	0.047	340	29	15	0.021	660	150	25	0.057
14.0	1160	235	50	0.051	290	27	15	0.023	580	140	25	0.060
16.0	1000	225	50	0.038	250	26	15	0.017	500	135	25	0.045
18.0	900	210	50	0.039	225	23	15	0.017	450	125	25	0.046
20.0	800	200	50	0.042	200	17	15	0.014	400	120	25	0.050
25.0	640	165	50	0.043	165	15	15	0.015	320	100	25	0.052



MATERIAL	INCONEL			
HARDNESS				
DIAMETER	RPM	FEED	Vc	fz
3.0	880	28	10	0.008
4.0	720	37	10	0.013
5.0	600	36	10	0.015
6.0	480	35	10	0.018
8.0	400	34	10	0.021
10.0	330	36	10	0.027
12.0	270	35	10	0.032
14.0	230	32	10	0.035
16.0	200	31	10	0.026
18.0	180	28	10	0.026
20.0	160	21	10	0.022
25.0	130	18	10	0.023



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

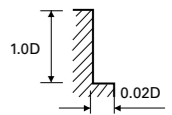
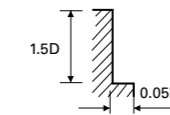
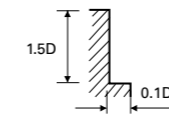
ET1 CUTTING CONDITION



6 & 8 FLUTE ET1 45° LONG CARBIDE

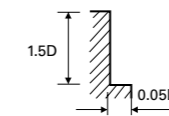
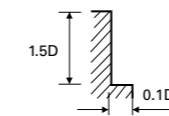
117323  NORMAL SPEED

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS								STAINLESS STEELS TITANIUM ALLOY				INCONEL			
	~HRc30				HRc30 ~ HRc45											
HARDNESS																
STRENGTH	1000N/mm ²				1000 ~ 1500N/mm ²											
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	5560	2000	105	0.060	3880	1370	75	0.059	3370	1100	65	0.054	1350	280	25	0.035
8.0	4200	2000	105	0.079	2940	1370	75	0.078	2490	1100	65	0.074	1000	280	25	0.047
10.0	3360	2000	105	0.099	2320	1370	75	0.098	1920	1100	60	0.095	440	280	15	0.106
12.0	2840	1680	105	0.099	2000	1160	75	0.097	1610	1000	60	0.104	400	250	15	0.104
16.0	2100	1260	105	0.100	1480	880	75	0.099	1160	770	60	0.111	310	190	15	0.102
20.0	1680	1010	105	0.075	1160	690	75	0.074	900	620	55	0.086	250	155	15	0.078
25.0	1500	900	120	0.075	1100	600	85	0.068	850	540	65	0.079	220	135	15	0.077



HIGH SPEED

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS							
	~ HRc30				HRc30 ~ HRc45			
STRENGTH	1000N/mm ²				1000 ~ 1500N/mm ²			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	22200	8000	420	0.060	16800	6090	315	0.060
8.0	16800	8000	420	0.079	12600	6090	315	0.081
10.0	13400	8000	420	0.100	9980	5990	315	0.100
12.0	11350	6720	430	0.099	8400	5040	315	0.100
16.0	8400	5040	420	0.100	6300	3780	315	0.100
20.0	6700	4040	420	0.075	5040	3050	315	0.076
25.0	6000	3600	470	0.075	4500	2700	355	0.075



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

SPHERE & DIAMOND COATED END MILLS CONTENTS

(Carbide for surpassing milling operation & dry cutting condition)

Europa Tool 11th Edition






SPHERE & DIAMOND COATED END MILLS



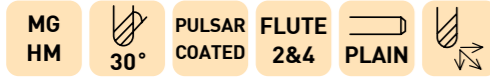
Designed For Surpassing Milling
Operation Dry Cutting & High Speed Cutting



www.europatool.co.uk

PRODUCTS	SERIES	DESCRIPTION	PAGE
	152320	SPHERE 2 FLUTE PULSAR COATED LONG CARBIDE BALL END MILLS	118
	154320	SPHERE 4 FLUTE PULSAR COATED LONG CARBIDE BALL END MILLS	118
 NEW	153320	SPHERE 2 FLUTE PULSAR LONG LENGTH	118
	113325	DIAMOND COATED 2 FLUTE LONG CARBIDE BALL END MILLS	120
	114325	DIAMOND COATED 2 FLUTE LONG REACH CARBIDE BALL END MILLS	121
CUTTING DATA			119 ~ 121

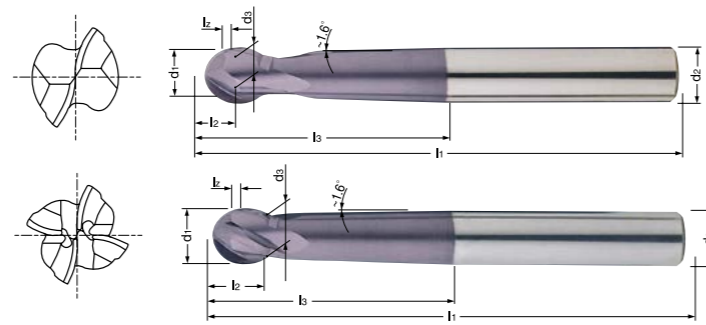
2&4 FLUTE, LONG BALL NOSE CARBIDE "PULSAR" COATED END MILLS



Series No. 152320, 154320

▶ cutting conditions : p.119,120

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6



R : ±0.01mm

EUROPA CODE 2FLUTE	EUROPA CODE 4FLUTE	MILL DIAMETER	RADIUS BALL NOSE	NECK DIAMETER	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH	SHANK DIAMETER	Lz
1523200300	-	3.0	1.5	2.5	4.0	30.0	80.0	6.0	1.5
1523200400	-	4.0	2.0	3.3	5.0	30.0			
1523200500	1543200500	5.0	2.5	4.1	6.0	43.0	100.0	8.0	2
1523200600	1543200600	6.0	3.0	4.7	7.0	30.0			
1523200800	1543200800	8.0	4.0	6.5	9.0	36.0	100.0	10.0	3
1523201000	1543201000	10.0	5.0	8.2	11.0	43.0			
1523201200	1543201200	12.0	6.0	9.8	13.0	52.0	150.0	12.0	3
1523201600	1543201600	16.0	8.0	13.4	15.0	61.0			

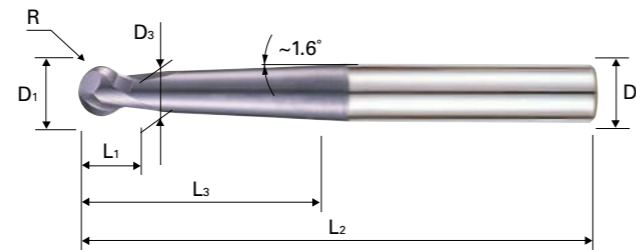
2 FLUTE, LONG BALL NOSE CARBIDE "PULSAR" COATED END MILLS



Series No. 153320

NEW

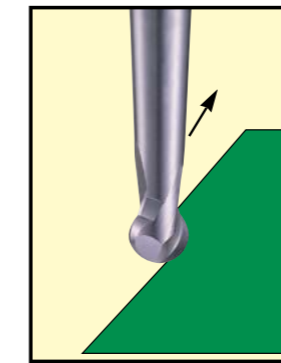
▶ cutting conditions : p.119



EUROPA CODE PLAIN	MILL DIAMETER	RADIUS OF BALL NOSE	NECK DIAMETER	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH	SHANK DIAMETER
1533200300	3.0	R1.5	2.5	2.3	30	80	6
1533200400	4.0	R2.0	3.3	3.1	30	80	6
1533200500	5.0	R2.5	4.1	3.9	38	80	6
1533200600	6.0	R3.0	4.7	4.9	28	100	6
1533200800	8.0	R4.0	6.5	6.3	33	100	8
1533201000	10	R5.0	8.2	7.9	40	100	10
1533201200	12	R6.0	9.8	9.5	49	100	12
1533201600	16	R8.0	13.4	12.4	59	150	16

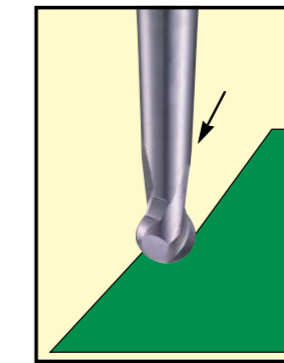
MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6

▶ ADVANCED TECHNIQUE

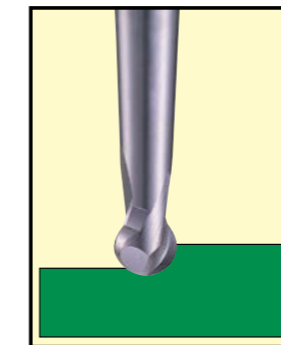


Favorable Back Milling
Vorteilhaftes Rückwärtsfräsen

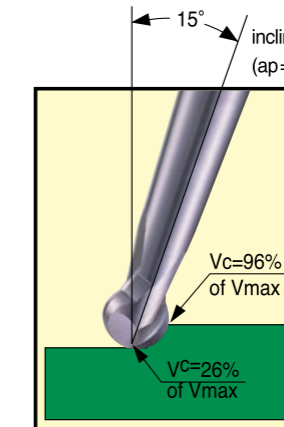
▶ NORMAL MILLING



Normal Ball Nose
Unvorteilhaftes Fräsen



Normal Ball Nose
Unvorteilhaftes Profilfräsen

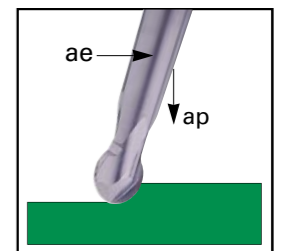


Favorable Profiling
Vovorteilhaftes Profilfräsen

- Operating angle 14° ~ 16°, higher speed and feed are possible by decreased cutting resistance at the cutting edges contacting the workpiece.
- Excellent surface roughness and higher milling process.
- Enable to milling with higher speed and feed when Back Milling.

- When 15 inclination milling operation, more productivity and higher speed and feed are possible.
- Decreased cutting force.
- Excellent surface roughness and brightness.

SPHERE CUTTING CONDITION



▶ ap = 0.05 x D
▶ ae = 0.02 x D

SPHERE CARBIDE LONG BALL CUTTING CONDITION



NORMAL SPEED

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS			
	~HRc30				HRc30 ~ HRc40				HRc45 ~ HRc65			
STRENGTH	~1000N/mm ²				1000 ~ 1250N/mm ²				1500N/mm ²			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R1.5 x 3.0	35000	2800	330	0.040	33000	2600	310	0.039	12000	900	115	0.038
R2.0 x 4.0	26000	2300	325	0.044	25000	2200	315	0.044	9000	800	115	0.044
R2.5 x 5.0	21000	2100	330	0.050	20000	2000	315	0.050	7000	700	110	0.050
R3.0 x 6.0	17000	1900	320	0.056	16000	1800	300	0.056	6000	650	115	0.054
R4.0 x 8.0	13000	1700	325	0.065	12000	1600	300	0.067	4500	550	115	0.061
R5.0 x 10.0	10500	1450	330	0.069	10000	1400	315	0.070	3500	500	110	0.071
R6.0 x 12.0	9000	1400	340	0.078	8000	1300	300	0.081	3000	450	115	0.075
R8.0 x 16.0	6000	1200	300	0.100	5500	1100	275	0.100	2000	400	100	0.100

HIGH SPEED

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON				ALLOY STEELS HEAT RESISTANT STEELS				HARDENED STEELS			
	~HRc30				HRc30 ~ HRc40				HRc45 ~ HRc65			
STRENGTH	~1000N/mm ²				1000 ~ 1250N/mm ²				1500N/mm ²			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R1.5 x 3.0	47000	3700	445	0.039	44000	3500	415	0.040	17000	1400	160	0.041
R2.0 x 4.0	35000	3200	440	0.046	33000	3000	415	0.045	13000	1200	165	0.046
R2.5 x 5.0	28000	2800	440	0.050	27000	2600	425	0.048	10000	1100	155	0.055
R3.0 x 6.0	23000	2600	435	0.057	22000	2400	415	0.055	8000	950	150	0.059
R4.0 x 8.0	18000	2300	450	0.064	17000	2100	425	0.062	6000	850	150	0.071
R5.0 x 10.0	14000	2000	440	0.071	13000	1900	410	0.073	5000	750	155	0.075
R6.0 x 12.0	12000	1800	450	0.075	11000	1800	415	0.082	4000	700	150	0.088
R8.0 x 16.0	9000	1600	450	0.089	8000	1500	400	0.094	3300	600	165	0.091

RPM= rev. / min. , FEED= mm / min.
Vc= m / min. , fz= mm / t

SPHERE CUTTING CONDITION



SPHERE CARBIDE LONG BALL CUTTING CONDITION

154320

NORMAL SPEED

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON			ALLOY STEELS HEAT RESISTANT STEELS			HARDENED STEELS					
HARDNESS	~HRc30			HRc30 ~ HRc40			HRc45 ~ HRc65					
STRENGTH	~1000N/mm ²			1000 ~ 1250N/mm ²			1500N/mm ²					
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R2.5 x 5.0	21000	4000	330	0.048	20000	4000	315	0.050	7000	1400	110	0.050
R3.0 x 6.0	17000	4000	320	0.059	16000	3500	300	0.055	6000	1300	115	0.054
R4.0 x 8.0	13000	3500	325	0.067	12000	3000	300	0.063	4500	1100	115	0.061
R5.0 x 10.0	10500	3000	330	0.071	10000	2500	315	0.063	3500	1000	110	0.071
R6.0 x 12.0	9000	2800	340	0.078	8000	2500	300	0.078	3000	950	115	0.079
R8.0 x 16.0	6000	2800	300	0.117	5500	2200	275	0.100	2000	800	100	0.100

HIGH SPEED

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS CAST IRON			ALLOY STEELS HEAT RESISTANT STEELS			HARDENED STEELS					
HARDNESS	~ HRc30			HRc30 ~ HRc40			HRc45 ~ HRc65					
STRENGTH	~1000N/mm ²			1000 ~ 1250N/mm ²			1500N/mm ²					
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R2.5 x 5.0	28000	5600	440	0.050	27000	5300	425	0.049	11000	2100	175	0.048
R3.0 x 6.0	23000	5100	435	0.055	22000	4900	415	0.056	9000	1900	170	0.053
R4.0 x 8.0	18000	4600	450	0.064	17000	4300	425	0.063	7000	1700	175	0.061
R5.0 x 10.0	14000	3900	440	0.070	13000	3700	410	0.071	5000	1400	155	0.070
R6.0 x 12.0	12000	3700	450	0.077	11000	3500	415	0.080	4500	1300	170	0.072
R8.0 x 16.0	9000	3100	450	0.086	8000	3000	400	0.094	3300	1100	165	0.083

RPM= rev. / min. , FEED= mm / min.
Vc= m / min. , fz= mm / t

2 FLUTE, DIAMOND COATED LONG CARBIDE END MILLS



MG HM 30° COATED FLUTE 2 PLAIN

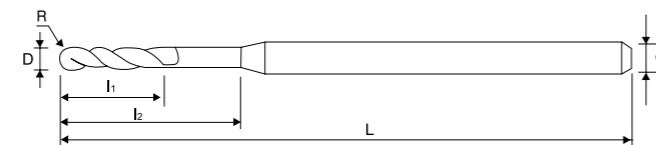
Series No. 113325

▶ cutting conditions : p.121



EUROPA CODE 2FLUTE	RADIUS	MILL DIAMETER D	SHANK DIAMETER d	LENGTH OF CUT l ₁	LENGTH BELOW SHANK l ₂	OVERALL LENGTH L
1133250200	1.0	2.0	4.0	10.0	20.0	80
1133250300	1.5	3.0		15.0	25.0	
1133250400	2.0	4.0		20.0	30.0	
1133250500	2.5	5.0	6.0	30.0	50.0	100
1133250600	3.0	6.0		30.0	50.0	
1133250800	4.0	8.0	8.0	40.0	60.0	110
1133251000	5.0	10.0	10.0	50.0	70.0	120
1133251200	6.0	12.0	12.0	55.0	75.0	130

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6



2 FLUTE, DIAMOND COATED LONG REACH CARBIDE END MILLS



MG HM 30° COATED FLUTE 2 PLAIN

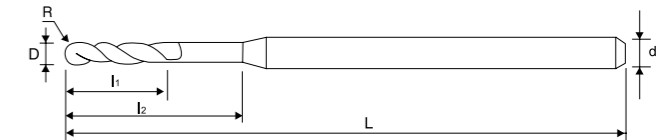
Series No. 114325

▶ cutting conditions : p.121



EUROPA CODE	RADIUS	MILL DIAMETER D	SHANK DIAMETER d	LENGTH OF CUT l ₁	LENGTH BELOW SHANK l ₂	OVERALL LENGTH L
1143250200	1.0	2.0	4.0	10.0	20.0	100
1143250300	1.5	3.0		15.0	25.0	
1143250400	2.0	4.0		20.0	30.0	
1143250500	2.5	5.0	6.0	30.0	50.0	120
1143250600	3.0	6.0		30.0	50.0	
1143250800	4.0	8.0	8.0	40.0	60.0	150

MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
0~-0.03	h6



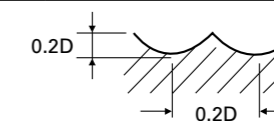
DIAMOND COATED CUTTING CONDITION



DIAMOND CUTTING CONDITION

113325, 114325

MATERIAL	GRAPHITE			
DIAMETER	RPM	FEED	Vc	fz
R1.0 x 2.0	16000	800	100	0.025
R1.25 x 2.5	16000	1120	125	0.035
R1.5 x 3.0	16000	1450	150	0.045
R1.75 x 3.5	16000	1750	175	0.055
R2.0 x 4.0	16000	2100	200	0.066
R2.5 x 5.0	15500	2550	245	0.082
R3.0 x 6.0	15000	2950	285	0.098
R4.0 x 8.0	13000	3000	325	0.115
R5.0 x 10.0	11500	3050	360	0.133
R6.0 x 12.0	10500	3150	395	0.150



※ The FEED, in long & long reach types, should be reduced by around 50%

RPM= rev. / min. , FEED= mm / min.
Vc= m / min. , fz= mm / t

HX2 & HX2S STAGGERED HELIX CARBIDE END MILL CONTENTS

(Carbide for silent and improved machining)

Europa Tool 11th Edition

HX2 & HX2S STAGGERED HELIX CARBIDE END MILLS



www.europatool.co.uk

PRODUCTS	SERIES	DESCRIPTION	PAGE
HX2 - STAINLESS STEEL - TITANIUM - INCONEL			
	136123 136323	4 FLUTE, SHORT LENGTH, INOX	125
	137123 137323	4 FLUTE, SHORT LENGTH, CORNER RADIUS INOX	126
	138123 138323	4 FLUTE, LONG LENGTH, INOX	127
	139123 139323	4 FLUTE, LONG LENGTH, CORNER RADIUS, INOX	128
	134123 134323	4 FLUTE, LONG LENGTH, BALL NOSED, INOX	129
	135123 135323	5 FLUTE, LONG LENGTH, INOX	130
	146123 146323	4 FLUTE LONG LENGTH WITH NECK INOX	131
HX2S - ALLOYS STEELS - CAST IRON			
	156123 156323	4 FLUTE, SHORT LENGTH, TiAIN	132
	157123 157323	4 FLUTE, SHORT LENGTH, CORNER RADIUS, TiAIN	133
	158123 158323	4 FLUTE, LONG LENGTH, TiAIN	134
	159123 159323	4 FLUTE, LONG LENGTH, CORNER RADIUS, TiAIN	135
	164123 164323	4 FLUTE LONG LENGTH WITH NECK TiAIN	136
	167323 167123	4&5 FLUTE MULTIPLE HELIX SHORT LENGTH ROUGHER WITH CORNER RADIUS	137
	168323 168123	4&5 FLUTE MULTIPLE HELIX LONG LENGTH ROUGHER WITH CORNER RADIUS	138
	169323 169123	4&5 FLUTE MULTIPLE HELIX LONG REACH ROUGHER WITH CORNER RADIUS	139
CUTTING DATA			140 ~ 143

HX2 STAGGERED HELIX MILLING CUTTERS



COMPLETELY NEW MILLING GENERATION

WORLD FIRST. VERY SMOOTH CHIP REMOVAL AND SILENT MACHINING
AVOIDS RESONANCE VIBRATION DUE TO THE UNIQUE SINUSOIDAL FLUTE FORM DESIGN
IMPROVES SURFACE FINISH DUE TO THE CHATTER FREE DESIGN
INCREASED CUTTING DEPTH AND FEED RATES

APPLICATION

HX2 : STAINLESS STEELS, TITANIUM ALLOYS, INCONEL
HX2S : ALLOY STEELS & CAST IRON

MATERIAL	K30/40	PRIME GRADE CARBIDE
COATING	ALTiN	HARDNESS: HV (0.05) = 3,500 OXIDISATION TEMP: 900 DEG C
GEOMETRY	SINUSOIDAL	HIGH RAKE MEDIUM CORE

HX2 STAGGERED HELIX VS COMPETITORS

THE CHARACTERISTICS

HX2	CONVENTIONAL	HX2	CONVENTIONAL
CROSS SECTION OF CORE			
		Chip flow: Very smooth	Chip flow: Not smooth

GEOMETRY COMPARISON BETWEEN HX2 AND COMPETITORS

	HX2 END MILL	COMPETITORS END MILLS
HELIX	SINUSOIDAL	UNEQUAL CONSTANT
END INDEX	 EQUAL	 UNEQUAL
RADIAL RAKE ANGLE	CHANGEABLE	CONSTANT
RADIAL PRIMARY RELIEF & TYPE	CHANGEABLE & ECCENTRIC	CONSTANT & ECCENTRIC
FLUTE FORM DESIGN	UNIQUE	CONVENTIONAL

UNIQUE PATENTED FLUTE FORM DESIGN

4 FLUTE, SHORT LENGTH HX2 INOX



Series No. 136123, 136323

▶ cutting conditions : p.140



MINIMIZED TOOL DEFLECTION
CORNER PROTECTED
REDUCED TOOL VIBRATION

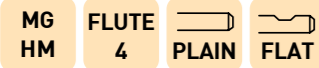
ALL DIMENSIONS ARE IN MM

MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	EUROPA CODE FLATTED	EUROPA CODE PLAIN
3	6	7	54	1361230300	1363230300
4	6	8	54	1361230400	1363230400
5	6	10	54	1361230500	1363230500
6	6	10	54	1361230600	1363230600
8	8	12	58	1361230800	1363230800
10	10	14	66	1361231000	1363231000
12	12	16	73	1361231200	1363231200
14	14	18	75	1361231400	1363231400
16	16	22	82	1361231600	1363231600
18	18	24	84	1361231800	1363231800
20	20	26	92	1361232000	1363232000

SUITABLE FOR
STAINLESS STEELS, TITANIUM AND INCONEL

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	h6

4 FLUTE, SHORT LENGTH, CORNER RADIUS HX2 INOX



Series No. 137123, 137323



▶ cutting conditions : p.140

MINIMIZED TOOL DEFLECTION
CORNER PROTECTED
REDUCED TOOL VIBRATION

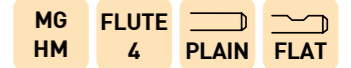
ALL DIMENSIONS ARE IN MM

MILL DIA.	RADIUS	SHANK DIA.	L.O.C.	O/ALL	EUROPA CODE FLATTED	EUROPA CODE PLAIN
3	R0.3	6	7	54	1371230300	1373230300
4	R0.3	6	8	54	1371230400	1373230400
5	R0.3	6	10	54	1371230500	1373230500
6	R0.5	6	10	54	1371230600	1373230600
8	R0.5	8	12	58	1371230800	1373230800
10	R0.5	10	14	66	1371231000	1373231000
12	R0.7	12	16	73	1371231200	1373231200
14	R0.7	14	18	75	1371231400	1373231400
16	R1.0	16	22	82	1371231600	1373231600
18	R1.0	18	24	84	1371231800	1373231800
20	R1.0	20	26	92	1371232000	1373232000

SUITABLE FOR
STAINLESS STEELS, TITANIUM AND INCONEL

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	h6

4 FLUTE, LONG LENGTH HX2 INOX



Series No. 138123, 138323



▶ cutting conditions : p.140

MINIMIZED TOOL DEFLECTION
CORNER PROTECTED
REDUCED TOOL VIBRATION

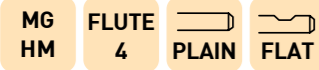
ALL DIMENSIONS ARE IN MM

MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	EUROPA CODE FLATTED	EUROPA CODE PLAIN
3	6	8	57	1381230300	1383230300
4	6	11	57	1381230400	1383230400
5	6	13	57	1381230500	1383230500
6	6	13	57	1381230600	1383230600
8	8	19	63	1381230800	1383230800
10	10	22	72	1381231000	1383231000
12	12	26	83	1381231200	1383231200
14	14	26	83	1381231400	1383231400
16	16	32	92	1381231600	1383231600
18	18	32	92	1381231800	1383231800
20	20	38	104	1381232000	1383232000
25	25	38	108	1381232500	1383232500

SUITABLE FOR
STAINLESS STEELS, TITANIUM AND INCONEL

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	h6

4 FLUTE, LONG LENGTH, CORNER RADIUS HX2 INOX



Series No. 139123, 139323



▶ cutting conditions : p.140

MINIMIZED TOOL DEFLECTION
CORNER PROTECTED
REDUCED TOOL VIBRATION

ALL DIMENSIONS ARE IN MM

MILL DIA.	RADIUS	SHANK DIA.	L.O.C.	O/ALL	EUROPA CODE FLATTED	EUROPA CODE PLAIN
3	R0.3	6	8	57	1391230300	1393230300
4	R0.3	6	11	57	1391230400	1393230400
5	R0.3	6	13	57	1391230500	1393230500
6	R0.5	6	13	57	1391230600	1393230600
8	R0.5	8	19	63	1391230800	1393230800
10	R0.5	10	22	72	1391231000	1393231000
12	R0.7	12	26	83	1391231200	1393231200
14	R0.7	14	26	83	1391231400	1393231400
16	R1.0	16	32	92	1391231600	1393231600
18	R1.0	18	32	92	1391231800	1393231800
20	R1.0	20	38	104	1391232000	1393232000

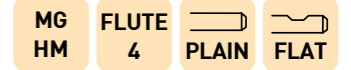
SUITABLE FOR
STAINLESS STEELS, TITANIUM AND INCONEL

NEW ITEM

MILL DIA.	RADIUS	SHANK DIA.	L.O.C.	O/ALL	EUROPA CODE FLATTED	EUROPA CODE PLAIN
6	R0.3	6	13	57	-	1393239063
8	R0.75	8	19	63	-	1393239087
10	R0.75	10	22	72	-	1393239107
12	R0.5	12	26	83	-	1393239127

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	h6

4 FLUTE, LONG LENGTH BALL NOSED HX2 INOX



Series No. 134123, 134323



▶ cutting conditions : p.141

MINIMIZED TOOL DEFLECTION
CORNER PROTECTED
REDUCED TOOL VIBRATION

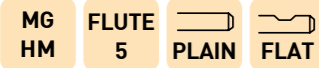
ALL DIMENSIONS ARE IN MM

MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	EUROPA CODE FLATTED	EUROPA CODE PLAIN
3	6	8	57	1341230300	1343230300
4	6	11	57	1341230400	1343230400
5	6	13	57	1341230500	1343230500
6	6	13	57	1341230600	1343230600
8	8	19	63	1341230800	1343230800
10	10	22	72	1341231000	1343231000
12	12	26	83	1341231200	1343231200
14	14	26	83	1341231600	1343231600
16	16	32	92	1341232000	1343232000
18	18	32	92	1341232500	1343232500
20	20	38	104	1381232000	1383232000
25	25	38	108	1381232500	1383232500

SUITABLE FOR
STAINLESS STEELS, TITANIUM AND INCONEL

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	h6

5 FLUTE, LONG LENGTH HX2 INOX



Series No. 135123, 135323



▶ cutting conditions : p.141

**MINIMIZED TOOL DEFLECTION
CORNER PROTECTED
REDUCED TOOL VIBRATION**

ALL DIMENSIONS ARE IN MM

MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	EUROPA CODE FLATTED	EUROPA CODE PLAIN
6	6	13	57	1351230600	1353230600
8	8	19	63	1351230800	1353230800
10	10	22	72	1351231000	1353231000
12	12	26	83	1351231200	1353231200
14	14	26	83	1351231400	1353231400
16	16	32	92	1351231600	1353231600
18	18	32	92	1351231800	1353231800
20	20	38	104	1351232000	1353232000
25	25	38	108	1351232500	1353232500

SUITABLE FOR
STAINLESS STEELS, TITANIUM AND INCONEL

MILL DIA. TOLERANCE	SHANK DIA. TOLERANCE
0~-0.03	h6

4 FLUTE LONG LENGTH with NECK INOX



Series No. 146123, 146323



NEW

▶ cutting conditions : p.140

Special flute geometry eliminates vibrations.
Designed to mild steels, stainless steels, cast iron, tool steels, titanium alloys, prehardened steels and low hardness materials under HRc40.
Excellent work piece finishes.
Higher speeds, deeper cuts and metal removal rates.

EUROPA CODE FLATTED	EUROPA CODE PLAIN	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH	NECK DIAMETER
1461230300	1463230300	3.0	6	7	12	54	2.7
1461239013	1463239013	3.0	6	7	17	57	2.7
1461230400	1463230400	4.0	6	8	15	57	3.7
1461239014	1463239014	4.0	6	8	22	63	3.7
1461230500	1463230500	5.0	6	10	17	57	4.7
1461239015	1463239015	5.0	6	10	27	67	4.7
1461230600	1463230600	6.0	6	10	15	57	5.5
1461239001	1463239001	6.0	6	10	20	62	5.5
1461239002	1463239002	6.0	6	10	32	74	5.5
1461230800	1463230800	8.0	8	12	20	63	7.5
1461239003	1463239003	8.0	8	12	30	73	7.5
1461239004	1463239004	8.0	8	12	46	90	7.5
1461231000	1463231000	10.0	10	14	25	72	9.2
1461239005	1463239005	10.0	10	14	35	82	9.2
1461239006	1463239006	10.0	10	14	55	102	9.2
1461231200	1463231200	12.0	12	16	30	83	11
1461239007	1463239007	12.0	12	16	40	93	11
1461239008	1463239008	12.0	12	16	64	117	11
1461231600	1463231600	16.0	16	22	38	92	15
1461239009	1463239009	16.0	16	22	55	109	15
1461239010	1463239010	16.0	16	22	87	141	15
1461232000	1463232000	20.0	20	26	50	104	19
1461239011	1463239011	20.0	20	26	70	124	19
1461239012	1463239012	20.0	20	26	110	164	19

Unit : mm

MILL DIA. TOLERANCE(mm)	SHANK DIA. TOLERANCE
0~-0.03	h6

4 FLUTE, SHORT LENGTH HX2S TiAlN



MG HM DIN 6527 FLUTE 4 PLAIN FLAT

Series No. 156123, 156323



► cutting conditions : p.142

Special flute geometry and multiple helix eliminate vibrations
 Designed to machine mild steels, cast irons, tool steels, and low hardened steels up to HRc 40.
 Excellent work piece finishes.
 Higher speeds, deeper cuts, and higher metal removal rates.

ALL DIMENSIONS ARE IN MM

MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	EUROPA CODE FLATTED	EUROPA CODE PLAIN
3	6	5	50	1561230300	1563230300
4	6	8	54	1561230400	1563230400
5	6	9	54	1561230500	1563230500
6	6	10	54	1561230600	1563230600
8	8	12	58	1561230800	1563230800
10	10	14	66	1561231000	1563231000
12	12	16	73	1561231200	1563231200
14	14	18	75	1561231400	1563231400
16	16	22	82	1561231600	1563231600
18	18	24	84	1561231800	1563231800
20	20	26	92	1561232000	1563232000

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	h6

4 FLUTE, SHORT LENGTH, CORNER RADIUS HX2S TiAlN



MG HM DIN 6527 FLUTE 4 PLAIN FLAT

Series No. 157123, 157323



► cutting conditions : p.142

Special flute geometry and multiple helix eliminate vibrations
 Designed to machine mild steels, cast irons, tool steels, and low hardened steels up to HRc 40.
 Excellent work piece finishes.
 Higher speeds, deeper cuts, and higher metal removal rates.

ALL DIMENSIONS ARE IN MM

MILL DIAMETER	RADIUS	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	EUROPA CODE FLATTED	EUROPA CODE PLAIN
3	R0.3	6	5	50	1571230300	1573230300
4	R0.3	6	8	54	1571230400	1573230400
5	R0.3	6	9	54	1571230500	1573230500
6	R0.4	6	10	54	1571230600	1573230600
8	R0.4	8	12	58	1571230800	1573230800
10	R0.4	10	14	66	1571231000	1573231000
12	R0.6	12	16	73	1571231200	1573231200
14	R0.6	14	18	75	1571231400	1573231400
16	R0.8	16	22	82	1571231600	1573231600
18	R0.8	18	24	84	1571231800	1573231800
20	R0.8	20	26	92	1571232000	1573232000

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	h6

4 FLUTE, LONG LENGTH HX2S TiAlN



MG HM DIN 6527 FLUTE 4 PLAIN FLAT

Series No. 158123, 158323



► cutting conditions : p.142

Special flute geometry and multiple helix eliminate vibrations
 Designed to machine mild steels, cast irons, tool steels, and low hardened steels up to HRc 40.
 Excellent work piece finishes.
 Higher speeds, deeper cuts, and higher metal removal rates.

ALL DIMENSIONS ARE IN MM

MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	EUROPA CODE FLATTED	EUROPA CODE PLAIN
3	6	8	57	1581230300	1583230300
4	6	11	57	1581230400	1583230400
5	6	13	57	1581230500	1583230500
6	6	13	57	1581230600	1583230600
8	8	19	63	1581230800	1583230800
10	10	22	72	1581231000	1583231000
12	12	26	83	1581231200	1583231200
14	14	26	83	1581231400	1583231400
16	16	32	92	1581231600	1583231600
18	18	32	92	1581231800	1583231800
20	20	38	104	1581232000	1583232000
25	25	38	104	1581232500	1583232500

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	h6

4 FLUTE, LONG LENGTH, CORNER RADIUS HX2S TiAlN



MG HM DIN 6527 FLUTE 4 PLAIN FLAT

Series No. 159123, 159323



► cutting conditions : p.142

Special flute geometry and multiple helix eliminate vibrations
 Designed to machine mild steels, cast irons, tool steels, and low hardened steels up to HRc 40.
 Excellent work piece finishes.
 Higher speeds, deeper cuts, and higher metal removal rates.

ALL DIMENSIONS ARE IN MM

MILL DIAMETER	RADIUS	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	EUROPA CODE FLATTED	EUROPA CODE PLAIN
3	R0.3	6	8	57	1591230300	1593230300
4	R0.3	6	11	57	1591230400	1593230400
5	R0.3	6	13	57	1591230500	1593230500
6	R0.4	6	13	57	1591230600	1593230600
8	R0.4	8	19	63	1591230800	1593230800
10	R0.4	10	22	72	1591231000	1593231000
12	R0.6	12	26	83	1591231200	1593231200
14	R0.6	14	26	83	1591231400	1593231400
16	R0.8	16	32	92	1591231600	1593231600
18	R0.8	18	32	92	1591231800	1593231800
20	R0.8	20	38	104	1591232000	1593232000
25	R0.8	25	38	104	1591232500	1593232500

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	h6

4 FLUTE LONG LENGTH with NECK TiAlN



Series No. 164123,164323 **NEW**



▶ cutting conditions : p.142

Special flute geometry and multiple helix eliminate vibrations.
Designed to machine mild steels, cast irons, tool steels, and low hardened steels up to HRc40.
Excellent work piece finishes.
Higher speeds, deeper cuts, and higher metal removal rates.

EUROPA CODE FLATTED	EUROPA CODE PLAIN	MILL DIAMETER	SHANK DIAMETER h6	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH	NECK DIAMETER
1641230300	1643230300	3.0	6	7	12	54	2.7
1641239013	1643239013	3.0	6	7	17	57	2.7
1641230400	1643230400	4.0	6	8	15	57	3.7
1641239014	1643239014	4.0	6	8	22	63	3.7
1641230500	1643230500	5.0	6	10	17	57	4.7
1641239015	1643239015	5.0	6	10	27	67	4.7
1641230600	1643230600	6.0	6	10	15	57	5.5
1641239001	1643239001	6.0	6	10	20	62	5.5
1641239002	1643239002	6.0	6	10	32	74	5.5
1641230800	1643230800	8.0	8	12	20	63	7.5
1641239003	1643239003	8.0	8	12	30	73	7.5
1641239004	1643239004	8.0	8	12	46	90	7.5
1641231000	1643231000	10.0	10	14	25	72	9.2
1641239005	1643239005	10.0	10	14	35	82	9.2
1641239006	1643239006	10.0	10	14	55	102	9.2
1641231200	1643231200	12.0	12	16	30	83	11
1641239007	1643239007	12.0	12	16	40	93	11
1641239008	1643239008	12.0	12	16	64	117	11
1641231600	1643231600	16.0	16	22	38	92	15
1641239009	1643239009	16.0	16	22	55	109	15
1641239010	1643239010	16.0	16	22	87	141	15
1641232000	1643232000	20.0	20	26	50	104	19
1641239011	1643239011	20.0	20	26	70	124	19
1641239012	1643239012	20.0	20	26	110	164	19

Unit : mm

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	h6

4&5 FLUTE, MULTIPLE HELIX SHORT LENGTH CORNER RADIUS



Series No. 167323, 167123



▶ cutting conditions : p.143

Unique flute design for excellent chip evacuation and vibration reduction.
Optimal roughing tooth profile to reduce cutting forces.
Special tool geometry for high feed rate and heavy cutting.
Strong end tooth design for plunge and pocket milling.
Custom engineered coating to allow long tool life and excellent chip evacuation.

ALL DIMENSIONS ARE IN MM

CORNER RADIUS R	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	No. of FLUTE	EUROPA CODE FLATTED	EUROPA CODE PLAIN
R0.5	6.0	6	9	57	4	1673230600	1671230600
R0.5	8.0	8	12	63	4	1673230800	1671230800
R0.5	10.0	10	15	72	4	1673231000	1671231000
R0.5	12.0	12	18	83	4	1673231200	1671231200
R1.0	16.0	16	24	92	5	1673231600	1671231600
R1.0	20.0	20	30	104	5	1673232000	1671232000

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.05	h6

4&5 FLUTE, MULTIPLE HELIX LONG LENGTH CORNER RADIUS



Series No. 168323, 168123



▶ cutting conditions : p.143

Unique flute design for excellent chip evacuation and vibration reduction.
Optimal roughing tooth profile to reduce cutting forces.
Special tool geometry for high feed rate and heavy cutting.
Strong end tooth design for plunge and pocket milling.
Custom engineered coating to allow long tool life and excellent chip evacuation.

ALL DIMENSIONS ARE IN MM

CORNER RADIUS R	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	No. of FLUTE	EUROPA CODE PLAIN	EUROPA CODE FLAT
R0.5	6.0	6	12	57	4	1683230600	1681230600
R0.5	8.0	8	16	63	4	1683230800	1681230800
R0.5	10.0	10	20	72	4	1683231000	1681231000
R0.5	12.0	12	24	83	4	1683231200	1681231200
R1.0	16.0	16	32	92	5	1683231600	1681231600
R1.0	20.0	20	40	104	5	1683232000	1681232000

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.05	h6

4&5 FLUTE, MULTIPLE HELIX LONG REACH CORNER RADIUS



Series No. 169323, 169123



▶ cutting conditions : p.143

Unique flute design for excellent chip evacuation and vibration reduction.
Optimal roughing tooth profile to reduce cutting forces.
Special tool geometry for high feed rate and heavy cutting.
Strong end tooth design for plunge and pocket milling.
Custom engineered coating to allow long tool life and excellent chip evacuation.

ALL DIMENSIONS ARE IN MM

CORNER RADIUS R	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH	No. of FLUTE	EUROPA CODE PLAIN	EUROPA CODE FLAT
R0.5	6.0	6	9	18	57	4	1693230600	1691230600
R0.5	8.0	8	12	24	63	4	1693230800	1691230800
R0.5	10.0	10	15	30	72	4	1693231000	1691231000
R0.5	12.0	12	18	36	83	4	1693231200	1691231200
R1.0	16.0	16	24	48	100	5	1693231600	1691231600
R1.0	20.0	20	30	60	110	5	1693232000	1691232000

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.05	h6

HX2 & HX2S STAGGERED HELIX cutting condition

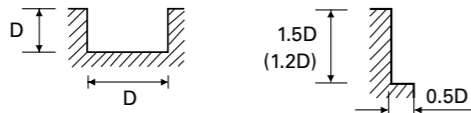


CARBIDE, 4 FLUTE

136123, 136323, 137123, 137323, 138123, 138323, 139123, 139323, 146323, 146123



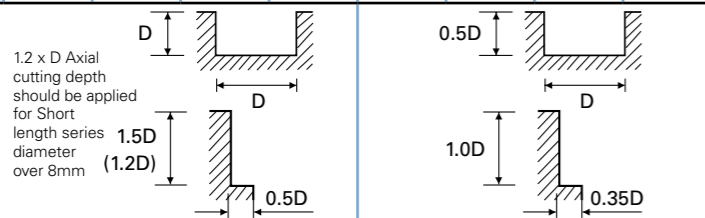
MATERIAL	ALLOY STEELS CAST IRON				STAINLESS STEELS 300SERIES				STAINLESS STEELS 400SERIES			
	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
HARDNESS	~ HB 230				HRc30 ~ HRc45							
STRENGTH	~ 1000N/mm ²				1000 ~ 1500N/mm ²							
DIAMETER												
3.0	13475	275	125	0.005	10185	195	95	0.005	14260	205	135	0.004
4.0	10105	330	125	0.008	7600	250	95	0.008	14260	255	180	0.004
5.0	8085	370	125	0.011	6110	310	95	0.013	8655	310	135	0.009
6.0	6735	435	125	0.016	5095	360	95	0.018	7130	360	135	0.013
8.0	5050	555	125	0.027	3820	435	95	0.028	5345	465	135	0.022
10.0	4455	690	140	0.039	3055	590	95	0.048	4275	585	135	0.034
12.0	3710	695	140	0.047	2545	565	95	0.056	3565	565	135	0.040
14.0	3180	620	140	0.049	2180	520	95	0.060	3055	520	135	0.043
16.0	2785	590	140	0.053	1910	480	95	0.063	2670	480	135	0.045
18.0	2475	585	140	0.059	1695	475	95	0.070	2375	475	135	0.050
20.0	2225	580	140	0.065	1525	470	95	0.077	2140	470	135	0.055
25.0	1780	450	140	0.063	1215	380	95	0.078	1710	380	135	0.056



*(): short length type

1.2 x D Axial cutting depth should be applied for Short length series diameter over 8mm

MATERIAL	TITANIUM				INCONEL			
	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
HARDNESS								
STRENGTH								
DIAMETER								
3.0	10185	205	95	0.005	2715	55	25	0.005
4.0	7600	255	95	0.008	2005	55	25	0.007
5.0	6110	310	95	0.013	1630	80	25	0.012
6.0	5095	360	95	0.018	1355	95	25	0.018
8.0	3280	465	80	0.035	1015	125	25	0.031
10.0	3055	585	95	0.048	815	155	25	0.048
12.0	2545	565	95	0.056	675	150	25	0.056
14.0	2180	520	95	0.060	580	140	25	0.060
16.0	1910	480	95	0.063	505	130	25	0.064
18.0	1695	475	95	0.070	450	125	25	0.069
20.0	1525	470	95	0.077	405	125	25	0.077
25.0	1215	380	95	0.078	320	110	25	0.086



1.2 x D Axial cutting depth should be applied for Short length series diameter over 8mm

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

HX2 & HX2S STAGGERED HELIX cutting condition

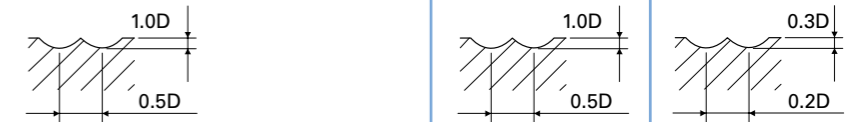


CARBIDE, 4 FLUTE BALL NOSE

134123, 134323



MATERIAL	ALLOY STEELS CAST IRON				STAINLESS STEELS 300SERIES				STAINLESS STEELS 400SERIES				TITANIUM				INCONEL			
	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
HARDNESS	~ HB 230																			
STRENGTH	~ 1000N/mm ²																			
DIAMETER																				
R1.5 x 3.0	14324	1430	135	0.025	8220	650	75	0.020	7420	440	70	0.015	5830	280	55	0.012	3180	140	30	0.011
R2.0 x 4.0	10740	1070	135	0.025	6160	490	75	0.020	5570	330	70	0.015	4370	210	55	0.012	2380	100	30	0.011
R2.5 x 5.0	8590	1030	135	0.030	4930	490	75	0.025	4450	440	70	0.025	3500	210	55	0.015	1910	80	30	0.010
R3.0 x 6.0	7460	1140	140	0.038	4110	670	75	0.041	3710	440	70	0.030	2910	230	55	0.020	1590	100	30	0.016
R4.0 x 8.0	5370	1280	135	0.060	3080	550	75	0.045	2780	440	70	0.040	2180	260	55	0.030	1190	120	30	0.025
R5.0 x 10.0	4290	1030	135	0.060	2460	490	75	0.050	2220	400	70	0.045	1750	210	55	0.030	950	100	30	0.026
R6.0 x 12.0	3580	1000	135	0.070	2050	450	75	0.055	1850	370	70	0.050	1450	230	55	0.040	790	120	30	0.038
R8.0 x 16.0	2680	800	135	0.075	1540	370	75	0.060	1390	300	70	0.054	1090	190	55	0.044	590	110	30	0.047
R9.0 x 18.0	2380	760	135	0.080	1370	350	75	0.064	1230	290	70	0.059	970	190	55	0.049	530	110	30	0.052
R10.0 x 20.0	2140	770	135	0.090	1230	320	75	0.065	1110	260	70	0.059	870	210	55	0.060	470	100	30	0.053
R12.5 x 25.0	1710	680	135	0.099	980	270	75	0.069	890	210	70	0.059	700	190	55	0.068	380	80	30	0.053



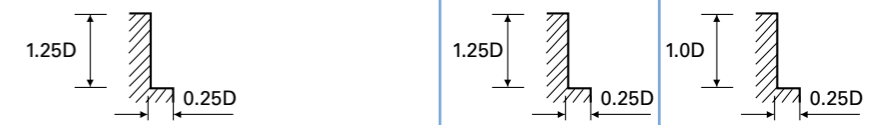
RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

CARBIDE, 5 FLUTE

135123, 135323



MATERIAL	ALLOY STEELS CAST IRON				STAINLESS STEELS 300SERIES				STAINLESS STEELS 400SERIES				TITANIUM				INCONEL			
	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
HARDNESS	~ HB 230																			
STRENGTH	~ 1000N/mm ²																			
DIAMETER																				
6.0	7270	1240	135	0.034	6060	920	115	0.030	5660	860	105	0.030	4440	670	85	0.030	1450	120	25	0.017
8.0	5450	1040	135	0.038	4540	720	115	0.032	4240	670	105	0.032	3330	520	85	0.031	1090	110	25	0.020
10.0	4360	1100	135	0.050	3630	690	115	0.038	3390	640	105	0.038	2660	500	85	0.038	870	110	25	0.025
12.0	3630	1150	135	0.063	3030	960	115	0.063	3830	820	145	0.043	2220	560	85	0.050	720	130	25	0.036
14.0	3110	1080	135	0.069	2600	850	115	0.065	2420	770	105	0.064	1900	540	85	0.057	620	140	25	0.045
16.0	2720	1040	135	0.076	2270	780	115	0.069	2120	720	105	0.068	1660	520	85	0.063	540	130	25	0.048
20.0	2180	970	135	0.089	1810	690	115	0.076	1690	640	105	0.076	1330	500	85	0.075	430	130	25	0.060



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

HX2 & HX2S STAGGERED HELIX cutting condition

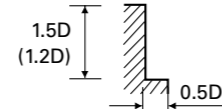
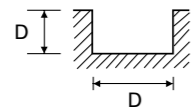


CARBIDE, 4 FLUTE, STEEL

156123,156323,157123,157323,158123,158323,159123,159323,164323,164123



MATERIAL	ALLOY STEELS TOOL STEELS CARBON STEELS							
	~ HB 300				HB 300 ~ HB 380			
STRENGTH	~ 1000N/mm ²				1000 ~ 1300N/mm ²			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
3.0	13475	275	125	0.005	9430	190	90	0.005
4.0	10105	330	125	0.008	7070	230	90	0.008
5.0	8085	370	125	0.011	5660	260	90	0.011
6.0	6735	435	125	0.016	4715	305	90	0.016
8.0	5050	555	125	0.027	3535	385	90	0.027
10.0	4455	690	140	0.039	3115	480	100	0.039
12.0	3710	695	140	0.047	2600	485	100	0.047
14.0	3180	620	140	0.049	2225	435	100	0.049
16.0	2785	590	140	0.053	1950	410	100	0.053
18.0	2475	585	140	0.059	1730	410	100	0.059
20.0	2225	580	140	0.065	1560	405	100	0.065
25.0	1780	450	140	0.063	1245	315	100	0.063



* () : Short length Type

1.2 x D Axial cutting depth should be applied for Short length series DIA over 8mm

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

HX2 & HX2S STAGGERED HELIX cutting condition

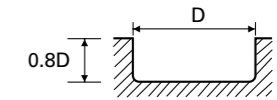
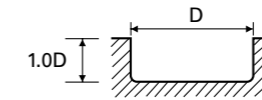


CARBIDE, 4&5 FLUTE, MULTIPLE HELIX CORNER RADIUS

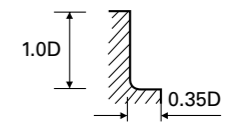
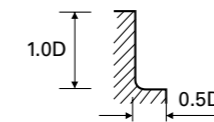
167323,167123,168323,168123,169323,169123



MATERIAL	ALLOY STEELS, CARBON STEELS TOOL STEELS, CAST IRON				ALLOYED STEELS, CARBON STEELS TOOL STEELS, CAST IRON PREHARDENED STEELS			
	~ HRc 25				HRc 25 ~ HRc 40			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	12000	1550	225	0.032	10600	1100	200	0.026
8.0	9000	1650	225	0.046	8100	1180	205	0.036
10.0	7200	1650	225	0.057	6400	1180	200	0.046
12.0	6000	1540	225	0.064	5400	1140	205	0.053
16.0	4500	1500	225	0.067	4100	1050	205	0.051
20.0	3600	1330	225	0.074	3200	900	200	0.056



MATERIAL	ALLOY STEELS, CARBON STEELS TOOL STEELS CAST IRON				ALLOYED STEELS, CARBON STEELS TOOL STEELS, CAST IRON PREHARDENED STEELS			
	~ HRc 25				HRc 25 ~ HRc 40			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6	15800	2570	300	0.041	14300	1850	270	0.032
8	11900	2700	300	0.057	10700	1950	270	0.046
10	9500	2700	300	0.071	8500	1950	265	0.057
12	8000	2570	300	0.080	7100	1850	270	0.065
16	6000	2450	300	0.082	5400	1750	270	0.065
20	4800	2140	300	0.089	4300	1500	270	0.070



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

Europa Tool 11th Edition





ALU-XP END MILLS



www.europatool.co.uk

ALU-XP END MILL CONTENTS

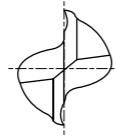
(Carbide for aluminium & other non-ferrous materials)

PRODUCTS	SERIES	DESCRIPTION	PAGE
	151303	2 FLUTE 45 DEG HELIX	146
	157303	2 FLUTE 55 DEG HELIX	147
	155309	2 FLUTE CORNER RADIUS TiCN COATED	148
	112309	2 FLUTE 50 DEG HELIX BALL NOSE TiCN COATED	149
	116309	3 FLUTE 40 DEG HELIX BALL NOSE TiCN COATED	150
	125103 125303	3 FLUTE LONG ROUGHING END MILLS	151
	142303	3 FLUTE 45 DEG.HELIX LONG LENGTH CORNER RADIUS	152
	112303	2 FLUTE 50 DEG HELIX BALL NOSE WITH NECK	153
	126303 126103	3 FLUTE ROUGHING WITH NECK	154
	331303	2 FLUTE STANDARD LENGTH 45 DEG HELIX METRIC	155
 NEW	153303	3 FLUTE 45 DEG.HELIX WITH NECK	156
 NEW	143303	3 FLUTE 45 DEG.HELIX LONG LENGTH	157
CUTTING DATA			158 ~ 162

2 FLUTE, 45° HELIX FOR ALUMINIUM



ALU-XP



Series No. 151303

▶ cutting conditions : p.159

Suitable for high speed machining in aluminium and other non-ferrous materials.
Excellent surface finishes, superior chip removal.

MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	EUROPA CODE
3	6	8	57	1513030300
4	6	11	57	1513030400
5	6	13	57	1513030500
6	6	13	57	1513030600
8	8	19	63	1513030800
10	10	22	72	1513031000
12	12	26	83	1513031200
14	14	26	83	1513031400
16	16	32	92	1513031600
18	18	32	92	1513031800
20	20	38	104	1513032000

ALL DIMENSIONS ARE IN MM

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	h6

2 FLUTE, 55° HELIX



ALU-XP



Series No. 157303

▶ cutting conditions : p.160

Designed to give extremely high performance in the machining of Aluminium and other soft non-ferrous materials.
The radical flute geometry gives exceptional swarf clearance, whilst the circular land and end teeth design give excellent surface finish.

MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	EUROPA CODE
3	3	12	38	1573030300
4	4	15	50	1573030400
5	5	20	50	1573030500
6	6	20	64	1573030600
8	8	22	64	1573030800
10	10	27	70	1573031000
12	12	27	76	1573031200
14	14	30	90	1573031400
16	16	35	90	1573031600
20	20	40	100	1573032000

ALL DIMENSIONS ARE IN MM

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	h6

2 FLUTE, CORNER RADIUS FOR ALUMINIUM, TiCN COATED



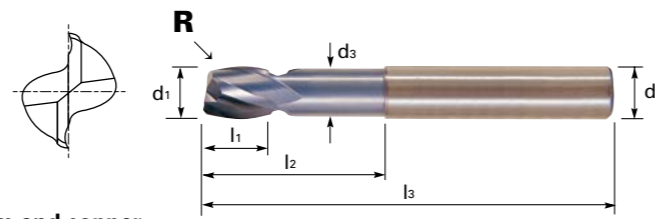
ALU-XP



Series No. 155309

▶ cutting conditions : p.158

Excellent cutting qualities on stainless steel, aluminium and copper
Increased tool life and higher cutting accuracy.



R	MILL DIA. d1	SHANK DIA. d2	LENGTH OF CUT l1	LENGTH BELOW SHANK l2	O/ALL LENGTH l3	NECK DIA. d3	EUROPA CODE
R0.3	4	6	5	10	50	3.6	1553090400
R0.5	6	6	8	20	60	5.4	1553090600
R0.6	8	8	10	30	70	7.2	1553090800
R0.8	10	10	12	36	80	9	1553091000
R1.0	12	12	14	40	90	11	1553091200
R1.3	16	16	18	45	100	14.5	1553091600
R1.6	20	20	24	45	100	18	1553092000

ALL DIMENSIONS ARE IN MM

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	h6

2 FLUTE, 50° HELIX BALL NOSE FOR ALUMINIUM, TiCN COATED



ALU-XP

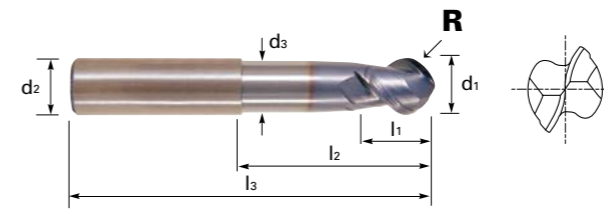


Series No. 112309

▶ cutting conditions : p.158

R : ±0.01mm

Excellent cutting qualities on aluminium, copper & stainless steel
Increased tool life and higher cutting accuracy.



RADIUS	MILL DIA. d1	SHANK DIA. d2	LENGTH OF CUT l1	LENGTH BELOW SHANK l2	O/ALL LENGTH l3	NECK DIA. d3	EUROPA CODE
R3.0	6	6	5.5	25	55	5.4	1123090600
R4.0	8	8	7	30	65	7.2	1123090800
R5.0	10	10	8.5	35	75	9	1123091000
R6.0	12	12	10.5	40	75	11	1123091200
R8.0	16	16	14	50	90	14.5	1123091600
R10.0	20	20	17	50	100	18	1123092000

ALL DIMENSIONS ARE IN MM

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
±0.02	h6

3 FLUTE, 40° HELIX BALL NOSE FOR ALUMINIUM, TiCN COATED



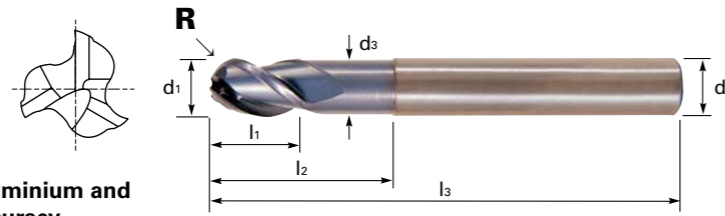
ALU-XP



Series No. 116309

► cutting conditions : p.159

Excellent cutting qualities on stainless steel, aluminium and copper Increased tool life and higher cutting accuracy.



R : ±0.01mm

RADIUS	MILL DIA. d1	SHANK DIA. d2	LENGTH OF CUT l1	LENGTH BELOW SHANK l2	O/ALL LENGTH l3	NECK DIA. d3	EUROPA CODE
R1.0	2.0	6	3	5	60	1.9	1163090200
R1.25	2.5	6	4	6	60	2.4	1163090250
R1.5	3.0	6	4.5	6.5	60	2.8	1163090300
R1.75	3.5	6	5	7	65	3.2	1163090350
R2.0	4.0	6	6	8	65	3.7	1163090400
R2.5	5.0	6	7.5	10	65	4.6	1163090500
R3.0	6.0	6	9	12	75	5.6	1163090600
R4.0	8.0	8	12	25	75	7.4	1163090800
R5.0	10.0	10	15	30	80	9.4	1163091000
R6.0	12.0	12	18	36	90	11.4	1163091200
R8.0	16.0	16	24	40	100	15.4	1163091600

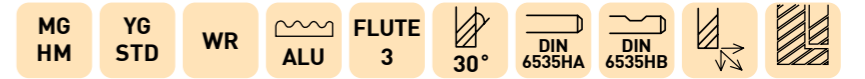
ALL DIMENSIONS ARE IN MM

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	h6

3 FLUTE LONG ROUGHING END MILLS

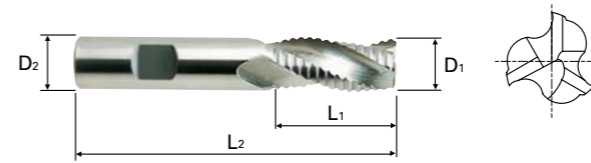


ALU-XP



Series No. 125103, 125303

► cutting conditions : p.160



MILL DIAMETER h10	SHANK DIAMETER h6	LENGTH OF CUT	OVERALL LENGTH	EUROPA CODE FLAT	EUROPA CODE PLAIN
6.0	6	16	57	1251030600	1253030600
8.0	8	16	63	1251030800	1253030800
10.0	10	22	72	1251031000	1253031000
12.0	12	26	83	1251031200	1253031200
14.0	14	26	83	1251031400	1253031400
16.0	16	32	92	1251031600	1253031600
20.0	20	38	104	1251032000	1253032000

ALL DIMENSIONS ARE IN MM

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

3FLUTE 45° HELIX LONG LENGTH CORNER RADIUS



ALU-XP



Series No. 142303

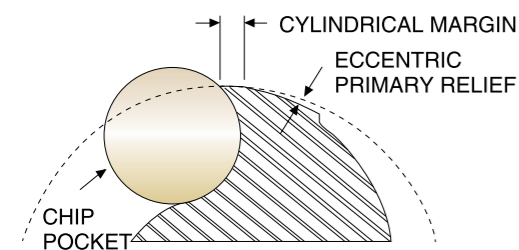
▶ cutting conditions : p.161

Excellent cutting qualities on aluminum, copper
Increased tool life and higher cutting accuracy
Mirror surface - Excellent surface finishes
Superior chip evacuation



CORNER RADIUS	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	EUROPA CODE
R0.5	3.0	6	12	57	1423030300
R1.0	3.0	6	12	57	1423030901
R0.5	4.0	6	15	57	1423030400
R1.0	4.0	6	15	57	1423030902
R0.5	5.0	6	20	57	1423030500
R1.0	5.0	6	20	57	1423030903
R0.5	6.0	6	20	65	1423030600
R1.0	6.0	6	20	65	1423030904
R0.5	8.0	8	22	65	1423030800
R1.0	8.0	8	22	65	1423030905
R0.5	10.0	10	25	70	1423031000
R1.0	10.0	10	25	70	1423030906
R2.0	10.0	10	25	70	1423030907
R0.5	12.0	12	25	75	1423031200
R1.0	12.0	12	25	75	1423030908
R2.0	12.0	12	25	75	1423030909
R0.5	16.0	16	35	90	1423031600
R1.0	16.0	16	35	90	1423030910
R2.0	16.0	16	35	90	1423030911
R0.5	20.0	20	40	100	1423032000
R1.0	20.0	20	40	100	1423039012
R2.0	20.0	20	40	100	1423039013

ALL DIMENSIONS ARE IN MM
AVAILABLE IN TIN, TICN & TIALN COATINGS - ON REQUEST



MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0--0.015	h6

2FLUTE, 50° HELIX BALL NOSE WITH NECK

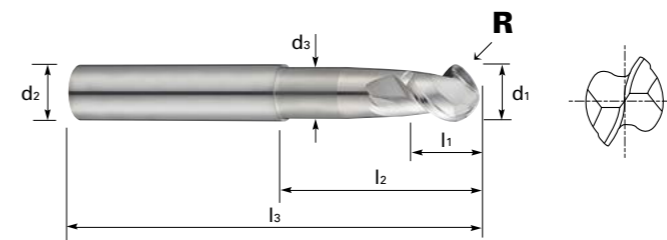


ALU-XP



Series No. 112303

▶ cutting conditions : p.162



R : ±0.01mm

Excellent cutting qualities on aluminum, copper
Increased tool life and higher cutting accuracy

RADIUS	MILL DIA. d1	SHANK DIA. d2	LENGTH OF CUT l1	LENGTH BELOW SHANK l2	O/ALL LENGTH l3	NECK DIA. d3	EUROPA CODE
R3.0	6	6	5.5	25	55	5.4	1123030600
R4.0	8	8	7	30	65	7.2	1123030800
R5.0	10	10	8.5	35	75	9	1123031000
R6.0	12	12	10.5	40	75	11	1123031200
R8.0	16	16	14	50	90	14.5	1123031600
R10.0	20	20	17	50	100	18	1123032000

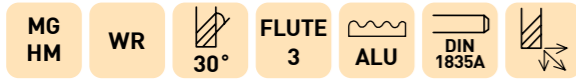
ALL DIMENSIONS ARE IN MM

MILL DIA TOLERANCE	SHANK DIA TOLERANCE
±0.02	h6

3FLUTE, ROUGHING WITH NECK



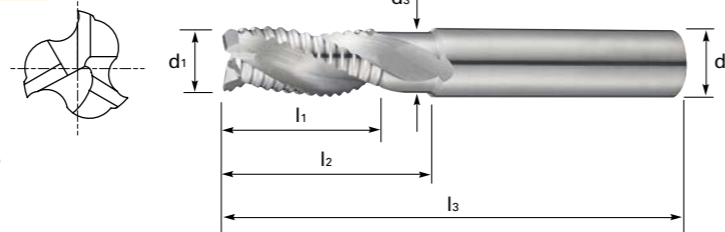
ALU-XP



Series No. 126303, 126103

▶ cutting conditions : p.160

Excellent cutting qualities on aluminum, copper
Increased tool life and superior chip evacuation



MILL DIA. d1(h10)	SHANK DIA. d2(h6)	LENGTH OF CUT l1	LENGTH BELOW SHANK l2	O/ALL LENGTH l3	NECK DIA. d3	EUROPA CODE FLAT	EUROPA CODE PLAIN
6.0	6	16	20	57	5	1263030600	1261030600
8.0	8	16	25	63	7	1263030800	1261030800
10.0	10	22	30	72	9	1263031000	1261031000
12.0	12	26	36	83	10.5	1263031200	1261031200
16.0	16	32	42	92	14.5	1263031600	1261031600
20.0	20	38	52	104	18.5	1263032000	1261032000

ALL DIMENSIONS ARE IN MM

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in μm / Tolerance range in μm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

2 FLUTE, 45° HELIX ALUMINIUM, SHORT REACH

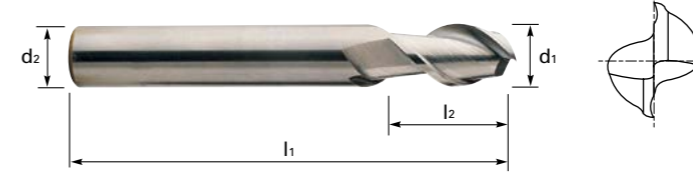


ALU-XP



Series No. 331303

▶ cutting conditions : p.159



MILL DIAMETER h10(d1)	SHANK DIAMETER h6(d2)	LENGTH OF CUT l2	OVERALL LENGTH l1	EUROPA CODE
3.0	3.0	7.0	38.0	3313030300
3.5	6.0	7.0	57.0	3313030350
4.0	6.0	8.0	57.0	3313030400
4.5	6.0	8.0	57.0	3313030450
5.0	6.0	10.0	57.0	3313030500
6.0	6.0	10.0	57.0	3313030600
8.0	8.0	16.0	63.0	3313030800
10.0	10.0	19.0	72.0	3313031000
12.0	12.0	22.0	83.0	3313031200
14.0	14.0	22.0	83.0	3313031400
16.0	16.0	26.0	92.0	3313031600
20.0	20.0	32.0	104.0	3313032000

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in μm / Tolerance range in μm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

3 FLUTE 45 DEG.HELIX WITH NECK

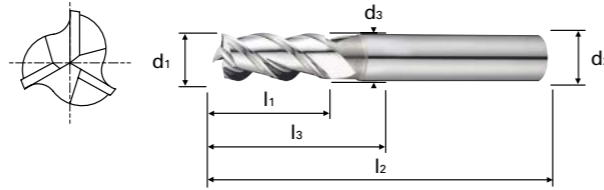


ALU-XP



Series No. 153303

NEW



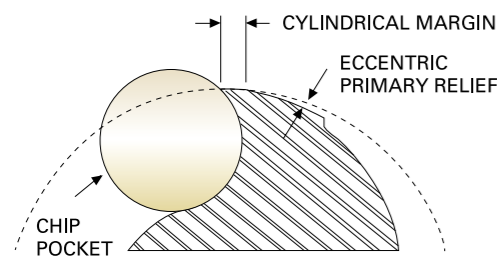
▶ cutting conditions : p.162

Excellent cutting qualities on aluminum, copper.
Increased tool life and higher cutting accuracy.
Mirror surface - Excellent surface finishes.
Superior chip evacuation.
Reduces chipping of corner edges.

EUROPA CODE	MILL DIAMETER D ₁	SHANK DIAMETER D ₂	LENGTH OF CUT l ₁	LENGTH BELOW SHANK l ₃	OVERALL LENGTH l ₂	NECK DIAMETER D ₃
1533030300	3.0	6	8	12	57	2.7
1533030400	4.0	6	11	18	57	3.7
1533030500	5.0	6	13	18	57	4.7
1533030600	6.0	6	13	18	57	5.7
1533030800	8.0	8	21	25	63	7.4
1533031000	10.0	10	22	30	72	9.2
1533031200	12.0	12	26	36	83	11
1533031600	16.0	16	36	42	92	15
1533032000	20.0	20	41	52	104	19

▶ TiN, TiCN-COATING & TiAlN-COATING are available on your request.

Unit : mm

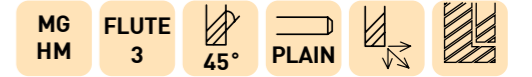


MILL DIA. TOLERANCE(mm)	SHANK DIA. TOLERANCE
0~-0.015	h6

3 FLUTE 45 DEG.HELIX LONG LENGTH

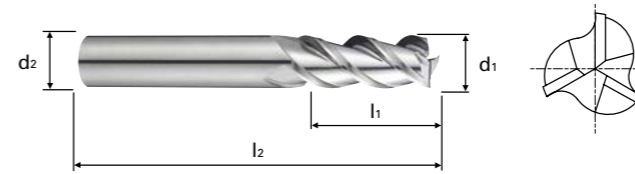


ALU-XP



Series No. 143303

NEW



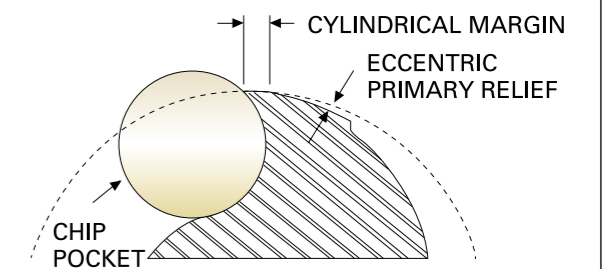
▶ cutting conditions : p.162

Excellent cutting qualities on aluminum, copper.
Increased tool life and higher cutting accuracy.
Mirror surface - Excellent surface finishes.
Superior chip evacuation.
Reduces chipping of corner edges.

EUROPA CODE	MILL DIAMETER D ₁	SHANK DIAMETER D ₂	LENGTH OF CUT l ₁	OVERALL LENGTH l ₂
1433030300	3.0	6	12	57
1433030400	4.0	6	15	57
1433030500	5.0	6	20	57
1433030600	6.0	6	20	65
1433030800	8.0	8	22	65
1433031000	10.0	10	25	70
1433031200	12.0	12	25	75
1433031600	16.0	16	35	90
1433032000	20.0	20	40	100

▶ TiN, TiCN-COATING & TiAlN-COATING are available on your request.

Unit : mm



MILL DIA. TOLERANCE(mm)	SHANK DIA. TOLERANCE
0~-0.015	h6

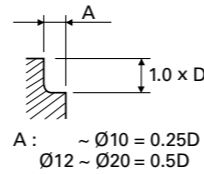
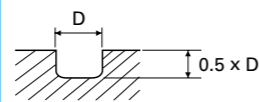
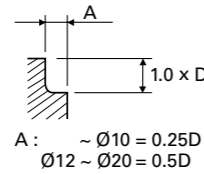
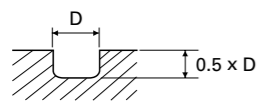
ALU-XP cutting condition



2 FLUTE CORNER RADIUS TiCN COATED

155309 

MATERIAL	ALUMINUM ALUMINUM ALLOY				COPPER ALLOY											
	DIAMETER	RPM	FEED (mm/min)	Vc	Fz	RPM	FEED (mm/min)	Vc	Fz							
R0.3 x 4	13000	1200	163	0.046	13000	1400	163	0.054	3900	300	49	0.038	3900	350	49	0.045
R0.5 x 6	13000	1500	245	0.058	13000	2000	245	0.077	3900	380	74	0.049	3900	500	74	0.064
R0.6 x 8	10000	1800	251	0.090	10000	2300	251	0.115	3000	450	75	0.075	3000	580	75	0.097
R0.8 x 10	10000	2200	314	0.110	10000	2700	314	0.135	3000	550	94	0.092	3000	680	94	0.113
R1.0 x 12	10000	2700	377	0.135	10000	3400	377	0.170	3000	680	113	0.113	3000	850	113	0.142
R1.3 x 16	8000	2500	402	0.156	8000	3100	402	0.194	2400	630	121	0.131	2400	780	121	0.163
R1.6 x 20	5000	2000	314	0.200	5000	2500	314	0.250	1500	500	94	0.167	1500	630	94	0.210



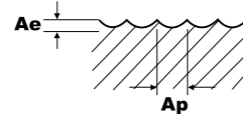
RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

2 FLUTE BALL NOSED TiCN COATED

112309 

MATERIAL	ALUMINUM ALUMINUM ALLOY				COPPER ALLOY			
	DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc
R3.0 x 6	18000	1750	339	0.049	5500	440	104	0.040
R4.0 x 8	14000	2000	352	0.071	4200	500	106	0.060
R5.0 x 10	14000	2350	440	0.084	4200	580	132	0.069
R6.0 x 12	14000	3000	528	0.107	4200	750	158	0.089
R8.0 x 16	11000	2700	553	0.123	3300	670	166	0.102
R10.0 x 20	7000	2200	440	0.157	2100	550	132	0.131

Ae = 0.2 x D
Ap = 0.5 x D



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

ALU-XP cutting condition

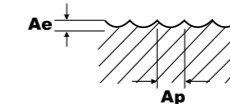


3 FLUTE, BALL NOSED TiCN COATED

116309 

MATERIAL	ALUMINUM LOW SILICON ALUMINUM				COPPER ALLOY			
	DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc
R1.0 x 2	27000	950	170	0.012	8000	240	50	0.010
R1.25 x 2.5	22000	950	173	0.014	6500	240	51	0.012
R1.5 x 3	18000	950	170	0.018	5500	240	52	0.015
R2.0 x 4	18000	1250	226	0.023	5500	310	69	0.019
R2.5 x 5	18000	1350	283	0.025	5500	340	86	0.021
R3.0 x 6	18000	1750	339	0.032	5500	440	104	0.027
R4.0 x 8	14000	2000	352	0.048	4200	500	106	0.040
R5.0 x 10	14000	2350	440	0.056	4200	580	132	0.046
R6.0 x 12	14000	3000	528	0.071	4200	750	158	0.060
R8.0 x 16	11000	2700	553	0.082	3300	670	166	0.068

Ae = 0.2 x D
Ap = 0.5 x D

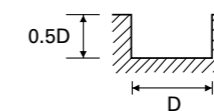


RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

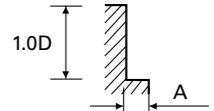
2 FLUTE, 45° HELIX for ALUMINUM

331303, 151303 

MATERIAL	ALUMINUM LOW SILICON ALUMINUM							
	DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc
3.0	10000	700	95	0.035	10000	900	95	0.045
4.0	10000	900	125	0.045	10000	1100	125	0.055
5.0	10000	1000	155	0.050	10000	1300	155	0.065
6.0	10000	1200	190	0.060	10000	1500	190	0.075
8.0	8000	1400	200	0.088	8000	1800	200	0.113
10.0	8000	1700	250	0.106	8000	2100	250	0.131
12.0	8000	2100	300	0.131	8000	2600	300	0.163
14.0	6000	1800	265	0.150	6000	2200	265	0.183
16.0	6000	1900	300	0.158	6000	2400	300	0.200
18.0	4000	1400	225	0.175	4000	1800	225	0.225
20.0	4000	1600	250	0.200	4000	1900	250	0.238



A : Ø3 ~ Ø10 = 0.25 x D
Ø12 ~ Ø20 = 0.5 x D



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

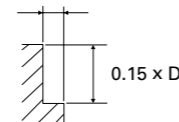
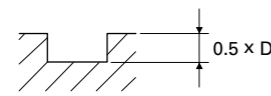
ALU-XP cutting condition



2 FLUTE, 55° HELIX

157303 

MATERIAL	ALUMINUM LOW SILICON ALUMINUM							
DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
3	36000	1350	339	0.019	36000	2160	339	0.030
4	32400	1620	407	0.025	32400	2340	407	0.036
5	27000	2520	424	0.047	27000	3600	424	0.067
6	24300	2520	458	0.052	24300	3600	458	0.074
8	18000	2520	452	0.070	18000	3600	452	0.100
10	14400	2880	452	0.100	14400	4050	452	0.141
12	11700	2880	441	0.123	11700	4050	441	0.173
16	9000	2880	452	0.160	9000	4050	452	0.225
20	7200	2700	452	0.188	7200	3870	452	0.269

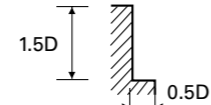
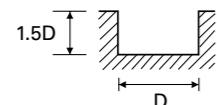


RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

3FLUTE, ROUGHING

126303, 125103 

MATERIAL	ALUMINUM							
DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
6.0	13500	6800	200	0.168	10500	5300	198	0.168
8.0	10500	5300	200	0.168	8000	4000	201	0.167
10.0	8500	4300	205	0.169	6500	3500	204	0.179
12.0	8500	4200	320	0.165	6400	3200	241	0.167
16.0	6400	3200	322	0.167	4800	2400	241	0.167
20.0	5100	2500	320	0.163	3850	1900	242	0.165



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

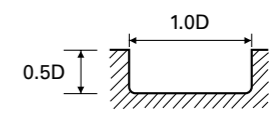
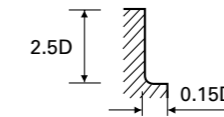
ALU-XP cutting condition



3FLUTE, 45° HELIX CORNER RADIUS

142303 

MATERIAL	ALUMINUM LOW SILICON ALUMINUM							
DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
3.0	10000	1490	95	0.050	10000	1160	95	0.039
4.0	10000	1820	125	0.061	10000	1490	125	0.050
5.0	10000	2150	155	0.072	10000	1650	155	0.055
6.0	10000	2480	190	0.083	10000	1980	190	0.066
8.0	8000	3000	200	0.125	8000	2310	200	0.096
10.0	8000	3470	250	0.145	8000	2810	250	0.117
12.0	8000	4290	300	0.179	8000	3470	300	0.145
16.0	6000	3960	300	0.220	6000	3140	300	0.174
20.0	4000	3140	250	0.262	4000	2640	250	0.220



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

ALU-XP cutting condition

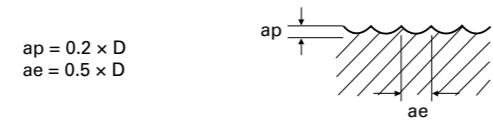


ALU-XP

2 FLUTE, 50° HELIX BALL NOSE

112303 

MATERIAL	ALUMINUM LOW SILICON ALUMINUM				COPPER ALLOY				
	DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
R3.0 x 6.0	14400	1400	270	0.049	4400	350	85	0.040	
R4.0 x 8.0	11200	1600	280	0.071	3360	400	85	0.060	
R5.0 x 10.0	11200	1880	350	0.084	3360	465	105	0.069	
R6.0 x 12.0	11200	2400	420	0.107	3360	600	125	0.089	
R8.0 x 16.0	8800	2160	440	0.123	2640	535	135	0.101	
R10.0 x 20.0	5600	1760	350	0.157	1680	440	105	0.131	

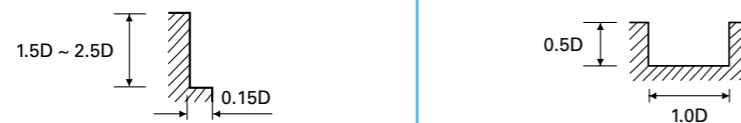


RPM= rev. / min.
 FEED= mm / min.
 Vc= m / min.
 fz= mm / t

3 FLUTE 45° HELIX

153303, 143303 

MATERIAL	ALUMINUM LOW SILICON ALUMINUM			
	DIAMETER	RPM	FEED	FEED
3.0	7000	940	7000	730
4.0	7000	1150	7000	940
5.0	7000	1360	7000	1050
6.0	7000	1580	7000	1250
8.0	5600	1900	5600	1470
9.0	5600	2050	5600	1630
10.0	5600	2200	5600	1780
12.0	5600	2740	5600	2200
16.0	4200	2520	4200	1990
20.0	2800	2000	2800	1680



STANDARD SOLID CARBIDE MILLING CUTTERS CONTENTS

(General purpose carbide material up to HRc 50)

Europa Tool 11th Edition

STANDARD SOLID CARBIDE MILLING CUTTERS END MILLS















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PRODUCTS	SERIES	DESCRIPTION	PAGE
Metric Standard Solid Carbide			
2 FLUTE MICRO GRAIN CARBIDE (METRIC)			
	300303	SHORTH LENGTH	169
	301303	STANDARD LENGTH	170
	302303	LONG SERIES	171
3 FLUTE MICRO GRAIN CARBIDE (METRIC)			
	303303	SHORTH LENGTH	172
	304303	STANDARD LENGTH	173
	305303	LONG SERIES	174
4 FLUTE MICRO GRAIN CARBIDE (METRIC)			
	309303	SHORTH LENGTH	175
	310303	STANDARD LENGTH	176
	311303	LONG SERIES	177
2 FLUTE BALL NOSED MICRO GRAIN CARBIDE (METRIC)			
	312303	SHORTH LENGTH	178
	313303	STANDARD LENGTH	179
	314303	LONG SERIES	180
3 FLUTE BALL NOSED MICRO GRAIN CARBIDE (METRIC)			
	306303	SHORTH LENGTH	181
	307303	STANDARD LENGTH	182
	308303	LONG SERIES	183











STANDARD SOLID CARBIDE MILLING CUTTERS CONTENTS

(General purpose carbide material up to HRc 50)

PRODUCTS	SERIES	DESCRIPTION	PAGE
4 FLUTE BALL NOSED MICRO GRAIN CARBIDE (METRIC)			
	317303	SHORTH LENGTH	184
	315303	STANDARD LENGTH	185
	316303	LONG SERIES	186
2 FLUTE CORNER RADIUS (METRIC) - TiAIN COATED			
	120323	STANDARD LENGTH	187
	121323	LONG SERIES	188
4 FLUTE CORNER RADIUS (METRIC) - TiAIN COATED			
	140323	STANDARD LENGTH	187
 NEW	142323	LONG SERIES	188
Din Standard Solid Carbide			
2 FLUTE MICRO GRAIN CARBIDE (METRIC)			
	100103	SHORT LENGTH FLATTED SHANK DIN6527	189
	102103	LONG LENGTH FLATTED SHANK DIN6527	190
	162303	EXTRA LENGTH BALL NOSED PLAIN SHANK	191
3 FLUTE MICRO GRAIN CARBIDE (METRIC)			
	140103	SHORT LENGTH 45DEG. FLATTED SHANK DIN6527	192
	141103	LONG LENGTH 45DEG. FLATTED SHANK DIN 6527	193

STANDARD SOLID CARBIDE MILLING CUTTERS CONTENTS

(General purpose carbide material up to HRc 50)




PRODUCTS	SERIES	DESCRIPTION	PAGE
4 FLUTE MICRO GRAIN CARBIDE (METRIC)			
	109103	SHORT LENGTH FLATTED SHANK DIN6527	194
	111103	LONG LENGTH FLATTED SHANK DIN6527	195
DRILL MILL			
 NEW	197303	2 FLUTE DRILL MILL	196
Imperial Standard Solid Carbide			
2 FLUTE MICRO GRAIN CARBIDE			
	500303	SHORTH LENGTH	197
	501303	STANDARD LENGTH	198
	502303	LONG SERIES	199
3 FLUTE MICRO GRAIN CARBIDE			
	506303	SHORTH LENGTH	200
	507303	STANDARD LENGTH	201
	508303	LONG SERIES	202
4 FLUTE MICRO GRAIN CARBIDE			
	509303	SHORTH LENGTH	203
	510303	STANDARD LENGTH	204
	511303	LONG SERIES	205

STANDARD SOLID CARBIDE MILLING CUTTERS CONTENTS




(General purpose carbide material up to HRc 50)

PRODUCTS	SERIES	DESCRIPTION	PAGE
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2 FLUTE BALL NOSED MICRO GRAIN CARBIDE

	512303	SHORTH LENGTH	206
	513303	STANDARD LENGTH	207
	514303	LONG SERIES	208

3 FLUTE BALL NOSED MICRO GRAIN CARBIDE

	518303	SHORTH LENGTH	209
	519303	STANDARD LENGTH	210
	520303	LONG SERIES	211

4 FLUTE BALL NOSED MICRO GRAIN CARBIDE

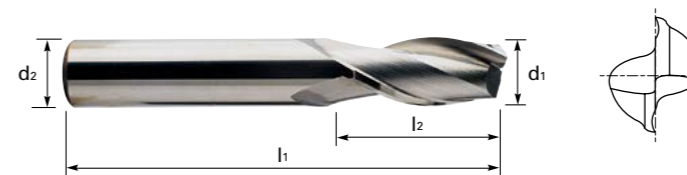
	516303	SHORTH LENGTH	212
	515303	STANDARD LENGTH	213
	517303	LONG SERIES	214
CUTTING DATA			215 ~ 233

2 FLUTE, SHORT, PLAIN SHANK



Series No. 300303

▶ cutting conditions : p.215



Mill Dia. h10(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
1.0	3.0	2.0	39.0	3003030100	3003230100
2.0		4.0		3003030200	3003230200
3.0		6.0		3003030300	3003230300
4.0	4.0	8.0	51.0	3003030400	3003230400
5.0	6.0	10.0		3003030500	3003230500
6.0		12.0		3003030600	3003230600
8.0	8.0	12.0	51.0	3003030800	3003230800
10.0	10.0	16.0	51.0	3003031000	3003231000
12.0	12.0	19.0	63.0	3003031200	3003231200

▶ TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

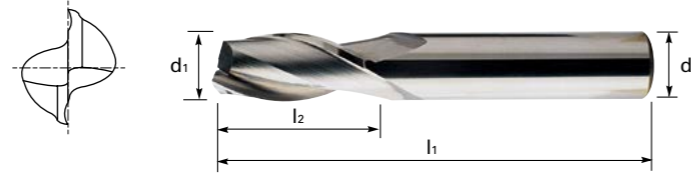
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 — 40	0 — 48	0 — 58	0 — 70	0 — 84
h6	0 — 6	0 — 8	0 — 9	0 — 11	0 — 13

2 FLUTE, STANDARD, PLAIN SHANK



Series No. 301303

▶ cutting conditions : p.215

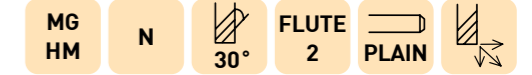


Mill Dia. h10(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	Carbide	TiAlN Carbide
1.0	3.0	4.0	38.0	3013030100	3013230100
1.5		4.5		3013030150	3013230150
2.0		6.3		3013030200	3013230200
2.5		9.5		3013030250	3013230250
3.0		12.0		3013030300	3013230300
3.5	4.0	12.0	50.0	3013030350	3013230350
4.0		14.0		3013030400	3013230400
4.5		16.0		3013030450	3013230450
5.0	6.0	16.0	58.0	3013030500	3013230500
6.0		19.0		3013030600	3013230600
7.0	8.0	19.0	63.0	3013030700	3013230700
8.0		20.0		3013030800	3013230800
9.0	10.0	22.0	75.0	3013030900	3013230900
10.0		22.0		3013031000	3013231000
11.0	12.0	25.0	75.0	3013031100	3013231100
12.0		25.0		3013031200	3013231200
14.0	14.0	32.0	89.0	3013031400	3013231400
16.0	16.0	32.0		3013031600	3013231600
18.0	18.0	38.0	100.0	3013031800	3013231800
20.0	20.0	38.0		3013032000	3013232000
25.0	25.0	38.0		3013032500	3013232500

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

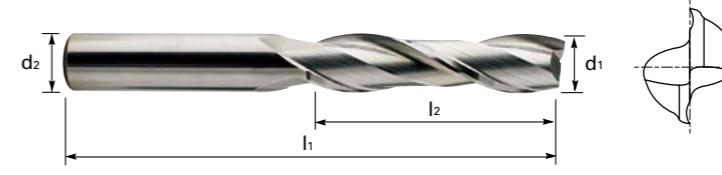
Toleranzwerte in μm / Tolerance range in μm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

2 FLUTE, LONG, PLAIN SHANK



Series No. 302303

▶ cutting conditions : p.215



Mill Dia. h10(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	Carbide	TiAlN Carbide
3.0	3.0	25.0	65.0	3023030300	3023230300
4.0	4.0	25.0		3023030400	3023230400
5.0	5.0	25.0		3023030500	3023230500
6.0	6.0	25.0	75.0	3023030600	3023230600
8.0	8.0	25.0		3023030800	3023230800
10.0	10.0	38.0	100.0	3023031000	3023231000
12.0	12.0	50.0		3023031200	3023231200
14.0	14.0	75.0	150.0	3023031400	3023231400
16.0	16.0	75.0		3023031600	3023231600
18.0	18.0	75.0		3023031800	3023231800
20.0	20.0	75.0		3023032000	3023232000
25.0	25.0	75.0		3023032500	3023232500

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

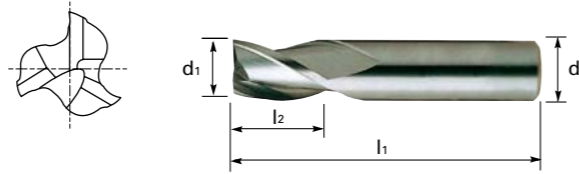
Toleranzwerte in μm / Tolerance range in μm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

3 FLUTE, SHORT, PLAIN SHANK



Series No. 303303

▶ cutting conditions : p.217



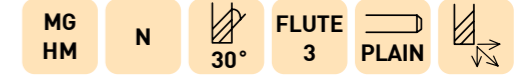
Mill Dia. h10(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
1.0	3.0	2.0	39.0	3033030100	3033230100
2.0		4.0		3033030200	3033230200
3.0		6.0		3033030300	3033230300
4.0	4.0	8.0	51.0	3033030400	3033230400
5.0	6.0	10.0		3033030500	3033230500
6.0	8.0	12.0	51.0	3033030600	3033230600
8.0		12.0		3033030800	3033230800
10.0		16.0		3033031000	3033231000
12.0	12.0	19.0	63.0	3033031200	3033231200

▶ TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

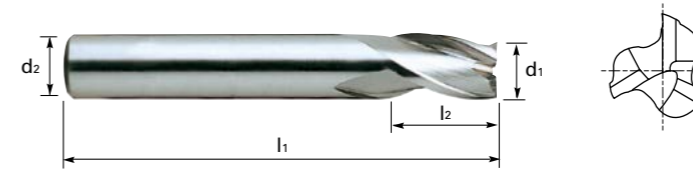
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

3 FLUTE, STANDARD, PLAIN SHANK



Series No. 304303

▶ cutting conditions : p.217



Mill Dia. h10(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
1.0	3.0	4.0	38.0	3043030100	3043230100
1.5		4.5		3043030150	3043230150
2.0		6.3		3043030200	3043230200
2.5		9.5		3043030250	3043230250
3.0		12.0		3043030300	3043230300
3.5	4.0	12.0	50.0	3043030350	3043230350
4.0		14.0		3043030400	3043230400
4.5		16.0		3043030450	3043230450
5.0		16.0		3043030500	3043230500
6.0	8.0	19.0	58.0	3043030600	3043230600
7.0		19.0	63.0	3043030700	3043230700
8.0		20.0	3043030800	3043230800	
9.0	10.0	22.0	75.0	3043030900	3043230900
10.0		22.0		3043031000	3043231000
11.0		25.0		3043031100	3043231100
12.0	12.0	25.0	89.0	3043031200	3043231200
14.0	14.0	32.0		3043031400	3043231400
16.0	16.0	32.0		3043031600	3043231600
18.0	18.0	38.0	100.0	3043031800	3043231800
20.0	20.0	38.0		3043032000	3043232000
25.0	25.0	38.0		3043032500	3043232500

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

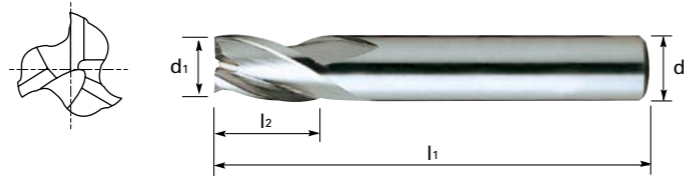
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

3 FLUTE, LONG, PLAIN SHANK



Series No. 305303

▶ cutting conditions : p.217

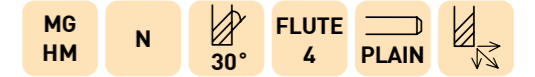


Mill Dia. h10(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
3.0	3.0	25.0	65.0	3053030300	3053230300
4.0	4.0	25.0		3053030400	3053230400
5.0	6.0	25.0	75.0	3053030500	3053230500
6.0	6.0	25.0		3053030600	3053230600
8.0	8.0	25.0	100.0	3053030800	3053230800
10.0	10.0	38.0		3053031000	3053231000
12.0	12.0	50.0		3053031200	3053231200
14.0	14.0	75.0	150.0	3053031400	3053231400
16.0	16.0	75.0		3053031600	3053231600
18.0	18.0	75.0		3053031800	3053231800
20.0	20.0	75.0		3053032000	3053232000
25.0	25.0	75.0		3053032500	3053232500

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

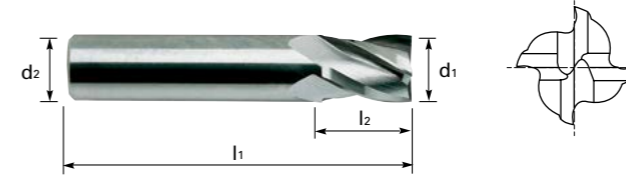
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

4 FLUTE, SHORT, PLAIN SHANK



Series No. 309303

▶ cutting conditions : p.223



Mill Dia. h10(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
1.0	3.0	2.0	39.0	3093030100	3093230100
2.0		4.0		3093030200	3093230200
3.0		6.0		3093030300	3093230300
4.0	4.0	8.0	51.0	3093030400	3093230400
5.0	6.0	10.0		3093030500	3093230500
6.0		12.0		3093030600	3093230600
8.0	8.0	12.0		3093030800	3093230800
10.0	10.0	16.0		3093031000	3093231000
12.0	12.0	19.0	63.0	3093031200	3093231200

▶ TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

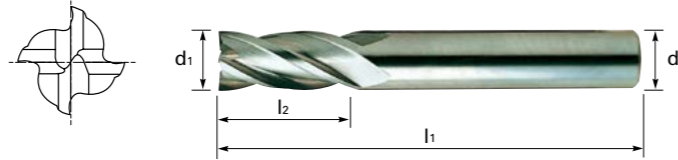
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

4 FLUTE, STANDARD, PLAIN SHANK



Series No. 310303

▶ cutting conditions : p.223

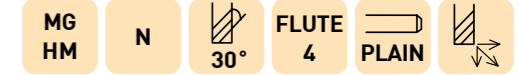


Mill Dia. h10(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	Carbide	TiAlN Carbide
1.0	3.0	4.0	38.0	3103030100	3103230100
1.5		4.5		3103030150	3103230150
2.0		6.3		3103030200	3103230200
2.5		9.5		3103030250	3103230250
3.0		12.0		3103030300	3103230300
3.5	4.0	12.0	50.0	3103030350	3103230350
4.0		14.0		3103030400	3103230400
4.5		16.0		3103030450	3103230450
5.0	6.0	16.0	58.0	3103030500	3103230500
6.0		19.0		3103030600	3103230600
7.0	8.0	19.0	63.0	3103030700	3103230700
8.0		20.0		3103030800	3103230800
9.0	10.0	22.0	75.0	3103030900	3103230900
10.0		22.0		3103031000	3103231000
11.0	12.0	25.0	89.0	3103031100	3103231100
12.0		25.0		3103031200	3103231200
14.0	14.0	32.0	100.0	3103031400	3103231400
16.0	16.0	32.0		3103031600	3103231600
18.0	18.0	38.0		3103031800	3103231800
20.0	20.0	38.0	100.0	3103032000	3103232000
25.0	25.0	38.0		3103032500	3103232500

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

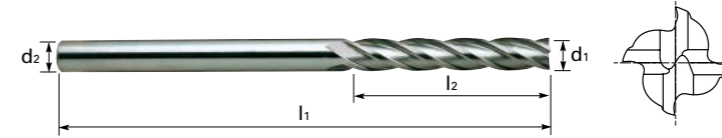
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

4 FLUTE, LONG, PLAIN SHANK



Series No. 311303

▶ cutting conditions : p.223

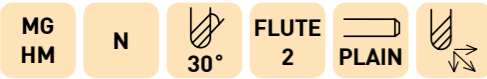


Mill Dia. h10(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	Carbide	TiAlN Carbide
3.0	3.0	25.0	65.0	3113030300	3113230300
4.0	4.0	25.0		3113030400	3113230400
5.0	5.0	25.0	75.0	3113030500	3113230500
6.0	6.0	25.0		3113030600	3113230600
8.0	8.0	25.0		3113030800	3113230800
10.0	10.0	38.0	100.0	3113031000	3113231000
12.0	12.0	50.0		3113031200	3113231200
16.0	16.0	58.0	125.0	3113039016	3113239016
20.0	20.0	58.0		3113039020	3113239020
25.0	25.0	58.0		3113039025	3113239025
12.0	12.0	75.0	150.0	3113039001	3113239001
14.0	14.0	75.0		3113031400	3113231400
16.0	16.0	75.0		3113031600	3113231600
18.0	18.0	75.0		3113031800	3113231800
20.0	20.0	75.0		3113032000	3113232000
25.0	25.0	75.0		3113032500	3113232500

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

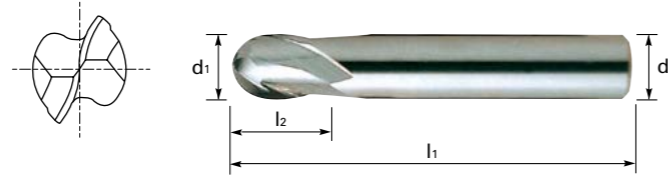
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

2 FLUTE, SHORT, BALL NOSE, SHORT REACH



Series No. 312303

▶ cutting conditions : p.225



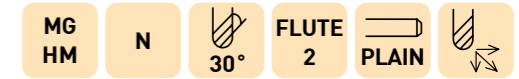
Mill Dia. h10(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
1.0	3.0	2.0	39.0	3123030100	3123230100
2.0		4.0		3123030200	3123230200
3.0		6.0		3123030300	3123230300
4.0	4.0	8.0	51.0	3123030400	3123230400
5.0	6.0	10.0		3123030500	3123230500
6.0		12.0		3123030600	3123230600
8.0	10.0	12.0		3123030800	3123230800
10.0	10.0	16.0		3123031000	3123231000
12.0	12.0	19.0	63.0	3123031200	3123231200

▶ TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

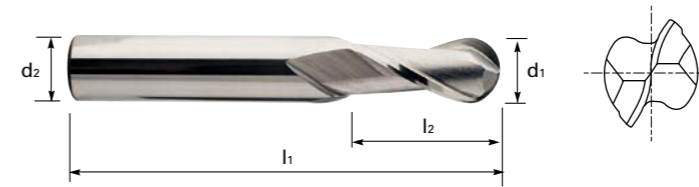
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

2 FLUTE, STANDARD, BALL NOSE



Series No. 313303

▶ cutting conditions : p.225

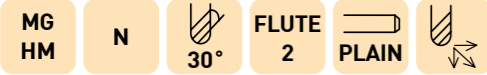


Mill Dia. h10(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide	
1.0	3.0	4.0	38.0	3133030100	3133230100	
1.5		4.5		3133030150	3133230150	
2.0		6.3		3133030200	3133230200	
2.5		9.5		3133030250	3133230250	
3.0		12.0		3133030300	3133230300	
3.5	4.0	12.0	50.0	3133030350	3133230350	
4.0		14.0		3133030400	3133230400	
4.5		16.0		3133030450	3133230450	
5.0		16.0		3133030500	3133230500	
6.0	6.0	19.0	58.0	3133030600	3133230600	
7.0		8.0	19.0	63.0	3133030700	3133230700
8.0			20.0		3133030800	3133230800
9.0	10.0	22.0	75.0	3133030900	3133230900	
10.0		22.0		3133031000	3133231000	
11.0		25.0		3133031100	3133231100	
12.0	12.0	25.0	89.0	3133031200	3133231200	
14.0	14.0	32.0		3133031400	3133231400	
16.0	16.0	32.0		3133031600	3133231600	
18.0	18.0	38.0		3133031800	3133231800	
20.0	20.0	38.0	100.0	3133032000	3133232000	
25.0		38.0		3133032500	3133232500	

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

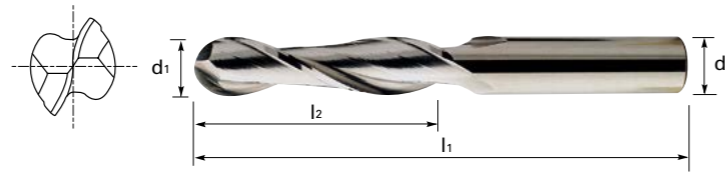
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

2 FLUTE, BALL NOSE, LONG REACH



Series No. 314303

▶ cutting conditions : p.225

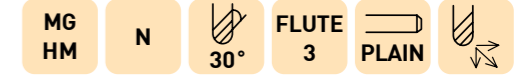


Mill Dia. h10(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
3.0	3.0	25.0	75.0	3143030300	3143230300
4.0	4.0	25.0		3143030400	3143230400
5.0	6.0	25.0		3143030500	3143230500
6.0	6.0	25.0		3143030600	3143230600
8.0	8.0	25.0		3143030800	3143230800
10.0	10.0	38.0	100.0	3143031000	3143231000
12.0	12.0	50.0		3143031200	3143231200
14.0	14.0	75.0		3143031400	3143231400
16.0	16.0	75.0	150.0	3143031600	3143231600
18.0	18.0	75.0		3143031800	3143231800
20.0	20.0	75.0		3143032000	3143232000
25.0	25.0	75.0		3143032500	3143232500

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

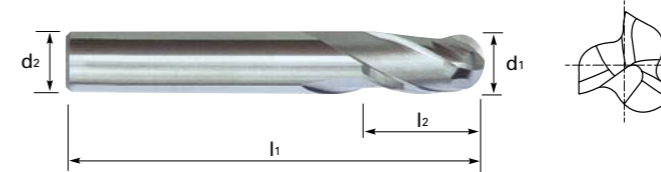
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

3 FLUTE, SHORT, BALL NOSE, SHORT REACH



Series No. 306303

▶ cutting conditions : p.226



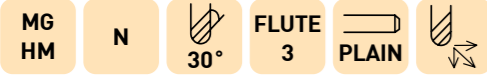
Mill Dia. h10(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
1.0	3.0	2.0	39.0	3063030100	3063230100
2.0		4.0		3063030200	3063230200
3.0		6.0		3063030300	3063230300
4.0	4.0	8.0	51.0	3063030400	3063230400
5.0	6.0	10.0		3063030500	3063230500
6.0		12.0		3063030600	3063230600
8.0	8.0	12.0		3063030800	3063230800
10.0	10.0	16.0		3063031000	3063231000
12.0	12.0	19.0	63.0	3063031200	3063231200

▶ TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

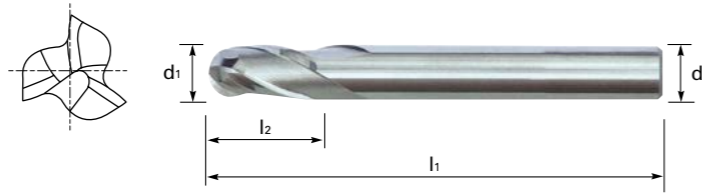
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

3 FLUTE, STANDARD, BALL NOSE



Series No. 307303

▶ cutting conditions : p.226



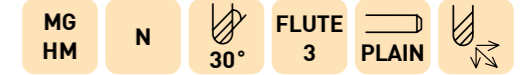
Mill Dia. h10(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
1.0	3.0	4.0	38.0	3073030100	3073230100
2.0		6.3		3073030200	3073230200
3.0		12.0		3073030300	3073230300
4.0	4.0	14.0	51.0	3073030400	3073230400
5.0	6.0	16.0		3073030500	3073230500
6.0	8.0	19.0	58.0	3073030600	3073230600
8.0		20.0	63.0	3073030800	3073230800
10.0		22.0	73.0	3073031000	3073231000
12.0	12.0	25.0	74.0	3073031200	3073231200
16.0	16.0	32.0	89.0	3073031600	3073231600

▶ TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

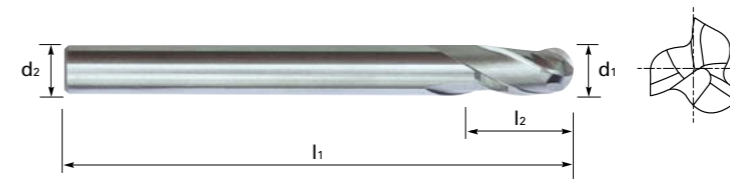
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

3 FLUTE, LONG, BALL NOSE



Series No. 308303

▶ cutting conditions : p.226



Mill Dia. h10(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
3.0	3.0	25.0	75.0	3083030300	3083230300
4.0	4.0	25.0		3083030400	3083230400
5.0	6.0	25.0		3083030500	3083230500
6.0	6.0	25.0		3083030600	3083230600
8.0	8.0	25.0	100.0	3083030800	3083230800
10.0	10.0	38.0		3083031000	3083231000
12.0	12.0	50.0		3083031200	3083231200
16.0	16.0	75.0		3083031600	3083231600
20.0	20.0	75.0	150.0	3083032000	3083232000
25.0	25.0	75.0		3083032500	3083232500

▶ TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

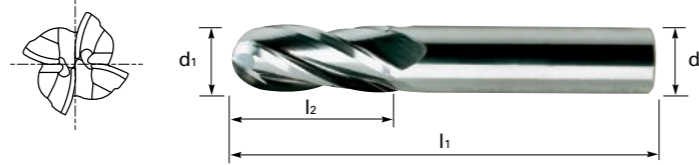
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

4 FLUTE, BALL NOSE, SHORT REACH



Series No. 317303

▶ cutting conditions : p.228



Mill Dia. h10(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	Carbide	TiAlN Carbide
1.0	3.0	2.0	39.0	3173030100	3173230100
2.0		4.0		3173030200	3173230200
3.0		6.0		3173030300	3173230300
4.0	4.0	8.0	51.0	3173030400	3173230400
5.0	6.0	10.0		3173030500	3173230500
6.0		12.0		3173030600	3173230600
8.0	8.0	12.0		3173030800	3173230800
10.0	10.0	16.0		3173031000	3173231000
12.0	12.0	19.0	63.0	3173031200	3173231200

▶ TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

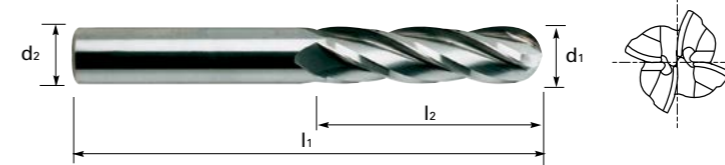
Toleranzwerte in μm / Tolerance range in μm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

4 FLUTE, STANDARD, BALL NOSE



Series No. 315303

▶ cutting conditions : p.228

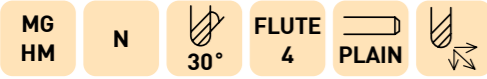


Mill Dia. h10(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	Carbide	TiAlN Carbide	
1.0	3.0	4.0	38.0	3153030100	3153230100	
1.5		4.5		3153030150	3153230150	
2.0		6.3		3153030200	3153230200	
2.5		9.5		3153030250	3153230250	
3.0		12.0		3153030300	3153230300	
3.5	4.0	12.0	50.0	3153030350	3153230350	
4.0		14.0		3153030400	3153230400	
4.5		16.0		3153030450	3153230450	
5.0		16.0		3153030500	3153230500	
6.0	6.0	19.0	58.0	3153030600	3153230600	
7.0		8.0	19.0	63.0	3153030700	3153230700
8.0			20.0		3153030800	3153230800
9.0	10.0	22.0	75.0	3153030900	3153230900	
10.0		22.0		3153031000	3153231000	
11.0		25.0		3153031100	3153231100	
12.0		25.0		3153031200	3153231200	
14.0	14.0	32.0	89.0	3153031400	3153231400	
16.0	16.0	32.0		3153031600	3153231600	
18.0	18.0	38.0	100.0	3153031800	3153231800	
20.0	20.0	38.0		3153032000	3153232000	
25.0	25.0	38.0		3153032500	3153232500	

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

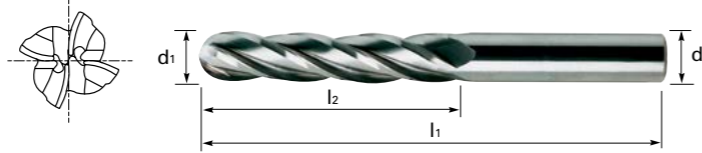
Toleranzwerte in μm / Tolerance range in μm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

4 FLUTE, BALL NOSE, LONG LENGTH



Series No. 316303

▶ cutting conditions : p.228

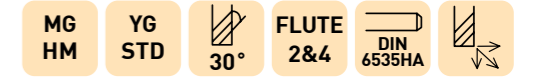


Mill Dia. h10(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
3.0	3.0	25.0	75.0	3163030300	3163230300
4.0	4.0	25.0		3163030400	3163230400
5.0	6.0	25.0		3163030500	3163230500
6.0	6.0	25.0		3163030600	3163230600
8.0	8.0	25.0		3163030800	3163230800
10.0	10.0	38.0	100.0	3163031000	3163231000
12.0	12.0	50.0		3163031200	3163231200
16.0	16.0	75.0	150.0	3163031600	3163231600
20.0	20.0	75.0		3163032000	3163232000
25.0	25.0	75.0		3163032500	3163232500

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

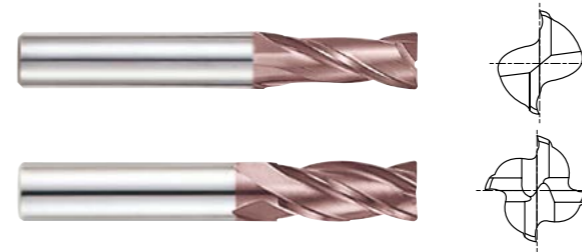
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

2&4 FLUTE, STANDARD LENGTH, CORNER RADIUS



Series No. 120323, 140323

▶ cutting conditions : p.230

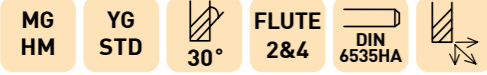


Suitable for dry milling applications at high temperatures.
Excellent high-performance end mills.

CORNER RADIUS	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	EUROPA CODE 2 FLUTE	EUROPA CODE 4 FLUTE
R0.2	2.0	4	4	50	1203230200	1403230200
R0.3	2.0	4	4	50	1203239001	1403239001
R0.5	2.0	4	4	50	1203239002	1403239002
R0.2	2.5	4	5	50	1203230250	1403230250
R0.3	2.5	4	5	50	1203239003	1403239003
R0.5	2.5	4	5	50	1203239004	1403239004
R0.2	3.0	4	6	50	1203230300	1403230300
R0.3	3.0	4	6	50	1203239005	1403239005
R0.5	3.0	4	6	50	1203239006	1403239006
R1.0	3.0	4	6	50	1203239007	1403239007
R0.2	4.0	4	8	50	1203230400	1403230400
R0.3	4.0	4	8	50	1203239008	1403239008
R0.5	4.0	4	8	50	1203239009	1403239009
R1.0	4.0	4	8	50	1203239010	1403239010
R0.2	5.0	6	10	50	1203230500	1403230500
R0.3	5.0	6	10	50	1203239011	1403239011
R0.5	5.0	6	10	50	1203239012	1403239012
R1.0	5.0	6	10	50	1203239013	1403239013
R0.2	6.0	6	12	50	1203230600	1403230600
R0.3	6.0	6	12	50	1203239014	1403239014
R0.5	6.0	6	12	50	1203239015	1403239015
R1.0	6.0	6	12	50	1203239016	1403239016
R0.5	8.0	8	16	60	1203230800	1403230800
R1.0	8.0	8	16	60	1203239017	1403239017
R1.5	8.0	8	16	60	1203239018	1403239018
R2.0	8.0	8	16	60	1203239019	1403239019
R2.5	8.0	8	16	60	1203239020	1403239020
R0.5	10.0	10	20	75	1203231000	1403231000
R1.0	10.0	10	20	75	1203239021	1403239021
R1.5	10.0	10	20	75	1203239022	1403239022
R2.0	10.0	10	20	75	1203239023	1403239023
R2.5	10.0	10	20	75	1203239024	1403239024
R0.5	12.0	12	24	75	1203231200	1403231200
R1.0	12.0	12	24	75	1203239025	1403239025
R1.5	12.0	12	24	75	1203239026	1403239026
R2.0	12.0	12	24	75	1203239027	1403239027
R2.5	12.0	12	24	75	1203239028	1403239028

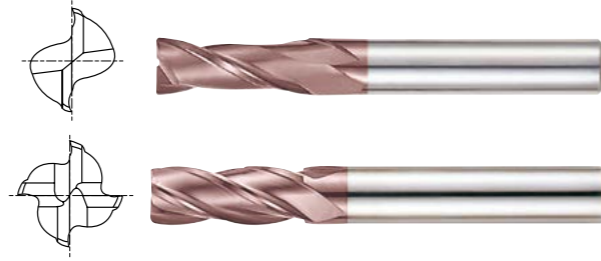
MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	h6

2&4 FLUTE, LONG LENGTH, CORNER RADIUS



Series No. 121323, 142323

▶ cutting conditions : p.230



Suitable for dry milling applications at high temperatures.
Excellent high-performance end mills.

CORNER RADIUS	MILL DIAMETER	SHANK DIAMETER	LENGTH OF CUT	OVERALL LENGTH	EUROPA CODE 2 FLUTE	EUROPA CODE 4 FLUTE
R0.5	3.0	4	6	75	1213239006	1423239006
R1.0	3.0	4	6	75	1213239007	1423239007
R0.5	4.0	4	8	75	1213239009	1423239009
R1.0	4.0	4	8	75	1213239010	1423239010
R0.5	5.0	6	10	75	1213239012	1423239012
R1.0	5.0	6	10	75	1213239013	1423239013
R0.5	6.0	6	12	75	1213239015	1423239015
R1.0	6.0	6	12	75	1213239016	1423239016
R0.5	8.0	8	16	100	1213230800	1423230800
R1.0	8.0	8	16	100	1213239017	1423239017
R1.5	8.0	8	16	100	1213239018	1423239018
R2.0	8.0	8	16	100	1213239019	1423239019
R2.5	8.0	8	16	100	1213239020	1423239020
R0.5	10.0	10	20	100	1213231000	1423231000
R1.0	10.0	10	20	100	1213239021	1423239021
R1.5	10.0	10	20	100	1213239022	1423239022
R2.0	10.0	10	20	100	1213239023	1423239023
R2.5	10.0	10	20	100	1213239024	1423239024
R0.5	12.0	12	24	100	1213231200	1423231200
R1.0	12.0	12	24	100	1213239025	1423239025
R1.5	12.0	12	24	100	1213239026	1423239026
R2.0	12.0	12	24	100	1213239027	1423239027
R2.5	12.0	12	24	100	1213239028	1423239028

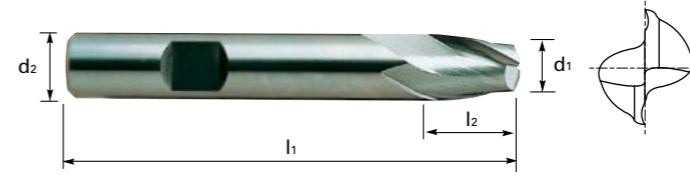
MILL DIA TOLERANCE	SHANK DIA TOLERANCE
0~-0.03	h6

2 FLUTE, SHORT LENGTH



Series No. 100103

▶ cutting conditions : p.215



Mill Dia. h10(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	Carbide	TiAlN Carbide
3.0	6.0	4.0	50.0	1001030300	1001230300
3.5		4.0		1001030350	1001230350
4.0		5.0	54.0	1001030400	1001230400
4.5		5.0		1001030450	1001230450
5.0	6.0	1001030500		1001230500	
6.0	8.0	7.0	58.0	1001030600	1001230600
7.0		8.0		1001030700	1001230700
8.0		9.0		1001030800	1001230800
9.0	10.0	10.0	66.0	1001030900	1001230900
10.0		11.0		1001031000	1001231000
12.0		12.0		1001031200	1001231200
14.0	14.0	14.0	75.0	1001031400	1001231400
16.0	16.0	16.0	82.0	1001031600	1001231600
18.0	18.0	18.0	84.0	1001031800	1001231800
20.0	20.0	20.0	92.0	1001032000	1001232000

▶ TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

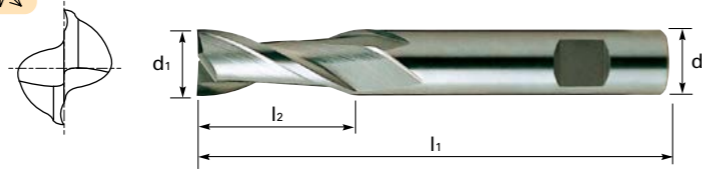
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

2 FLUTE, LONG LENGTH



Series No. 102103

► cutting conditions : p.215



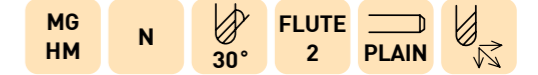
Mill Dia. h10(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	Carbide	TiAlN Carbide
3.0	6.0	7.0	57.0	1021030300	1021230300
3.5		7.0		1021030350	1021230350
4.0		8.0		1021030400	1021230400
4.5		8.0		1021030450	1021230450
5.0		10.0		1021030500	1021230500
6.0		10.0		1021030600	1021230600
7.0	8.0	13.0	63.0	1021030700	1021230700
8.0		16.0		1021030800	1021230800
9.0	10.0	16.0	72.0	1021030900	1021230900
10.0		19.0		1021031000	1021231000
12.0	12.0	22.0	83.0	1021031200	1021231200
14.0	14.0	22.0		1021031400	1021231400
16.0	16.0	26.0	92.0	1021031600	1021231600
18.0	18.0	26.0		1021031800	1021231800
20.0	20.0	32.0		1021032000	1021232000

► TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

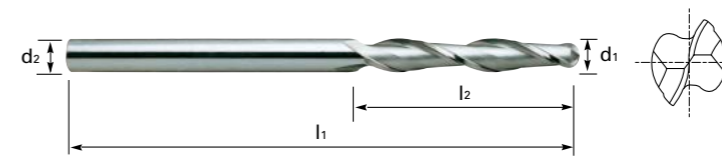
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

2 FLUTE, BALL NOSE, EXTRA LONG LENGTH



Series No. 162303

► cutting conditions : p.225



Mill Dia. h10(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	Carbide	TiAlN Carbide
3.0	3.0	30	75	1623030300	1623230300
4.0	4.0	30	75	1623030400	1623230400
5.0	5.0	40	100	1623030500	1623230500
6.0	6.0	50	150	1623030600	1623230600
8.0	8.0	50	150	1623030800	1623230800
10.0	10.0	60	150	1623031000	1623231000
12.0	12.0	75	150	1623031200	1623231200
14.0	14.0	75	150	1623031400	1623231400
16.0	16.0	75	150	1623031600	1623231600
18.0	18.0	75	150	1623031800	1623231800
20.0	20.0	75	150	1623032000	1623232000

► High alloy steels, steel casting, chill casting, malleable cast iron, CrNi-steels, brass, copper, aluminum with a high percentage of silicon and abrasive plastics.

► Applicable to the fields of K10, K20, K40, and P40

► TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

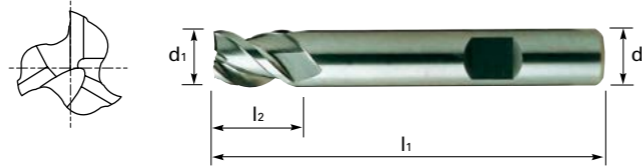
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

3 FLUTE, 45° HELIX, SHORT LENGTH



Series No. 140103

▶ cutting conditions : p.221



Mill Dia. h10(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
3.0	6.0	4.0	50.0	1401030300	1401230300
3.5		4.0		1401030350	1401230350
4.0		5.0	54.0	1401030400	1401230400
4.5		5.0		1401030450	1401230450
5.0		6.0		1401030500	1401230500
6.0	8.0	7.0	58.0	1401030600	1401230600
7.0		8.0		1401030700	1401230700
8.0		9.0		1401030800	1401230800
9.0	10.0	10.0	66.0	1401030900	1401230900
10.0		11.0		1401031000	1401231000
12.0	12.0	12.0	73.0	1401031200	1401231200
14.0	14.0	14.0	75.0	1401031400	1401231400
16.0	16.0	16.0	82.0	1401031600	1401231600
18.0	18.0	18.0	84.0	1401031800	1401231800
20.0	20.0	20.0	92.0	1401032000	1401232000

▶ TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

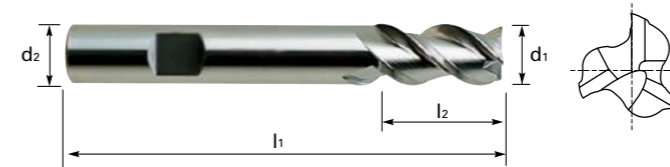
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

3 FLUTE, 45° HELIX, LONG LENGTH



Series No. 141103

▶ cutting conditions : p.221



Mill Dia. h10(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide	
3.0	6.0	7.0	57.0	1411030300	1411230300	
3.5		7.0		1411030350	1411230350	
4.0		8.0		58.0	1411030400	1411230400
4.5		8.0			1411030450	1411230450
5.0		10.0			1411030500	1411230500
6.0	8.0	10.0	63.0	1411030600	1411230600	
7.0		13.0		1411030700	1411230700	
8.0		16.0		1411030800	1411230800	
9.0	10.0	16.0	72.0	1411030900	1411230900	
10.0		19.0		1411031000	1411231000	
12.0	12.0	22.0	83.0	1411031200	1411231200	
14.0	14.0	22.0		1411031400	1411231400	
16.0	16.0	26.0	92.0	1411031600	1411231600	
18.0	18.0	26.0		1411031800	1411231800	
20.0	20.0	32.0		104.0	1411032000	1411232000

▶ TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

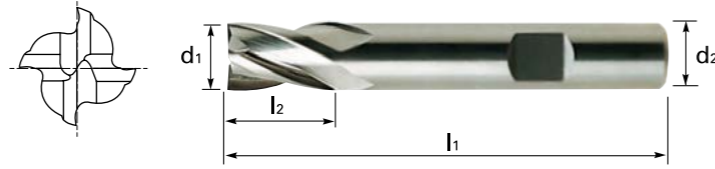
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

4 FLUTE, SHORT LENGTH



Series No. 109103

▶ cutting conditions : p.223



Mill Dia. h10(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	Carbide	TiAlN Carbide
3.0	6.0	5.0	50.0	1091030300	1091230300
3.5		6.0		1091030350	1091230350
4.0		8.0	54.0	1091030400	1091230400
4.5		8.0		1091030450	1091230450
5.0		9.0		1091030500	1091230500
6.0	8.0	10.0	58.0	1091030600	1091230600
7.0		11.0		1091030700	1091230700
8.0		12.0		1091030800	1091230800
9.0	10.0	13.0	66.0	1091030900	1091230900
10.0		14.0		1091031000	1091231000
12.0	12.0	16.0	73.0	1091031200	1091231200
14.0	14.0	18.0	75.0	1091031400	1091231400
16.0	16.0	22.0	82.0	1091031600	1091231600
18.0	18.0	24.0	84.0	1091031800	1091231800
20.0	20.0	26.0	92.0	1091032000	1091232000

▶ TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

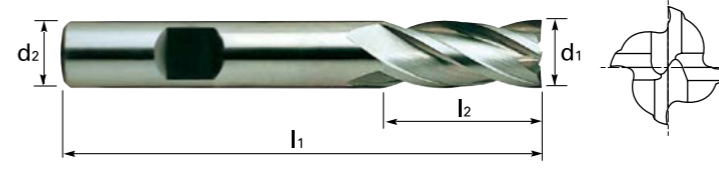
Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

4 FLUTE, LONG LENGTH



Series No. 111103

▶ cutting conditions : p.223



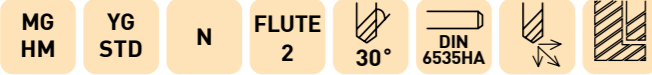
Mill Dia. h10(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	Carbide	TiAlN Carbide
3.0	6.0	8.0	57.0	1111030300	1111230300
3.5		10.0		1111030350	1111230350
4.0		11.0		1111030400	1111230400
4.5		11.0		1111030450	1111230450
5.0		13.0		1111030500	1111230500
6.0	8.0	13.0	63.0	1111030600	1111230600
7.0		16.0		1111030700	1111230700
8.0		19.0		1111030800	1111230800
9.0	10.0	19.0	72.0	1111030900	1111230900
10.0		22.0		1111031000	1111231000
12.0	12.0	26.0	83.0	1111031200	1111231200
14.0	14.0	26.0		1111031400	1111231400
16.0	16.0	32.0	92.0	1111031600	1111231600
18.0	18.0	32.0		1111031800	1111231800
20.0	20.0	38.0	104.0	1111032000	1111232000

▶ TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm					
Nennmaßbereich in mm / Nominal-Diameter in mm					
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

2 FLUTE DRILL MILL



Series No. 197303



▶ cutting conditions : p.231

- Performs many drilling and milling operations not presently done with the standard end mill.
- Among the many vertical milling machine operations, the Drill Mill performs are :
Drilling, Slotting, NC Milling Drilling & Slotting, Profile Milling, Chamfering.

EUROPA CODE PLAIN	Mill Diameter	Shank Diameter h6	Length of Cut	Overall Length
1973030300	3.0	4	6	50
1973030400	4.0	5	8	50
1973030500	5.0	6	10	50
1973030600	6.0	8	12	60
1973030800	8.0	10	16	70
1973031000	10.0	12	18	70
1973031200	12.0	12	20	70
1973031400	14.0	14	24	80
1973031600	16.0	16	26	80
1973032000	20.0	20	32	100

▶ TiN, TiCN-COATING & TiAlN-COATING are available on your request.

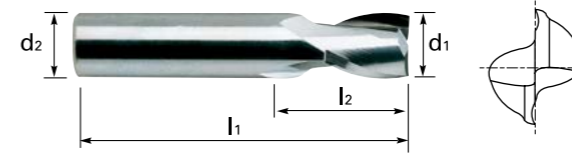
MILL DIA TOLERANCE(mm)	SHANK DIA TOLERANCE
Ø3 ~ Ø10=h9 Ø12 ~ Ø20=d9	h6

2 FLUTE, SHORT, PLAIN SHANK



Series No. 500303

▶ cutting conditions : p.215



Mill Dia. (d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	Carbide	TiAlN Carbide
1/16	1/8	1/8	1.1/2	5003030040	5003230040
1/8	1/8	1/4	1.1/2	5003030080	5003230080
3/16	3/16	3/8	2	5003030120	5003230120
1/4	1/4	1/2	2	5003030160	5003230160
3/8	3/8	1/2	2	5003030240	5003230240
1/2	1/2	1/2	2	5003030320	5003230320

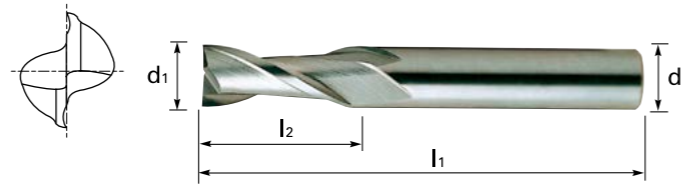
▶ TiAlN Coating to Order

2 FLUTE, LONG, PLAIN SHANK



Series No. 501303

► cutting conditions : p.215



Mill Dia. (d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAIN Carbide
1/16	1/8	3/16	1.1/2	5013030040	5013230040
3/32	1/8	9/32	1.1/2	5013030060	5013230060
1/8	1/8	1/2	1.1/2	5013030080	5013230080
5/32	3/16	1/2	2	5013030100	5013230100
3/16	3/16	5/8	2	5013030120	5013230120
7/32	1/4	5/8	2.1/2	5013030140	5013230140
1/4	1/4	3/4	2.1/2	5013030160	5013230160
9/32	5/16	3/4	2.1/2	5013030180	5013230180
5/16	5/16	13/16	2.1/2	5013030200	5013230200
11/32	3/8	1	2.1/2	5013030220	5013230220
3/8	3/8	1	2.1/2	5013030240	5013230240
13/32	7/16	1	2.3/4	5013030260	5013230260
7/16	7/16	1	2.3/4	5013030280	5013230280
15/32	1/2	1	3	5013030300	5013230300
1/2	1/2	1	3	5013030320	5013230320
9/16	9/16	1.1/8	3.1/2	5013030360	5013230360
5/8	5/8	1.1/4	3.1/2	5013030400	5013230400
11/16	3/4	1.3/8	4	5013030440	5013230440
3/4	3/4	1.1/2	4	5013030480	5013230480
1	1	1.1/2	4	5013030640	5013230640

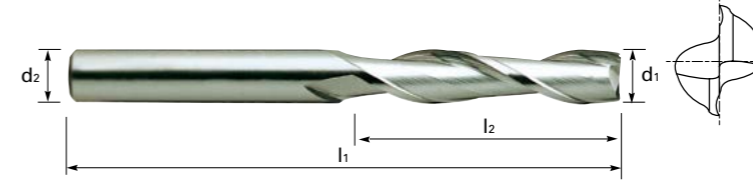
► TiAIN Coating to Order

2 FLUTE, LONG, PLAIN SHANK



Series No. 502303

► cutting conditions : p.215



Mill Dia. (d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAIN Carbide
1/8	1/8	1	3	5023030080	5023230080
3/16	3/16	3/4	2.1/2	5023030120	5023230120
1/4	1/4	1.1/8	3	5023030160	5023230160
5/16	5/16	1.1/8	3	5023030200	5023230200
3/8	3/8	1.1/8	3	5023030240	5023230240
7/16	7/16	2	4.1/2	5023030280	5023230280
1/2	1/2	2	4.1/2	5023030320	5023230320
5/8	5/8	1.1/4	5	5023030400	5023230400
3/4	3/4	1.1/4	5	5023030480	5023230480
1	1	1.1/4	5	5023030640	5023230640

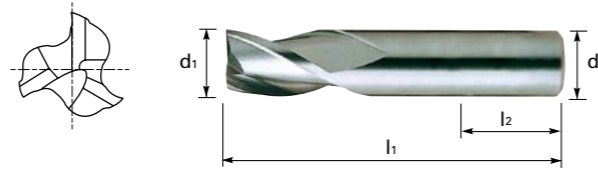
► TiAIN Coating to Order

3 FLUTE, SHORT, PLAIN SHANK



Series No. 506303

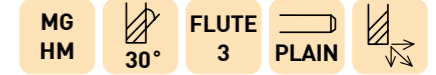
► cutting conditions : p.217



Mill Dia. (d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
1/16	1/8	1/8	1.1/2	5063030040	5063230040
1/8	1/8	1/4	1.1/2	5063030080	5063230080
3/16	3/16	3/8	2	5063030120	5063230120
1/4	1/4	1/2	2	5063030160	5063230160
3/8	3/8	1/2	2	5063030240	5063230240
1/2	1/2	1/2	2	5063030320	5063230320

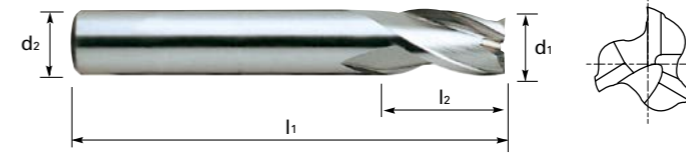
► TiAlN Coating to Order

3 FLUTE, STANDARD, PLAIN SHANK



Series No. 507303

► cutting conditions : p.217



Mill Dia. (d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
1/16	1/8	3/16	1.1/2	5073030040	5073230040
1/8	1/8	1/2	1.1/2	5073030080	5073230080
3/16	3/16	5/8	2	5073030120	5073230120
1/4	1/4	3/4	2.1/2	5073030160	5073230160
5/16	5/16	13/16	2.1/2	5073030200	5073230200
3/8	3/8	1	2.1/2	5073030240	5073230240
7/16	7/16	1	2.3/4	5073030280	5073230280
1/2	1/2	1	3	5073030320	5073230320
5/8	5/8	1.1/4	3.1/2	5073030400	5073230400
3/4	3/4	1.1/2	4	5073030480	5073230480
1	1	1.1/2	4	5073030640	5073230640

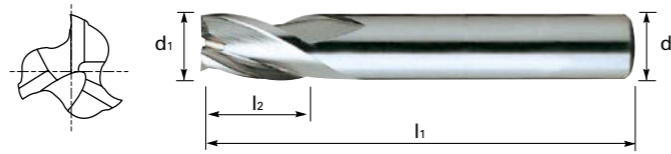
► TiAlN Coating to Order

3 FLUTE, LONG, PLAIN SHANK



Series No. 508303

► cutting conditions : p.217



Mill Dia. (d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAIN Carbide
1/8	1/8	1	3	5083030080	5083230080
1/4	1/4	1	3	5083030160	5083230160
3/8	3/8	1.1/2	4	5083030240	5083230240
1/2	1/2	2	4	5083030320	5083230320
1	1	1.1/4	5	5083030640	5083230640

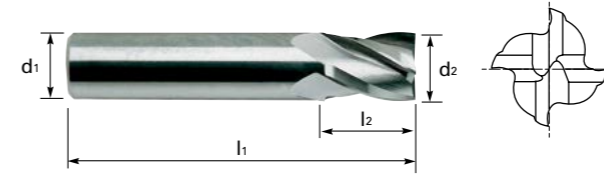
► TiAIN Coating to Order

4 FLUTE, SHORT, PLAIN SHANK



Series No. 509303

► cutting conditions : p.223



Mill Dia. (d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAIN Carbide
1/16	1/8	1/8	1.1/2	5093030040	5093230040
1/8	1/8	1/4	1.1/2	5093030080	5093230080
3/16	3/16	3/8	2	5093030120	5093230120
1/4	1/4	1/2	2	5093030160	5093230160
3/8	3/8	1/2	2	5093030240	5093230240
1/2	1/2	1/2	2	5093030320	5093230320

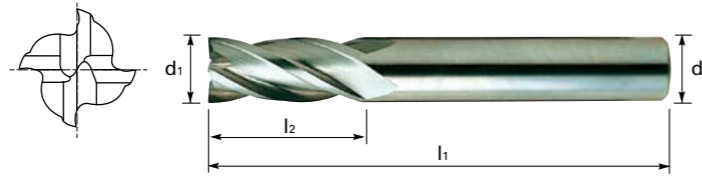
► TiAIN Coating to Order

4 FLUTE, STANDARD, PLAIN SHANK



Series No. 510303

▶ cutting conditions : p.223



Mill Dia. (d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAIN Carbide
1/16	1/8	3/16	1.1/2	5103030040	5103230040
3/32	1/8	9/32	1.1/2	5103030060	5103230060
1/8	1/8	1/2	1.1/2	5103030080	5103230080
5/32	3/16	1/2	2	5103030100	5103230100
3/16	3/16	5/8	2	5103030120	5103230120
7/32	1/4	5/8	2.1/2	5103030140	5103230140
1/4	1/4	3/4	2.1/2	5103030160	5103230160
9/32	5/16	3/4	2.1/2	5103030180	5103230180
5/16	5/16	13/16	2.1/2	5103030200	5103230200
11/32	3/8	1	2.1/2	5103030220	5103230220
3/8	3/8	1	2.1/2	5103030240	5103230240
13/32	7/16	1	2.3/4	5103030260	5103230260
7/16	7/16	1	2.3/4	5103030280	5103230280
15/32	1/2	1	3	5103030300	5103230300
1/2	1/2	1	3	5103030320	5103230320
9/16	9/16	1.1/8	3.1/2	5103030360	5103230360
5/8	5/8	1.1/4	3.1/2	5103030400	5103230400
11/16	3/4	1.3/8	4	5103030440	5103230440
3/4	3/4	1.1/2	4	5103030480	5103230480
1	1	1.1/2	4	5103030640	5103230640

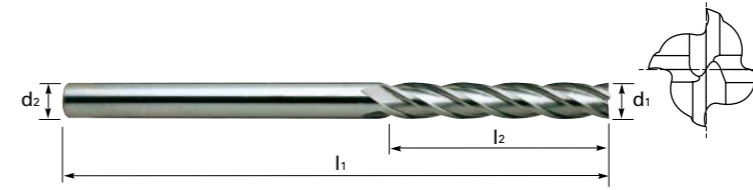
▶ TiAIN Coating to Order

4 FLUTE, LONG, PLAIN SHANK



Series No. 511303

▶ cutting conditions : p.223



Mill Dia. (d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAIN Carbide
1/8	1/8	1	3	5113030080	5113230080
3/16	3/16	3/4	2.1/2	5113030120	5113230120
1/4	1/4	1.1/8	3	5113030160	5113230160
5/16	5/16	1.1/8	3	5113030200	5113230200
3/8	3/8	1.1/8	3	5113030240	5113230240
7/16	7/16	2	4.1/2	5113030280	5113230280
1/2	1/2	2	4.1/2	5113030320	5113230320
5/8	5/8	1.1/4	5	5113030400	5113230400
3/4	3/4	1.1/4	5	5113030480	5113230480
1	1	2.1/4	5	5113030640	5113230640

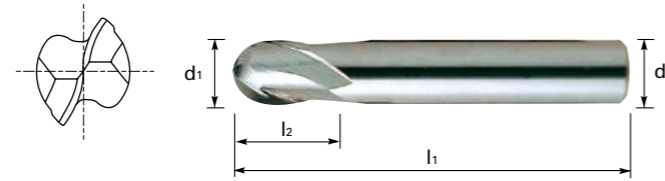
▶ TiAIN Coating to Order

2 FLUTE, SHORT, BALL NOSE, PLAIN SHANK



Series No. 512303

► cutting conditions : p.225



Mill Dia. (d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
1/16	1/8	1/8	1.1/2	5123030040	5123230040
1/8	1/8	1/4	1.1/2	5123030080	5123230080
3/16	3/16	3/8	2	5123030120	5123230120
1/4	1/4	1/2	2	5123030160	5123230160
3/8	3/8	1/2	2	5123030240	5123230240
1/2	1/2	1/2	2	5123030320	5123230320

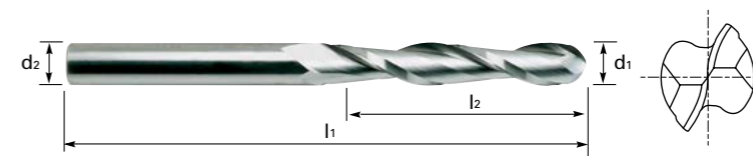
► TiAlN Coating to Order

2 FLUTE, STANDARD, BALL NOSE, PLAIN SHANK



Series No. 513303

► cutting conditions : p.225



Mill Dia. (d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
1/16	1/8	3/16	1.1/2	5133030040	5133230040
3/32	1/8	9/32	1.1/2	5133030060	5133230060
1/8	1/8	1/2	1.1/2	5133030080	5133230080
5/32	3/16	1/2	2	5133030100	5133230100
3/16	3/16	5/8	2	5133030120	5133230120
7/32	1/4	5/8	2.1/2	5133030140	5133230140
1/4	1/4	3/4	2.1/2	5133030160	5133230160
9/32	5/16	3/4	2.1/2	5133030180	5133230180
5/16	5/16	13/16	2.1/2	5133030200	5133230200
3/8	3/8	1	2.1/2	5133030240	5133230240
7/16	7/16	1	2.3/4	5133030280	5133230280
1/2	1/2	1	3	5133030320	5133230320
9/16	9/16	1.1/8	3.1/2	5133030360	5133230360
5/8	5/8	1.1/4	3.1/2	5133030400	5133230400
11/16	3/4	1.3/8	4	5133030440	5133230440
3/4	3/4	1.1/2	4	5133030480	5133230480
1	1	1.1/2	4	5133030640	5133230640

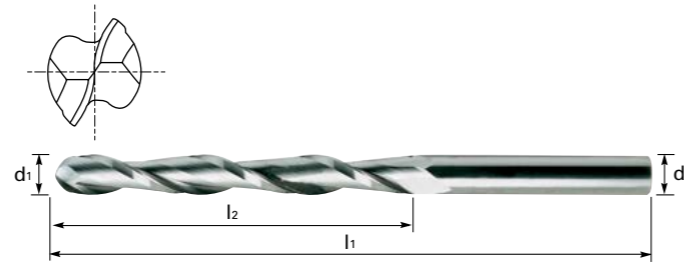
► TiAlN Coating to Order

2 FLUTE, LONG, BALL NOSE, PLAIN SHANK



Series No. 514303

► cutting conditions : p.225



Mill Dia. (d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
1/8	1/8	1	3	5143030080	5143230080
3/16	3/16	3/4	2.1/2	5143030120	5143230120
1/4	1/4	1.1/8	3	5143030160	5143230160
5/16	5/16	1.1/8	3	5143030200	5143230200
3/8	3/8	1.1/8	3	5143030240	5143230240
7/16	7/16	2	4.1/2	5143030280	5143230280
1/2	1/2	2	4.1/2	5143030320	5143230320
5/8	5/8	1.1/4	5	5143030400	5143230400
3/4	3/4	1.1/4	5	5143030480	5143230480

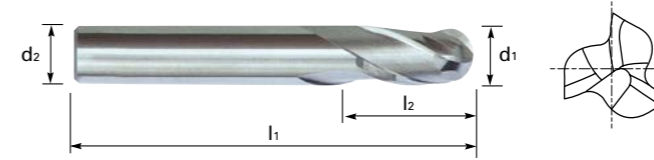
► TiAlN Coating to Order

3 FLUTE, SHORT, BALL NOSE, PLAIN SHANK



Series No. 518303

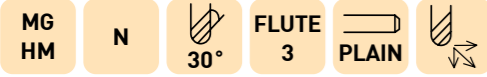
► cutting conditions : p.226



Mill Dia. (d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
1/16	1/8	1/8	1.1/2	5183030040	5183230040
1/8	1/8	1/4	1.1/2	5183030080	5183230080
3/16	3/16	3/8	2	5183030120	5183230120
1/4	1/4	1/2	2	5183030160	5183230160
3/8	3/8	1/2	2	5183030240	5183230240
1/2	1/2	1/2	2	5183030320	5183230320

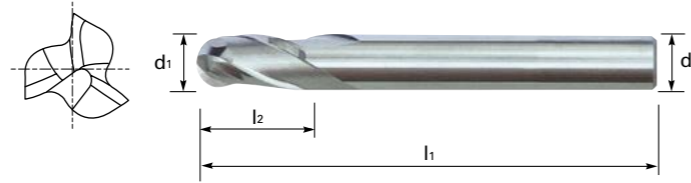
► TiAlN Coating to Order

3 FLUTE, STANDARD, BALL NOSE, PLAIN SHANK



Series No. 519303

► cutting conditions : p.226



Mill Dia. (d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAIN Carbide
1/16	1/8	3/16	1.1/2	5193030040	5193230040
1/8	1/8	1/2	1.1/2	5193030080	5193230080
3/16	3/16	5/8	2	5193030120	5193230120
1/4	1/4	3/4	2.1/2	5193030160	5193230160
5/16	5/16	13/16	2.1/2	5193030200	5193230200
3/8	3/8	1	2.1/2	5193030240	5193230240
7/16	7/16	1	2.3/4	5193030280	5193230280
1/2	1/2	1	3	5193030320	5193230320
3/4	3/4	1.1/2	4	5193030480	5193230480
1	1	1.1/2	4	5193030640	5193230640

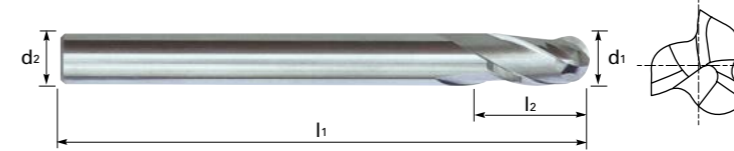
► TiAIN Coating to Order

3 FLUTE, LONG, BALL NOSE, PLAIN SHANK



Series No. 520303

► cutting conditions : p.226



Mill Dia. (d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAIN Carbide
1/8	1/8	1	3	5203030080	5203230080
1/4	1/4	1.1/8	3	5203030160	5203230160
3/8	3/8	1.1/2	4	5203030240	5203230240
1/2	1/2	2	4	5203030320	5203230320
3/4	3/4	1.1/4	5	5203030480	5203230480

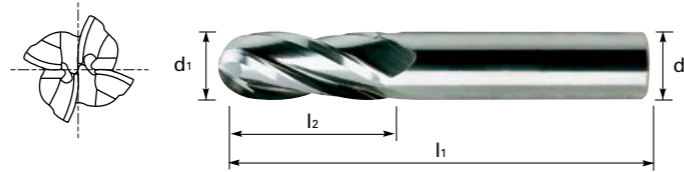
► TiAIN Coating to Order

4 FLUTE, SHORT, BALL NOSE, PLAIN SHANK



Series No. 516303

► cutting conditions : p.228



Mill Dia. (d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
1/16	1/8	1/8	1.1/2	5163030040	5163230040
1/8	1/8	1/4	1.1/2	5163030080	5163230080
3/16	3/16	3/8	2	5163030120	5163230120
1/4	1/4	1/2	2	5163030160	5163230160
3/8	3/8	1/2	2	5163030240	5163230240
1/2	1/2	1/2	2	5163030320	5163230320

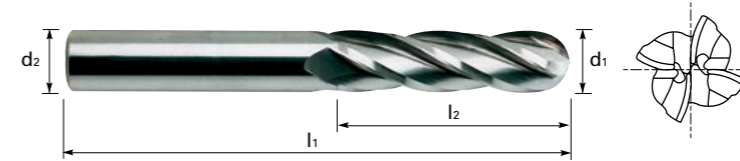
► TiAlN Coating to Order

4 FLUTE, STANDARD, BALL NOSE, PLAIN SHANK



Series No. 515303

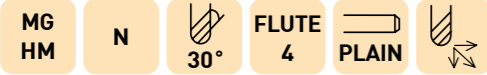
► cutting conditions : p.226



Mill Dia. (d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
1/16	1/8	3/16	1.1/2	5153030040	5153230040
3/32	1/8	9/32	1.1/2	5153030060	5153230060
1/8	1/8	1/2	1.1/2	5153030080	5153230080
5/32	3/16	1/2	2	5153030100	5153230100
3/16	3/16	5/8	2	5153030120	5153230120
7/32	1/4	5/8	2.1/2	5153030140	5153230140
1/4	1/4	3/4	2.1/2	5153030160	5153230160
9/32	5/16	3/4	2.1/2	5153030180	5153230180
5/16	5/16	13/16	2.1/2	5153030200	5153230200
3/8	3/8	1	2.1/2	5153030240	5153230240
7/16	7/16	1	2.3/4	5153030280	5153230280
1/2	1/2	1	3	5153030320	5153230320
9/16	9/16	1.1/8	3.1/2	5153030360	5153230360
5/8	5/8	1.1/4	3.1/2	5153030400	5153230400
11/16	3/4	1.3/8	4	5153030440	5153230440
3/4	3/4	1.1/2	4	5153030480	5153230480
1	1	1.1/2	4	5153030640	5153230640

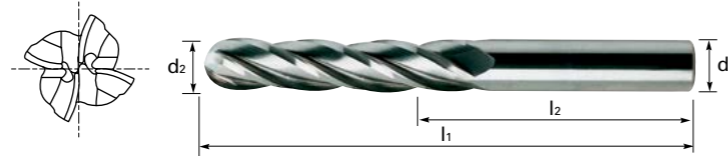
► TiAlN Coating to Order

4 FLUTE, LONG, BALL NOSE, PLAIN SHANK



Series No. 517303

▶ cutting conditions : p.228



Mill Dia. (d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	Carbide	TiAlN Carbide
1/8	1/8	1	3	5173030080	5173230080
1/4	1/4	1	3	5173030160	5173230160
3/8	3/8	1.1/2	4	5173030240	5173230240
1/2	1/2	2	4	5173030320	5173230320
1	1	2.1/4	5	5173030640	5173030640

▶ TiAlN Coating to Order

TABLE OF CUTTING CONDITION (MICRO GRAIN CARBIDE)



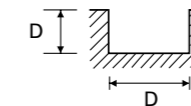
2 FLUTE

300303, 301303, 302303, 502303, 501303

500303, 100103, 102103

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS												STAINLESS STEELS TITANIUM ALLOYS				
	~ HRc20				HRc20~HRc30				HRc30~HRc40								
STRENGTH	500~800N/mm ²				800~1000N/mm ²				1000~1300N/mm ²								
	DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	5500	80	35	0.007	4800	70	30	0.007	4000	55	25	0.007	8000	65	50	0.004	
3.0	3700	90	35	0.012	3200	80	30	0.013	2600	60	25	0.012	5300	65	50	0.006	
4.0	2800	90	35	0.016	2400	80	30	0.017	2000	60	25	0.015	4000	65	50	0.008	
5.0	2200	90	35	0.020	1900	80	30	0.021	1600	60	25	0.019	3200	65	50	0.010	
6.0	1800	90	35	0.025	1600	80	30	0.025	1300	60	25	0.023	2600	65	50	0.013	
8.0	1400	90	35	0.032	1200	80	30	0.033	1000	60	25	0.030	2000	65	50	0.016	
10.0	1100	90	35	0.041	950	80	30	0.042	800	60	25	0.038	1600	65	50	0.020	
12.0	900	90	35	0.050	800	80	30	0.050	660	60	25	0.045	1300	65	50	0.025	
14.0	800	90	35	0.056	700	80	30	0.057	570	60	25	0.053	1100	65	50	0.030	
16.0	700	100	35	0.071	600	85	30	0.071	500	75	25	0.075	1000	75	50	0.038	
20.0	550	100	35	0.091	480	85	30	0.089	400	75	25	0.094	800	80	50	0.050	

MATERIAL	CAST IRON				ALUMINUM ALLOYS				COPPER, BRASS NON-FERROUS METALS				
STRENGTH													
	DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	6500	150	40	0.012	16000	320	100	0.010	12000	240	75	0.010	
3.0	4200	150	40	0.018	11000	320	105	0.015	8000	240	75	0.015	
4.0	3200	150	40	0.023	8000	320	100	0.020	6000	240	75	0.020	
5.0	2500	150	40	0.030	6400	320	100	0.025	4800	240	75	0.025	
6.0	2100	180	40	0.043	5300	340	100	0.032	4000	260	75	0.033	
8.0	1600	190	40	0.059	4000	340	100	0.043	3000	260	75	0.043	
10.0	1300	200	40	0.077	3200	340	100	0.053	2400	260	75	0.054	
12.0	1000	210	40	0.105	2600	340	100	0.065	2000	260	75	0.065	
14.0	900	220	40	0.122	2300	340	100	0.074	1700	260	75	0.076	
16.0	800	225	40	0.141	2000	340	100	0.085	1500	260	75	0.087	
20.0	640	240	40	0.188	1600	340	100	0.106	1200	260	75	0.108	



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION (MICRO GRAIN CARBIDE)



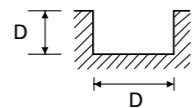
2 FLUTE, TiAlN-COATED

300323, 301323, 302323, 502323, 501323

500323, 100123, 102123

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS												STAINLESS STEELS TITANIUM ALLOYS				
	~ HRc20				HRc20~HRc30				HRc30~HRc40								
STRENGTH	500 ~ 800N/mm ²				800~1000N/mm ²				1000~1300N/mm ²								
	DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	7700	110	50	0.007	6720	100	40	0.007	5600	75	35	0.007	11200	90	70	0.004	
3.0	5180	125	50	0.012	4480	110	40	0.012	3640	85	35	0.012	7420	90	70	0.006	
4.0	3920	125	50	0.016	3360	110	40	0.016	2800	85	35	0.015	5600	90	70	0.008	
5.0	3080	125	50	0.020	2660	110	40	0.021	2240	85	35	0.019	4480	90	70	0.010	
6.0	2520	125	50	0.025	2240	110	40	0.025	1820	85	35	0.023	3640	90	70	0.012	
8.0	1960	125	50	0.032	1680	110	40	0.033	1400	85	35	0.030	2800	90	70	0.016	
10.0	1540	125	50	0.041	1330	110	40	0.041	1120	85	35	0.038	2240	90	70	0.020	
12.0	1260	125	50	0.050	1120	110	40	0.049	924	85	35	0.046	1820	90	70	0.025	
14.0	1120	125	50	0.056	980	110	40	0.056	798	85	35	0.053	1540	90	70	0.029	
16.0	980	140	50	0.071	840	120	40	0.071	700	105	35	0.075	1400	105	70	0.038	
20.0	770	140	50	0.091	672	120	40	0.089	560	105	35	0.094	1120	110	70	0.049	

MATERIAL	CAST IRON				ALUMINUM ALLOYS				COPPER, BRASS NON-FERROUS METALS				
HARDNESS													
STRENGTH													
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	
2.0	9100	210	55	0.012	22400	450	140	0.010	16800	335	105	0.010	
3.0	5880	210	55	0.018	15400	450	145	0.015	11200	335	105	0.015	
4.0	4480	210	55	0.023	11200	450	140	0.020	8400	335	105	0.020	
5.0	3500	210	55	0.030	8960	450	140	0.025	6720	335	105	0.025	
6.0	2940	250	55	0.043	7420	475	140	0.032	5600	365	105	0.033	
8.0	2240	265	55	0.059	5600	475	140	0.042	4200	365	105	0.043	
10.0	1820	280	55	0.077	4480	475	140	0.053	3360	365	105	0.054	
12.0	1400	295	55	0.105	3640	475	135	0.065	2800	365	105	0.065	
14.0	1260	310	55	0.123	3220	475	140	0.074	2380	365	105	0.077	
16.0	1120	315	55	0.141	2800	475	140	0.085	2100	365	105	0.087	
20.0	900	335	55	0.186	2240	475	140	0.106	1680	365	105	0.109	



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION (MICRO GRAIN CARBIDE)

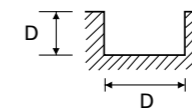


3 FLUTE, FINISH SLOTTING

303303, 304303, 305303, 506303, 507303, 508303

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS												STAINLESS STEELS TITANIUM ALLOYS				
	~ HRc20				HRc20~HRc30				HRc30~HRc40								
STRENGTH	500~800N/mm ²				800~1000N/mm ²				1000~1300N/mm ²								
	DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	5500	70	35	0.004	4800	60	30	0.004	4000	50	25	0.004	8000	55	50	0.002	
3.0	3700	80	35	0.007	3200	75	30	0.008	2600	55	25	0.007	5300	55	50	0.003	
4.0	2800	80	35	0.010	2400	75	30	0.010	2000	55	25	0.009	4000	55	50	0.005	
5.0	2200	80	35	0.012	1900	70	30	0.012	1600	55	25	0.011	3200	55	50	0.006	
6.0	1800	80	35	0.015	1600	70	30	0.015	1300	55	25	0.014	2600	60	50	0.008	
8.0	1400	80	35	0.019	1200	70	30	0.019	1000	55	25	0.018	2000	60	50	0.010	
10.0	1100	80	35	0.024	950	70	30	0.025	800	55	25	0.023	1600	60	50	0.013	
12.0	900	80	35	0.030	800	70	30	0.029	660	55	25	0.028	1300	60	50	0.015	
14.0	800	80	35	0.033	700	70	30	0.033	570	55	25	0.032	1100	60	50	0.018	
16.0	700	90	35	0.043	600	75	30	0.042	500	65	25	0.043	1000	70	50	0.023	
20.0	550	90	35	0.055	480	75	30	0.052	400	65	25	0.054	800	70	50	0.029	

MATERIAL	CAST IRON				ALUMINUM ALLOYS				COPPER, BRASS NON-FERROUS METALS				
HARDNESS													
STRENGTH													
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	
2.0	6500	140	40	0.007	16000	290	100	0.006	12000	220	75	0.006	
3.0	4200	140	40	0.011	11000	300	105	0.009	8000	220	75	0.009	
4.0	3200	130	40	0.014	8000	290	100	0.012	6000	220	75	0.012	
5.0	2500	135	40	0.018	6400	290	100	0.015	4800	220	75	0.015	
6.0	2100	160	40	0.025	5300	305	100	0.019	4000	240	75	0.020	
8.0	1600	170	40	0.035	4000	310	100	0.026	3000	230	75	0.026	
10.0	1300	180	40	0.046	3200	305	100	0.032	2400	230	75	0.032	
12.0	1000	190	40	0.063	2600	300	100	0.038	2000	230	75	0.038	
14.0	900	200	40	0.074	2300	300	100	0.043	1700	230	75	0.045	
16.0	800	200	40	0.083	2000	300	100	0.050	1500	230	75	0.051	
20.0	640	215	40	0.112	1600	300	100	0.063	1200	230	75	0.064	



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION (MICRO GRAIN CARBIDE)



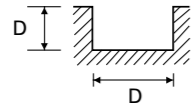
3 FLUTE, FINISH SLOTING, TiAlN-COATED

303323, 304323, 305323, 506323, 507323, 508323



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS												STAINLESS STEELS TITANIUM ALLOYS			
	~ HRc20				HRc20~HRc30				HRc30~HRc40							
STRENGTH	500~800N/mm ²				800~1000N/mm ²				1000~1300N/mm ²							
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	7700	100	50	0.004	6720	85	40	0.004	5600	70	35	0.004	11200	75	70	0.002
3.0	5180	110	50	0.007	4480	105	40	0.008	3640	75	35	0.007	7420	75	70	0.003
4.0	3920	110	50	0.009	3360	105	40	0.010	2800	75	35	0.009	5600	75	70	0.004
5.0	3080	110	50	0.012	2660	100	40	0.013	2240	75	35	0.011	4480	75	70	0.006
6.0	2520	110	50	0.015	2240	100	40	0.015	1820	75	35	0.014	3640	85	70	0.008
8.0	1960	110	50	0.019	1680	100	40	0.020	1400	75	35	0.018	2800	85	70	0.010
10.0	1540	110	50	0.024	1330	100	40	0.025	1120	75	35	0.022	2240	85	70	0.013
12.0	1260	110	50	0.029	1120	100	40	0.030	920	75	35	0.027	1820	85	70	0.016
14.0	1120	110	50	0.033	980	100	45	0.034	800	75	35	0.031	1540	85	70	0.018
16.0	980	125	50	0.043	840	105	40	0.042	700	90	35	0.043	1400	100	70	0.024
20.0	770	125	50	0.054	670	105	40	0.052	560	90	35	0.054	1120	100	70	0.030

MATERIAL	CAST IRON				ALUMINUM ALLOYS				COPPER, BRASS NON-FERROUS METALS			
	DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc
2.0	9100	195	55	0.007	22400	405	140	0.006	16800	310	105	0.006
3.0	5880	195	55	0.011	15400	420	145	0.009	11200	310	105	0.009
4.0	4480	180	55	0.013	11200	405	140	0.012	8400	310	105	0.012
5.0	3500	190	55	0.018	8960	405	140	0.015	6720	310	105	0.015
6.0	2940	225	55	0.026	7420	425	140	0.019	5600	335	105	0.020
8.0	2240	240	55	0.036	5600	435	140	0.026	4200	320	105	0.025
10.0	1820	250	55	0.046	4480	425	140	0.032	3360	320	105	0.032
12.0	1400	265	55	0.063	3640	420	135	0.038	2800	320	105	0.038
14.0	1260	280	55	0.074	3220	420	140	0.043	2380	320	105	0.045
16.0	1120	280	55	0.083	2800	420	140	0.050	2100	320	105	0.051
20.0	900	300	55	0.111	2240	420	140	0.063	1680	320	105	0.063



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION (MICRO GRAIN CARBIDE)



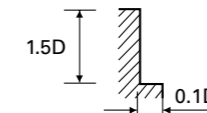
3 FLUTE, FINISH SIDE CUTTING

304303, 305303, 506303, 507303, 508303



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS												STAINLESS STEELS TITANIUM ALLOYS			
	~ HRc20				HRc20~HRc30				HRc30~HRc40							
STRENGTH	500~800N/mm ²				800~1000N/mm ²				1000~1300N/mm ²							
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	5500	180	35	0.011	4800	160	30	0.011	4000	120	25	0.010	8000	140	50	0.006
3.0	3700	200	35	0.018	3200	170	30	0.018	2600	130	25	0.017	5300	140	50	0.009
4.0	2800	200	35	0.024	2400	180	30	0.025	2000	130	25	0.022	4000	140	50	0.012
5.0	2200	200	35	0.030	1900	180	30	0.032	1600	130	25	0.027	3200	140	50	0.015
6.0	1800	200	35	0.037	1600	180	30	0.038	1300	130	25	0.033	2600	150	50	0.019
8.0	1400	200	35	0.048	1200	180	30	0.050	1000	130	25	0.043	2000	150	50	0.025
10.0	1100	200	35	0.061	950	180	30	0.063	800	130	25	0.054	1600	150	50	0.031
12.0	900	200	35	0.074	800	180	30	0.075	660	130	25	0.066	1300	150	50	0.038
14.0	800	200	35	0.083	700	180	30	0.086	570	130	25	0.076	1100	150	50	0.045
16.0	700	220	35	0.105	600	190	30	0.106	500	160	25	0.107	1000	170	50	0.057
20.0	550	220	35	0.133	480	190	30	0.132	400	160	25	0.133	800	180	50	0.075

MATERIAL	CAST IRON				ALUMINUM ALLOYS				COPPER, BRASS NON-FERROUS METALS			
	DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc
2.0	6500	330	40	0.017	16000	720	100	0.015	12000	540	75	0.015
3.0	4200	330	40	0.026	11000	690	105	0.021	8000	530	75	0.022
4.0	3200	340	40	0.035	8000	720	100	0.030	6000	540	75	0.030
5.0	2500	340	40	0.045	6400	710	100	0.037	4800	530	75	0.037
6.0	2100	400	40	0.063	5300	760	100	0.048	4000	580	75	0.048
8.0	1600	430	40	0.090	4000	760	100	0.063	3000	580	75	0.064
10.0	1300	450	40	0.115	3200	760	100	0.079	2400	580	75	0.081
12.0	1000	470	40	0.157	2600	760	100	0.097	2000	580	75	0.097
14.0	900	490	40	0.181	2300	760	100	0.110	1700	580	75	0.114
16.0	800	510	40	0.213	2000	760	100	0.127	1500	580	75	0.129
20.0	640	540	40	0.281	1600	760	100	0.158	1200	580	75	0.161



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION (MICRO GRAIN CARBIDE)



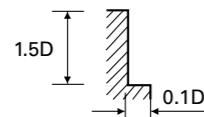
3 FLUTE, FINISH SIDE CUTTING, TiAlN-COATED

304323, 305323, 506323, 507323, 508323



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS												STAINLESS STEELS TITANIUM ALLOYS			
HARDNESS	~ HRc20				HRc20~HRc30				HRc30~HRc40							
STRENGTH	500~800N/mm ²				800~1000N/mm ²				1000~1300N/mm ²							
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	7700	250	50	0.016	6720	225	40	0.011	5600	170	35	0.010	11200	195	70	0.006
3.0	5180	280	50	0.027	4480	240	40	0.018	3640	180	35	0.016	7420	195	70	0.009
4.0	3920	280	50	0.036	3360	250	40	0.025	2800	180	35	0.021	5600	195	70	0.012
5.0	3080	280	50	0.045	2660	250	40	0.031	2240	180	35	0.027	4480	195	70	0.015
6.0	2520	280	50	0.056	2240	250	40	0.037	1820	180	35	0.033	3640	210	70	0.019
8.0	1960	280	50	0.071	1680	250	40	0.050	1400	180	35	0.043	2800	210	70	0.025
10.0	1540	280	50	0.091	1330	250	40	0.063	1120	180	35	0.054	2240	210	70	0.031
12.0	1260	280	50	0.111	1120	250	40	0.074	920	180	35	0.065	1820	210	70	0.038
14.0	1120	280	50	0.125	980	250	45	0.085	800	180	35	0.075	1540	210	70	0.045
16.0	980	310	50	0.158	840	265	40	0.105	700	225	35	0.107	1400	240	70	0.057
20.0	770	310	50	0.201	670	265	40	0.132	560	225	35	0.134	1120	250	70	0.074

MATERIAL	CAST IRON				ALUMINUM ALLOYS				COPPER. BRASS NON-FERROUS METALS			
HARDNESS												
STRENGTH												
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	9100	460	55	0.017	22400	1010	140	0.015	16800	755	105	0.015
3.0	5880	460	55	0.026	15400	965	145	0.021	11200	740	105	0.022
4.0	4480	475	55	0.035	11200	1010	140	0.030	8400	755	105	0.030
5.0	3500	475	55	0.045	8960	995	140	0.037	6720	740	105	0.037
6.0	2940	560	55	0.063	7420	1065	140	0.048	5600	810	105	0.048
8.0	2240	600	55	0.089	5600	1065	140	0.063	4200	810	105	0.064
10.0	1820	630	55	0.115	4480	1065	140	0.079	3360	810	105	0.080
12.0	1400	660	55	0.157	3640	1065	135	0.098	2800	810	105	0.096
14.0	1260	685	55	0.181	3220	1065	140	0.110	2380	810	105	0.113
16.0	1120	715	55	0.213	2800	1065	140	0.127	2100	810	105	0.129
20.0	900	755	55	0.280	2240	1065	140	0.158	1680	810	105	0.161



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION (MICRO GRAIN CARBIDE)

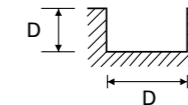


3 FLUTE, FINISH SLOTING, 45° HELIX

140103, 141103



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS								CAST IRON				ALUMINUM ALLOYS				COPPER. BRASS NON-FERROUS METALS			
HARDNESS	~ HRc30				HRc30 ~ HRc40															
STRENGTH	~ 1000N/mm ²				1000 ~ 1300N/mm ²															
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz				
6.0	1600	95	30	0.020	1300	65	25	0.017	2100	220	40	0.035	5300	410	100	0.026				
8.0	1200	95	30	0.026	1000	65	25	0.022	1600	230	40	0.048	4000	410	100	0.034				
10.0	950	95	30	0.033	800	65	25	0.027	1300	240	40	0.062	3200	410	100	0.043				
12.0	800	95	30	0.040	660	65	25	0.033	1000	250	40	0.083	2600	410	100	0.053				
14.0	700	95	30	0.045	570	65	25	0.038	900	260	40	0.096	2300	410	100	0.059				
16.0	600	100	30	0.056	500	80	25	0.053	800	270	40	0.113	2000	410	100	0.068				
20.0	480	100	30	0.069	400	80	25	0.067	640	290	40	0.151	1600	410	100	0.085				



※ The FEED, in long & extra long types, should be reduced by around 50%

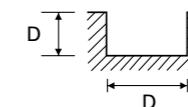
RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

3 FLUTE, FINISH SLOTING, 45° HELIX, TiAlN-COATED

140123, 141123



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS								CAST IRON				ALUMINUM ALLOYS				COPPER. BRASS NON-FERROUS METALS			
HARDNESS	~ HRc30				HRc30 ~ HRc40															
STRENGTH	~ 1000N/mm ²				1000 ~ 1300N/mm ²															
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz				
6.0	2240	135	40	0.020	1820	90	35	0.016	2940	310	55	0.035	7420	575	140	0.026				
8.0	1680	135	40	0.027	1400	90	35	0.021	2240	320	55	0.048	5600	575	140	0.034				
10.0	1330	135	40	0.034	1120	90	35	0.027	1820	335	55	0.061	4480	575	140	0.043				
12.0	1120	135	40	0.040	925	90	35	0.032	1400	350	55	0.083	3640	575	135	0.053				
14.0	980	135	45	0.046	800	90	35	0.038	1260	365	55	0.097	3220	575	140	0.060				
16.0	840	140	40	0.056	700	110	35	0.052	1120	380	55	0.113	2800	575	140	0.068				
20.0	670	140	40	0.070	560	110	35	0.065	895	405	55	0.151	2240	575	140	0.086				



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION (MICRO GRAIN CARBIDE)

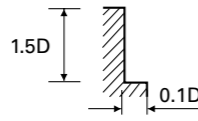


3 FLUTE, FINISH SIDE CUTTING, 45° HELIX

140103, 141103



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS								CAST IRON				ALUMINUM ALLOYS				COPPER. BRASS NON-FERROUS METALS			
	~ HRC30				HRC30 ~ HRC40															
	~ 1000N/mm ²				1000 ~ 1300N/mm ²															
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	1600	190	30	0.040	1300	130	25	0.033	2100	440	40	0.070	5300	820	100	0.052	4000	620	75	0.052
8.0	1200	190	30	0.053	1000	130	25	0.043	1600	460	40	0.096	4000	820	100	0.068	3000	620	75	0.069
10.0	950	190	30	0.067	800	130	25	0.054	1300	480	40	0.123	3200	820	100	0.085	2400	620	75	0.086
12.0	800	190	30	0.079	660	130	25	0.066	1000	500	40	0.167	2600	820	100	0.105	2000	620	75	0.103
14.0	700	190	30	0.090	570	130	25	0.076	900	520	40	0.193	2300	820	100	0.119	1700	620	75	0.122
16.0	600	200	30	0.111	500	160	25	0.107	800	540	40	0.225	2000	820	100	0.137	1500	620	75	0.138
20.0	480	200	30	0.139	400	160	25	0.133	640	580	40	0.302	1600	820	100	0.171	1200	620	75	0.172



※ The FEED, in long & extra long types, should be reduced by around 50%

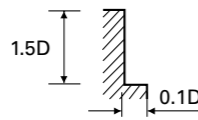
RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

3 FLUTE, FINISH SIDE CUTTING, 45° HELIX, TiAlN-COATED

140123, 141123



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS								CAST IRON				ALUMINUM ALLOYS				COPPER. BRASS NON-FERROUS METALS			
	~ HRC30				HRC30 ~ HRC40															
	~ 1000N/mm ²				1000 ~ 1300N/mm ²															
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	2240	265	40	0.039	1820	180	35	0.033	2940	615	55	0.070	7420	1150	140	0.052	5600	870	105	0.052
8.0	1680	265	40	0.053	1400	180	35	0.043	2240	645	55	0.096	5600	1150	140	0.068	4200	870	105	0.069
10.0	1330	265	40	0.066	1120	180	35	0.054	1820	670	55	0.123	4480	1150	140	0.086	3360	870	105	0.086
12.0	1120	265	40	0.079	925	180	35	0.065	1400	700	55	0.167	3640	1150	135	0.105	2800	870	105	0.104
14.0	980	265	45	0.090	800	180	35	0.075	1260	730	55	0.193	3220	1150	140	0.119	2380	870	105	0.122
16.0	840	280	40	0.111	700	225	35	0.107	1120	755	55	0.225	2800	1150	140	0.137	2100	870	105	0.138
20.0	670	280	40	0.139	560	225	35	0.134	895	810	55	0.302	2240	1150	140	0.171	1680	870	105	0.173



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION (MICRO GRAIN CARBIDE)



4 FLUTE, SIDE CUTTING

511303, 510303, 509303, 309303, 310303

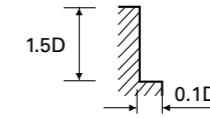


109103, 111103, 311303



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS												STAINLESS STEELS TITANIUM ALLOYS			
	~ HRC20				HRC20~HRC30				HRC30~HRC40							
	500~800N/mm ²				800~1000N/mm ²				1000~1300N/mm ²							
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	5500	240	35	0.011	4800	210	30	0.011	4000	160	25	0.010	8000	200	50	0.006
3.0	3700	270	35	0.018	3200	240	30	0.019	2600	180	25	0.017	5300	200	50	0.009
4.0	2800	270	35	0.024	2400	240	30	0.025	2000	180	25	0.023	4000	200	50	0.013
5.0	2200	270	35	0.031	1900	240	30	0.032	1600	180	25	0.028	3200	200	50	0.016
6.0	1800	270	35	0.038	1600	240	30	0.038	1300	180	25	0.035	2600	200	50	0.019
8.0	1400	270	35	0.048	1200	240	30	0.050	1000	180	25	0.045	2000	200	50	0.025
10.0	1100	270	35	0.061	950	240	30	0.063	800	180	25	0.056	1600	200	50	0.031
12.0	900	270	35	0.075	800	240	30	0.075	660	180	25	0.068	1300	200	50	0.038
14.0	800	270	35	0.084	700	240	30	0.086	570	180	25	0.079	1100	200	50	0.045
16.0	700	300	35	0.107	600	260	30	0.108	500	220	25	0.110	1000	225	50	0.056
20.0	550	300	35	0.136	480	260	30	0.135	400	220	25	0.138	800	240	50	0.075

MATERIAL	CAST IRON				ALUMINUM ALLOYS				COPPER. BRASS NON-FERROUS METALS			
	HARDNESS				HARDNESS				HARDNESS			
	STRENGTH				STRENGTH				STRENGTH			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	6500	450	40	0.017	16000	960	100	0.015	12000	720	75	0.015
3.0	4200	450	40	0.027	11000	960	105	0.022	8000	720	75	0.023
4.0	3200	450	40	0.035	8000	960	100	0.030	6000	720	75	0.030
5.0	2500	450	40	0.045	6400	960	100	0.038	4800	720	75	0.038
6.0	2100	540	40	0.064	5300	1020	100	0.048	4000	780	75	0.049
8.0	1600	570	40	0.089	4000	1020	100	0.064	3000	780	75	0.065
10.0	1300	600	40	0.115	3200	1020	100	0.080	2400	780	75	0.081
12.0	1000	630	40	0.158	2600	1020	100	0.098	2000	780	75	0.098
14.0	900	660	40	0.183	2300	1020	100	0.111	1700	780	75	0.115
16.0	800	680	40	0.213	2000	1020	100	0.128	1500	780	75	0.130
20.0	640	720	40	0.281	1600	1020	100	0.159	1200	780	75	0.163



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

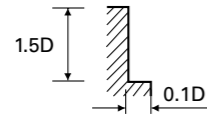
TABLE OF CUTTING CONDITION (MICRO GRAIN CARBIDE)

4 FLUTE, SIDE CUTTING, TiAlN-COATED



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS												STAINLESS STEELS TITANIUM ALLOYS			
HARDNESS	~ HRC20				HRC20~HRC30				HRC30~HRC40							
STRENGTH	500~800N/mm ²				800~1000N/mm ²				1000~1300N/mm ²							
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	7700	335	50	0.011	6720	295	40	0.011	5600	225	35	0.010	11200	280	70	0.006
3.0	5180	380	50	0.018	4480	335	40	0.019	3640	250	35	0.017	7420	280	70	0.009
4.0	3920	380	50	0.024	3360	335	40	0.025	2800	250	35	0.022	5600	280	70	0.013
5.0	3080	380	50	0.031	2660	335	40	0.031	2240	250	35	0.028	4480	280	70	0.016
6.0	2520	380	50	0.038	2240	335	40	0.037	1820	250	35	0.034	3640	280	70	0.019
8.0	1960	380	50	0.048	1680	335	40	0.050	1400	250	35	0.045	2800	280	70	0.025
10.0	1540	380	50	0.062	1330	335	40	0.063	1120	250	35	0.056	2240	280	70	0.031
12.0	1260	380	50	0.075	1120	335	40	0.075	920	250	35	0.068	1820	280	70	0.038
14.0	1120	380	50	0.085	980	335	45	0.085	800	250	35	0.078	1540	280	70	0.045
16.0	980	420	50	0.107	840	365	45	0.109	700	310	35	0.111	1400	315	70	0.056
20.0	770	420	50	0.136	670	365	45	0.136	560	310	35	0.138	1120	335	70	0.075

MATERIAL	CAST IRON				ALUMINUM ALLOYS				COPPER, BRASS NON-FERROUS METALS							
HARDNESS																
STRENGTH																
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	9100	630	55	0.017	22400	1345	140	0.015	16800	1010	105	0.015				
3.0	5880	630	55	0.027	15400	1345	145	0.022	11200	1010	105	0.023				
4.0	4480	630	55	0.035	11200	1345	140	0.030	8400	1010	105	0.030				
5.0	3500	630	55	0.045	8960	1345	140	0.038	6720	1010	105	0.038				
6.0	2940	755	55	0.064	7420	1430	140	0.048	5600	1090	105	0.049				
8.0	2240	800	55	0.089	5600	1430	140	0.064	4200	1090	105	0.065				
10.0	1820	840	55	0.115	4480	1430	140	0.080	3360	1090	105	0.081				
12.0	1400	880	55	0.157	3640	1430	135	0.098	2800	1090	105	0.097				
14.0	1260	925	55	0.184	3220	1430	140	0.111	2380	1090	105	0.114				
16.0	1120	950	55	0.212	2800	1430	140	0.128	2100	1090	105	0.130				
20.0	900	1010	55	0.281	2240	1430	140	0.160	1680	1090	105	0.162				



* The FEED, in long & extra long types, should be reduced by around 50%

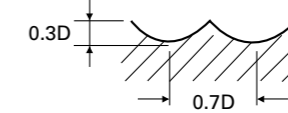
RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION (MICRO GRAIN CARBIDE)

2 FLUTE, BALL NOSE



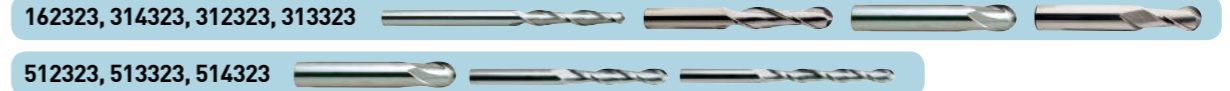
MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS								CAST IRON				ALUMINUM ALLOYS			
HARDNESS	~HRC30				HRC30 ~ HRC40											
STRENGTH	~1000N/mm ²				1000 ~ 1300N/mm ²											
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R1.0 × 2.0	5200	90	35	0.009	4400	45	30	0.005	7300	150	45	0.010	21500	280	135	0.007
R1.5 × 3.0	3500	100	35	0.014	2900	45	25	0.008	4900	160	45	0.016	14300	280	135	0.010
R2.0 × 4.0	2600	100	35	0.019	2100	45	25	0.011	3600	200	45	0.028	10900	280	135	0.013
R2.5 × 5.0	2100	105	35	0.025	1700	45	25	0.013	2900	230	45	0.040	8800	330	140	0.019
R3.0 × 6.0	1700	100	30	0.029	1430	45	25	0.016	2400	250	45	0.052	7260	330	135	0.023
R4.0 × 8.0	1270	95	30	0.037	1100	45	30	0.020	1800	320	45	0.089	5500	380	140	0.035
R5.0 × 10.0	1000	95	30	0.048	870	45	25	0.026	1430	320	45	0.112	4300	380	135	0.044
R6.0 × 12.0	870	85	35	0.049	730	45	30	0.031	1200	320	45	0.133	3600	440	135	0.061
R7.0 × 14.0	750	85	35	0.057	620	45	25	0.036	1000	325	45	0.163	3000	440	130	0.073
R8.0 × 16.0	650	85	35	0.065	540	45	25	0.042	920	325	45	0.177	2700	380	135	0.070
R9.0 × 18.0	580	85	35	0.073	480	45	25	0.047	810	325	45	0.201	2400	380	135	0.079
R10.0 × 20.0	500	85	30	0.085	430	45	25	0.052	730	290	45	0.199	2100	380	130	0.090



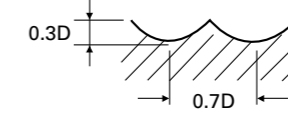
* The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min. , FEED= mm / min.
Vc= m / min. , fz= mm / t

2 FLUTE, BALL NOSE, TiAlN-COATED



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS								CAST IRON				ALUMINUM ALLOYS			
HARDNESS	~HRC30				HRC30 ~ HRC40											
STRENGTH	~1000N/mm ²				1000 ~ 1300N/mm ²											
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R1.0 × 2.0	7280	125	45	0.009	6160	65	40	0.005	10220	210	65	0.010	30100	390	190	0.006
R1.5 × 3.0	4900	140	45	0.014	4060	65	40	0.008	6860	225	65	0.016	20020	390	190	0.010
R2.0 × 4.0	3640	140	45	0.019	2940	65	35	0.011	5040	280	65	0.028	15260	390	190	0.013
R2.5 × 5.0	2940	145	45	0.025	2380	65	35	0.014	4060	320	65	0.039	12320	460	195	0.019
R3.0 × 6.0	2380	140	45	0.029	2000	65	40	0.016	3360	350	65	0.052	10165	460	190	0.023
R4.0 × 8.0	1780	135	45	0.038	1540	65	40	0.021	2520	450	65	0.089	7700	530	195	0.034
R5.0 × 10.0	1400	135	45	0.048	1220	65	40	0.027	2000	450	65	0.113	6020	530	190	0.044
R6.0 × 12.0	1220	120	45	0.049	1020	65	40	0.032	1680	450	65	0.134	5040	615	190	0.061
R7.0 × 14.0	1050	120	45	0.057	870	65	40	0.037	1400	455	60	0.163	4200	615	185	0.073
R8.0 × 16.0	910	120	45	0.066	755	65	40	0.043	1290	455	65	0.176	3780	530	190	0.070
R9.0 × 18.0	810	120	45	0.074	670	65	40	0.049	1135	455	65	0.200	3360	530	190	0.079
R10.0 × 20.0	700	120	45	0.086	600	65	40	0.054	1020	405	65	0.199	2940	530	185	0.090



* The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min. , FEED= mm / min.
Vc= m / min. , fz= mm / t

STANDARD SOLID CARBIDE MILLING CUTTERS

STANDARD SOLID CARBIDE MILLING CUTTERS

TABLE OF CUTTING CONDITION (MICRO GRAIN CARBIDE)



STANDARD SOLID CARBIDE MILLING CUTTERS

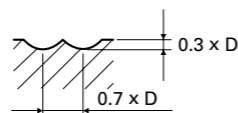
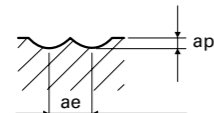
3 FLUTE, BALL NOSE

306303, 307303, 308303, 518303, 519303, 520303



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS								CAST IRON				ALUMINUM ALLOYS			
HARDNESS	~HRc30				HRc30 ~ HRc40											
STRENGTH	~1000N/mm ²				1000 ~ 1300N/mm ²											
DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
R0.5 x 1.0	20320	730	64	0.012	15430	460	48	0.010	15920	380	50	0.008	47280	710	149	0.005
R0.75 x 1.5	13550	490	64	0.012	10280	310	48	0.010	10620	250	50	0.008	31520	470	149	0.005
R1.0 x 2.0	10230	390	64	0.013	7690	230	48	0.010	8080	190	51	0.008	23690	350	149	0.005
R1.25 x 2.5	8130	290	64	0.012	6170	185	48	0.010	6370	150	50	0.008	18910	280	149	0.005
R1.5 x 3.0	8850	500	83	0.019	6580	340	62	0.017	5420	195	51	0.012	15770	350	149	0.007
R1.75 x 3.5	7560	405	83	0.018	5670	290	62	0.017	4550	160	50	0.012	13510	280	149	0.007
R2.0 x 4.0	6880	545	86	0.026	5500	390	69	0.024	3960	250	50	0.021	11850	350	149	0.010
R2.25 x 4.5	6090	475	86	0.026	4900	350	69	0.024	3540	210	50	0.020	10510	310	149	0.010
R2.5 x 5.0	6000	600	94	0.033	4770	430	75	0.030	3190	290	50	0.030	9310	410	146	0.015
R3.0 x 6.0	5580	770	105	0.046	4540	630	86	0.046	2620	310	49	0.039	7920	410	149	0.017
R3.5 x 7.0	4760	640	105	0.045	3880	535	85	0.046	2270	265	50	0.039	6790	355	149	0.017
R4.0 x 8.0	4690	960	118	0.068	3770	680	95	0.060	1920	390	48	0.068	6080	470	153	0.026
R4.5 x 9.0	4160	850	118	0.068	3350	600	95	0.060	1770	360	50	0.068	5250	410	148	0.026
R5.0 x 10.0	4190	1125	132	0.089	3350	770	105	0.077	1580	390	50	0.082	4730	470	149	0.033
R5.5 x 11.0	3830	1020	132	0.089	3050	695	105	0.076	1450	355	50	0.082	4300	425	149	0.033
R6.0 x 12.0	3830	1290	144	0.112	3080	820	116	0.089	1350	390	51	0.096	3960	545	149	0.046
R7.0 x 14.0	3460	1290	152	0.124	2770	820	122	0.099	1080	400	48	0.123	3310	545	146	0.055
R8.0 x 16.0	3140	1290	158	0.137	2460	800	124	0.108	1000	400	50	0.133	2960	470	149	0.053
R9.0 x 18.0	2920	1230	165	0.140	2310	770	131	0.111	850	400	48	0.157	2620	470	148	0.060
R10.0 x 20.0	2730	1230	172	0.150	2150	770	135	0.119	810	360	51	0.148	2270	470	143	0.069
R12.5 x 25.0	2180	980	171	0.150	1720	570	135	0.110	640	290	50	0.151	1810	380	142	0.070

ap : D1 ~ D6 = 0.2mm
D8 ~ D20 = 0.3mm
ae : 0.2 x D



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION (MICRO GRAIN CARBIDE)



STANDARD SOLID CARBIDE MILLING CUTTERS

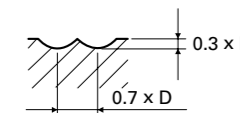
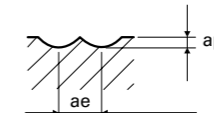
3 FLUTE, BALL NOSE, TiAIN-COATED

306323, 307323, 308323, 518323, 519323, 520323



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS								CAST IRON				ALUMINUM ALLOYS			
HARDNESS	~HRc30				HRc30 ~ HRc40											
STRENGTH	~1000N/mm ²				1000 ~ 1300N/mm ²											
DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
R0.5 x 1.0	26420	950	83	0.012	20050	600	63	0.010	20700	490	65	0.008	61470	920	193	0.005
R0.75 x 1.5	17610	630	83	0.012	13370	400	63	0.010	13800	320	65	0.008	40980	615	193	0.005
R1.0 x 2.0	13300	510	84	0.013	10000	300	63	0.010	10500	250	66	0.008	30800	450	194	0.005
R1.25 x 2.5	10570	380	83	0.012	8030	240	63	0.010	8280	195	65	0.008	24590	370	193	0.005
R1.5 x 3.0	11500	650	108	0.019	8550	440	81	0.017	7050	255	66	0.012	20500	450	193	0.007
R1.75 x 3.5	9820	530	108	0.018	7370	375	81	0.017	5910	210	65	0.012	17560	370	193	0.007
R2.0 x 4.0	8950	710	112	0.026	7150	510	90	0.024	5150	320	65	0.021	15400	450	194	0.010
R2.25 x 4.5	7920	620	112	0.026	6370	460	90	0.024	4600	275	65	0.020	13660	400	193	0.010
R2.5 x 5.0	7800	780	123	0.033	6200	560	97	0.030	4150	370	65	0.030	12100	535	190	0.015
R3.0 x 6.0	7250	995	137	0.046	5900	820	111	0.046	3400	405	64	0.040	10300	535	194	0.017
R3.5 x 7.0	6190	835	136	0.045	5050	700	111	0.046	2960	345	65	0.039	8830	460	194	0.017
R4.0 x 8.0	6100	1245	153	0.068	4900	890	123	0.061	2500	510	63	0.068	7900	615	199	0.026
R4.5 x 9.0	5410	1100	153	0.068	4350	780	123	0.060	2300	470	65	0.068	6830	530	193	0.026
R5.0 x 10.0	5450	1460	171	0.089	4350	995	137	0.076	2050	510	64	0.083	6150	615	193	0.033
R5.5 x 11.0	4990	1330	172	0.089	3970	900	137	0.076	1880	460	65	0.082	5590	550	193	0.033
R6.0 x 12.0	4990	1670	188	0.112	4000	1070	151	0.089	1750	510	66	0.097	5150	710	194	0.046
R7.0 x 14.0	4500	1670	198	0.124	3600	1070	158	0.099	1400	525	62	0.125	4300	710	189	0.055
R8.0 x 16.0	4090	1670	206	0.136	3200	1035	161	0.108	1300	525	65	0.135	3850	615	194	0.053
R9.0 x 18.0	3800	1600	215	0.140	3000	995	170	0.111	1100	525	62	0.159	3400	615	192	0.060
R10.0 x 20.0	3550	1600	223	0.150	2800	995	176	0.118	1050	470	66	0.149	2950	615	185	0.069
R12.5 x 25.0	2840	1280	223	0.150	2240	740	176	0.110	830	370	65	0.149	2360	490	185	0.069

ap : D1 ~ D6 = 0.2mm
D8 ~ D20 = 0.3mm
ae : 0.2 x D



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION (MICRO GRAIN CARBIDE)



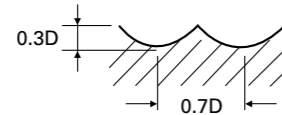
4 FLUTE, BALL NOSE

317303, 316303, 315303, 516303, 515303, 517303



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS							
	~HRc30				HRc30 ~ HRc40			
STRENGTH	~1000N/mm ²				1000 ~ 1300N/mm ²			
DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
R1.0 x 2.0	5200	140	35	0.007	4400	70	30	0.004
R1.5 x 3.0	3500	150	35	0.011	2900	70	25	0.006
R2.0 x 4.0	2600	150	35	0.014	2100	70	25	0.008
R2.5 x 5.0	2100	160	35	0.019	1700	70	25	0.010
R3.0 x 6.0	1700	150	30	0.022	1430	70	25	0.012
R4.0 x 8.0	1270	140	30	0.028	1100	70	30	0.016
R5.0 x 10.0	1000	140	30	0.035	870	70	25	0.020
R6.0 x 12.0	870	130	35	0.037	730	70	30	0.024
R7.0 x 14.0	750	130	35	0.043	620	70	25	0.028
R8.0 x 16.0	650	130	35	0.050	540	70	25	0.032
R9.0 x 18.0	580	130	35	0.056	480	70	25	0.036
R10.0 x 20.0	500	130	30	0.065	430	70	25	0.041

MATERIAL	CAST IRON				ALUMINUM ALLOYS			
	HARDNESS				HARDNESS			
STRENGTH				STRENGTH				
DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
R1.0 x 2.0	7300	230	45	0.008	21500	420	135	0.005
R1.5 x 3.0	4900	240	45	0.012	14300	420	135	0.007
R2.0 x 4.0	3600	300	45	0.021	10900	420	135	0.010
R2.5 x 5.0	2900	350	45	0.030	8800	500	140	0.014
R3.0 x 6.0	2400	380	45	0.040	7260	500	135	0.017
R4.0 x 8.0	1800	480	45	0.067	5500	570	140	0.026
R5.0 x 10.0	1430	480	45	0.084	4300	570	135	0.033
R6.0 x 12.0	1200	480	45	0.100	3600	660	135	0.046
R7.0 x 14.0	1000	490	45	0.123	3000	660	130	0.055
R8.0 x 16.0	920	490	45	0.133	2700	570	135	0.053
R9.0 x 18.0	810	490	45	0.151	2400	570	135	0.059
R10.0 x 20.0	730	440	45	0.151	2100	570	130	0.068



※ The FEED, in long & extra long types, should be reduced by around 50%

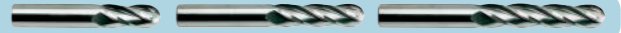
RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION (MICRO GRAIN CARBIDE)



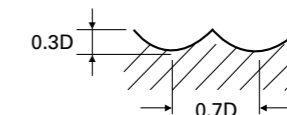
4 FLUTE, BALL NOSE, TiAIN-COATED

317323, 316323, 315323, 516323, 515323, 517323



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS							
	~HRc30				HRc30 ~ HRc40			
STRENGTH	~1000N/mm ²				1000 ~ 1300N/mm ²			
DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
R1.0 x 2.0	7280	195	45	0.007	6160	100	40	0.004
R1.5 x 3.0	4900	210	45	0.011	4060	100	40	0.006
R2.0 x 4.0	3640	210	45	0.014	2940	100	35	0.009
R2.5 x 5.0	2940	225	45	0.019	2380	100	35	0.011
R3.0 x 6.0	2380	210	45	0.022	2000	100	40	0.013
R4.0 x 8.0	1780	195	45	0.027	1540	100	40	0.016
R5.0 x 10.0	1400	195	45	0.035	1220	100	40	0.020
R6.0 x 12.0	1220	180	45	0.037	1020	100	40	0.025
R7.0 x 14.0	1050	180	45	0.043	870	100	40	0.029
R8.0 x 16.0	910	180	45	0.049	755	100	40	0.033
R9.0 x 18.0	810	180	45	0.056	670	100	40	0.037
R10.0 x 20.0	700	180	45	0.064	600	100	40	0.042

MATERIAL	CAST IRON				ALUMINUM ALLOYS			
	HARDNESS				HARDNESS			
STRENGTH				STRENGTH				
DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
R1.0 x 2.0	10220	320	65	0.008	30100	590	190	0.005
R1.5 x 3.0	6860	335	65	0.012	20020	590	190	0.007
R2.0 x 4.0	5040	420	65	0.021	15260	590	190	0.010
R2.5 x 5.0	4060	490	65	0.030	12320	700	195	0.014
R3.0 x 6.0	3360	530	65	0.039	10165	700	190	0.017
R4.0 x 8.0	2520	670	65	0.066	7700	800	195	0.026
R5.0 x 10.0	2000	670	65	0.084	6020	800	190	0.033
R6.0 x 12.0	1680	670	65	0.100	5040	925	190	0.046
R7.0 x 14.0	1400	685	60	0.122	4200	925	185	0.055
R8.0 x 16.0	1290	685	65	0.133	3780	800	190	0.053
R9.0 x 18.0	1135	685	65	0.151	3360	800	190	0.060
R10.0 x 20.0	1020	615	65	0.151	2940	800	185	0.068



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

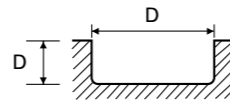
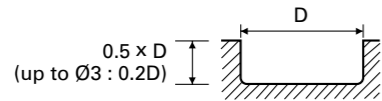
TABLE OF CUTTING CONDITION (MICRO GRAIN CARBIDE)



2 FLUTE, CORNER RADIUS FINISH SLOTTING

120323, 121323 

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS TOOL STEELS				ALLOY STEELS, HEAT RESISTANT STEELS				STAINLESS STEELS				CAST IRON				ALUMINUM ALLOYS				COPPER. BRASS NON-FERROUS METALS							
HARDNESS	~ HRc30				HRc30~HRc45																							
STRENGTH	~1000N/mm ²				1000~1500N/mm ²																							
DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
2.0	7850	160	50	0.010	5150	100	30	0.010	4300	80	25	0.009	9350	220	60	0.012	22000	460	140	0.010	16500	340	105	0.010				
3.0	6100	180	55	0.015	3800	120	35	0.016	3150	100	30	0.016	6050	220	55	0.018	15400	460	145	0.015	11000	340	105	0.015				
4.0	5150	255	65	0.025	3150	155	40	0.025	2650	130	35	0.025	4600	220	60	0.024	11000	460	140	0.021	8800	340	110	0.019				
5.0	4300	270	70	0.031	2550	160	40	0.031	2150	135	35	0.031	3650	220	55	0.030	9150	460	145	0.025	6800	340	105	0.025				
6.0	3800	300	70	0.039	2300	190	45	0.041	1950	155	35	0.040	2950	255	55	0.043	7600	485	145	0.032	5700	375	105	0.033				
8.0	2850	325	70	0.057	1700	170	45	0.050	1450	155	35	0.053	2200	275	55	0.063	5700	485	145	0.043	4400	375	110	0.043				
10.0	2200	280	70	0.064	1350	135	40	0.050	1150	135	35	0.059	1850	285	60	0.077	4600	485	145	0.053	3400	375	105	0.055				
12.0	1850	240	70	0.065	1150	110	45	0.048	950	110	35	0.058	1450	295	55	0.102	3750	485	140	0.065	2850	375	105	0.066				



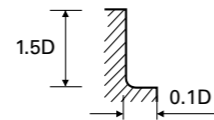
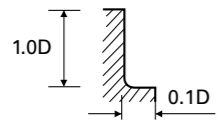
※ The FEED, in long & extra long types, should be reduced by around 50%

RPM = REVOLUTION PER MIN.
FEED = mm/min.

4 FLUTE, CORNER RADIUS FINISH SLOTTING

140323, 142323 

MATERIAL	NON-ALLOYED STEELS ALLOY STEELS TOOL STEELS				ALLOY STEELS, HEAT RESISTANT STEELS				STAINLESS STEELS				CAST IRON				ALUMINUM ALLOYS				COPPER. BRASS NON-FERROUS METALS							
HARDNESS	~ HRc30				HRc30~HRc45																							
STRENGTH	~1000N/mm ²				1000~1500N/mm ²																							
DIAMETER	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
1.0	17600	150	55	0.002	10250	85	30	0.002	8650	75	25	0.002	18700	620	60	0.008	44000	1050	140	0.006	24700	605	80	0.006				
1.5	11800	215	55	0.005	7050	115	35	0.004	7050	120	35	0.004	12100	620	55	0.013	27500	1160	130	0.011	20300	910	95	0.011				
2.0	9850	240	60	0.006	6450	145	40	0.006	5350	120	35	0.006	9350	640	60	0.017	22000	1320	140	0.015	16500	1035	105	0.016				
3.0	7600	270	70	0.009	4750	170	45	0.009	3950	145	35	0.009	6050	640	55	0.026	15400	1320	145	0.021	11000	1035	105	0.024				
4.0	6450	485	80	0.019	3950	300	50	0.019	3300	240	40	0.018	4600	640	60	0.035	11000	1320	140	0.030	8800	1035	110	0.029				
5.0	5350	510	85	0.024	3200	305	50	0.024	2700	255	40	0.024	3650	640	55	0.044	9150	1320	145	0.036	6800	1035	105	0.038				
6.0	4750	560	90	0.029	2850	350	55	0.031	2400	280	45	0.029	2950	770	55	0.065	7600	1430	145	0.047	5700	1100	105	0.048				
8.0	3550	605	90	0.043	2150	325	55	0.038	1800	300	45	0.042	2200	815	55	0.093	5700	1430	145	0.063	4400	1100	110	0.063				
10.0	2750	520	85	0.047	1700	255	55	0.038	1450	255	45	0.044	1850	860	60	0.116	4600	1430	145	0.078	3400	1100	105	0.081				
12.0	2350	440	90	0.047	1450	215	55	0.037	1150	205	45	0.045	1450	900	55	0.155	3750	1430	140	0.095	2850	1100	105	0.096				



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM = REVOLUTION PER MIN.
FEED = mm/min.

TABLE OF CUTTING CONDITION (MICRO GRAIN CARBIDE)



2 FLUTE - CHAMFERING

197303 

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS						STAINLESS STEELS TITANIUM ALLOYS		ALUMINUM ALLOYS	
HARDNESS	~ HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40					
STRENGTH	500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²					
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3.0	4400	220	3500	160	3000	140	2400	100	11000	550
4.0	3600	220	3000	160	2500	140	2000	100	9000	580
5.0	2860	230	2400	170	2000	140	1760	105	6900	620
6.0	2300	240	2000	170	1600	140	1400	105	5600	640
8.0	1760	250	1540	180	1200	145	1000	110	4400	660
10.0	1500	250	1300	190	1100	145	870	110	4000	680
12.0	1300	260	1100	200	900	150	730	115	3500	700
10.0	1000	250	950	200	700	160	550	120	2750	740
20.0	950	260	750	210	600	160	530	130	2200	770



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM = REVOLUTION PER MIN.
FEED = mm/min.

2 FLUTE TiAlN-COATED - CHAMFERING

197303 

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS						STAINLESS STEELS TITANIUM ALLOYS		ALUMINUM ALLOYS	
HARDNESS	~ HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40					
STRENGTH	500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²					
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3.0	6160	310	4900	225	4200	195	3360	140	15400	770
4.0	5040	310	4200	225	3500	195	2800	140	12600	810
5.0	4005	320	3360	240	2800	195	2465	145	9660	870
6.0	3220	335	2800	240	2240	195	1960	145	7840	895
8.0	2465	350	2155	250	1680	2030	1400	155	6160	925
10.0	2100	350	1820	265	1540	2030	1220	155	5600	950
12.0	1820	365	1540	280	1260	210	1020	160	4900	980
16.0	1400	350	1330	280	980	225	770	170	3850	1035
20.0	1330	365	1050	295	840	225	740	180	3080	1080



※ The FEED, in long & extra long types, should be reduced by around 50%

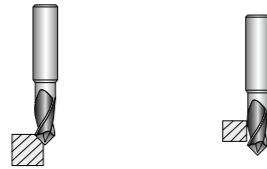
RPM = REVOLUTION PER MIN.
FEED = mm/min.

TABLE OF CUTTING CONDITION (MICRO GRAIN CARBIDE)

2 FLUTE - CHAMFERING & SIDE CUTTING

197303 

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS						STAINLESS STEELS TITANIUM ALLOYS		ALUMINUM ALLOYS	
	~ HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40					
STRENGTH	500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²					
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3.0	5900	95	3900	65	3300	50	2400	40	14000	230
4.0	4800	95	3200	65	2800	50	2000	40	12000	240
5.0	3800	100	2500	65	2200	55	1760	45	9500	250
6.0	3000	110	2000	70	1800	60	1400	50	7700	300
8.0	2300	115	1540	75	1300	65	1100	55	5800	350
10.0	2000	120	1300	80	1200	65	1000	55	5100	380
12.0	1760	130	1100	90	1000	70	840	60	4400	400
16.0	1300	140	900	90	770	70	660	60	3300	330
20.0	1100	140	700	90	600	70	440	60	2640	340



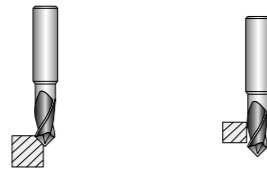
※ The FEED, in long & extra long types, should be reduced by around 50%

RPM = REVOLUTION PER MIN.
FEED = mm/min.

2 FLUTE TiAlN-COATED - CHAMFERING & SIDE CUTTING

197303 

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS						STAINLESS STEELS TITANIUM ALLOYS		ALUMINUM ALLOYS	
	~ HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40					
STRENGTH	500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²					
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3.0	8260	135	5460	90	4620	70	3360	55	19600	320
4.0	6720	135	4480	90	3920	70	2800	55	16800	335
5.0	5320	140	3500	90	3080	75	2465	65	13300	350
6.0	4200	155	2800	100	2520	85	1960	70	10780	420
8.0	3220	160	2155	105	1820	90	1540	75	8120	490
10.0	2800	170	1820	110	1680	90	1400	75	7140	530
12.0	2465	180	1540	125	1400	100	1175	85	6160	560
16.0	1820	195	1260	125	1080	100	925	85	4620	460
20.0	1540	195	980	125	840	100	615	85	3695	475



※ The FEED, in long & extra long types, should be reduced by around 50%

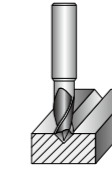
RPM = REVOLUTION PER MIN.
FEED = mm/min.

TABLE OF CUTTING CONDITION (MICRO GRAIN CARBIDE)

2 FLUTE - V-GROOVING

197303 

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS						STAINLESS STEELS TITANIUM ALLOYS		ALUMINUM ALLOYS	
	~ HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40					
STRENGTH	500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²					
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3.0	5900	60	4000	30	3300	25	2400	20	14000	220
4.0	4800	60	3300	30	2800	25	2000	20	11800	230
5.0	3800	60	2500	30	2200	25	1760	20	9500	240
6.0	3000	60	2000	30	1800	30	1400	20	7700	250
8.0	2300	65	1540	35	1300	35	1100	20	5800	260
10.0	2000	65	1300	35	1200	35	1000	20	5000	260
12.0	1760	65	1000	40	1000	35	840	20	4400	260
16.0	1400	65	900	40	770	35	660	25	3300	270
20.0	1100	65	700	40	600	35	440	25	2600	270



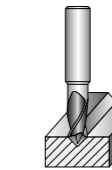
※ The FEED, in long & extra long types, should be reduced by around 50%

RPM = REVOLUTION PER MIN.
FEED = mm/min.

2 FLUTE TiAlN-COATED - V-GROOVING

197303 

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS						STAINLESS STEELS TITANIUM ALLOYS		ALUMINUM ALLOYS	
	~ HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40					
STRENGTH	500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²					
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3.0	8260	85	5600	40	4620	35	3360	30	19600	310
4.0	6720	85	4620	40	3920	35	2800	30	16520	320
5.0	5320	85	3500	40	3080	35	2465	30	13300	335
6.0	4200	85	2800	40	2520	40	1960	30	10780	350
8.0	3220	90	2155	50	1820	50	1540	30	8120	365
10.0	2800	90	1820	50	1680	50	1400	30	7000	365
12.0	2465	90	1400	55	1400	50	1175	30	6160	365
16.0	1960	90	1260	55	1080	50	925	35	4620	380
20.0	1540	90	980	55	840	50	615	35	3640	380



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM = REVOLUTION PER MIN.
FEED = mm/min.

SABRE ROUGHING CUTTERS





(New material & coating high speed & feed roughing)

Europa Tool 11th Edition

SABRE ROUGHING END MILLS



www.europatool.co.uk

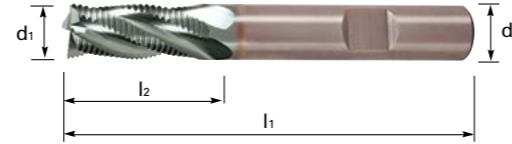
PRODUCTS	SERIES	DESCRIPTION	PAGE
	190140	MULTI FLUTE, SHORT LENGTH FINE PITCH ROUGHING END MILL	236
	191140	MULTI FLUTE, LONG LENGTH FINE PITCH ROUGHING END MILL	237
	121240	MULTI FLUTE, 45 DEG FINE PITCH ROUGHING END MILL	238
 NEW	192140	MULTI FLUTE COARSE PITCH ROUGHER WITH NECK	239
CUTTING DATA			240 ~ 241

MULTI FLUTE, SHORT, FINE PITCH ROUGHING END MILL



Series No. 190140

▶ cutting conditions : p.240



SUITABLE FOR HIGH-FEED ROUGHING MILLING.
DESIGNED TO MACHINE CARBON STEELS, ALLOYED STEELS, STAINLESS STEELS.
PROVIDING EXCELLENT FINISHED SURFACES IN MANY CASES.
EUROPA'S NEW DEVELOPED SABRE ROUGHER COATING SUITABLE FOR HIGH SPEED CUTTING.
UP TO Ø20 : CENTER CUT, OVER Ø20 : NON CENTER CUT

EUROPA CODE	d1(js12)	d2(h6)	l2	l1	No.of flutes
1901400600	6	6	13	57	3
1901400700	7	10	16	66	3
1901400800	8	10	19	69	3
1901400900	9	10	19	69	3
1901401000	10	10	22	72	4
1901401200	12	12	26	83	4
1901401400	14	12	26	83	4
1901401600	16	16	32	92	4
1901401800	18	16	32	92	4
1901402000	20	20	38	104	4
1901402200	22	20	38	104	5
1901402500	25	25	45	121	5

UP TO & INCL. 20MM-CENTRE CUTTING, OVER 20MM NON CENTRE CUTTING

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

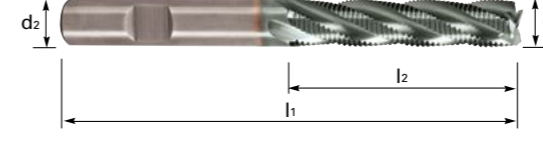
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

MULTI FLUTE, LONG, FINE PITCH ROUGHING END MILL



Series No. 191140

▶ cutting conditions : p.240



SUITABLE FOR HIGH-FEED ROUGHING MILLING.
DESIGNED TO MACHINE CARBON STEELS, ALLOYED STEELS, STAINLESS STEELS.
PROVIDING EXCELLENT FINISHED SURFACES IN MANY CASES.
EUROPA'S NEW DEVELOPED SABRE ROUGHER COATING SUITABLE FOR HIGH SPEED CUTTING.
UP TO Ø20 : CENTER CUT, OVER Ø20 : NON CENTER CUT

EUROPA CODE	d1(js12)	d2(h6)	l2	l1	No.of flutes
1911400600	6	6	24	68	3
1911400700	7	10	30	80	3
1911400800	8	10	38	88	3
1911400900	9	10	38	88	3
1911401000	10	10	45	95	4
1911401200	12	12	53	110	4
1911401400	14	12	53	110	4
1911401600	16	16	63	123	4
1911401800	18	16	63	123	4
1911402000	20	20	75	141	4
1911402200	22	20	75	141	5
1911402500	25	25	90	168	5

UP TO & INCL. 20MM-CENTRE CUTTING, OVER 20MM NON CENTRE CUTTING

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

MULTI FLUTE, 45 DEG FINE PITCH ROUGHING END MILL



Series No. 121240



► cutting conditions : p.240

HIGH CHIP REMOVAL AND MINIMIZING BREAKAGES OF CUTTING EDGES.
DESIGNED TO MACHINE CARBON STEELS, ALLOYED STEELS, STAINLESS STEELS
EUROPA'S NEW DEVELOPED SABRE ROUGHING COATING SUITABLE FOR HIGH SPEED CUTTING

EUROPA CODE	MILL DIAMETER js12	SHANK DIAMETER h6	NECK DIAMETER	LENGTH OF CUT	LENGTH BELOW SHANK	OVERALL LENGTH	No. of flutes
121240600	6	6	—	13	—	57	4
121240800	8	10	—	19	—	69	4
1212401000	10	10	9.5	22	31	72	4
1212401200	12	12	11.5	26	37	83	4
1212401600	16	16	15	32	44	92	5
1212402000	20	20	19	38	54	104	6
1212402500	25	25	24	45	63	121	6

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in μm / Tolerance range in μm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

MULTI FLUTE COARSE PITCH ROUGHER WITH NECK



Series No. 192140



► cutting conditions : p.241

HIGH CHIP REMOVAL AND MINIMIZING BREAKAGES OF CUTTING EDGES.
DESIGNED TO MACHINE CARBON STEELS, ALLOYED STEELS, STAINLESS STEELS
EUROPA'S NEW DEVELOPED SABRE ROUGHING COATING SUITABLE FOR HIGH SPEED CUTTING

EUROPA CODE	Mill Diameter D ₁ (js12)	Shank Diameter D ₂ (h6)	Length Of Cut L ₁	Length Below Shank L ₃	Overall Length L ₂	Neck Diameter	No. of flutes
1921401000	10.0	10	22	69	110	8.5	4
1921401200	12.0	12	26	78	125	10.5	4
1921401600	16.0	16	32	87	138	14	4
1921402000	20.0	20	38	108	160	18	4
1921402500	25.0	25	45	155	216	23	5

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in μm / Tolerance range in μm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

SABRE ROUGHING cutting condition

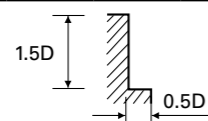


MULTI FLUTE, ROUGHING, SIDE CUTTING

190140, 191140, 121240

MATERIAL	STRUCTURAL STEELS CARBON STEELS				STRUCTURAL STEELS CARBON STEELS CAST IRONS				CARBON STEELS ALLOY STEELS TOOL STEELS			
HARDNESS					~ HRc20				HRc20 ~ HRc30			
STRENGTH	~ 500N/mm ²				500 ~ 800N/mm ²				800 ~ 1000N/mm ²			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	2800	230	55	0.021	2200	180	40	0.020	1600	115	30	0.018
8.0	2400	290	60	0.030	1900	230	50	0.030	1400	160	35	0.029
10.0	1900	415	60	0.055	1500	315	45	0.053	1050	195	35	0.046
12.0	1600	415	60	0.065	1200	330	45	0.069	900	230	35	0.064
14.0	1400	415	60	0.059	1050	330	45	0.063	760	230	35	0.061
16.0	1200	415	60	0.069	950	330	50	0.069	660	230	35	0.070
18.0	1050	415	60	0.066	890	330	50	0.062	610	230	35	0.063
20.0	960	425	60	0.074	760	330	50	0.072	530	230	35	0.072
22.0	890	425	60	0.080	650	330	45	0.085	470	230	30	0.082
25.0	790	415	60	0.088	600	315	45	0.088	420	220	35	0.087

MATERIAL	PREHARDENED STEELS ALLOY STEELS TOOL STEELS				STAINLESS STEELS			
HARDNESS	HRc30 ~ HRc40							
STRENGTH	1000 ~ 1300N/mm ²							
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	1300	105	25	0.020	1450	110	25	0.019
8.0	1050	125	25	0.030	1200	140	30	0.029
10.0	890	160	30	0.045	950	170	30	0.045
12.0	740	180	30	0.061	800	205	30	0.064
14.0	630	180	30	0.057	690	205	30	0.059
16.0	550	180	30	0.065	600	205	30	0.068
18.0	490	180	30	0.061	550	205	30	0.062
20.0	440	180	30	0.068	480	205	30	0.071
22.0	400	180	30	0.075	430	205	30	0.079
25.0	360	180	30	0.083	390	200	30	0.085



※ The FEED, in long & long reach types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

SABRE ROUGHING cutting condition

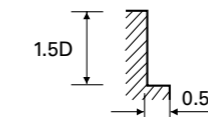


MULTI FLUTE, ROUGHING WITH NECK, SIDE CUTTING

192140

MATERIAL	STRUCTURAL STEELS CARBON STEELS				STRUCTURAL STEELS CARBON STEELS CAST IRONS				CARBON STEELS ALLOY STEELS TOOL STEELS			
HARDNESS					~ HRc20				HRc20 ~ HRc30			
STRENGTH	~ 500N/mm ²				500 ~ 800N/mm ²				800 ~ 1000N/mm ²			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
10.0	1900	355	60	0.047	1500	270	47	0.045	1050	165	33	0.039
12.0	1600	355	60	0.055	1200	280	47	0.058	900	195	33	0.054
16.0	1200	355	60	0.074	950	280	47	0.074	660	195	33	0.074
20.0	960	360	60	0.094	760	280	47	0.092	530	195	33	0.092
25.0	790	355	60	0.090	600	270	47	0.090	420	185	33	0.088

MATERIAL	PREHARDENED STEELS ALLOY STEELS TOOL STEELS				STAINLESS STEELS			
HARDNESS	HRc30 ~ HRc40							
STRENGTH	1000 ~ 1300N/mm ²							
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
10.0	890	135	28	0.038	950	145	30	0.038
12.0	740	155	28	0.052	800	175	30	0.055
16.0	550	155	28	0.070	600	175	30	0.073
20.0	440	155	28	0.088	480	175	30	0.091
25.0	360	155	28	0.086	390	170	30	0.087



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

COBALT MILLING CUTTERS (FLATTED SHANK) CONTENTS

(Standard cobalt milling cutter range)

Europa Tool 11th Edition

COBALT MILLING CUTTERS (FLATTED SHANK) END MILLS















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PRODUCTS	SERIES	DESCRIPTION	PAGE
<i>Cobalt Flatted Shank (Metric)</i>			
2 FLUTE DIN STANDARD (METRIC)			
	100102	SHORT LENGTH DIN327 FLATTED SHANK	246
	101102	LONG LENGTH DIN844 FLATTED SHANK	248
	102102	EXTRA LONG DIN844 FLATTED SHANK	249
3 FLUTE DIN STANDARD (METRIC)			
	103102	STUB LENGTH DIN327 FLATTED SHANK	250
	104102	SHORT LENGTH DIN844 FLATTED SHANK	251
	105102	LONG LENGTH DIN844 FLATTED SHANK	252
MULTI FLUTE DIN STANDARD (METRIC)			
	107102	SHORT LENGTH DIN844 FLATTED SHANK	253
	108102	LONG LENGTH DIN844 FLATTED SHANK	254
2 FLUTE BALL NOSED DIN STANDARD (METRIC)			
	112102	SHORT LENGTH DIN327 FLATTED SHANK	255
	114102	EXTRA LONG DIN844 FLATTED SHANK	256
MULTI FLUTE BALL NOSED DIN STANDARD (METRIC)			
	115102	SHORT LENGTH DIN1889 FLATTED SHANK	257
	116102	LONG LENGTH DIN1889 FLATTED SHANK	258
MULTI FLUTE HIGH HELIX DIN STANDARD (METRIC)			
	132102	SHORT LENGTH DIN844 FLATTED SHANK	259








COBALT MILLING CUTTERS (FLATTED SHANK) CONTENTS

(Standard cobalt milling cutter range)

PRODUCTS	SERIES	DESCRIPTION	PAGE
3 FLUTE THROW AWAY DIN STANDARD (METRIC)			
	128102	SHORT LENGTH DIN THROW AWAY	260
	129102	LONG LENGTH DIN THROW AWAY	261
1 FLUTE FOR ALUMINIUM DIN STANDARD (METRIC)			
	135316	SHORT LENGTH SINGLE FLUTE ROUTER	262
	136316	LONG LENGTH SINGLE FLUTE ROUTER	263
2 FLUTE FOR ALUMINIUM DIN STANDARD (METRIC)			
	131102	SHORT LENGTH DIN44 FLATTED SHANK	264
MULTI FLUTE COARSE PITCH ROUGHING DIN STANDARD(METRIC)			
	118102	SHORT LENGTH DIN844 FLATTED SHANK	265
	119102	LONG LENGTH DIN844 FLATTED SHANK	266
3 FLUTE COARSE PITCH ROUGHING DIN STANDARD (METRIC)			
	133102	SHORT LENGTH DIN844 FLATTED SHANK	267
	134102	LONG LENGTH DIN844 FLATTED SHANK	268
3 FLUTE COARSE PITCH ROUGHING FOR ALUMINIUM DIN STANDARD (METRIC)			
	124102	SHORT LENGTH DIN844 FLATTED SHANK	269
	125102	LONG LENGTH DIN844 FLATTED SHANK	270
MULTI FLUTE BALL NOSED COARSE PITCH ROUGHING DIN STANDARD (METRIC)			
	127102	SHORT LENGTH DIN844 FLATTED SHANK	271

COBALT MILLING CUTTERS (FLATTED SHANK) CONTENTS

(Standard cobalt milling cutter range)

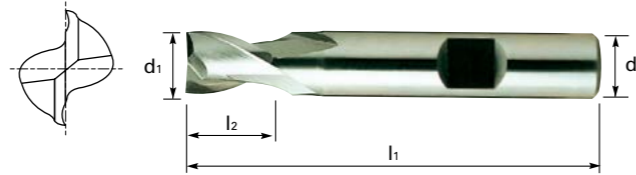
PRODUCTS	SERIES	DESCRIPTION	PAGE
MULTI FLUTE FINE PITCH ROUGHING DIN STANDARD (METRIC)			
	121102	SHORT LENGTH DIN844 FLATTED SHANK	272
	122102	LONG LENGTH DIN844 FLATTED SHANK	273
	121113	SHORT LENGTH DIN844 FLATTED SHANK PM	274
MULTI FLUTE COARSE PITCH ROUGHING & FINISHING DIN STANDARD (METRIC)			
	126102	SHORT LENGTH DIN844 FLATTED SHANK	275
	137102	LONG LENGTH DIN844 FLATTED SHANK	276
3 FLUTE COARSE PITCH ROUGHING & FINISHING DIN STANDARD (METRIC)			
	138102	SHORT LENGTH DIN844 FLATTED SHANK	277
	139102	LONG LENGTH DIN844 FLATTED SHANK	278
CUTTING DATA			279 ~ 299

2 FLUTE, SHORT LENGTH



Series No. 100102

▶ cutting conditions : p.286



TWO FLUTE END MILLS

Short Length, 2 Flute, Centre Cutting, with Flatted Shank

Mill Dia. e8(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co8	TiAlN HSS Co8
1.0	6.0	2.5	47.0	1001020100	1001210100
1.5		3.0		1001020150	1001210150
2.0		4.0		1001020200	1001210200
2.5		5.0	49.0	1001020250	1001210250
2.8		5.0		1001020280	1001210280
3.0		5.0		1001020300	1001210300
3.5		6.0	50.0	1001020350	1001210350
3.8		7.0	51.0	1001020380	1001210380
4.0		7.0		1001020400	1001210400
4.5		7.0		1001020450	1001210450
4.8		8.0	52.0	1001020480	1001210480
5.0		8.0		1001020500	1001210500
5.5		8.0		1001020550	1001210550
5.75		8.0	1001020575	1001210575	
6.0		8.0	1001020600	1001210600	
6.5	10.0	10.0	60.0	1001020650	1001210650
6.75		10.0		1001020675	1001210675
7.0		10.0		1001020700	1001210700
7.5		10.0	61.0	1001020750	1001210750
7.75		11.0		1001020775	1001210775
8.0		11.0		1001020800	1001210800
8.5		11.0	1001020850	1001210850	
8.7		11.0	1001020870	1001210870	
9.0		11.0	1001020900	1001210900	
9.5		11.0	1001020950	1001210950	
10.0	13.0	63.0	1001021000	1001211000	
11.0	12.0	13.0	70.0	1001021100	1001211100

▶ TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

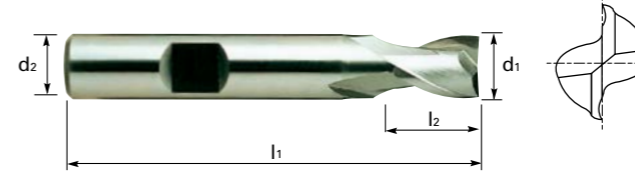
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

2 FLUTE, SHORT LENGTH



Series No. 100102

▶ cutting conditions : p.286



TWO FLUTE END MILLS

Short Length, 2 Flute, Centre Cutting, with Flatted Shank

Mill Dia. e8(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co8	TiAlN HSS Co8
8.0	8.0	11.0	55.0	1001029002	1001219002
8.0		11.0	61.0	1001029003	1001219003
12.0	12.0	16.0	73.0	1001021200	1001211200
13.0		16.0		1001021300	1001211300
14.0		16.0		1001021400	1001211400
15.0		16.0		1001021500	1001211500
15.7	16.0	19.0	79.0	1001021570	1001211570
16.0		19.0		1001021600	1001211600
17.0		19.0		1001021700	1001211700
17.7		19.0		1001021770	1001211770
18.0		19.0		1001021800	1001211800
19.0		19.0		1001021900	1001211900
20.0	20.0	22.0	88.0	1001022000	1001212000
22.0		22.0		1001022200	1001212200
24.0	25.0	26.0	102.0	1001022400	1001212400
25.0		26.0		1001022500	1001212500
26.0		26.0		1001022600	1001212600
28.0		26.0		1001022800	1001212800
30.0		26.0		1001023000	1001213000
32.0	32.0	32.0	112.0	1001023200	1001213200

▶ TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

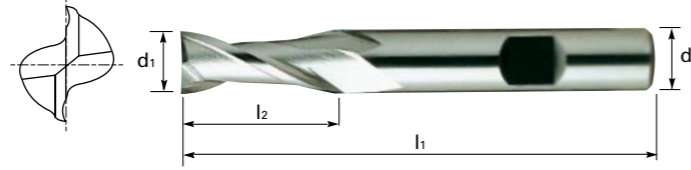
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

2 FLUTE, LONG LENGTH



Series No. 101102

▶ cutting conditions : p.286



TWO FLUTE END MILLS

Long Length, 2 Flute, Centre Cutting, with Flatted Shank

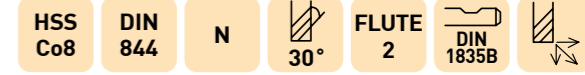
Mill Dia. e8(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co8	TiAIN HSS Co8
2.0	6.0	7.0	51.0	1011020200	1011210200
3.0		8.0	52.0	1011020300	1011210300
4.0		11.0	55.0	1011020400	1011210400
5.0		13.0	57.0	1011020500	1011210500
6.0		13.0		1011020600	1011210600
7.0	10.0	16.0	66.0	1011020700	1011210700
8.0		19.0	69.0	1011020800	1011210800
10.0		22.0	72.0	1011021000	1011211000
12.0	12.0	26.0	83.0	1011021200	1011211200
14.0		26.0		1011021400	1011211400
16.0	16.0	32.0	92.0	1011021600	1011211600
18.0		32.0		1011021800	1011211800
20.0	20.0	38.0	104.0	1011022000	1011212000
22.0		38.0		1011022200	1011212200
25.0		45.0		121.0	1011022500

▶ TiAIN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

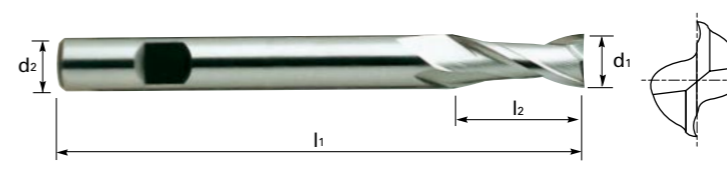
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

2 FLUTE, EXTRA LONG LENGTH



Series No. 102102

▶ cutting conditions : p.286



TWO FLUTE END MILLS

Extra Long Length, 2 Flute, Centre Cutting, with Flatted Shank

Mill Dia. e8(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co8	TiAIN HSS Co8
3.0	6.0	8.0	56.0	1021020300	1021210300
3.5		10.0	59.0	1021020350	1021210350
4.0		11.0	63.0	1021020400	1021210400
4.5		11.0		1021020450	1021210450
5.0		13.0	68.0	1021020500	1021210500
5.5	13.0	1021020550		1021210550	
6.0	13.0	1021020600		1021210600	
6.5	10.0	16.0	80.0	1021020650	1021210650
7.0		16.0		1021020700	1021210700
8.0		19.0	88.0	1021020800	1021210800
8.5		19.0		1021020850	1021210850
9.0		19.0		1021020900	1021210900
10.0	12.0	22.0	95.0	1021021000	1021211000
12.0		26.0	110.0	1021021200	1021211200
14.0		26.0		1021021400	1021211400
16.0		32.0	123.0	1021021600	1021211600
18.0		32.0		1021021800	1021211800
20.0	20.0	38.0	141.0	1021022000	1021212000
22.0		38.0		1021022200	1021212200
25.0		45.0		166.0	1021022500

▶ TiAIN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

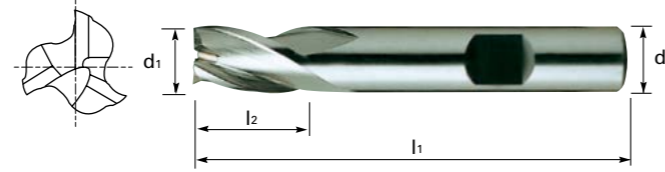
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

3 FLUTE, STUB LENGTH



Series No. 103102

▶ cutting conditions : p.288



THREE FLUTE END MILLS

Stub Length, 3 Flute, Centre Cutting, with Flatted Shank

Mill Dia. e8(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co8	TiAlN HSS Co8
2.0	6.0	4.0	48.0	1031020200	1031210200
3.0		5.0	49.0	1031020300	1031210300
4.0		7.0	51.0	1031020400	1031210400
5.0		8.0	52.0	1031020500	1031210500
6.0		8.0		1031020600	1031210600
7.0	10.0	10.0	60.0	1031020700	1031210700
8.0		11.0	61.0	1031020800	1031210800
10.0		13.0	63.0	1031021000	1031211000
12.0	12.0	16.0	73.0	1031021200	1031211200
14.0		16.0		1031021400	1031211400
16.0	16.0	19.0	79.0	1031021600	1031211600
18.0		19.0		1031021800	1031211800
20.0	20.0	22.0	88.0	1031022000	1031212000
22.0		22.0		1031022200	1031212200
25.0		26.0		102.0	1031022500

▶ TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

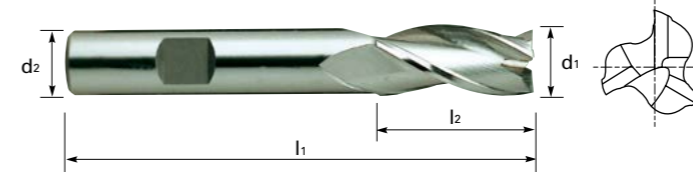
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

3 FLUTE, SHORT LENGTH



Series No. 104102

▶ cutting conditions : p.288



THREE FLUTE END MILLS

Short Length, 3 Flute, Centre Cutting, with Flatted Shank

Mill Dia. e8(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co8	TiAlN HSS Co8		
1.5	6.0	7.0	51.0	1041020150	1041210150		
2.0		7.0		1041020200	1041210200		
2.5		8.0	8.0	52.0	1041020250	1041210250	
3.0			8.0		1041020300	1041210300	
3.5		10.0	10.0	54.0	1041020350	1041210350	
4.0			11.0		55.0	1041020400	1041210400
4.5			11.0			1041020450	1041210450
5.0		12.0	13.0	57.0	1041020500	1041210500	
5.5			13.0		1041020550	1041210550	
6.0			13.0		1041020600	1041210600	
6.5	16.0		16.0		66.0	1041020650	1041210650
7.0			16.0			1041020700	1041210700
7.5	10.0	16.0	69.0	1041020750	1041210750		
8.0		19.0		1041020800	1041210800		
8.5		19.0		1041020850	1041210850		
9.0	16.0	19.0	92.0	1041020900	1041210900		
10.0		22.0		1041021000	1041211000		
12.0		26.0		83.0	1041021200	1041211200	
14.0		26.0			1041021400	1041211400	
16.0	20.0	32.0	104.0	1041021600	1041211600		
18.0		32.0		1041021800	1041211800		
20.0	25.0	38.0	121.0	1041022000	1041212000		
22.0		38.0		1041022200	1041212200		
25.0	25.0	45.0	121.0	1041022500	1041212500		
28.0		45.0		1041022800	1041212800		
30.0		45.0		1041023000	1041213000		

▶ TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

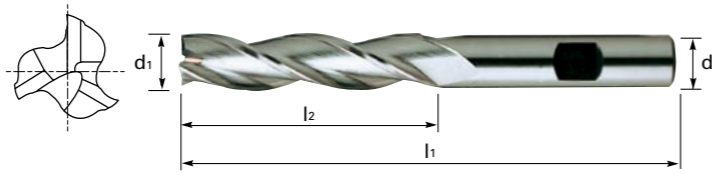
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

3 FLUTE, LONG LENGTH



Series No. 105102

▶ cutting conditions : p.288



THREE FLUTE END MILLS

Long Length, 3 Flute, Centre Cutting, with Flatted Shank

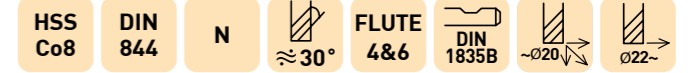
Mill Dia. e8(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co8	TiAIN HSS Co8
3.0	6.0	12.0	56.0	1051020300	1051210300
4.0		19.0	63.0	1051020400	1051210400
5.0		24.0	68.0	1051020500	1051210500
6.0		24.0		1051020600	1051210600
7.0	10.0	30.0	80.0	1051020700	1051210700
8.0		38.0	88.0	1051020800	1051210800
9.0		38.0		1051020900	1051210900
10.0		45.0	95.0	1051021000	1051211000
12.0	12.0	53.0	110.0	1051021200	1051211200
14.0		53.0		1051021400	1051211400
16.0	16.0	63.0	123.0	1051021600	1051211600
18.0		63.0		1051021800	1051211800
20.0	20.0	75.0	141.0	1051022000	1051212000
22.0		75.0		1051022200	1051212200
25.0	25.0	90.0	166.0	1051022500	1051212500

▶ TiAIN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

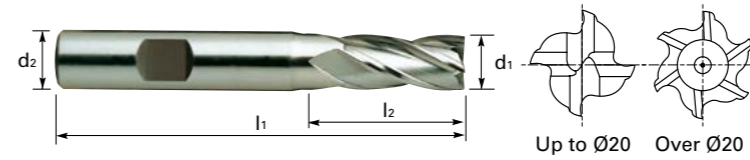
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

4&6 FLUTE, SHORT LENGTH



Series No. 107102

▶ cutting conditions : p.290



MULTI FLUTE END MILLS

Short Length, 4 & 6 Flute, with Flatted Shank

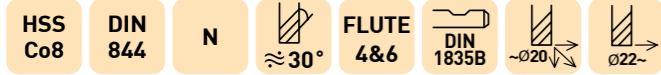
Mill Dia. d ₁	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	No. of Flute	HSS Co8	TiAIN HSS Co8	
2.0	6.0	7.0	51.0	4	1071020200	1071210200	
2.5		8.0	52.0	4	1071020250	1071210250	
3.0		8.0		4	1071020300	1071210300	
3.5		10.0	10.0	54.0	4	1071020350	1071210350
4.0		10.0	11.0	55.0	4	1071020400	1071210400
5.0			13.0	57.0	4	1071020500	1071210500
6.0	13.0		4		1071020600	1071210600	
7.0	16.0		66.0	4	1071020700	1071210700	
8.0	10.0	19.0	69.0	4	1071020800	1071210800	
9.0		19.0		4	1071020900	1071210900	
10.0		22.0	72.0	4	1071021000	1071211000	
11.0	12.0	22.0	79.0	4	1071021100	1071211100	
12.0		26.0	83.0	4	1071021200	1071211200	
13.0		26.0		4	1071021300	1071211300	
14.0		26.0	4	1071021400	1071211400		
16.0	16.0	32.0	92.0	4	1071021600	1071211600	
18.0		32.0		4	1071021800	1071211800	
20.0	20.0	38.0	104.0	4	1071022000	1071212000	
22.0		38.0		6	1071022200	1071212200	
25.0	25.0	45.0	121.0	6	1071022500	1071212500	
28.0		45.0		6	1071022800	1071212800	
30.0		45.0		6	1071023000	1071213000	
32.0	32.0	53.0	133.0	6	1071023200	1071213200	

▶ TiAIN Coating to Order

TOLERANCE

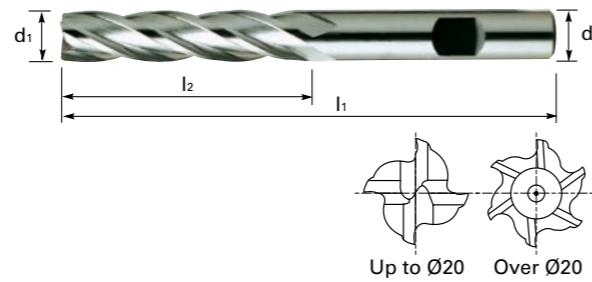
MILL DIA.	+0.040 -0
SHANK DIA.	h6

4&6 FLUTE, LONG LENGTH



Series No. 108102

▶ cutting conditions : p.290



MULTI FLUTE END MILLS

Long Length, 4 & 6 Flute, with Flatted Shank

Mill Dia. d ₁	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	No. of Flute	HSS Co8	TiAIN HSS Co8
3.0	6.0	12.0	56.0	4	1081020300	1081210300
3.5		15.0	59.0	4	1081020350	1081210350
4.0		19.0	63.0	4	1081020400	1081210400
4.5		19.0		4	1081020450	1081210450
5.0		24.0	68.0	4	1081020500	1081210500
6.0		24.0		4	1081020600	1081210600
7.0	10.0	30.0	80.0	4	1081020700	1081210700
8.0		38.0	88.0	4	1081020800	1081210800
9.0		38.0		4	1081020900	1081210900
10.0		45.0	95.0	4	1081021000	1081211000
11.0	12.0	45.0	102.0	4	1081021100	1081211100
12.0		53.0	110.0	4	1081021200	1081211200
14.0	53.0	4		1081021400	1081211400	
16.0	16.0	63.0	123.0	4	1081021600	1081211600
18.0		63.0		4	1081021800	1081211800
20.0	20.0	75.0	141.0	4	1081022000	1081212000
22.0		75.0		6	1081022200	1081212200
24.0	25.0	90.0	166.0	6	1081022400	1081212400
25.0		90.0		6	1081022500	1081212500

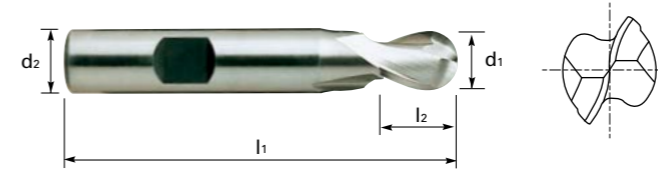
TOLERANCE		
MILL DIA.	Ø2.0~Ø6.0	+0.040 -0
	Ø6.5~	+0.050 -0
SHANK DIA.	h6	

2 FLUTE, BALL NOSE, SHORT LENGTH



Series No. 112102

▶ cutting conditions : p.279



R : ±0.02mm

BALL END MILLS

Short Length, 2 Flute, Ball End, with Flatted Shank

Mill Dia. d ₁	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co8	TiAIN HSS Co8
3.0	6.0	5.0	49.0	1121020300	1121210300
3.5		6.0	50.0	1121020350	1121210350
4.0		7.0	51.0	1121020400	1121210400
4.5		7.0		1121020450	1121210450
5.0		8.0	52.0	1121020500	1121210500
5.5		8.0		1121020550	1121210550
6.0	10.0	8.0	1121020600	1121210600	
7.0		10.0	60.0	1121020700	1121210700
8.0		11.0	61.0	1121020800	1121210800
9.0		11.0		1121020900	1121210900
10.0	12.0	13.0	63.0	1121021000	1121211000
12.0		16.0	73.0	1121021200	1121211200
13.0	16.0	1121021300		1121211300	
14.0	16.0	16.0	79.0	1121021400	1121211400
15.0		16.0		1121021500	1121211500
16.0	16.0	19.0	79.0	1121021600	1121211600
17.0		19.0		1121021700	1121211700
18.0		19.0		1121021800	1121211800
19.0		19.0		1121021900	1121211900
20.0	20.0	22.0	88.0	1121022000	1121212000
22.0		22.0		1121022200	1121212200
24.0	25.0	26.0	102.0	1121022400	1121212400
25.0		26.0		1121022500	1121212500

▶ TiAIN Coating to Order

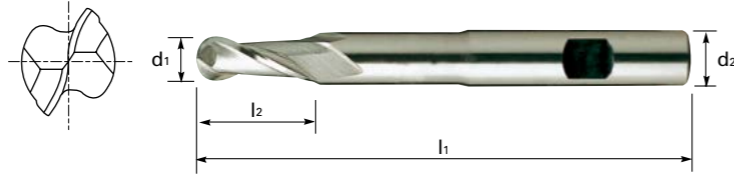
TOLERANCE	
MILL DIA.	+0 -0.030
SHANK DIA.	h6

2 FLUTE, BALL NOSE LONG LENGTH



Series No. 114102

▶ cutting conditions : p.279



R : ±0.02mm

BALL END MILLS

Extra Long Length, 2 Flute, Ball End, with Flatted Shank

Mill Dia. d ₁	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co8	TiAIN HSS Co8
3.0	6.0	8.0	56.0	1141020300	1141210300
4.0		11.0	63.0	1141020400	1141210400
5.0		13.0	68.0	1141020500	1141210500
6.0		13.0		1141020600	1141210600
8.0	10.0	19.0	88.0	1141020800	1141210800
10.0		22.0	95.0	1141021000	1141211000
12.0	12.0	26.0	110.0	1141021200	1141211200
13.0		26.0		1141021300	1141211300
14.0		26.0		1141021400	1141211400
15.0		26.0		1141021500	1141211500
16.0	16.0	32.0	123.0	1141021600	1141211600
18.0		32.0		1141021800	1141211800
20.0	20.0	38.0	141.0	1141022000	1141212000
22.0		38.0		1141022200	1141212200
25.0		45.0		1141022500	1141212500

▶ TiAIN Coating to Order

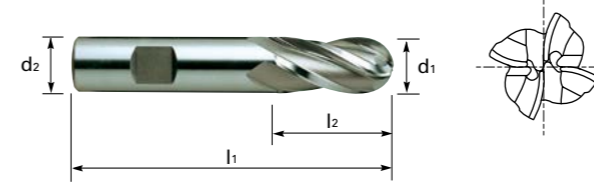
TOLERANCE	
MILL DIA.	+0 -0.030
SHANK DIA.	h6

4&6 FLUTE, BALL NOSE SHORT LENGTH



Series No. 115102

▶ cutting conditions : p.281



R : ±0.02mm

BALL END MILLS

Short Length, Multi Flute, Ball End, with Flatted Shank

Mill Dia. d ₁	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	No. of Flute	HSS Co8	TiAIN HSS Co8
6.0	6.0	13.0	57.0	4	1151020600	1151210600
8.0	10.0	19.0	69.0	4	1151020800	1151210800
10.0		22.0	72.0	4	1151021000	1151211000
12.0	12.0	26.0	83.0	4	1151021200	1151211200
16.0	16.0	32.0	92.0	4	1151021600	1151211600
20.0	20.0	38.0	104.0	4	1151022000	1151212000
25.0	25.0	45.0	121.0	6	1151022500	1151212500

▶ TiAIN Coating to Order

TOLERANCE	
MILL DIA.	+0 -0.030
SHANK DIA.	h6

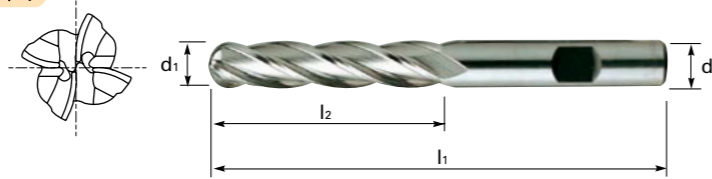
4&6 FLUTE, BALL NOSE LONG LENGTH



HSS Co8
DIN 1889
N
30°
FLUTE 4&6
DIN 1835B

Series No. 116102

▶ cutting conditions : p.281



R : ±0.02mm

BALL END MILLS

Long Length, Multi Flute, Ball End, with Flatted Shank

Mill Dia. d ₁	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	No. of Flute	HSS Co8	TiAlN HSS Co8
10.0	10.0	45.0	95.0	4	1161021000	1161211000
12.0	12.0	53.0	110.0	4	1161021200	1161211200
16.0	16.0	63.0	123.0	4	1161021600	1161211600
20.0	20.0	75.0	141.0	4	1161022000	1161212000
25.0	25.0	90.0	166.0	6	1161022500	1161212500

▶ TiAlN Coating to Order

TOLERANCE	
MILL DIA.	+0 -0.030
SHANK DIA.	h6

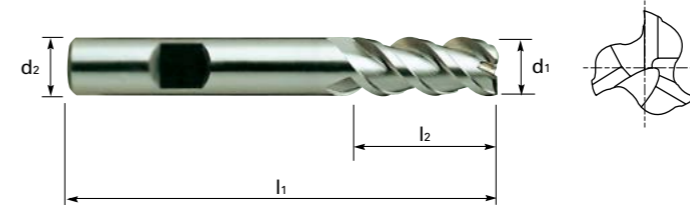
MULTI FLUTE, 50° HELIX SHORT LENGTH



HSS Co8
DIN 844
N
50°
FLUTE 2-4
DIN 1835B

Series No. 132102

▶ cutting conditions : p.283



END MILLS HIGH HELIX

Multi-Flute, High Helical 50°, Centre Cutting, with Flatted Shank

Mill Dia. d ₁	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	No. of Flute	HSS Co8	TiAlN HSS Co8
2.0	6.0	7.0	51.0	2	1321020200	1321210200
3.0		8.0	52.0	2	1321020300	1321210300
4.0		11.0	55.0	2	1321020400	1321210400
5.0		13.0	57.0	2	1321020500	1321210500
6.0		13.0		3	1321020600	1321210600
7.0		10.0	16.0	66.0	3	1321020700
8.0	19.0		69.0	3	1321020800	1321210800
9.0	19.0			3	1321020900	1321210900
10.0	12.0	22.0	72.0	3	1321021000	1321211000
12.0		26.0	83.0	3	1321021200	1321211200
14.0		26.0		3	1321021400	1321211400
15.0		26.0		3	1321021500	1321211500
16.0	16.0	32.0	92.0	3	1321021600	1321211600
18.0		32.0	3	1321021800	1321211800	
20.0	20.0	38.0	104.0	3	1321022000	1321212000
25.0	25.0	45.0	121.0	4	1321022500	1321212500
30.0		45.0		4	1321023000	1321213000

▶ TiAlN Coating to Order

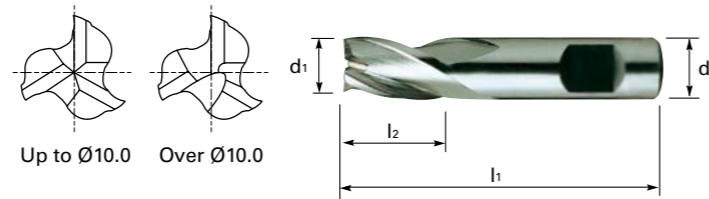
TOLERANCE		
MILL DIA.	Ø2.0~Ø6.0	+0.040 -0
	Ø4.0~Ø6.0	+0.048 -0
	Ø7.0~Ø10.0	+0.058 -0
	Ø10.5~Ø18.0	+0.070 -0
	Ø18.5~Ø30.0	+0.084 -0
SHANK DIA.	h6	

3 FLUTE, SHORT LENGTH, THROW AWAY



Series No. 128102

▶ cutting conditions : p.288



THREE FLUTE THROW AWAY END MILLS

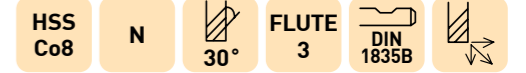
Short Length, 3 Flute, Centre Cutting, with Flatted Shank

Mill Dia. e8(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co8	TiAIN HSS Co8
1.0	6.0	2.0	34.0	1281020100	1281210100
1.5		3.0		1281020150	1281210150
1.8		3.0		1281020180	1281210180
2.0		4.0	35.0	1281020200	1281210200
2.3		4.0		1281020230	1281210230
2.5		5.0	36.0	1281020250	1281210250
2.8		5.0		1281020280	1281210280
3.0		5.0	37.0	1281020300	1281210300
3.3		6.0		1281020330	1281210330
3.5		6.0	38.0	1281020350	1281210350
3.8		7.0		1281020380	1281210380
4.0		7.0	39.0	1281020400	1281210400
4.3		7.0		1281020430	1281210430
4.5		7.0	42.0	1281020450	1281210450
4.8		8.0		1281020480	1281210480
5.0		8.0	43.0	1281020500	1281210500
5.5	8.0	1281020550		1281210550	
5.75	8.0	48.0	1281020575	1281210575	
6.0	8.0		1281020600	1281210600	
6.5	8.0	10.0	50.0	1281020650	1281210650
7.0		10.0		1281020700	1281210700
7.5		10.0	58.0	1281020750	1281210750
8.0		11.0		1281020800	1281210800
8.5	11.0	64.0	1281020850	1281210850	
9.0	11.0		1281020900	1281210900	
9.5	10.0	11.0	64.0	1281020950	1281210950
10.0		13.0		1281021000	1281211000
12.0	12.0	16.0	78.0	1281021200	1281211200
16.0	16.0	19.0		1281021600	1281211600
20.0	20.0	22.0		1281022000	1281212000

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

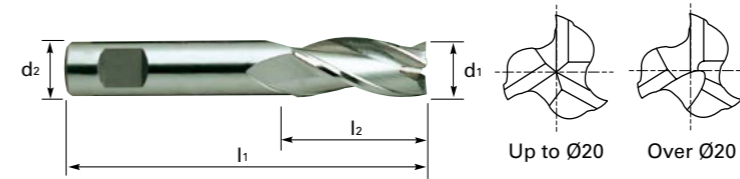
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

3 FLUTE, LONG LENGTH, THROW AWAY



Series No. 129102

▶ cutting conditions : p.288



THREE FLUTE THROW AWAY END MILLS

Long Length, 3 Flute, Centre Cutting, with Flatted Shank

Mill Dia. e8(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co8	TiAIN HSS Co8	
1.5	6.0	4.0	35.0	1291020150	1291210150	
2.0		7.0	38.0	1291020200	1291210200	
2.5		8.0	39.0	1291020250	1291210250	
3.0		8.0		1291020300	1291210300	
3.5		10.0	41.0	1291020350	1291210350	
4.0		11.0	42.0	1291020400	1291210400	
4.5		11.0		1291020450	1291210450	
5.0		13.0	44.0	1291020500	1291210500	
5.5		13.0		1291020550	1291210550	
6.0		13.0	48.0	1291020600	1291210600	
6.5		16.0		1291020650	1291210650	
7.0		16.0	51.0	1291020700	1291210700	
7.5		16.0		1291020750	1291210750	
8.0		19.0	56.0	1291020800	1291210800	
8.5		10.0	19.0	56.0	1291020850	1291210850
9.0			19.0		1291020900	1291210900
10.0	22.0	59.0	1291021000	1291211000		

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

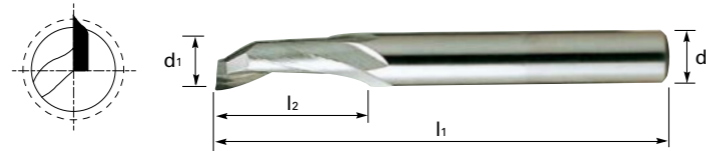
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

1 FLUTE END MILLS for ALUMINIUM



Series No. 135316

▶ cutting conditions : p.284



ONE FLUTE END MILLS

Short Length, 1 Flute, with Plain Shank for Aluminium Machining

Mill Dia. js14(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co5	TiAIN HSS Co5	
3.0	8.0	12.0	60.0	1353160300	1353270300	
4.0		12.0		1353160400	1353270400	
5.0		14.0		1353160500	1353270500	
6.0		14.0		1353160600	1353270600	
8.0		14.0		80.0	1353160800	1353270800
10.0		14.0			1353161000	1353271000

▶ TiAIN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

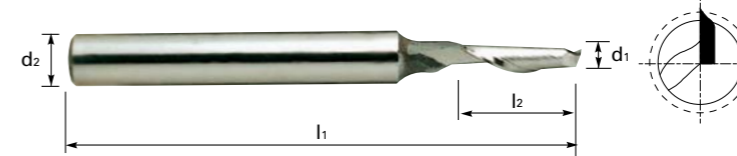
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js14	± 125	± 150	± 180	± 215	± 260	± 310
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

1 FLUTE END MILLS for ALUMINIUM



Series No. 136316

▶ cutting conditions : p.284



ONE FLUTE END MILLS

Short Length, 1 Flute, with Plain Shank for Aluminium Machining

Mill Dia. js14(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co5	TiAIN HSS Co5
5.0	8.0	18.0	80.0	1363160500	1363270500
5.0		40.0	100.0	1363169001	1363279001
8.0		14.0	120.0	1363160800	1363270800

▶ TiAIN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

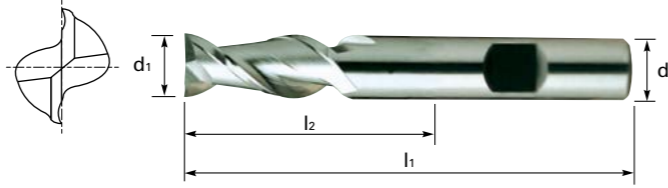
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js14	± 125	± 150	± 180	± 215	± 260	± 310
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

2 FLUTE, 42° HELIX SHORT LENGTH, for ALUMINIUM



Series No. 131102

▶ cutting conditions : p.285



END MILLS FOR ALUMINIUM

Short Length, 2 Flute, Helix 42°, Centre Cutting, with Flatted Shank

Mill Dia. e8(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	HSS Co8	TiAIN HSS Co8
2.0	6.0	7.0	51.0	1311020200	1311210200
2.5		8.0	52.0	1311020250	1311210250
3.0		8.0		1311020300	1311210300
3.5		10.0	54.0	1311020350	1311210350
4.0		11.0	55.0	1311020400	1311210400
4.5		11.0		1311020450	1311210450
5.0		13.0	57.0	1311020500	1311210500
5.5		13.0		1311020550	1311210550
6.0		13.0		1311020600	1311210600
6.5		16.0		66.0	1311020650
7.0	16.0	1311020700	1311210700		
7.5	16.0	1311020750	1311210750		
8.0	10.0	19.0	1311020800		1311210800
8.5		19.0	1311020850		1311210850
9.0		19.0	1311020900	1311210900	
10.0	12.0	22.0	72.0	1311021000	1311211000
11.0		22.0	79.0	1311021100	1311211100
12.0		26.0	83.0	1311021200	1311211200
13.0		26.0		1311021300	1311211300
14.0		26.0		1311021400	1311211400
15.0	26.0	1311021500		1311211500	
16.0	16.0	32.0	92.0	1311021600	1311211600
17.0		32.0		1311021700	1311211700
18.0		32.0		1311021800	1311211800
19.0		32.0		1311021900	1311211900
20.0		20.0		38.0	104.0
21.0	38.0		1311022100	1311212100	
22.0	38.0		1311022200	1311212200	
23.0	38.0		1311022300	1311212300	
24.0	25.0	45.0	121.0	1311022400	1311212400
25.0		45.0		1311022500	1311212500

▶ TiAIN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

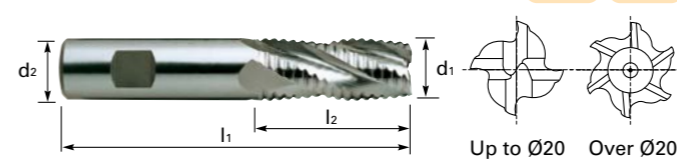
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	— 14 — 28	— 20 — 38	— 25 — 47	— 32 — 59	— 40 — 73	— 50 — 89
h6	0 — 6	0 — 8	0 — 9	0 — 11	0 — 13	0 — 16

MULTI. FLUTE, COARSE PITCH ROUGHING, SHORT LENGTH



Series No. 118102

▶ cutting conditions : p.292



ROUGHING END MILLS

Short Length, Multi-Flute, Coarse Pitch, Round Profile, with Flatted Shank

Mill Dia. js12(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	No. of Flute	HSS Co8	TiAIN HSS Co8
6.0	6.0	13.0	57.0	3	1181020600	1181210600
7.0	10.0	16.0	66.0	3	1181020700	1181210700
8.0		19.0	69.0	3	1181020800	1181210800
9.0		19.0		3	1181020900	1181210900
10.0		22.0	72.0	4	1181021000	1181211000
11.0	12.0	22.0	79.0	4	1181021100	1181211100
12.0		26.0		4	1181021200	1181211200
13.0		26.0	83.0	4	1181021300	1181211300
14.0		26.0		4	1181021400	1181211400
15.0		26.0		4	1181021500	1181211500
16.0		32.0		92.0	4	1181021600
17.0	32.0	4	1181021700		1181211700	
18.0	32.0	4	1181021800		1181211800	
19.0	32.0	4	1181021900		1181211900	
20.0	16.0	38.0	98.0		4	1181029001
20.0		38.0	104.0	4	1181022000	1181212000
22.0		38.0		5	1181022200	1181212200
22.0		20.0	38.0	114.0	5	1181029002
24.0	45.0		121.0	5	1181022400	1181212400
25.0	45.0			5	1181022500	1181212500
26.0	45.0			6	1181022600	1181212600
28.0	45.0			6	1181022800	1181212800
30.0	45.0			6	1181023000	1181213000
32.0	32.0		53.0	133.0	6	1181023200
35.0		53.0	6		1181023500	1181213500
36.0		53.0	6		1181023600	1181213600
38.0		63.0	155.0	6	1181023800	1181213800
38.0		63.0		6	1181029003	1181219003
40.0		63.0		6	1181024000	1181214000
40.0	40.0	63.0	177.0	6	1181029004	1181219004
50.0	50.0	75.0		6	1181025000	1181215000

▶ TiAIN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

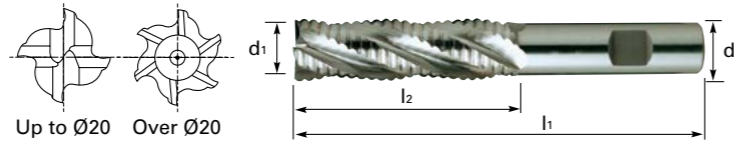
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 — 6	0 — 8	0 — 9	0 — 11	0 — 13	0 — 16

MULTI. FLUTE, COARSE PITCH ROUGHING, LONG LENGTH



Series No. 119102

▶ cutting conditions : p.292



Up to Ø20 Over Ø20

ROUGHING END MILLS

Long Length, Multi-Flute, Coarse Pitch, Round Profile, with Flatted Shank

Mill Dia. d ₁	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	No. of Flute	HSS Co8	TiAlN HSS Co8
6.0	6.0	24.0	68.0	3	1191020600	1191210600
7.0	10.0	30.0	80.0	3	1191020700	1191210700
8.0		38.0	88.0	3	1191020800	1191210800
9.0		38.0		3	1191020900	1191210900
10.0	12.0	45.0	95.0	4	1191021000	1191211000
11.0		45.0	102.0	4	1191021100	1191211100
12.0		53.0	110.0	4	1191021200	1191211200
13.0		53.0		4	1191021300	1191211300
14.0	53.0	4		1191021400	1191211400	
15.0	16.0	53.0	123.0	4	1191021500	1191211500
16.0		63.0		4	1191021600	1191211600
17.0		63.0		4	1191021700	1191211700
18.0		63.0		4	1191021800	1191211800
19.0		63.0		4	1191021900	1191211900
20.0	20.0	75.0	135.0	4	1191029001	1191219001
20.0		75.0	141.0	4	1191022000	1191212000
22.0		75.0	5	1191022200	1191212200	
22.0	25.0	75.0	151.0	5	1191029002	1191219002
24.0		90.0	166.0	5	1191022400	1191212400
25.0		90.0		5	1191022500	1191212500
26.0		90.0		6	1191022600	1191212600
28.0		90.0		6	1191022800	1191212800
30.0		90.0		6	1191023000	1191213000
32.0	32.0	106.0		186.0	6	1191023200
35.0		106.0	6		1191023500	1191213500
36.0		106.0	6		1191023600	1191213600
38.0		125.0	6		1191023800	1191213800
38.0	40.0	125.0	217.0	6	1191029003	1191219003
40.0	32.0	125.0		6	1191024000	1191214000
40.0	40.0	125.0		6	1191029004	1191219004

▶ TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

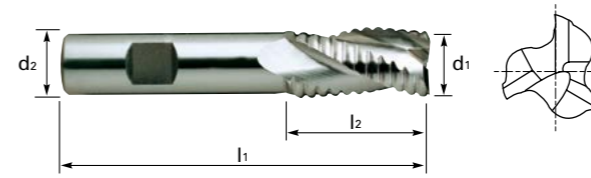
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

3 FLUTE, COARSE PITCH ROUGHING, SHORT LENGTH



Series No. 133102

▶ cutting conditions : p.292



ROUGHING END MILLS

Short Length, 3 Flute, Coarse Pitch, Round Profile, with Flatted Shank

Mill Dia. js12(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co8	TiAlN HSS Co8
10.0	10.0	22.0	72.0	1331021000	1331211000
12.0	12.0	26.0	83.0	1331021200	1331211200
14.0		26.0		1331021400	1331211400
16.0	16.0	32.0	92.0	1331021600	1331211600
18.0		32.0		1331021800	1331211800
20.0	20.0	38.0	104.0	1331022000	1331212000
22.0		38.0		1331022200	1331212200
25.0	25.0	45.0	121.0	1331022500	1331212500
28.0		45.0		1331022800	1331212800
30.0		45.0		1331023000	1331213000
32.0	32.0	53.0	133.0	1331023200	1331213200
36.0		53.0		1331023600	1331213600
40.0		63.0		155.0	1331024000

▶ TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

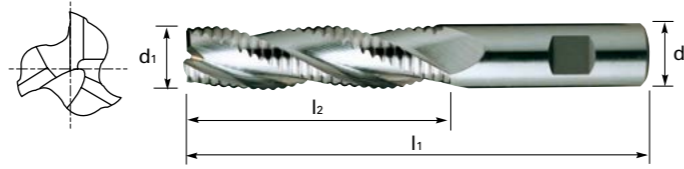
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

3 FLUTE, COARSE PITCH ROUGHING, LONG LENGTH



Series No. 134102

▶ cutting conditions : p.292



ROUGHING END MILLS

Long Length, 3 Flute, Coarse Pitch, Round Profile, with Flatted Shank

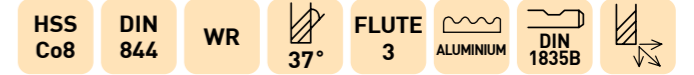
Mill Dia. js12(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co8	TiAIN HSS Co8
10.0	10.0	45.0	95.0	1341021000	1341021000
12.0	12.0	53.0	110.0	1341021200	1341021200
14.0		53.0		1341021400	1341021400
16.0	16.0	63.0	123.0	1341021600	1341021600
18.0		63.0		1341021800	1341021800
20.0	20.0	75.0	141.0	1341022000	1341022000
22.0		75.0		1341022200	1341022200
25.0	25.0	90.0	166.0	1341022500	1341022500
28.0		90.0		1341022800	1341022800
30.0		90.0		1341023000	1341023000
36.0	32.0	106.0	186.0	1341023600	1341023600
40.0		125.0		1341024000	1341024000

▶ TiAIN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

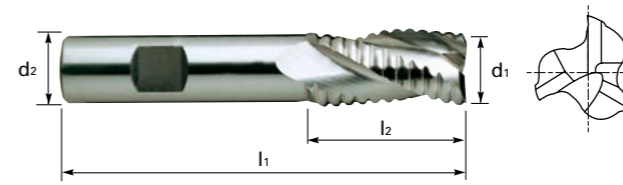
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

3 FLUTE, 37° HELIX, COARSE PITCH ROUGHING, SHORT LENGTH for ALUMINIUM



Series No. 124102

▶ cutting conditions : p.292



ROUGHING END MILLS FOR ALUMINIUM

Short Length, 3 Flute, Coarse Pitch, Helix 37°, Round Profile, with Flatted Shank

Mill Dia. js12(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co8	TiAIN HSS Co8
6.0	6.0	13.0	57.0	1241020600	1241210600
8.0	10.0	19.0	69.0	1241020800	1241210800
10.0		22.0		1241021000	1241211000
12.0	12.0	26.0	83.0	1241021200	1241211200
14.0		26.0		1241021400	1241211400
16.0	16.0	32.0	92.0	1241021600	1241211600
18.0		32.0		1241021800	1241211800
20.0	20.0	38.0	104.0	1241022000	1241212000
22.0		38.0		1241022200	1241212200
25.0	25.0	45.0	121.0	1241022500	1241212500
30.0		45.0		1241023000	1241213000

▶ TiAIN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

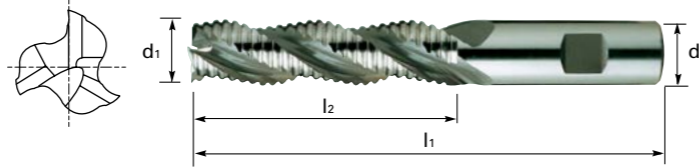
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

3 FLUTE, 37° HELIX, COARSE PITCH ROUGHING, LONG LENGTH for ALUMINIUM



Series No. 125102

▶ cutting conditions : p.292



ROUGHING END MILLS FOR ALUMINIUM

Long Length, 3 Flute, Coarse Pitch, Helix 37°, Round Profile, with Flatted Shank

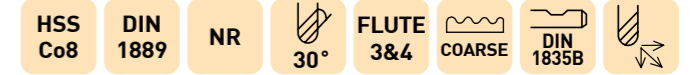
Mill Dia. js12(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co8	TiAIN HSS Co8
10.0	10.0	45.0	95.0	1251021000	1251211000
12.0	12.0	53.0	110.0	1251021200	1251211200
14.0		53.0		1251021400	1251211400
16.0	16.0	63.0	123.0	1251021600	1251211600
18.0		63.0		1251021800	1251211800
20.0	20.0	75.0	141.0	1251022000	1251212000
22.0		75.0		1251022200	1251212200
25.0	25.0	90.0	166.0	1251022500	1251212500
30.0		90.0		1251023000	1251213000

▶ TiAIN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

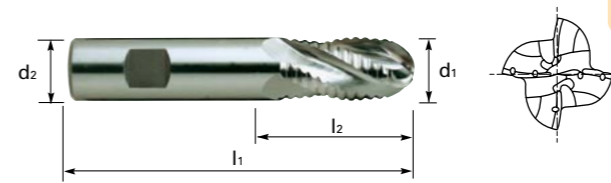
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

3&4 FLUTE, BALL NOSE COARSE PITCH ROUGHING SHORT LENGTH



Series No. 127102

▶ cutting conditions : p.296



R : ±0.02mm

ROUGHING DIE-SINKING CUTTERS

Short Length, Multi-Flute Coarse Pitch, Round Profile, Ball End Centre Cutting, with Flatted Shank

Mill Dia. js12(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	No. of Flute	HSS Co8	TiAIN HSS Co8
8.0	10.0	19.0	69.0	3	1271020800	1271210800
10.0		22.0	72.0	3	1271021000	1271211000
12.0	12.0	26.0	83.0	4	1271021200	1271211200
16.0	16.0	32.0	92.0	4	1271021600	1271211600
20.0	20.0	38.0	104.0	4	1271022000	1271212000
25.0	25.0	45.0	121.0	4	1271022500	1271212500
32.0	32.0	53.0	133.0	4	1271023200	1271213200
40.0		63.0	155.0	4	1271024000	1271214000

▶ TiAIN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

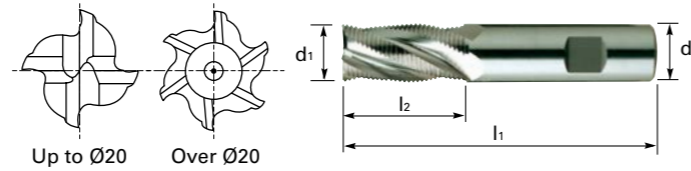
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

MULTI. FLUTE, FINE PITCH ROUGHING, SHORT LENGTH



Series No. 121102

▶ cutting conditions : p.292



FINE PITCH ROUGHING END MILLS

Short Length, Multi-Flute, Fine Pitch, Round Profile, with Flatted Shank

Mill Dia. js12(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	No. of Flute	HSS Co8	TiAlN HSS Co8
6.0	6.0	13.0	57.0	3	1211020600	1211210600
8.0	10.0	19.0	69.0	3	1211020800	1211210800
10.0		22.0	72.0	4	1211021000	1211211000
12.0	12.0	26.0	83.0	4	1211021200	1211211200
14.0		26.0		4	1211021400	1211211400
16.0	16.0	32.0	92.0	4	1211021600	1211211600
18.0		32.0		4	1211021800	1211211800
20.0	20.0	38.0	104.0	4	1211022000	1211212000
25.0	25.0	45.0	121.0	5	1211022500	1211212500
30.0		45.0		6	1211023000	1211213000
32.0	32.0	53.0	133.0	6	1211023200	1211213200

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

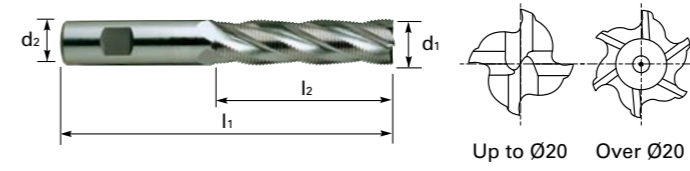
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

MULTI. FLUTE, FINE PITCH ROUGHING, LONG LENGTH



Series No. 122102

▶ cutting conditions : p.292



FINE PITCH ROUGHING END MILLS

Long Length, Multi-Flute, Fine Pitch, Round Profile, with Flatted Shank

Mill Dia. js12(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	No. of Flute	HSS Co8	TiAlN HSS Co8	
6.0	6.0	24.0	68.0	3	1221020600	1221210600	
7.0	10.0	30.0	80.0	3	1221020700	1221210700	
8.0		38.0	88.0	3	1221020800	1221210800	
9.0		38.0		3	1221020900	1221210900	
10.0	12.0	45.0	95.0	4	1221021000	1221211000	
11.0		45.0	102.0	4	1221021100	1221211100	
12.0		53.0	110.0	4	1221021200	1221211200	
13.0		53.0		4	1221021300	1221211300	
14.0	53.0	4		1221021400	1221211400		
15.0	16.0	53.0	123.0	4	1221021500	1221211500	
16.0		63.0		4	1221021600	1221211600	
17.0		63.0		4	1221021700	1221211700	
18.0		63.0		4	1221021800	1221211800	
19.0	20.0	63.0	141.0	4	1221021900	1221211900	
20.0		75.0		4	1221022000	1221212000	
22.0		75.0		5	1221022200	1221212200	
24.0		90.0		166.0	5	1221022400	1221212400
25.0	90.0	5	1221022500		1221212500		
26.0	90.0	6	1221022600		1221212600		
28.0	25.0	90.0	186.0	6	1221022800	1221212800	
30.0		90.0		6	1221023000	1221213000	
32.0		106.0		217.0	6	1221023200	1221213200
35.0		106.0			6	1221023500	1221213500
36.0	32.0	106.0	186.0	6	1221023600	1221213600	
38.0		125.0		6	1221023800	1221213800	
38.0		125.0		217.0	6	1221029001	1221219001
40.0		125.0			6	1221024000	1221214000
40.0	40.0	125.0	217.0	6	1221029002	1221219002	

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

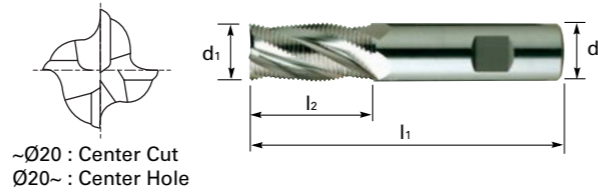
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

MULTI. FLUTE, FINE PITCH ROUGHING SHORT LENGTH



Series No. 121113

▶ cutting conditions : p.294



FINE PITCH ROUGHING END MILLS

Short Length, Multi-Flute, Centre Cutting, 1 Tooth Over Centre, Fine Pitch, Round Profile with Flatted Shank

Mill Dia. js12(d1)	Shank Dia. h6(d2)	Length of Cut l ₂	Overall Length l ₁	No. of Flute	ASP-60	TiAlN ASP-60
6.0	6.0	13.0	57.0	4	1211130600	1211220600
7.0	10.0	16.0	66.0	4	1211130700	1211220700
8.0		19.0	69.0	4	1211130800	1211220800
9.0		19.0		5	1211130900	1211220900
10.0	12.0	22.0	72.0	5	1211131000	1211221000
11.0		22.0	83.0	5	1211131100	1211221100
12.0		26.0		5	1211131200	1211221200
13.0		26.0		5	1211131300	1211221300
14.0		26.0		5	1211131400	1211221400
15.0	16.0	26.0	92.0	5	1211131500	1211221500
16.0		32.0		5	1211131600	1211221600
18.0		32.0		5	1211131800	1211221800
20.0	20.0	38.0	104.0	5	1211132000	1211222000
22.0		38.0		5	1211132200	1211222200
25.0	25.0	45.0	121.0	6	1211132500	1211222500
30.0		45.0		6	1211133000	1211223000

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

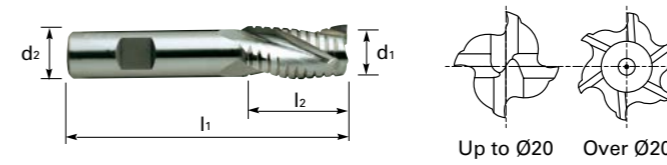
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

MULTI. FLUTE, ROUGHING & FINISHING, SHORT LENGTH



Series No. 126102

▶ cutting conditions : p.298



ROUGHING-FINISHING END MILLS

Short Length, Multi-Flute, Rough-Finishing Profile, with Flatted Shank

Mill Dia. k10(d1)	Shank Dia. h6(d2)	Length of Cut l ₂	Overall Length l ₁	No. of Flute	HSS Co8	TiAlN HSS Co8
6.0	6.0	13.0	57.0	3	1261020600	1261210600
7.0	10.0	16.0	66.0	3	1261020700	1261210700
8.0		19.0	69.0	4	1261020800	1261210800
9.0		19.0		4	1261020900	1261210900
10.0	12.0	22.0	72.0	4	1261021000	1261211000
11.0		22.0	83.0	4	1261021100	1261211100
12.0		26.0		4	1261021200	1261211200
13.0		26.0		4	1261021300	1261211300
14.0		26.0		4	1261021400	1261211400
16.0	16.0	32.0	92.0	4	1261021600	1261211600
18.0		32.0		4	1261021800	1261211800
20.0		38.0		104.0	4	1261022000
22.0	38.0	5	1261022200		1261212200	
25.0	25.0	45.0	121.0	5	1261022500	1261212500
28.0		45.0		5	1261022800	1261212800
30.0		45.0		5	1261023000	1261213000
32.0	32.0	53.0	133.0	5	1261023200	1261213200
36.0		53.0		6	1261023600	1261213600
40.0		63.0		6	1261024000	1261214000

▶ TiAlN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

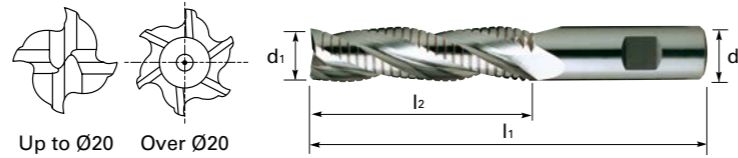
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
k10	+ 40 0	+ 48 0	+ 58 0	+ 70 0	+ 84 0	+ 100 0
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

MULTI. FLUTE, ROUGHING & FINISHING, LONG LENGTH



Series No. 137102

▶ cutting conditions : p.298



ROUGHING-FINISHING END MILLS

Long Length, Multi-Flute, Rough-Finishing Profile, with Flatted Shank

Mill Dia. k10(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	No. of Flute	HSS Co8	TiAIN HSS Co8
6.0	6.0	24.0	68.0	3	1371020600	1371210600
8.0	10.0	38.0	88.0	4	1371020800	1371210800
10.0		45.0	95.0	4	1371021000	1371211000
12.0	12.0	53.0	110.0	4	1371021200	1371211200
14.0		53.0		4	1371021400	1371211400
16.0	16.0	63.0	123.0	4	1371021600	1371211600
18.0		63.0		4	1371021800	1371211800
20.0	20.0	75.0	141.0	4	1371022000	1371212000
22.0		75.0		5	1371022200	1371212200
25.0	25.0	90.0	166.0	5	1371022500	1371212500
30.0		90.0		5	1371023000	1371213000
32.0	32.0	106.0	186.0	5	1371023200	1371213200

▶ TiAIN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

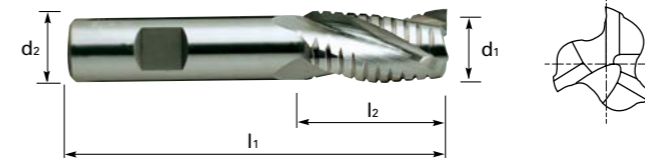
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
k10	+ 40 0	+ 48 0	+ 58 0	+ 70 0	+ 84 0	+ 100 0
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

3 FLUTE, ROUGHING & FINISHING SHORT LENGTH



Series No. 138102

▶ cutting conditions : p.298



ROUGHING-FINISHING END MILLS

Short Length, 3 Flute, Rough-Finishing Profile, with Flatted Shank

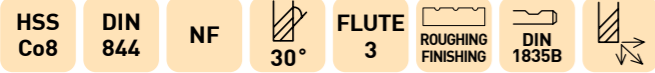
Mill Dia. k10(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co8	TiAIN HSS Co8
6.0	6.0	13.0	57.0	1381020600	1381210600
8.0	10.0	19.0	69.0	1381020800	1381210800
10.0		22.0	72.0	1381021000	1381211000
12.0	12.0	26.0	83.0	1381021200	1381211200
14.0		26.0		1381021400	1381211400
16.0	16.0	32.0	92.0	1381021600	1381211600
18.0		32.0		1381021800	1381211800
20.0	20.0	38.0	104.0	1381022000	1381212000
22.0		38.0		1381022200	1381212200
25.0	25.0	45.0	121.0	1381022500	1381212500
28.0		45.0		1381022800	1381212800
30.0	32.0	45.0	133.0	1381023000	1381213000
32.0		53.0		1381023200	1381213200
36.0	32.0	53.0	155.0	1381023600	1381213600
40.0		63.0		1381024000	1381214000

▶ TiAIN Coating to Order

Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

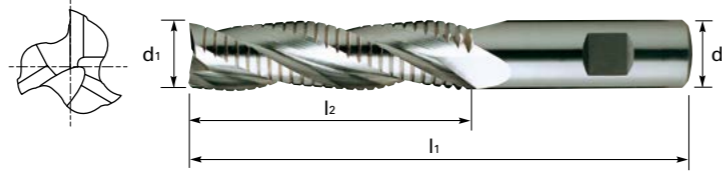
Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
k10	+ 40 0	+ 48 0	+ 58 0	+ 70 0	+ 84 0	+ 100 0
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

3 FLUTE, ROUGHING & FINISHING LONG LENGTH



Series No. 139102

▶ cutting conditions : p.298



ROUGHING-FINISHING END MILLS

Long Length, 3 Flute, Rough-Finishing Profile, with Flatted Shank

Mill Dia. k10(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	HSS Co8	TiAIN HSS Co8
6.0	6.0	24.0	68.0	1391020600	1391210600
8.0	10.0	38.0	88.0	1391020800	1391210800
10.0		45.0	95.0	1391021000	1391211000
12.0	12.0	53.0	110.0	1391021200	1391211200
14.0		53.0		1391021400	1391211400
16.0	16.0	63.0	123.0	1391021600	1391211600
18.0		63.0		1391021800	1391211800
20.0	20.0	75.0	141.0	1391022000	1391212000
22.0		75.0		1391022200	1391212200
25.0	25.0	90.0	166.0	1391022500	1391212500
28.0		90.0		1391022800	1391212800
30.0		90.0		1391023000	1391213000
36.0	32.0	106.0	186.0	1391023600	1391213600
40.0		125.0	217.0	1391024000	1391214000

▶ TiAIN Coating to Order

Tolerances according to DIN 7160 & 7161

Toleranzen nach DIN 7160 & 7161

Toleranzwerte in μm / Tolerance range in μm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
k10	+ 40 0	+ 48 0	+ 58 0	+ 70 0	+ 84 0	+ 100 0
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

TABLE OF CUTTING CONDITION

(8% CO HSS, SHORT TYPE*)

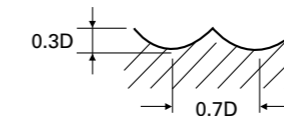


2 FLUTE BALL NOSE



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS											
HARDNESS	~ 500N/mm ²				~ HRC20				HRC20 ~ HRC30			
STRENGTH	~ 500N/mm ²				500 ~ 800N/mm ²				800 ~ 1000N/mm ²			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R1.5 x 3.0	4500	95	40	0.011	3400	70	30	0.010	2000	30	20	0.008
R2.0 x 4.0	3200	115	40	0.018	2400	80	30	0.017	1400	35	20	0.013
R3.0 x 6.0	2200	135	40	0.031	1700	90	30	0.026	1000	45	20	0.023
R4.0 x 8.0	1600	160	40	0.050	1200	105	30	0.044	700	50	20	0.036
R5.0 x 10.0	1300	180	40	0.069	1000	120	30	0.060	560	60	20	0.054
R6.0 x 12.0	1000	170	40	0.085	800	105	30	0.066	450	55	15	0.061
R8.0 x 16.0	800	150	40	0.094	600	100	30	0.083	350	55	20	0.079
R10.0 x 20.0	600	140	40	0.117	500	85	30	0.085	300	50	20	0.083
R12.5 x 25.0	500	130	40	0.130	400	70	30	0.088	220	40	15	0.091

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS				ALUMINUM ALUMINUM ALLOYS			
HARDNESS	HRC30 ~ HRC40							
STRENGTH	1000 ~ 1300N/mm ²							
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R1.5 x 3.0	1400	20	15	0.007	11000	230	105	0.010
R2.0 x 4.0	1000	25	15	0.013	8000	260	100	0.016
R3.0 x 6.0	700	25	15	0.018	5600	280	105	0.025
R4.0 x 8.0	500	30	15	0.030	4000	350	100	0.044
R5.0 x 10.0	400	35	15	0.044	3200	360	100	0.056
R6.0 x 12.0	320	35	10	0.055	2500	340	95	0.068
R8.0 x 16.0	250	35	15	0.070	2000	300	100	0.075
R10.0 x 20.0	200	35	15	0.088	1600	280	100	0.088
R12.5 x 25.0	160	30	15	0.094	1300	250	100	0.096



* The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION

(8% CO HSS, SHORT TYPE*)

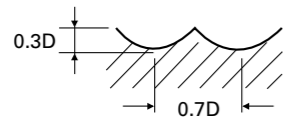


2 FLUTE BALL NOSE, TiAlN-COATED

114121, 112121

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS											
	~ HRc20				HRc20 ~ HRc30							
HARDNESS												
STRENGTH	~ 500N/mm ²				500 ~ 800N/mm ²				800 ~ 1000N/mm ²			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R1.5 x 3.0	6300	135	60	0.011	4750	100	45	0.011	2800	40	25	0.007
R2.0 x 4.0	4500	160	55	0.018	3350	110	40	0.016	1950	50	25	0.013
R3.0 x 6.0	3100	190	60	0.031	2400	125	45	0.026	1400	65	25	0.023
R4.0 x 8.0	2250	225	55	0.050	1700	145	45	0.043	1000	70	25	0.035
R5.0 x 10.0	1800	250	55	0.069	1400	170	45	0.061	800	85	25	0.053
R6.0 x 12.0	1400	240	55	0.086	1100	145	40	0.066	650	75	25	0.058
R8.0 x 16.0	1100	210	55	0.095	850	140	45	0.082	500	75	25	0.075
R10.0 x 20.0	850	195	55	0.115	700	120	45	0.086	400	70	25	0.088
R12.5 x 25.0	700	180	55	0.129	550	100	45	0.091	300	55	25	0.092

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS				ALUMINUM ALUMINUM ALLOYS			
	HRc30 ~ HRc40							
HARDNESS								
STRENGTH	1000 ~ 1300N/mm ²							
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R1.5 x 3.0	1950	30	20	0.008	15400	320	145	0.010
R2.0 x 4.0	1400	35	20	0.013	11200	365	140	0.016
R3.0 x 6.0	1000	35	20	0.018	7850	390	150	0.025
R4.0 x 8.0	700	40	20	0.029	5600	490	140	0.044
R5.0 x 10.0	550	50	15	0.045	4500	505	140	0.056
R6.0 x 12.0	450	50	15	0.056	3500	475	130	0.068
R8.0 x 16.0	350	50	20	0.071	2800	420	140	0.075
R10.0 x 20.0	300	50	20	0.083	2250	390	140	0.087
R12.5 x 25.0	200	40	15	0.100	1800	350	140	0.097



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION

(8% CO HSS, SHORT TYPE*)

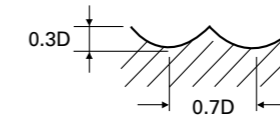


MULTI FLUTE BALL NOSE

115102, 116102

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS											
	~ HRc20				HRc20 ~ HRc30							
HARDNESS												
STRENGTH	~ 500N/mm ²				500 ~ 800N/mm ²				800 ~ 1000N/mm ²			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R3.0 x 6.0	2200	200	40	0.030	1700	135	30	0.026	1000	70	20	0.023
R4.0 x 8.0	1600	240	40	0.050	1200	160	30	0.044	700	75	20	0.036
R5.0 x 10.0	1300	270	40	0.069	1000	180	30	0.060	560	90	20	0.054
R6.0 x 12.0	1000	260	40	0.087	800	160	30	0.067	450	80	15	0.059
R8.0 x 16.0	800	230	40	0.096	600	150	30	0.083	350	80	20	0.076
R10.0 x 20.0	600	210	40	0.117	500	130	30	0.087	300	75	20	0.083
R12.5 x 25.0	500	200	40	0.133	400	105	30	0.088	220	60	15	0.091

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS				ALUMINUM ALUMINUM ALLOYS			
	HRc30 ~ HRc40							
HARDNESS								
STRENGTH	1000 ~ 1300N/mm ²							
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R3.0 x 6.0	700	40	15	0.019	5600	420	105	0.025
R4.0 x 8.0	500	45	15	0.030	4000	530	100	0.044
R5.0 x 10.0	400	50	15	0.042	3200	540	100	0.056
R6.0 x 12.0	320	50	15	0.052	2500	510	95	0.068
R8.0 x 16.0	250	50	15	0.067	2000	450	100	0.075
R10.0 x 20.0	200	50	15	0.083	1600	420	100	0.088
R12.5 x 25.0	160	45	15	0.094	1300	380	100	0.097



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION

(8% CO HSS, SHORT TYPE*)

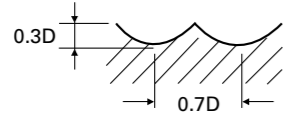


MULTI FLUTE BALL NOSE, TiAlN-COATED

115121, 116121

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS											
	~ HRc20				HRc20 ~ HRc30							
	500 ~ 800N/mm ²				800 ~ 1000N/mm ²							
HARDNESS												
STRENGTH	~ 500N/mm ²				500 ~ 800N/mm ²							
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R3.0 x 6.0	3100	280	58	0.030	2400	190	45	0.026	1400	100	26	0.024
R4.0 x 8.0	2250	335	57	0.050	1700	225	43	0.044	1000	105	25	0.035
R5.0 x 10.0	1800	380	57	0.070	1400	250	44	0.060	800	125	25	0.052
R6.0 x 12.0	1400	365	53	0.087	1100	225	41	0.068	650	110	25	0.056
R8.0 x 16.0	1100	320	55	0.097	850	210	43	0.082	500	110	25	0.073
R10.0 x 20.0	850	295	53	0.116	700	180	44	0.086	400	105	25	0.088
R12.5 x 25.0	700	280	55	0.133	550	145	43	0.088	300	85	24	0.094

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS				ALUMINUM ALUMINUM ALLOYS			
	HRc30 ~ HRc40							
	1000 ~ 1300N/mm ²							
HARDNESS								
STRENGTH								
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R3.0 x 6.0	1000	55	19	0.018	7850	590	148	0.025
R4.0 x 8.0	700	65	18	0.031	5600	740	141	0.044
R5.0 x 10.0	550	70	17	0.042	4500	755	141	0.056
R6.0 x 12.0	450	70	17	0.052	3500	715	132	0.068
R8.0 x 16.0	350	70	18	0.067	2800	630	141	0.075
R10.0 x 20.0	300	70	19	0.078	2250	590	141	0.087
R12.5 x 25.0	200	65	16	0.108	1800	530	141	0.098



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION

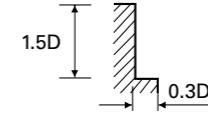
(8% CO HSS, SHORT TYPE*)



MULTI FLUTE, 50° HELIX SHORT LENGTH

132102

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS											
	~ HRc20				HRc20 ~ HRc30				HRc30 ~ HRc40			
	500 ~ 800N/mm ²				800 ~ 1000N/mm ²				1000 ~ 1300N/mm ²			
HARDNESS												
STRENGTH												
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	5000	35	30	0.004	4500	25	30	0.003	2500	10	15	0.002
3.0	3500	50	35	0.007	2800	35	30	0.006	1800	20	15	0.006
4.0	2500	60	30	0.012	2000	40	25	0.010	1200	25	15	0.010
5.0	2000	75	30	0.019	1800	55	30	0.015	1000	30	15	0.015
6.0	1800	85	35	0.016	1300	55	25	0.014	900	35	15	0.013
8.0	1200	95	30	0.026	1000	65	25	0.022	600	40	15	0.022
10.0	1000	95	30	0.032	900	70	30	0.026	500	40	15	0.027
12.0	900	110	35	0.041	700	70	25	0.033	450	45	15	0.033
14.0	800	95	35	0.040	600	70	25	0.039	400	45	20	0.038
16.0	600	95	30	0.053	500	65	25	0.043	300	40	15	0.044
18.0	550	95	30	0.058	450	65	25	0.048	280	40	15	0.048
20.0	500	95	30	0.063	450	65	30	0.048	250	40	15	0.053
22.0	500	95	35	0.048	400	65	30	0.041	250	40	15	0.040
25.0	450	85	35	0.047	350	55	25	0.039	200	30	15	0.038
28.0	400	75	35	0.047	300	50	25	0.042	180	25	15	0.035
30.0	350	65	35	0.046	280	45	25	0.040	180	25	15	0.035

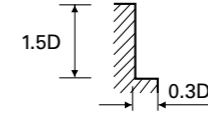


RPM= rev. / min. , FEED= mm / min.
Vc= m / min. , fz= mm / t

MULTI FLUTE, 50° HELIX SHORT LENGTH, TiAlN-COATED

132121

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS											
	~ HRc20				HRc20 ~ HRc30				HRc30 ~ HRc40			
	500 ~ 800N/mm ²				800 ~ 1000N/mm ²				1000 ~ 1300N/mm ²			
HARDNESS												
STRENGTH												
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	7000	50	45	0.004	6300	35	40	0.003	3500	15	20	0.002
3.0	4900	70	45	0.007	3920	50	35	0.006	2520	30	25	0.006
4.0	3500	85	45	0.012	2800	55	35	0.010	1680	35	20	0.010
5.0	2800	105	45	0.019	2520	75	40	0.015	1400	40	20	0.014
6.0	2520	120	50	0.016	1820	75	35	0.014	1260	50	25	0.013
8.0	1680	135	40	0.027	1400	90	35	0.021	840	55	20	0.022
10.0	1400	135	45	0.032	1260	100	40	0.026	700	55	20	0.026
12.0	1260	155	50	0.041	980	100	35	0.034	630	65	25	0.034
14.0	1120	135	50	0.040	840	100	35	0.040	560	65	25	0.039
16.0	840	135	40	0.054	700	90	35	0.043	420	55	20	0.044
18.0	770	135	45	0.058	630	90	35	0.048	390	55	20	0.047
20.0	700	135	45	0.064	630	90	40	0.048	350	55	20	0.052
22.0	700	135	50	0.048	560	90	40	0.040	350	55	25	0.039
25.0	630	120	50	0.048	490	75	40	0.038	280	40	20	0.036
28.0	560	105	50	0.047	420	70	35	0.042	250	35	20	0.035
30.0	490	90	45	0.046	390	65	35	0.042	250	35	25	0.035



RPM= rev. / min. , FEED= mm / min.
Vc= m / min. , fz= mm / t

COBAL T MILLING CUTTER (FLATTED SHANK)

COBAL T MILLING CUTTER (FLATTED SHANK)

TABLE OF CUTTING CONDITION

(8% CO HSS, SHORT TYPE*)

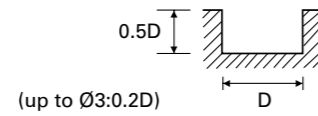


HSS-Co5(M35), 1 FLUTE E/M FOR ALUMINUM

135316, 136316



MATERIAL	ALUMINUM ALUMINUM ALLOYS			
DIAMETER	RPM	FEED	Vc	fz
3.0	20000	1100	188	0.055
4.0	18000	950	226	0.053
5.0	14000	750	220	0.054
6.0	11000	600	207	0.055
7.0	10000	550	220	0.055
8.0	8500	450	214	0.053
10.0	7000	380	220	0.054



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

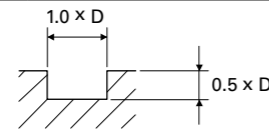
HSS-Co5(M35), 1 FLUTE E/M FOR ALUMINUM, TiAlN-COATED

135327, 136327



SLOTTING

MATERIAL	ALUMINUM ALUMINUM ALLOYS			
DIAMETER	RPM	FEED	Vc	fz
3	16800	390		
4	15400	420		
5	14700	420		
6	14700	490		
7	14000	460		
8	13300	560		
9	13000	630		
10	12600	700		



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION

(8% CO HSS, SHORT TYPE*)



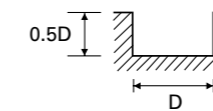
2FLUTE, SHORT LENGTH, FOR ALUMINIUM

131102



SLOTTING

MATERIAL	ALUMINUM NONFERROUS METALS			
DIAMETER	RPM	FEED	Vc	fz
3.0	8000	560	75	0.035
6.0	7000	700	130	0.050
8.0	6000	850	150	0.071
10.0	5000	1200	155	0.120
12.0	5000	1200	190	0.120
14.0	3500	1240	155	0.177
16.0	3500	1240	175	0.177
18.0	2300	1300	130	0.283
20.0	2300	1300	145	0.283

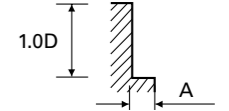


RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

SIDE CUTTING

MATERIAL	ALUMINUM NONFERROUS METALS			
DIAMETER	RPM	FEED	Vc	fz
3.0	8000	730	75	0.046
6.0	7000	900	130	0.064
8.0	6000	1100	150	0.092
10.0	5000	1500	155	0.150
12.0	5000	1500	190	0.150
14.0	3500	1600	155	0.229
16.0	3500	1600	175	0.229
18.0	2300	1700	130	0.370
20.0	2300	1700	145	0.370

A : Ø3-Ø10 = 0.25 x D
Ø12-Ø20 = 0.5 x D



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

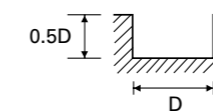
2FLUTE, SHORT LENGTH, FOR ALUMINIUM, TiAlN-COATED

131121



SLOTTING

MATERIAL	ALUMINUM NONFERROUS METALS			
DIAMETER	RPM	FEED	Vc	fz
3.0	10400	730	100	0.035
6.0	9100	910	170	0.050
8.0	7800	1100	195	0.071
10.0	6500	1560	205	0.120
12.0	6500	1560	245	0.120
14.0	4500	1610	200	0.179
16.0	4500	1610	225	0.179
18.0	3000	1700	170	0.283
20.0	3000	1700	190	0.283

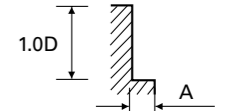


RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

SIDE CUTTING

MATERIAL	ALUMINUM NONFERROUS METALS			
DIAMETER	RPM	FEED	Vc	fz
3.0	10400	950	100	0.046
6.0	9100	1150	170	0.063
8.0	7800	1400	195	0.090
10.0	6500	1950	205	0.150
12.0	6500	1950	245	0.150
14.0	4500	2080	200	0.231
16.0	4500	2080	225	0.231
18.0	3000	2210	170	0.368
20.0	3000	2210	190	0.368

A : Ø3-Ø10 = 0.25 x D
Ø12-Ø20 = 0.5 x D



RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION

(8% CO HSS, SHORT TYPE*)



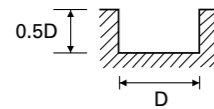
2FLUTE, SLOTTING

102102, 100102, 101102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS											
	~ 500N/mm ²				~ HRC20				HRC20 ~ HRC30			
	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	5600	40	35	0.004	4500	30	30	0.003	4000	30	25	0.004
3.0	3500	55	35	0.008	3200	45	30	0.007	2500	40	25	0.008
4.0	2800	70	35	0.013	2200	55	30	0.013	1800	45	25	0.013
5.0	2200	90	35	0.020	1800	70	30	0.019	1600	60	25	0.019
6.0	1800	90	35	0.025	1600	80	30	0.025	1200	60	25	0.025
8.0	1400	100	35	0.036	1100	90	30	0.041	900	70	25	0.039
10.0	1100	100	35	0.045	900	90	30	0.050	800	80	25	0.050
12.0	900	110	35	0.061	800	100	30	0.063	630	80	25	0.063
14.0	800	110	35	0.069	700	90	30	0.064	560	80	25	0.071
16.0	700	110	35	0.079	560	90	30	0.080	450	70	25	0.078
18.0	630	100	35	0.079	500	90	30	0.090	400	70	25	0.088
20.0	560	100	35	0.089	450	90	30	0.100	400	70	25	0.088
22.0	500	100	35	0.100	450	90	30	0.100	350	70	25	0.100
25.0	450	90	35	0.100	400	80	30	0.100	310	60	25	0.097
28.0	400	80	35	0.100	350	70	30	0.100	280	55	25	0.098
30.0	350	70	35	0.100	310	60	30	0.097	250	50	25	0.100
32.0	350	70	35	0.100	280	55	30	0.098	220	45	20	0.102
36.0	310	60	35	0.097	250	50	30	0.100	200	40	25	0.100
40.0	280	60	35	0.107	220	50	30	0.114	180	40	25	0.111

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS				ALUMINUM ALUMINUM ALLOYS			
	HRC30 ~ HRC40							
	1000 ~ 1300N/mm ²							
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	2200	15	15	0.003	12000	160	75	0.007
3.0	1600	20	15	0.006	11000	250	105	0.011
4.0	1100	30	15	0.014	8000	290	100	0.018
5.0	900	35	15	0.019	6300	310	100	0.025
6.0	800	40	15	0.025	5600	310	105	0.028
8.0	560	45	15	0.040	4000	390	100	0.049
10.0	450	45	15	0.050	3100	400	95	0.065
12.0	400	50	15	0.063	2500	380	95	0.076
14.0	350	50	15	0.071	2200	350	95	0.080
16.0	280	45	15	0.080	2000	350	100	0.088
18.0	250	45	15	0.090	1800	350	100	0.097
20.0	220	45	15	0.102	1600	320	100	0.100
22.0	220	45	15	0.102	1400	300	95	0.107
25.0	180	35	15	0.097	1200	280	95	0.117
28.0	160	30	15	0.094	1100	270	95	0.123
30.0	160	30	15	0.094	1100	270	105	0.123
32.0	140	30	15	0.107	1000	240	100	0.120
36.0	120	25	15	0.104	900	220	100	0.122
40.0	110	25	15	0.114	800	200	100	0.125



* The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION

(8% CO HSS, SHORT TYPE*)



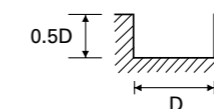
2FLUTE, SLOTTING, TiAlN-COATED

102121, 100121, 101121



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS											
	~ 500N/mm ²				~ HRC20				HRC20 ~ HRC30			
	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	7850	55	50	0.004	6300	40	40	0.003	5600	40	35	0.004
3.0	4900	75	45	0.008	4500	65	40	0.007	3500	55	35	0.008
4.0	3900	100	50	0.013	3100	75	40	0.012	2500	65	30	0.013
5.0	3100	125	50	0.020	2500	100	40	0.020	2250	85	35	0.019
6.0	2500	125	45	0.025	2250	110	40	0.024	1700	85	30	0.025
8.0	1950	140	50	0.036	1550	125	40	0.040	1250	100	30	0.040
10.0	1550	140	50	0.045	1250	125	40	0.050	1100	110	35	0.050
12.0	1250	155	45	0.062	1100	140	40	0.064	900	110	35	0.061
14.0	1100	155	50	0.070	1000	125	45	0.063	800	110	35	0.069
16.0	1000	155	50	0.078	800	125	40	0.078	650	100	35	0.077
18.0	900	140	50	0.078	700	125	40	0.089	550	100	30	0.091
20.0	800	140	50	0.088	650	125	40	0.096	550	100	35	0.091
22.0	700	140	50	0.100	650	125	45	0.096	500	100	35	0.100
25.0	650	125	50	0.096	550	110	45	0.100	450	85	35	0.094
28.0	550	110	50	0.100	500	100	45	0.100	400	75	35	0.094
30.0	500	100	45	0.100	450	85	40	0.094	350	70	35	0.100
32.0	500	100	50	0.100	400	75	40	0.094	300	65	30	0.108
36.0	450	85	50	0.094	350	70	40	0.100	300	55	35	0.092
40.0	400	85	50	0.106	300	70	40	0.117	250	55	30	0.110

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS				ALUMINUM ALUMINUM ALLOYS			
	HRC30 ~ HRC40							
	1000 ~ 1300N/mm ²							
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
2.0	3100	20	20	0.003	16800	225	105	0.007
3.0	2250	30	20	0.007	15400	350	145	0.011
4.0	1550	40	20	0.013	11200	405	140	0.018
5.0	1250	50	20	0.020	8800	435	140	0.025
6.0	1100	55	20	0.025	7850	435	150	0.028
8.0	800	65	20	0.041	5600	545	140	0.049
10.0	650	65	20	0.050	4350	560	135	0.064
12.0	550	70	20	0.064	3500	530	130	0.076
14.0	500	70	20	0.070	3100	490	135	0.079
16.0	400	65	20	0.081	2800	490	140	0.088
18.0	350	65	20	0.093	2500	490	140	0.098
20.0	300	65	20	0.108	2250	450	140	0.100
22.0	300	65	20	0.108	1950	420	135	0.108
25.0	250	50	20	0.100	1700	390	135	0.115
28.0	200	40	20	0.100	1550	380	135	0.123
30.0	200	40	20	0.100	1550	380	145	0.123
32.0	200	40	20	0.100	1400	335	140	0.120
36.0	150	35	15	0.117	1250	310	140	0.124
40.0	150	35	20	0.117	1100	280	140	0.127



* The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION

(8% CO HSS, SHORT TYPE*)

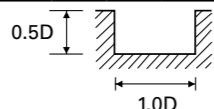


3 FLUTE SLOTTING

105102, 128102, 129102, 103102, 104102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS																ALUMINUM ALUMINUM ALLOYS												
	~ HRC20				HRC20 ~ HRC30				HRC30 ~ HRC40																				
	~ 500N/mm ²				500 ~ 800N/mm ²				800 ~ 1000N/mm ²				1000 ~ 1300N/mm ²																
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	
2.0	5600	35	35	0.002	4500	25	30	0.002	4000	20	25	0.002	2200	10	15	0.002	12000	110	75	0.003									
3.0	3500	50	35	0.005	3200	35	30	0.004	2500	25	25	0.003	1600	15	15	0.003	11000	170	105	0.005									
4.0	2800	60	35	0.007	2200	45	30	0.007	1800	30	25	0.006	1100	20	15	0.006	8000	200	100	0.008									
5.0	2200	80	35	0.012	1800	55	30	0.010	1600	40	25	0.008	900	20	15	0.007	6300	210	100	0.011									
6.0	1800	80	35	0.015	1600	65	30	0.014	1200	40	25	0.011	800	25	15	0.010	5600	210	105	0.013									
8.0	1400	90	35	0.021	1100	70	30	0.021	900	50	25	0.019	560	30	15	0.018	4000	260	100	0.022									
10.0	1100	90	35	0.027	900	70	30	0.026	800	55	25	0.023	450	30	15	0.022	3100	270	95	0.029									
12.0	900	100	35	0.037	800	80	30	0.033	630	55	25	0.029	400	35	15	0.029	2500	260	95	0.035									
14.0	800	100	35	0.042	700	70	30	0.033	560	55	25	0.033	350	35	15	0.033	2200	240	95	0.036									
16.0	700	100	35	0.048	560	70	30	0.042	450	50	25	0.037	280	30	15	0.036	2000	240	100	0.040									
18.0	630	90	35	0.048	500	70	30	0.047	400	50	25	0.042	250	30	15	0.040	1800	240	100	0.044									
20.0	560	90	35	0.054	450	70	30	0.052	400	50	25	0.042	220	30	15	0.045	1600	220	100	0.046									
22.0	500	90	35	0.060	450	70	30	0.052	350	50	25	0.048	220	30	15	0.045	1400	200	95	0.048									
25.0	450	80	35	0.059	400	65	30	0.054	310	40	25	0.043	180	20	15	0.037	1200	190	95	0.053									
28.0	400	70	35	0.058	350	55	30	0.052	280	35	25	0.042	160	20	15	0.042	1100	180	95	0.055									
30.0	350	60	35	0.057	310	50	30	0.054	250	30	25	0.040	160	20	15	0.042	1100	180	105	0.055									
32.0	350	60	35	0.057	280	45	30	0.054	220	30	20	0.045	140	20	15	0.048	1000	160	100	0.053									
35.0	320	55	35	0.057	260	40	30	0.051	210	25	25	0.040	130	15	15	0.038	950	150	105	0.053									
36.0	310	55	35	0.059	250	40	30	0.053	200	25	25	0.042	120	15	15	0.042	900	150	100	0.056									
40.0	280	55	35	0.065	220	40	30	0.061	180	25	25	0.046	110	15	15	0.045	800	130	100	0.054									



※ The FEED, in long & extra long types, should be reduced by around 50%

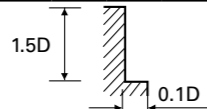
RPM= rev. / min. , FEED= mm / min.
Vc= m / min. , fz= mm / t

3 FLUTE FINISH SIDE CUTTING

105102, 128102, 129102, 103102, 104102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS																ALUMINUM ALUMINUM ALLOYS												
	~ HRC20				HRC20 ~ HRC30				HRC30 ~ HRC40																				
	~ 500N/mm ²				500 ~ 800N/mm ²				800 ~ 1000N/mm ²				1000 ~ 1300N/mm ²																
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	
2.0	5600	60	35	0.004	4500	40	30	0.003	4000	35	25	0.003	2200	15	15	0.002	12000	180	75	0.005									
3.0	3500	80	35	0.008	3200	60	30	0.006	2500	45	25	0.006	1600	20	15	0.004	11000	280	105	0.008									
4.0	2800	105	35	0.013	2200	75	30	0.011	1800	50	25	0.009	1100	30	15	0.009	8000	330	100	0.014									
5.0	2200	135	35	0.020	1800	95	30	0.018	1600	65	25	0.014	900	35	15	0.013	6300	350	100	0.019									
6.0	1800	135	35	0.025	1600	110	30	0.023	1200	65	25	0.018	800	45	15	0.019	5600	350	105	0.021									
8.0	1400	150	35	0.036	1100	120	30	0.036	900	80	25	0.030	560	50	15	0.030	4000	440	100	0.037									
10.0	1100	150	35	0.045	900	120	30	0.044	800	90	25	0.038	450	50	15	0.037	3100	450	95	0.048									
12.0	900	165	35	0.061	800	135	30	0.056	630	90	25	0.048	400	55	15	0.046	2500	430	95	0.057									
14.0	800	165	35	0.069	700	120	30	0.057	560	90	25	0.054	350	55	15	0.052	2200	400	95	0.061									
16.0	700	165	35	0.079	560	120	30	0.071	450	80	25	0.059	280	50	15	0.060	2000	400	100	0.067									
18.0	630	150	35	0.079	500	120	30	0.080	400	80	25	0.067	250	50	15	0.067	1800	400	100	0.074									
20.0	560	150	35	0.089	450	120	30	0.089	400	80	25	0.067	220	50	15	0.076	1600	360	100	0.075									
22.0	500	150	35	0.100	450	120	30	0.089	350	80	25	0.076	220	50	15	0.076	1400	340	95	0.081									
25.0	450	135	35	0.100	400	110	30	0.092	310	65	25	0.070	180	35	15	0.065	1200	320	95	0.089									
28.0	400	120	35	0.100	350	95	30	0.090	280	60	25	0.071	160	30	15	0.063	1100	300	95	0.091									
30.0	350	105	35	0.100	310	80	30	0.086	250	55	25	0.073	160	30	15	0.063	1100	300	105	0.091									
32.0	350	105	35	0.100	280	75	30	0.089	220	50	20	0.076	140	30	15	0.071	1000	270	100	0.090									
35.0	320	95	35	0.099	260	65	30	0.083	210	45	25	0.071	130	25	15	0.064	950	260	105	0.091									
36.0	310	90	35	0.097	250	65	30	0.087	200	45	25	0.075	120	25	15	0.069	900	250	100	0.093									
40.0	280	90	35	0.107	220	65	30	0.098	180	45	25	0.083	110	25	15	0.076	800	220	100	0.092									



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min. , FEED= mm / min.
Vc= m / min. , fz= mm / t

TABLE OF CUTTING CONDITION

(8% CO HSS, SHORT TYPE*)



3 FLUTE SLOTTING, TiAIN-COATED

105121, 128121, 129121, 103121, 104121



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS																ALUMINUM ALUMINUM ALLOYS												
	~ HRC20				HRC20 ~ HRC30				HRC30 ~ HRC40																				
	~ 500N/mm ²				500 ~ 800N/mm ²				800 ~ 1000N/mm ²				1000 ~ 1300N/mm ²																
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	
2.0	7900	50	50	0.002	6300	35	40	0.002	5600	30	35	0.002	3100	15	20	0.002	16800	150	105	0.003									
3.0	4900	70	45	0.005	4500	50	40	0.004	3500	35	35	0.003	2200	20	20	0.003	15400	240	145	0.005									
4.0	3900	85	50	0.007	3100	60	40	0.006	2500	40	30	0.005	1500	30	20	0.007	11200	280	140	0.008									
5.0	3100	110	50	0.012	2500	75	40	0.010	2200	55	35	0.008	1300	30	20	0.008	8800	290	140	0.011									
6.0	2500	110	45	0.015	2200	90	40	0.014	1700	55	30	0.011	1100	35	20	0.011	7800	290	145	0.012									
8.0	2000	125	50	0.021																									

TABLE OF CUTTING CONDITION

[8% CO HSS, SHORT TYPE*]

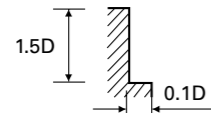


4&6 FLUTE, FINISH SIDE CUTTING

107102, 108102

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS													
	~ HRc20				HRc20 ~ HRc30									
	~ 500N/mm ²				500 ~ 800N/mm ²				800 ~ 1000N/mm ²					
HARDNESS	DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	
STRENGTH														
2.0	5600	80	35	0.004	4500	55	30	0.003	4000	45	25	0.003		
3.0	3500	110	35	0.008	3200	80	30	0.006	2500	60	25	0.006		
4.0	2800	140	35	0.013	2200	100	30	0.011	1800	65	25	0.009		
5.0	2200	180	35	0.020	1800	125	30	0.017	1600	90	25	0.014		
6.0	1800	180	35	0.025	1600	145	30	0.023	1200	90	25	0.019		
8.0	1400	200	35	0.036	1100	160	30	0.036	900	105	25	0.029		
10.0	1100	200	35	0.045	900	160	30	0.044	800	120	25	0.038		
12.0	900	220	35	0.061	800	180	30	0.056	630	120	25	0.048		
14.0	800	220	35	0.069	700	160	30	0.057	560	120	25	0.054		
16.0	700	220	35	0.079	560	160	30	0.071	450	105	25	0.058		
18.0	630	200	35	0.079	500	160	30	0.080	400	105	25	0.066		
20.0	560	200	35	0.089	450	160	30	0.089	400	105	25	0.066		
22.0	500	200	35	0.067	450	160	30	0.059	350	105	25	0.050		
25.0	450	180	35	0.067	400	145	30	0.060	310	90	25	0.048		
28.0	400	160	35	0.067	350	125	30	0.060	280	80	25	0.048		
30.0	350	140	35	0.067	310	110	30	0.059	250	75	25	0.050		
32.0	350	140	35	0.067	280	100	30	0.060	220	65	20	0.049		
36.0	310	120	35	0.065	250	90	30	0.060	200	60	25	0.050		
40.0	280	120	35	0.071	220	90	30	0.068	180	60	25	0.056		

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS				ALUMINUM ALUMINUM ALLOYS					
	HRc30 ~ HRc40									
	1000 ~ 1300N/mm ²									
HARDNESS	DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	
STRENGTH										
2.0	2200	20	15	0.002	12000	240	75	0.005		
3.0	1600	30	15	0.005	11000	380	105	0.009		
4.0	1100	45	15	0.010	8000	440	100	0.014		
5.0	900	50	15	0.014	6300	470	100	0.019		
6.0	800	60	15	0.019	5600	470	105	0.021		
8.0	560	65	15	0.029	4000	580	100	0.036		
10.0	450	65	15	0.036	3100	600	95	0.048		
12.0	400	75	15	0.047	2500	570	95	0.057		
14.0	350	75	15	0.054	2200	530	95	0.060		
16.0	280	65	15	0.058	2000	530	100	0.066		
18.0	250	65	15	0.065	1800	530	100	0.074		
20.0	220	65	15	0.074	1600	480	100	0.075		
22.0	220	65	15	0.049	1400	450	95	0.054		
25.0	180	50	15	0.046	1200	420	95	0.058		
28.0	160	45	15	0.047	1100	400	95	0.061		
30.0	160	45	15	0.047	1100	400	105	0.061		
32.0	140	45	15	0.054	1000	360	100	0.060		
36.0	120	35	15	0.049	900	330	100	0.061		
40.0	110	35	15	0.053	800	300	100	0.063		



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION

[8% CO HSS, SHORT TYPE*]

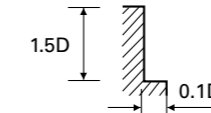


4&6 FLUTE, FINISH SIDE CUTTING, TiAIN-COATED

107121, 108121

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS													
	~ HRc20				HRc20 ~ HRc30									
	~ 500N/mm ²				500 ~ 800N/mm ²				800 ~ 1000N/mm ²					
HARDNESS	DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	
STRENGTH														
2.0	7850	110	50	0.004	6300	75	40	0.003	5600	65	35	0.003		
3.0	4900	155	45	0.008	4500	110	40	0.006	3500	85	35	0.006		
4.0	3900	195	50	0.013	3100	140	40	0.011	2500	90	30	0.009		
5.0	3100	250	50	0.020	2500	175	40	0.018	2250	125	35	0.014		
6.0	2500	250	45	0.025	2250	205	40	0.023	1700	125	30	0.018		
8.0	1950	280	50	0.036	1550	225	40	0.036	1250	145	30	0.029		
10.0	1550	280	50	0.045	1250	225	40	0.045	1100	170	35	0.039		
12.0	1250	310	45	0.062	1100	250	40	0.057	900	170	35	0.047		
14.0	1100	310	50	0.070	1000	225	45	0.056	800	170	35	0.053		
16.0	1000	310	50	0.078	800	225	40	0.070	650	145	35	0.056		
18.0	900	280	50	0.078	700	225	40	0.080	550	145	30	0.066		
20.0	800	280	50	0.088	650	225	40	0.087	550	145	35	0.066		
22.0	700	280	50	0.067	650	225	45	0.058	500	145	35	0.048		
25.0	650	250	50	0.064	550	205	45	0.062	450	125	35	0.046		
28.0	550	225	50	0.068	500	175	45	0.058	400	110	35	0.046		
30.0	500	195	45	0.065	450	155	40	0.057	350	105	35	0.050		
32.0	500	195	50	0.065	400	140	40	0.058	300	90	30	0.050		
36.0	450	170	50	0.063	350	125	40	0.060	300	85	35	0.047		
40.0	400	170	50	0.071	300	125	40	0.069	250	85	30	0.057		

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS				ALUMINUM ALUMINUM ALLOYS					
	HRc30 ~ HRc40									
	1000 ~ 1300N/mm ²									
HARDNESS	DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	
STRENGTH										
2.0	3100	30	20	0.002	16800	335	105	0.005		
3.0	2250	40	20	0.004	15400	530	145	0.009		
4.0	1550	65	20	0.010	11200	615	140	0.014		
5.0	1250	70	20	0.014	8800	660	140	0.019		
6.0	1100	85	20	0.019	7850	660	150	0.021		
8.0	800	90	20	0.028	5600	810	140	0.036		
10.0	650	90	20	0.035	4350	840	135	0.048		
12.0	550	105	20	0.048	3500	800	130	0.057		
14.0	500	105	20	0.053	3100	740	135	0.060		
16.0	400	90	20	0.056	2800	740	140	0.066		
18.0	350	90	20	0.064	2500	740	140	0.074		
20.0	300	90	20	0.075	2250	670	140	0.074		
22.0	300	90	20	0.050	1950	630	135	0.054		
25.0	250	70	20	0.047	1700	590	135	0.058		
28.0	200	65	20	0.054	1550	560	135	0.060		
30.0	200	65	20	0.054	1550	560	145	0.060		
32.0	200	65	20	0.054	1400	505	140	0.060		
36.0	150	50	15	0.056	1250	460	140	0.061		
40.0	150	50	20	0.056	1100	420	140	0.064		



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

COBALT MILLING CUTTER (FLATTED SHANK)

COBALT MILLING CUTTER (FLATTED SHANK)

TABLE OF CUTTING CONDITION

(8% CO HSS, SHORT TYPE*)



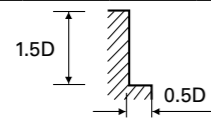
MULTI FLUTE, SIDE CUTTING, ROUGHING

118102, 119102, 121102, 124102, 125102, 122102, 133102, 134102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS											
	~ HRC20				HRC20 ~ HRC30							
	~ 500N/mm ²				500 ~ 800N/mm ²				800 ~ 1000N/mm ²			
HARDNESS												
STRENGTH												
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	1800	80	35	0.015	1600	60	30	0.013	1200	55	25	0.015
8.0	1400	105	35	0.025	1100	75	30	0.023	900	65	25	0.024
10.0	1100	150	35	0.034	900	120	30	0.033	800	110	25	0.034
12.0	900	180	35	0.050	800	140	30	0.044	630	110	25	0.044
14.0	800	180	35	0.056	700	140	30	0.050	560	110	25	0.049
16.0	700	180	35	0.064	560	140	30	0.063	450	110	25	0.061
18.0	630	180	35	0.071	500	140	30	0.070	400	110	25	0.069
20.0	560	180	35	0.080	450	140	30	0.078	400	110	25	0.069
22.0	500	220	35	0.088	450	170	30	0.076	350	140	25	0.080
25.0	450	220	35	0.098	400	170	30	0.085	310	140	25	0.090
28.0	400	210	35	0.088	350	160	30	0.076	280	130	25	0.077
30.0	350	210	35	0.100	310	160	30	0.086	250	130	25	0.087
32.0	350	210	35	0.100	280	160	30	0.095	220	130	20	0.098
36.0	310	210	35	0.113	250	160	30	0.107	200	130	25	0.108
40.0	280	200	35	0.119	220	150	30	0.114	180	120	25	0.111
50.0	220	200	35	0.152	180	170	30	0.157	160	140	25	0.146

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS				ALUMINUM ALUMINUM ALLOYS			
	HRC30 ~ HRC40							
	1000 ~ 1300N/mm ²							
HARDNESS								
STRENGTH								
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	800	30	15	0.013	4500	200	85	0.015
8.0	560	35	15	0.021	3100	230	80	0.025
10.0	450	60	15	0.033	2500	350	80	0.035
12.0	400	70	15	0.044	2000	400	75	0.050
14.0	350	70	15	0.050	1800	420	80	0.058
16.0	280	70	15	0.063	1600	450	80	0.070
18.0	250	70	15	0.070	1400	470	80	0.084
20.0	220	70	15	0.080	1200	500	75	0.104
22.0	220	85	15	0.077	1100	470	75	0.085
25.0	180	85	15	0.094	1000	450	80	0.090
28.0	160	85	15	0.089	900	510	80	0.094
30.0	160	85	15	0.089	900	530	85	0.098
32.0	140	85	15	0.101	800	500	80	0.104
36.0	120	85	15	0.118	700	470	80	0.112
40.0	110	80	15	0.121	630	450	80	0.119
50.0	90	80	15	0.148	500	370	80	0.123



* The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION

(8% CO HSS, SHORT TYPE*)



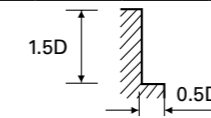
MULTI FLUTE, SIDE CUTTING, ROUGHING, TiAIN-COATED

118121, 119121, 121121, 124121, 125121, 122121, 133121, 134121



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS											
	~ HRC20				HRC20 ~ HRC30							
	~ 500N/mm ²				500 ~ 800N/mm ²				800 ~ 1000N/mm ²			
HARDNESS												
STRENGTH												
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	2500	110	45	0.015	2250	85	40	0.013	1700	75	30	0.015
8.0	1950	145	50	0.025	1550	105	40	0.023	1250	90	30	0.024
10.0	1550	210	50	0.034	1250	170	40	0.034	1100	155	35	0.035
12.0	1250	250	45	0.050	1100	195	40	0.044	900	155	35	0.043
14.0	1100	250	50	0.057	1000	195	45	0.049	800	155	35	0.048
16.0	1000	250	50	0.063	800	195	40	0.061	650	155	35	0.060
18.0	900	250	50	0.069	700	195	40	0.070	550	155	30	0.070
20.0	800	250	50	0.078	650	195	40	0.075	550	155	35	0.070
22.0	700	310	50	0.089	650	240	45	0.074	500	195	35	0.078
25.0	650	310	50	0.095	550	240	45	0.087	450	195	35	0.087
28.0	550	295	50	0.089	500	225	45	0.075	400	180	35	0.075
30.0	500	295	45	0.098	450	225	40	0.083	350	180	35	0.086
32.0	500	295	50	0.098	400	225	40	0.094	300	180	30	0.100
36.0	450	295	50	0.109	350	225	40	0.107	300	180	35	0.100
40.0	400	280	50	0.117	300	210	40	0.117	250	170	30	0.113
50.0	300	280	45	0.156	250	240	40	0.160	220	195	35	0.148

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS				ALUMINUM ALUMINUM ALLOYS			
	HRC30 ~ HRC40							
	1000 ~ 1300N/mm ²							
HARDNESS								
STRENGTH								
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	1100	40	20	0.012	6300	280	120	0.015
8.0	800	50	20	0.021	4350	320	110	0.025
10.0	650	85	20	0.033	3500	490	110	0.035
12.0	550	100	20	0.045	2800	560	105	0.050
14.0	500	100	20	0.050	2500	590	110	0.059
16.0	400	100	20	0.063	2250	630	115	0.070
18.0	350	100	20	0.071	1950	660	110	0.085
20.0	300	100	20	0.083	1700	700	105	0.103
22.0	300	120	20	0.080	1550	660	105	0.085
25.0	250	120	20	0.096	1400	630	110	0.090
28.0	220	120	20	0.091	1250	715	110	0.095
30.0	220	120	20	0.091	1250	740	120	0.099
32.0	200	120	20	0.100	1100	700	110	0.106
36.0	170	120	20	0.118	1000	660	115	0.110
40.0	130	110	15	0.141	900	630	115	0.117
50.0	120	110	20	0.153	700	520	110	0.124



* The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION

(8% CO HSS, SHORT TYPE*)

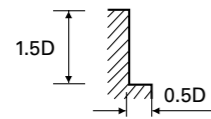


MULTI FLUTE, ROUGHING SHORT LENGTH

121113

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS											
	~ HRC20				HRC20 ~ HRC30							
	~ 500N/mm ²				500 ~ 800N/mm ²				800 ~ 1000N/mm ²			
HARDNESS												
STRENGTH												
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	1800	80	35	0.015	1600	60	30	0.013	1200	55	25	0.015
8.0	1400	105	35	0.025	1100	75	30	0.023	900	65	25	0.024
10.0	1100	150	35	0.034	900	120	30	0.033	800	110	25	0.034
12.0	900	180	35	0.050	800	140	30	0.044	630	110	25	0.044
14.0	800	180	35	0.056	700	140	30	0.050	560	110	25	0.049
16.0	700	180	35	0.064	560	140	30	0.063	450	110	25	0.061
18.0	630	180	35	0.071	500	140	30	0.070	400	110	25	0.069
20.0	560	180	35	0.080	450	140	30	0.078	400	110	25	0.069
22.0	500	220	35	0.088	450	170	30	0.076	350	140	25	0.080
25.0	450	220	35	0.098	400	170	30	0.085	310	140	25	0.090
28.0	400	210	35	0.088	350	160	30	0.076	280	130	25	0.077
30.0	350	210	35	0.100	310	160	30	0.086	250	130	25	0.087
32.0	350	210	35	0.100	280	160	30	0.095	220	130	20	0.098
36.0	310	210	35	0.113	250	160	30	0.107	200	130	25	0.108
40.0	280	200	35	0.119	220	150	30	0.114	180	120	25	0.111
50.0	220	200	35	0.152	180	170	30	0.157	160	140	25	0.146

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS				ALUMINUM ALUMINUM ALLOYS			
	HRC30 ~ HRC40							
	1000 ~ 1300N/mm ²							
HARDNESS								
STRENGTH								
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	800	30	15	0.013	4500	200	85	0.015
8.0	560	35	15	0.021	3100	230	80	0.025
10.0	450	60	15	0.033	2500	350	80	0.035
12.0	400	70	15	0.044	2000	400	75	0.050
14.0	350	70	15	0.050	1800	420	80	0.058
16.0	280	70	15	0.063	1600	450	80	0.070
18.0	250	70	15	0.070	1400	470	80	0.084
20.0	220	70	15	0.080	1200	500	75	0.104
22.0	220	85	15	0.077	1100	470	75	0.085
25.0	180	85	15	0.094	1000	450	80	0.090
28.0	160	85	15	0.089	900	510	80	0.094
30.0	160	85	15	0.089	900	530	85	0.098
32.0	140	85	15	0.101	800	500	80	0.104
36.0	120	85	15	0.118	700	470	80	0.112
40.0	110	80	15	0.121	630	450	80	0.119
50.0	90	80	15	0.148	500	370	80	0.123



* The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION

(8% CO HSS, SHORT TYPE*)

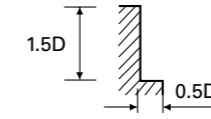


MULTI FLUTE, ROUGHING SHORT LENGTH, TiAIN-COATED

121122

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS											
	~ HRC20				HRC20 ~ HRC30							
	~ 500N/mm ²				500 ~ 800N/mm ²				800 ~ 1000N/mm ²			
HARDNESS												
STRENGTH												
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	2500	110	45	0.015	2250	85	40	0.013	1700	75	30	0.015
8.0	1950	145	50	0.025	1550	105	40	0.023	1250	90	30	0.024
10.0	1550	210	50	0.034	1250	170	40	0.034	1100	155	35	0.035
12.0	1250	250	45	0.050	1100	195	40	0.044	900	155	35	0.043
14.0	1100	250	50	0.057	1000	195	45	0.049	800	155	35	0.048
16.0	1000	250	50	0.063	800	195	40	0.061	650	155	35	0.060
18.0	900	250	50	0.069	700	195	40	0.070	550	155	30	0.070
20.0	800	250	50	0.078	650	195	40	0.075	550	155	35	0.070
22.0	700	310	50	0.089	650	240	45	0.074	500	195	35	0.078
25.0	650	310	50	0.095	550	240	45	0.087	450	195	35	0.087
28.0	550	295	50	0.089	500	225	45	0.075	400	180	35	0.075
30.0	500	295	45	0.098	450	225	40	0.083	350	180	35	0.086
32.0	500	295	50	0.098	400	225	40	0.094	300	180	30	0.100
36.0	450	295	50	0.109	350	225	40	0.107	300	180	35	0.100
40.0	400	280	50	0.117	300	210	40	0.117	250	170	30	0.113
50.0	300	280	45	0.156	250	240	40	0.160	220	195	35	0.148

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS				ALUMINUM ALUMINUM ALLOYS			
	HRC30 ~ HRC40							
	1000 ~ 1300N/mm ²							
HARDNESS								
STRENGTH								
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	1100	40	20	0.012	6300	280	120	0.015
8.0	800	50	20	0.021	4350	320	110	0.025
10.0	650	85	20	0.033	3500	490	110	0.035
12.0	550	100	20	0.045	2800	560	105	0.050
14.0	500	100	20	0.050	2500	590	110	0.059
16.0	400	100	20	0.063	2250	630	115	0.070
18.0	350	100	20	0.071	1950	660	110	0.085
20.0	300	100	20	0.083	1700	700	105	0.103
22.0	300	120	20	0.080	1550	660	105	0.085
25.0	250	120	20	0.096	1400	630	110	0.090
28.0	220	120	20	0.091	1250	715	110	0.095
30.0	220	120	20	0.091	1250	740	120	0.099
32.0	200	120	20	0.100	1100	700	110	0.106
36.0	170	120	20	0.118	1000	660	115	0.110
40.0	130	110	15	0.141	900	630	115	0.117
50.0	120	110	20	0.153	700	520	110	0.124



* The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION

(8% CO HSS, SHORT TYPE*)

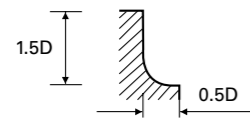


3&4 FLUTE, BALL LOSE ROUGHING SHORT LENGTH

127102 

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS											
	~ HRc20				HRc20 ~ HRc30							
HARDNESS												
STRENGTH	~ 500N/mm ²				500 ~ 800N/mm ²				800 ~ 1000N/mm ²			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R4.0 × 8.0	1400	105	35	0.025	1100	75	30	0.023	900	65	25	0.024
R5.0 × 10.0	1100	150	35	0.045	900	120	30	0.044	800	110	25	0.046
R6.0 × 12.0	900	180	35	0.050	800	140	30	0.044	630	110	25	0.044
R8.0 × 16.0	700	180	35	0.064	560	140	30	0.063	450	110	25	0.061
R10.0 × 20.0	560	180	35	0.080	450	140	30	0.078	400	110	25	0.069
R12.5 × 25.0	450	220	35	0.122	400	170	30	0.106	310	140	25	0.113
R16.0 × 32.0	350	210	35	0.150	280	160	30	0.143	220	130	20	0.148
R20.0 × 40.0	280	200	35	0.179	220	150	30	0.170	180	120	25	0.167

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS				ALUMINUM ALUMINUM ALLOYS			
	HRc30 ~ HRc40							
HARDNESS								
STRENGTH	1000 ~ 1300N/mm ²							
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R4.0 × 8.0	560	35	15	0.021	3100	230	80	0.025
R5.0 × 10.0	450	60	15	0.044	2500	250	80	0.033
R6.0 × 12.0	400	70	15	0.044	2000	400	75	0.050
R8.0 × 16.0	280	70	15	0.063	1600	450	80	0.070
R10.0 × 20.0	220	70	15	0.080	1200	500	75	0.104
R12.5 × 25.0	180	85	15	0.118	1000	450	80	0.113
R16.0 × 32.0	140	85	15	0.152	800	500	80	0.156
R20.0 × 40.0	110	80	15	0.182	630	450	80	0.179



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION

(8% CO HSS, SHORT TYPE*)

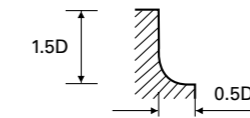


3&4 FLUTE, BALL LOSE ROUGHING SHORT LENGTH, TiAlN-COATED

127121 

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS											
	~ HRc20				HRc20 ~ HRc30							
HARDNESS												
STRENGTH	~ 500N/mm ²				500 ~ 800N/mm ²				800 ~ 1000N/mm ²			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R4.0 × 8.0	1960	150	50	0.026	1540	105	40	0.023	1260	90	30	0.024
R5.0 × 10.0	1540	210	50	0.045	1260	170	40	0.045	1120	155	35	0.046
R6.0 × 12.0	1260	250	50	0.050	1120	195	40	0.044	880	155	35	0.044
R8.0 × 16.0	980	250	50	0.064	790	195	40	0.062	630	155	30	0.062
R10.0 × 20.0	790	250	50	0.079	630	195	40	0.077	560	155	35	0.069
R12.5 × 25.0	630	310	50	0.123	560	240	45	0.107	440	195	35	0.111
R16.0 × 32.0	490	295	50	0.151	390	225	40	0.144	310	180	30	0.145
R20.0 × 40.0	390	280	50	0.179	310	210	40	0.169	250	170	30	0.170

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS				ALUMINUM ALUMINUM ALLOYS			
	HRc30 ~ HRc40							
HARDNESS								
STRENGTH	1000 ~ 1300N/mm ²							
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
R4.0 × 8.0	790	50	20	0.021	4340	320	110	0.025
R5.0 × 10.0	630	85	20	0.045	3500	350	110	0.033
R6.0 × 12.0	560	100	20	0.045	2800	560	105	0.050
R8.0 × 16.0	390	100	20	0.064	2240	630	115	0.070
R10.0 × 20.0	310	100	20	0.081	1680	700	105	0.104
R12.5 × 25.0	250	120	20	0.120	1400	630	110	0.113
R16.0 × 32.0	200	120	20	0.150	1120	700	115	0.156
R20.0 × 40.0	160	110	20	0.172	880	630	110	0.179



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION

(8% CO HSS, SHORT TYPE*)

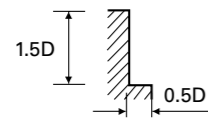


MULTI FLUTE SIDE CUTTING, ROUGHING & FINISHING

126102, 138102, 139102, 137102 

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS											
	~ HRc20				HRc20 ~ HRc30							
	~ 500N/mm ²				500 ~ 800N/mm ²				800 ~ 1000N/mm ²			
HARDNESS												
STRENGTH												
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	1800	65	35	0.012	1600	50	30	0.010	1200	45	25	0.013
8.0	1400	85	35	0.015	1100	60	30	0.014	900	50	25	0.014
10.0	1100	120	35	0.027	900	95	30	0.026	800	90	25	0.028
12.0	900	145	35	0.040	800	110	30	0.034	630	90	25	0.036
14.0	800	145	35	0.045	700	110	30	0.039	560	90	25	0.040
16.0	700	145	35	0.052	560	110	30	0.049	450	90	25	0.050
18.0	630	145	35	0.058	500	110	30	0.055	400	90	25	0.056
20.0	560	145	35	0.065	450	110	30	0.061	400	90	25	0.056
22.0	500	175	35	0.070	450	135	30	0.060	350	110	25	0.063
25.0	450	175	35	0.078	400	135	30	0.068	310	110	25	0.071
28.0	400	170	35	0.085	350	130	30	0.074	280	105	25	0.075
30.0	350	170	35	0.097	310	130	30	0.084	250	105	25	0.084
32.0	350	170	35	0.097	280	130	30	0.093	220	105	25	0.095
36.0	310	170	35	0.091	250	130	30	0.087	200	105	25	0.088
40.0	280	160	35	0.095	220	120	30	0.091	180	95	25	0.088

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS				ALUMINUM ALUMINUM ALLOYS			
	HRc30 ~ HRc40							
	1000 ~ 1300N/mm ²							
HARDNESS								
STRENGTH								
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	800	25	15	0.010	4500	160	85	0.012
8.0	560	30	15	0.013	3100	185	80	0.015
10.0	450	50	15	0.028	2500	280	80	0.028
12.0	400	55	15	0.034	2000	320	80	0.040
14.0	350	55	15	0.039	1800	340	80	0.047
16.0	280	55	15	0.049	1600	360	80	0.056
18.0	250	55	15	0.055	1400	380	80	0.068
20.0	220	55	15	0.063	1200	400	80	0.083
22.0	220	70	15	0.064	1100	380	80	0.069
25.0	180	70	15	0.078	1000	360	80	0.072
28.0	160	70	15	0.088	900	410	80	0.091
30.0	160	70	15	0.088	900	420	85	0.093
32.0	140	70	15	0.100	800	400	80	0.100
36.0	120	70	15	0.097	700	380	80	0.090
40.0	110	65	15	0.098	630	360	80	0.095



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

TABLE OF CUTTING CONDITION

(8% CO HSS, SHORT TYPE*)

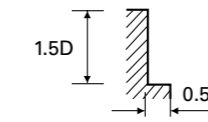


MULTI FLUTE SIDE CUTTING, ROUGHING & FINISHING, TiAlN-COATED

126121, 138121, 139121, 137121 

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS											
	~ HRc20				HRc20 ~ HRc30							
	~ 500N/mm ²				500 ~ 800N/mm ²				800 ~ 1000N/mm ²			
HARDNESS												
STRENGTH												
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	2500	90	50	0.012	2250	70	40	0.010	1700	65	30	0.013
8.0	1950	120	50	0.015	1550	85	40	0.014	1250	70	30	0.014
10.0	1550	170	50	0.027	1250	135	40	0.027	1100	125	35	0.028
12.0	1250	205	50	0.041	1100	155	40	0.035	900	125	35	0.035
14.0	1100	205	50	0.047	1000	155	45	0.039	800	125	35	0.039
16.0	1000	205	50	0.051	800	155	40	0.048	650	125	35	0.048
18.0	900	205	50	0.057	700	155	40	0.055	550	125	30	0.057
20.0	800	205	50	0.064	650	155	40	0.060	550	125	35	0.057
22.0	700	245	50	0.070	650	190	45	0.058	500	155	35	0.062
25.0	650	245	50	0.075	550	190	45	0.069	450	155	35	0.069
28.0	550	240	50	0.087	500	180	45	0.072	400	145	35	0.073
30.0	500	240	50	0.096	450	180	40	0.080	350	145	35	0.083
32.0	500	240	50	0.096	400	180	40	0.090	300	145	30	0.097
36.0	450	240	50	0.089	350	180	40	0.086	280	145	30	0.086
40.0	400	225	50	0.094	300	170	40	0.094	250	135	30	0.090

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS				ALUMINUM ALUMINUM ALLOYS			
	HRc30 ~ HRc40							
	1000 ~ 1300N/mm ²							
HARDNESS								
STRENGTH								
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
6.0	1100	35	20	0.011	6300	225	120	0.012
8.0	800	40	20	0.013	4350	260	110	0.015
10.0	650	70	20	0.027	3500	390	110	0.028
12.0	550	75	20	0.034	2800	450	105	0.040
14.0	500	75	20	0.038	2500	475	110	0.048
16.0	400	75	20	0.047	2250	505	115	0.056
18.0	350	75	20	0.054	1950	530	110	0.068
20.0	300	75	20	0.063	1700	560	105	0.082
22.0	300	100	20	0.067	1550	530	105	0.068
25.0	250	100	20	0.080	1400	505	110	0.072
28.0	200	100	20	0.100	1250	575	110	0.092
30.0	200	100	20	0.100	1250	590	120	0.094
32.0	170	100	15	0.118	1100	560	110	0.102
36.0	150	100	15	0.111	1000	530	115	0.088
40.0	150	90	20	0.100	900	505	115	0.094



※ The FEED, in long & extra long types, should be reduced by around 50%

RPM= rev. / min.
FEED= mm / min.
Vc= m / min.
fz= mm / t

HSS & COBALT MILLING CUTTERS (SCREWED SHANK) CONTENTS

(Standard cobalt milling cutter range)

Europa Tool 11th Edition

HSS & COBALT MILLING CUTTERS (SCREWED SHANK)





www.europatool.co.uk


PRODUCTS	SERIES		DESCRIPTION	PAGE
	Europa	Clarkson		

HSS Screwed Shank (Metric)



2 FLUTE BS STANDARD (METRIC)

	301201 301202	10M/13M 10PM/13PM	STANDARD LENGTH SCREWED SHANK	304
	302201 302202	11M/16M 11PM	LONG SERIES SCREWED SHANK	306



3 FLUTE BS STANDARD (METRIC)

	304202	-	STANDARD LENGTH SCREWED SHANK	308
	305202	-	LONG SERIES SCREWED SHANK	309



3 FLUTE BS STANDARD THROW AWAY (METRIC)

	328102	24M	STANDARD LENGTH THROW AWAY	310
	329102	24L	LONG SERIES THROW AWAY	311
	334102	24N	BALL NOSED THROW AWAY	312



MULTI FLUTE BS STANDARD (METRIC)

	307201 307202	01M/03M 01PM/03PM	STANDARD LENGTH SCREWED SHANK	313
	308201 308202	02M/04M 02PM/04PM	LONG SERIES SCREWED SHANK	315

2 FLUTE BS STANDARD (METRIC)

	313201 313202	14M	STANDARD LENGTH SCREWED SHANK	316
	314201 314202	27M	LONG SERIES SCREWED SHANK	317

COARSE PITCH ROUGHING END MILLS (METRIC)


	118202	776M/777M	STANDARD LENGTH SCREWED SHANK	318
	119202	776L/777L	LONG SERIES SCREWED SHANK	319

HSS & COBALT MILLING CUTTERS (SCREWED SHANK) CONTENTS


(Standard cobalt milling cutter range)

PRODUCTS	SERIES		DESCRIPTION	PAGE
	Europa	Clarkson		

FINE PITCH ROUGHING END MILLS (METRIC)



	121202	776M	STANDARD LENGTH SCREWED SHANK	320
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3FLUTE COARSE PITCH ROUGHING FOR ALUMINIUM (METRIC)



	124202	104M	STANDARD LENGTH SCREWED SHANK	321
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HSS Screwed Shank (Imperial)




2 FLUTE BS STANDARD

	501201 501202	100/101/130/131 10P/13P	STANDARD LENGTH SCREWED SHANK	322
	502201 502202	110/111 11P	LONG SERIES SCREWED SHANK	324



3 FLUTE BS STANDARD

	504202	103	STANDARD LENGTH SCREWED SHANK	326
	505202	113	LONG SERIES SCREWED SHANK	327



3 FLUTE BS STANDARD THROW AWAY

	528102	245	STANDARD LENGTH THROW AWAY	328
	529102	246	LONG SERIES THROW AWAY	329
	530102	247	BALL NOSED THROW AWAY	330

MULTI FLUTE BS STANDARD

	507201 507202	010/011/030/031 01P/03P	STANDARD LENGTH SCREWED SHANK	331
	508201 508202	020/011/030/031 02P/03P	LONG SERIES SCREWED SHANK	333

2 FLUTE BS STANDARD



	513201 513202	140	STANDARD LENGTH SCREWED SHANK	335
	514201 514202	270	LONG SERIES SCREWED SHANK	336

HSS & COBALT MILLING CUTTERS (SCREWED SHANK) CONTENTS

(Standard cobalt milling cutter range)

PRODUCTS	SERIES		DESCRIPTION	PAGE
	Europa	Clarkson		


COARSE PITCH ROUGHING END MILLS

	518202	760/770/771	STANDARD LENGTH SCREWED SHANK	337
	519202	762/772/773	LONG SERIES SCREWED SHANK	338

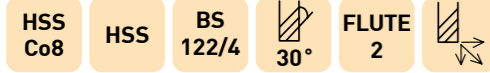
FINE PITCH ROUGHING END MILLS

	521202	-	STANDARD LENGTH SCREWED SHANK	339
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3FLUTE COARSE PITCH ROUGHING FOR ALUMINIUM

	524202	-	STANDARD LENGTH SCREWED SHANK	340
CUTTING DATA				341 ~ 345

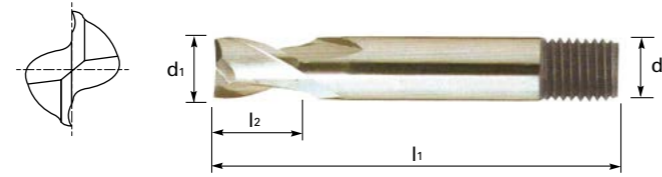
2 FLUTE, STANDARD SERIES



Series No. 301202, 301201

Clarkson No. 10PM/13PM, 10M/13M

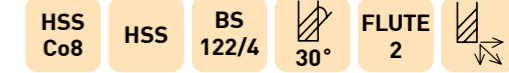
► cutting conditions : p.341



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code		Clarkson Code	
				HSS Co8	HSS	HSS Co8	HSS
1.5	6	2.5	48.5	3012020150	-	10PM03	-
2.0	6	3	49	3012020200	-	10PM04	-
2.5	6	4.5	51	3012020250	-	10PM05	-
3.0	6	7	51	3012020300	-	10PM06	-
3.5	6	7.5	52.5	3012020350	-	10PM07	-
4.0	6	9.5	52.5	3012020400	-	10PM08	-
4.5	6	9.5	52.5	3012020450	-	10PM09	-
5.0	6	9.5	52.5	3012020500	-	10PM10	-
5.5	6	11	55.5	3012020550	-	10PM11	-
6.0	6	11	56.5	3012020600	-	10PM12	-
6.5	10	11	58.5	3012020650	3012010650	10PM13	10M13
7.0	10	11	58.5	3012020700	3012010700	10PM14	10M14
7.5	10	11	58.5	3012020750	3012010750	10PM15	10M15
8.0	10	12.5	59.5	3012020800	3012010800	10PM16	10M16
8.5	10	14.5	60.5	3012020850	3012010850	10PM17	10M17
9.0	10	14.5	60.5	3012020900	3012010900	10PM18	10M18
9.5	10	14.5	60.5	3012020950	3012010950	-	10M19
10.0	10	14.5	60.5	3012021000	3012011000	10PM20	10M20
10.5	12	17.5	65	3012021050	3012011050	-	10M21
11.0	12	17.5	65	3012021100	3012011100	10PM22	10M22
11.5	12	17.5	65	3012021150	3012011150	-	10M23
12.0	12	19	66.5	3012021200	3012011200	10PM24	10M24
13.0	12	19	66.5	3012021300	3012011300	10PM26	10M26
14.0	12	22	68.5	3012021400	3012011400	10PM28	10M28
15.0	16	22	72	3012021500	3012011500	10PM30	10M30
16.0	16	22	72	3012021600	3012011600	10PM32	10M32
17.0	16	24	72	3012021700	3012011700	10PM34	10M34
18.0	16	24	72	3012021800	3012011800	10PM36	10M36
19.0	16	25.5	77	3012021900	3012011900	10PM38	10M38
20.0	16	25.5	77	3012022000	3012012000	10PM40	10M40

Avialable only while stocks last

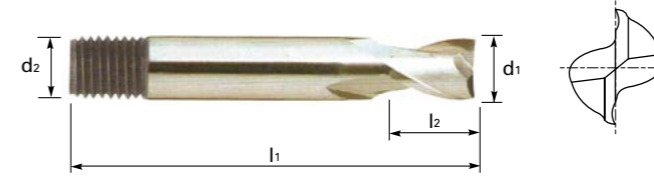
2 FLUTE, STANDARD SERIES



Series No. 301202, 301201

Clarkson No. 10PM/13PM, 10M/13M

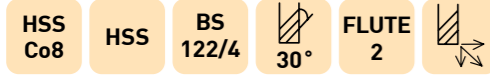
► cutting conditions : p.341



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code		Clarkson Code	
				HSS Co8	HSS	HSS Co8	HSS
21.0	25	25.5	98.5	3012022100	3012012100	-	10M42
22.0	25	25.5	100	3012022200	3012012200	10PM44	10M44
23.0	25	25.5	101.5	3012022300	3012012300	-	10M46
24.0	25	25.5	103	3012022400	3012012400	10PM48	10M48
25.0	25	27	95	3012022500	3012012500	10PM50	10M50
26.0	25	27	95	3012022600	3012012600	10PM52	10M52
27.0	25	28.5	93.5	3012022700	3012012700	-	10M54
28.0	25	30	95	3012022800	3012012800	10PM56	10M56
29.0	25	30	93.5	3012022900	3012012900	-	10M58
30.0	25	30	93.5	3012023000	3012013000	10PM60	10M60
32.0	32	35	117.5	3012023200	3012013200	13PM64	13M64
34.0	32	35	119	3012023400	3012013400	-	-
35.0	32	39.5	111	3012023500	3012013500	-	-
36.0	32	39.5	111	3012023600	3012013600	-	-
38.0	32	43	114.5	3012023800	3012013800	13PM76	-
40.0	32	46	117.5	3012024000	3012014000	13PM80	13M80
42.0	32	47.5	117.5	3012024200	3012014200	-	13M84
44.0	32	47.5	119	3012024400	3012014400	-	-
45.0	32	47.5	119	3012024500	3012014500	13PM90	-
50.0	32	51	117.5	3012025000	3012015000	13PM10	13M10

Avialable only while stocks last

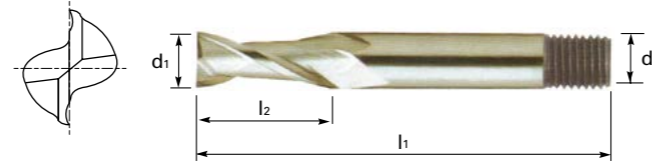
2 FLUTE, LONG SERIES



Series No. 302202, 302201

Clarkson No. 11PM, 11M/16M

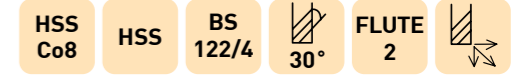
► cutting conditions : p.341



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code		Clarkson Code	
				HSS Co8	HSS	HSS Co8	HSS
2.0	6	3	51	3022020200	-	11PM04	-
2.5	6	6.5	54	3022020250	-	11PM05	-
3.0	6	11	60.5	3022020300	-	11PM06	-
3.5	6	12.5	66.5	3022020350	-	11PM07	-
4.0	6	12.5	66.5	3022020400	-	11PM08	-
4.5	6	12.5	66.5	3022020450	-	11PM09	-
5.0	6	12.5	70	3022020500	-	11PM10	-
5.5	6	16	76	3022020550	-	11PM11	-
6.0	6	16	76	3022020600	-	11PM12	-
6.5	10	16	76	3022020650	3022010650	11PM13	11M13
7.0	10	16	76	3022020700	3022010700	11PM14	11M14
7.5	10	16	76	3022020750	3022010750	11PM15	11M15
8.0	10	19	79.5	3022020800	3022010800	11PM16	11M16
8.5	10	22	82.5	3022020850	3022010850	-	-
9.0	10	22	82.5	3022020900	3022010900	11PM18	11M18
9.5	10	22	82.5	3022020950	3022010950	-	-
10.0	10	22	82.5	3022021000	3022011000	11PM20	11M20
11.0	12	22	89	3022021100	3022011100	-	11M22
12.0	12	25.5	95	3022021200	3022011200	11PM24	11M24
13.0	12	25.5	95	3022021300	3022011300	-	11M26
14.0	12	28.5	101.5	3022021400	3022011400	11PM28	11M28
15.0	16	31.5	108	3022021500	3022011500	-	11M30
16.0	16	31.5	108	3022021600	3022071600	11PM32	11M32
17.0	16	35	114.5	3022021700	3022011700	-	11M34
18.0	16	35	114.5	3022021800	3022011800	11PM36	11M36
19.0	16	38	120.5	3022021900	3022011900	-	11M38
20.0	16	38	120.5	3022022000	3022012000	11PM40	11M40
21.0	25	38	139	3022022100	3022012100	-	-
22.0	25	41.5	140	3022022200	3022012200	11PM44	11M44
24.0	25	41.5	152.5	3022022400	3022012400	11PM48	11M48

Avialable only while stocks last

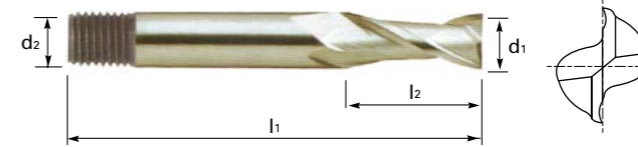
2 FLUTE, LONG SERIES



Series No. 302202, 302201

Clarkson No. 11PM, 11M/16M

► cutting conditions : p.341



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code		Clarkson Code	
				HSS Co8	HSS	HSS Co8	HSS
25.0	25	44.5	159	3022022500	3022012500	11PM50	11M50
26.0	25	44.5	159	3022022600	3022012600	-	11M52
27.0	25	44.5	159	3022022700	3022012700	-	11M54
28.0	25	47.5	159	3022022800	3022012800	-	11M56
30.0	25	51	159	3022023000	3022013000	11PM60	11M60
32.0	32	51	159	3022023200	3022013200	-	16M64
34.0	32	51	159	3022023400	3022013400	-	-
35.0	32	54	159	3022023500	3022013500	-	16M70
36.0	32	54	159	3022023600	3022013600	-	16M72
38.0	32	57	159	3022023800	3022013800	-	-
40.0	32	63.5	159	3022024000	3022014000	-	16M80
42.0	32	63.5	159	3022024200	3022014200	-	-
44.0	32	63.5	159	3022024400	3022014400	-	-
45.0	32	63.5	159	3022024500	3022014500	-	16M90
50.0	32	63.5	159	3022025000	3022015000	-	16M10

Avialable only while stocks last

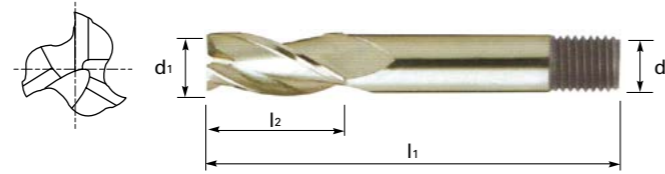
3 FLUTE, STANDARD SERIES

Clarkson

HSS Co8 BS 122/4 30° FLUTE 3

Series No. 304202

▶ cutting conditions : p.342



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code	Clarkson Code
				HSS Co8	HSS Co8
3.0	6	9.5	54	3042020300	-
3.5	6	12.5	57	3042020350	-
4.0	6	12.5	57	3042020400	-
4.5	6	12.5	57	3042020450	-
5.0	6	16	60.5	3042020500	-
5.5	6	16	60.5	3042020550	-
6.0	6	16	60.5	3042020600	-
8.0	10	18	63.5	3042020800	-
10.0	10	21	66.5	3042021000	-
12.0	12	24	70	3042021200	-
14.0	12	28.5	74.5	3042021400	-
16.0	16	26.5	77	3042021600	-
18.0	16	35	80	3042021800	-
20.0	16	38	83.5	3042022000	-
22.0	25	41.5	98.5	3042022200	-
24.0	25	41.5	98.5	3042022400	-
25.0	25	44.5	101.5	3042022500	-
26.0	25	43	101.5	3042022600	-
28.0	25	46	104.5	3042022800	-
30.0	25	46	104.5	3042023000	-
32.0	32	51	112.5	3042023200	-
35.0	32	54	116	3042023500	-
38.0	32	54	116	3042023800	-
40.0	32	55.5	117.5	3042024000	-
45.0	32	57	119	3042024500	-
50.0	32	65	127	3042025000	-

Avialable only while stocks last

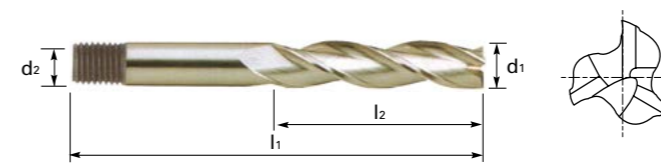
3 FLUTE, LONG SERIES

Clarkson

HSS Co8 BS 122/4 30° FLUTE 3

Series No. 305202

▶ cutting conditions : p.342



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code	Clarkson Code
				HSS Co8	HSS Co8
3.0	6	19	63.5	3052020300	-
3.5	6	25.5	70	3052020350	-
4.0	6	25.5	70	3052020400	-
4.5	6	25.5	70	3052020450	-
5.0	6	31.5	76	3052020500	-
5.5	6	31.5	76	3052020550	-
6.0	6	31.5	76	3052020600	-
8.0	10	34	79.5	3052020800	-
10.0	10	37	82.5	3052021000	-
12.0	12	49.5	95	3052021200	-
14.0	12	57	101.5	3052021400	-
16.0	16	58.5	108.5	3052021600	-
18.0	16	70	115	3052021800	-
20.0	16	76	121.5	3052022000	-
22.0	25	85.5	143	3052022200	-
24.0	25	92	149	3052022400	-
25.0	25	100	157	3052022500	-
26.0	25	98.5	157	3052022600	-
28.0	25	98.5	157	3052022800	-
30.0	25	98.5	157	3052023000	-
32.0	32	98.5	163.5	3052023200	-
35.0	32	98.5	163.5	3052023500	-
38.0	32	98.5	163.5	3052023800	-
40.0	32	98.5	163.5	3052024000	-
45.0	32	98.5	163.5	3052024500	-
50.0	32	98.5	163.5	3052025000	-

Avialable only while stocks last

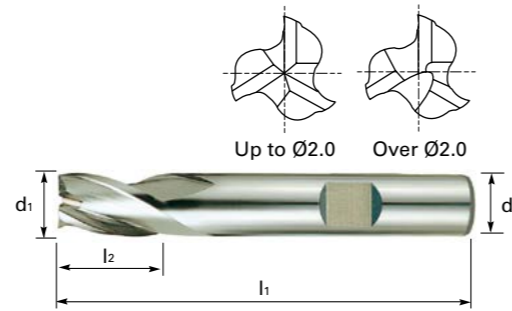
3 FLUTE, THROW AWAY, FLATTED SHANK, SHORT SERIES



Series No. 328102

Clarkson No. 24M

► cutting conditions : p.344



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code	Clarkson Code
				HSS Co8	HSS Co8
1.0	6	2	24.5	3281020100	24M02
1.5	6	2.5	24.5	3281020150	24M03
2.0	6	3	25.5	3281020200	24M04
2.5	6	4	26	3281020250	24M05
2.8	6	4.5	28	3281020280	24M28
3.0	6	4.5	28	3281020300	24M06
3.5	6	5.5	30	3281020350	24M07
3.8	6	6.5	32.5	3281020380	24M38
4.0	6	6.5	32.5	3281020400	24M08
4.5	6	7.5	36	3281020450	24M09
4.8	6	7.5	36	3281020480	24M48
5.0	6	7.5	36	3281020500	24M10
5.5	6	7.5	36	3281020550	24M11
5.75	6	9.5	36	3281020575	24M57
6.0	6	9.5	36	3281020600	24M12
7.0	10	10.5	46	3281020700	24M14B
8.0	10	11	47.5	3281020800	24M16B
9.0	10	13	51	3281020900	24M18B
10.0	10	13	51.5	3281021000	24M20B

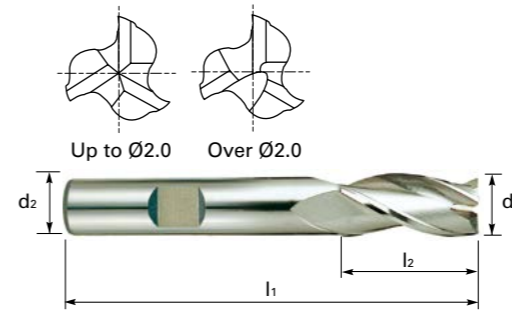
3 FLUTE, THROW AWAY, FLATTED SHANK, LONG SERIES



Series No. 329102

Clarkson No. 24L

► cutting conditions : p.344



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code	Clarkson Code
				HSS Co8	HSS Co8
1.5	6	4	28	3291020150	24L03
2.0	6	4.5	29	3291020200	24L04
2.5	6	6.5	32	3291020250	24L05
3.0	6	7.5	34	3291020300	24L06
3.5	6	8.5	36.5	3291020350	24L07
4.0	6	9.5	39	3291020400	24L08
4.5	6	11	42	3291020450	24L09
5.0	6	12.5	44.5	3291020500	24L10
5.5	6	14.5	46	3291020550	24L11
6.0	6	16	44.5	3291020600	24L12
8.0	10	19	55.5	3291020800	24L16B
10.0	10	22.5	61	3291021000	24L20B

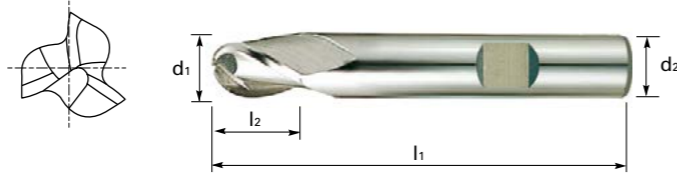
3 FLUTE BALL NOSED, THROW AWAY, FLATTED SHANK, LONG SERIES



Series No. 334102

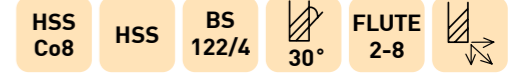
Clarkson No. 24N

▶ cutting conditions : p.345



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code		Clarkson Code	
				HSS Co8	HSS Co8	HSS Co8	HSS Co8
2.0	6	4.5	29	3341020200	24N04		
2.5	6	4.5	35	3341020250	24N05		
3.0	6	7.5	34	3341020300	24N06		
4.0	6	9.5	39	3341020400	24N08		
5.0	6	12.5	44.5	3341020500	24N10		
6.0	6	16	44.5	3341020600	24N12		

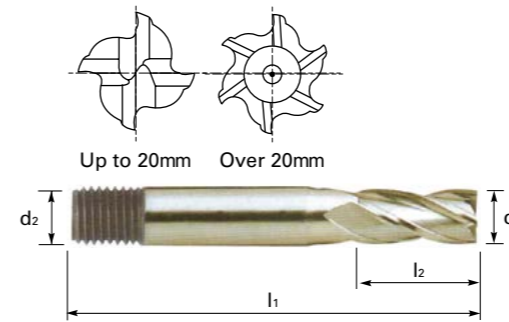
MULTI FLUTE, STANDARD SERIES



Series No. 307202, 307201

Clarkson No. 01PM/03PM, 01M/03M

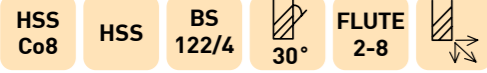
▶ cutting conditions : p.343



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	No. of Flute	Europa Code		Clarkson Code	
					HSS Co8	HSS	HSS Co8	HSS
1.5	6	2.5	51	2	3072020150	-	-	-
2.0	6	4	51	4	3072020200	-	-	-
2.5	6	6.5	51	4	3072020250	-	01PM05	-
3.0	6	9.5	54	4	3072020300	-	01PM06	-
3.5	6	12.5	57	4	3072020350	-	01PM07	-
4.0	6	12.5	57	4	3072020400	-	01PM08	-
4.5	6	12.5	57	4	3072020450	-	01PM09	-
5.0	6	16	60.5	4	3072020500	-	01PM10	-
5.5	6	16	60.5	4	3072020550	-	01PM11	-
6.0	6	16	60.5	4	3072020600	-	01PM12	-
6.5	10	16	60.5	4	3072020650	3072010650	01PM13	01M13
7.0	10	15	60.5	4	3072020700	3072010700	01PM14	01M14
7.5	10	18	63.5	4	3072020750	3072010750	-	-
8.0	10	18	63.5	4	3072020800	3072010800	01PM16	01M16
8.5	10	21	66.5	4	3072020850	3072010850	-	01M17
9.0	10	21	66.5	4	3072020900	3072010900	01PM18	01M18
9.5	10	21	66.5	4	3072020950	3072010950	-	01M19
10.0	10	21	66.5	4	3072021000	3072011000	01PM20	01M20
10.5	12	19	66.5	4	3072021050	3072011050	-	01M21
11.0	12	19	66.5	4	3072021100	3072011100	01PM22	01M22
11.5	12	22.5	70	4	3072021150	3072011150	-	01M23
12.0	12	24	70	4	3072021200	3072011200	01PM24	01M24
13.0	12	24.5	70	4	3072021300	3072011300	01PM26	01M26
14.0	12	28.5	73.5	4	3072021400	3072011400	01PM28	01M28
15.0	16	26.5	77	4	3072021500	3072011500	01PM30	01M30
16.0	16	26.5	80	4	3072021600	3072011600	01PM32	01M32
17.0	16	32	80	4	3072021700	3072011700	01PM34	01M34
18.0	16	35	88	4	3072021800	3072011800	01PM36	01M36
19.0	16	38	83.5	4	3072021900	3072011900	01PM38	01M38
20.0	16	38	83.5	4	3072022000	3072012000	01PM40	01M40

Avialable only while stocks last

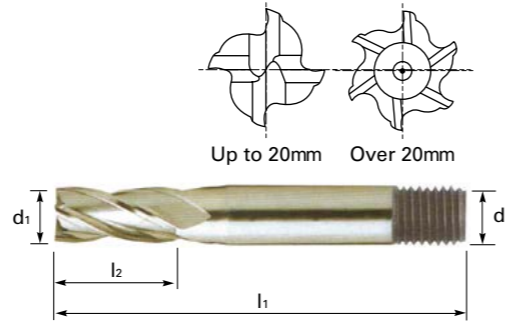
MULTI FLUTE, STANDARD SERIES



Series No. 307202, 307201

Clarkson No. 01PM/03PM, 01M/03M

▶ cutting conditions : p.343



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	No. of Flute	Europa Code		Clarkson Code	
					HSS Co8	HSS	HSS Co8	HSS
21.0	25	38.5	95	6	3072022100	3072012100	-	01M42
22.0	25	41.5	98.5	6	3072022200	3072012200	01PM44	01M44
23.0	25	41.5	98.5	6	3072022300	3072012300	-	01M46
24.0	25	41.5	98.5	6	3072022400	3072012400	01PM48	01M48
25.0	25	41.5	101.5	6	3072022500	3072012500	01PM50	01M50
26.0	25	43	101.5	6	3072022600	3072012600	01PM52	01M52
27.0	25	44	102	6	3072022700	3072012700	-	01M54
28.0	25	46	104.5	6	3072022800	3072012800	01PM56	01M56
29.0	25	46	105	6	3072022900	3072012900	-	-
30.0	25	46	104.5	6	3072023000	3072013000	01PM60	01M60
32.0	32	51	112.5	6	3072023200	3072013200	03PM64	03M64
33.0	32	51	112.5	6	3072023300	3072013300	-	-
34.0	32	51	112.5	6	3072023400	3072013400	-	-
35.0	32	54	116	6	3072023500	3072013500	03PM70	03M70
36.0	32	54	116	6	3072023600	3072013600	-	03M72
38.0	32	54	116	6	3072023800	3072013800	03PM76	03M76
40.0	32	55.5	117.5	8	3072024000	3072014000	03PM80	03M80
42.0	32	54	116	8	3072024200	3072014200	-	03M84
44.0	32	57	119	8	3072024400	3072014400	-	03M88
45.0	32	57	119	8	3072024500	3072014500	03PM90	03M90
50.0	32	65	127	8	3072025000	3072015000	03PM10	03M10

Available while stocks last
All items remove red star indicator

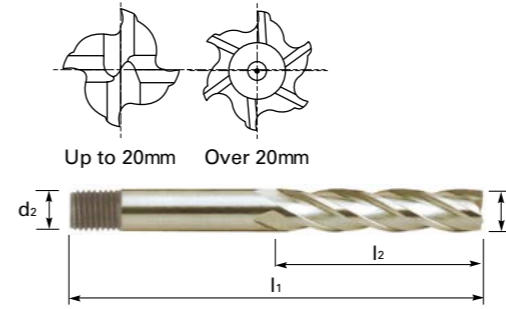
MULTI FLUTE, LONG SERIES



Series No. 308202, 308201

Clarkson No. 02PM/04PM, 02M/04M

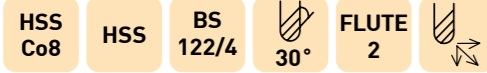
▶ cutting conditions : p.343



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	No. of Flute	Europa Code		Clarkson Code	
					HSS Co8	HSS	HSS Co8	HSS
3.0	6	19	63.5	4	3082020300	-	02PM06	-
3.5	6	25.5	70	4	3082020350	-	02PM07	-
4.0	6	25.5	70	4	3082020400	-	02PM08	-
4.5	6	25.5	70	4	3082020450	-	02PM09	-
5.0	6	31.5	76	4	3082020500	-	02PM10	-
5.5	6	31.5	76	4	3082020550	-	02PM11	-
6.0	6	31.5	76	4	3082020600	-	02PM12	-
6.5	10	35	79.5	4	3082020650	3082010650	-	02M13
7.0	10	34	79.5	4	3082020700	3082010700	02PM14	02M14
7.5	10	34	79.5	4	3082020750	3082010750	-	02M15
8.0	10	34	79.5	4	3082020800	3082010800	02PM16	02M16
8.5	10	37	82.5	4	3082020850	3082010850	-	02M17
9.0	10	37	82.5	4	3082020900	3082010900	02PM18	02M18
10.0	10	37	82.5	4	3082021000	3082011000	02PM20	02M20
11.0	12	41.5	89	4	3082021100	3082011100	-	02M22
12.0	12	49.5	95	4	3082021200	3082011200	02PM24	02M24
13.0	12	50	95	4	3082021300	3082011300	-	02M26
14.0	12	57	101.5	4	3082021400	3082011400	02PM28	02M28
15.0	16	58.5	108.5	4	3082021500	3082011500	02PM30	02M30
16.0	16	58.5	108.5	4	3082021600	3082011600	02PM32	02M32
17.0	16	67	115	4	3082021700	3082011700	-	02M34
18.0	16	70	115	4	3082021800	3082011800	02PM36	02M36
19.0	16	76	121.5	4	3082021900	3082011900	-	02M38
20.0	16	76	121.5	4	3082022000	3082012000	02PM40	02M40
22.0	25	85.5	143	6	3082022200	3082012200	02PM44	02M44
23.0	25	92	149	6	3082022300	3082012300	-	-
24.0	25	92	149	6	3082022400	3082012400	02PM48	02M48
25.0	25	100	157	6	3082022500	3082012500	02PM50	02M50
26.0	25	98.5	157	6	3082022600	3082012600	02PM52	02M52
28.0	25	98.5	157	6	3082022800	3082012800	02PM56	02M56
29.0	25	98.5	157	6	3082022900	3082012900	-	-
30.0	25	98.5	157	6	3082023000	3082013000	02PM60	02M60
32.0	32	98.5	163.5	6	3082023200	3082013200	04PM64	04M64
34.0	32	98.5	163.5	6	3082023400	3082013400	-	-
35.0	32	98.5	163.5	6	3082023500	3082013500	04PM70	04M70
36.0	32	98.5	163.5	6	3082023600	3082013600	-	-
38.0	32	98.5	163.5	6	3082023800	3082013800	04PM76	04M76
40.0	32	98.5	163.5	8	3082024000	3082014000	04PM80	04M80
42.0	32	98.5	163.5	8	3082024200	3082014200	-	-
44.0	32	98.5	163.5	8	3082024400	3082014400	-	-
45.0	32	98.5	163.5	8	3082024500	3082014500	04PM90	04M90
50.0	32	98.5	163.5	8	3082025000	3082015000	04PM10	-

Available only while stocks last

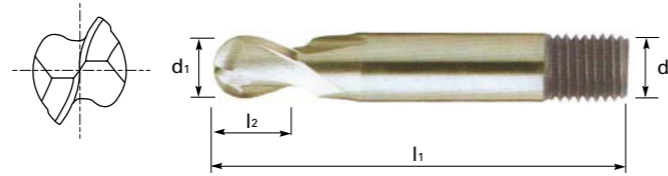
2 FLUTE BALL NOSED, STANDARD SERIES



Series No. 313202, 313201

Clarkson No. 14M

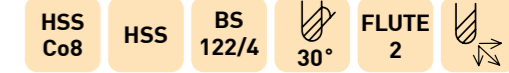
► cutting conditions : p.341



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code		Clarkson Code	
				HSS Co8	HSS	HSS Co8	HSS
2.0	6	3	49	3132020200	-	14M04	-
2.5	6	4.5	51	3132020250	-	14M05	-
3.0	6	7	51	3132020300	-	14M06	-
4.0	6	9.5	52.5	3132020400	-	14M08	-
5.0	6	9.5	52.5	3132020500	-	14M10	-
6.0	6	11	56.5	3132020600	-	14M12	-
7.0	10	11	58.5	3132020700	3132010700	-	14M14
8.0	10	12.5	59.5	3132020800	3132010800	-	14M16
9.0	10	14.5	58.5	3132020900	3132010900	-	14M18
10.0	10	14.5	60.5	3132021000	3132011000	-	14M20
11.0	12	17.5	65	3132021100	3132011100	-	14M22
12.0	12	19	66.5	3132021200	3132011200	-	14M24
13.0	12	19	66.5	3132021300	3132011300	-	14M26
14.0	12	22	68.5	3132021400	3132011400	-	14M28
15.0	16	22	72	3132021500	3132011500	-	14M30
16.0	16	22	72	3132021600	3132011600	-	14M32
17.0	16	24	73	3132021700	3132011700	-	14M34
18.0	16	24	74	3132021800	3132011800	-	14M36
19.0	16	25.5	77	3132021900	3132011900	-	14M38
20.0	16	25.5	77	3132022000	3132012000	-	14M40
22.0	25	25.5	100	3132022200	3132012200	-	14M44
24.0	25	25.5	103	3132022400	3132012400	-	14M48
25.0	25	28.5	97	3132022500	3132012500	-	14M50
* 26.0	25	28.5	97	3132022600	3132012600	-	14M52
* 28.0	25	30	95	3132022800	3132012800	-	14M56
* 30.0	25	30	93.5	3132023000	3132013000	-	14M60

* Available only while stocks last

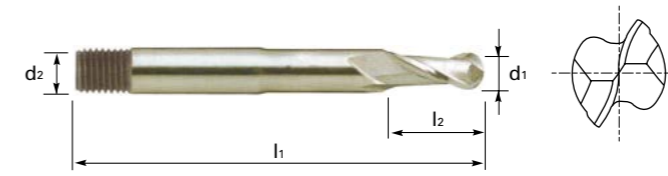
2 FLUTE BALL NOSED, LONG SERIES



Series No. 314202, 314201

Clarkson No. 27M

► cutting conditions : p.341



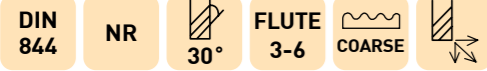
Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code		Clarkson Code	
				HSS Co8	HSS	HSS Co8	HSS
3.0	6	11	60.5	3142020300	-	27M06	-
4.0	6	12.5	66.5	3142020400	-	27M08	-
5.0	6	12.5	70	3142020500	-	27M10	-
6.0	6	16	76	3142020600	-	27M12	-
7.0	10	16	76	3142020700	3142010700	-	27M14
8.0	10	19	79.5	3142020800	3142010800	-	27M16
9.0	10	22	82.5	3142020900	3142010900	-	27M18
10.0	10	22	82.5	3142021000	3142011000	-	27M20
11.0	12	22	89	3142021100	3142011100	-	27M22
12.0	12	25.5	95	3142021200	3142011200	-	27M24
13.0	12	25.5	95	3142021300	3142011300	-	27M26
14.0	12	28.5	101.5	3142021400	3142011400	-	27M28
15.0	16	31.5	108	3142021500	3142011500	-	27M30
16.0	16	31.5	108	3142021600	3142011600	-	27M32
17.0	16	35	114.5	3142021700	3142011700	-	27M34
18.0	16	35	114.5	3142021800	3142011800	-	27M36
19.0	16	38	120.5	3142021900	3142011900	-	27M38
20.0	16	38	120.5	3142022000	3142012000	-	27M40
25.0	25	44.5	159	3142022500	3142012500	-	27M50

Available only while stocks last

HSS & COBALT MILLING CUTTERS [SCREWED SHANK]

HSS & COBALT MILLING CUTTERS [SCREWED SHANK]

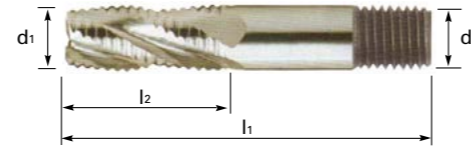
MULTI FLUTE STANDARD LENGTH COARSE PITCH ROUGHING



Series No. 118202

Clarkson No. 776M/777M

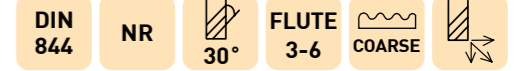
► cutting conditions : p.344



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	No. of Flute	Europa Code	Clarkson Code
					ORDER NO.	ORDER NO.
6.0	6	13	57	3	1182020600	776M12G
7.0	10	16	66	3	1182020700	776M14G
8.0	10	19	69	3	1182020800	776M16G
9.0	10	19	69	3	1182020900	776M18G
10.0	10	22	72	4	1182021000	776M20G
11.0	12	22	79	4	1182021100	776M22G
12.0	12	26	83	4	1182021200	776M24G
13.0	12	26	83	4	1182021300	776M26G
14.0	12	26	83	4	1182021400	776M28G
15.0	12	26	83	4	1182021500	776M30G
16.0	16	32	92	4	1182021600	776M32G
17.0	16	32	92	4	1182021700	-
18.0	16	32	92	4	1182021800	776M36G
19.0	16	32	92	4	1182021900	-
20.0	16	38	98	4	1182029001	
20.0	20	38	104	5	1182022000	776M40G
22.0	20	38	104	5	1182022200	776M44G
22.0	25	38	114	5	1182029002	
24.0	25	45	121	5	1182022400	776M48G
25.0	25	45	121	5	1182022500	776M50G
* 26.0	25	45	121	6	1182022600	-
* 28.0	25	45	121	6	1182022800	776M56G
* 30.0	25	45	121	6	1182023000	776M60G
* 32.0	32	53	133	6	1182023200	777M64G
* 35.0	32	53	133	6	1182023500	777M70G
* 36.0	32	53	133	6	1182023600	777M72G
* 38.0	32	63	143	6	1182023800	777M76G
* 40.0	32	63	143	6	1182024000	777M80G
* 45.0	32	63	143	6	1182024500	777M90G
* 50.0	32	75	155	6	1182025000	-

* Available only while stocks last

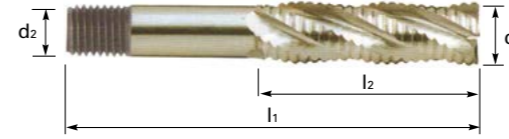
MULTI FLUTE LONG LENGTH COARSE PITCH ROUGHING



Series No. 119202

Clarkson No. 776L/777L

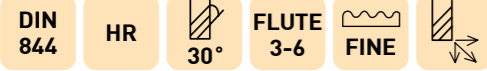
► cutting conditions : p.344



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	No. of Flute	Europa Code	Clarkson Code
					ORDER NO.	ORDER NO.
6.0	6	24	68	3	1192020600	776L12G
7.0	10	30	80	3	1192020700	776L14G
8.0	10	38	88	3	1192020800	776L16G
9.0	10	38	88	3	1192020900	776L18G
10.0	10	45	95	4	1192021000	776L20G
11.0	12	45	102	4	1192021100	776L22G
12.0	12	53	110	4	1192021200	776L24G
13.0	12	53	110	4	1192021300	-
14.0	12	53	110	4	1192021400	776L28G
15.0	12	53	110	4	1192021500	776L30G
16.0	16	63	123	4	1192021600	776L32G
17.0	16	63	123	4	1192021700	-
18.0	16	63	123	4	1192021800	776L36G
19.0	16	63	123	4	1192021900	-
20.0	16	75	135	4	1192029001	
20.0	20	75	141	4	1192022000	776L40G
22.0	20	75	141	5	1192022200	776L44G
22.0	25	75	151	5	1192029002	
24.0	25	90	166	5	1192022400	776L48G
25.0	25	90	166	5	1192022500	776L50G
* 26.0	25	90	166	6	1192022600	-
* 28.0	25	90	166	6	1192022800	776L56G
* 30.0	25	90	166	6	1192023000	776L60G
* 32.0	32	106	186	6	1192023200	777L64G
* 35.0	32	106	186	6	1192023500	777L70G
* 36.0	32	106	186	6	1192023600	777L72G
* 38.0	32	125	205	6	1192023800	777L76G
* 40.0	32	125	205	6	1192024000	777L80G

* Available only while stocks last

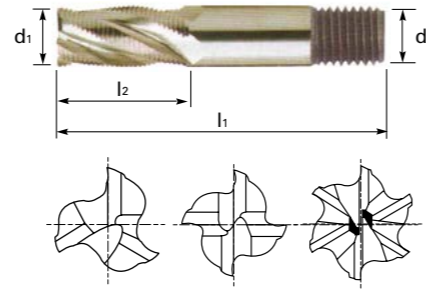
MULTI FLUTE STANDARD LENGTH FINE PITCH ROUGHING



Series No. 121202

Clarkson No. 776M

► cutting conditions : p.345



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	No. of Flute	Europa Code	Clarkson Code
					ORDER NO.	ORDER NO.
6.0	6	13	57	3	1212020600	776M12FP
8.0	10	19	69	3	1212020800	776M16FP
10.0	10	22	72	4	1212021000	776M20FP
12.0	12	26	83	4	1212021200	776M24FP
14.0	12	26	83	4	1212021400	776M28FP
16.0	16	32	92	4	1212021600	776M32FP
18.0	16	32	92	4	1212021800	776M36FP
20.0	20	38	104	4	1212022000	776M40FP
25.0	25	45	121	5	1212022500	776M50FP
30.0	25	45	121	6	1212023000	776M60FP
32.0	25	53	133	6	1212023200	776M64FP

Avialable only while stocks last

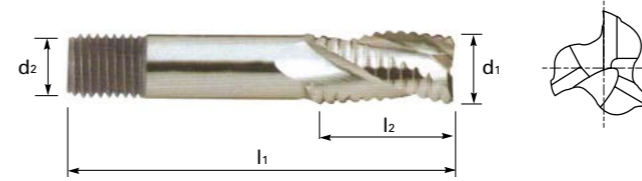
3 FLUTE STANDARD LENGTH COARSE PITCH ROUGHING FOR ALUMINIUM



Series No. 124202

Clarkson No. 104M

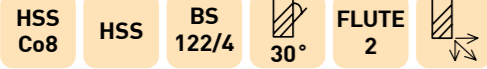
► cutting conditions : p.345



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code	Clarkson Code
				HSS Co8	HSS Co8
6.0	6	13	57	1242020600	-
8.0	10	19	69	1242020800	-
10.0	10	22	72	1242021000	104M20G
12.0	12	26	83	1242021200	104M24G
14.0	12	26	83	1242021400	104M28G
16.0	16	32	92	1242021600	104M32G
18.0	16	32	92	1242021800	104M36G
20.0	20	38	104	1242022000	104M40G
22.0	20	38	104	1242022200	-
25.0	25	45	121	1242022500	104M50G
30.0	25	45	121	1242023000	-

Avialable only while stocks last

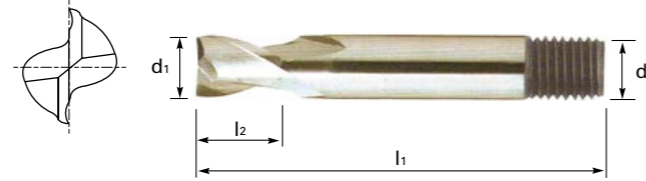
2 FLUTE, STANDARD SERIES



Series No. 501202, 501201

Clarkson No. 10P/13P, 100/101/130/131

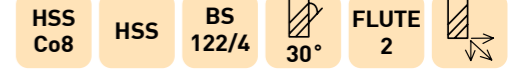
► cutting conditions : p.341



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code		Clarkson Code	
				HSS Co8	HSS	HSS Co8	HSS
1/16	1/4	3/32	1.29/32	5012020040	-	10P004	-
5/64	1/4	3/32	1.15/16	5012020050	-	10P005	-
3/32	1/4	3/16	2	5012020060	-	10P006	-
7/64	1/4	1/4	2	5012020070	-	10P007	-
1/8	1/4	9/32	2	5012020080	-	10P008	-
9/64	1/4	3/8	2.1/16	5012020090	-	10P009	-
5/32	1/4	3/8	2.1/16	5012020100	-	10P010	-
11/64	1/4	3/8	2.1/16	5012020110	-	10P011	-
3/16	1/4	3/8	2.1/16	5012020120	-	10P012	-
13/64	1/4	7/16	2.3/16	5012020130	-	10P013	-
7/32	1/4	7/16	2.3/16	5012020140	-	10P014	-
15/64	1/4	7/16	2.7/32	5012020150	-	10P015	-
1/4	1/4	7/16	2.7/32	5012020160	-	10P016	-
17/64	3/8	7/16	2.11/32	5012020170	5012010170	-	10017
9/32	3/8	7/16	2.5/16	5012020180	5012010180	10P018	10018
19/64	3/8	1/2	2.5/16	5012020190	5012010190	-	-
5/16	3/8	1/2	2.11/32	5012020200	5012010200	10P020	10020
21/64	3/8	9/16	2.11/32	5012020210	5012010210	-	10021
11/32	3/8	9/16	2.3/8	5012020220	5012010220	10P022	10022
23/64	3/8	9/16	2.3/8	5012020230	5012010230	-	-
3/8	3/8	9/16	2.3/8	5012020240	5012010240	10P024	10024
25/64	3/8	5/8	2.3/8	5012020250	5012010250	-	10025
13/32	3/8	5/8	2.3/8	5012020260	5012010260	-	10026
27/64	1/2	11/16	2.9/16	5012020270	5012010270	-	10027
7/16	1/2	11/16	2.9/16	5012020280	5012010280	10P028	10028
29/64	1/2	11/16	2.9/16	5012020290	5012010290	-	10029
15/32	1/2	11/16	2.9/16	5012020300	5012010300	-	10030
31/64	1/2	3/4	2.5/8	5012020310	5012010310	-	10031
1/2	1/2	3/4	2.5/8	5012020320	5012010320	10P032	10032
17/32	1/2	7/8	2.11/16	5012020340	5012010340	-	10034
9/16	1/2	27/32	2.23/32	5012020360	5012010360	10P036	10036
19/32	5/8	7/8	2.27/32	5012020380	5012010380	-	10038

Avialable only while stocks last

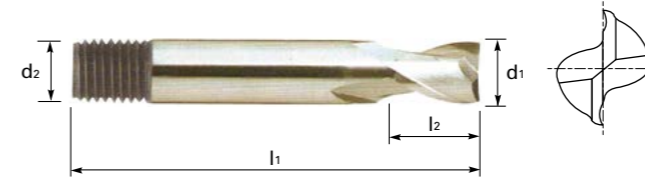
2 FLUTE, STANDARD SERIES



Series No. 501202, 501201

Clarkson No. 10P/13P, 100/101/130/131

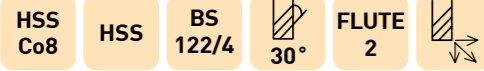
► cutting conditions : p.341



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code		Clarkson Code	
				HSS Co8	HSS	HSS Co8	HSS
8	5/8	7/8	2.27/32	5012020400	5012010400	10P040	10040
21/32	5/8	15/16	2.7/8	5012020420	5012010420	-	10042
11/16	5/8	15/16	2.29/32	5012020440	5012010440	10P044	10044
23/32	5/8	1	2.31/32	5012020460	5012010460	-	10046
3/4	5/8	1	3.1/32	5012020480	5012010480	10P048	10048
25/32	5/8	1	3.1/32	5012020500	5012010500	-	-
13/16	1	1	3.1/32	5012020520	5012010520	-	10052
27/32	1	1	3.15/16	5012020540	5012010540	-	-
7/8	1	1	3.15/16	5012020560	5012010560	10P056	10056
29/32	1	1	4	5012020580	5012010580	-	-
1	1	1.1/16	3.3/4	5012020640	5012010640	10P064	10064
1.1/16	1	1.1/8	3.11/16	5012021040	5012011040	-	10068
1.1/8	1	1.3/16	3.3/4	5012021080	5012011080	10P072	10072
1.3/16	1	1.3/16	3.11/16	5012021120	5012011120	-	-
1.1/4	1	1.1/2	4	5012029001	5012019001	10P080	10080
1.5/16	1	1.1/2	4	5012029002	5012019002	-	-
1.3/8	1	1.9/16	4.11/16	5012029003	5012019003	-	10088
1.7/16	1	1.9/16	4.3/8	5012029004	5012019004	-	-
1.1/2	1	1.11/17	4.3/4	5012029005	5012019005	10P096	10096
1.5/8	1	1.7/9	4.7/16	5012029006	5012019006	-	10104
1.3/4	1	3	4.9/16	5012029007	5012019007	-	10112
1.7/8	1	2.1/8	4.11/16	5012029008	5012019008	-	-
2	1	2.1/4	4.13/16	5012029009	5012019009	-	10128
1.1/4	1.1/4	1.3/8	4.5/8	5012021160	5012011160	-	13080
1.5/16	1.1/4	1.3/8	4.11/16	5012021200	5012011200	-	-
1.3/8	1.1/4	1.9/16	4.3/8	5012021240	5012011240	-	-
1.7/16	1.1/4	1.9/16	4.3/16	5012021280	5012011280	-	-
1.1/12	1.1/4	1.11/17	4.3/16	5012021320	5012011320	-	13096
1.5/8	1.1/4	1.7/8	4.5/8	5012021400	5012011400	-	10104
1.3/4	1.1/4	1.7/8	4.11/16	5012021480	5012011480	-	-
1.7/8	1.1/4	2	4.11/16	5012021560	5012011560	-	-
2	1.1/4	2	4.5/8	5012021640	5012011640	13P128	13128

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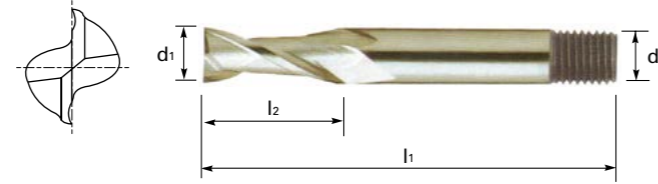
2 FLUTE, LONG SERIES



Series No. 502202, 502201

Clarkson No. 11P, 110/111

► cutting conditions : p.341



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code		Clarkson Code	
				HSS Co8	HSS	HSS Co8	HSS
1/16	4	3/16	2	5022020040	-	11P004	-
5/64	1/4	3/16	2	5022020050	-	-	-
3/32	1/4	1/4	2.1/8	5022020060	-	11P006	-
7/64	1/4	7/16	2.1/2	5022020070	-	-	-
1/8	1/4	7/16	2.1/2	5022020080	-	11P008	-
9/64	1/4	1/2	2.3/4	5022020090	-	-	-
5/32	1/4	1/2	2.3/4	5022020100	-	11P010	-
11/64	1/4	1/2	2.3/4	5022020110	-	-	-
3/16	1/4	1/2	2.3/4	5022020120	-	11P012	-
13/64	1/4	5/8	3	5022020130	-	-	-
7/32	1/4	5/8	3	5022020140	-	11P014	-
15/64	1/4	5/8	3	5022020150	-	-	-
1/4	1/4	5/8	3	5022020160	-	11P016	-
17/64	3/8	5/8	3	5022020170	5022010170	-	-
9/32	3/8	5/8	3	5022020180	5022010180	-	11018
19/64	3/8	3/4	3.1/8	5022020190	5022010190	-	-
5/16	3/8	3/4	3.1/2	5022020200	5022010200	11P020	11020
21/64	3/8	7/8	3.1/4	5022020210	5022010210	-	-
11/32	3/8	7/8	3.1/4	5022020220	5022010220	-	11022
23/64	3/8	7/8	3.1/4	5022020230	5022010230	-	-
3/8	3/8	7/8	3.1/4	5022020240	5022010240	11P024	11024
25/64	3/8	7/8	3.1/2	5022020250	5022010250	-	-
13/32	3/8	7/8	3.1/2	5022020260	5022010260	-	11026
27/64	1/2	7/8	3.1/2	5022020270	5022010270	-	-
7/16	1/2	7/8	3.1/2	5022020280	5022010280	-	11028
15/32	1/2	1	3.3/4	5022020300	5022010300	-	-
31/64	1/2	1	3.3/4	5022020310	5022010310	-	-
1/2	1/2	1	3.3/4	5022020320	5022010320	11P032	11032
17/32	1/2	1.1/8	4	5022020340	5022010340	-	11034
9/16	1/2	1.1/8	4	5022020360	5022010360	-	11036
19/32	5/8	1.1/4	4.1/4	5022020380	5022010380	-	-
5/8	5/8	1.1/4	4.1/4	5022020400	5022010400	11P040	11040

Available only while stocks last

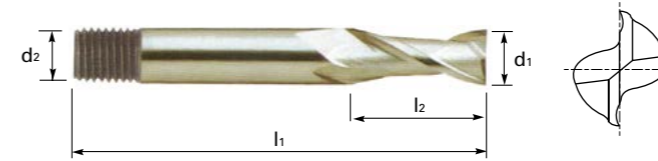
2 FLUTE, LONG SERIES



Series No. 502202, 502201

Clarkson No. 11P, 110/111

► cutting conditions : p.341



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code		Clarkson Code	
				HSS Co8	HSS	HSS Co8	HSS
21/32	5/8	1.3/8	4.1/2	5022020420	5022010420	-	-
11/16	5/8	1.3/8	4.1/2	5022020440	5022010440	-	11044
3/4	5/8	1.1/2	4.3/4	5022020480	5022010480	11P048	11048
25/32	5/8	1.1/2	4.3/4	5022020500	5022010500	-	-
13/16	1	1.1/2	5.1/2	5022020520	5022010520	-	11052
27/32	1	1.5/8	5.1/2	5022020540	5022010540	-	-
7/8	1	1.5/8	5.1/2	5022020560	5022010560	11P056	11056
29/32	1	1.5/8	6	5022020580	5022010580	-	-
15/16	1	1.5/8	6	5022020600	5022010600	-	-
1	1	1.3/4	6.1/4	5022020640	5022010640	11P064	11064
1.1/16	1	1.3/4	6.1/4	5022021040	5022011040	-	-
1.1/8	1	1.7/8	6.1/4	5022021080	5022011080	-	11072
1.3/16	1	2	6.1/4	5022021120	5022011120	-	-
1.1/4	1	2	6.1/4	5022029001	5022019001	-	11080
1.5/16	1	2	6.1/4	5022029002	5022019002	-	-
1.3/8	1	2.1/8	6.1/4	5022029003	5022019003	-	11088
1.7/16	1	2.1/8	6.1/4	5022029004	5022019004	-	-
1.1/2	1	2.1/4	6.1/4	5022029005	5022019005	-	11096
1.5/8	1	2.1/2	6.1/4	5022029006	5022019006	-	-
1.3/4	1	2.1/2	6.1/4	5022029007	5022019007	-	11112
1.7/8	1	2.1/2	6.1/4	5022029008	5022019008	-	-
2	1	2.1/2	6.1/4	5022029009	5022019009	-	11128
1.1/4	1.1/4	2	6.1/4	5022021160	5022011160	-	-
1.5/16	1.1/4	2	6.1/4	5022021200	5022011200	-	-
1.3/8	1.1/4	2.1/8	6.1/4	5022021240	5022011240	-	-
1.7/16	1.1/4	2.1/8	6.1/4	5022021280	5022011280	-	-
1.1/2	1.1/4	2.1/4	6.1/4	5022021320	5022011320	-	-
1.5/8	1.1/4	2.1/2	6.1/4	5022021400	5022011400	-	-
1.3/4	1.1/4	2.1/2	6.1/4	5022021480	5022011480	-	-
1.7/8	1.1/4	2.1/2	6.1/4	5022021560	5022011560	-	-
2	1.1/4	2.1/2	6.1/4	5022021640	5022011640	-	-

Available only while stocks last

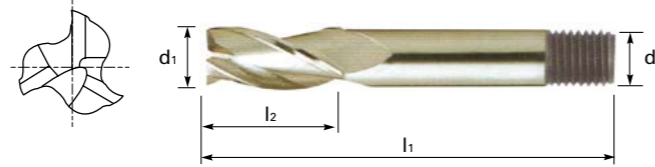
3 FLUTE, STANDARD SERIES



Series No. 504202

Clarkson No. 103

► cutting conditions : p.342



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code	Clarkson Code
				HSS Co8	HSS Co8
1/8	1/4	3/8	2.1/8	5042020080	103008
5/32	1/4	1/2	2.1/4	5042020100	103010
3/16	1/4	5/8	2.3/8	5042020120	103012
7/32	1/4	5/8	2.3/8	5042020140	103014
1/4	1/4	5/8	2.3/8	5042020160	103016
9/32	3/8	19/32	2.3/8	5042020180	103018
5/16	3/8	23/32	2.1/2	5042020200	103020
11/32	3/8	27/32	2.5/8	5042020220	103022
3/8	3/8	27/32	2.5/8	5042020240	103024
13/32	3/8	7/8	2.5/8	5042020260	103026
7/16	1/2	3/4	2.5/8	5042020280	103028
15/32	1/2	7/8	2.3/4	5042020300	103030
1/2	1/2	15/16	2.3/4	5042020320	103032
9/16	1/2	1.1/8	2.7/8	5042020360	103036
5/8	5/8	1.1/4	3.1/32	5042020400	103040
11/16	5/8	1.3/8	3.5/32	5042020440	103044
3/4	5/8	1.1/2	3.9/32	5042020480	103048
13/16	5/8	1.5/8	3.3/4	5042020520	-
7/8	1	1.5/8	4.7/8	5042020560	103056
1	1	1.11/16	4	5042020640	103064
1.1/8	1	1.13/16	4.1/8	5042021080	-
1.1/4	1	1.15/16	4.1/4	5042029001	-
1.1/2	1	2.3/16	4.1/2	5042029002	-
1.1/4	1.1/4	2	4.7/16	5042021160	-
1.3/8	1.1/4	2.1/8	4.9/16	5042021240	-
1.1/2	1.1/4	2.1/8	4.9/16	5042021320	-
1.3/4	1.1/4	2.1/4	4.11/16	5042021480	103112
2	1.1/4	2.9/16	5	5042021640	103128

Avialable only while stocks last

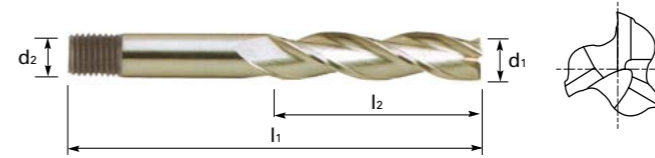
3 FLUTE, LONG SERIES



Series No. 505202

Clarkson No. 113

► cutting conditions : p.342



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code	Clarkson Code
				HSS Co8	HSS Co8
1/8	1/4	3/4	2.1/2	5052020080	113008
3/16	1/4	1.1/4	2.3/4	5052020120	113012
1/4	1/4	1.1/4	3	5052020160	113016
5/16	3/8	1.1/4	3	5052020200	113020
3/8	3/8	1.15/32	3.1/4	5052020240	113024
7/16	1/2	1.5/8	3.1/2	5052020280	113028
1/2	1/2	1.15/16	3.3/4	5052020320	113032
9/16	1/2	2.1/4	4	5052020360	113036
5/8	5/8	2.5/16	4.9/32	5052020400	113040
11/16	5/8	2.3/4	4.17/32	5052020440	-
3/4	5/8	3	4.25/32	5052020480	113048
7/8	1	3.3/8	5.5/8	5052020560	113056
1	1	3.15/16	6.1/2	5052020640	113064
1.1/4	1	3.15/16	6.5/16	5052029001	113080
1.1/2	1	3.15/16	6.1/4	5052029002	113096
1.3/8	1.1/4	4	6.7/8	5052021240	-
1.1/2	1.1/4	4	6.7/16	5052021320	-
1.3/4	1.1/4	4	6.7/16	5052021480	-
2	1.1/4	4	6.7/16	5052021640	-

Avialable only while stocks last

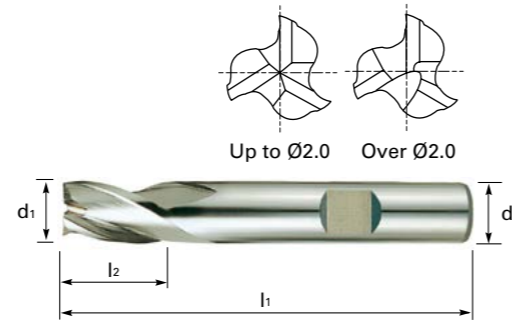
3 FLUTE, THROW AWAY, FLATTED SHANK, SHORT SERIES



Series No. 528102

Clarkson No. 245

► cutting conditions : p.344



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code	Clarkson Code
				HSS Co8	HSS Co8
1/16	1/4	3/32	31/32	5281020040	24504
3/32	1/4	5/32	1.1/64	5281020060	24506
1/8	1/4	3/16	1.3/32	5281020080	24508
5/32	1/4	1/4	1.9/32	5281020100	24510
3/16	1/4	9/32	1.11/32	5281020120	24512
7/32	1/4	5/16	1.13/32	5281020140	24514
1/4	1/4	3/8	1.13/32	5281020160	24516
5/16	3/8	3/4	2.3/4	5281020200	-
3/8	3/8	7/8	2.3/4	5281020240	-

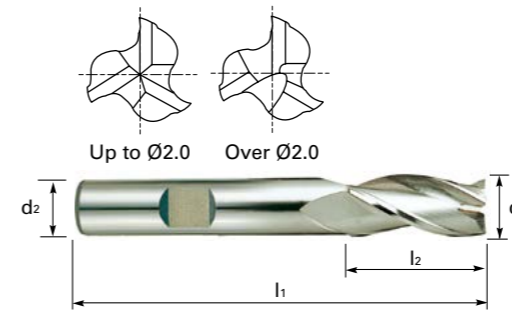
3 FLUTE, THROW AWAY, FLATTED SHANK, LONG SERIES



Series No. 529102

Clarkson No. 246

► cutting conditions : p.344



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code	Clarkson Code
				HSS Co8	HSS Co8
1/16	1/4	5/32	1.3/32	5291020040	24604
5/64	1/4	7/32	1.3/16	5291020050	24605
3/32	1/4	1/4	1.1/4	5291020060	24606
7/64	1/4	9/32	1.9/32	5291020070	24607
1/8	1/4	5/16	1.11/32	5291020080	24608
9/64	1/4	11/32	1.7/16	5291020090	24609
5/32	1/4	3/8	1.17/32	5291020100	24610
11/64	1/4	13/32	1.19/32	5291020110	24611
3/16	1/4	7/16	1.21/32	5291020120	24612
13/64	1/4	15/32	1.11/16	5291020130	24613
7/32	1/4	1/2	1.3/4	5291020140	24614
15/64	1/4	9/16	1.13/16	5291020150	24615
1/4	1/4	5/8	1.3/4	5291020160	24616

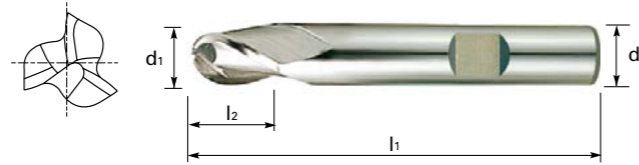
3 FLUTE, THROW AWAY, BALL NOSE, FLATTED SHANK



Series No. 530102

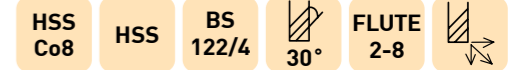
Clarkson No. 247

► cutting conditions : p.345



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code	Clarkson Code
				HSS Co8	HSS Co8
1/16	1/4	1/8	1.1/4	5301020040	24704
3/32	1/4	3/16	1.3/8	5301020060	24706
1/8	1/4	5/16	1.11/32	5301020080	24708
5/32	1/4	3/8	1.17/32	5301020100	24710
3/16	1/4	7/16	1.21/32	5301020120	24712
7/32	1/4	1/2	1.3/4	5301020140	24714
1/4	1/4	5/8	1.3/4	5301020160	24716

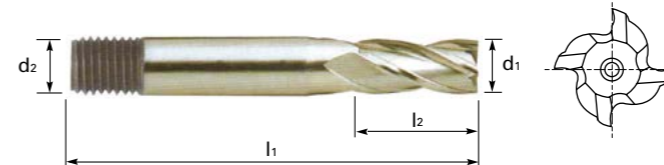
MULTI FLUTE, STANDARD SERIES



Series No. 507202, 507201

Clarkson No. 01P/03P, 010/011/030/031

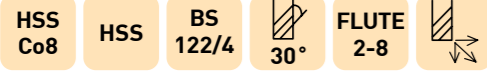
► cutting conditions : p.343



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	No. of Flute	Europa Code		Clarkson Code	
					HSS Co8	HSS	HSS Co8	HSS
1/16	1/4	3/16	2	2	5072020040	-	01P004	-
3/32	1/4	1/4	2	4	5072020060	-	01P006	-
1/8	1/4	3/8	2.1/8	4	5072020080	-	01P008	-
5/32	1/4	1/2	2.1/4	4	5072020100	-	01P010	-
3/16	1/4	1/2	2.1/4	4	5072020120	-	01P012	-
7/32	1/4	5/8	2.3/8	4	5072020140	-	01P014	-
1/4	1/4	5/8	2.3/8	4	5072020160	-	01P016	-
9/32	3/8	19/32	2.3/8	4	5072020180	5072010180	-	01018
5/16	3/8	23/32	2.1/2	4	5072020200	5072010200	01P020	01020
11/32	3/8	27/32	2.5/8	4	5072020220	5072010220	-	01022
3/8	3/8	27/32	2.5/8	4	5072020240	5072010240	01P024	01024
13/32	3/8	7/8	2.5/8	4	5072020260	5072010260	-	01026
7/16	1/2	3/4	2.5/8	4	5072020280	5072010280	01P028	01028
15/32	1/2	7/8	2.3/4	4	5072020300	5072010300	-	01030
1/2	1/2	15/16	2.3/4	4	5072020320	5072010320	01P032	01032
17/32	1/2	1.1/8	2.7/8	4	5072020340	5072010340	-	01034
9/16	1/2	1.1/8	2.7/8	4	5072020360	5072010360	01P036	01036
19/32	5/8	1.1/16	3.1/32	4	5072020380	5072010380	-	-
5/8	5/8	1.1/16	3.1/32	4	5072020400	5072010400	01P040	01040
21/32	5/8	1.1/4	3.5/32	4	5072020420	5072010420	-	01042
11/16	5/8	1.3/8	3.5/32	4	5072020440	5072010440	01P044	01044
23/32	5/8	1.1/2	3.9/32	4	5072020460	5072010460	-	-
3/4	5/8	1.1/2	3.9/32	4	5072020480	5072010480	01P048	01048
25/32	5/8	1.1/2	3.9/32	4	5072020500	5072010500	-	-
13/16	1	1.1/2	3.3/4	6	5072020520	5072070520	01P052	01052
7/8	1	1.5/8	3.7/8	6	5072020560	5072010560	01P056	01056
15/16	1	1.5/8	3.7/8	6	5072020600	5072010600	01P060	01060
1	1	1.11/16	4	6	5072020640	5072010640	01P064	01064
1.1/16	1	1.11/16	4	6	5072021040	5072011040	-	-
1.1/8	1	1.13/16	4.1/8	6	5072021080	5072011080	01P072	01072

Available only while stocks last

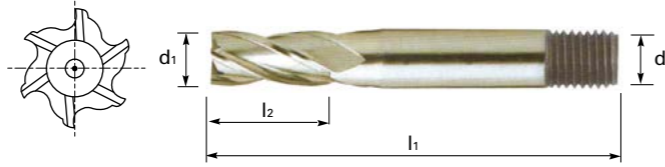
MULTI FLUTE, STANDARD SERIES



Series No. 507202, 507201

Clarkson No. 01P/03P, 010/011/030/031

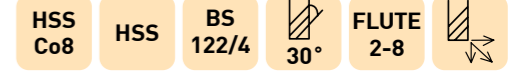
▶ cutting conditions : p.343



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	No. of Flute	Europa Code		Clarkson Code	
					HSS Co8	HSS	HSS Co8	HSS
1.3/16	1	1.13/16	4.1/8	6	5072021120	5072011120	-	-
1.1/4	1	1.15/16	4.1/4	6	5072029001	5072019001	01P080	01080
1.5/16	1	1.15/16	4.1/4	6	5072029002	5072019002	-	-
1.3/8	1	2.1/16	4.3/8	6	5072029003	5072019003	01P088	01088
1.7/16	1	2.1/16	4.3/8	6	5072029004	5072019004	-	-
1.1/2	1	2.3/16	4.1/2	6	5072029005	5072019005	01P096	01096
1.5/8	1	2.3/8	4.5/8	8	5072029006	5072019006	-	01104
1.3/4	1	2.1/2	4.3/4	8	5072029007	5072019007	-	01112
1.7/8	1	2.5/8	4.7/8	8	5072029008	5072019008	-	01120
2	1	2.3/4	5	8	5072029009	5072019009	01P128	01128
1.1/4	1.1/4	2	4.7/16	8	5072021160	5072011160	03P080	03080
1.5/16	1.1/4	2	4.7/16	8	5072021200	5072011200	-	-
1.3/8	1.1/4	2.1/8	4.9/16	8	5072021240	5072011240	-	-
1.7/16	1.1/4	2.1/8	4.9/16	8	5072021280	5072011280	-	-
1.1/2	1.1/4	2.1/8	4.9/16	8	5072021320	5072011320	03P096	03096
1.5/8	1.1/4	2.1/8	4.9/16	8	5072021400	5072011400	-	-
1.3/4	1.1/4	2.1/4	4.11/16	8	5072021480	5072011480	03P112	03112
1.7/8	1.1/4	2.7/16	4.7/8	8	5072021560	5072011560	-	-
2	1.1/4	2.9/16	5	8	5072021640	5072011640	03P128	03128

Avialable only while stocks last

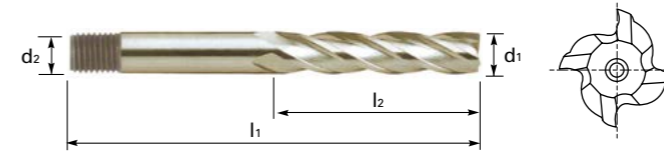
MULTI FLUTE, LONG SERIES



Series No. 508202, 508201

Clarkson No. 02P/03P, 020/011/030/031

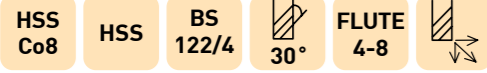
▶ cutting conditions : p.343



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	No. of Flute	Europa Code		Clarkson Code	
					HSS Co8	HSS	HSS Co8	HSS
1/16	1/4	3/32	2	2	5082020040	-	02P004	-
3/32	1/4	25/64	2.1/4	4	5082020060	-	02P006	-
1/8	1/4	3/4	2.1/2	4	5082020080	-	02P008	-
5/32	1/4	1	2.3/4	4	5082020100	-	02P010	-
3/16	1/4	1	2.3/4	4	5082020120	-	02P012	-
7/32	1/4	1.1/4	3	4	5082020140	-	02P014	-
1/4	1/4	1.1/4	3	4	5082020160	-	02P016	-
9/32	3/8	1.11/32	3.1/8	4	5082020180	5082010180	-	-
5/16	3/8	1.11/32	3.1/8	4	5082020200	5082010200	02P020	02020
11/32	3/8	1.15/32	3.1/4	4	5082020220	5082010220	-	-
3/8	3/8	1.15/32	3.1/4	4	5082020240	5082010240	02P024	02024
13/32	3/8	1.1/2	3.1/4	4	5082020260	5082010260	-	02026
7/16	1/2	1.5/8	3.1/2	4	5082020280	5082010280	02P028	02028
15/32	1/2	1.7/8	3.3/4	4	5082020300	5082010300	-	02030
1/2	1/2	1.15/16	3.3/4	4	5082020320	5082010320	02P032	02032
17/32	1/2	2.1/4	4	4	5082020340	5082010340	-	02034
9/16	1/2	2.1/4	4	4	5082020360	5082010360	02P036	02036
19/32	5/8	2.5/16	4.9/32	4	5082020380	5082010380	-	-
5/8	5/8	2.5/16	4.9/32	4	5082020400	5082010400	02P040	02040
21/32	5/8	2.5/16	4.9/32	4	5082020420	5082010420	-	-
11/16	5/8	2.3/4	4.17/32	4	5082020440	5082010440	02P044	02044
3/4	5/8	3	4.25/32	4	5082020480	5082010480	02P048	02048
13/16	1	3.1/16	5.3/8	6	5082020520	5082010520	02P048	02052
7/8	1	3.3/8	5.5/8	6	5082020560	5082010560	02P056	02056
15/16	1	3.5/8	5.7/8	6	5082020600	5082010600	02P060	02060
1	1	3.15/16	6.3/16	6	5082020640	5082010640	02P064	02064
1.1/16	1	3.7/8	6.3/16	6	5082021040	5082011040	-	-
1.1/8	1	3.7/8	6.3/16	6	5082021080	5082011080	02P072	02072
1.3/16	1	3.7/8	6.3/16	6	5082021120	5082011120	-	-
1.1/4	1	3.15/16	6.1/4	6	5082029001	5082019001	02P080	-

Avialable only while stocks last

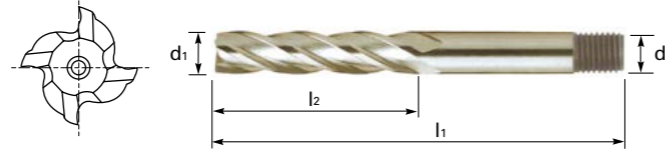
MULTI FLUTE, LONG SERIES



Series No. 508202, 508201

Clarkson No. 01P/03P, 010/011/030/031

► cutting conditions : p.343



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	No. of Flute	Europa Code		Clarkson Code	
					HSS Co8	HSS	HSS Co8	HSS
1.5/16	1	3.15/16	6.1/4	6	5082029002	5082019002	-	-
1.3/8	1	3.15/16	6.1/4	6	5082029003	5082019003	01P088	-
1.7/16	1	3.15/16	6.1/4	6	5082029004	5082019004	-	-
1.1/2	1	3.15/16	6.1/4	6	5082029005	5082019005	01P096	01096
1.5/8	1	4	6.1/4	4	5082029006	5082019006	-	01104
1.3/4	1	4	6.1/4	4	5082029007	5082019007	-	01112
1.7/8	1	4	6.1/4	8	5082029008	5082019008	-	01120
2	1	4	6.1/4	8	5082029009	5082019009	01P128	01128
1.1/4	1.1/4	4	6.7/16	6	5082021160	5082011160	03P080	04080
1.5/16	1.1/4	4	6.7/16	8	5082021200	5082011200	-	-
1.3/8	1.1/4	4	6.7/16	8	5082021240	5082011240	-	-
1.7/16	1.1/4	4	6.7/16	8	5082021280	5082011280	-	-
1.1/2	1.1/4	4	6.7/16	8	5082021320	5082011320	03P096	03096
1.5/8	1.1/4	4	6.7/16	8	5082021400	5082011400	-	-
1.3/4	1.1/4	4	6.7/16	8	5082021480	5082011480	03P112	03112
1.7/8	1.1/4	4	6.7/16	8	5082021560	5082011560	-	-
2	1.1/4	4	6.7/16	8	5082021640	5082011640	03P128	03128

Avialable only while stocks last

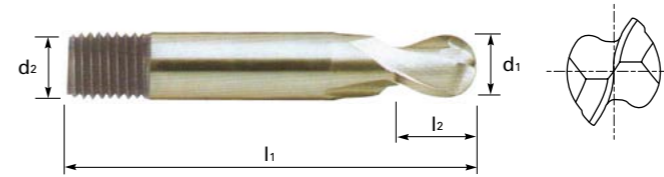
2 FLUTE BALL NOSED, STANDARD SERIES



Series No. 513202, 513201

Clarkson No. 140

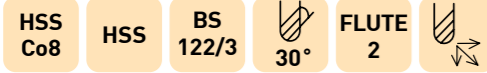
► cutting conditions : p.341



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code		Clarkson Code	
				HSS Co8	HSS	HSS Co8	HSS
1/16	1/4	3/32	1.29/32	5132020040	-	14004	-
3/32	1/4	3/16	2	5132020060	-	14006	-
1/8	1/4	9/32	2	5132020080	-	14008	-
5/32	1/4	3/8	2.1/16	5132020100	-	14010	-
3/16	1/4	3/8	2.1/16	5132020120	-	14012	-
7/32	1/4	7/16	2.3/16	5132020140	-	14014	-
1/4	1/4	7/16	2.7/32	5132020160	-	14016	-
9/32	3/8	7/16	2.5/16	5132020180	5132010180	-	-
5/16	3/8	1/2	2.11/32	5132020200	5132010200	-	14020
11/32	3/8	9/16	2.3/8	5132020220	5132010220	-	14022
3/8	3/8	9/16	2.3/8	5132020240	5132010240	-	14024
13/32	3/8	5/8	2.3/8	5132020260	5132010260	-	-
7/16	1/2	11/16	2.9/16	5132020280	5132010280	-	14028
1/2	1/2	3/4	2.5/8	5132020320	5132010320	-	14032
9/16	1/2	27/32	2.23/32	5132020360	5132010360	-	14036
5/8	5/8	7/8	2.27/32	5132020400	5132010400	-	14040
11/16	5/8	15/16	2.29/32	5132020440	5132010440	-	14044
3/4	5/8	1	3.1/32	5132020480	5132010480	-	14048
7/8	1	1	3.15/16	5132020560	5132010560	-	14056
1	1	1.1/16	3.3/4	5132020640	5132010640	-	14064
1.1/8	1	1.3/16	3.3/4	5132021080	5132011080	-	14072
1.1/4	1	1.7/16	3.15/16	5132029001	5132019001	-	14080
1.1/2	1	1.11/16	4.3/16	5132029002	5132019002	-	14096
1.1/4	1.1/4	1.3/8	4.5/8	5132021160	5132011160	-	-
1.3/8	1.1/4	1.9/16	4.3/8	5132021240	5132011240	-	-
1.1/2	1.1/4	1.11/16	4.1/2	5132021320	5132011320	-	-

Avialable only while stocks last

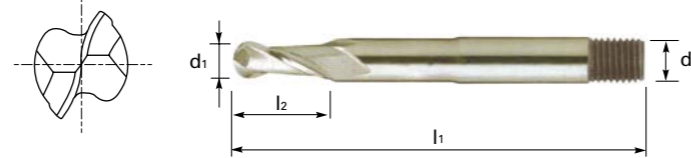
2 FLUTE BALL NOSED, LONG SERIES



Series No. 514202, 514201

Clarkson No. 270

► cutting conditions : p.341



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code		Clarkson Code	
				HSS Co8	HSS	HSS Co8	HSS
1/8	1/4	7/16	2.1/2	5142020080	-	27008	-
3/16	1/4	1/2	2.3/4	5142020120	-	27012	-
1/4	1/4	5/8	3	5142020160	-	27016	-
5/16	3/8	3/4	3.1/8	5142020200	5142010200	-	-
3/8	3/8	7/8	3.1/4	5142020240	5142010240	-	27024
7/16	1/2	7/8	3.1/2	5142020280	5142010280	-	27028
1/2	1/2	1	3.3/4	5142020320	5142010320	-	27032
9/16	1/2	1.1/8	4	5142020360	5142010360	-	27036
5/8	5/8	1.1/4	4.1/4	5142020400	5142010400	-	27040
11/16	5/8	1.3/8	4.1/2	5142020440	5142010440	-	-
3/4	5/8	1.1/2	4.3/4	5142020480	5142010480	-	27048
7/8	1	1.5/8	5.1/2	5142020560	5142010560	-	27056
1	1	1.3/4	6.1/4	5142020640	5142010640	-	27064
1.1/8	1	1.7/8	6.1/4	5142021080	5142011080	-	-
1.1/4	1	2	6.1/4	5142029001	5142019001	-	27080
1.1/2	1	2	6.1/4	5142029002	5142019002	-	27096
1.1/4	1.1/4	2	6.1/4	5142021160	5142011160	-	-
1.1/2	1.1/4	2.1/4	6.1/4	5142021320	5142011320	-	-

Available only while stocks last

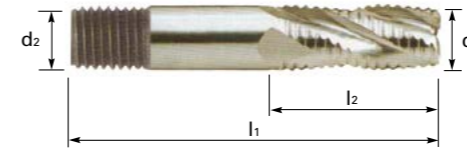
MULTI FLUTE, COARSE PITCH ROUGHING, STANDARD SERIES



Series No. 518202

Clarkson No. 760/770/771

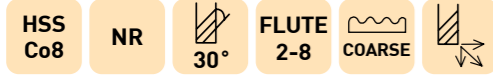
► cutting conditions : p.344



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	No. of Flute	Europa Code		Clarkson Code	
					HSS Co8	HSS	HSS Co8	HSS
1/4	1/4	5/8	2.3/8	3	5182020160	-	76016G	-
5/16	3/8	3/4	2.1/2	3	5182020200	-	76020G	-
3/8	3/8	5/8	2.3/4	3	5182020240	-	76024G	-
1/2	1/2	15/16	2.3/4	4	5182020320	-	76032G	-
9/16	1/2	1.1/18	2.7/8	4	5182020360	-	76036G	-
5/8	5/8	1.1/16	3.1/32	4	5182020400	-	76040G	-
11/16	5/8	1.3/8	3.5/32	4	5182020440	-	76044G	-
3/4	5/8	1.1/2	3.9/32	4	5182020480	-	76048G	-
7/8	1	1.5/8	3.7/8	5	5182020560	-	76056G	-
1	1	1.11/16	4	5	5182020640	-	76064G	-
1.1/16	1	1.11/16	4	5	5182021040	-	-	-
1.1/8	1	1.13/16	4.1/8	6	5182021080	-	76072G	-
1.3/16	1	1.13/16	4.1/8	6	5182021120	-	-	-
1.1/4	1	1.15/16	4.1/4	6	5182029001	-	76080G	-
1.3/8	1	2.1/16	4.3/8	6	5182029002	-	76088G	-
1.1/2	1	2.3/16	4.1/2	6	5182029003	-	76096G	-
1.1/4	1.1/4	2	4.7/16	6	5182021160	-	77080G	-
1.3/8	1.1/4	2.1/8	4.9/16	6	5182021200	-	-	-
1.1/2	1.1/4	2.1/8	4.9/16	6	5182021320	-	77096G	-
1.3/4	1.1/4	2.1/2	4.15/16	6	5182021480	-	-	-
2	1.1/4	2.9/16	5	8	5182021640	-	77128G	-

Available only while stocks last

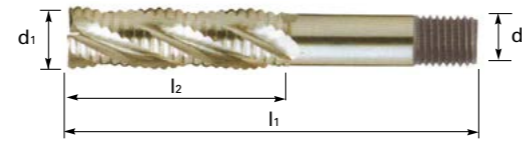
MULTI FLUTE, COARSE PITCH ROUGHING, LONG SERIES



Series No. 519202

Clarkson No. 762/772/773

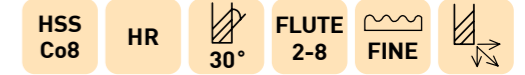
▶ cutting conditions : p.344



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	No. of Flute	Europa Code	Clarkson Code
					HSS Co8	HSS Co8
5/16	3/8	1.11/32	3.1/8	3	5192020200	-
3/8	3/8	1.15/32	3.1/4	3	5192020240	76224
7/16	1/2	1.5/8	3.1/2	4	5192020280	-
1/2	1/2	1.15/16	3.3/4	4	5192020320	76232
5/8	5/8	2.5/16	4.9/32	4	5192020400	76240
3/4	5/8	3	4.25/32	4	5192020480	76248
7/8	1	3.3/8	5.5/8	5	5192020560	76256
1	1	3.15/16	6.3/16	5	5192020640	72664
1.1/8	1	3.7/8	6.3/16	6	5192021080	76272
1.1/4	1	3.15/16	6.1/4	6	5192029001	76280
1.3/8	1	3.15/16	6.1/4	6	5192029002	-
1.1/2	1	3.15/16	6.1/4	6	5192029003	-
1.1/4	1.1/4	4	6.7/16	6	5192021160	77280
1.3/8	1.1/4	4	6.7/16	6	5192021240	-
1.1/2	1.1/4	4	6.7/16	6	5192021320	77296
1.3/4	1.1/4	4	6.7/16	6	5192021480	77312
2	1.1/4	4	6.7/16	8	5192021640	77328

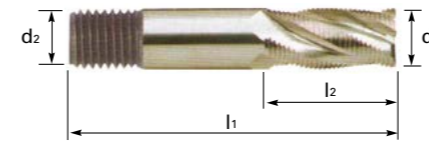
Avialable only while stocks last

MULTI FLUTE, FINE PITCH ROUGHING, STANDARD SERIES



Series No. 521202

▶ cutting conditions : p.345



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	No. of Flute	Europa Code	Clarkson Code
					HSS Co8	HSS Co8
1/4	1/4	5/8	2.3/8	3	5212020160	-
5/16	3/8	3/4	2.1/2	3	5212020200	-
3/8	3/8	5/8	2.3/4	3	5212020240	-
1/2	1/2	15/16	2.3/4	4	5212020320	-
9/16	1/2	1.1/18	2.7/8	4	5212020360	-
5/8	5/8	1.1/16	3.1/32	4	5212020400	-
11/16	5/8	1.3/8	3.5/32	4	5212020440	-
3/4	5/8	1.1/2	3.9/32	4	5212020480	-
7/8	1	1.5/8	3.7/8	5	5212020560	-
1	1	1.11/16	4	5	5212020640	-
1.1/8	1	1.13/16	4.1/8	6	5212021080	-
1.1/4	1	1.15/16	4.1/4	6	5212029001	-
1.3/8	1	2.1/16	4.3/8	6	5212029002	-
1.1/2	1	2.3/16	4.1/2	6	5212029003	-
1.1/4	1.1/4	2	4.7/16	6	5212021160	-
1.3/8	1.1/4	2.1/8	4.9/16	6	5212021240	-
1.1/2	1.1/4	2.1/8	4.9/16	6	5212021320	-
1.3/4	1.1/4	2.1/2	4.15/16	6	5212021480	-
2	1.1/4	2.9/16	5	8	5212021640	-

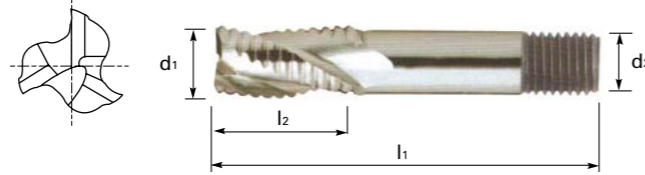
Avialable only while stocks last

3 FLUTE, COARSE PITCH ROUGHING, FOR ALUMINIUM STANDARD SERIES



Series No. 524202

▶ cutting conditions : p.345



Mil Dia. d ₁	Shank Dia. d ₂	Length of Cut l ₂	Overall Length l ₁	Europa Code	Clarkson Code
				HSS Co8	HSS Co8
1/4	1/4	5/8	2.3/8	5242020160	-
5/16	3/8	3/4	2.1/2	5242020200	-
3/8	3/8	5/8	2.3/4	5242020240	-
1/2	1/2	15/16	2.3/4	5242020320	-
9/16	1/2	1.1/18	2.7/8	5242020360	-
5/8	5/8	1.1/16	3.1/32	5242020400	-
11/16	5/8	1.3/8	3.5/32	5242020440	-
3/4	5/8	1.1/2	3.9/32	5242020480	-
7/8	1	1.5/8	3.7/8	5242020560	-
1	1	1.11/16	4	5242020640	-
1.1/8	1	1.13/16	4.1/8	5242021080	-
1.1/4	1	1.15/16	4.1/4	5242029001	-
1.3/8	1	2.1/16	4.3/8	5242029002	-
1.1/2	1	2.3/16	4.1/2	5242029003	-
1.1/4	1.1/4	2	4.7/16	5242021160	-
1.3/8	1.1/4	2.1/8	4.9/16	5242021240	-
1.1/2	1.1/4	2.1/8	4.9/16	5242021320	-
1.3/4	1.1/4	2.1/2	4.15/16	5242021480	-
2	1.1/4	2.9/16	5	5242021640	-

Available only while stocks last

TABLE OF CUTTING CONDITION

[8% Co HSS, Short Type*]



2FLUTE, SLOTTING

MATERIAL		STEELS											
STRENGTH		~ 500N/mm ²			500 ~ 800N/mm ²			800 ~ 1000N/mm ²			1100 ~ 1300N/mm ²		
CUTTING SPEED		v=28-40m/min.			v=24-32m/min.			v=18-25m/min.			v=12-16m/min.		
d	z	n	s _t	u	n	s _t	u	n	s _t	u	n	s _t	u
2	2	5600	0.003	40	4500	0.003	30	4000	0.003	30	2240	0.003	15
3	2	3550	0.007	55	3150	0.007	45	2500	0.008	40	1600	0.006	20
4	2	2800	0.012	70	2240	0.012	55	1800	0.012	45	1120	0.013	30
5	2	2240	0.020	90	1800	0.019	70	1600	0.018	60	900	0.019	35
6	2	1800	0.025	90	1600	0.025	80	1250	0.024	60	800	0.025	40
8	2	1400	0.035	100	1120	0.040	90	900	0.038	70	560	0.040	45
10	2	1120	0.044	100	900	0.050	90	800	0.050	80	450	0.050	45
12	2	900	0.061	110	800	0.062	100	630	0.063	80	400	0.062	50
14	2	800	0.068	110	710	0.063	90	560	0.071	80	355	0.070	50
16	2	710	0.077	110	560	0.080	90	450	0.077	70	280	0.080	45
18	2	630	0.079	100	500	0.090	90	400	0.087	70	250	0.090	45
20	2	560	0.089	100	450	0.100	90	400	0.087	70	224	0.100	45
22	2	500	0.100	100	450	0.100	90	355	0.098	70	224	0.100	45
25	2	450	0.100	90	400	0.100	80	315	0.095	60	180	0.097	35
28	2	400	0.100	80	355	0.098	70	280	0.098	55	160	0.093	30
30	2	355	0.098	70	315	0.095	60	250	0.100	50	160	0.193	30
32	2	355	0.098	70	280	0.098	55	224	0.100	45	140	0.107	30
36	2	315	0.095	60	250	0.100	50	200	0.100	40	125	0.100	25
40	2	280	0.107	60	224	0.111	50	180	0.111	40	112	0.111	25

MATERIAL		TOOL STEELS			NICKEL BASED High Temp. Alloys			ALUMINIUM		
STRENGTH										
CUTTING SPEED		v=7-12m/min.			v=4-6m/min.			v=75-102m/min.		
d	z	n	s _t	u	n	s _t	u	n	s _t	u
2	2	1600	0.003	10	800	0.006	10	12500	0.006	160
3	2	1000	0.007	15	500	0.010	10	11200	0.011	250
4	2	800	0.012	20	400	0.012	10	8000	0.018	290
5	2	630	0.019	25	315	0.015	10	6300	0.025	315
6	2	500	0.025	25	250	0.020	10	5600	0.028	315
8	2	400	0.037	30	180	0.027	10	4000	0.048	387
10	2	315	0.047	30	160	0.031	10	3150	0.063	400
12	2	250	0.060	30	125	0.060	15	2500	0.075	375
14	2	224	0.067	30	112	0.067	15	2240	0.079	355
16	2	180	0.083	30	90	0.083	15	2000	0.086	345
18	2	160	0.093	30	80	0.093	15	1800	0.095	345
20	2	160	0.093	30	80	0.093	15	1600	0.098	315
22	2	140	0.107	30	71	0.105	15	1400	0.107	300
25	2	125	0.100	25	63	0.119	15	1250	0.112	280
28	2	112	0.089	20	56	0.087	10	1120	0.118	265
30	2	100	0.100	20	50	0.100	10	1120	0.118	265
32	2	90	0.111	20	45	0.111	10	1000	0.118	236
36	2	80	0.125	20	40	0.125	10	900	0.124	244
40	2	80	0.125	20	40	0.125	10	800	0.125	200

※ The FEED, in long types, should be reduced by around 50%

v = Cutting Speed
 n = Revolution per min.
 u = Feed
 s_t = Feed per tooth
 d = Cutting Diameter in mm
 z = Number of flute
 π = 3.14

v = dπn / 1000 (m/ min.)
 n = v1000/dπ (Rev./ min.)
 u = s_t z n (mm/min.)
 s_t = u / n z (mm/ tooth)

TABLE OF CUTTING CONDITION

[8% Co HSS, Short Type*]



3FLUTE, SLOTTING

MATERIAL		STEELS											
STRENGTH		~ 500N/mm ²			500 ~ 800N/mm ²			800 ~ 1000N/mm ²			1100 ~ 1300N/mm ²		
CUTTING SPEED		v=28-40m/min.			v=24-32m/min.			v=18-25m/min.			v=12-16m/min.		
d	z	n	s _r	u	n	s _r	u	n	s _r	u	n	s _r	u
2	3	5600	0.004	80	4500	0.004	60	4000	0.004	50	2240	0.004	30
3	3	3550	0.009	100	3150	0.009	90	2500	0.009	70	1600	0.009	45
4	3	2800	0.013	110	2240	0.013	90	1800	0.014	80	1120	0.013	45
5	3	2240	0.020	140	1800	0.020	110	1600	0.020	100	900	0.020	55
6	3	1800	0.026	140	1600	0.026	125	1250	0.026	100	800	0.025	60
8	3	1400	0.037	155	1120	0.037	125	900	0.037	100	560	0.035	60
10	3	1120	0.046	155	900	0.046	125	800	0.045	110	450	0.044	60
12	3	900	0.057	155	800	0.058	140	630	0.058	110	400	0.058	70
14	3	800	0.064	155	710	0.065	140	560	0.065	110	355	0.065	70
16	3	710	0.072	155	560	0.074	125	450	0.081	110	280	0.071	60
18	3	630	0.082	155	500	0.083	125	400	0.091	110	250	0.080	60
20	3	560	0.092	155	450	0.092	125	400	0.091	110	224	0.089	60
22	3	500	0.093	140	450	0.092	125	355	0.093	100	224	0.089	60
25	3	450	0.092	125	400	0.091	110	315	0.095	90	180	0.092	50
28	3	400	0.104	125	355	0.103	110	280	0.107	90	160	0.104	50
30	3	355	0.103	110	315	0.105	100	250	0.106	80	160	0.104	50

MATERIAL		TOOL STEELS			NICKEL BASED High Temp. Alloys			ALUMINIUM		
STRENGTH		v=7-12m/min.			v=4-6m/min.			v=75-102m/min.		
d	z	n	s _r	u	n	s _r	u	n	s _r	u
2	3	1600	0.004	20	800	0.004	10			
3	3	1000	0.010	30	500	0.010	15	11200	0.009	315
4	3	800	0.012	30	400	0.012	15	8000	0.015	375
5	3	630	0.021	40	315	0.021	20	6300	0.021	400
6	3	500	0.026	40	250	0.026	20	5600	0.023	400
8	3	400	0.037	45	180	0.037	20	4000	0.041	500
10	3	315	0.047	45	160	0.041	20	3150	0.056	530
12	3	250	0.060	45	125	0.053	20	2500	0.066	500
14	3	224	0.067	45	112	0.059	20	2240	0.070	475
16	3	180	0.074	40	90	0.074	20	2000	0.075	450
18	3	160	0.083	40	80	0.083	20	1800	0.083	450
20	3	160	0.083	40	80	0.083	20	1600	0.083	400
22	3	140	0.095	40	71	0.093	20	1400	0.095	400
25	3	125	0.093	35	63	0.079	15	1250	0.100	375
28	3	112	0.104	35	56	0.089	15	1120	0.105	355
30	3	100	0.100	30	50	0.100	15	1120	0.105	355

※The FEED, in long types, should be reduced by around 50%

v = Cutting Speed
 n = Revolution per min.
 u = Feed
 s_r = Feed per tooth
 d = Cutting Diameter in mm
 z = Number of flute
 π = 3.14

$v = d\pi n / 1000$ (m/ min.)
 $n = v1000/d\pi$ (Rev./ min.)
 $u = s_r z n$ (mm/min.)
 $s_r = u / n z$ (mm/ tooth)

TABLE OF CUTTING CONDITION

[8% Co HSS, Short Type*]



4,6 FLUTE, SIDE CUTTING

MATERIAL		STEELS											
STRENGTH		~ 500N/mm ²			500 ~ 800N/mm ²			800 ~ 1000N/mm ²			1100 ~ 1300N/mm ²		
CUTTING SPEED		v=28-40m/min.			v=24-32m/min.			v=18-25m/min.			v=12-16m/min.		
d	z	n	s _r	u	n	s _r	u	n	s _r	u	n	s _r	u
2	3	5600	0.002	50	4500	0.002	45	4000	0.002	40	2240	0.002	20
3	3	3550	0.004	60	3150	0.004	55	2500	0.004	45	1600	0.003	20
4	3	2800	0.007	80	2240	0.006	60	1800	0.007	50	1120	0.006	30
5	3	2240	0.010	90	1800	0.009	70	1600	0.009	60	900	0.009	35
6	3	1800	0.015	110	1600	0.015	100	1250	0.016	80	800	0.015	50
8	3	1400	0.031	175	1120	0.031	140	900	0.030	110	560	0.031	70
10	3	1120	0.044	200	900	0.048	175	800	0.048	155	450	0.050	90
12	3	900	0.068	245	800	0.062	200	630	0.069	175	400	0.068	110
14	3	800	0.085	275	710	0.070	200	560	0.078	175	355	0.770	110
16	3	710	0.096	275	560	0.089	200	450	0.097	175	280	0.098	110
18	3	630	0.109	275	500	0.110	220	400	0.109	175	250	0.110	110
20	3	560	0.122	275	450	0.122	220	400	0.125	200	224	0.122	110
22	3	500	0.138	415	450	0.137	370	355	0.138	295	224	0.137	185
25	3	450	0.153	415	400	0.154	370	315	0.156	295	180	0.152	165
28	3	400	0.173	415	355	0.155	330	280	0.157	265	160	0.171	165
30	3	355	0.173	370	315	0.174	330	250	0.176	265	160	0.171	165

MATERIAL		TOOL STEELS			NICKEL BASED High Temp. Alloys			ALUMINIUM		
STRENGTH		v=7-12m/min.			v=4-6m/min.			v=75-102m/min.		
d	z	n	s _r	u	n	s _r	u	n	s _r	u
2	3	1600	0.002	15	800	0.003	10			
3	3	1000	0.003	15	500	0.005	10	18000	0.011	800
4	3	800	0.006	20	400	0.006	10	12500	0.018	900
5	3	630	0.010	25	315	0.012	15	10000	0.025	1000
6	3	500	0.015	30	250	0.015	15	9000	0.027	1000
8	3	400	0.031	50	180	0.027	20	6300	0.046	1180
10	3	315	0.047	60	160	0.046	30	5000	0.062	1250
12	3	250	0.070	70	125	0.070	35	4000	0.073	1180
14	3	224	0.078	70	112	0.078	35	3550	0.078	1120
16	3	180	0.097	70	90	0.097	35	3150	0.084	1060
18	3	160	0.109	70	80	0.109	35	2800	0.094	1060
20	3	160	0.125	80	80	0.125	40	2500	0.100	1000
22	3	140	0.137	115	71	0.140	60	2000	0.088	1060
25	3	125	0.140	105	63	0.158	60	1800	0.092	1000
28	3	112	0.156	105	56	0.163	55	1600	0.099	950
30	3	100	0.175	105	50	0.183	55	1600	0.099	950

※The FEED, in long types, should be reduced by around 50%

v = Cutting Speed
 n = Revolution per min.
 u = Feed
 s_r = Feed per tooth
 d = Cutting Diameter in mm
 z = Number of flute
 π = 3.14

$v = d\pi n / 1000$ (m/ min.)
 $n = v1000/d\pi$ (Rev./ min.)
 $u = s_r z n$ (mm/min.)
 $s_r = u / n z$ (mm/ tooth)

TABLE OF CUTTING CONDITION

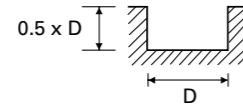
[8% Co HSS, Short Type*]



HSS & COBALT MILLING CUTTERS [SCREWED SHANK]

MULTI FLUTE SLOTTING

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS								ALUMINUM ALUMINUM ALLOYS	
	~ HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40					
HARDNESS	~ 500N/mm ²		500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²			
STRENGTH	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	5600	60	4500	45	4000	45	2200	20	12000	240
3	3500	80	3200	65	2500	60	1600	30	11000	380
4	2800	105	2200	80	1800	65	1100	45	8000	440
5	2200	135	1800	105	1600	90	900	50	6300	470
6	1800	135	1600	120	1200	90	800	60	5600	470
8	1400	150	1100	135	900	105	560	65	4000	580
10	1100	150	900	135	800	120	450	65	3100	600
12	900	165	800	150	630	120	400	75	2500	570
14	800	165	700	135	560	120	350	75	2200	530
16	700	165	560	135	450	105	280	65	2000	530
18	630	150	500	135	400	105	250	65	1800	530
20	560	150	450	135	400	105	220	65	1600	480
22	500	150	450	135	350	105	220	65	1400	450
25	450	135	400	120	310	90	180	50	1200	420
28	400	120	350	105	280	80	160	45	1100	400
30	350	105	310	90	250	75	160	45	1100	400

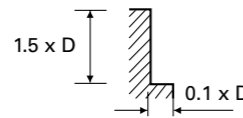


*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.
FEED=mm/min.

MULTI FLUTE FINISH SIDE CUTTING

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS								ALUMINUM ALUMINUM ALLOYS	
	~ HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40					
HARDNESS	~ 500N/mm ²		500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²			
STRENGTH	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	5600	60	4500	40	4000	35	2200	15	12000	180
3	3500	80	3200	60	2500	45	1600	20	11000	280
4	2800	105	2200	75	1800	50	1100	30	8000	330
5	2200	135	1800	95	1600	65	900	35	6300	350
6	1800	135	1600	110	1200	65	800	45	5600	350
8	1400	150	1100	120	900	80	560	50	4000	440
10	1100	150	900	120	800	90	450	50	3100	450
12	900	165	800	135	630	90	400	55	2500	430
14	800	165	700	120	560	90	350	55	2200	400
16	700	165	560	120	450	80	280	50	2000	400
18	630	150	500	120	400	80	250	50	1800	400
20	560	150	450	120	400	80	220	50	1600	360
22	500	150	450	120	350	80	220	50	1400	340
25	450	135	400	110	310	65	180	35	1200	320
28	400	120	350	95	280	60	160	30	1100	300
30	350	105	310	80	250	55	160	30	1100	300



*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.
FEED=mm/min.

TABLE OF CUTTING CONDITION

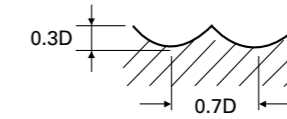
[8% Co HSS, Short Type*]



HSS & COBALT MILLING CUTTERS [SCREWED SHANK]

MULTI FLUTE BALL NOSE

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS								ALUMINUM ALUMINUM ALLOYS	
	~ HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40					
HARDNESS	~ 500N/mm ²		500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²			
STRENGTH	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
R3.0 x 6.0	2200	200	1700	135	1000	70	700	40	5600	420
R4.0 x 8.0	1600	240	1200	160	700	75	500	45	4000	530
R5.0 x 10.0	1300	270	1000	180	560	90	400	50	3200	540
R6.0 x 12.0	1000	260	800	160	450	80	320	50	2500	510
R8.0 x 16.0	800	230	600	150	350	80	250	50	2000	450
R10.0 x 20.0	600	210	500	130	300	75	200	50	1600	420
R12.5 x 25.0	500	200	400	105	220	60	160	45	1300	380

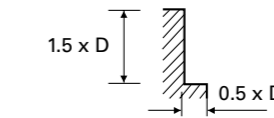


*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.
FEED=mm/min.

MULTI FLUTE, SIDE CUTTING, ROUGHING

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS								ALUMINUM ALUMINUM ALLOYS	
	~ HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40					
HARDNESS	~ 500N/mm ²		500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²			
STRENGTH	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	1800	80	1600	60	1200	55	800	30	4500	200
8	1400	105	1100	75	900	65	560	35	3100	230
10	1100	150	900	120	800	110	450	60	2500	350
12	900	180	800	140	630	110	400	70	2000	400
14	800	180	700	140	560	110	350	70	1800	420
16	700	180	560	140	450	110	280	70	1600	450
18	630	180	500	140	400	110	250	70	1400	470
20	560	180	450	140	400	110	220	70	1200	500
22	500	220	450	170	350	140	220	85	1100	470
25	450	220	400	170	310	140	180	85	1000	450
28	400	210	350	160	280	130	160	85	900	510
30	350	210	310	160	250	130	160	85	900	530
32	350	210	280	160	220	130	140	85	800	500
36	310	210	250	160	200	130	120	85	700	470
40	280	200	220	150	180	120	110	80	630	450
50	220	200	180	170	160	140	90	80	500	370



*The FEED, in long & extra long types, should be reduced by around 50%







RPM=REVOLUTION PER MIN.
FEED=mm/min.

Europa Tool 11th Edition

APPLICATION FORM MILLING CUTTER END MILLS



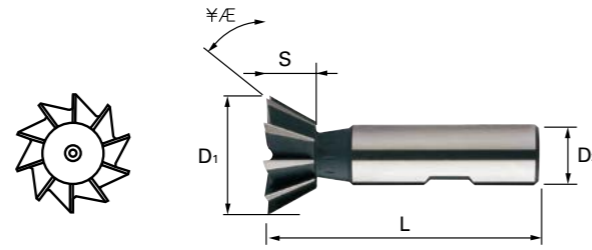
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PRODUCTS	SERIES	DESCRIPTION	PAGE
	153116, 153216 154116, 154216	HSS-E DOVETAIL CUTTERS	348
	156116, 156216 155116, 155216	HSS-E INVERTED DOVETAIL CUTTERS	349
	158116 158216	HSS-E WOODRUFF KEYSEAT CUTTERS	350
	152116 152216	HSS-ET-SLOT CUTTERS	351
	159102	HSS-E 4 FLUTE CORNER ROUNDING CUTTERS	352
	151201	HSS COUNTERBORE CUTTERS	353

HSS-E DOVETAIL CUTTERS



Series No. 153116, 153216
154116, 154216



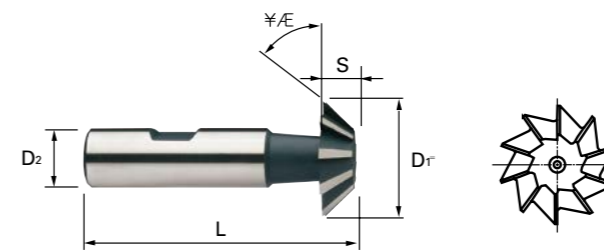
Cutting Diameter	Width	Angle	Shank Diameter	Overall Length	No. Flutes	EUROPA CODE	
						Flatted Shank	Screwed Shank
16.0	4.0	45 DEG.	12	60	6	1531161600	1532161600
20.0	5.0	45 DEG.	12	63	6	1531162000	1532162000
22.0	6.0	45 DEG.	12	67	6	1531162200	1532162200
25.0	6.3	45 DEG.	16	67	8	1531162500	1532162500
28.0	7.5	45 DEG.	16	67	8	1531162800	1532162800
32.0	8.0	45 DEG.	16	71	10	1531163200	1532163200
38.0	10.0	45 DEG.	16	80	12	1531163800	1532163800

Cutting Diameter	Width	Angle	Shank Diameter	Overall Length	No. Flutes	EUROPA CODE	
						Flatted Shank	Screwed Shank
16.0	6.3	60 DEG.	12	60	6	1541161600	1542161600
20.0	8.0	60 DEG.	12	63	6	1541162000	1542162000
22.0	9.0	60 DEG.	12	67	6	1541162200	1542162200
25.0	10.0	60 DEG.	16	67	8	1541162500	1542162500
28.0	11.0	60 DEG.	16	67	8	1541162800	1542162800
32.0	12.5	60 DEG.	16	71	10	1541163200	1542163200
38.0	16.0	60 DEG.	16	80	12	1541163800	1542163800
40.0	13.0	60 DEG.	25	85	12	1541164000	1542164000
50.0	16.0	60 DEG.	25	100	16	1541165000	1542165000

HSS-E INVERTED DOVETAIL CUTTERS



Series No. 156116, 156216
155116, 155216



Cutting Diameter	Width	Angle	Shank Diameter	Overall Length	No. Flutes	EUROPA CODE	
						Flatted Shank	Screwed Shank
16.0	4.0	45 DEG.	12	60	6	1561161600	1562161600
20.0	5.0	45 DEG.	12	63	6	1561162000	1562162000
22.0	6.0	45 DEG.	12	67	6	1561162200	1562162200
25.0	6.3	45 DEG.	16	67	8	1561162500	1562162500
28.0	7.5	45 DEG.	16	67	8	1561162800	1562162800
32.0	8.0	45 DEG.	16	71	10	1561163200	1562163200
38.0	10.0	45 DEG.	16	80	12	1561163800	1562163800

Cutting Diameter	Width	Angle	Shank Diameter	Overall Length	No. Flutes	EUROPA CODE	
						Flatted Shank	Screwed Shank
16.0	6.3	60 DEG.	12	60	6	1551161600	1552161600
20.0	8.0	60 DEG.	12	63	6	1551162000	1552162000
22.0	9.0	60 DEG.	12	67	6	1551162200	1552162200
25.0	10.0	60 DEG.	16	67	8	1551162500	1552162500
28.0	11.0	60 DEG.	16	67	8	1551162800	1552162800
32.0	12.5	60 DEG.	16	71	10	1551163200	1552163200
38.0	16.0	60 DEG.	16	80	12	1551163800	1552163800

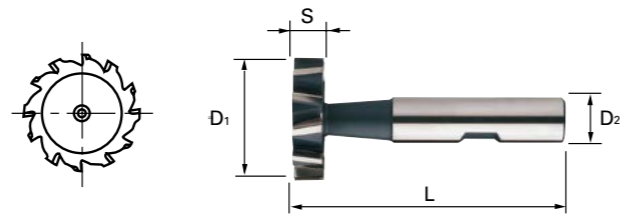
APPLICATION FORM MILLING CUTTER

APPLICATION FORM MILLING CUTTER

HSS-E WOODRUFF KEYSEAT CUTTERS



Series No. 158116, 158216

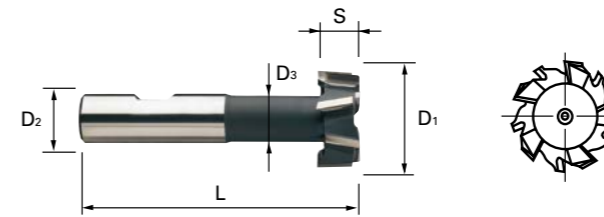


Cutting Diameter	Width	Shank Diameter	Overall Length	No. Flutes	EUROPA CODE	
					Flatted Shank	Screwed Shank
10.5	2.0	6	50	8	1581161050	1582161050
10.5	2.5	6	50	8	1581161051	1582161051
10.5	3.0	6	50	8	1581161052	1582161052
13.5	2.0	10	56	8	1581161350	1582161350
13.5	2.5	10	56	8	1581161351	1582161351
13.5	3.0	10	56	8	1581161352	1582161352
13.5	4.0	10	56	8	1581161353	1582161353
16.5	2.5	10	56	8	1581161650	1582161650
16.5	3.0	10	56	8	1581161651	1582161651
16.5	4.0	10	56	8	1581161652	1582161652
16.5	5.0	10	56	8	1581161653	1582161653
19.5	3.0	10	56	8	1581161950	1582161950
19.5	4.0	10	63	8	1581161951	1582161951
19.5	5.0	10	63	8	1581161952	1582161952
19.5	6.0	10	63	8	1581161953	1582161953
22.5	4.0	10	63	10	1581162250	1582162250
22.5	5.0	10	63	10	1581162251	1582162251
22.5	6.0	10	63	10	1581162252	1582162252
22.5	8.0	10	63	10	1581162253	1582162253
25.5	5.0	10	63	10	1581162550	1582162550
25.5	6.0	10	63	10	1581162551	1582162551
25.5	7.0	10	63	10	1581162552	1582162552
25.5	8.0	10	63	10	1581162553	1582162553
28.5	5.0	10	63	10	1581162850	1582162850
28.5	6.0	10	63	10	1581162851	1582162851
28.5	7.0	10	63	10	1581162852	1582162852
28.5	8.0	10	63	10	1581162853	1582162853
28.5	10.0	12	71	10	1581162854	1582162854
32.5	5.0	12	71	12	1581163250	1582163250
32.5	6.0	12	71	12	1581163251	1582163251
32.5	7.0	12	71	12	1581163252	1582163252
32.5	8.0	12	71	12	1581163253	1582163253
32.5	10.0	12	71	12	1581163254	1582163254
38.5	7.0	12	71	12	1581163850	1582163850
38.5	8.0	12	71	12	1581163851	1582163851
38.5	9.0	12	71	12	1581163852	1582163852
38.5	10.0	12	71	12	1581163853	1582163853
45.5	10.0	12	71	14	1581164550	1582164550

HSS-E T-SLOT CUTTERS



Series No. 152116, 152216



Cutting Diameter	Width	Shank Diameter	Overall Length	Neck Diameter	No. Flutes	EUROPA CODE	
						Flatted Shank	Screwed Shank
12.5	6	10	57	5	6	1521161250	1522161250
16.0	8	10	62	6.5	6	1521161600	1522161600
18.0	8	12	70	8	6	1521161800	1522161800
19.0	9	12	71	8	6	1521161900	1522161900
21.0	9	12	74	10	6	1521162100	1522162100
22.0	10	12	75	10	6	1521162200	1522162200
25.0	11	16	82	12	6	1521162500	1522162500
28.0	12	16	83	13	6	1521162800	1522162800
32.0	14	16	90	15	8	1521163200	1522163200
36.0	16	25	103	17	8	1521163600	1522163600
40.0	18	25	108	19	8	1521164000	1522164000

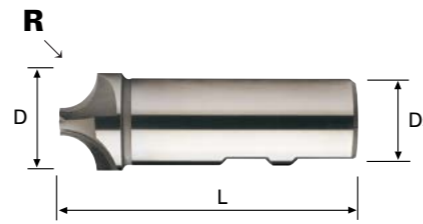
APPLICATION FORM MILLING CUTTER

APPLICATION FORM MILLING CUTTER

HSS-E 4 FLUTE CORNER ROUNDING CUTTERS



Series No. 159102



Radius	Outside Diameter	Shank Diameter	Overall Length	EUROPA CODE
				Flatted Shank
R1.0	8.0	10	60	1591020100
R1.5	9.0	10	60	1591020150
R2.0	10.0	10	60	1591020200
R2.5	11.0	10	60	1591020250
R3.0	12.0	12	60	1591020300
R3.5	13.0	12	60	1591020350
R4.0	14.0	12	60	1591020400
R4.5	15.0	12	60	1591020450
R5.0	16.0	12	60	1591020500
R5.5	19.0	16	67	1591020550
R6.0	20.0	16	67	1591020600
R6.5	21.0	16	71	1591020650
R7.0	22.0	16	71	1591020700
R7.5	23.0	16	71	1591020750
R8.0	24.0	16	71	1591020800
R8.5	25.0	25	85	1591020850
R9.0	26.0	25	85	1591020900
R9.5	27.0	25	85	1591020950
R10.0	28.0	25	85	1591021000
R10.5	31.0	25	90	1591021050
R11.0	32.0	25	90	1591021100
R12.0	34.0	25	90	1591021200
R12.5	41.0	25	100	1591021250
R13.0	42.0	25	100	1591021300
R14.0	44.0	25	100	1591021400
R15.0	46.0	25	100	1591021500
R16.0	48.0	25	100	1591021600
R18.0	52.0	32	112	1591021800
R20.0	56.0	32	112	1591022000

HSS COUNTERBORE CUTTERS



Series No. 151201



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

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



DRILLING. INDEX



SPADE DRILL CONTENTS

Europa Tool 11th Edition





SPADE DRILL










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PRODUCTS	SERIES	COATING	DESCRIPTION	PAGE
FLAT BOTTOM INSERTS				
	828327	TiAlN	T15 TiAlN SERIES Y, Z, O	360
	828327	TiAlN	T15 TiAlN SERIES 1, 2	360
	828327	TiAlN	T15 TiAlN SERIES 3	360
4F POINT INSERTS				
	834327	TiAlN	SERIES Y, Z, O 4F-POINT SPADE THROW-AWAY DRILL INSERTS(T-15)	361
	834327	TiAlN	SERIES 1, 2 4F-POINT SPADE THROW-AWAY DRILL INSERTS(T-15)	362
	834327	TiAlN	SERIES 3 4F-POINT SPADE THROW-AWAY DRILL INSERTS(T-15)	363
	834523	TiAlN	SERIES Y, Z, O 4F-POINT SPADE THROW-AWAY DRILL INSERTS(P-40)	364
	834523	TiAlN	SERIES 1, 2 4F-POINT SPADE THROW-AWAY DRILL INSERTS(P-40)	365
	834523	TiAlN	SERIES 3 4F-POINT SPADE THROW-AWAY DRILL INSERTS(P-40)	366
SPADE INSERTS HSS				
	807304 807306 807326	TiN TiCN TiAlN	SERIES 1, 2 SPADE THROW-AWAY DRILL INSERTS(M-4)	367
	807304 807306 807326	TiN TiCN TiAlN	SERIES 3 SPADE THROW-AWAY DRILL INSERTS(M-4)	368
	807304 807306 807326	TiN TiCN TiAlN	SERIES 4 SPADE THROW-AWAY DRILL INSERTS(M-4)	369
	807304 807306 807326	TiN TiCN TiAlN	SERIES 5, 6 SPADE THROW-AWAY DRILL INSERTS(M-4)	370
	807304 807306 807326	TiN TiCN TiAlN	SERIES 7, 8 SPADE THROW-AWAY DRILL INSERTS(M-4)	371

SPADE DRILL CONTENTS

PRODUCTS	SERIES	COATING	DESCRIPTION	PAGE
	808317 808318 808327	TiN TiCN TiAlN	SERIES Y, Z, O SPADE THROW-AWAY DRILL INSERTS(T-15)	372
	808317 808318 808327	TiN TiCN TiAlN	SERIES 1, 2 SPADE THROW-AWAY DRILL INSERTS(T-15)	373
	808317 808318 808327	TiN TiCN TiAlN	SERIES 3 SPADE THROW-AWAY DRILL INSERTS(T-15)	374
	808317 808318 808327	TiN TiCN TiAlN	SERIES 4 SPADE THROW-AWAY DRILL INSERTS(T-15)	375
	809305 809307 809321	TiN TiCN TiAlN	SERIES Y, Z, O SPADE THROW-AWAY DRILL INSERTS(M-48)	376
	809305 809307 809321	TiN TiCN TiAlN	SERIES 1, 2 SPADE THROW-AWAY DRILL INSERTS(M-48)	377

SPADE INSERTS HSS

	832308 832309 832323	TiN TiCN TiAlN	SERIES Y, Z, O SPADE THROW-AWAY DRILL INSERTS(K-10)	378
	832308 832309 832323	TiN TiCN TiAlN	SERIES 1, 2 SPADE THROW-AWAY DRILL INSERTS(K-10)	379
	830308 830309 830323	TiN TiCN TiAlN	SERIES Y, Z, O SPADE THROW-AWAY DRILL INSERTS(K-20)	380
	830308 830309 830323	TiN TiCN TiAlN	SERIES 1, 2 SPADE THROW-AWAY DRILL INSERTS(K-20)	381
	831308 831309 831323	TiN TiCN TiAlN	SERIES Y, Z, O SPADE THROW-AWAY DRILL INSERTS(P-40)	382
	831308 831309 831323	TiN TiCN TiAlN	SERIES 1, 2 SPADE THROW-AWAY DRILL INSERTS(P-40)	383
	831308 831309 831323	TiN TiCN TiAlN	SERIES 3 SPADE THROW-AWAY DRILL INSERTS(P-40)	384
CUTTING DATA				385 ~ 387

HOLDERS

SERIES	DESCRIPTION	PAGE
TAPER SHANK		
8Y215 TO 89215	TAPER SHANK - SHORT - STRAIGHT FLUTE	389
82325 TO 86325	TAPER SHANK - INTERMEDIATE LENGTH - SPIRAL FLUTE	389
8Y425 TO 89425	TAPER SHANK - STANDARD LENGTH - SPIRAL FLUTE	390
8Y525 TO 85525	TAPER SHANK - EXTENDED LENGTH - SPIRAL FLUTE	391
86515 TO 89515	TAPER SHANK - EXTENDED LENGTH - STRAIGHT FLUTE	391

FLANGED STRAIGHT SHANK

8Y115 TO 84115	STRAIGHT SHANK - STUB LENGTH - STRAIGHT FLUTE	392
8Y215 TO 87215	STRAIGHT SHANK - SHORT LENGTH - STRAIGHT FLUTE	392
82325 TO 86325	STRAIGHT SHANK - INTERMEDIATE LENGTH - SPIRAL FLUTE	393
8Y325 TO 87425	STRAIGHT SHANK - STANDARD LENGTH - SPIRAL FLUTE	393
8Y425 TO 85525	STRAIGHT SHANK - EXTENDED LENGTH - SPIRAL FLUTE	394
86515 TO 87515	STRAIGHT SHANK - EXTENDED LENGTH - STRAIGHT FLUTE	394

HOLDER ACCESSORIES

SP	COOLANT RINGS	395
SP	TORX SCREWS / DRIVERS	395

FLAT BOTTOM T15 TiAlN SERIES



Series No. 828327

NEW

▶ cutting conditions : p.385

Series Min. to Max. (mm/inch)	Diameter		Thick Metric (mm/inch)	EUROPA CODE
	Metric (mm)	Decimal (inch)		SUPER HSS (T15)
				TiAlN
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
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
2 24.41(.961") to 35.05(1.380")	25.00	.9843"	4.8 (3/16")	8283272500
	26.00	1.0236"		8283272600
	27.00	1.0630"		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

4F POINT T15 TiAlN SERIES



Series No. 834327

▶ cutting conditions : p.386

SERIES Y, Z, O

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE
	Inch (inch)	Metric (mm)	Decimal (inch)		TiAlN
					TiAlN
Y 9.50(.374") to 11.07(.436")		9.50	.3740"	2.4 (3/32")	8343270950
	3/8"	9.53	.3750"		8343270953
		9.80	.3860"		8343270980
	25/64"	9.92	.3906"		8343270992
		10.00	.3937"		8343271000
		10.20	.4016"		8343271020
	13/32"	10.32	.4063"		8343271032
		10.50	.4134"		8343271050
	27/64"	10.72	.4219"		8343271072
		10.80	.4252"		8343271080
Z 11.11(.437") to 12.95(.510")		11.00	.4331"	2.4 (3/32")	8343271100
	7/16"	11.11	.4375"		8343271111
		11.50	.4528"		8343271150
	29/64"	11.51	.4531"		8343271151
	15/32"	11.91	.4688"		8343271191
		12.00	.4724"		8343271200
	31/64"	12.30	.4844"		8343271230
		12.50	.4921"		8343271250
	1/2"	12.70	.5000"		8343271270
		13.00	.5118"		8343271300
O 12.98(.511") to 17.65(.695")	33/64"	13.10	.5156"	3.2 (1/8")	8343271310
	17/32"	13.49	.5313"		8343271349
		13.50	.5315"		8343271350
	35/64"	13.89	.5469"		8343271389
		14.00	.5512"		8343271400
	9/16"	14.29	.5625"		8343271429
		14.50	.5709"		8343271450
	37/64"	14.68	.5781"		8343271468
		15.00	.5906"		8343271500
	19/32"	15.08	.5938"		8343271508
	39/64"	15.48	.6094"		8343271548
		15.50	.6102"		8343271550
	5/8"	15.88	.6250"		8343271588
		16.00	.6299"		8343271600
	41/64"	16.27	.6406"		8343271627
		16.50	.6496"		8343271650
	21/32"	16.67	.6563"		8343271667
		17.00	.6693"		8343271700
	43/64"	17.07	.6719"		8343271707
	11/16"	17.46	.6875"		8343271746
	17.50	.6890"	8343271750		

4F POINT T15 TiAlN SERIES



- For use in high nickel alloys 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.

Series No. 834327

▶ cutting conditions : p.386

SERIES 1, 2

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE TiAlN
	Inch (inch)	Metric (mm)	Decimal (inch)		
1 17.53(.690") to 24.38(.960")	45/64"	17.86	.7031"	4.0 (5/32")	8343271786
		18.00	.7087"		8343271800
	23/32"	18.26	.7188"		8343271826
		18.50	.7283"		8343271850
	47/64"	18.65	.7344"		8343271865
		19.00	.7480"		8343271900
	3/4"	19.05	.7500"		8343271905
	49/64"	19.45	.7656"		8343271945
		19.50	.7677"		8343271950
	25/32"	19.84	.7813"		8343271984
		20.00	.7874"		8343272000
	51/64"	20.24	.7969"		8343272024
		20.50	.8071"		8343272050
	13/16"	20.64	.8125"		8343272064
		21.00	.8268"		8343272100
	27/32"	21.43	.8438"		8343272143
	55/64"	21.83	.8594"		8343272183
		22.00	.8661"		8343272200
	7/8"	22.23	.8750"		8343272223
	57/64"	22.62	.8906"		8343272262
	23.00	.9055"	8343272300		
29/32"	23.02	.9063"	8343272302		
59/64"	23.42	.9219"	8343272342		
15/16"	23.81	.9375"	8343272381		
	24.00	.9449"	8343272400		
2 24.41(.961") to 35.05(1.380")	31/32"	24.61	.9688"	4.8 (3/16")	8343272461
	63/64"	25.00	.9843"		8343272500
	1"	25.40	1.0000"		8343272540
	1-1/64"	25.80	1.0156"		8343272580
		26.00	1.0236"		8343272600
	1-1/32"	26.19	1.0313"		8343272619
	1-3/64"	26.59	1.0469"		8343272659
	1-1/16"	26.99	1.0625"		8343272699
		27.00	1.0630"		8343272700
	1-3/32"	27.78	1.0938"		8343272778
		28.00	1.1024"		8343272800
	1-7/64"	28.18	1.1094"		8343272818
	1-1/8"	28.58	1.1250"		8343272858
		29.00	1.1417"		8343272900
	1-5/32"	29.37	1.1563"		8343272937
		30.00	1.1811"		8343273000
	1-3/16"	30.16	1.1875"		8343273016
	1-7/32"	30.96	1.2188"		8343273096
		31.00	1.2205"		8343273100
	1-1/4"	31.75	1.2500"		8343273175
		32.00	1.2598"		8343273200
	1-9/32"	32.54	1.2813"		8343273254
		33.00	1.2992"		8343273300
	1-5/16"	33.34	1.3125"		8343273334
		34.00	1.3386"		8343273400
	1-11/32"	34.13	1.3438"		8343273413
	1-3/8"	34.93	1.3750"		8343273493
		35.00	1.3780"		8343273500

4F POINT T15 TiAlN SERIES



- For use in high nickel alloys 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.

Series No. 834327

▶ cutting conditions : p.386

SERIES 3

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE TiAlN
	Inch (inch)	Metric (mm)	Decimal (inch)		
3 34.37(1.353") to 47.80(1.882")	35.72	35.72	1.4063"	6.4 (1/4")	8343273572
	36.00	36.00	1.4173"		8343273600
	36.51	36.51	1.4375"		8343273651
	37.00	37.00	1.4567"		8343273700
	37.31	37.31	1.4688"		8343273731
	38.00	38.00	1.4961"		8343273800
	38.10	38.10	1.5000"		8343273810
	38.89	38.89	1.5313"		8343273889
	39.00	39.00	1.5354"		8343273900
	39.69	39.69	1.5625"		8343273969
	40.00	40.00	1.5748"		8343274000
	40.48	40.48	1.5938"		8343274048
	41.00	41.00	1.6142"		8343274100
	41.28	41.28	1.6250"		8343274128
	42.00	42.00	1.6535"		8343274200
	42.07	42.07	1.6563"		8343274207
	42.86	42.86	1.6875"		8343274286
	43.00	43.00	1.6929"		8343274300
	43.66	43.66	1.7188"		8343274366
	44.00	44.00	1.7323"		8343274400
	44.45	44.45	1.7500"		8343274445
	45.00	45.00	1.7717"		8343274500
	45.24	45.24	1.7813"		8343274524
	46.00	46.00	1.8110"		8343274600
	46.04	46.04	1.8125"		8343274604
	46.83	46.83	1.8438"		8343274683
	47.00	47.00	1.8504"		8343274700
	47.63	47.63	1.8750"		8343274763

4F POINT P40 TiAlN SERIES



- For use in high nickel alloys 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.

Series No. 834523

▶ cutting conditions : p.386

SERIES Y, Z, O

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE TiAlN
	Inch (inch)	Metric (mm)	Decimal (inch)		
Y 9.50(.374") to 11.07(.436")		9.50	.3740"	2.4 (3/32")	8345230950
	3/8"	9.53	.3750"		8345230953
		9.80	.3860"		8345230980
	25/64"	9.92	.3906"		8345230992
		10.00	.3937"		8345231000
		10.20	.4016"		8345231020
	13/32"	10.32	.4063"		8345231032
		10.50	.4134"		8345231050
	27/64"	10.72	.4219"		8345231072
		10.80	.4252"		8345231080
Z 11.11(.437") to 12.95(.510")		11.00	.4331"	2.4 (3/32")	8345231100
	7/16"	11.11	.4375"		8345231111
		11.50	.4528"		8345231150
	29/64"	11.51	.4531"		8345231151
	15/32"	11.91	.4688"		8345231191
		12.00	.4724"		8345231200
	31/64"	12.30	.4844"		8345231230
		12.50	.4921"		8345231250
	1/2"	12.70	.5000"		8345231270
		13.00	.5118"		8345231300
O 12.98(.511") to 17.65(.695")	33/64"	13.10	.5156"	3.2 (1/8")	8345231310
	17/32"	13.49	.5313"		8345231349
		13.50	.5315"		8345231350
	35/64"	13.89	.5469"		8345231389
		14.00	.5512"		8345231400
	9/16"	14.29	.5625"		8345231429
		14.50	.5709"		8345231450
	37/64"	14.68	.5781"		8345231468
		15.00	.5906"		8345231500
	19/32"	15.08	.5938"		8345231508
	39/64"	15.48	.6094"		8345231548
		15.50	.6102"		8345231550
	5/8"	15.88	.6250"		8345231588
		16.00	.6299"		8345231600
	41/64"	16.27	.6406"		8345231627
		16.50	.6496"		8345231650
	21/32"	16.67	.6563"		8345231667
		17.00	.6693"		8345231700
	43/64"	17.07	.6719"		8345231707
	11/16"	17.46	.6875"		8345231746
	17.50	.6890"	8345231750		

4F POINT P40 TiAlN SERIES



- For use in high nickel alloys 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.

Series No. 834523

▶ cutting conditions : p.386

SERIES 1, 2

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE TiAlN		
	Inch (inch)	Metric (mm)	Decimal (inch)				
1 17.53(.690") to 24.38(.960")	45/64"	17.86	.7031"	4.0 (5/32")	8345231786		
		18.00	.7087"		8345231800		
	23/32"	18.26	.7188"		8345231826		
		18.50	.7283"		8345231850		
	47/64"	18.65	.7344"		8345231865		
		19.00	.7480"		8345231900		
	3/4"	19.05	.7500"		8345231905		
	49/64"	19.45	.7656"		8345231945		
		19.50	.7677"		8345231950		
	25/32"	19.84	.7813"		8345231984		
		20.00	.7874"		8345232000		
	51/64"	20.24	.7969"		8345232024		
		20.50	.8071"		8345232050		
	13/16"	20.64	.8125"		8345232064		
		21.00	.8268"		8345232100		
	27/32"	21.43	.8438"		8345232143		
	55/64"	21.83	.8594"		8345232183		
		22.00	.8661"		8345232200		
	7/8"	22.23	.8750"		8345232223		
	57/64"	22.62	.8906"		8345232262		
		23.00	.9055"		8345232300		
	29/32"	23.02	.9063"		8345232302		
	59/64"	23.42	.9219"		8345232342		
	15/16"	23.81	.9375"		8345232381		
		24.00	.9449"		8345232400		
	2 24.41(.961") to 35.05(1.380")	31/32"	24.61		.9688"	4.8 (3/16")	8345232461
		63/64"	25.00		.9843"		8345232500
		1"	25.40		1.0000"		8345232540
		1-1/64"	25.80		1.0156"		8345232580
		26.00	1.0236"	8345232600			
1-1/32"		26.19	1.0313"	8345232619			
1-3/64"		26.59	1.0469"	8345232659			
1-1/16"		26.99	1.0625"	8345232699			
		27.00	1.0630"	8345232700			
1-3/32"		27.78	1.0938"	8345232778			
		28.00	1.1024"	8345232800			
1-7/64"		28.18	1.1094"	8345232818			
1-1/8"		28.58	1.1250"	8345232858			
		29.00	1.1417"	8345232900			
1-5/32"		29.37	1.1563"	8345232937			
		30.00	1.1811"	8345233000			
1-3/16"		30.16	1.1875"	8345233016			
1-7/32"		30.96	1.2188"	8345233096			
		31.00	1.2205"	8345233100			
1-1/4"		31.75	1.2500"	8345233175			
		32.00	1.2598"	8345233200			
1-9/32"		32.54	1.2813"	8345233254			
		33.00	1.2992"	8345233300			
1-5/16"		33.34	1.3125"	8345233334			
		34.00	1.3386"	8345233400			
1-11/32"		34.13	1.3438"	8345233413			
1-3/8"		34.93	1.3750"	8345233493			
		35.00	1.3780"	8345233500			

4F POINT P40 TiAlN SERIES



- For use in high nickel alloys 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.

Series No. 834523

▶ cutting conditions : p.386

SERIES 3

Series Min. to Max. (mm/inch)	Diameter			Thick	EUROPA CODE TiAlN
	Inch (inch)	Metric (mm)	Decimal (inch)	Metric (mm/inch)	
3 34.37(1.353") to 47.80(1.882")	35.72	35.72	1.4063"	6.4 (1/4")	8345233572
	36.00	36.00	1.4173"		8345233600
	36.51	36.51	1.4375"		8345233651
	37.00	37.00	1.4567"		8345233700
	37.31	37.31	1.4688"		8345233731
	38.00	38.00	1.4961"		8345233800
	38.10	38.10	1.5000"		8345233810
	38.89	38.89	1.5313"		8345233889
	39.00	39.00	1.5354"		8345233900
	39.69	39.69	1.5625"		8345233969
	40.00	40.00	1.5748"		8345234000
	40.48	40.48	1.5938"		8345234048
	41.00	41.00	1.6142"		8345234100
	41.28	41.28	1.6250"		8345234128
	42.00	42.00	1.6535"		8345234200
	42.07	42.07	1.6563"		8345234207
	42.86	42.86	1.6875"		8345234286
	43.00	43.00	1.6929"		8345234300
	43.66	43.66	1.7188"		8345234366
	44.00	44.00	1.7323"		8345234400
	44.45	44.45	1.7500"		8345234445
	45.00	45.00	1.7717"		8345234500
	45.24	45.24	1.7813"		8345234524
	46.00	46.00	1.8110"		8345234600
	46.04	46.04	1.8125"		8345234604
	46.83	46.83	1.8438"		8345234683
	47.00	47.00	1.8504"		8345234700
	47.63	47.63	1.8750"		8345234763

SPADE Throw-Away Drill Inserts-HSS M4



- For general use in steels and cast irons.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available.40

Series No. 807304, 807306, 807326

▶ cutting conditions : p.386

SERIES 1, 2

Series Min. to Max. (mm/inch)	Diameter			Thick	EUROPA CODE			
	Inch (inch)	Metric (mm)	Decimal (inch)	Metric (mm/inch)	TIN	TICN	TiAlN	
1 17.53(.690") to 24.38(.960")	45/64"	17.86	.7031"	4.0 (5/32")	8073041786	8073061786	8073261786	
		18.00	.7087"		8073041800	8073061800	8073261800	
	23/32"	18.26	.7188"		8073041826	8073061826	8073261826	
		18.50	.7283"		8073041850	8073061850	8073261850	
	47/64"	18.65	.7344"		8073041865	8073061865	8073261865	
		19.00	.7480"		8073041900	8073061900	8073261900	
	3/4"	19.05	.7500"		8073041905	8073061905	8073261905	
	49/64"	19.45	.7656"		8073041945	8073061945	8073261945	
		19.50	.7677"		8073041950	8073061950	8073261950	
	25/32"	19.84	.7812"		8073041984	8073061984	8073261984	
		20.00	.7874"		8073042000	8073062000	8073262000	
	51/64"	20.24	.7969"		8073042024	8073062024	8073262024	
		20.50	.8071"		8073042050	8073062050	8073262050	
	13/16"	20.64	.8125"		8073042064	8073062064	8073262064	
		21.00	.8268"		8073042100	8073062100	8073262100	
	27/32"	21.43	.8438"		8073042143	8073062143	8073262143	
	55/64"	21.83	.8594"		8073042183	8073062183	8073262183	
		22.00	.8661"		8073042200	8073062200	8073262200	
	7/8"	22.23	.8750"		8073042223	8073062223	8073262223	
	57/64"	22.62	.8906"		8073042262	8073062262	8073262262	
		23.00	.9055"		8073042300	8073062300	8073262300	
	29/32"	23.02	.9062"		8073042302	8073062302	8073262302	
	59/64"	23.42	.9219"		8073042342	8073062342	8073262342	
	15/16"	23.81	.9375"		8073042381	8073062381	8073262381	
		24.00	.9449"		8073042400	8073062400	8073262400	
		31/32"	24.61		.9688"	8073042461	8073062461	8073262461
	63/64"	25.00	.9843"		8073042500	8073062500	8073262500	
	1"	25.40	1.0000"		8073042540	8073062540	8073262540	
	1-1/64"	25.80	1.0156"		8073042580	8073062580	8073262580	
		26.00	1.0236"		8073042600	8073062600	8073262600	
1-1/32"	26.19	1.0312"	8073042619	8073062619	8073262619			
1-3/64"	26.59	1.0469"	8073042659	8073062659	8073262659			
1-1/16"	26.99	1.0625"	8073042699	8073062699	8073262699			
	27.00	1.0630"	8073042700	8073062700	8073262700			
1-3/32"	27.78	1.0938"	8073042778	8073062778	8073262778			
	28.00	1.1024"	8073042800	8073062800	8073262800			
1-7/64"	28.18	1.1094"	8073042818	8073062818	8073262818			
1-1/8"	28.58	1.1250"	8073042858	8073062858	8073262858			
	29.00	1.1417"	8073042900	8073062900	8073262900			
1-5/32"	29.37	1.1562"	8073042937	8073062937	8073262937			
	30.00	1.1811"	8073043000	8073063000	8073263000			
1-3/16"	30.16	1.1875"	8073043016	8073063016	8073263016			
1-7/32"	30.96	1.2188"	8073043096	8073063096	8073263096			
	31.00	1.2205"	8073043100	8073063100	8073263100			
1-1/4"	31.75	1.2500"	8073043175	8073063175	8073263175			
	32.00	1.2598"	8073043200	8073063200	8073263200			
1-9/32"	32.54	1.2812"	8073043254	8073063254	8073263254			
	33.00	1.2992"	8073043300	8073063300	8073263300			
1-5/16"	33.34	1.3125"	8073043334	8073063334	8073263334			
	34.00	1.3386"	8073043400	8073063400	8073263400			
1-11/32"	34.13	1.3438"	8073043413	8073063413	8073263413			
1-3/8"	34.93	1.3750"	8073043493	8073063493	8073263493			
	35.00	1.3780"	8073043500	8073063500	8073263500			

SPADE Throw-Away Drill Inserts-HSS M4



- For general use in steels and cast irons.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available.40

Series No. 807304, 807306, 807326

▶ cutting conditions : p.386

SERIES 3

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE		
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAlN
3 34.37(1.353") to 47.80(1.882")	1-13/32"	35.72	1.4062"	6.4 (1/4")	8073043572	8073063572	8073263572
		36.00	1.4173"		8073043600	8073063600	8073263600
	1-7/16"	36.51	1.4375"		8073043651	8073063651	8073263651
		37.00	1.4567"		8073043700	8073063700	8073263700
	1-15/32"	37.31	1.4688"		8073043731	8073063731	8073263731
		38.00	1.4961"		8073043800	8073063800	8073263800
	1-1/2"	38.10	1.5000"		8073043810	8073063810	8073263810
	1-17/32"	38.89	1.5312"		8073043889	8073063889	8073263889
		39.00	1.5354"		8073043900	8073063900	8073263900
	1-9/16"	39.69	1.5625"		8073043969	8073063969	8073263969
		40.00	1.5748"		8073044000	8073064000	8073264000
	1-19/32"	40.48	1.5938"		8073044048	8073064048	8073264048
		41.00	1.6142"		8073044100	8073064100	8073264100
	1-5/8"	41.28	1.6250"		8073044128	8073064128	8073264128
		42.00	1.6535"		8073044200	8073064200	8073264200
	1-21/32"	42.07	1.6562"		8073044207	8073064207	8073264207
	1-11/16"	42.86	1.6875"		8073044286	8073064286	8073264286
		43.00	1.6929"		8073044300	8073064300	8073264300
	1-23/32"	43.66	1.7188"		8073044366	8073064366	8073264366
		44.00	1.7323"		8073044400	8073064400	8073264400
	1-3/4"	44.45	1.7500"		8073044445	8073064445	8073264445
		45.00	1.7717"		8073044500	8073064500	8073264500
	1-25/32"	45.24	1.7812"		8073044524	8073064524	8073264524
		46.00	1.8110"		8073044600	8073064600	8073264600
	1-13/16"	46.04	1.8125"		8073044604	8073064604	8073264604
	1-27/32"	46.83	1.8438"		8073044683	8073064683	8073264683
		47.00	1.8504"		8073044700	8073064700	8073264700
	1-7/8"	47.63	1.8750"		8073044763	8073064763	8073264763

SPADE Throw-Away Drill Inserts-HSS M4



- For general use in steels and cast irons.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available.

Series No. 807304, 807306, 807326

▶ cutting conditions : p.386

SERIES 4

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE		
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAlN
4 46.99(1.850") to 65.28(2.570")	1-29/32"	48.00	1.8898"	7.9 (5/16")	8073044800	8073064800	8073264800
		48.42	1.9062"		8073044842	8073064842	8073264842
	1-15/16"	49.00	1.9291"		8073044900	8073064900	8073264900
		49.21	1.9375"		8073044921	8073064921	8073264921
	1-31/32"	50.00	1.9685"		8073045000	8073065000	8073265000
		50.01	1.9688"		8073045001	8073065001	8073265001
	2"	50.80	2.0000"		8073045080	8073065080	8073265080
		51.00	2.0079"		8073045100	8073065100	8073265100
	2-1/32"	51.59	2.0312"		8073045159	8073065159	8073265159
		52.00	2.0472"		8073045200	8073065200	8073265200
	2-3/64"	52.39	2.0625"		8073045239	8073065239	8073265239
		53.00	2.0866"		8073045300	8073065300	8073265300
	2-3/32"	53.18	2.0938"		8073045318	8073065318	8073265318
		53.98	2.1250"		8073045398	8073065398	8073265398
	2-1/8"	54.00	2.1260"		8073045400	8073065400	8073265400
		54.79	2.1562"		8073045479	8073065479	8073265479
	2-5/32"	55.00	2.1654"		8073045500	8073065500	8073265500
		55.56	2.1875"		8073045556	8073065556	8073265556
	2-3/16"	56.00	2.2047"		8073045600	8073065600	8073265600
		56.36	2.2188"		8073045636	8073065636	8073265636
	2-7/32"	57.00	2.2441"		8073045700	8073065700	8073265700
		57.15	2.2500"		8073045715	8073065715	8073265715
	2-1/4"	57.94	2.2812"		8073045794	8073065794	8073265794
		58.00	2.2835"		8073045800	8073065800	8073265800
	2-9/32"	58.74	2.3125"		8073045874	8073065874	8073265874
		59.00	2.3228"		8073045900	8073065900	8073265900
	2-11/32"	59.53	2.3438"		8073045953	8073065953	8073265953
		60.00	2.3622"		8073046000	8073066000	8073266000
	2-3/8"	60.33	2.3750"		8073046033	8073066033	8073266033
		61.00	2.4016"		8073046100	8073066100	8073266100
	2-13/32"	61.12	2.4062"		8073046112	8073066112	8073266112
		61.91	2.4375"		8073046191	8073066191	8073266191
	2-7/16"	62.00	2.4409"		8073046200	8073066200	8073266200
		62.71	2.4688"		8073046271	8073066271	8073266271
	2-15/32"	63.00	2.4803"		8073046300	8073066300	8073266300
		63.50	2.5000"		8073046350	8073066350	8073266350
	2-1/2"	64.00	2.5197"		8073046400	8073066400	8073266400
		64.29	2.5312"		8073046429	8073066429	8073266429
	2-17/32"	65.00	2.5591"		8073046500	8073066500	8073266500
		65.09	2.5625"		8073046509	8073066509	8073266509

SPADE Throw-Away Drill Inserts-HSS M4



SPADE DRILL INSERTS



- For general use in steels and cast irons.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available.

Series No. 807304, 807306, 807326

▶ cutting conditions : p.386

SERIES 5, 6

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE		
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAlN
5 62.38(2.456") to 76.20(3.000")	2-1/2"	63.50	2.5000"	11.1 (7/16")	8073946350	8073866350	8073966350
		64.00	2.5197"		8073946400	8073866400	8073966400
	2-17/32"	64.29	2.5312"		8073946429	8073866429	8073966429
	2-9/16"	65.09	2.5625"		8073946509	8073866509	8073966509
	2-19/32"	65.88	2.5938"		8073046588	8073066588	8073266588
		66.00	2.5984"		8073046600	8073066600	8073266600
	2-5/8"	66.68	2.6250"		8073046668	8073066668	8073266668
	2-21/32"	67.47	2.6562"		8073046747	8073066747	8073266747
		68.00	2.6772"		8073046800	8073066800	8073266800
	2-11/16"	68.26	2.6875"		8073046826	8073066826	8073266826
	2-23/32"	69.05	2.7188"		8073046905	8073066905	8073266905
	2-3/4"	69.85	2.7500"		8073046985	8073066985	8073266985
		70.00	2.7559"		8073047000	8073067000	8073267000
	2-25/32"	70.64	2.7812"		8073047064	8073067064	8073267064
	2-13/16"	71.44	2.8125"		8073047144	8073067144	8073267144
		72.00	2.8346"		8073047200	8073067200	8073267200
	2-27/32"	72.23	2.8438"		8073047223	8073067223	8073267223
	2-7/8"	73.03	2.8750"		8073047303	8073067303	8073267303
	2-29/32"	73.82	2.9062"		8073047382	8073067382	8073267382
		74.00	2.9134"		8073047400	8073067400	8073267400
2-15/16"	74.61	2.9375"	8073047461	8073067461	8073267461		
2-31/32"	75.41	2.9688"	8073047541	8073067541	8073267541		
	76.00	2.9921"	8073047600	8073067600	8073267600		
3"	76.20	3.0000"	8073047620	8073067620	8073267620		
3-1/32"	76.99	3.0312"	8073047699	8073067699	8073267699		
3-1/16"	77.79	3.0625"	8073047779	8073067779	8073267779		
	78.00	3.0709"	8073047800	8073067800	8073267800		
3-3/32"	78.58	3.0938"	8073047858	8073067858	8073267858		
3-1/8"	79.38	3.1250"	8073047938	8073067938	8073267938		
	80.00	3.1496"	8073048000	8073068000	8073268000		
3-5/32"	80.17	3.1562"	8073048017	8073068017	8073268017		
3-3/16"	80.96	3.1875"	8073048096	8073068096	8073268096		
3-7/32"	81.76	3.2188"	8073048176	8073068176	8073268176		
	82.00	3.2283"	8073048200	8073068200	8073268200		
3-1/4"	82.55	3.2500"	8073048255	8073068255	8073268255		
3-9/32"	83.34	3.2812"	8073048334	8073068334	8073268334		
	84.00	3.3071"	8073048400	8073068400	8073268400		
3-5/16"	84.14	3.3125"	8073048414	8073068414	8073268414		
3-11/32"	84.93	3.3438"	8073048493	8073068493	8073268493		
3-3/8"	85.73	3.3750"	8073048573	8073068573	8073268573		
	86.00	3.3858"	8073048600	8073068600	8073268600		
3-13/32"	86.52	3.4062"	8073048652	8073068652	8073268652		
3-7/16"	87.31	3.4375"	8073048731	8073068731	8073268731		
	88.00	3.4646"	8073048800	8073068800	8073268800		
3-15/32"	88.11	3.4688"	8073048811	8073068811	8073268811		
3-1/2"	88.90	3.5000"	8073048890	8073068890	8073268890		

SPADE Throw-Away Drill Inserts-HSS M4



SPADE DRILL INSERTS



- For general use in steels and cast irons.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available.

Series No. 807304, 807306, 807326

▶ cutting conditions : p.386

SERIES 7, 8

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE		
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAlN
7 87.76(3.455") to 101.60(4.000")	3-17/32"	89.69	3.5312"	11.1 (7/16")	8073048969	8073068969	8073268969
		90.00	3.5433"		8073049000	8073069000	8073269000
	3-9/16"	90.49	3.5625"		8073049049	8073069049	8073269049
	3-19/32"	91.28	3.5938"		8073049128	8073069128	8073269128
		92.00	3.6221"		8073049200	8073069200	8073269200
	3-5/8"	92.08	3.6250"		8073049208	8073069208	8073269208
	3-21/32"	92.87	3.6562"		8073049287	8073069287	8073269287
	3-11/16"	93.66	3.6875"		8073049366	8073069366	8073269366
		94.00	3.7008"		8073049400	8073069400	8073269400
	3-23/32"	94.46	3.7188"		8073049446	8073069446	8073269446
	3-3/4"	95.25	3.7500"		8073049525	8073069525	8073269525
		96.00	3.7795"		8073049600	8073069600	8073269600
	3-25/32"	96.04	3.7812"		8073049604	8073069604	8073269604
	3-13/16"	96.84	3.8125"		8073049684	8073069684	8073269684
	3-27/32"	97.63	3.8438"		8073049763	8073069763	8073269763
		98.00	3.8583"		8073049800	8073069800	8073269800
	3-7/8"	98.43	3.8750"		8073049843	8073069843	8073269843
	3-29/32"	99.22	3.9062"		8073049922	8073069922	8073269922
		100.00	3.9370"		80730410000	80730610000	80732610000
	3-15/16"	100.01	3.9375"		80730410001	80730610001	80732610001
3-31/32"	100.81	3.9688"	80730410081	80730610081	80732610081		
4"	101.60	4.0000"	80730410160	80730610160	80732610160		
8 101.63(4.001") to 114.48(4.507")	4-1/64"	102.00	4.0156"	11.1 (7/16")	80730410200	80730610200	80732610200
	4-1/16"	103.19	4.0625"		80730410319	80730610319	80732610319
	4-3/32"	104.00	4.0945"		80730410400	80730610400	80732610400
	4-1/8"	104.78	4.1250"		80730410478	80730610478	80732610478
		106.00	4.1732"		80730410600	80730610600	80732610600
	4-3/16"	106.36	4.1875"		80730410636	80730610636	80732610636
	4-1/4"	107.95	4.2500"		80730410795	80730610795	80732610795
		108.00	4.2520"		80730410800	80730610800	80732610800
	4-5/16"	109.54	4.3125"		80730410954	80730610954	80732610954
		110.00	4.3307"		80730411000	80730611000	80732611000
	4-3/8"	111.13	4.3750"		80730411113	80730611113	80732611113
		112.00	4.4094"		80730411200	80730611200	80732611200
	4-7/16"	112.71	4.4375"		80730411271	80730611271	80732611271
		114.00	4.4882"		80730411400	80730611400	80732611400
	4-1/2"	114.30	4.5000"		80730411430	80730611430	80732611430

SPADE Throw-Away Drill Inserts-HSS T15



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

Series No. 808317, 808318, 808327

▶ cutting conditions : p.386

SERIES Y, Z, O

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE		
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAlN
Y 9.50(.374") to 11.07(.436")		9.50	.3740"	2.4 (3/32")	8083170950	8083180950	8083270950
	3/8"	9.53	.3750"		8083170953	8083180953	8083270953
		9.80	.3860"		8083170980	8083180980	8083270980
	25/64"	9.92	.3906"		8083170992	8083180992	8083270992
		10.00	.3937"		8083171000	8083181000	8083271000
		10.20	.4016"		8083171020	8083181020	8083271020
	13/32"	10.32	.4063"		8083171032	8083181032	8083271032
		10.50	.4134"		8083171050	8083181050	8083271050
	27/64"	10.72	.4219"		8083171072	8083181072	8083271072
		10.80	.4252"		8083171080	8083181080	8083271080
Z 11.11(.437") to 12.95(.510")		11.00	.4331"	2.4 (3/32")	8083171100	8083181100	8083271100
	7/16"	11.11	.4375"		8083171111	8083181111	8083271111
		11.50	.4528"		8083171150	8083181150	8083271150
	29/64"	11.51	.4531"		8083171151	8083181151	8083271151
	15/32"	11.91	.4688"		8083171191	8083181191	8083271191
		12.00	.4724"		8083171200	8083181200	8083271200
	31/64"	12.30	.4844"		8083171230	8083181230	8083271230
		12.50	.4921"		8083171250	8083181250	8083271250
	1/2"	12.70	.5000"		8083171270	8083181270	8083271270
		13.00	.5118"		8083171300	8083181300	8083271300
O 12.98(.511") to 17.65(.695")	33/64"	13.10	.5156"	3.2 (1/8")	8083171310	8083181310	8083271310
	17/32"	13.49	.5313"		8083171349	8083181349	8083271349
		13.50	.5315"		8083171350	8083181350	8083271350
	35/64"	13.89	.5469"		8083171389	8083181389	8083271389
		14.00	.5512"		8083171400	8083181400	8083271400
	9/16"	14.29	.5625"		8083171429	8083181429	8083271429
		14.50	.5709"		8083171450	8083181450	8083271450
	37/64"	14.68	.5781"		8083171468	8083181468	8083271468
		15.00	.5906"		8083171500	8083181500	8083271500
	19/32"	15.08	.5938"		8083171508	8083181508	8083271508
	39/64"	15.48	.6094"		8083171548	8083181548	8083271548
		15.50	.6102"		8083171550	8083181550	8083271550
	5/8"	15.88	.6250"		8083171588	8083181588	8083271588
		16.00	.6299"		8083171600	8083181600	8083271600
	41/64"	16.27	.6406"		8083171627	8083181627	8083271627
		16.50	.6496"		8083171650	8083181650	8083271650
	21/32"	16.67	.6563"		8083171667	8083181667	8083271667
		17.00	.6693"		8083171700	8083181700	8083271700
	43/64"	17.07	.6719"		8083171707	8083181707	8083271707
	11/16"	17.46	.6875"		8083171746	8083181746	8083271746
		17.50	.6890"		8083171750	8083181750	8083271750

SPADE Throw-Away Drill Inserts-HSS T15



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

Series No. 808317, 808318, 808327

▶ cutting conditions : p.386

SERIES 1, 2

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE		
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAlN
1 17.53(.690") to 24.38(.960")	45/64"	17.86	.7031"	4.0 (5/32")	8083171786	8083181786	8083271786
		18.00	.7087"		8083171800	8083181800	8083271800
	23/32"	18.26	.7188"		8083171826	8083181826	8083271826
		18.50	.7283"		8083171850	8083181850	8083271850
	47/64"	18.65	.7344"		8083171865	8083181865	8083271865
		19.00	.7480"		8083171900	8083181900	8083271900
	3/4"	19.05	.7500"		8083171905	8083181905	8083271905
	49/64"	19.45	.7656"		8083171945	8083181945	8083271945
		19.50	.7677"		8083171950	8083181950	8083271950
	25/32"	19.84	.7813"		8083171984	8083181984	8083271984
		20.00	.7874"		8083172000	8083182000	8083272000
	51/64"	20.24	.7969"		8083172024	8083182024	8083272024
		20.50	.8071"		8083172050	8083182050	8083272050
	13/16"	20.64	.8125"		8083172064	8083182064	8083272064
		21.00	.8268"		8083172100	8083182100	8083272100
	27/32"	21.43	.8438"		8083172143	8083182143	8083272143
	55/64"	21.83	.8594"		8083172183	8083182183	8083272183
		22.00	.8661"		8083172200	8083182200	8083272200
	7/8"	22.23	.8750"		8083172223	8083182223	8083272223
	57/64"	22.62	.8906"		8083172262	8083182262	8083272262
		23.00	.9055"		8083172300	8083182300	8083272300
	29/32"	23.02	.9063"		8083172302	8083182302	8083272302
	59/64"	23.42	.9219"		8083172342	8083182342	8083272342
	15/16"	23.81	.9375"		8083172381	8083182381	8083272381
		24.00	.9449"		8083172400	8083182400	8083272400
2 24.41(.961") to 35.05(1.380")	31/32"	24.61	.9688"	4.8 (3/16")	8083172461	8083182461	8083272461
	63/64"	25.00	.9843"		8083172500	8083182500	8083272500
	1"	25.40	1.0000"		8083172540	8083182540	8083272540
	1-1/64"	25.80	1.0156"		8083172580	8083182580	8083272580
		26.00	1.0236"		8083172600	8083182600	8083272600
	1-1/32"	26.19	1.0313"		8083172619	8083182619	8083272619
	1-3/64"	26.59	1.0469"		8083172659	8083182659	8083272659
	1-1/16"	26.99	1.0625"		8083172699	8083182699	8083272699
		27.00	1.0630"		8083172700	8083182700	8083272700
	1-3/32"	27.78	1.0938"		8083172778	8083182778	8083272778
		28.00	1.1024"		8083172800	8083182800	8083272800
	1-7/64"	28.18	1.1094"		8083172818	8083182818	8083272818
	1-1/8"	28.58	1.1250"		8083172858	8083182858	8083272858
		29.00	1.1417"		8083172900	8083182900	8083272900
	1-5/32"	29.37	1.1563"		8083172937	8083182937	8083272937
		30.00	1.1811"		8083173000	8083183000	8083273000
	1-3/16"	30.16	1.1875"		8083173016	8083183016	8083273016
	1-7/32"	30.96	1.2188"		8083173096	8083183096	8083273096
		31.00	1.2205"		8083173100	8083183100	8083273100
	1-1/4"	31.75	1.2500"		8083173175	8083183175	8083273175
		32.00	1.2598"		8083173200	8083183200	8083273200
	1-9/32"	32.54	1.2813"		8083173254	8083183254	8083273254
		33.00	1.2992"		8083173300	8083183300	8083273300
	1-5/16"	33.34	1.3125"		8083173334	8083183334	8083273334
		34.00	1.3386"		8083173400	8083183400	8083273400
1-11/32"	34.13	1.3438"	8083173413	8083183413	8083273413		
1-3/8"	34.93	1.3750"	8083173493	8083183493	8083273493		
	35.00	1.3780"	8083173500	8083183500	8083273500		

SPADE Throw-Away Drill Inserts-HSS T15



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

Series No. 808317, 808318, 808327

► cutting conditions : p.386

SERIES 3

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE		
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAIN
3 34.37(1.353") to 47.80(1.882")	1-13/32"	35.72	1.4063"	6.4 (1/4")	8083173572	8083183572	8083273572
		36.00	1.4173"		8083173600	8083183600	8083273600
	1-7/16"	36.51	1.4375"		8083173651	8083183651	8083273651
		37.00	1.4567"		8083173700	8083183700	8083273700
	1-15/32"	37.31	1.4688"		8083173731	8083183731	8083273731
		38.00	1.4961"		8083173800	8083183800	8083273800
	1-1/2"	38.10	1.5000"		8083173810	8083183810	8083273810
	1-17/32"	38.89	1.5313"		8083173889	8083183889	8083273889
		39.00	1.5354"		8083173900	8083183900	8083273900
	1-9/16"	39.69	1.5625"		8083173969	8083183969	8083273969
		40.00	1.5748"		8083174000	8083184000	8083274000
	1-19/32"	40.48	1.5938"		8083174048	8083184048	8083274048
		41.00	1.6142"		8083174100	8083184100	8083274100
	1-5/8"	41.28	1.6250"		8083174128	8083184128	8083274128
		42.00	1.6535"		8083174200	8083184200	8083274200
	1-21/32"	42.07	1.6563"		8083174207	8083184207	8083274207
	1-11/16"	42.86	1.6875"		8083174286	8083184286	8083274286
		43.00	1.6929"		8083174300	8083184300	8083274300
	1-23/32"	43.66	1.7188"		8083174366	8083184366	8083274366
		44.00	1.7323"		8083174400	8083184400	8083274400
	1-3/4"	44.45	1.7500"		8083174445	8083184445	8083274445
		45.00	1.7717"		8083174500	8083184500	8083274500
	1-25/32"	45.24	1.7813"		8083174524	8083184524	8083274524
		46.00	1.8110"		8083174600	8083184600	8083274600
	1-13/16"	46.04	1.8125"		8083174604	8083184604	8083274604
	1-27/32"	46.83	1.8438"		8083174683	8083184683	8083274683
47.00		1.8504"	8083174700	8083184700	8083274700		
1-7/8"	47.63	1.8750"	8083174763	8083184763	8083274763		

SPADE Throw-Away Drill Inserts-HSS T15



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

Series No. 808317, 808318, 808327

► cutting conditions : p.386

SERIES 4

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE		
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAIN
4 46.99(1.850") to 65.28(2.570")	1-29/32	48.00	1.8898"	7.9 (5/16")	8083174800	8083184800	8083274800
		48.42	1.9062"		8083174842	8083184842	8083274842
		49.00	1.9291"		8083174900	8083184900	8083274900
	1-15/16	49.21	1.9375"		8083174921	8083184921	8083274921
		50.00	1.9685"		8083175000	8083185000	8083275000
	1-31/32	50.01	1.9688"		8083175001	8083185001	8083275001
		2	50.80		2.0000"	8083175080	8083185080
	2-1/32	51.00	2.0079"		8083175100	8083185100	8083275100
		51.59	2.0312"		8083175159	8083185159	8083275159
	2-3/64	52.00	2.0472"		8083175200	8083185200	8083275200
	2-1/16	52.39	2.0625"		8083175239	8083185239	8083275239
		53.00	2.0866"		8083175300	8083185300	8083275300
	2-3/32	53.18	2.0938"		8083175318	8083185318	8083275318
		53.98	2.1250"		8083175398	8083185398	8083275398
	2-1/8	54.00	2.1260"		8083175400	8083185400	8083275400
		54.79	2.1562"		8083175479	8083185479	8083275479
	2-5/32	55.00	2.1654"		8083175500	8083185500	8083275500
		55.56	2.1875"		8083175556	8083185556	8083275556
	2-3/16	56.00	2.2047"		8083175600	8083185600	8083275600
		56.36	2.2188"		8083175636	8083185636	8083275636
	2-7/32	57.00	2.2441"		8083175700	8083185700	8083275700
		57.15	2.2500"		8083175715	8083185715	8083275715
	2-1/4	57.94	2.2812"		8083175794	8083185794	8083275794
		58.00	2.2835"		8083175800	8083185800	8083275800
	2-9/32	58.74	2.3125"		8083175874	8083185874	8083275874
		59.00	2.3228"		8083175900	8083185900	8083275900
	2-11/32	59.53	2.3438"		8083175953	8083185953	8083275953
		60.00	2.3622"		8083176000	8083186000	8083276000
	2-3/8	60.33	2.3750"		8083176033	8083186033	8083276033
		61.00	2.4016"		8083176100	8083186100	8083276100
	2-13/32	61.12	2.4062"		8083176112	8083186112	8083276112
		61.91	2.4375"		8083176191	8083186191	8083276191
	2-7/16	62.00	2.4409"		8083176200	8083186200	8083276200
		62.71	2.4688"		8083176271	8083186271	8083276271
	2-15/32	63.00	2.4688"		8083176300	8083186300	8083276300
		63.50	2.5000"		8083176350	8083186350	8083276350
	2-1/2	64.00	2.5197"		8083176400	8083186400	8083276400
		64.29	2.5312"		8083176429	8083186429	8083276429
	2-17/32	65.00	2.5591"		8083176500	8083186500	8083276500
		65.09	2.5625"		8083176509	8083186509	8083276509

SPADE Throw-Away Drill Inserts-HSS M48



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

Series No. 809305, 809307, 809321

▶ cutting conditions : p.386

SERIES Y, Z, O

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE		
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAlN
Y 9.50(.374") to 11.07(.436")		9.50	.3740"	2.4 (3/32")	8093050950	8093070950	8093210950
	3/8"	9.53	.3750"		8093050953	8093070953	8093210953
		9.80	.3858"		8093050980	8093070980	8093210980
	25/64"	9.92	.3906"		8093050992	8093070992	8093210992
		10.00	.3937"		8093051000	8093071000	8093211000
		10.20	.4016"		8093051020	8093071020	8093211020
	13/32"	10.32	.4062"		8093051032	8093071032	8093211032
		10.50	.4134"		8093051050	8093071050	8093211050
	27/64"	10.72	.4219"		8093051072	8093071072	8093211072
		10.80	.4252"		8093051080	8093071080	8093211080
		11.00	.4331"		8093051100	8093071100	8093211100
	Z 11.11(.437") to 12.95(.510")	7/16"	11.11		.4375"	2.4 (3/32")	8093051111
		11.50	.4528"	8093051150	8093071150		8093211150
29/64"		11.51	.4531"	8093051151	8093071151		8093211151
15/32"		11.91	.4688"	8093051191	8093071191		8093211191
		12.00	.4724"	8093051200	8093071200		8093211200
31/64"		12.30	.4844"	8093051230	8093071230		8093211230
		12.50	.4921"	8093051250	8093071250		8093211250
1/2"		12.70	.5000"	8093051270	8093071270		8093211270
O 12.98(.511") to 17.65(.695")		13.00	.5118"	3.2 (1/8")	8093051300	8093071300	8093211300
	33/64"	13.10	.5156"		8093051310	8093071310	8093211310
	17/32"	13.49	.5312"		8093051349	8093071349	8093211349
		13.50	.5315"		8093051350	8093071350	8093211350
	35/64"	13.89	.5469"		8093051389	8093071389	8093211389
		14.00	.5512"		8093051400	8093071400	8093211400
	9/16"	14.29	.5625"		8093051429	8093071429	8093211429
		14.50	.5709"		8093051450	8093071450	8093211450
	37/64"	14.68	.5781"		8093051468	8093071468	8093211468
		15.00	.5906"		8093051500	8093071500	8093211500
	19/32"	15.08	.5938"		8093051508	8093071508	8093211508
	39/64"	15.48	.6094"		8093051548	8093071548	8093211548
		15.50	.6102"		8093051550	8093071550	8093211550
	5/8"	15.88	.6250"		8093051588	8093071588	8093211588
		16.00	.6299"		8093051600	8093071600	8093211600
	41/64"	16.27	.6406"		8093051627	8093071627	8093211627
		16.50	.6496"		8093051650	8093071650	8093211650
	21/32"	16.67	.6562"		8093051667	8093071667	8093211667
		17.00	.6693"		8093051700	8093071700	8093211700
	43/64"	17.07	.6719"		8093051707	8093071707	8093211707
11/16"	17.46	.6875"	8093051746	8093071746	8093211746		
	17.50	.6890"	8093051750	8093071750	8093211750		

SPADE Throw-Away Drill Inserts-HSS M48



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

Series No. 809305, 809307, 809321

▶ cutting conditions : p.386

SERIES 1, 2

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE				
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAlN		
1 17.53(.690") to 24.38(.960")	45/64"	17.86	.7031"	4.0 (5/32")	8093051786	8093071786	8093211786		
		18.00	.7087"		8093051800	8093071800	8093211800		
	23/32"	18.26	.7188"		8093051826	8093071826	8093211826		
		18.50	.7283"		8093051850	8093071850	8093211850		
	47/64"	18.65	.7344"		8093051865	8093071865	8093211865		
		19.00	.7480"		8093051900	8093071900	8093211900		
	3/4"	19.05	.7500"		8093051905	8093071905	8093211905		
	49/64"	19.45	.7656"		8093051945	8093071945	8093211945		
		19.50	.7677"		8093051950	8093071950	8093211950		
	25/32"	19.84	.7813"		8093051984	8093071984	8093211984		
		20.00	.7874"		8093052000	8093072000	8093212000		
	51/64"	20.24	.7969"		8093052024	8093072024	8093212024		
		20.50	.8071"		8093052050	8093072050	8093212050		
	13/16"	20.64	.8125"		8093052064	8093072064	8093212064		
		21.00	.8268"		8093052100	8093072100	8093212100		
	27/32"	21.43	.8438"		8093052143	8093072143	8093212143		
	55/64"	21.83	.8594"		8093052183	8093072183	8093212183		
		22.00	.8661"		8093052200	8093072200	8093212200		
	7/8"	22.23	.8750"		8093052223	8093072223	8093212223		
	57/64"	22.62	.8906"		8093052262	8093072262	8093212262		
		23.00	.9055"		8093052300	8093072300	8093212300		
	29/32"	23.02	.9063"		8093052302	8093072302	8093212302		
	59/64"	23.42	.9219"		8093052342	8093072342	8093212342		
	15/16"	23.81	.9375"		8093052381	8093072381	8093212381		
		24.00	.9449"		8093052400	8093072400	8093212400		
	2 24.41(.961") to 35.05(1.380")	31/32"	24.61		.9688"	4.8 (3/16")	8093052461	8093072461	8093212461
		63/64"	25.00		.9843"		8093052500	8093072500	8093212500
		1"	25.40		1.0000"		8093052540	8093072540	8093212540
		1-1/64"	25.80		1.0156"		8093052580	8093072580	8093212580
			26.00		1.0236"		8093052600	8093072600	8093212600
		1-1/32"	26.19		1.0313"		8093052619	8093072619	8093212619
		1-3/64"	26.59		1.0469"		8093052659	8093072659	8093212659
1-1/16"		26.99	1.0625"	8093052699	8093072699		8093212699		
		27.00	1.0630"	8093052700	8093072700		8093212700		
1-3/32"		27.78	1.0938"	8093052778	8093072778		8093212778		
		28.00	1.1024"	8093052800	8093072800		8093212800		
1-7/64"		28.18	1.1094"	8093052818	8093072818		8093212818		
1-1/8"		28.58	1.1250"	8093052858	8093072858		8093212858		
		29.00	1.1417"	8093052900	8093072900		8093212900		
1-5/32"		29.37	1.1563"	8093052937	8093072937		8093212937		
		30.00	1.1811"	8093053000	8093073000		8093213000		
1-3/16"		30.16	1.1875"	8093053016	8093073016		8093213016		
1-7/32"		30.96	1.2188"	8093053096	8093073096		8093213096		
		31.00	1.2205"	8093053100	8093073100		8093213100		
1-1/4"		31.75	1.2500"	8093053175	8093073175		8093213175		
		32.00	1.2598"	8093053200	8093073200		8093213200		
1-9/32"		32.54	1.2813"	8093053254	8093073254		8093213254		
		33.00	1.2992"	8093053300	8093073300		8093213300		
1-5/16"		33.34	1.3125"	8093053334	8093073334		8093213334		
		34.00	1.3386"	8093053400	8093073400		8093213400		
1-11/32"		34.13	1.3438"	8093053413	8093073413		8093213413		
1-3/8"		34.93	1.3750"	8093053493	8093073493		8093213493		
		35.00	1.3780"	8093053500	8093073500		8093213500		

SPADE Throw-Away Drill Inserts for Cast Iron-Carbide K10



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

Series No. 832308, 832309, 832323

▶ cutting conditions : p.387

SERIES Y, Z, O

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE		
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAlN
Y 9.50(.374") to 11.07(.436")		9.50	.3740"	2.4 (3/32")	8323080950	8323090950	8323230950
	3/8"	9.53	.3750"		8323080953	8323090953	8323230953
		9.80	.3858"		8323080980	8323090980	8323230980
	25/64"	9.92	.3906"		8323080992	8323090992	8323230992
		10.00	.3937"		8323081000	8323091000	8323231000
		10.20	.4016"		8323081020	8323091020	8323231020
	13/32"	10.32	.4062"		8323081032	8323091032	8323231032
		10.50	.4134"		8323081050	8323091050	8323231050
	27/64"	10.72	.4219"		8323081072	8323091072	8323231072
		10.80	.4252"		8323081080	8323091080	8323231080
Z 11.11(.437") to 12.95(.510")		11.00	.4331"	2.4 (3/32")	8323081100	8323091100	8323231100
	7/16"	11.11	.4375"		8323081111	8323091111	8323231111
		11.50	.4528"		8323081150	8323091150	8323231150
	29/64"	11.51	.4531"		8323081151	8323091151	8323231151
	15/32"	11.91	.4688"		8323081191	8323091191	8323231191
		12.00	.4724"		8323081200	8323091200	8323231200
	31/64"	12.30	.4844"		8323081230	8323091230	8323231230
		12.50	.4921"		8323081250	8323091250	8323231250
	1/2"	12.70	.5000"		8323081270	8323091270	8323231270
		13.00	.5118"		8323081300	8323091300	8323231300
O 12.98(.511") to 17.65(.695")	33/64"	13.10	.5156"	3.2 (1/8")	8323081310	8323091310	8323231310
	17/32"	13.49	.5312"		8323081349	8323091349	8323231349
		13.50	.5315"		8323081350	8323091350	8323231350
	35/64"	13.89	.5469"		8323081389	8323091389	8323231389
		14.00	.5512"		8323081400	8323091400	8323231400
	9/16"	14.29	.5625"		8323081429	8323091429	8323231429
		14.50	.5709"		8323081450	8323091450	8323231450
	37/64"	14.68	.5781"		8323081468	8323091468	8323231468
		15.00	.5906"		8323081500	8323091500	8323231500
	19/32"	15.08	.5938"		8323081508	8323091508	8323231508
	39/64"	15.48	.6094"		8323081548	8323091548	8323231548
		15.50	.6102"		8323081550	8323091550	8323231550
	5/8"	15.88	.6250"		8323081588	8323091588	8323231588
		16.00	.6299"		8323081600	8323091600	8323231600
	41/64"	16.27	.6406"		8323081627	8323091627	8323231627
		16.50	.6496"		8323081650	8323091650	8323231650
	21/32"	16.67	.6562"		8323081667	8323091667	8323231667
		17.00	.6693"		8323081700	8323091700	8323231700
	43/64"	17.07	.6719"		8323081707	8323091707	8323231707
	11/16"	17.46	.6875"		8323081746	8323091746	8323231746
		17.50	.6890"		8323081750	8323091750	8323231750

SPADE Throw-Away Drill Inserts for Cast Iron-Carbide K10



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

Series No. 832308, 832309, 832323

▶ cutting conditions : p.387

SERIES 1, 2

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE		
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAlN
1 17.53(.690") to 24.38(.960")	45/64"	17.86	.7031"	4.0 (5/32")	8323081786	8323091786	8323231786
		18.00	.7087"		8323081800	8323091800	8323231800
	23/32"	18.26	.7188"		8323081826	8323091826	8323231826
		18.50	.7283"		8323081850	8323091850	8323231850
	47/64"	18.65	.7344"		8323081865	8323091865	8323231865
		19.00	.7480"		8323081900	8323091900	8323231900
	3/4"	19.05	.7500"		8323081905	8323091905	8323231905
	49/64"	19.45	.7656"		8323081945	8323091945	8323231945
		19.50	.7677"		8323081950	8323091950	8323231950
	25/32"	19.84	.7812"		8323081984	8323091984	8323231984
		20.00	.7874"		8323082000	8323092000	8323232000
	51/64"	20.24	.7969"		8323082024	8323092024	8323232024
		20.50	.8071"		8323082050	8323092050	8323232050
	13/16"	20.64	.8125"		8323082064	8323092064	8323232064
		21.00	.8268"		8323082100	8323092100	8323232100
	27/32"	21.43	.8438"		8323082143	8323092143	8323232143
	55/64"	21.83	.8594"		8323082183	8323092183	8323232183
		22.00	.8661"		8323082200	8323092200	8323232200
	7/8"	22.23	.8750"		8323082223	8323092223	8323232223
	57/64"	22.62	.8906"		8323082262	8323092262	8323232262
		23.00	.9055"		8323082300	8323092300	8323232300
	29/32"	23.02	.9062"		8323082302	8323092302	8323232302
	59/64"	23.42	.9219"		8323082342	8323092342	8323232342
	15/16"	23.81	.9375"		8323082381	8323092381	8323232381
		24.00	.9449"		8323082400	8323092400	8323232400
2 24.41(.961") to 35.05(1.380")	31/32"	24.61	.9688"	4.8 (3/16")	8323082461	8323092461	8323232461
	63/64"	25.00	.9843"		8323082500	8323092500	8323232500
	1"	25.40	1.0000"		8323082540	8323092540	8323232540
	1-1/64"	25.80	1.0156"		8323082580	8323092580	8323232580
		26.00	1.0236"		8323082600	8323092600	8323232600
	1-1/32"	26.19	1.0312"		8323082619	8323092619	8323232619
	1-3/64"	26.59	1.0469"		8323082659	8323092659	8323232659
	1-1/16"	26.99	1.0625"		8323082699	8323092699	8323232699
		27.00	1.0630"		8323082700	8323092700	8323232700
	1-3/32"	27.78	1.0938"		8323082778	8323092778	8323232778
		28.00	1.1024"		8323082800	8323092800	8323232800
	1-7/64"	28.18	1.1094"		8323082818	8323092818	8323232818
	1-1/8"	28.58	1.1250"		8323082858	8323092858	8323232858
		29.00	1.1417"		8323082900	8323092900	8323232900
	1-5/32"	29.37	1.1562"		8323082937	8323092937	8323232937
		30.00	1.1811"		8323083000	8323093000	8323233000
	1-3/16"	30.16	1.1875"		8323083016	8323093016	8323233016
	1-7/32"	30.96	1.2188"		8323083096	8323093096	8323233096
		31.00	1.2205"		8323083100	8323093100	8323233100
	1-1/4"	31.75	1.2500"		8323083175	8323093175	8323233175
		32.00	1.2598"		8323083200	8323093200	8323233200
	1-9/32"	32.54	1.2812"		8323083254	8323093254	8323233254
		33.00	1.2992"		8323083300	8323093300	8323233300
	1-5/16"	33.34	1.3125"		8323083334	8323093334	8323233334
		34.00	1.3386"		8323083400	8323093400	8323233400
1-11/32"	34.13	1.3438"	8323083413	8323093413	8323233413		
1-3/8"	34.93	1.3750"	8323083493	8323093493	8323233493		
	35.00	1.3780"	8323083500	8323093500	8323233500		

SPADE Throw-Away Drill Inserts-Carbide K20



- For use in Gray cast iron up to 220 Brinell, nonferrous metals, copper, brass and aluminum.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available.

Series No. 830308, 830309, 830323

► cutting conditions : p.387

SERIES Y, Z, O

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE		
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAIN
Y 9.50(.374") to 11.07(.436")		9.50	.3740"	2.4 (3/32")	8303080950	8303090950	8303230950
	3/8"	9.53	.3750"		8303080953	8303090953	8303230953
		9.80	.3858"		8303080980	8303090980	8303230980
	25/64"	9.92	.3906"		8303080992	8303090992	8303230992
		10.00	.3937"		8303081000	8303091000	8303231000
		10.20	.4016"		8303081020	8303091020	8303231020
	13/32"	10.32	.4062"		8303081032	8303091032	8303231032
		10.50	.4134"		8303081050	8303091050	8303231050
	27/64"	10.72	.4219"		8303081072	8303091072	8303231072
		10.80	.4252"		8303081080	8303091080	8303231080
Z 11.11(.437") to 12.95(.510")		11.00	.4331"	2.4 (3/32")	8303081100	8303091100	8303231100
	7/16"	11.11	.4375"		8303081111	8303091111	8303231111
		11.50	.4528"		8303081150	8303091150	8303231150
	29/64"	11.51	.4531"		8303081151	8303091151	8303231151
	15/32"	11.91	.4688"		8303081191	8303091191	8303231191
		12.00	.4724"		8303081200	8303091200	8303231200
	31/64"	12.30	.4844"		8303081230	8303091230	8303231230
		12.50	.4921"		8303081250	8303091250	8303231250
	1/2"	12.70	.5000"		8303081270	8303091270	8303231270
		13.00	.5118"		8303081300	8303091300	8303231300
O 12.98(.511") to 17.65(.695")	33/64"	13.10	.5156"	3.2 (1/8")	8303081310	8303091310	8303231310
	17/32"	13.49	.5312"		8303081349	8303091349	8303231349
		13.50	.5315"		8303081350	8303091350	8303231350
	35/64"	13.89	.5469"		8303081389	8303091389	8303231389
		14.00	.5512"		8303081400	8303091400	8303231400
	9/16"	14.29	.5625"		8303081429	8303091429	8303231429
		14.50	.5709"		8303081450	8303091450	8303231450
	37/64"	14.68	.5781"		8303081468	8303091468	8303231480
		15.00	.5906"		8303081500	8303091500	8303231500
	19/32"	15.08	.5938"		8303081508	8303091508	8303231508
	39/64"	15.48	.6094"		8303081548	8303091548	8303231548
		15.50	.6102"		8303081550	8303091550	8303231550
	5/8"	15.88	.6250"		8303081588	8303091588	8303231588
		16.00	.6299"		8303081600	8303091600	8303231600
	41/64"	16.27	.6406"		8303081627	8303091627	8303231627
		16.50	.6496"		8303081650	8303091650	8303231650
	21/32"	16.67	.6562"		8303081667	8303091667	8303231667
		17.00	.6693"		8303081700	8303091700	8303231700
	43/64"	17.07	.6719"		8303081707	8303091707	8303231707
	11/16"	17.46	.6875"		8303081746	8303091746	8303231746
		17.50	.6890"		8303081750	8303091750	8303231750

SPADE Throw-Away Drill Inserts-Carbide K20



- For use in Gray cast iron up to 220 Brinell, nonferrous metals, copper, brass and aluminum.
- Reduce set-up time, it easily can be replaced on the machine.
- Any non-standard size available.

Series No. 830308, 830309, 830323

► cutting conditions : p.387

SERIES 1, 2

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE				
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAIN		
1 17.53(.690") to 24.38(.960")	45/64"	17.86	.7031"	4.0 (5/32")	8303081786	8303091786	8303231786		
		18.00	.7087"		8303081800	8303091800	8303231800		
	23/32"	18.26	.7188"		8303081826	8303091826	8303231826		
		18.50	.7283"		8303081850	8303091850	8303231850		
	47/64"	18.65	.7344"		8303081865	8303091865	8303231865		
		19.00	.7480"		8303081900	8303091900	8303231900		
	3/4"	19.05	.7500"		8303081905	8303091905	8303231905		
	49/64"	19.45	.7656"		8303081945	8303091945	8303231945		
		19.50	.7677"		8303081950	8303091950	8303231950		
	25/32"	19.84	.7812"		8303081984	8303091984	8303231984		
		20.00	.7874"		8303082000	8303092000	8303232000		
	51/64"	20.24	.7969"		8303082024	8303092024	8303232024		
		20.50	.8071"		8303082050	8303092050	8303232050		
	13/16"	20.64	.8125"		8303082064	8303092064	8303232064		
		21.00	.8268"		8303082100	8303092100	8303232100		
	27/32"	21.43	.8438"		8303082143	8303092143	8303232143		
	55/64"	21.83	.8594"		8303082183	8303092183	8303232183		
		22.00	.8661"		8303082200	8303092200	8303232200		
	7/8"	22.23	.8750"		8303082223	8303092223	8303232223		
	57/64"	22.62	.8906"		8303082262	8303092262	8303232262		
		23.00	.9055"		8303082300	8303092300	8303232300		
	29/32"	23.02	.9062"		8303082302	8303092302	8303232302		
	59/64"	23.42	.9219"		8303082342	8303092342	8303232342		
	15/16"	23.81	.9375"		8303082381	8303092381	8303232381		
		24.00	.9449"		8303082400	8303092400	8303232400		
	2 24.41(.961") to 35.05(1.380")	31/32"	24.61		.9688"	4.8 (3/16")	8303082461	8303092461	8303232461
		63/64"	25.00		.9843"		8303082500	8303092500	8303232500
		1"	25.40		1.0000"		8303082540	8303092540	8303232540
		1-1/64"	25.80		1.0156"		8303082580	8303092580	8303232580
			26.00		1.0236"		8303082600	8303092600	8303232600
		1-1/32"	26.19		1.0312"		8303082619	8303092619	8303232619
		1-3/64"	26.59		1.0469"		8303082659	8303092659	8303232659
		1-1/16"	26.99		1.0625"		8303082699	8303092699	8303232699
			27.00		1.0630"		8303082700	8303092700	8303232700
1-3/32"		27.78	1.0938"	8303082778	8303092778		8303232778		
		28.00	1.1024"	8303082800	8303092800		8303232800		
1-7/64"		28.18	1.1094"	8303082818	8303092818		8303232818		
1-1/8"		28.58	1.1250"	8303082858	8303092858		8303232858		
		29.00	1.1417"	8303082900	8303092900		8303232900		
1-5/32"		29.37	1.1562"	8303082937	8303092937		8303232937		
		30.00	1.1811"	8303083000	8303093000		8303233000		
1-3/16"		30.16	1.1875"	8303083016	8303093016		8303233016		
1-7/32"		30.96	1.2188"	8303083096	8303093096		8303233096		
		31.00	1.2205"	8303083100	8303093100		8303233100		
1-1/4"		31.75	1.2500"	8303083175	8303093175		8303233175		
		32.00	1.2598"	8303083200	8303093200		8303233200		
1-9/32"		32.54	1.2812"	8303083254	8303093254		8303233254		
		33.00	1.2992"	8303083300	8303093300		8303233300		
1-5/16"		33.34	1.3125"	8303083334	8303093334		8303233334		
		34.00	1.3386"	8303083400	8303093400		8303233400		
1-11/32"		34.13	1.3438"	8303083413	8303093413		8303233413		
1-3/8"		34.93	1.3750"	8303083493	8303093493		8303233493		
		35.00	1.3780"	8303083500	8303093500		8303233500		

SPADE Throw-Away Drill Inserts-Carbide P40



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

Series No. 831308, 831309, 831323

▶ cutting conditions : p.387

SERIES Y, Z, O

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE		
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAlN
Y 9.50(.374") to 11.07(.436")		9.50	.3740"	2.4 (3/32")	8313080950	8313090950	8313230950
	3/8"	9.53	.3750"		8313080953	8313090953	8313230953
		9.80	.3858"		8313080980	8313090980	8313230980
	25/64"	9.92	.3906"		8313080992	8313090992	8313230992
		10.00	.3937"		8313081000	8313091000	8313231000
		10.20	.4016"		8313081020	8313091020	8313231020
	13/32"	10.32	.4062"		8313081032	8313091032	8313231032
		10.50	.4134"		8313081050	8313091050	8313231050
	27/64"	10.72	.4219"		8313081072	8313091072	8313231072
		10.80	.4252"		8313081080	8313091080	8313231080
		11.00	.4331"		8313081100	8313091100	8313231100
Z 11.11(.437") to 12.95(.510")	7/16"	11.11	.4375"	2.4 (3/32")	8313081111	8313091111	8313231111
		11.50	.4528"		8313081150	8313091150	8313231150
	29/64"	11.51	.4531"		8313081151	8313091151	8313231151
	15/32"	11.91	.4688"		8313081191	8313091191	8313231191
		12.00	.4724"		8313081200	8313091200	8313231200
	31/64"	12.30	.4844"		8313081230	8313091230	8313231230
		12.50	.4921"		8313081250	8313091250	8313231250
	1/2"	12.70	.5000"		8313081270	8313091270	8313231270
O 12.98(.511") to 17.65(.695")		13.00	.5118"	3.2 (1/8")	8313081300	8313091300	8313231300
	33/64"	13.10	.5156"		8313081310	8313091310	8313231310
	17/32"	13.49	.5312"		8313081349	8313091349	8313231349
		13.50	.5315"		8313081350	8313091350	8313231350
	35/64"	13.89	.5469"		8313081389	8313091389	8313231389
		14.00	.5512"		8313081400	8313091400	8313231400
	9/16"	14.29	.5625"		8313081429	8313091429	8313231429
		14.50	.5709"		8313081450	8313091450	8313231450
	37/64"	14.68	.5781"		8313081468	8313091468	8313231468
		15.00	.5906"		8313081500	8313091500	8313231500
	19/32"	15.08	.5938"		8313081508	8313091508	8313231508
	39/64"	15.48	.6094"		8313081548	8313091548	8313231548
		15.50	.6102"		8313081550	8313091550	8313231550
	5/8"	15.88	.6250"		8313081588	8313091588	8313231588
		16.00	.6299"		8313081600	8313091600	8313231600
	41/64"	16.27	.6406"		8313081627	8313091627	8313231627
		16.50	.6496"		8313081650	8313091650	8313231650
	21/32"	16.67	.6562"		8313081667	8313091667	8313231667
		17.00	.6693"		8313081700	8313091700	8313231700
	43/64"	17.07	.6719"		8313081707	8313091707	8313231707
	11/16"	17.46	.6875"		8313081746	8313091746	8313231746
		17.50	.6890"		8313081750	8313091750	8313231750

SPADE Throw-Away Drill Inserts-Carbide P40



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

Series No. 831308, 831309, 831323

▶ cutting conditions : p.387

SERIES 1, 2

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE		
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAlN
1 17.53(.690") to 24.38(.960")	45/64"	17.86	.7031"	4.0 (5/32")	8313081786	8313091786	8313231786
		18.00	.7087"		8313081800	8313091800	8313231800
	23/32"	18.26	.7188"		8313081826	8313091826	8313231826
		18.50	.7283"		8313081850	8313091850	8313231850
	47/64"	18.65	.7344"		8313081865	8313091865	8313231865
		19.00	.7480"		8313081900	8313091900	8313231900
	3/4"	19.05	.7500"		8313081905	8313091905	8313231905
	49/64"	19.45	.7656"		8313081945	8313091945	8313231945
		19.50	.7677"		8313081950	8313091950	8313231950
	25/32"	19.84	.7812"		8313081984	8313091984	8313231984
		20.00	.7874"		8313082000	8313092000	8313232000
	51/64"	20.24	.7969"		8313082024	8313092024	8313232024
		20.50	.8071"		8313082050	8313092050	8313232050
	13/16"	20.64	.8125"		8313082064	8313092064	8313232064
		21.00	.8268"		8313082100	8313092100	8313232100
	27/32"	21.43	.8438"		8313082143	8313092143	8313232143
	55/64"	21.83	.8594"		8313082183	8313092183	8313232183
		22.00	.8661"		8313082200	8313092200	8313232200
	7/8"	22.23	.8750"		8313082223	8313092223	8313232223
	57/64"	22.62	.8906"		8313082262	8313092262	8313232262
		23.00	.9055"		8313082300	8313092300	8313232300
	29/32"	23.02	.9062"		8313082302	8313092302	8313232302
	59/64"	23.42	.9219"		8313082342	8313092342	8313232342
	15/16"	23.81	.9375"		8313082381	8313092381	8313232381
		24.00	.9449"		8313082400	8313092400	8313232400
		24.61	.9688"		8313082461	8313092461	8313232461
	63/64"	25.00	.9843"		8313082500	8313092500	8313232500
	1"	25.40	1.0000"		8313082540	8313092540	8313232540
	1-1/64"	25.80	1.0156"		8313082580	8313092580	8313232580
		26.00	1.0236"		8313082600	8313092600	8313232600
	1-1/32"	26.19	1.0312"		8313082619	8313092619	8313232619
	1-3/64"	26.59	1.0469"		8313082659	8313092659	8313232659
	1-1/16"	26.99	1.0625"		8313082699	8313092699	8313232699
	27.00	1.0630"	8313082700	8313092700	8313232700		
1-3/32"	27.78	1.0938"	8313082778	8313092778	8313232778		
	28.00	1.1024"	8313082800	8313092800	8313232800		
1-7/64"	28.18	1.1094"	8313082818	8313092818	8313232818		
1-1/8"	28.58	1.1250"	8313082858	8313092858	8313232858		
	29.00	1.1417"	8313082900	8313092900	8313232900		
1-5/32"	29.37	1.1562"	8313082937	8313092937	8313232937		
	30.00	1.1811"	8313083000	8313093000	8313233000		
1-3/16"	30.16	1.1875"	8313083016	8313093016	8313233016		
1-7/32"	30.96	1.2188"	8313083096	8313093096	8313233096		
	31.00	1.2205"	8313083100	8313093100	8313233100		
1-1/4"	31.75	1.2500"	8313083175	8313093175	8313233175		
	32.00	1.2598"	8313083200	8313093200	8313233200		
1-9/32"	32.54	1.2812"	8313083254	8313093254	8313233254		
	33.00	1.2992"	8313083300	8313093300	8313233300		
1-5/16"	33.34	1.3125"	8313083334	8313093334	8313233334		
	34.00	1.3386"	8313083400	8313093400	8313233400		
1-11/32"	34.13	1.3438"	8313083413	8313093413	8313233413		
1-3/8"	34.93	1.3750"	8313083493	8313093493	8313233493		
	35.00	1.3780"	8313083500	8313093500	8313233500		

SPADE Throw-Away Drill Inserts-Carbide P40



- For general use in carbon steels and alloys steels.
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- Any non-standard size available.

Series No. 831308, 831309, 831323

▶ cutting conditions : p.387

SERIES 3

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EUROPA CODE		
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAlN
3 34.37(1.353") to 47.80(1.882")	1-13/32"	35.72	1.4062"	6.4 (1/4")	8313083572	8313093572	8313233572
		36.00	1.4173"		8313083600	8313093600	8313233600
	1-7/16"	36.51	1.4375"		8313083651	8313093651	8313233651
		37.00	1.4567"		8313083700	8313093700	8313233700
	1-15/32"	37.31	1.4688"		8313083731	8313093731	8313233731
		38.00	1.4961"		8313083800	8313093800	8313233800
	1-1/2"	38.10	1.5000"		8313083810	8313093810	8313233810
	1-17/32"	38.89	1.5312"		8313083889	8313093889	8313233889
		39.00	1.5354"		8313083900	8313093900	8313233900
	1-9/16"	39.69	1.5625"		8313083969	8313093969	8313233969
		40.00	1.5748"		8313084000	8313094000	8313234000
	1-19/32"	40.48	1.5938"		8313084048	8313094048	8313234048
		41.00	1.6142"		8313084100	8313094100	8313234100
	1-5/8"	41.28	1.6250"		8313084128	8313094128	8313234128
		42.00	1.6535"		8313084200	8313094200	8313234200
	1-21/32"	42.07	1.6562"		8313084207	8313094207	8313234207
	1-11/16"	42.86	1.6875"		8313084286	8313094286	8313234286
		43.00	1.6929"		8313084300	8313094300	8313234300
	1-23/32"	43.66	1.7188"		8313084366	8313094366	8313234366
		44.00	1.7323"		8313084400	8313094400	8313234400
	1-3/4"	44.45	1.7500"		8313084445	8313094445	8313234445
		45.00	1.7717"		8313084500	8313094500	8313234500
	1-25/32"	45.24	1.7812"		8313084524	8313094524	8313234524
46.00		1.8110"	8313084600	8313094600	8313234600		
1-13/16"	46.04	1.8125"	8313084604	8313094604	8313234604		
1-27/32"	46.83	1.8438"	8313084683	8313094683	8313234683		
	47.00	1.8504"	8313084700	8313094700	8313234700		
1-7/8"	47.63	1.8750"	8313084763	8313094763	8313234763		

SUPER HSS T-15 FLAT BOTTOM



Material	Material Hardness		Speed		Feed			
	(Bhn)	(HRc)	TiN	TiAlN (Hardslick)	Ø 9.5 ~ 12.5	Ø 13 ~ 17.5	Ø 18 ~ 24	Ø 25 ~ 35
Free machining Steel 9SMn36, 9SMnPb28 10SPb20 etc	100 - 150		63	67	0.13	0.18	0.25	0.32
	150 - 200	-13	56	65	0.13	0.18	0.25	0.32
	200 - 250	13 - 24	53	58	0.11	0.18	0.25	0.30
Low Carbon Steel C10, C15, C22, C25 etc	85 - 125		54	60	0.12	0.18	0.22	0.30
	125 - 175	- 7	50	58	0.12	0.18	0.22	0.30
	175 - 225	7 - 20	46	55	0.10	0.15	0.19	0.27
Medium Carbon Steel C35, C40, C45 etc	225 - 275	20 - 28	45	53	0.10	0.15	0.19	0.27
	125 - 175	- 7	50	60	0.11	0.18	0.22	0.28
	175 - 225	7 - 20	47	55	0.10	0.15	0.18	0.27
Structural Steel St33, St37-2, St44-2 St52, St60 etc	225 - 275	20 - 28	45	50	0.10	0.15	0.18	0.27
	275 - 325	28 - 34	42	46	0.08	0.14	0.17	0.22
	100 - 150		45	50	0.11	0.18	0.23	0.28
Cast Iron / S,G Iron GG10, 20, 25, 35, 40 GGG50, 70 GTW35, GTS70 etc	150 - 250	- 24	38	44	0.10	0.18	0.19	0.22
	250 - 350	24 - 37	33	36	0.08	0.16	0.18	0.19
	120 - 150		56	66	0.13	0.25	0.35	0.41
Alloy Steels 45CrMo4, 42CrMo4 16MnCr5, Ck75 35CrMo4, 16MnCr5 etc	150 - 200	- 13	51	60	0.12	0.21	0.29	0.40
	200 - 220	13 - 19	47	51	0.12	0.20	0.25	0.36
	220 - 260	19 - 26	38	48	0.10	0.14	0.20	0.25
	260 - 320	26 - 34	30	37	0.10	0.13	0.13	0.20
Tool Steels 102Cr6, 105WCr6, C75W etc	125 - 175	- 7	46	50	0.12	0.16	0.19	0.29
	175 - 225	7 - 20	45	46	0.10	0.16	0.19	0.29
	225 - 275	20 - 28	40	45	0.10	0.13	0.18	0.28
	275 - 325	28 - 34	38	42	0.07	0.12	0.18	0.22
High Temp. Alloy Hastelloy B, Inconel etc	325 - 375	34 - 40	34	37	0.06	0.12	0.17	0.22
	150 - 200	- 13	27	29	0.07	0.12	0.15	0.20
High Strength Alloy 36CrNiMo4, 34CrNiMo8 40NiCrMo73 etc	200 - 250	13 - 24	22	23	0.07	0.12	0.15	0.20
	140 - 220	- 19	9	10	0.06	0.14	0.16	0.19
Aluminium AlCuSiMn, AlMgSi0.5, AlZnMgCu1.5 etc	220 - 310	19 - 33	7	9	0.06	0.11	0.14	0.15
	225 - 300	- 32	27	28	0.10	0.14	0.18	0.19
	300 - 350	32 - 37	21	22	0.08	0.14	0.18	0.19
Stainless Steels X7Cr13, X10CrAl18, X5CrNi189, X5CrNiMo18 10 etc	350 - 400	37 - 43	17	18	0.06	0.12	0.16	0.18
	30		208	213	0.17	0.28	0.36	0.43
Aluminium AlCuSiMn, AlMgSi0.5, AlZnMgCu1.5 etc	180	- 8	112	121	0.17	0.28	0.36	0.41
	135 - 185	- 9	26	29	0.12	0.18	0.20	0.23
Stainless Steels X7Cr13, X10CrAl18, X5CrNi189, X5CrNiMo18 10 etc	185 - 275	9 - 28	20	25	0.09	0.15	0.18	0.22

RPM = revolution per minute (rev/min)

M/min = surface meter per minute(M/min)

DIA = diameter of drill (mm)

mm/rev = feed rate(mm/rev)

* Formulas :

$$M/min = \frac{(RPM) \cdot (\pi) \cdot (DIA.)}{1000}$$

$$mm/min = (RPM) \cdot (mm/rev)$$

$$RPM = \frac{(M/min) \cdot (1000)}{(\pi) \cdot (DIA.)}$$

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.

RECOMMENDED CUTTING CONDITIONS-HSS



Material	Material Hardness		* HSS Grade	Speed (M/min)	Feed (mm/rev)						
	(Bhn)	(HRC)			Ø 9.5	Ø 13	Ø 18	Ø 25	Ø 36	Ø 48	Ø 66
					~ 12.5	~ 17.5	~ 24	~ 35	~ 47	~ 65	~ 114
Free machining Steel 1213, 12L13, 1215 12L14, 1118 etc	100 - 150	0	HSS	84	0.16	0.23	0.31	0.40	0.48	0.55	0.67
	150 - 200	0 - 13	HSS	81	0.16	0.23	0.31	0.40	0.48	0.55	0.67
	200 - 250	13 - 24	HSS	72	0.14	0.23	0.31	0.38	0.48	0.57	0.69
Low Carbon Steel 1015, 1020, 1140 1025 etc	85 - 125	0	HSS	75	0.15	0.22	0.28	0.37	0.46	0.56	0.67
	125 - 175	0 - 7	HSS	72	0.15	0.22	0.28	0.37	0.46	0.56	0.67
	175 - 225	7 - 20	HSS	69	0.13	0.19	0.24	0.34	0.43	0.50	0.57
Medium Carbon Steel 1035, 1050, 1045 1055, 1140 etc	125 - 175	0 - 7	HSS	75	0.14	0.22	0.28	0.35	0.45	0.55	0.65
	175 - 225	7 - 20	HSS	69	0.13	0.19	0.23	0.34	0.43	0.50	0.58
	225 - 275	20 - 28	HSS	63	0.13	0.19	0.23	0.34	0.43	0.50	0.58
Structural Steel A36, A516, A182 etc	100 - 150	0	HSS	63	0.14	0.23	0.29	0.35	0.44	0.50	0.63
	150 - 250	0 - 24	HSS	55	0.13	0.22	0.24	0.28	0.38	0.46	0.59
	250 - 350	24 - 37	SH, PH	41	0.10	0.20	0.22	0.24	0.34	0.40	0.48
Cast Iron / S,G Iron A48-76 GR30/GR45 A536-72 60-40-18 A220-76 GR40010 etc	120 - 150	0	HSS	75	0.16	0.30	0.40	0.49	0.59	0.69	0.75
	150 - 200	0 - 13	HSS	70	0.14	0.26	0.35	0.45	0.56	0.64	0.68
	200 - 220	13 - 19	HSS	58	0.14	0.23	0.30	0.41	0.46	0.52	0.60
	220 - 260	19 - 26	SH, PH	52	0.13	0.17	0.23	0.30	0.35	0.43	0.50
Alloy Steel 8620, 4130, 4137 4140, 6150 etc	125 - 175	0 - 7	HSS	63	0.15	0.20	0.24	0.36	0.43	0.47	0.53
	175 - 225	7 - 20	HSS	58	0.13	0.20	0.24	0.36	0.42	0.46	0.55
	225 - 275	20 - 28	HSS	56	0.13	0.16	0.23	0.35	0.41	0.44	0.55
	275 - 325	28 - 34	SH, PH	53	0.09	0.15	0.22	0.28	0.38	0.41	0.50
Tool Steel H13, H21, A2, S1 etc	150 - 200	0 - 13	SH	34	0.09	0.15	0.19	0.25	0.28	0.36	0.41
	200 - 250	13 - 24	SH, PH	26	0.09	0.15	0.19	0.25	0.28	0.36	0.41
	140 - 220	0 - 19	SH, PH	12	0.08	0.17	0.20	0.24	0.30	0.37	0.39
High Temp. Alloy Hastelloy B, Inconel etc	220 - 310	19 - 33	PH	11	0.08	0.14	0.18	0.19	0.25	0.29	0.34
	225 - 300	0 - 32	SH, PH	35	0.13	0.18	0.23	0.24	0.36	0.43	0.50
High Strength Alloy 9840, 4340, 4330V etc	300 - 350	32 - 37	SH, PH	27	0.10	0.18	0.23	0.24	0.36	0.43	0.50
	350 - 400	37 - 43	PH	21	0.08	0.15	0.20	0.22	0.30	0.48	0.46
	Aluminium 2014, 6061, 7075 etc	30	0	HSS	244	0.19	0.33	0.41	0.50	0.54	0.64
Stainless Steel 310, 316, 410, 330 etc	180	0 - 8	HSS	137	0.19	0.33	0.41	0.46	0.54	0.64	0.62
	135 - 185	0 - 9	HSS	34	0.14	0.20	0.23	0.26	0.36	0.41	0.50
	185 - 275	9 - 28	HSS	29	0.12	0.18	0.20	0.24	0.30	0.36	0.46

RPM = revolution per minute (rev/min)
M/min = surface meter per minute(M/min)
DIA = diameter of drill (mm)
mm/rev = feed rate(mm/rev)

*** Formulas :**

$$M/min = \frac{(RPM) \cdot (\pi) \cdot (DIA.)}{1000}$$

$$mm/min = (RPM) \cdot (mm/rev)$$

$$RPM = \frac{(M/min) \cdot (1000)}{(\pi) \cdot (DIA.)}$$

*** HSS Grade :** HSS = HSS M4, SH = Super HSST15, PH = Premium HSS M48
 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.

RECOMMENDED CUTTING CONDITIONS-CARBIDE



Material	Material Hardness		CARBIDE Grade	Speed (M/min)	Feed (mm/rev)				
	(Bhn)	(HRC)			Ø 9.5	Ø 13	Ø 18	Ø 25	Ø 36
					~ 12.5	~ 17.5	~ 24	~ 35	~ 47
Free machining Steel 1213, 12L13, 1215 12L14, 1118 etc	100 - 150	0	P40	125	0.18	0.28	0.36	0.44	0.50
	150 - 200	0 - 13	P40	110	0.16	0.26	0.33	0.39	0.45
	200 - 250	13 - 24	P40	101	0.14	0.23	0.31	0.41	0.42
Low Carbon Steel 1015, 1020, 1140 1025 etc	85 - 125	0	P40	119	0.20	0.24	0.31	0.42	0.46
	125 - 175	0 - 7	P40	107	0.18	0.24	0.31	0.39	0.43
	175 - 225	7 - 20	P40	96	0.15	0.22	0.29	0.36	0.40
Medium Carbon Steel 1035, 1050, 1045 1055, 1140 etc	225 - 275	20 - 28	P40	84	0.13	0.22	0.29	0.36	0.40
	125 - 175	0 - 7	P40	102	0.17	0.24	0.31	0.37	0.42
	175 - 225	7 - 20	P40	93	0.15	0.22	0.28	0.36	0.40
Structural Steel A36, A516, A182 etc	225 - 275	20 - 28	P40	84	0.15	0.22	0.28	0.36	0.40
	275 - 325	28 - 34	P40	67	0.13	0.19	0.26	0.33	0.37
	100 - 150	0	P40	91	0.19	0.26	0.34	0.39	0.43
Cast Iron / S,G Iron A48-76 GR30/GR45 A536-72 60-40-18 A220-76 GR40010 etc	150 - 250	0 - 24	P40	75	0.15	0.24	0.29	0.33	0.37
	250 - 350	24 - 37	P40	73	0.13	0.23	0.27	0.29	0.33
	120 - 150	0	K20,K10	137	0.18	0.30	0.37	0.46	0.56
Alloy Steel 8620, 4130, 4137 4140, 6150 etc	150 - 200	0 - 13	K20,K10	125	0.17	0.26	0.32	0.42	0.53
	200 - 220	13 - 19	K20,K10	111	0.14	0.23	0.30	0.38	0.45
	220 - 260	19 - 26	K20,K10	93	0.13	0.15	0.28	0.33	0.37
	260 - 320	26 - 34	K20,K10	79	0.13	0.18	0.23	0.28	0.33
Tool Steel H13, H21, A2, S1 etc	125 - 175	0 - 7	P40	98	0.18	0.25	0.32	0.40	0.45
	175 - 225	7 - 20	P40	88	0.15	0.23	0.29	0.38	0.42
	225 - 275	20 - 28	P40	81	0.15	0.21	0.28	0.37	0.41
	275 - 325	28 - 34	P40	78	0.12	0.20	0.27	0.33	0.40
High Temp. Alloy Hastelloy B, Inconel etc	325 - 375	34 - 40	P40	64	0.10	0.18	0.23	0.30	0.38
	150 - 200	0 - 13	P40	67	0.09	0.18	0.22	0.28	0.31
High Strength Alloy 9840, 4340, 4330V etc	200 - 250	13 - 24	P40	50	0.09	0.18	0.22	0.28	0.31
	140 - 220	0 - 19	K20	30	0.10	0.17	0.23	0.27	0.33
Aluminium 2014, 6061, 7075 etc	220 - 310	19 - 33	K20	24	0.10	0.14	0.20	0.24	0.30
	225 - 300	0 - 32	P40	62	0.15	0.23	0.25	0.29	0.38
	300 - 350	32 - 37	P40	55	0.12	0.20	0.23	0.27	0.35
Stainless Steel 310, 316, 410, 330 etc	350 - 400	37 - 43	P40	47	0.10	0.18	0.20	0.24	0.30
	30	0	K20	427	0.24	0.38	0.45	0.50	0.53
	180	0 - 8	K20	291	0.22	0.33	0.40	0.45	0.48
Stainless Steel 310, 316, 410, 330 etc	135 - 185	0 - 9	K20	62	0.19	0.19	0.21	0.24	0.30
	185 - 275	9 - 28	K20	46	0.15	0.17	0.20	0.21	0.25

RPM = revolution per minute (rev/min)
M/min = surface meter per minute(M/min)
DIA = diameter of drill (mm)
mm/rev = feed rate(mm/rev)

*** Formulas :**

$$M/min = \frac{(RPM) \cdot (\pi) \cdot (DIA.)}{1000}$$

$$mm/min = (RPM) \cdot (mm/rev)$$

$$RPM = \frac{(M/min) \cdot (1000)}{(\pi) \cdot (DIA.)}$$

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.



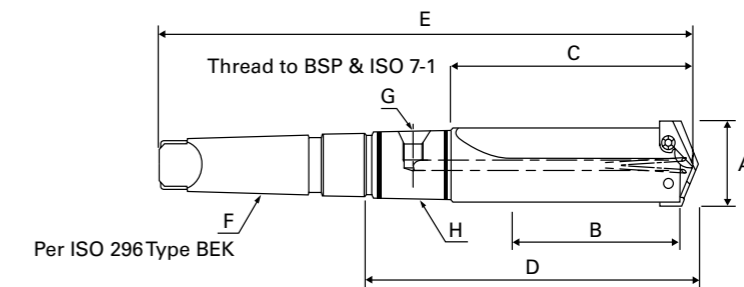
Drill Insert Holders



- Taper Shank Holders
- Flanged Straight Shank Holders
- Holder Accessories
- Drill Insert Holders Designation System



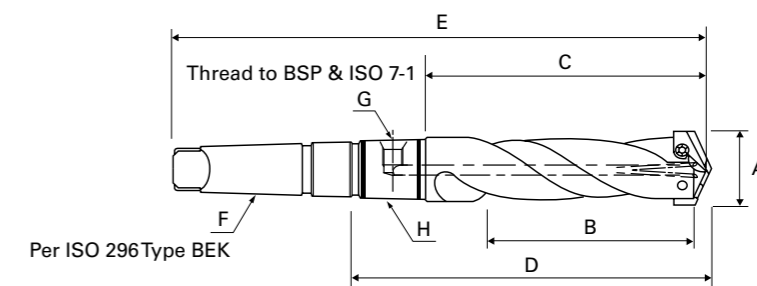
TAPER SHANK - SHORT - Straight Flute



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

► You can also apply RCA(Rotary Coolant Adapter) for internal cooling.

TAPER SHANK - INTERMEDIATE LENGTH - Spiral Flute

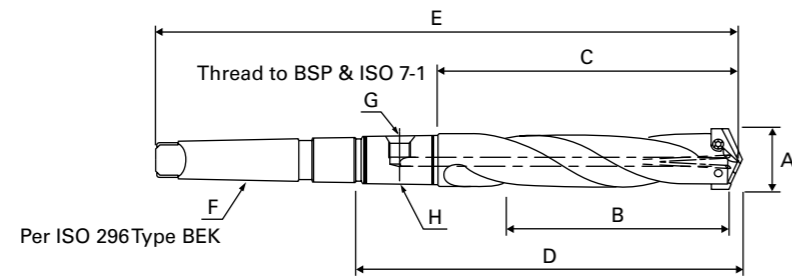


Series	EUROPA CODE	A	B	C	D	E	F	G	H
		Drill Insert Range	Max. Drill Depth	Flute Length	Ref. Length	Overall Length	MT	Pipe Tap	RCA
1	823250003M	18.0 ~ 24.0	120.7	149.2	193.3	283.3	#3	1/8"	SP0108
1.5	833250003M	22.0 ~ 24.0	120.7	149.2	193.3	283.3	#3	1/8"	SP0108
2	843250004M	25.0 ~ 35.0	136.5	165.1	211.2	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

► You can also apply RCA(Rotary Coolant Adapter) for internal cooling.

SPADE DRILL HOLDERS

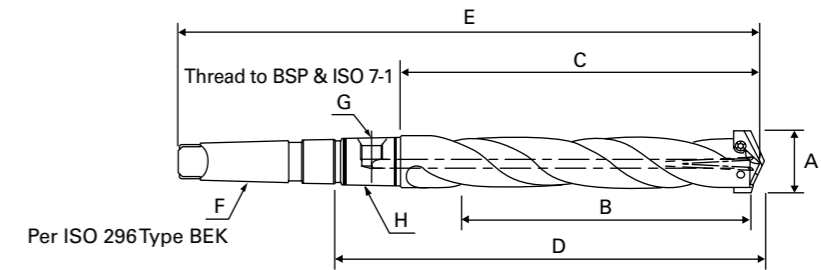
TAPER SHANK - STANDARD LENGTH - Spiral Flute



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

► You can also apply RCA(Rotary Coolant Adapter) for internal cooling.

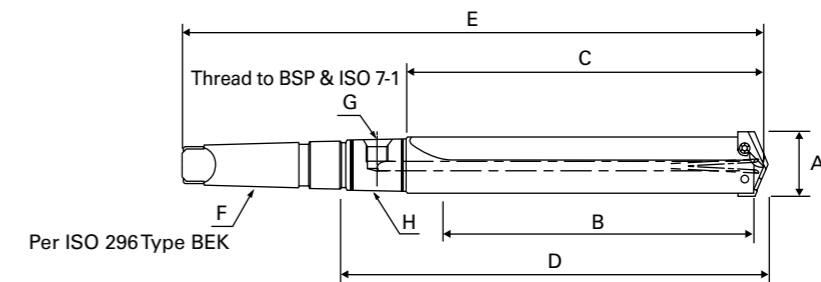
TAPER SHANK HOLDER - EXTENDED LENGTH Spiral Flute



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

► You can also apply RCA(Rotary Coolant Adapter) for internal cooling.

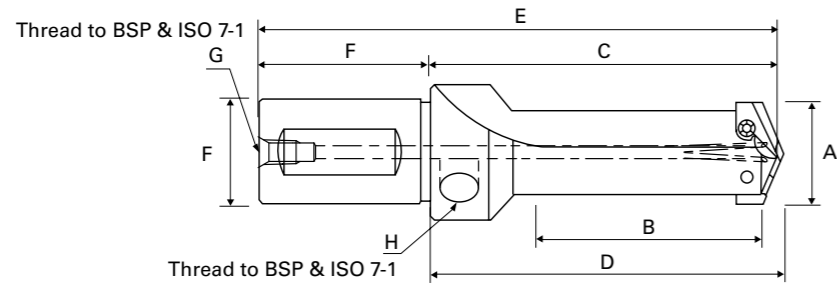
TAPER SHANK HOLDER - EXTENDED LENGTH Straight Flute



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

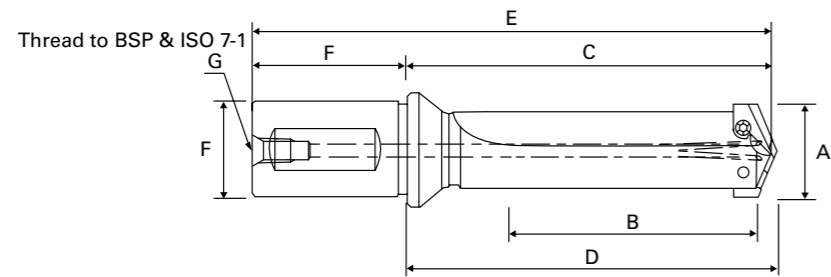
► You can also apply RCA(Rotary Coolant Adapter) for internal cooling.

STRAIGHT SHANK - STUB LENGTH - Straight Flute



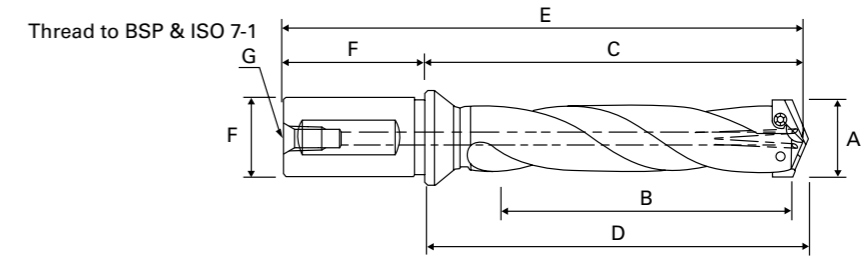
Series	EUROPA CODE	A Drill Insert Range	B Max. Drill Depth	C Flute Length	D Ref. Length	E Overall Length	F Shank		G Pipe Tap	
							Dia.	Length	Rear	Side
Y	8Y115016FM	9.5 ~ 11.0	19.1	47.6	50.0	89.5	16.0	41.9	1/16"	1/8"
Z	8Z115016FM	11.5 ~ 12.5	19.1	47.6	50.0	89.5	16.0	41.9	1/16"	1/8"
0	80115020FM	13.0 ~ 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 LENGTH - Straight Flute



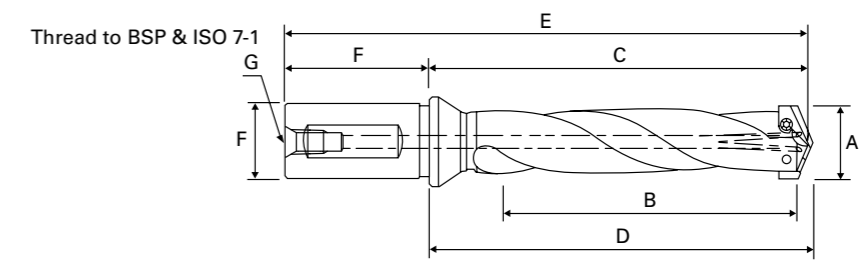
Series	EUROPA CODE	A Drill Insert Range	B Max. Drill Depth	C Flute Length	D Ref. Length	E Overall Length	F Shank		G Pipe Tap
							Dia.	Length	
Y	8Y215020FM	9.5 ~ 11.0	31.8	61.1	63.5	103.0	20.0	41.9	1/8"
Z	8Z215020FM	11.5 ~ 12.5	31.8	61.1	63.5	103.0	20.0	41.9	1/8"
0	80215020FM	13.0 ~ 17.5	34.9	63.5	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 LENGTH - Spiral Flute



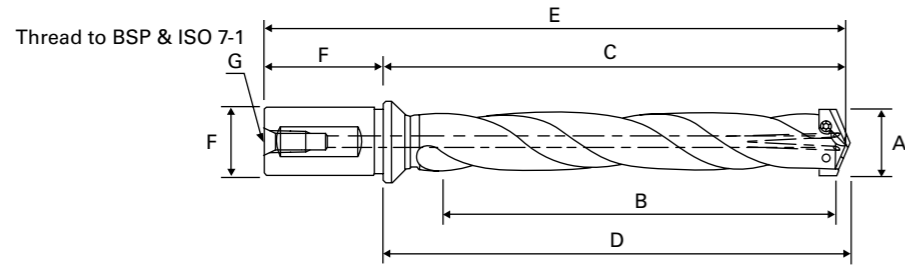
Series	EUROPA CODE	A Drill Insert Range	B Max. Drill Depth	C Flute Length	D Ref. Length	E Overall Length	F Shank		G Pipe Tap
							Dia.	Length	
1	82325025FM	18.0 ~ 24.0	117.5	154.8	158.4	207.9	25.0	53.1	1/8"
1.5	83325025FM	22.0 ~ 24.0	117.5	154.8	158.4	207.9	25.0	53.1	1/8"
2	84325032FM	25.0 ~ 35.0	136.5	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 LENGTH - Spiral Flute



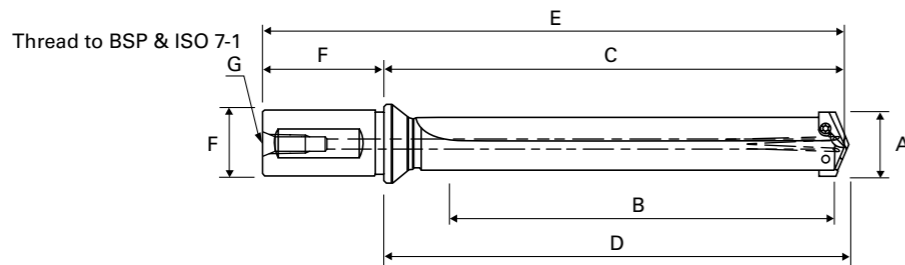
Series	EUROPA CODE	A Drill Insert Range	B Max. Drill Depth	C Flute Length	D Ref. Length	E Overall Length	F Shank		G Pipe Tap
							Dia.	Length	
Y	8Y325020FM	9.5 ~ 11.0	60.3	89.7	92.1	131.6	20.0	41.9	1/8"
Z	8Z425020FM	11.5 ~ 12.5	60.3	89.7	92.1	131.6	20.0	41.9	1/8"
0	80425020FM	13.0 ~ 17.5	63.5	92.1	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 LENGTH - Spiral Flute



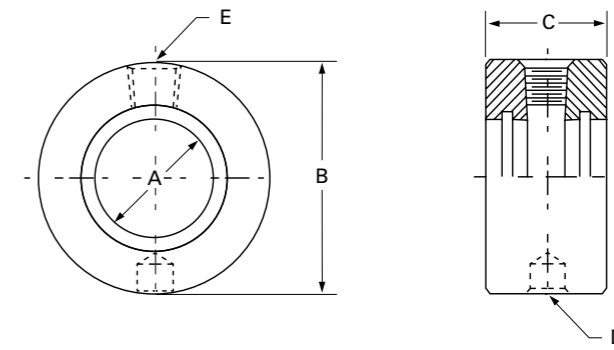
Series	EUROPA CODE	A Drill Insert Range	B Max. Drill Depth	C Flute Length	D Ref. Length	E Overall Length	F Shank		G Pipe Tap
							Dia.	Length	
Y	8Y425020FM	9.5 ~ 11.0	111.1	140.5	142.9	182.4	20.0	41.9	1/8"
Z	8Z525020FM	11.5 ~ 12.5	111.1	140.5	142.9	182.4	20.0	41.9	1/8"
0	80525020FM	13.0 ~ 17.5	114.3	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 LENGTH - Straight Flute



Series	EUROPA CODE	A Drill Insert Range	B Max. Drill Depth	C Flute Length	D Ref. Length	E Overall Length	F Shank		G Pipe Tap
							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	Threading 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	Item No.	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 packages(10 screws per package)

Europa Tool 11th Edition

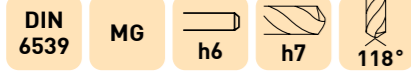
SOLID CARBIDE DRILLS



www.europatool.co.uk

PRODUCTS	SERIES	DESCRIPTION	PAGE
GENERAL CARBIDE DRILL			
	800303	CARBIDE STUB DRILL DIN6539	398
	801303	CARBIDE JOBBERS DIN338	400
	802323	CARBIDE TiAIN GOLD DRILL DIN6539	401
	807323	CARBIDE TiAIN 3D DRILL	403
	808323	CARBIDE TiAIN 5D DRILL	405
	806303	CARBIDE 90 DEG. NC SPOTTING DRILL	407
	806403	CARBIDE 120 DEG. NC SPOTTING DRILL	407
SOLID CARBIDE TiAIN THROUGH COOLANT DRILLS			
	803323	CARBIDE TiAIN 3D DIN6537	408
	804323	CARBIDE TiAIN 5D DIN6537	410
	805323	CARBIDE TiAIN 8D DIN6537	412
	810323	CARBIDE TiAIN 10D	414
	815323	CARBIDE TiAIN 15D	414
	820323	CARBIDE TiAIN 20D	414
SOLID CARBIDE INOX THROUGH COOLANT DRILLS			
	823323	CARBIDE INOX 3D DIN6537	415
	825323	CARBIDE INOX 5D DIN6537	417
	828323	CARBIDE INOX 8D DIN6537	419
SOLID CARBIDE ALU-XP THROUGH COOLANT DRILLS			
	843303	CARBIDE 3D DIN6537	421
	845303	CARBIDE 5D DIN6537	423
	848303	CARBIDE 8D DIN6537	425
PULSAR SOLID CARBIDE TiAIN DRILL			
	821223	CARBIDE TiAIN 15DEG.SPIRAL	427
CUTTING DATA			428 ~ 431

CARBIDE STUB DRILL DIN6539

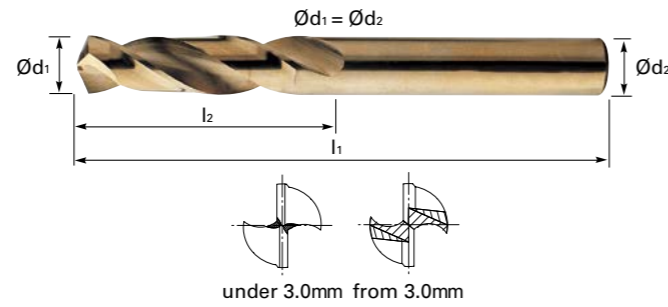


Series No. 800303

▶ cutting conditions : p.428

Application :

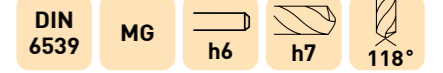
Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.



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
8003030410	4.1	22	55
8003030420	4.2	24	58
8003030430	4.3	24	58
8003030440	4.4	24	58
8003030450	4.5	24	58
8003030460	4.6	24	58
8003030470	4.7	24	58

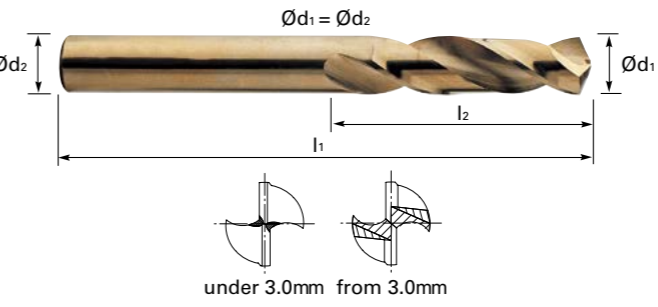
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8003030480	4.8	26	62
8003030490	4.9	26	62
8003030500	5.0	26	62
8003030510	5.1	26	62
8003030520	5.2	26	62
8003030530	5.3	28	66
8003030540	5.4	28	66
8003030550	5.5	28	66
8003030560	5.6	28	66
8003030570	5.7	28	66
8003030580	5.8	28	66
8003030590	5.9	28	66
8003030600	6.0	31	70
8003030610	6.1	31	70
8003030620	6.2	31	70
8003030630	6.3	31	70
8003030640	6.4	31	70
8003030650	6.5	31	70
8003030660	6.6	34	74
8003030670	6.7	34	74
8003030680	6.8	34	74
8003030690	6.9	34	74
8003030700	7.0	34	74
8003030710	7.1	34	74
8003030720	7.2	34	74
8003030730	7.3	34	74
8003030740	7.4	34	74
8003030750	7.5	34	74

CARBIDE STUB DRILL DIN6539



Series No. 800303

▶ cutting conditions : p.428



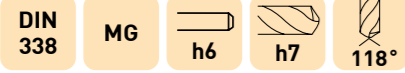
Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8003030760	7.6	37	79
8003030770	7.7	37	79
8003030780	7.8	37	79
8003030790	7.9	37	79
8003030800	8.0	37	79
8003030810	8.1	37	79
8003030820	8.2	37	79
8003030830	8.3	37	79
8003030840	8.4	37	79
8003030850	8.5	40	84
8003030860	8.6	40	84
8003030870	8.7	40	84
8003030880	8.8	40	84
8003030890	8.9	40	84
8003030900	9.0	40	84
8003030910	9.1	40	84

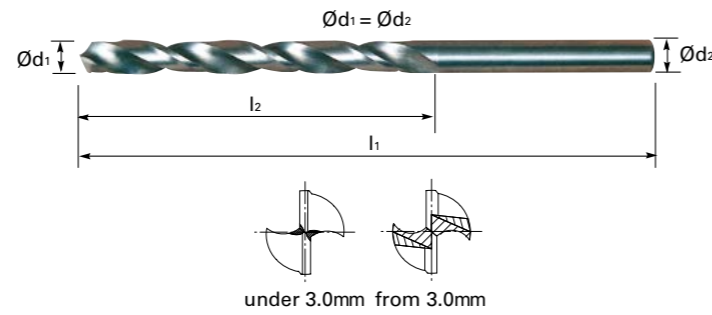
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8003030920	9.2	40	84
8003030930	9.3	40	84
8003030940	9.4	40	84
8003030950	9.5	40	84
8003030960	9.6	43	89
8003030970	9.7	43	89
8003030980	9.8	43	89
8003030990	9.9	43	89
8003031000	10.0	43	89
8003031020	10.2	47	95
8003031050	10.5	47	95
8003031100	11.0	47	95
8003031150	11.5	51	102
8003031200	12.0	51	102
8003031300	13.0	51	102

CARBIDE JOBBERS DIN338



Series No. 801303

► cutting conditions : p.428

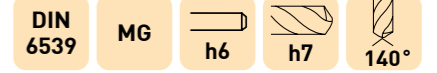


Application :
Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
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		
8013030270	2.7		
8013030280	2.8	33	61
8013030290	2.9		
8013030300	3.0		
8013030310	3.1	36	65
8013030320	3.2		
8013030330	3.3		
8013030340	3.4		
8013030350	3.5		
8013030360	3.6	39	70
8013030370	3.7		
8013030380	3.8		
8013030390	3.9	43	75
8013030400	4.0		
8013030410	4.1		
8013030420	4.2		
8013030430	4.3		
8013030440	4.4	47	80
8013030450	4.5		

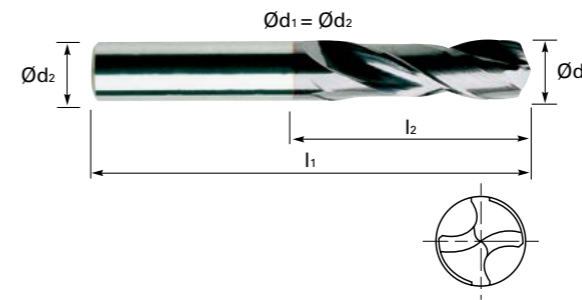
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8013030460	4.6	47	80
8013030470	4.7		
8013030480	4.8	52	86
8013030490	4.9		
8013030500	5.0		
8013030510	5.1		
8013030520	5.2		
8013030530	5.3	57	93
8013030540	5.4		
8013030550	5.5		
8013030560	5.6		
8013030570	5.7		
8013030580	5.8	63	101
8013030590	5.9		
8013030600	6.0		
8013030610	6.1		
8013030620	6.2		
8013030630	6.3	69	109
8013030640	6.4		
8013030650	6.5		
8013030680	6.8		
8013030700	7.0		
8013030800	8.0	75	117
8013030850	8.5		
8013031000	10.0	87	113
8013031020	10.2		

CARBIDE TiAlN GOLD DRILL DIN6539



Series No. 802323

► cutting conditions : p.428



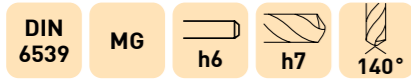
Application :
Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

Advantage :
Self centering - center 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		
8023230390	3.9	22	55
8023230400	4.0		
8023230410	4.1		
8023230420	4.2		
8023230430	4.3		
8023230440	4.4	24	58
8023230450	4.5		
8023230460	4.6		
8023230470	4.7		
8023230480	4.8		
8023230490	4.9	26	62
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	34	74
8023230690	6.9		
8023230700	7.0		
8023230710	7.1		
8023230720	7.2		
8023230730	7.3	26	62
8023230740	7.4		
8023230750	7.5		

CARBIDE TiAlN GOLD DRILL DIN6539



Series No. 802323

▶ cutting conditions : p.428

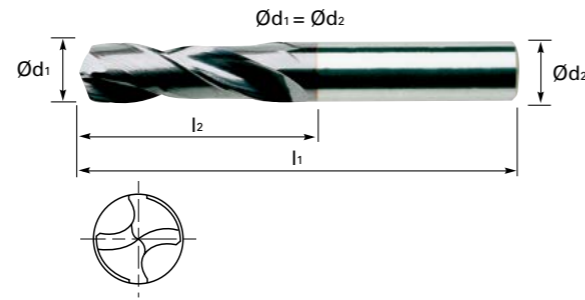


Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

Advantage :

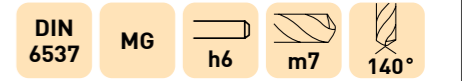
Self centering - center drilling is not required
Excellent positioning - bush is not necessary
Special design - reaming is not required,
good chip removal, powerful drilling



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		

CARBIDE TiAlN 3D DRILL



Series No. 807323

▶ cutting conditions : p.428

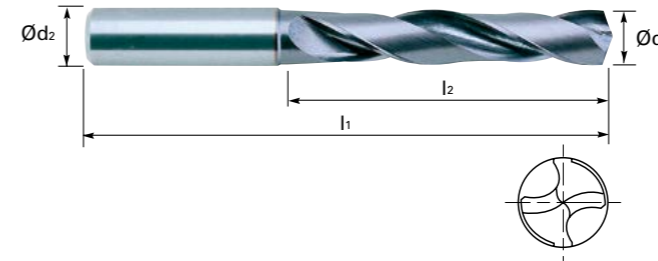


Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

Advantage :

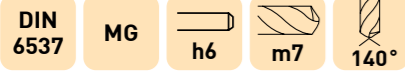
Self centering center drilling is not required
Excellent positioning bush is not necessary
Special Design reaming is not required good chip removal
powerful drilling



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

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8073230610	6.1	8.0	34	79
8073230620	6.2	8.0	34	79
8073230630	6.3	8.0	34	79
8073230640	6.4	8.0	34	79
8073230650	6.5	8.0	34	79
8073230660	6.6	8.0	34	79
8073230670	6.7	8.0	34	79
8073230680	6.8	8.0	34	79
8073230690	6.9	8.0	34	79
8073230700	7.0	8.0	34	79
8073230710	7.1	8.0	41	79
8073230720	7.2	8.0	41	79
8073230730	7.3	8.0	41	79
8073230740	7.4	8.0	41	79
8073230750	7.5	8.0	41	79
8073230760	7.6	8.0	41	79
8073230770	7.7	8.0	41	79
8073230780	7.8	8.0	41	79
8073230790	7.9	8.0	41	79
8073230800	8.0	8.0	41	79
8073230810	8.1	10.0	47	89
8073230820	8.2	10.0	47	89
8073230830	8.3	10.0	47	89
8073230840	8.4	10.0	47	89
8073230850	8.5	10.0	47	89
8073230860	8.6	10.0	47	89
8073230870	8.7	10.0	47	89
8073230880	8.8	10.0	47	89
8073230890	8.9	10.0	47	89
8073230900	9.0	10.0	47	89
8073230910	9.1	10.0	47	89

CARBIDE TiAlN 3D DRILL

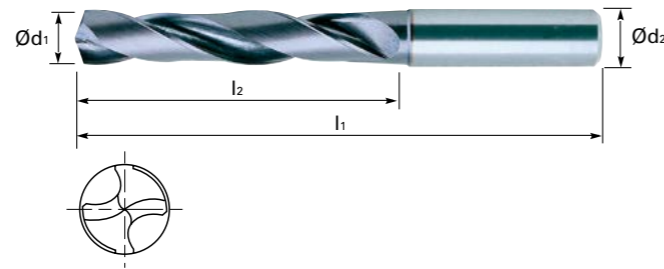


Series No. 807323

► cutting conditions : p.428



Application :
Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

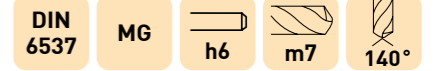


Advantage :
Self centering center drilling is not required
Excellent positioning bush is not necessary
Special Design reaming is not required good chip removal
powerful drilling

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

CARBIDE TiAlN 5D DRILL

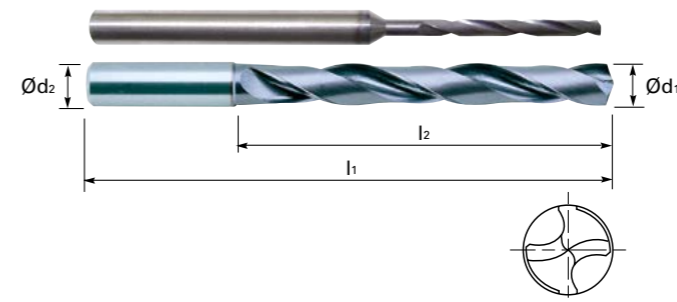


Series No. 808323

► cutting conditions : p.428



Application :
Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

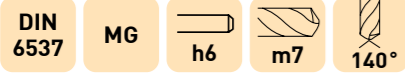


Advantage :
Self centering center drilling is not required
Excellent positioning bush is not necessary
Special Design reaming is not required good chip removal
powerful drilling

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

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8083230460	4.6	6.0	36	74
8083230470	4.7	6.0	36	74
8083230480	4.8	6.0	44	82
8083230490	4.9	6.0	44	82
8083230500	5.0	6.0	44	82
8083230510	5.1	6.0	44	82
8083230520	5.2	6.0	44	82
8083230530	5.3	6.0	44	82
8083230540	5.4	6.0	44	82
8083230550	5.5	6.0	44	82
8083230560	5.6	6.0	44	82
8083230570	5.7	6.0	44	82
8083230580	5.8	6.0	44	82
8083230590	5.9	6.0	44	82
8083230600	6.0	6.0	44	82
8083230610	6.1	8.0	53	91
8083230620	6.2	8.0	53	91
8083230630	6.3	8.0	53	91
8083230640	6.4	8.0	53	91
8083230650	6.5	8.0	53	91
8083230660	6.6	8.0	53	91
8083230670	6.7	8.0	53	91
8083230680	6.8	8.0	53	91
8083230690	6.9	8.0	53	91
8083230700	7.0	8.0	53	91
8083230710	7.1	8.0	53	91
8083230720	7.2	8.0	53	91
8083230730	7.3	8.0	53	91
8083230740	7.4	8.0	53	91
8083230750	7.5	8.0	53	91
8083230760	7.6	8.0	53	91
8083230770	7.7	8.0	53	91
8083230780	7.8	8.0	53	91
8083230790	7.9	8.0	53	91
8083230800	8.0	8.0	53	91
8083230810	8.1	10.0	61	103

CARBIDE TiAIN 5D DRILL



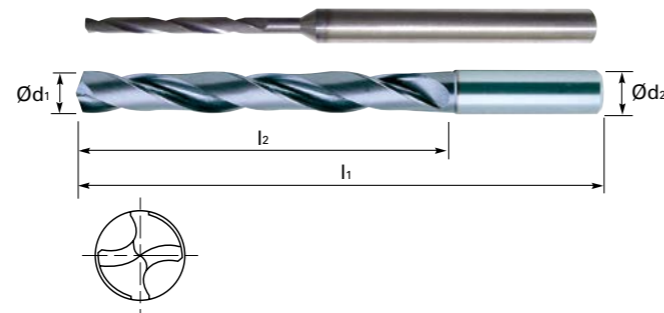
Series No. 808323

▶ cutting conditions : p.428



Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.



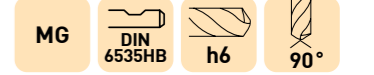
Advantage :

Self centering center drilling is not required
Excellent positioning bush is not necessary
Special Design reaming is not required good chip removal
powerful drilling

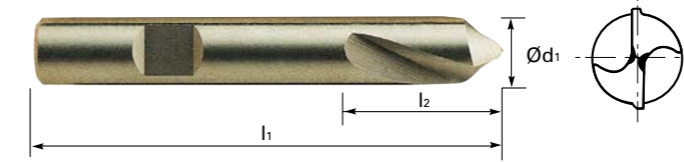
EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8083230820	8.2	10.0	61	103
8083230830	8.3	10.0	61	103
8083230840	8.4	10.0	61	103
8083230850	8.5	10.0	61	103
8083230860	8.6	10.0	61	103
8083230870	8.7	10.0	61	103
8083230880	8.8	10.0	61	103
8083230890	8.9	10.0	61	103
8083230900	9.0	10.0	61	103
8083230910	9.1	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

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8083231140	11.4	12.0	71	118
8083231150	11.5	12.0	71	118
8083231160	11.6	12.0	71	118
8083231170	11.7	12.0	71	118
8083231180	11.8	12.0	71	118
8083231190	11.9	12.0	71	118
8083231200	12.0	12.0	71	118
8083231230	12.3	14.0	77	124
8083231250	12.5	14.0	77	124
8083231280	12.8	14.0	77	124
8083231300	13.0	14.0	77	124
8083231350	13.5	14.0	77	124
8083231380	13.8	14.0	77	124
8083231400	14.0	14.0	77	124
8083231450	14.5	16.0	83	133
8083231480	14.8	16.0	83	133
8083231500	15.0	16.0	83	133
8083231550	15.5	16.0	83	133
8083231580	15.8	16.0	83	133
8083231600	16.0	16.0	83	133
8083231650	16.5	18.0	93	143
8083231680	16.8	18.0	93	143
8083231700	17.0	18.0	93	143
8083231750	17.5	18.0	93	143
8083231780	17.8	18.0	93	143
8083231800	18.0	18.0	93	143
8083231850	18.5	20.0	101	153
8083231900	19.0	20.0	101	153
8083231950	19.5	20.0	101	153
8083231980	19.8	20.0	101	153
8083232000	20.0	20.0	101	153

CARBIDE 90 DEG. NC SPOTTING DRILL



Series No. 806303



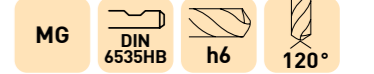
Application :

For more precise centering work on NC/CNC Machine.
A larger diameter in respect to the subsequent drilling tool permits to obtain the centering and chamfering simultaneously.

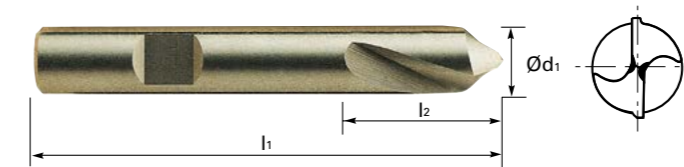
NC-Spotting drills 90°

EUROPA CODE	O.D d ₁	FL l ₂	OAL l ₁
8063030600	6.0	13	50
8063030800	8.0	23	60
8063031000	10.0	24	70
8063031200	12.0		
8063031600	16.0	29	75
8063032000	20.0	35	100

CARBIDE 120 DEG. NC SPOTTING DRILL



Series No. 806403



Application :

For more precise centering work on NC/CNC Machine.
A larger diameter in respect to the subsequent drilling tool permits to obtain the centering and chamfering simultaneously.

NC-Spotting drills 120°

EUROPA CODE	O.D d ₁	FL l ₂	OAL l ₁
8064030600	6.0	13	50
8064030800	8.0	23	60
8064031000	10.0	24	70
8064031200	12.0		
8064031600	16.0	29	75
8064032000	20.0	35	100

CARBIDE TiAlN 3D DIN6537 WITH COOLANT HOLE



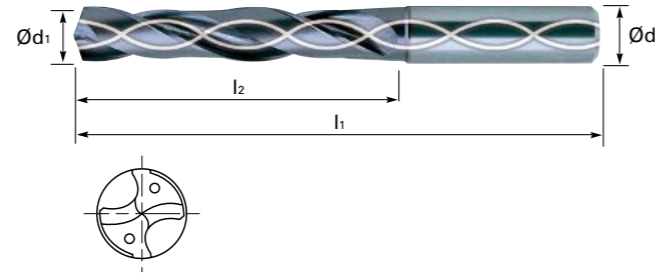
DIN 6537
DIN 6535-HA
MG
h6
m7
140°

Series No. 803323

▶ cutting conditions : p.429



Application :
Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.



Advantage :
Self centering - center 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			
8033230570	5.7			
8033230580	5.8			
8033230590	5.9			
8033230600	6.0	8.0	34	79
8033230610	6.1			
8033230620	6.2			

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
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	8.0	41	79
8033230740	7.4			
8033230750	7.5			
8033230760	7.6			
8033230770	7.7			
8033230780	7.8			
8033230790	7.9			
8033230800	8.0			
8033230810	8.1			
8033230820	8.2			
8033230830	8.3	10.0	47	89
8033230840	8.4			
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			
8033230950	9.5			

CARBIDE TiAlN 3D DIN6537 WITH COOLANT HOLE



DIN 6537
DIN 6535-HA
MG
h6
m7
140°

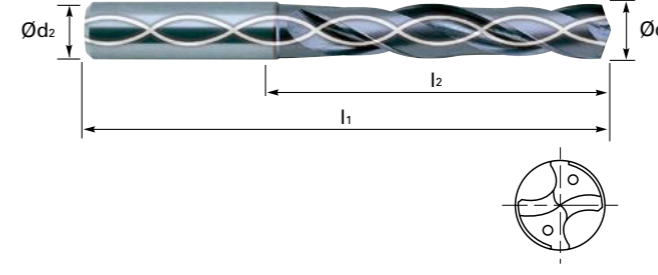
Series No. 803323

▶ cutting conditions : p.429



Application :
Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

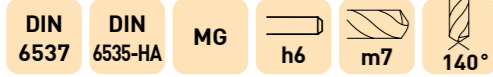
Advantage :
Self centering - center drilling is not required
Excellent positioning - bush is not necessary
Special design - reaming is not required, good chip removal, powerful drilling



EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8033230960	9.6	10.0	47	89
8033230970	9.7			
8033230980	9.8			
8033230990	9.9			
8033231000	10.0			
8033231010	10.1			
8033231020	10.2			
8033231030	10.3			
8033231040	10.4			
8033231050	10.5			
8033231060	10.6	12.0	55	102
8033231070	10.7			
8033231080	10.8			
8033231090	10.9			
8033231100	11.0			
8033231110	11.1			
8033231120	11.2			
8033231130	11.3			
8033231140	11.4			
8033231150	11.5			
8033231160	11.6			
8033231170	11.7			
8033231180	11.8			
8033231190	11.9			

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8033231200	12.0	12.0	55	102
8033231250	12.5	14.0	60	107
8033231300	13.0			
8033231350	13.5			
8033231400	14.0			
8033231450	14.5	16.0	65	115
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	20.0	79	131
8033231900	19.0			
8033231950	19.5			
8033232000	20.0			

CARBIDE TiAlN 5D DIN6537 WITH COOLANT HOLE



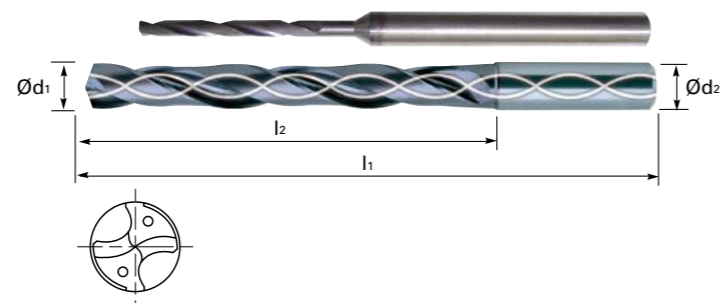
Series No. 804323

► cutting conditions : p.429



Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.



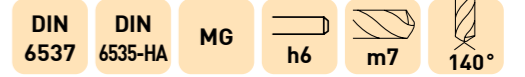
Advantage :

Self centering - center 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			
8043230120	1.2			
8043230130	1.3			
8043230140	1.4			
8043230150	1.5			
8043230160	1.6	3.0	16	55
8043230170	1.7			
8043230180	1.8			
8043230190	1.9			
8043230200	2.0			
8043230210	2.1			
8043230220	2.2	4.0	21	57
8043230230	2.3			
8043230240	2.4			
8043230250	2.5			
8043230260	2.6			
8043230270	2.7			
8043230280	2.8	6.0	28	66
8043230290	2.9			
8043230300	3.0			
8043230310	3.1			
8043230320	3.2			
8043230330	3.3			
8043230340	3.4	6.0	28	66
8043230350	3.5			
8043230360	3.6			
8043230370	3.7			
8043230380	3.8			
8043230390	3.9			
8043230400	4.0	6.0	36	74
8043230410	4.1			

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8043230420	4.2	6.0	36	74
8043230430	4.3			
8043230440	4.4			
8043230450	4.5			
8043230460	4.6			
8043230470	4.7			
8043230480	4.8	6.0	44	82
8043230490	4.9			
8043230500	5.0			
8043230510	5.1			
8043230520	5.2			
8043230530	5.3			
8043230540	5.4	6.0	44	82
8043230550	5.5			
8043230560	5.6			
8043230570	5.7			
8043230580	5.8			
8043230590	5.9			
8043230600	6.0	8.0	53	91
8043230610	6.1			
8043230620	6.2			
8043230630	6.3			
8043230640	6.4			
8043230650	6.5			
8043230660	6.6	8.0	53	91
8043230670	6.7			
8043230680	6.8			
8043230690	6.9			
8043230700	7.0			
8043230710	7.1			
8043230720	7.2	7.3	53	91
8043230730	7.3			

CARBIDE TiAlN 5D DIN6537 WITH COOLANT HOLE



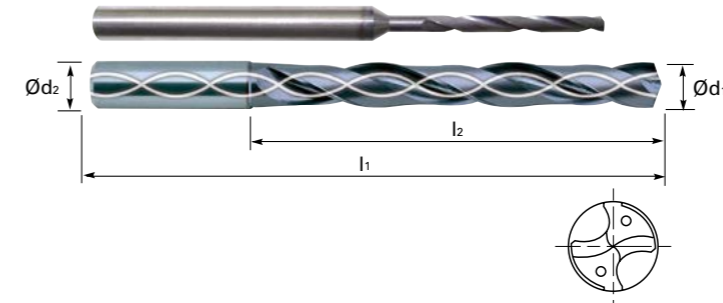
Series No. 804323

► cutting conditions : p.429



Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.



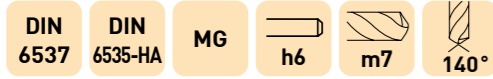
Advantage :

Self centering - center 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			
8043230780	7.8			
8043230790	7.9			
8043230800	8.0	10.0	61	103
8043230810	8.1			
8043230820	8.2			
8043230830	8.3			
8043230840	8.4			
8043230850	8.5			
8043230860	8.6	10.0	61	103
8043230870	8.7			
8043230880	8.8			
8043230890	8.9			
8043230900	9.0			
8043230910	9.1			
8043230920	9.2	12.0	71	118
8043230930	9.3			
8043230940	9.4			
8043230950	9.5			
8043230960	9.6			
8043230970	9.7			
8043230980	9.8	12.0	71	118
8043230990	9.9			
8043231000	10.0			
8043231010	10.1			
8043231020	10.2			
8043231030	10.3			
8043231040	10.4	12.0	71	118
8043231050	10.5			

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8043231060	10.6	12.0	71	118
8043231070	10.7			
8043231080	10.8			
8043231090	10.9			
8043231100	11.0			
8043231110	11.1			
8043231120	11.2	12.0	71	118
8043231130	11.3			
8043231140	11.4			
8043231150	11.5			
8043231160	11.6			
8043231170	11.7			
8043231180	11.8	14.0	77	124
8043231190	11.9			
8043231200	12.0			
8043231250	12.5			
8043231300	13.0			
8043231350	13.5			
8043231400	14.0	16.0	83	133
8043231450	14.5			
8043231500	15.0			
8043231550	15.5			
8043231600	16.0			
8043231650	16.5			
8043231700	17.0	18.0	93	143
8043231750	17.5			
8043231800	18.0			
8043231850	18.5			
8043231900	19.0			
8043231950	19.5			
8043232000	20.0	20.0	101	153
8043232000	20.0			

CARBIDE TiAlN 8D DIN6537 WITH COOLANT HOLE

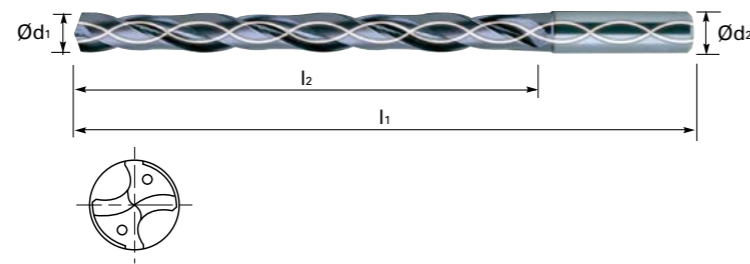


Series No. 805323

▶ cutting conditions : p.429



Application :
Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

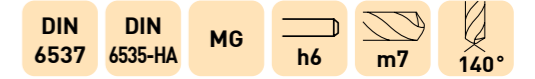


Advantage :
Self centering - center drilling is not required
Excellent positioning - bush is not necessary
Special design - reaming is not required, good chip removal, powerful drilling

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			

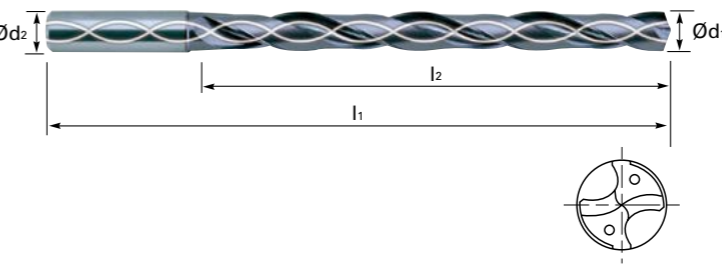
EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8053230530	5.3	6.0	57	95
8053230540	5.4			
8053230550	5.5			
8053230560	5.6			
8053230570	5.7			
8053230580	5.8			
8053230590	5.9			
8053230600	6.0			
8053230610	6.1			
8053230620	6.2			
8053230630	6.3			
8053230640	6.4			
8053230650	6.5	8.0	76	114
8053230660	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			

CARBIDE TiAlN 8D DIN6537 WITH COOLANT HOLE



Series No. 805323

▶ cutting conditions : p.429



Application :
Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

Advantage :
Self centering - center drilling is not required
Excellent positioning - bush is not necessary
Special design - reaming is not required, good chip removal, powerful drilling

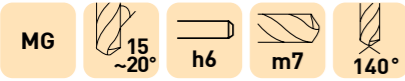
EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8053230760	7.6	8.0	76	114
8053230770	7.7			
8053230780	7.8			
8053230790	7.9			
8053230800	8.0			
8053230810	8.1			
8053230820	8.2			
8053230830	8.3			
8053230840	8.4			
8053230850	8.5			
8053230860	8.6			
8053230870	8.7	10.0	95	142
8053230880	8.8			
8053230890	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			

SOLID CARBIDE DRILLS

SOLID CARBIDE DRILLS

CARBIDE TiAlN WITH COOLANT HOLE



Series No. 810323, 815323, 820323

▶ cutting conditions : p.430

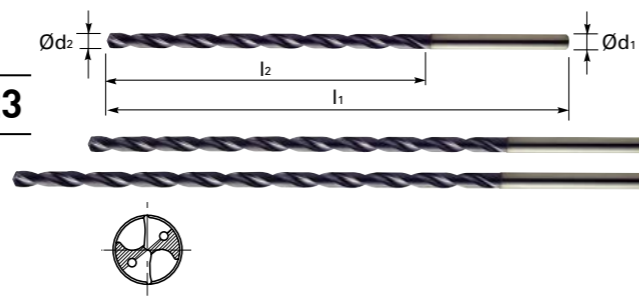


Application :

Drilling into steel in general, cast steel, cast iron, chilled cast iron, malleable cast iron, non-ferrous heavy metal, non-ferrous light metal, abrasive plastic.

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



Advantage :

Non step drilling up to 15 times (20 times) of drill diameter. Available for processing MQL(Minimum Quantity Lubrication). Excellent positioning - Bush is not necessary. Special design - Good chip removal Powerful drilling

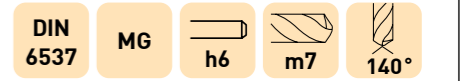
15 X D

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8153230300	3.0	3.0	54	105
8153230350	3.5	4.0	63	114
8153230400	4.0	4.0	72	123
8153230450	4.5	5.0	81	134
8153230500	5.0	5.0	90	143
8153230550	5.5	6.0	99	154
8153230600	6.0	6.0	108	163
8153230700	7.0	7.0	126	182
8153230800	8.0	8.0	144	201
8153230900	9.0	9.0	162	220
8153231000	10.0	10.0	180	238
8153231100	11.0	11.0	198	262
8153231200	12.0	12.0	216	281

20 X D

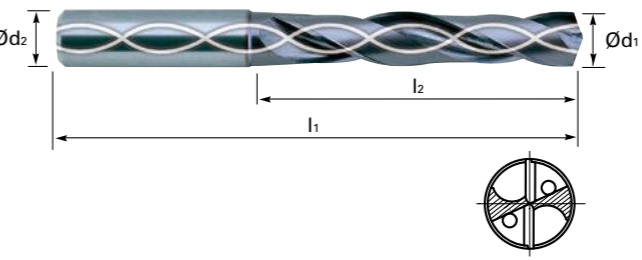
EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8203230300	3.0	3.0	69	120
8203230350	3.5	4.0	81	132
8203230400	4.0	4.0	92	143
8203230450	4.5	5.0	104	157
8203230500	5.0	5.0	115	168
8203230550	5.5	6.0	127	182
8203230600	6.0	6.0	138	193
8203230700	7.0	7.0	161	217
8203230800	8.0	8.0	184	241
8203230900	9.0	9.0	207	265
8203231000	10.0	10.0	230	288
8203231200	12.0	12.0	276	341

CARBIDE INOX 3D DIN6537 WITH COOLANT HOLE



Series No. 823323

▶ cutting conditions : p.429



Application :

For drilling tough materials, stainless steels, nickel alloys and titanium up to HRC35

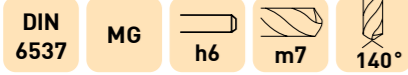
Advantage :

The tool has the special flute shape and geometry suitability for machining stainless steels. Excellent chip evacuation due to better surface treatment. Point R-thinning makes superior centering and chip curling. Applied INOX coating achieves A better surface finish of materials to be cut and a 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

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8233230610	6.1	8.0	34	79
8233230620	6.2	8.0	34	79
8233230630	6.3	8.0	34	79
8233230640	6.4	8.0	34	79
8233230650	6.5	8.0	34	79
8233230660	6.6	8.0	34	79
8233230670	6.7	8.0	34	79
8233230680	6.8	8.0	34	79
8233230690	6.9	8.0	34	79
8233230700	7.0	8.0	34	79
8233230710	7.1	8.0	41	79
8233230720	7.2	8.0	41	79
8233230730	7.3	8.0	41	79
8233230740	7.4	8.0	41	79
8233230750	7.5	8.0	41	79
8233230760	7.6	8.0	41	79
8233230770	7.7	8.0	41	79
8233230780	7.8	8.0	41	79
8233230790	7.9	8.0	41	79
8233230800	8.0	8.0	41	79
8233230810	8.1	10.0	47	89
8233230820	8.2	10.0	47	89
8233230830	8.3	10.0	47	89
8233230840	8.4	10.0	47	89
8233230850	8.5	10.0	47	89
8233230860	8.6	10.0	47	89
8233230870	8.7	10.0	47	89
8233230880	8.8	10.0	47	89
8233230890	8.9	10.0	47	89
8233230900	9.0	10.0	47	89
8233230910	9.1	10.0	47	89

CARBIDE INOX 3D DIN6537 WITH COOLANT HOLE



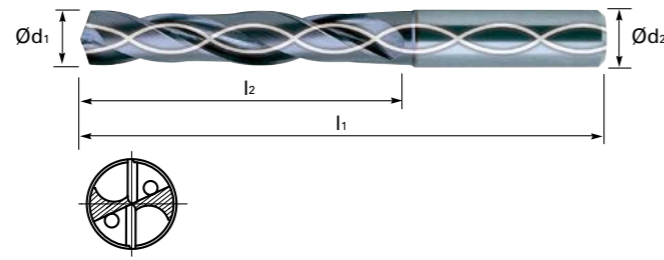
Series No. 823323

► cutting conditions : p.429



Application :

For drilling tough materials, stainless steels, nickel alloys and titanium up to HRC35



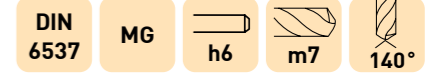
Advantage :

The tool has the special flute shape and geometry suitability for machining stainless steels. Excellent chip evacuation due to better surface treatment. Point R-thinning makes superior centering and chip curling. Applied INOX coating achieves A better surface finish of materials to be cut and a 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

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8233231150	11.5	12.0	55	102
8233231160	11.6	12.0	55	102
8233231170	11.7	12.0	55	102
8233231180	11.8	12.0	55	102
8233231190	11.9	12.0	55	102
8233231200	12.0	12.0	55	102
8233231250	12.5	14.0	60	107
8233231300	13.0	14.0	60	107
8233231350	13.5	14.0	60	107
8233231400	14.0	14.0	60	107
8233231450	14.5	16.0	65	115
8233231500	15.0	16.0	65	115
8233231550	15.5	16.0	65	115
8233231600	16.0	16.0	65	115
8233231650	16.5	18.0	73	123
8233231700	17.0	18.0	73	123
8233231750	17.5	18.0	73	123
8233231800	18.0	18.0	73	123
8233231850	18.5	20.0	79	131
8233231900	19.0	20.0	79	131
8233231950	19.5	20.0	79	131
8233232000	20.0	20.0	79	131

CARBIDE INOX 5D DIN6537 WITH COOLANT HOLE



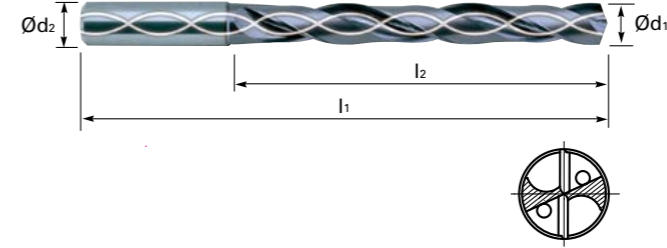
Series No. 825323

► cutting conditions : p.429



Application :

For drilling tough materials, stainless steels, nickel alloys and titanium up to HRC35



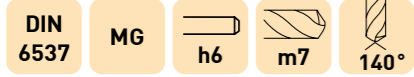
Advantage :

The tool has the special flute shape and geometry suitability for machining stainless steels. Excellent chip evacuation due to better surface treatment. Point R-thinning makes superior centering and chip curling. Applied INOX coating achieves A better surface finish of materials to be cut and a longer tool life.

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8253230150	1.5	3	16	55
8253230160	1.6	3	16	55
8253230170	1.7	3	16	55
8253230180	1.8	3	16	55
8253230190	1.9	3	16	55
8253230200	2	4	21	57
8253230210	2.1	4	21	57
8253230220	2.2	4	21	57
8253230230	2.3	4	21	57
8253230240	2.4	4	21	57
8253230250	2.5	4	21	57
8253230260	2.6	4	21	57
8253230270	2.7	4	21	57
8253230280	2.8	4	21	57
8253230290	2.9	4	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

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8253230460	4.6	6.0	36	74
8253230470	4.7	6.0	36	74
8253230480	4.8	6.0	44	82
8253230490	4.9	6.0	44	82
8253230500	5.0	6.0	44	82
8253230510	5.1	6.0	44	82
8253230520	5.2	6.0	44	82
8253230530	5.3	6.0	44	82
8253230540	5.4	6.0	44	82
8253230550	5.5	6.0	44	82
8253230560	5.6	6.0	44	82
8253230570	5.7	6.0	44	82
8253230580	5.8	6.0	44	82
8253230590	5.9	6.0	44	82
8253230600	6.0	6.0	44	82
8253230610	6.1	8.0	53	91
8253230620	6.2	8.0	53	91
8253230630	6.3	8.0	53	91
8253230640	6.4	8.0	53	91
8253230650	6.5	8.0	53	91
8253230660	6.6	8.0	53	91
8253230670	6.7	8.0	53	91
8253230680	6.8	8.0	53	91
8253230690	6.9	8.0	53	91
8253230700	7.0	8.0	53	91
8253230710	7.1	8.0	53	91
8253230720	7.2	8.0	53	91
8253230730	7.3	8.0	53	91
8253230740	7.4	8.0	53	91
8253230750	7.5	8.0	53	91
8253230760	7.6	8.0	53	91

CARIBDE INOX 5D DIN6537 WITH COOLANT HOLE

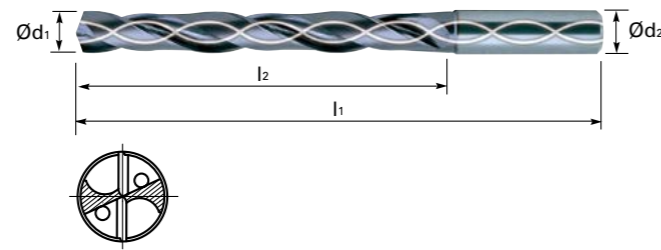


Series No. 825323

► cutting conditions : p.429



Application :
For drilling tough materials, stainless steels, nickel alloys and titanium up to HRC35

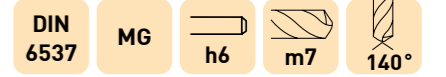


Advantage :
The tool has the special flute shape and geometry suitability for machining stainless steels.
Excellent chip evacuation due to better surface treatment.
Point R-thinning makes superior centering and chip curling.
Applied INOX coating achieves A better surface finish of materials to be cut and a 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

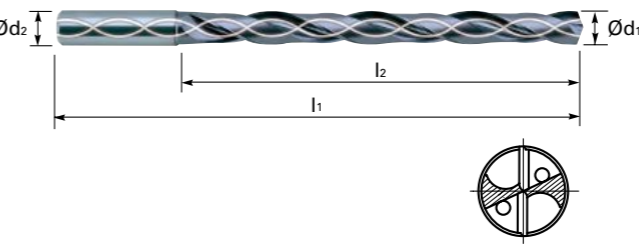
EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8253231070	10.7	12.0	71	118
8253231080	10.8	12.0	71	118
8253231090	10.9	12.0	71	118
8253231100	11.0	12.0	71	118
8253231110	11.1	12.0	71	118
8253231120	11.2	12.0	71	118
8253231130	11.3	12.0	71	118
8253231140	11.4	12.0	71	118
8253231150	11.5	12.0	71	118
8253231160	11.6	12.0	71	118
8253231170	11.7	12.0	71	118
8253231180	11.8	12.0	71	118
8253231190	11.9	12.0	71	118
8253231200	12.0	12.0	71	118
8253231250	12.5	14.0	77	124
8253231300	13.0	14.0	77	124
8253231350	13.5	14.0	77	124
8253231400	14.0	14.0	77	124
8253231450	14.5	16.0	83	133
8253231500	15.0	16.0	83	133
8253231550	15.5	16.0	83	133
8253231600	16.0	16.0	83	133
8253231650	16.5	18.0	93	143
8253231700	17.0	18.0	93	143
8253231750	17.5	18.0	93	143
8253231800	18.0	18.0	93	143
8253231850	18.5	20.0	101	153
8253231900	19.0	20.0	101	153
8253231950	19.5	20.0	101	153
8253232000	20.0	20.0	101	153

CARBIDE INOX 8D DIN6537 WITH COOLANT HOLE



Series No. 828323

► cutting conditions : p.429



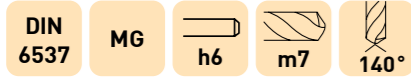
Application :
For drilling tough materials, stainless steels, nickel alloys and titanium up to HRC35

Advantage :
The tool has the special flute shape and geometry suitability for machining stainless steels.
Excellent chip evacuation due to better surface treatment.
Point R-thinning makes superior centering and chip curling.
Applied INOX coating achieves A better surface finish of materials to be cut and a 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

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8283230610	6.1	8.0	76	114
8283230620	6.2	8.0	76	114
8283230630	6.3	8.0	76	114
8283230640	6.4	8.0	76	114
8283230650	6.5	8.0	76	114
8283230660	6.6	8.0	76	114
8283230670	6.7	8.0	76	114
8283230680	6.8	8.0	76	114
8283230690	6.9	8.0	76	114
8283230700	7.0	8.0	76	114
8283230710	7.1	8.0	76	114
8283230720	7.2	8.0	76	114
8283230730	7.3	8.0	76	114
8283230740	7.4	8.0	76	114
8283230750	7.5	8.0	76	114
8283230760	7.6	8.0	76	114
8283230770	7.7	8.0	76	114
8283230780	7.8	8.0	76	114
8283230790	7.9	8.0	76	114
8283230800	8.0	8.0	76	114
8283230810	8.1	10.0	95	142
8283230820	8.2	10.0	95	142
8283230830	8.3	10.0	95	142
8283230840	8.4	10.0	95	142
8283230850	8.5	10.0	95	142
8283230860	8.6	10.0	95	142
8283230870	8.7	10.0	95	142
8283230880	8.8	10.0	95	142
8283230890	8.9	10.0	95	142
8283230900	9.0	10.0	95	142
8283230910	9.1	10.0	95	142

CARBIDE INOX 8D DIN6537 WITH COOLANT HOLE

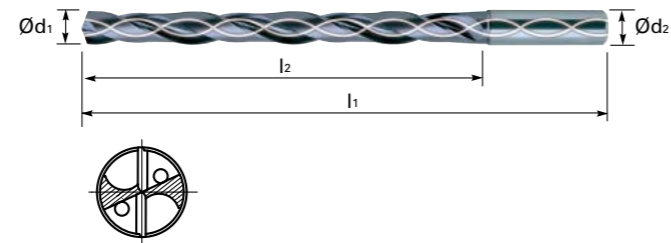


Series No. 828323

► cutting conditions : p.429



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

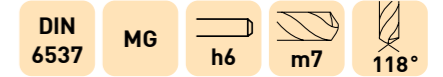


Advantage :
The tool has the special flute shape and geometry suitability
for machining stainless steels.
Excellent chip evacuation due to better surface treatment.
Point R-thinning makes superior centering and chip curling.
Applied INOX coating achieves A better surface finish of
materials to be cut and a 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

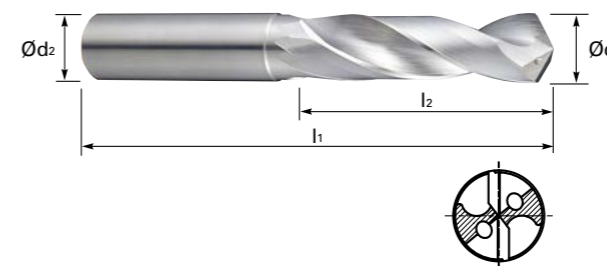
EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8283231090	10.9	12.0	114	162
8283231100	11.0	12.0	114	162
8283231110	11.1	12.0	114	162
8283231120	11.2	12.0	114	162
8283231130	11.3	12.0	114	162
8283231140	11.4	12.0	114	162
8283231150	11.5	12.0	114	162
8283231160	11.6	12.0	114	162
8283231170	11.7	12.0	114	162
8283231180	11.8	12.0	114	162
8283231190	11.9	12.0	114	162
8283231200	12.0	12.0	114	162
8283231250	12.5	14.0	133	178
8283231300	13.0	14.0	133	178
8283231350	13.5	14.0	133	178
8283231400	14.0	14.0	133	178

ALU-XP CARBIDE 3D DIN6537



Series No. 843303

► cutting conditions : p.431

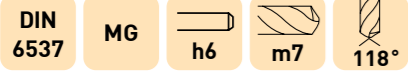


**Good chip treatment due to flute geometry & chip space
Better finish & built-up edge preventive**

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

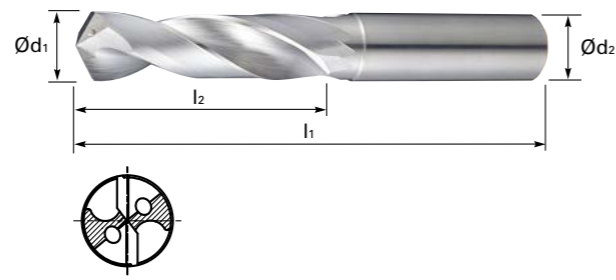
EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8433030610	6.1	8.0	34	79
8433030620	6.2	8.0	34	79
8433030630	6.3	8.0	34	79
8433030640	6.4	8.0	34	79
8433030650	6.5	8.0	34	79
8433030660	6.6	8.0	34	79
8433030670	6.7	8.0	34	79
8433030680	6.8	8.0	34	79
8433030690	6.9	8.0	34	79
8433030700	7.0	8.0	34	79
8433030710	7.1	8.0	41	79
8433030720	7.2	8.0	41	79
8433030730	7.3	8.0	41	79
8433030740	7.4	8.0	41	79
8433030750	7.5	8.0	41	79
8433030760	7.6	8.0	41	79
8433030770	7.7	8.0	41	79
8433030780	7.8	8.0	41	79
8433030790	7.9	8.0	41	79
8433030800	8.0	8.0	41	79
8433030810	8.1	10.0	47	89
8433030820	8.2	10.0	47	89
8433030830	8.3	10.0	47	89
8433030840	8.4	10.0	47	89
8433030850	8.5	10.0	47	89
8433030860	8.6	10.0	47	89
8433030870	8.7	10.0	47	89
8433030880	8.8	10.0	47	89
8433030890	8.9	10.0	47	89
8433030900	9.0	10.0	47	89
8433030910	9.1	10.0	47	89

ALU-XP CARBIDE 3D DIN6537



Series No. 843303

► cutting conditions : p.431

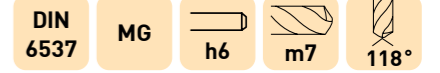


Good chip treatment due to flute geometry & chip space
Better finish & built-up edge preventive

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

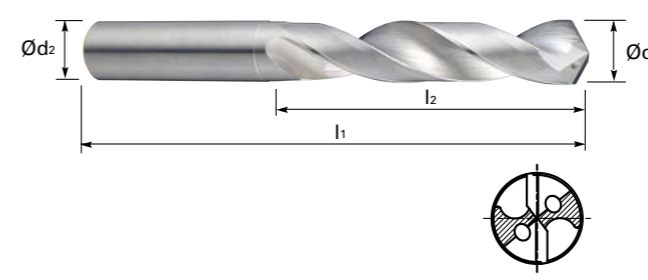
EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8433031150	11.5	12.0	55	102
8433031160	11.6	12.0	55	102
8433031170	11.7	12.0	55	102
8433031180	11.8	12.0	55	102
8433031190	11.9	12.0	55	102
8433031200	12.0	12.0	55	102
8433031250	12.5	14.0	60	107
8433031300	13.0	14.0	60	107
8433031350	13.5	14.0	60	107
8433031400	14.0	14.0	60	107
8433031450	14.5	16.0	65	115
8433031500	15.0	16.0	65	115
8433031550	15.5	16.0	65	115
8433031600	16.0	16.0	65	115
8433031650	16.5	18.0	73	123
8433031700	17.0	18.0	73	123
8433031750	17.5	18.0	73	123
8433031800	18.0	18.0	73	123
8433031850	18.5	20.0	79	131
8433031900	19.0	20.0	79	131
8433031950	19.5	20.0	79	131
8433032000	20.0	20.0	79	131

ALU-XP CARBIDE 5D DIN6537



Series No. 845303

► cutting conditions : p.431

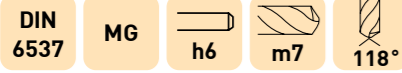


Good chip treatment due to flute geometry & chip space
Better finish & built-up edge preventive

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

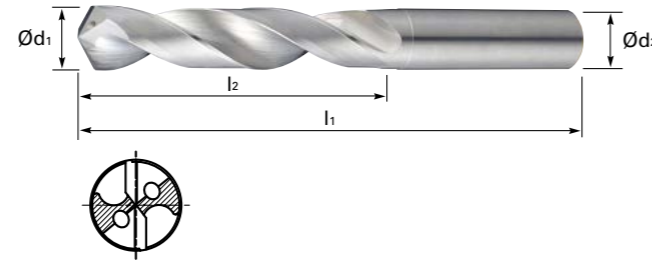
EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8453030610	6.1	8.0	53	91
8453030620	6.2	8.0	53	91
8453030630	6.3	8.0	53	91
8453030640	6.4	8.0	53	91
8453030650	6.5	8.0	53	91
8453030660	6.6	8.0	53	91
8453030670	6.7	8.0	53	91
8453030680	6.8	8.0	53	91
8453030690	6.9	8.0	53	91
8453030700	7.0	8.0	53	91
8453030710	7.1	8.0	53	91
8453030720	7.2	8.0	53	91
8453030730	7.3	8.0	53	91
8453030740	7.4	8.0	53	91
8453030750	7.5	8.0	53	91
8453030760	7.6	8.0	53	91
8453030770	7.7	8.0	53	91
8453030780	7.8	8.0	53	91
8453030790	7.9	8.0	53	91
8453030800	8.0	8.0	53	91
8453030810	8.1	10.0	61	103
8453030820	8.2	10.0	61	103
8453030830	8.3	10.0	61	103
8453030840	8.4	10.0	61	103
8453030850	8.5	10.0	61	103
8453030860	8.6	10.0	61	103
8453030870	8.7	10.0	61	103
8453030880	8.8	10.0	61	103
8453030890	8.9	10.0	61	103
8453030900	9.0	10.0	61	103
8453030910	9.1	10.0	61	103

ALU-XP CARBIDE 5D DIN6537



Series No. 845303

► cutting conditions : p.431

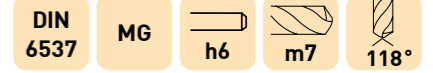


Good chip treatment due to flute geometry & chip space
Better finish & built-up edge preventive

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

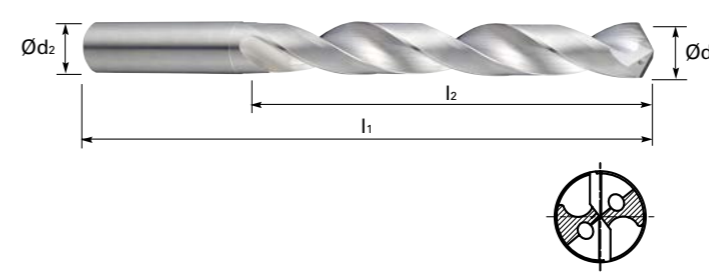
EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8453031150	11.5	12.0	71	118
8453031160	11.6	12.0	71	118
8453031170	11.7	12.0	71	118
8453031180	11.8	12.0	71	118
8453031190	11.9	12.0	71	118
8453031200	12.0	12.0	71	118
8453031250	12.5	14.0	77	124
8453031300	13.0	14.0	77	124
8453031350	13.5	14.0	77	124
8453031400	14.0	14.0	77	124
8453031450	14.5	16.0	83	133
8453031500	15.0	16.0	83	133
8453031550	15.5	16.0	83	133
8453031600	16.0	16.0	83	133
8453031650	16.5	18.0	93	143
8453031700	17.0	18.0	93	143
8453031750	17.5	18.0	93	143
8453031800	18.0	18.0	93	143
8453031850	18.5	20.0	101	153
8453031900	19.0	20.0	101	153
8453031950	19.5	20.0	101	153
8453032000	20.0	20.0	101	153

ALU-XP CARBIDE 8D DIN6537



Series No. 848303

► cutting conditions : p.431

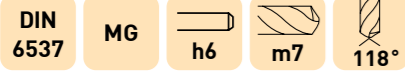


Good chip treatment due to flute geometry & chip space
Better finish & built-up edge preventive

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

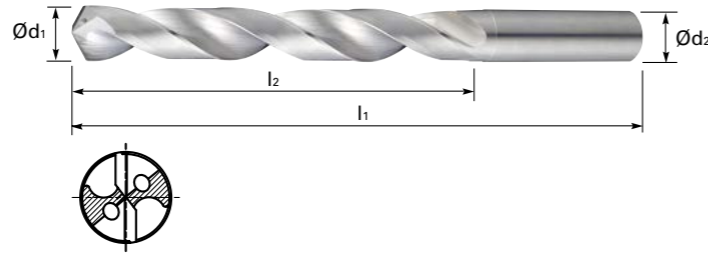
EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8483030610	6.1	8.0	76	114
8483030620	6.2	8.0	76	114
8483030630	6.3	8.0	76	114
8483030640	6.4	8.0	76	114
8483030650	6.5	8.0	76	114
8483030660	6.6	8.0	76	114
8483030670	6.7	8.0	76	114
8483030680	6.8	8.0	76	114
8483030690	6.9	8.0	76	114
8483030700	7.0	8.0	76	114
8483030710	7.1	8.0	76	114
8483030720	7.2	8.0	76	114
8483030730	7.3	8.0	76	114
8483030740	7.4	8.0	76	114
8483030750	7.5	8.0	76	114
8483030760	7.6	8.0	76	114
8483030770	7.7	8.0	76	114
8483030780	7.8	8.0	76	114
8483030790	7.9	8.0	76	114
8483030800	8.0	8.0	76	114
8483030810	8.1	10.0	95	142
8483030820	8.2	10.0	95	142
8483030830	8.3	10.0	95	142
8483030840	8.4	10.0	95	142
8483030850	8.5	10.0	95	142
8483030860	8.6	10.0	95	142
8483030870	8.7	10.0	95	142
8483030880	8.8	10.0	95	142
8483030890	8.9	10.0	95	142
8483030900	9.0	10.0	95	142
8483030910	9.1	10.0	95	142

ALU-XP CARBIDE 8D DIN6537



Series No. 848303

► cutting conditions : p.431

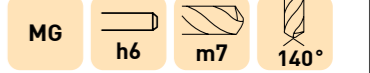


Good chip treatment due to flute geometry & chip space
Better finish & built-up edge preventive

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

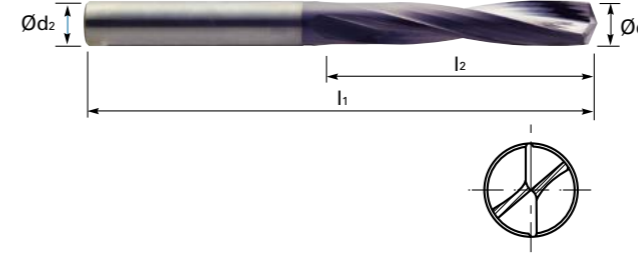
EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8483031090	10.9	12.0	114	162
8483031100	11.0	12.0	114	162
8483031110	11.1	12.0	114	162
8483031120	11.2	12.0	114	162
8483031130	11.3	12.0	114	162
8483031140	11.4	12.0	114	162
8483031150	11.5	12.0	114	162
8483031160	11.6	12.0	114	162
8483031170	11.7	12.0	114	162
8483031180	11.8	12.0	114	162
8483031190	11.9	12.0	114	162
8483031200	12.0	12.0	114	162
8483031250	12.5	14.0	133	178
8483031300	13.0	14.0	133	178
8483031350	13.5	14.0	133	178
8483031400	14.0	14.0	133	178

PULSAR CARBIDE TiAlN HRC70



Series No. 821223

► cutting conditions : p.431



Application :
FOR Drilling High Hardened Steels (Quenched Steels, Tempered Steels) Under HRC70

Advantage :
Special Design
Minimum of cutting load through special 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

CARBIDE DRILL CUTTING CONDITION



800303, 801303



WORK MATERIAL	NON-ALLOY STEELS		ALLOY STEELS		SOFT GREY CAST IRON		HARD GREY CAST IRON		STAINLESS STEELS		AL-SI ALLOYS, Si<10%		AL-SI ALLOYS, Si>10%		TI, NI ALLOY STEELS	
STRENGTH	< 700N/mm²		< 1000N/mm²		< HB240, GG25		< HB300, GG40									
DIAMETER	N	S	N	S	N	S	N	S	N	S	N	S	N	S	N	S
1.0	23000	0.03	17200	0.03	32000	0.04	23000	0.04	12000	0.04	54000	0.05	42000	0.05	11800	0.02
2.0	11500	0.04	8600	0.04	16000	0.05	11500	0.05	6000	0.03	27000	0.06	21000	0.06	5900	0.03
3.0	7800	0.05	5750	0.05	10500	0.06	7600	0.06	4000	0.04	18000	0.07	14000	0.07	3900	0.04
4.0	5800	0.06	4300	0.06	7800	0.07	5700	0.07	3000	0.05	13000	0.08	10500	0.08	2950	0.05
5.0	4700	0.07	3450	0.07	6200	0.08	4550	0.08	2400	0.06	10500	0.09	8500	0.09	2350	0.06
6.0	3900	0.08	2850	0.08	5200	0.09	3800	0.09	2000	0.07	8800	0.11	7100	0.11	1950	0.07
7.0	3350	0.09	2450	0.09	4500	0.10	3250	0.10	1700	0.08	7600	0.13	6100	0.13	1700	0.08
8.0	2900	0.10	2150	0.10	3900	0.12	2850	0.12	1500	0.09	6600	0.15	5350	0.15	1450	0.09
9.0	2600	0.11	1900	0.11	3450	0.14	2550	0.14	1350	0.10	5900	0.17	4750	0.17	1300	0.10
10.0	2350	0.12	1700	0.12	3100	0.16	2300	0.16	1200	0.11	5300	0.19	4250	0.19	1200	0.11
11.0	2150	0.13	1600	0.13	2850	0.18	2100	0.18	1100	0.12	4850	0.21	3900	0.21	1050	0.12
12.0	1950	0.14	1450	0.14	2600	0.20	1900	0.20	1000	0.13	4450	0.23	3550	0.23	980	0.13
13.0	1800	0.16	1350	0.16	2400	0.20	1750	0.20	950	0.13	4100	0.25	3300	0.25	905	0.13

N = R.P.M (rev./min)
S = Feed per revolution (mm/rev.)

802323, 807323, 808323 (TiAlN Coated)



MATERIAL	NON-ALLOY STEELS		ALLOY STEELS		SOFT GREY CAST IRON		HARD GREY CAST IRON	
STRENGTH	< 700 N/mm²		< 1000N/mm²		< HB240, GG25		< HB300, GG40	
DIAMETER	N	S	N	S	N	S	N	S
1.0	13000	0.04	11250	0.04	21300	0.04	14200	0.04
2.0	13000	0.06	11250	0.06	21300	0.06	14200	0.06
3.0	13000	0.13	11000	0.13	21000	0.13	14000	0.13
4.0	9500	0.14	8400	0.14	16000	0.14	10500	0.14
5.0	7600	0.15	6700	0.15	13000	0.15	8300	0.15
6.0	6400	0.17	5600	0.17	11000	0.17	6900	0.17
7.0	5500	0.19	4800	0.19	9100	0.19	5900	0.19
8.0	4800	0.21	4200	0.21	8000	0.21	5200	0.21
9.0	4200	0.23	3700	0.23	7100	0.23	4600	0.23
10.0	3800	0.25	3350	0.25	6400	0.25	4150	0.25
12.0	3200	0.27	2800	0.27	5300	0.27	3450	0.27
14.0	2750	0.29	2400	0.29	4550	0.29	3000	0.29
16.0	2400	0.31	2100	0.31	4000	0.31	2600	0.31
18.0	2100	0.33	1850	0.33	3550	0.33	2300	0.33
20.0	1900	0.35	1650	0.35	3200	0.35	2100	0.35

N = R.P.M (rev./min)
S = Feed per revolution (mm/rev.)

CARBIDE DRILL CUTTING CONDITION



803323, 804323, 805323 (TiAlN Coated)



MATERIAL	NON-ALLOY STEELS		ALLOY STEELS		SOFT GREY CAST IRON		HARD GREY CAST IRON	
STRENGTH	< 700 N/mm²		< 1000N/mm²		< HB240, GG25		< HB300, GG40	
DIAMETER	N	S	N	S	N	S	N	S
1.0	16250	0.05	14800	0.05	26600	0.05	17300	0.05
2.0	16250	0.07	14800	0.07	26600	0.07	17300	0.07
3.0	16000	0.16	14500	0.16	26000	0.16	17000	0.16
4.0	12000	0.17	11000	0.17	20000	0.17	13000	0.17
5.0	9500	0.18	8600	0.18	16000	0.18	10000	0.18
6.0	8000	0.20	7200	0.2	13000	0.2	8500	0.20
7.0	6800	0.22	6100	0.22	11500	0.22	7300	0.22
8.0	6000	0.24	5400	0.24	9900	0.24	6400	0.24
9.0	5300	0.27	4800	0.27	8800	0.27	5700	0.27
10.0	4800	0.30	4300	0.30	8000	0.30	5100	0.30
12.0	4000	0.33	3600	0.33	6600	0.33	4250	0.33
14.0	3400	0.36	3050	0.36	5700	0.36	3650	0.36
16.0	3000	0.39	2700	0.39	5000	0.39	3200	0.39
18.0	2650	0.42	2400	0.42	4400	0.42	2850	0.42
20.0	2400	0.45	2150	0.45	4000	0.45	2550	0.45

N = R.P.M (rev./min)
S = Feed per revolution (mm/rev.)

823323, 825323, 828323 (INOX Coated)



MATERIAL	STAINLESS STEELS		STAINLESS STEELS		ALUMINUM		ALUMINUM		TITANIUM TI ALLOYS		CARBON STEELS ALLOY STEELS		TITANIUM NON FERROUS	
DIAMETER	< 800 N/mm²		> 800 N/mm²		< 10% Si		> 10% Si		N	S	N	S	N	S
1.5	9000	0.03	5400	0.02	43000	0.05	32000	0.04	7500	0.01	18000	0.03	25500	0.03
2.5	7000	0.04	4200	0.03	25500	0.08	19500	0.06	4500	0.02	10800	0.05	15500	0.05
3.0	7400	0.04	4700	0.02	23000	0.12	18500	0.10	5300	0.03	13000	0.04	16000	0.08
4.0	5600	0.05	3600	0.03	17500	0.18	13900	0.15	4000	0.04	10000	0.05	11900	0.10
5.0	4400	0.05	2800	0.03	14000	0.20	11000	0.18	3200	0.05	8000	0.05	9500	0.12
6.0	3700	0.06	2400	0.04	11700	0.25	9300	0.25	2650	0.06	6600	0.06	8000	0.15
8.0	2800	0.08	1800	0.06	8800	0.30	7000	0.30	2000	0.07	5000	0.08	6000	0.18
10.0	2200	0.10	1400	0.08	7000	0.40	5600	0.35	1600	0.08	4000	0.10	4800	0.22
12.0	1900	0.12	1200	0.10	5800	0.50	4600	0.40	1300	0.10	3300	0.12	4000	0.26
14.0	1600	0.15	1000	0.12	5000	0.60	4000	0.50	1100	0.12	2800	0.15	3400	0.30
16.0	1400	0.20	900	0.15	4380	0.80	3500	0.60	1000	0.14	2500	0.20	3000	0.40
18.0	1250	0.22	800	0.17	3900	1.00	3100	0.70	900	0.16	2200	0.22	2650	0.45
20.0	1120	0.24	720	0.19	3500	1.20	2800	0.80	800	0.18	2000	0.24	2400	0.50

N = R.P.M (rev./min)
S = Feed per revolution (mm/rev.)

CARBIDE DRILL CUTTING CONDITION

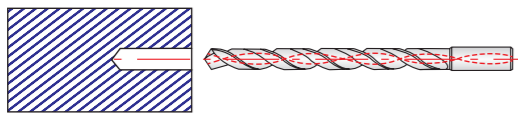


810323, 815323, 820323 (TiAlN Coated)

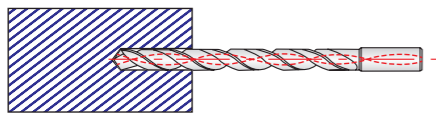


MATERIAL	CARBON STEELS ALLOY STEELS		CAST IRON		DUCTILE CAST IRON	
STRENGTH	~ 1060 N/mm ²		250 ~ 350 N/mm ²		400 ~ 500N/mm ²	
DRILLING SPEED	63 ~ 125 m/min		63 ~ 125 m/min		60 ~ 80 m/min	
DIAMETER	N	S	N	S	N	S
3	7500	0.06~0.12	7500	0.06~0.12	7500	0.06~0.12
4	6400	0.08~0.16	6400	0.08~0.16	5600	0.08~0.16
5	5800	0.10~0.20	5800	0.10~0.20	4500	0.10~0.20
6	4800	0.12~0.24	4800	0.12~0.24	3800	0.12~0.24
8	3600	0.16~0.28	3600	0.16~0.28	2800	0.16~0.28
10	2900	0.20~0.35	2900	0.20~0.35	2300	0.20~0.35
12	2400	0.24~0.42	2400	0.24~0.42	1900	0.24~0.42
14	2050	0.28~0.46	2050	0.28~0.46	1600	0.28~0.46

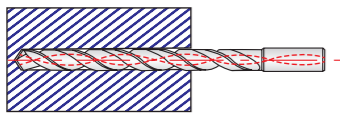
N = R.P.M (rev./min)
S = Feed per revolution (mm/rev.)



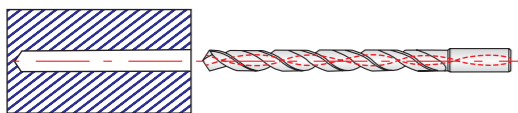
1. Guide Drilling should be done as Diameter+0.1mm between 3xD and 5xD depth.



2. For Main Drilling, proceed with low RPM at Guide Drilling segment. (RPM 300, FEED 400mm/min)



3. Just before the end of Guide Drilling segment, reduce feed to zero and increase the RPM according to Recommended Cutting Condition chart (See above).



4. After then, proceed main drilling by increasing feed without step drilling.

5. When coming out from Guide Drilling start point after drilling, RPM should be reduced as 300 and feed should be 1000 mm/min.

6. When coming out from Guide Drilling segment to the outside, the feed should be decreased as 50%.

CARBIDE ALU-XP DRILL CUTTING CONDITION



843303, 845303, 848303



MATERIAL	Aluminium Alloy Casting Aluminium Die Casting		Wrought Aluminium Alloy	
DIAMETER	N	S	N	S
Ø 3.0 ~ Ø 6.0	8,000~15,000	0.2~0.5	8,000~15,000	0.15~0.3
~ Ø 10.0	6,000~10,500	0.3~1.0	6,000~10,500	0.2~0.4
~ Ø 14.0	4,500~5,800	0.3~1.0	4,500~5,800	0.2~0.4
~ Ø 20.0	3,200~4,600	0.3~1.0	3,200~4,600	0.2~0.4

N = R.P.M (rev./min)
S = Feed per revolution (mm/rev.)

PULSAR CARBIDE DRILL CUTTING CONDITION



821223



MATERIAL	HARDENED STEELS					
	HRc 50 ~ 55		HRc 55 ~ 60		HRc 60 ~ 70	
DRILLING SPEED	14 ~ 22 m/min		10 ~ 16 m/min		8 ~ 13 m/min	
DIAMETER	N	S	N	S	N	S
3.0	1900	0.04	1330	0.04	1250	0.04
4.0	1430	0.04	1000	0.04	950	0.04
5.0	1150	0.04	800	0.04	750	0.04
6.0	960	0.04	670	0.04	630	0.04
8.0	720	0.04	500	0.04	480	0.04
10.0	570	0.04	400	0.04	380	0.04
12.0	480	0.04	330	0.04	320	0.04
14.0	438	0.04	282	0.04	272	0.04

N = R.P.M (rev./min)
S = Feed per revolution (mm/rev.)


















COBALT & HSS TWIST DRILLS CONTENTS

Europa Tool 11th Edition





COBALT & HSS TWIST DRILLS



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PRODUCTS	SERIES	DESCRIPTION	PAGE
HPD-SUS TWIST DRILL FOR STAINLESS STEELS			
	820434	HPD-SUS STUB DRILL SUPERIOR TiN COATED	435
	810434	HPD-SUS JOBBER DRILL SUPERIOR TiN COATED	437
HPD TWIST DRILL			
	810205	HSS-CO SUPERIOR TiN COATED JOBBER	439
PM SABRE DRILLS			
	820422	PM-HSS TiAIN SABRE STUB	443
STRAIGHT SHANK DRILLS			
	810504	GOLDEX HSS JOBBER DRILL	445
	810505	GOLDEX COBALT JOBBER DRILL	447
	811505	GOLDEX COBALT JOBBER DRILL WORM PATTERN	449
	820502	HSCO STUB DRILL DIN1897	451
	820702	HSCO JOBBER DRILL DIN338	454
	820902	HSCO LONG SERIES STRAIGHT SHANK DRILL DIN340	456
	820801	HSS JOBBER DRILL DIN338 METRIC	458
	810801	HSS JOBBER DRILL DIN338 IMPERIAL	460
	821402	NC COBALT SPOTTING DRILL 90 DEG	461
	822402	NC COBALT SPOTTING DRILL 120 DEG	461
	821901	BLACKSMITH DRILLS	462
	888301	CENTRE DRILLS (BS STANDARD)	463
	810334	CENTRE DRILLS (METRIC)	464

COBALT & HSS TWIST DRILLS CONTENTS

PRODUCTS	SERIES	DESCRIPTION	PAGE
 NEW	820601	HSS STUB DRILL DIN1897	465
 NEW	820901	HSS LONG SERIES SS DRILLS	467
 NEW	820116	HSCO SS WORM PATTERN DRILLS	469
 NEW	821001	HSS SS EXTRA LONG DRILLS	470

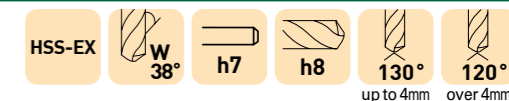
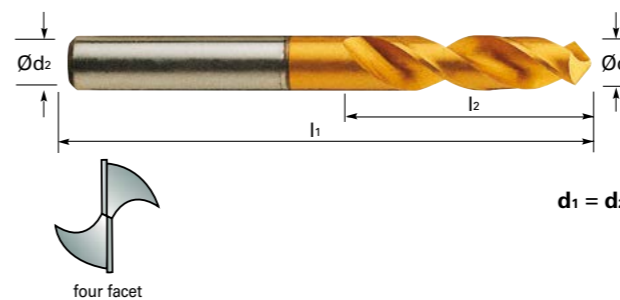
TAPER SHANK DRILLS

	821601	HSS MTS DRILL DIN345	471
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DRILL SETS

CUTTING DATA	474 ~ 479
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HPD-SUS STUB DRILL SUPERIOR TiN COATED



Series No. 820434

▶ cutting conditions : p.474

For Stainless Steels

Application

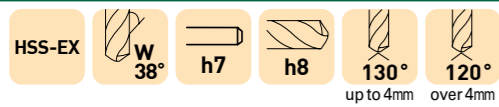
Designed for drilling in stainless steels, mild steels, aluminum, aluminum alloy, aluminum die cast, copper, copper alloy, etc.

Advantage

High helix-sharp cutting edges to avoid built-up and to be suitable for high performance drilling
Wide flute and stub length-increasing chip removal and reducing vibration and deflection.
High vanadium HSS-EX material with superior TiN coating - higher speed and feed, longer service life High quality-good surface finishes, 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

EUROPA CODE	O.D = S.D $d_1 = d_2$	FL l_2	OAL l_1
8204340480	4.8	26	70
8204340490	4.9	26	70
8204340500	5.0	26	70
8204340510	5.1	26	70
8204340520	5.2	26	70
8204340530	5.3	26	70
8204340540	5.4	28	72
8204340550	5.5	28	72
8204340560	5.6	28	72
8204340570	5.7	28	72
8204340580	5.8	28	72
8204340590	5.9	28	72
8204340600	6.0	28	72
8204340610	6.1	31	75
8204340620	6.2	31	75
8204340630	6.3	31	75
8204340640	6.4	31	75
8204340650	6.5	31	75
8204340660	6.6	31	75
8204340670	6.7	31	75
8204340680	6.8	34	78
8204340690	6.9	34	78
8204340700	7.0	34	78
8204340710	7.1	34	78
8204340720	7.2	34	78
8204340730	7.3	34	78
8204340740	7.4	34	78
8204340750	7.5	34	78

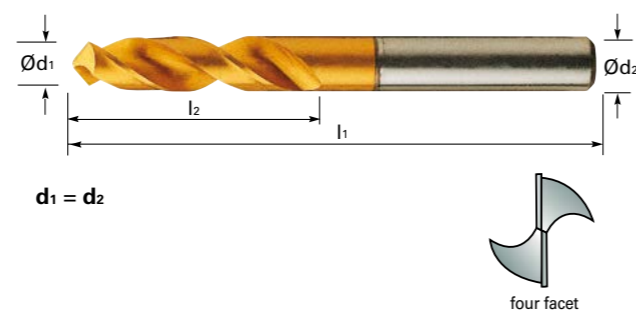
HPD-SUS STUB DRILL SUPERIOR TiN COATED 

Series No. 820434

▶ cutting conditions : p.474

For Stainless Steels**Application**

Designed for drilling in stainless steels, mild steels, aluminum, aluminum alloy, aluminum die cast, copper, copper alloy, etc.



$d_1 = d_2$

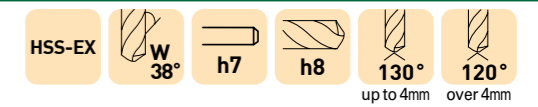
Advantage

High helix-sharp cutting edges to avoid built-up and to be suitable for high performance drilling
Wide flute and stub length-increasing chip removal and reducing vibration and deflecton.
High vanadium HSS-EX material with superiorTiN coating - higher speed and feed, longer service life High quality-good surface finishes, 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

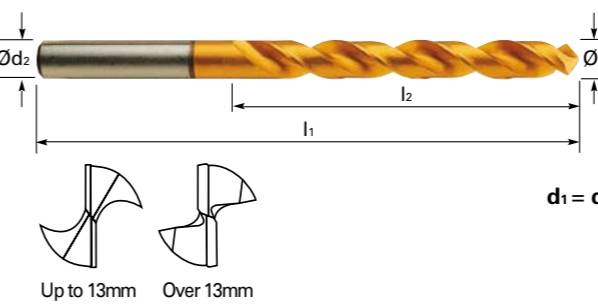
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8204341040	10.4	43	100
8204341050	10.5	43	100
8204341060	10.6	43	100
8204341070	10.7	47	104
8204341080	10.8	47	104
8204341090	10.9	47	104
8204341100	11.0	47	104
8204341110	11.1	47	104
8204341120	11.2	47	104
8204341130	11.3	47	104
8204341140	11.4	47	104
8204341150	11.5	47	104
8204341160	11.6	47	104
8204341170	11.7	47	104
8204341180	11.8	47	104
8204341190	11.9	51	108
8204341200	12.0	51	108
8204341210	12.1	51	108
8204341220	12.2	51	108
8204341230	12.3	51	108
8204341240	12.4	51	108
8204341250	12.5	51	108
8204341260	12.6	51	108
8204341270	12.7	51	108
8204341280	12.8	51	108
8204341290	12.9	51	108
8204341300	13.0	51	108

HPD-SUS JOBBER DRILL SUPERIOR TiN COATED



Series No. 810434

▶ cutting conditions : p.474

For Stainless Steels

$d_1 = d_2$

Up to 13mm Over 13mm

Application

Designed for 4D ~ 5D drilling in stainless steels, mild steels, aluminium, aluminium alloy, aluminium die cast, copper, copper alloy, etc.

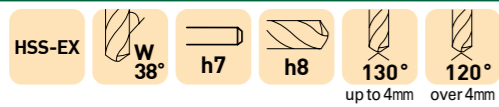
Advantage

High helix-sharp cutting edges to avoid built-up and to be suitable for high performance drilling.
Reinforced web and jobbers length-increasing rigidity and suitable for 4D ~ 5D drilling.
High vanadium HSS-EX material with superiorTiN coating - higher speed and feed, longer service life.
High quality-good surface finishes, high productivity and weeding second operation.

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

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8104340480	4.8	52	96
8104340490	4.9	52	96
8104340500	5.0	52	96
8104340510	5.1	52	96
8104340520	5.2	52	96
8104340530	5.3	52	96
8104340540	5.4	57	101
8104340550	5.5	57	101
8104340560	5.6	57	101
8104340570	5.7	57	101
8104340580	5.8	57	101
8104340590	5.9	57	101
8104340600	6.0	57	101
8104340610	6.1	63	107
8104340620	6.2	63	107
8104340630	6.3	63	107
8104340640	6.4	63	107
8104340650	6.5	63	107
8104340660	6.6	63	107
8104340670	6.7	63	107
8104340680	6.8	69	113
8104340690	6.9	69	113
8104340700	7.0	69	113
8104340710	7.1	69	113
8104340720	7.2	69	113
8104340730	7.3	69	113
8104340740	7.4	69	113
8104340750	7.5	69	113

HPD-SUS JOBBER DRILL SUPERIOR TIN COATED



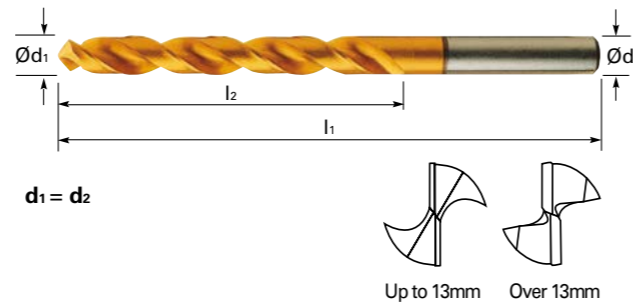
Series No. 810434

▶ cutting conditions : p.474

For Stainless Steels

Application

Designed for 4D ~ 5D drilling in stainless steels, mild steels, aluminium, aluminium alloy, aluminium die cast, copper, copper alloy, etc.



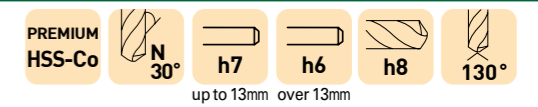
Advantage

High helix-sharp cutting edges to avoid built-up and to be suitable for high performance drilling. Reinforced web and jobbers length-increasing rigidity and suitable for 4D ~ 5D drilling. High vanadium HSS-EX material with superior TiN coating - higher speed and feed, longer service life. High quality-good surface finishes, high productivity and weeding second operation.

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

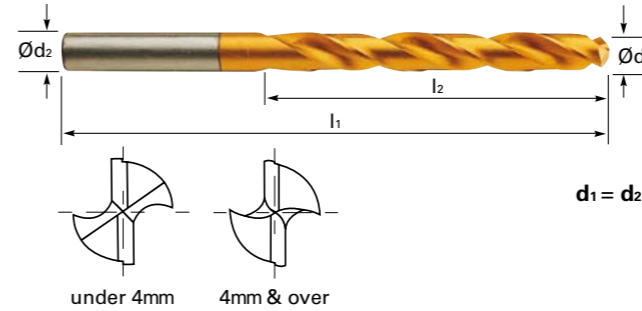
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8104341030	10.3	87	144
8104341050	10.5	87	144
8104341100	11.0	94	151
8104341110	11.1	94	151
8104341120	11.2	94	151
8104341150	11.5	94	151
8104341180	11.8	94	151
8104341200	12.0	101	158
8104341250	12.5	101	158
8104341270	12.7	101	158
8104341280	12.8	101	158
8104341300	13.0	101	158
8104341350	13.5	106	166
8104341400	14.0	106	166
8104341410	14.1	109	169
8104341450	14.5	109	169
8104341500	15.0	109	169
8104341550	15.5	112	172
8104341600	16.0	112	172
8104341650	16.5	115	181
8104341700	17.0	115	181
8104341750	17.5	118	184
8104341800	18.0	118	184
8104341850	18.5	122	188
8104341900	19.0	122	188
8104341950	19.5	125	191
8104342000	20.0	125	191

HPD SUPERIOR TiN COATED JOBBER



Series No. 810205

▶ cutting conditions : p.474



Application

Designed for high speed non-step 4D ~ 5D drilling. Drilling in mild steel, cast iron, aluminum, alloyed, tool steel, etc.

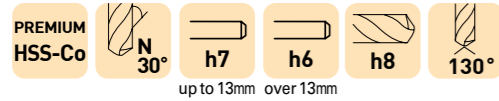
Advantage

Helical thinning - good chip removal, self-centering, reducing thrust and improving accuracy. Reinforced web and jobbers length - increasing rigidity and suitable for 4D~5D drilling Premium Cobalt HSS with superior TiN coating - higher speed and feed, longer service life. High quality-good surface finishes, high productivity and weeding second operation.

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
8102050355	3.55	39	71

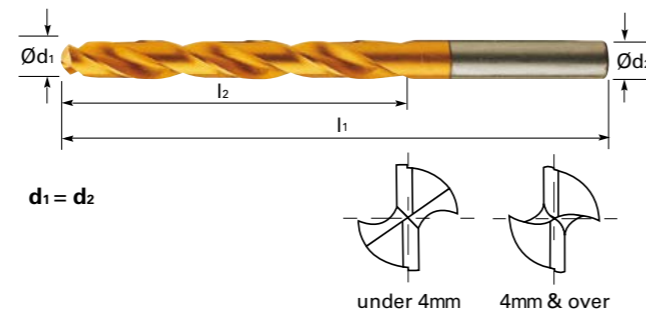
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8102050360	3.6	39	71
8102050365	3.65	39	71
8102050370	3.7	39	71
8102050375	3.75	39	71
8102050380	3.8	43	75
8102050385	3.85	43	75
8102050390	3.9	43	75
8102050395	3.95	43	75
8102050400	4.0	43	75
8102050405	4.05	43	87
8102050410	4.1	43	87
8102050415	4.15	43	87
8102050420	4.2	43	87
8102050425	4.25	43	87
8102050430	4.3	47	91
8102050435	4.35	47	91
8102050440	4.4	47	91
8102050445	4.45	47	91
8102050450	4.5	47	91
8102050455	4.55	47	91
8102050460	4.6	47	91
8102050465	4.65	47	91
8102050470	4.7	47	91
8102050475	4.75	47	91
8102050480	4.8	52	96
8102050485	4.85	52	96
8102050490	4.9	52	96
8102050495	4.95	52	96
8102050500	5.0	52	96
8102050505	5.05	52	96
8102050510	5.1	52	96
8102050515	5.15	52	96

HPD SUPERIOR TiN COATED JOBBER



Series No. 810205

► cutting conditions : p.474



$d_1 = d_2$

under 4mm 4mm & over

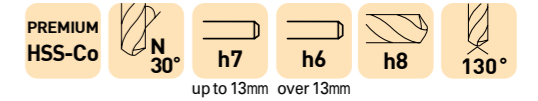
Application
Designed for 4D ~ 5D drilling in stainless steels, mild steels, aluminium, aluminium alloy, aluminium die cast, copper, copper alloy, etc.

Advantage
High helix-sharp cutting edges to avoid built-up and to be suitable for high performance drilling.
Reinforced web and jobbers length-increasing rigidity and suitable for 4D ~ 5D drilling.
High vanadium HSS-EX material with superior TiN coating - higher speed and feed, longer service life.
High quality-good surface finishes, high productivity and weeding second operation.

EUROPA CODE	O.D = S.D $d_1 = d_2$	FL l_2	OAL l_1
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
8102050665	6.65	63	107
8102050670	6.7	63	107
8102050675	6.75	69	113

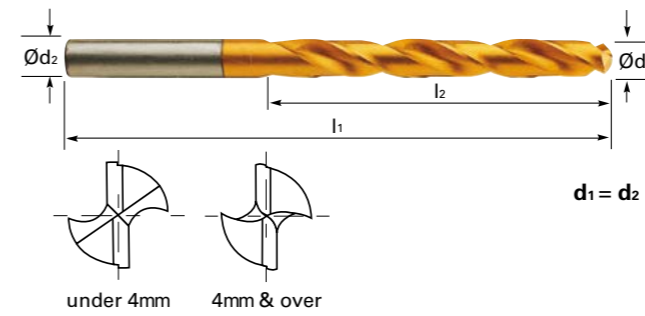
EUROPA CODE	O.D = S.D $d_1 = d_2$	FL l_2	OAL l_1
8102050680	6.8	69	113
8102050685	6.85	69	113
8102050690	6.9	69	113
8102050695	6.95	69	113
8102050700	7.0	69	113
8102050705	7.05	69	113
8102050710	7.1	69	113
8102050715	7.15	69	113
8102050720	7.2	69	113
8102050725	7.25	69	113
8102050730	7.3	69	113
8102050735	7.35	69	113
8102050740	7.4	69	113
8102050745	7.45	69	113
8102050750	7.5	69	113
8102050755	7.55	75	119
8102050760	7.6	75	119
8102050765	7.65	75	119
8102050770	7.7	75	119
8102050775	7.75	75	119
8102050780	7.8	75	119
8102050785	7.85	75	119
8102050790	7.9	75	119
8102050795	7.95	75	119
8102050800	8.0	75	119
8102050805	8.05	75	125
8102050810	8.1	75	125
8102050815	8.15	75	125
8102050820	8.2	75	125
8102050825	8.25	75	125
8102050830	8.3	75	125
8102050835	8.35	75	125

HPD SUPERIOR TiN COATED JOBBER



Series No. 810205

► cutting conditions : p.474



$d_1 = d_2$

under 4mm 4mm & over

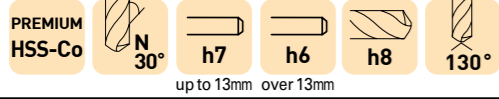
Application
Designed for high speed non-step 4D ~ 5D drilling. Drilling in mild steel, cast iron, aluminum, alloyed, tool steel, etc.

Advantage
Helical thinning - good chip removal, self-centering, reducing thrust and improving accuracy.
Reinforced web and jobbers length - increasing rigidity and suitable for 4D~5D drilling Premium Cobalt HSS with superior TiN coating - higher speed and feed, longer service life
High quality-good surface finishes, high productivity and weeding second operation.

EUROPA CODE	O.D = S.D $d_1 = d_2$	FL l_2	OAL l_1
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
8102050975	9.75	87	137
8102050980	9.8	87	137
8102050985	9.85	87	137
8102050990	9.9	87	137
8102050995	9.95	87	137

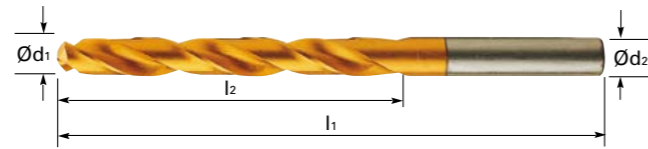
EUROPA CODE	O.D = S.D $d_1 = d_2$	FL l_2	OAL l_1
8102051000	10.0	87	137
8102051005	10.05	87	144
8102051010	10.1	87	144
8102051015	10.15	87	144
8102051020	10.2	87	144
8102051025	10.25	87	144
8102051030	10.3	87	144
8102051035	10.35	87	144
8102051040	10.4	87	144
8102051045	10.45	87	144
8102051050	10.5	87	144
8102051055	10.55	87	144
8102051060	10.6	87	144
8102051065	10.65	94	151
8102051070	10.7	94	151
8102051075	10.75	94	151
8102051080	10.8	94	151
8102051085	10.85	94	151
8102051090	10.9	94	151
8102051095	10.95	94	151
8102051100	11.0	94	151
8102051105	11.05	94	151
8102051110	11.1	94	151
8102051115	11.15	94	151
8102051120	11.2	94	151
8102051125	11.25	94	151
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

HPD SUPERIOR TiN COATED JOBBER

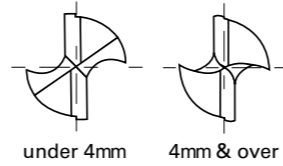


Series No. 810205

► cutting conditions : p.474



d₁ = d₂



Application

Designed for high speed non-step 4D ~ 5D drilling. Drilling in mild steel, cast iron, aluminum, alloyed, tool steel, etc.

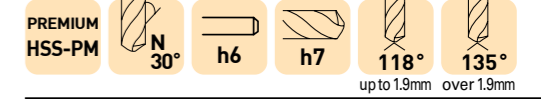
Advantage

Helical thinning - good chip removal, self-centering, reducing thrust and improving accuracy.
Reinforced web and jobbers length - increasing rigidity and suitable for 4D~5D drilling Premium Cobalt HSS with superior TiN coating - higher speed and feed, longer service life
High quality-good surface finishes, high productivity and weeding second operation.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
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
8102051500	15.0	95	161
8102051550	15.5	100	166
8102051560	15.6	100	166
8102051600	16.0	100	166
8102051650	16.5	106	172
8102051700	17.0	106	172

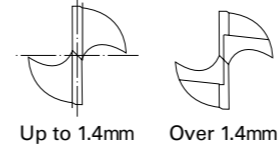
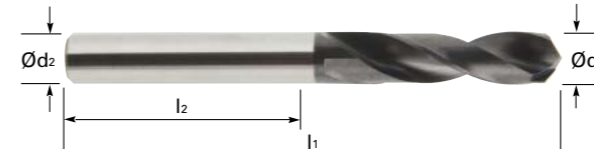
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8102051750	17.5	112	178
8102051760	17.6	112	178
8102051800	18.0	112	178
8102051850	18.5	118	184
8102051900	19.0	118	194
8102051950	19.5	125	201
8102051960	19.6	125	201
8102052000	20.0	125	201
8102052050	20.5	128	204
8102052100	21.0	128	204
8102052110	21.1	128	204
8102052150	21.5	132	208
8102052200	22.0	132	208
8102052250	22.5	136	212
8102052300	23.0	136	212
8102052350	23.5	136	212
8102052400	24.0	140	220
8102052450	24.5	140	220
8102052500	25.0	140	220
8102052550	25.5	145	225
8102052600	26.0	145	225
8102052650	26.5	145	225
8102052700	27.0	150	230
8102052800	28.0	150	230
8102052900	29.0	155	235
8102053000	30.0	155	235
8102053100	31.0	160	240
8102053200	32.0	165	245

PM-HSS TiAlN SABRE STUB



Series No. 820422

► cutting conditions : p.475



Application

Structural steels, Carbon steels, Alloy steels, Pre-hardened steels, Mold steels, stainless steels, Hardened steels(HRC30~45), Cast iron, Aluminum alloys, Nonferrous alloys.

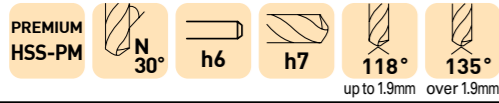
Advantage

Point shape to maximize self-centering. Flute design for the best chip evacuation. Premium powder materials with excellent toughness.

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

EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8204220410	4.1	6.0	22	66
8204220420	4.2	6.0	22	66
8204220430	4.3	6.0	24	68
8204220440	4.4	6.0	24	68
8204220450	4.5	6.0	24	68
8204220460	4.6	6.0	24	68
8204220470	4.7	6.0	24	68
8204220480	4.8	6.0	26	70
8204220490	4.9	6.0	26	70
8204220500	5.0	6.0	26	70
8204220510	5.1	6.0	26	70
8204220520	5.2	6.0	26	70
8204220530	5.3	6.0	26	70
8204220540	5.4	6.0	28	72
8204220550	5.5	6.0	28	72
8204220560	5.6	6.0	28	72
8204220570	5.7	6.0	28	72
8204220580	5.8	6.0	28	72
8204220590	5.9	6.0	28	72
8204220600	6.0	6.0	28	72
8204220610	6.1	8.0	31	75
8204220620	6.2	8.0	31	75
8204220630	6.3	8.0	31	75
8204220640	6.4	8.0	31	75
8204220650	6.5	8.0	31	75
8204220660	6.6	8.0	31	75
8204220670	6.7	8.0	31	75
8204220680	6.8	8.0	34	78
8204220690	6.9	8.0	34	78
8204220700	7.0	8.0	34	78
8204220710	7.1	8.0	34	78

PM-HSS TiAlN SABRE STUB

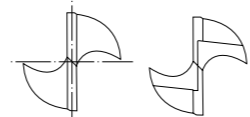
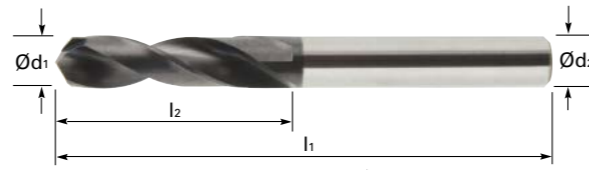


Series No. 820422

► cutting conditions : p.475



Application
Structural steels, Carbon steels, Alloy steels, Pre-hardened steels, Mold steels, stainless steels, Hardened steels(HRc30-45), Cast iron, Aluminum alloys, Nonferrous alloys.



Up to 1.4mm Over 1.4mm

Advantage
Point shape to maximize self-centering.
Flute design for the best chip evacuation.
Premium powder materials with excellent toughness.

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

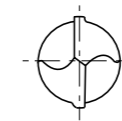
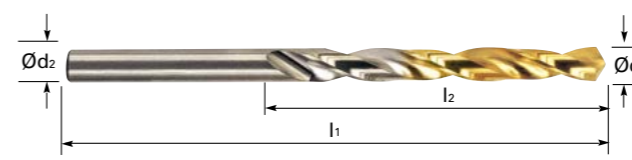
EUROPA CODE	O.D d ₁	S.D d ₂	FL l ₂	OAL l ₁
8204221020	10.2	12	43	100
8204221030	10.3	12	43	100
8204221040	10.4	12	43	100
8204221050	10.5	12	43	100
8204221060	10.6	12	43	100
8204221070	10.7	12	47	104
8204221080	10.8	12	47	104
8204221090	10.9	12	47	104
8204221100	11.0	12	47	104
8204221110	11.1	12	47	104
8204221120	11.2	12	47	104
8204221130	11.3	12	47	104
8204221140	11.4	12	47	104
8204221150	11.5	12	47	104
8204221160	11.6	12	47	104
8204221170	11.7	12	47	104
8204221180	11.8	12	47	104
8204221190	11.9	12	51	108
8204221200	12.0	12	51	108
8204221210	12.1	12	51	108
8204221220	12.2	12	51	108
8204221230	12.3	12	51	108
8204221240	12.4	12	51	108
8204221250	12.5	12	51	108
8204221260	12.6	12	51	108
8204221270	12.7	12	51	108
8204221280	12.8	12	51	108
8204221290	12.9	12	51	108
8204221300	13.0	12	51	108

GOLDEX HSS JOBBER DRILL



Series No. 810504

► cutting conditions : p.475



Application
Drilling in steel, cast steel alloyed and Non-alloyed, gray cast iron, graphite, malleable cast iron

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
8105040410	4.1	43	75

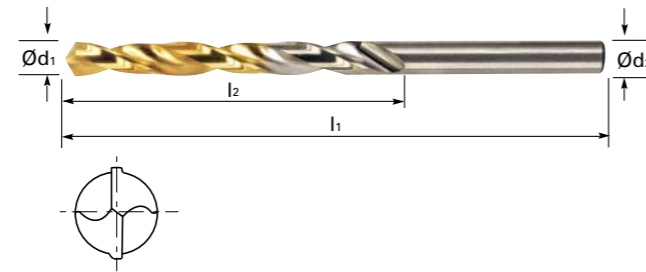
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8105040420	4.2	43	75
8105040430	4.3	47	80
8105040440	4.4	47	80
8105040450	4.5	47	80
8105040460	4.6	47	80
8105040470	4.7	47	80
8105040480	4.8	52	86
8105040490	4.9	52	86
8105040500	5.0	52	86
8105040510	5.1	52	86
8105040520	5.2	52	86
8105040530	5.3	52	86
8105040540	5.4	57	93
8105040550	5.5	57	93
8105040560	5.6	57	93
8105040570	5.7	57	93
8105040580	5.8	57	93
8105040590	5.9	57	93
8105040600	6.0	57	93
8105040610	6.1	63	101
8105040620	6.2	63	101
8105040630	6.3	63	101
8105040640	6.4	63	101
8105040650	6.5	63	101
8105040660	6.6	63	101
8105040670	6.7	63	101
8105040680	6.8	69	109
8105040690	6.9	69	109
8105040700	7.0	69	109
8105040710	7.1	69	109
8105040720	7.2	69	109
8105040730	7.3	69	109

GOLDEX HSS JOBBER DRILL



Series No. 810504

► cutting conditions : p.475



Application
Drilling in steel, cast steel alloyed and Non-alloyed, gray cast iron, graphite, malleable cast iron

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
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
8105041020	10.2	87	133

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8105041030	10.3	87	133
8105041040	10.4	87	133
8105041050	10.5	87	133
8105041060	10.6	87	133
8105041070	10.7	94	142
8105041080	10.8	94	142
8105041090	10.9	94	142
8105041100	11.0	94	142
8105041110	11.1	94	142
8105041120	11.2	94	142
8105041130	11.3	94	142
8105041140	11.4	94	142
8105041150	11.5	94	142
8105041160	11.6	94	142
8105041170	11.7	94	142
8105041180	11.8	94	142
8105041190	11.9	101	151
8105041200	12.0	101	151
8105041210	12.1	101	151
8105041220	12.2	101	151
8105041230	12.3	101	151
8105041240	12.4	101	151
8105041250	12.5	101	151
8105041260	12.6	101	151
8105041270	12.7	101	151
8105041280	12.8	101	151
8105041290	12.9	101	151
8105041300	13.0	101	151

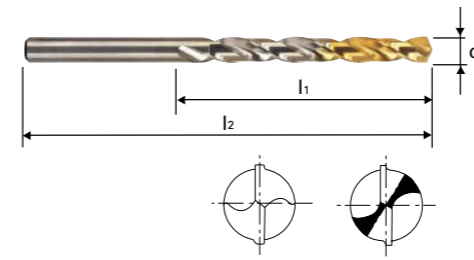
GOLDEX COBALT JOBBER DRILL



NEW

Series No. 810505

► cutting conditions : p.475



Surface treatment
Bright body, TiN coating on working area

Application
Drilling stainless steels, difficult to cut materials such as titanium alloys and inconel.

EUROPA CODE	Drill Diameter D ₁	Flute Length L ₁	Overall Length L ₂
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

EUROPA CODE	Drill Diameter D ₁	Flute Length L ₁	Overall Length L ₂
8105050410	4.1	43	75
8105050420	4.2	43	75
8105050430	4.3	47	80
8105050440	4.4	47	80
8105050450	4.5	47	80
8105050460	4.6	47	80
8105050470	4.7	47	80
8105050480	4.8	52	86
8105050490	4.9	52	86
8105050500	5.0	52	86
8105050510	5.1	52	86
8105050520	5.2	52	86
8105050530	5.3	52	86
8105050540	5.4	57	93
8105050550	5.5	57	93
8105050560	5.6	57	93
8105050570	5.7	57	93
8105050580	5.8	57	93
8105050590	5.9	57	93
8105050600	6.0	57	93
8105050610	6.1	63	101
8105050620	6.2	63	101
8105050630	6.3	63	101
8105050640	6.4	63	101
8105050650	6.5	63	101
8105050660	6.6	63	101
8105050670	6.7	63	101
8105050680	6.8	69	109
8105050690	6.9	69	109
8105050700	7.0	69	109
8105050710	7.1	69	109

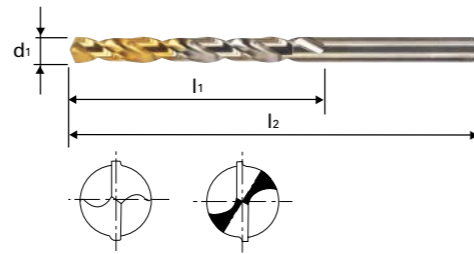
GOLDEX COBALT JOBBER DRILL



Series No. 810505



► cutting conditions : p.475



Surface treatment

Bright body, TiN coating on working area

Application

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

EUROPA CODE	Drill Diameter D ₁	Flute Length L ₁	Overall Length L ₂
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

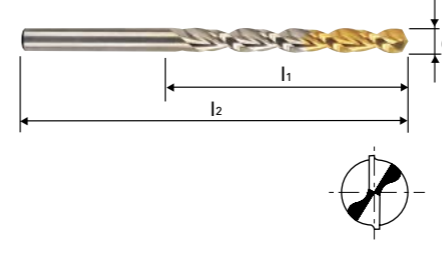
EUROPA CODE	Drill Diameter D ₁	Flute Length L ₁	Overall Length L ₂
8105051020	10.2	87	133
8105051030	10.3	87	133
8105051040	10.4	87	133
8105051050	10.5	87	133
8105051060	10.6	87	133
8105051070	10.7	94	142
8105051080	10.8	94	142
8105051090	10.9	94	142
8105051100	11.0	94	142
8105051110	11.1	94	142
8105051120	11.2	94	142
8105051130	11.3	94	142
8105051140	11.4	94	142
8105051150	11.5	94	142
8105051160	11.6	94	142
8105051170	11.7	94	142
8105051180	11.8	94	142
8105051190	11.9	101	151
8105051200	12.0	101	151
8105051210	12.1	101	151
8105051220	12.2	101	151
8105051230	12.3	101	151
8105051240	12.4	101	151
8105051250	12.5	101	151
8105051260	12.6	101	151
8105051270	12.7	101	151
8105051280	12.8	101	151
8105051290	12.9	101	151
8105051300	13.0	101	151

GOLDEX COBALT JOBBER DRILL WORM PATTERN



Series No. 811505

► cutting conditions : p.476



Surface treatment

Bright body, TiN coating on working area.

Application

Drilling deep holes in non alloy steels, alloy steels, grey cast iron, malleable cast iron, Special aluminum or magnesium alloys.

EUROPA CODE	Drill Diameter D ₁	Flute Length L ₁	Overall Length L ₂
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

EUROPA CODE	Drill Diameter D ₁	Flute Length L ₁	Overall Length L ₂
8115050490	4.9	52	86
8115050500	5.0	52	86
8115050510	5.1	52	86
8115050520	5.2	52	86
8115050530	5.3	52	86
8115050540	5.4	57	93
8115050550	5.5	57	93
8115050560	5.6	57	93
8115050570	5.7	57	93
8115050580	5.8	57	93
8115050590	5.9	57	93
8115050600	6.0	57	93
8115050610	6.1	63	101
8115050620	6.2	63	101
8115050630	6.3	63	101
8115050640	6.4	63	101
8115050650	6.5	63	101
8115050660	6.6	63	101
8115050670	6.7	63	101
8115050680	6.8	69	109
8115050690	6.9	69	109
8115050700	7.0	69	109
8115050710	7.1	69	109
8115050720	7.2	69	109
8115050730	7.3	69	109
8115050740	7.4	69	109
8115050750	7.5	69	109
8115050760	7.6	75	117
8115050770	7.7	75	117

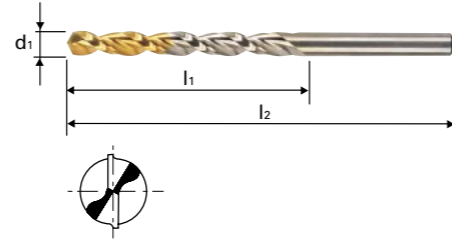
GOLDEX COBALT JOBBER DRILL WORM PATTERN



Series No. 811505



▶ cutting conditions : p.476



Surface treatment

Bright body, TiN coating on working area.

Application

Drilling deep holes in non alloy steels, alloy steels, grey cast iron, malleable cast iron, Special aluminum or magnesium alloys.

EUROPA CODE	Drill Diameter D ₁	Flute Length L ₁	Overall Length L ₂
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

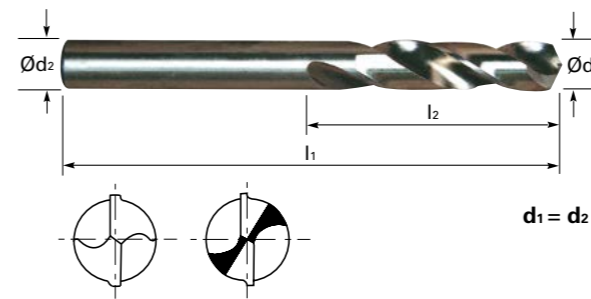
EUROPA CODE	Drill Diameter D ₁	Flute Length L ₁	Overall Length L ₂
8115051050	10.5	87	133
8115051060	10.6	87	133
8115051070	10.7	94	142
8115051080	10.8	94	142
8115051090	10.9	94	142
8115051100	11.0	94	142
8115051110	11.1	94	142
8115051120	11.2	94	142
8115051130	11.3	94	142
8115051140	11.4	94	142
8115051150	11.5	94	142
8115051160	11.6	94	142
8115051170	11.7	94	142
8115051180	11.8	94	142
8115051190	11.9	101	151
8115051200	12.0	101	151
8115051210	12.1	101	151
8115051220	12.2	101	151
8115051230	12.3	101	151
8115051240	12.4	101	151
8115051250	12.5	101	151
8115051260	12.6	101	151
8115051270	12.7	101	151
8115051280	12.8	101	151
8115051290	12.9	101	151
8115051300	13.0	101	151

HSCO STUB DRILL DIN1897



Series No. 820502

▶ cutting conditions : p.477



d₁ = d₂

Up to 1.5mm Over 1.5mm

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	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
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

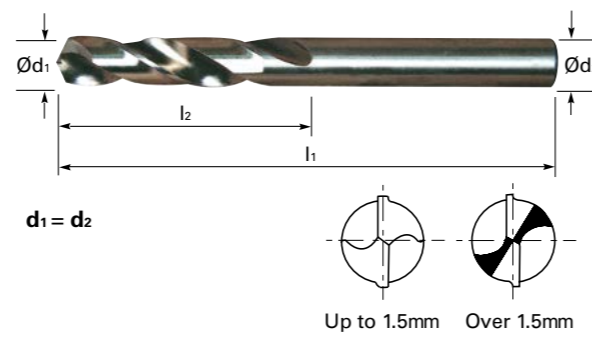
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8205020370	3.7	20	52
8205020375	3.75	20	52
8205020380	3.8	22	55
8205020390	3.9	22	55
8205020400	4.0	22	55
8205020410	4.1	22	55
8205020420	4.2	22	55
8205020425	4.25	22	55
8205020430	4.3	24	58
8205020440	4.4	24	58
8205020450	4.5	24	58
8205020460	4.6	24	58
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

HSCO STUB DRILL DIN1897



Series No. 820502

▶ cutting conditions : p.477



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
8205020620	6.2	31	70
8205020625	6.25	31	70
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	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	37	79
8205020810	8.10	37	79
8205020820	8.20	37	79
8205020825	8.25	37	79
8205020830	8.30	37	79
8205020840	8.40	37	79
8205020850	8.50	37	79
8205020860	8.60	40	84
8205020870	8.70	40	84

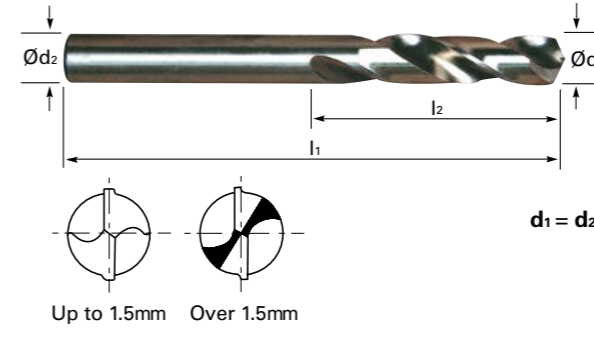
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8205020875	8.75	40	84
8205020880	8.80	40	84
8205020890	8.90	40	84
8205020900	9.00	40	84
8205020910	9.10	40	84
8205020920	9.20	40	84
8205020925	9.25	40	84
8205020930	9.30	40	84
8205020935	9.35	40	84
8205020940	9.40	40	84
8205020950	9.50	40	84
8205020960	9.60	43	89
8205020970	9.70	43	89
8205020975	9.75	43	89
8205020980	9.80	43	89
8205020990	9.90	43	89
8205021000	10.00	43	89
8205021020	10.20	43	89
8205021025	10.25	43	89
8205021050	10.5	43	89
8205021075	10.75	47	95
8205021100	11	47	95
8205021125	11.25	47	95
8205021150	11.5	47	95
8205021175	11.75	47	95
8205021180	11.8	47	95
8205021200	12	51	102
8205021225	12.25	51	102
8205021250	12.5	51	102
8205021275	12.75	51	102
8205021300	13.00	51	102
8205021325	13.25	54	107

HSCO STUB DRILL DIN1897



Series No. 820502

▶ cutting conditions : p.477



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
8205021350	13.50	54	107
8205021375	13.75	54	107
8205021380	13.80	54	107
8205021400	14.00	54	107
8205021425	14.25	56	111
8205021450	14.50	56	111
8205021475	14.75	56	111
8205021500	15.00	56	111
8205021525	15.25	58	115
8205021550	15.50	58	115
8205021575	15.75	58	115
8205021600	16.00	58	115
8205021625	16.25	60	119
8205021650	16.5	60	119
8205021675	16.75	60	119
8205021700	17	60	119
8205021725	17.25	62	123
8205021750	17.5	62	123
8205021775	17.75	62	123
8205021800	18	62	123
8205021825	18.25	64	127
8205021850	18.5	64	127

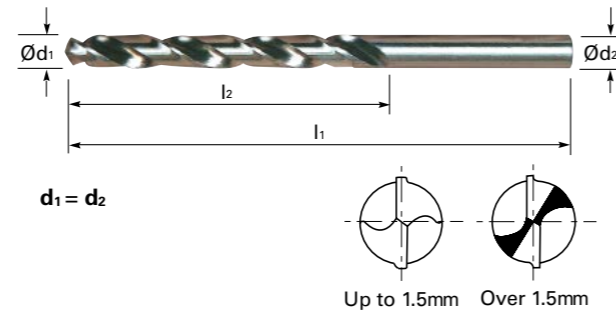
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8205021875	18.75	64	127
8205021900	19	64	127
8205021925	19.25	66	131
8205021950	19.50	66	131
8205021975	19.75	66	131
8205022000	20.00	66	131
8205022050	20.50	68	136
8205022100	21.00	68	136
8205022150	21.50	70	141
8205022200	22.00	70	141
8205022250	22.50	72	146
8205022300	23.00	72	146
8205022350	23.5	72	146
8205022400	24	75	151
8205022450	24.5	75	151
8205022500	25	75	151
8205022600	26	78	156
8205022700	27	81	162
8205022800	28	81	162
8205022900	29	84	168
8205023000	30	84	168
8205023100	31	87	174

HSCO JOBBER DRILL DIN338



Series No. 820702

▶ cutting conditions : p.477



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

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8207020100	1	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

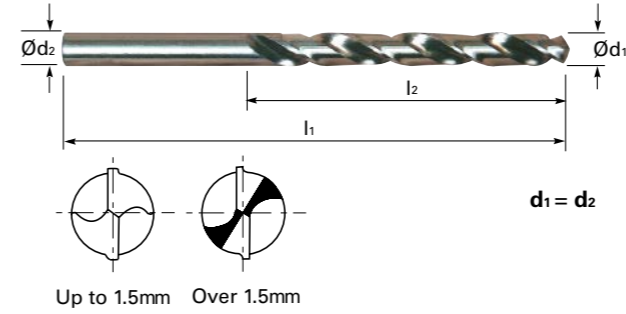
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8207020375	3.75	39	70
8207020380	3.8	43	75
8207020390	3.9	43	75
8207020400	4.0	43	75
8207020410	4.1	43	75
8207020420	4.2	43	75
8207020425	4.25	43	75
8207020430	4.3	47	80
8207020440	4.4	47	80
8207020450	4.5	47	80
8207020460	4.6	47	80
8207020470	4.7	47	80
8207020475	4.75	47	80
8207020480	4.8	52	86
8207020490	4.9	52	86
8207020500	5.0	52	86
8207020510	5.1	52	86
8207020520	5.2	52	86
8207020525	5.25	52	86
8207020530	5.3	52	86
8207020540	5.4	57	93
8207020550	5.5	57	93
8207020560	5.6	57	93
8207020570	5.7	57	93
8207020575	5.75	57	93
8207020580	5.8	57	93
8207020590	5.9	57	93
8207020600	6.0	57	93
8207020610	6.1	63	101
8207020620	6.2	63	101
8207020625	6.25	63	101
8207020630	6.3	63	101
8207020640	6.4	63	101

HSCO JOBBER DRILL DIN338



Series No. 820702

▶ cutting conditions : p.477



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

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

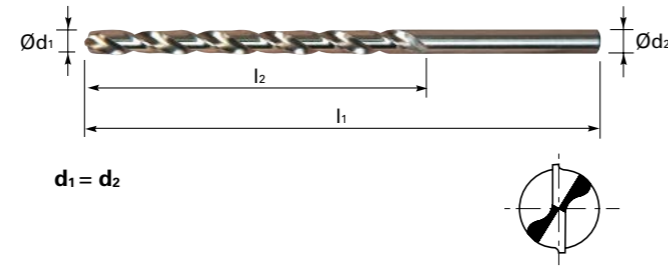
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8207020920	9.2	81	125
8207020925	9.25	81	125
8207020930	9.3	81	125
8207020940	9.4	81	125
8207020950	9.5	81	125
8207020960	9.6	87	133
8207020970	9.7	87	133
8207020975	9.75	87	133
8207020980	9.8	87	133
8207020990	9.9	87	133
8207021000	10.0	87	133
8207021020	10.2	87	133
8207021050	10.5	87	133
8207021100	11.0	94	142
8207021150	11.5	94	142
8207021200	12.0	101	151
8207021250	12.5	101	151
8207021300	13	101	151
8207021350	13.5	108	160
8207021400	14	108	160
8207021450	14.5	114	169
8207021500	15	114	169
8207021550	15.5	120	178
8207021600	16	120	178
8207021650	16.5	125	184
8207021700	17	125	184
8207021750	17.5	130	191
8207021800	18	130	191
8207021850	18.5	135	198
8207021900	19	135	198
8207021950	19.5	140	205
8207022000	20	140	205

HSCO LONG SERIES STRAIGHT SHANK DRILL DIN340



Series No. 820902

▶ cutting conditions : p.477



Application

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

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8209020200	2	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	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	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

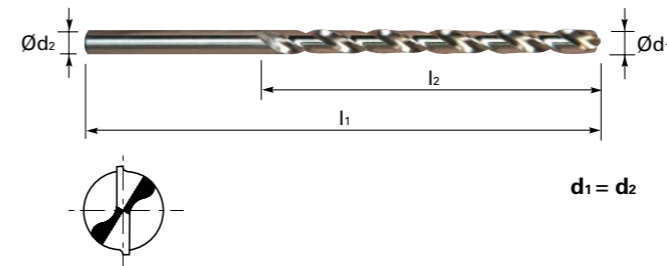
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8209020460	4.6	82	126
8209020470	4.7	82	126
8209020480	4.8	87	132
8209020490	4.9	87	132
8209020500	5	87	132
8209020510	5.1	87	132
8209020520	5.2	87	132
8209020530	5.3	87	139
8209020540	5.4	91	139
8209020550	5.5	91	139
8209020560	5.6	91	139
8209020570	5.7	91	139
8209020580	5.8	91	139
8209020590	5.9	91	139
8209020600	6	91	139
8209020610	6.1	97	148
8209020620	6.2	97	148
8209020630	6.3	97	148
8209020640	6.4	97	148
8209020650	6.5	97	148
8209020660	6.6	97	148
8209020670	6.7	97	148
8209020680	6.8	102	156
8209020690	6.9	102	156
8209020700	7	102	156
8209020710	7.1	102	156

HSCO LONG SERIES STRAIGHT SHANK DRILL DIN340



Series No. 820902

▶ cutting conditions : p.477



Application

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

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	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	115	175

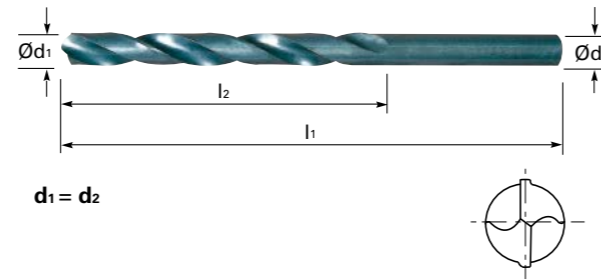
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8209020910	9.1	115	175
8209020920	9.2	115	175
8209020930	9.3	115	175
8209020940	9.4	115	175
8209020950	9.5	115	175
8209020960	9.6	121	184
8209020970	9.7	121	184
8209020980	9.8	121	184
8209020990	9.9	121	184
8209021000	10	121	184
8209021020	10.2	121	184
8209021050	10.5	121	184
8209021080	10.8	128	195
8209021100	11	128	195
8209021120	11.2	128	195
8209021150	11.5	128	195
8209021180	11.8	128	195
8209021200	12	134	205

HSS JOBBER DRILL DIN338 METRIC



Series No. 820801

▶ cutting conditions : p.477



Surface treatment

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

Application

Drilling steels, cast steels alloyed and non-alloyed,
grey cast iron, malleable cast iron and graphite.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8208010100	1	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
8208010260	2.6	30	57
8208010265	2.65	30	57
8208010270	2.7	33	61
8208010275	2.75	33	61
8208010280	2.8	33	61
8208010285	2.85	33	61
8208010290	2.9	33	61

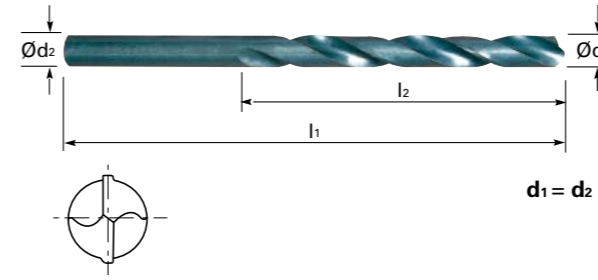
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8208010295	2.95	33	61
8208010300	3.0	33	61
8208010305	3.05	36	65
8208010310	3.1	36	65
8208010315	3.15	36	65
8208010320	3.2	36	65
8208010325	3.25	36	65
8208010330	3.3	36	65
8208010335	3.35	36	65
8208010340	3.4	39	70
8208010345	3.45	39	70
8208010350	3.5	39	70
8208010355	3.55	39	70
8208010360	3.6	39	70
8208010365	3.65	39	70
8208010370	3.7	39	70
8208010375	3.75	39	70
8208010380	3.8	43	75
8208010385	3.85	43	75
8208010390	3.9	43	75
8208010395	3.95	43	75
8208010400	4.0	43	75
8208010405	4.05	43	75
8208010410	4.1	43	75
8208010415	4.15	43	75
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

HSS JOBBER DRILL DIN338 METRIC



Series No. 820801

▶ cutting conditions : p.477



Surface treatment

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

Application

Drilling steels, cast steels alloyed and non-alloyed,
grey cast iron, malleable cast iron and graphite.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
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
8208010580	5.8	57	93
8208010585	5.85	57	93
8208010590	5.9	57	93
8208010595	5.95	57	93
8208010600	6.0	57	93
8208010605	6.05	63	101
8208010610	6.1	63	101
8208010615	6.15	63	101
8208010620	6.2	63	101
8208010625	6.25	63	101
8208010630	6.3	63	101
8208010635	6.35	63	101
8208010640	6.4	63	101
8208010645	6.45	63	101
8208010650	6.5	63	101
8208010655	6.55	63	101
8208010660	6.6	63	101
8208010665	6.65	63	101
8208010670	6.7	63	101
8208010675	6.75	69	109
8208010680	6.8	69	109

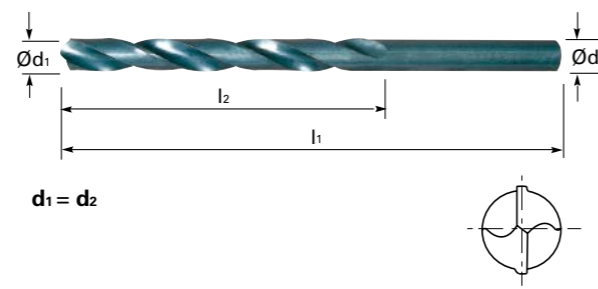
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8208010685	6.85	69	109
8208010690	6.9	69	109
8208010695	6.95	69	109
8208010700	7.0	69	109
8208010705	7.05	69	109
8208010710	7.1	69	109
8208010715	7.15	69	109
8208010720	7.2	69	109
8208010725	7.25	69	109
8208010730	7.3	69	109
8208010735	7.35	69	109
8208010740	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

HSS JOBBER DRILL DIN338 IMPERIAL



Series No. 810801

▶ cutting conditions : p.477



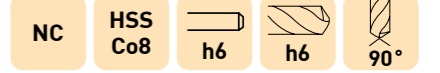
Surface treatment
Steam Tempered(Black Oxide Finish)
Bright Finish under 2mm

Application
Drilling steels, cast steels alloyed and non-alloyed,
grey cast iron, malleable cast iron and graphite.

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

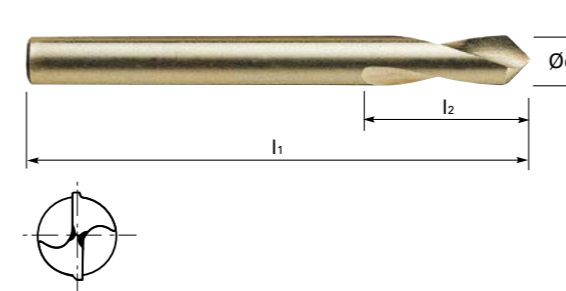
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8108010180	9/32	2.15/16	4.1/4
8108010190	19/64	3.1/16	4.3/8
8108010200	5/16	3.3/16	4.1/2
8108010210	21/64	3.5/16	4.5/8
8108010220	11/32	3.7/16	4.3/4
8108010230	23/64	3.1/2	4.7/8
8108010240	3/8	3.5/8	5"
8108010250	25/64	3.3/4	5.1/8
8108010260	13/32	3.7/8	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"

NC COBALT SPOTTING DRILL 90 DEG



Series No. 821402

▶ cutting conditions : p.478

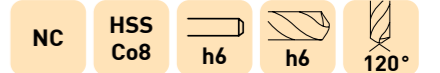


Application :
For more precise centering work on NC/CNC Machines.
The large diameter of the tool permits chamfering work after centering continuously.

NC-Spotting drills 90°

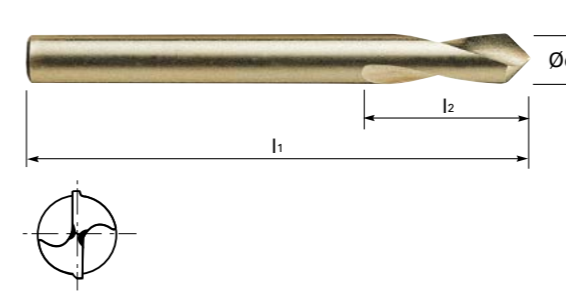
EUROPA CODE	O.D d ₁	FL l ₂	OAL l ₁
8214020300	3	12	46
8214020400	4	12	55
8214020500	5	15	60
8214020600	6	20	66
8214020800	8	25	79
8214021000	10	25	89
8214021200	12	30	102
8214021600	16	35	115
8214022000	20	40	131

NC COBALT SPOTTING DRILL 120 DEG



Series No. 822402

▶ cutting conditions : p.478

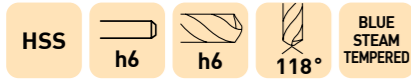


Application :
For more precise centering work on NC/CNC Machines.
The large diameter of the tool permits chamfering work after centering continuously.

NC-Spotting drills 120°

EUROPA CODE	O.D d ₁	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

BLACKSMITH DRILLS



Series No. 821901



BLACKSMITH DRILLS WITH REDUCED 1/2" SHANK FOR USE WHEN CHUCKING CAPACITY IS LIMITED.

EUROPA CODE	Diameter	length of Cut	overall length	shank dia.
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"

CENTRE DRILLS (BS STANDARD)



Series No. 888301

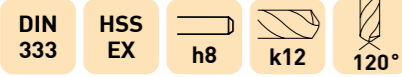


EUROPA CODE	BS	Pilot Dia.	Body Dia.	Pilot Length max	Pilot Length min	Overall Length
8883010010	BS1	3/64"	1/8"	5/64"	1/16"	1.1/2"
8883010020	BS2	1/16"	3/16"	3/32"	5/64"	1.3/4"
8883010030	BS3	3/32"	1/4"	5/32"	1/8"	2"
8883010040	BS4	1/8"	5/16"	3/16"	5/32"	2.1/4"
8883010050	BS5	3/16"	7/16"	9/32"	1/4"	2.1/2"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

COBALT & HSS TWIST DRILLS

COBALT & HSS TWIST DRILLS

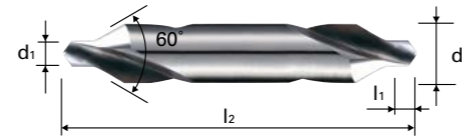
CENTRE DRILLS (METRIC)



Series No. 810334

NEW

► cutting conditions : p.479



FORM A (60°)

EUROPA CODE	Drill Diameter D ₁	Shank Diameter D ₂	Pilot Length L ₁	Overall Length L ₂
8103340050	0.5	3.15	0.8	25
8103340080	0.8	3.15	1.1	25
8103340100	1.0	3.15	1.3	31.5
8103340125	1.25	3.15	1.6	31.5
8103340160	1.6	4	2	35.5
8103340200	2.0	5	2.5	40
8103340250	2.5	6.3	3.1	45
8103340315	3.15	8	3.9	50
8103340400	4.0	10	5	56
8103340500	5.0	12.5	6.3	63
8103340630	6.3	16	8	71

► Under 1.0mm : Single End

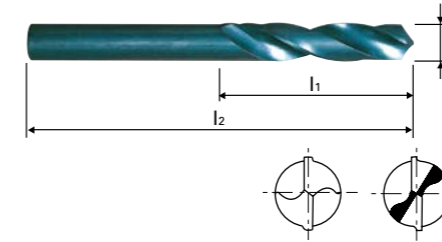
HSS STUB DRILL DIN1897



Series No. 820601

NEW

► cutting conditions : p.477



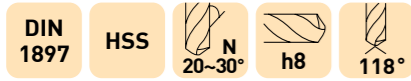
Surface treatment
Steam Tempered(Black Oxide Finish)
Bright Finish under 2mm

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

EUROPA CODE	Drill Diameter D ₁	Flute Length L ₁	Overall Length L ₂
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

EUROPA CODE	Drill Diameter D ₁	Flute Length L ₁	Overall Length L ₂
8206010360	3.6	20	52
8206010370	3.7	20	52
8206010375	3.75	20	52
8206010380	3.8	22	55
8206010390	3.9	22	55
8206010400	4.0	22	55
8206010410	4.1	22	55
8206010420	4.2	22	55
8206010425	4.25	22	55
8206010430	4.3	24	58
8206010440	4.4	24	58
8206010450	4.5	24	58
8206010460	4.6	24	58
8206010470	4.7	24	58
8206010475	4.75	24	58
8206010480	4.8	26	62
8206010490	4.9	26	62
8206010500	5.0	26	62
8206010510	5.1	26	62
8206010520	5.2	26	62
8206010525	5.25	26	62
8206010530	5.3	26	62
8206010540	5.4	28	66
8206010550	5.5	28	66
8206010560	5.6	28	66
8206010570	5.7	28	66
8206010575	5.75	28	66
8206010580	5.8	28	66
8206010590	5.9	28	66
8206010600	6.0	28	66
8206010610	6.1	31	70

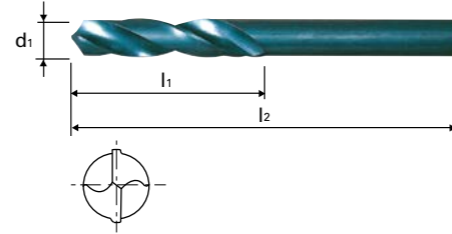
HSS STUB DRILL DIN1897



Series No. 820601



▶ cutting conditions : p.477



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	Drill Diameter D ₁	Flute Length L ₁	Overall Length L ₂
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

EUROPA CODE	Drill Diameter D ₁	Flute Length L ₁	Overall Length L ₂
8206010870	8.7	40	84
8206010875	8.75	40	84
8206010880	8.8	40	84
8206010890	8.9	40	84
8206010900	9.0	40	84
8206010910	9.1	40	84
8206010920	9.2	40	84
8206010925	9.25	40	84
8206010930	9.3	40	84
8206010935	9.35	40	84
8206010940	9.4	40	84
8206010950	9.5	40	84
8206010960	9.6	43	89
8206010970	9.7	43	89
8206010975	9.75	43	89
8206010980	9.8	43	89
8206010990	9.9	43	89
8206011000	10.0	43	89
8206011025	10.25	43	89
8206011050	10.5	43	89
8206011075	10.75	47	95
8206011100	11.0	47	95
8206011125	11.25	47	95
8206011150	11.5	47	95
8206011175	11.75	47	95
8206011200	12.0	51	102
8206011225	12.25	51	102
8206011250	12.5	51	102
8206011275	12.75	51	102
8206011300	13.0	51	102

HSS LONG SERIES SS DRILLS



Series No. 820901



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
8209010430	4.3	82	126
8209010440	4.4	82	126
8209010450	4.5	82	126
8209010460	4.6	82	126
8209010470	4.7	82	126
8209010480	4.8	87	132
8209010490	4.9	87	132

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8209010500	5.0	87	132
8209010510	5.1	87	132
8209010520	5.2	87	132
8209010530	5.3	87	132
8209010540	5.4	91	139
8209010550	5.5	91	139
8209010560	5.6	91	139
8209010570	5.7	91	139
8209010580	5.8	91	139
8209010590	5.9	91	139
8209010600	6.0	91	139
8209010610	6.1	97	148
8209010620	6.2	97	148
8209010630	6.3	97	148
8209010640	6.4	97	148
8209010650	6.5	97	148
8209010660	6.6	97	148
8209010670	6.7	97	148
8209010680	6.8	102	156
8209010690	6.9	102	156
8209010700	7.0	102	156
8209010710	7.1	102	156
8209010720	7.2	102	156
8209010730	7.3	102	156
8209010740	7.4	102	156
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

HSS LONG SERIES SS DRILLS



HSS DIN 340 118° STEAM TEMP

Series No. 820901

NEW



EUROPA CODE	O.D = S.D $d_1 = d_2$	FL l_2	OAL l_1
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
8209011070	10.7	128	195
8209011080	10.8	128	195
8209011090	10.9	128	195
8209011100	11.0	128	195
8209011110	11.1	128	195
8209011120	11.2	128	195
8209011130	11.3	128	195
8209011140	11.4	128	195
8209011150	11.5	128	195
8209011160	11.6	128	195
8209011170	11.7	128	195
8209011180	11.8	128	195
8209011190	11.9	134	205
8209011200	12.0	134	205
8209011210	12.1	134	205
8209011202	12.2	134	205
8209011203	12.3	134	205
8209011204	12.4	134	205
8209011250	12.5	134	205
8209011260	12.6	134	205
8209011270	12.7	134	205

EUROPA CODE	O.D = S.D $d_1 = d_2$	FL l_2	OAL l_1
8209011280	12.8	134	205
8209011290	12.9	134	205
8209011300	13.0	134	205
8209011400	14.0	140	214
8209011500	15.0	144	205
8209011600	16.0	149	227
8209011700	17.0	154	235
8209011800	18.0	158	241
8209011900	19.0	162	247
8209012000	20.0	166	254

HSCO SS WORM PATTERN DRILLS

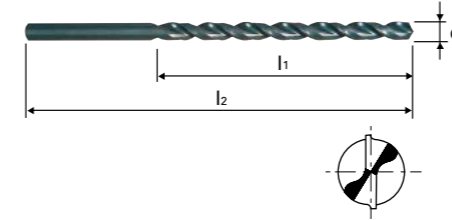


DIN 340 HSS-E N 38° h8 130°

NEW

Series No. 820116

▶ cutting conditions : p.479



Application

Drilling deep holes in non alloy steels, alloy steels, grey cast iron, malleable cast iron, special aluminum or magnesium alloys.

EUROPA CODE	Drill Diameter D_1	Flute Length L_1	Overall Length L_2
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	Drill Diameter D_1	Flute Length L_1	Overall Length L_2
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

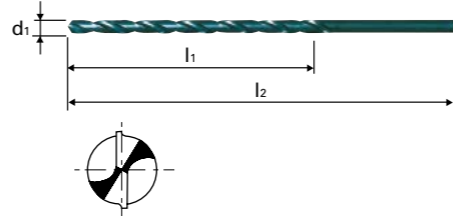
HSS SS EXTRA LONG DRILLS



Series No. 821001

NEW

▶ cutting conditions : p.477



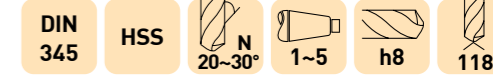
Application

Designed for drilling deep holes or deeply located holes Drilling steels, cast steels alloyed and nonalloyed, grey cast iron, malleable cast iron and graphite.

EUROPA CODE	Drill Diameter D ₁	Flute Length L ₁	Overall Length L ₂
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

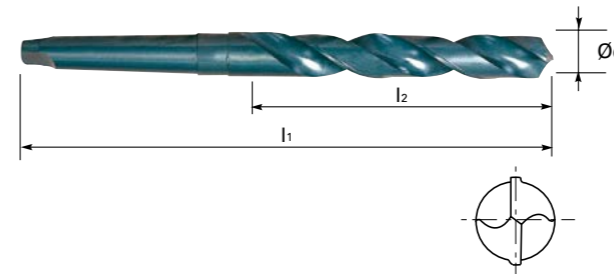
EUROPA CODE	Drill Diameter D ₁	Flute Length L ₁	Overall Length L ₂
8210010800	8.0	165	240
8210010850	8.5	165	240
8210010900	9.0	175	250
8210010950	9.5	175	250
8210011000	10.0	185	265
8210011050	10.5	185	265
8210011100	11.0	195	280
8210011150	11.5	195	280
8210011200	12.0	205	295
8210011250	12.5	205	295
8210011300	13.0	205	295

HSS MTS DRILL DIN345



Series No. 821601

▶ cutting conditions : p.478



Surface treatment

Steam Tempered(Black Oxide Finish)

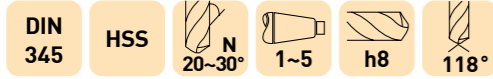
Application

Drilling steels, cast steels alloyed and non-alloyed, grey cast iron, malleable cast iron, graphite.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8216011300	13	101	182
8216011320	13.2	101	182
8216011325	13.25	108	189
8216011350	13.5	108	189
8216011375	13.75	108	189
8216011380	13.8	108	189
8216011400	14.0	108	189
8216011425	14.25	114	212
8216011450	14.5	114	212
8216011475	14.75	114	212
8216011500	15	114	212
8216011525	15.25	120	218
8216011550	15.5	120	218
8216011575	15.75	120	218
8216011600	16.0	120	218
8216011625	16.25	125	223
8216011650	16.5	125	223
8216011675	16.75	125	223
8216011700	17	125	223
8216011725	17.25	130	228
8216011750	17.5	130	228
8216011775	17.75	130	228
8216011800	18.0	130	228
8216011825	18.25	135	233
8216011850	18.5	135	233
8216011875	18.75	135	233
8216011900	19	135	233
8216011925	19.25	140	238
8216011950	19.5	140	238
8216011975	19.75	140	238
8216012000	20.0	140	238
8216012025	20.25	145	243

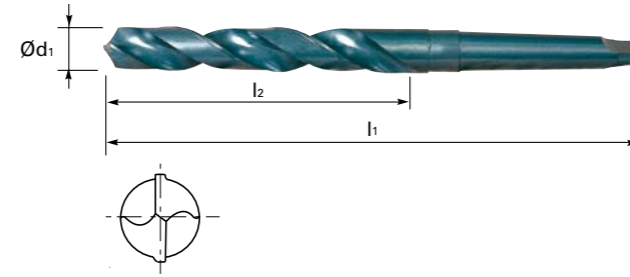
EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8216012050	20.5	145	243
8216012075	20.75	145	243
8216012100	21	145	243
8216012125	21.25	150	248
8216012150	21.5	150	248
8216012175	21.75	150	248
8216012200	22.0	150	248
8216012225	22.25	150	248
8216012250	22.5	155	253
8216012275	22.75	155	253
8216012300	23	155	253
8216012325	23.25	155	276
8216012350	23.5	155	276
8216012375	23.75	160	281
8216012400	24	160	281
8216012425	24.25	160	281
8216012450	24.5	160	281
8216012475	24.75	160	281
8216012500	25.0	160	281
8216012525	25.25	165	286
8216012550	25.5	165	286
8216012575	25.75	165	286
8216012600	26	165	286
8216012625	26.25	165	286
8216012650	26.5	165	286
8216012675	26.75	170	291
8216012700	27	170	291
8216012725	27.25	170	291
8216012750	27.5	170	291
8216012775	27.75	170	291
8216012800	28	170	291
8216012825	28.25	175	296

HSS MTS DRILL DIN345



Series No. 821601

▶ cutting conditions : p.478



Surface treatment
Steam Tempered(Black Oxide Finish)

Application
Drilling steels, cast steels alloyed and non-alloyed, grey cast iron, malleable cast iron, graphite.

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8216012850	28.5	175	296
8216012875	28.75	175	296
8216012900	29	175	296
8216012925	29.25	175	296
8216012950	29.5	175	296
8216012975	29.75	175	296
8216013000	30	175	296
8216013025	30.25	180	301
8216013050	30.5	180	301
8216013075	30.75	180	301
8216013100	31	180	301
8216013125	31.25	180	301
8216013150	31.5	180	301
8216013175	31.75	185	306
8216013200	32	185	334
8216013225	32.5	185	334
8216013300	33	185	334
8216013350	33.5	185	334
8216013400	34	190	339
8216013450	34.5	190	339
8216013500	35	190	339
8216013550	35.5	190	339
8216013600	36	195	344
8216013650	36.5	195	344
8216013700	37	195	344
8216013750	37.5	195	344
8216013800	38	200	349
8216013850	38.5	200	349
8216013900	39	200	349
8216013950	39.5	200	349
8216014000	40	200	349

EUROPA CODE	O.D = S.D d ₁ = d ₂	FL l ₂	OAL l ₁
8216014050	40.5	205	354
8216014100	41	205	354
8216014150	41.5	205	354
8216014200	42	205	354
8216014250	42.5	205	354
8216014300	43	210	359
8216014350	43.5	210	359
8216014400	44	210	359
8216014450	44.5	210	359
8216014500	45	210	359
8216014550	45.5	215	364
8216014600	46	215	364
8216014650	46.5	215	364
8216014700	47	215	364
8216014750	47.5	215	364
8216014800	48	220	369
8216014850	48.5	220	369
8216014900	49	220	369
8216014950	49.5	220	369
8216015000	50	220	369
8216015050	50.5	225	374
8216015100	51	225	412
8216015200	52	225	412
8216015300	53	225	412
8216015400	54	230	417
8216015500	55	230	417
8216015600	56	230	417
8216015700	57	235	422
8216015800	58	235	422
8216015900	59	235	422
8216016000	60	235	422

DRILL SETS



EUROPA CODE	Set No.	No. Of Drills	Range Dia.	Increments	Drill Type	
810504SET2	19M	19	1.0 TO 10	0.5	HSS GOLDEX	JOBBER DRILLS
810504SET1	25M	25	1.0 TO 13	0.5	HSS GOLDEX	JOBBER DRILLS
810505SET2	19M	19	1.0 TO 10	0.5	COBALT GOLDEX	JOBBER DRILLS
810505SET1	25M	25	1.0 TO 13	0.5	COBALT GOLDEX	JOBBER DRILLS
820801SET2	19M	19	1.0 TO 10	0.5	HSS	JOBBER DRILLS
820801SET1	25M	25	1.0 TO 13	0.5	HSS	JOBBER DRILLS
820801SET3	M4	50	1 TO 5.9	0.1	HSS	JOBBER DRILLS
820801SET4	M5	41	6 TO 10	0.1	HSS	JOBBER DRILLS
820702SET2	19M	19	1.0 TO 10	0.5	COBALT	JOBBER DRILLS
820702SET1	25M	25	1.0 TO 13	0.5	COBALT	JOBBER DRILLS

COBALT & HSS TWIST cutting condition



HPD-SUS TWIST DRILLS, TiN COATED (STUB / JOBBER)



WORK MATERIAL	STAINLESS STEELS (SUS304, 200)		STAINLESS STEELS (SUS420, 440)		ALUMINIUM & ALUMINIUM ALLOYS		PLASTICS COPPER COPPER ALLOYS		MILD STEELS LOW CARBON STEELS	
	N	S	N	S	N	S	N	S	N	S
DIAMETER										
2	2600	0.03	3100	0.07	11000	0.09	5600	0.06	6300	0.08
3	1800	0.04	2100	0.08	7350	0.13	3750	0.08	4200	0.13
4	1300	0.06	1600	0.10	7050	0.18	2800	0.10	3200	0.14
5	1050	0.08	1250	0.15	5500	0.22	2250	0.13	2500	0.16
6	900	0.09	1050	0.18	4600	0.26	1850	0.15	2100	0.18
8	650	0.12	800	0.24	3500	0.34	1350	0.20	1550	0.22
10	550	0.15	630	0.30	2800	0.40	1100	0.25	1250	0.26
12	450	0.18	530	0.36	2300	0.50	950	0.30	1050	0.32
14	400	0.33	450	0.44	2050	0.55	800	0.33	900	0.36
16	350	0.36	390	0.48	1750	0.62	700	0.35	790	0.40
18	300	0.39	350	0.50	1600	0.70	620	0.40	700	0.45
20	260	0.43	320	0.53	1450	0.75	560	0.40	620	0.47

N = R.P.M
S = Feed per Revolution (mm/rev.)

HPD TWIST DRILLS, TiN COATED (JOBBER)



WORK MATERIAL	CARBON STEELS		ALLOY STEELS (SCM-SNC-SNCM)		TOOL STEELS ALLOY STEELS (SKD11)		CAST IRON TOOL STEELS		ALUMINIUM ALLOYS MAGNESIUM ALLOYS	
	N	S	N	S	N	S	N	S	N	S
DIAMETER										
2	4200	0.08	3600	0.08	1750	0.08	5800	0.11	10500	0.16
3	2900	0.13	2500	0.13	1170	0.13	4000	0.14	10500	0.25
4	2100	0.14	1900	0.14	880	0.14	3000	0.17	8000	0.30
5	1700	0.16	1500	0.16	700	0.16	2400	0.20	6500	0.36
6	1300	0.17	1300	0.17	580	0.17	2100	0.23	5200	0.42
8	1000	0.21	950	0.21	440	0.21	1500	0.26	4200	0.47
10	850	0.25	750	0.25	350	0.25	1100	0.32	3400	0.56
12	700	0.30	650	0.30	290	0.30	1000	0.38	2700	0.67
14	550	0.35	500	0.35	250	0.35	850	0.40	2400	0.72
16	520	0.38	470	0.38	220	0.38	750	0.42	2100	0.77
18	450	0.44	420	0.44	195	0.44	700	0.45	1900	0.80
20	400	0.45	350	0.45	175	0.45	600	0.51	1600	0.87
22	370	0.50	340	0.50	160	0.50	550	0.52	1500	0.95
24	350	0.54	300	0.54	145	0.54	500	0.58	1400	1.00
26	320	0.58	280	0.58	135	0.58	450	0.60	1300	1.05
28	300	0.62	260	0.62	125	0.62	420	0.63	1200	1.10
30	280	0.66	240	0.66	115	0.66	400	0.74	1100	1.15
32	260	0.70	230	0.70	110	0.70	380	0.74	950	1.20

N = R.P.M
S = Feed per Revolution (mm/rev.)

COBALT & HSS TWIST cutting condition



Premium HSS-PM, TiAIN COATED (STUB)



WORK MATERIAL	CARBON STEELS		ALLOY STEELS PRE-HARDENED STEELS		CAST IRON		ALUMINIUM ALLOYS NONFERROUS ALLOYS		MOLD STEELS, HARDENED STEELS (HRc30~45) STAINLESS STEELS (SUS304, 200)		STAINLESS STEELS (SUS420, 440)	
	N	S	N	S	N	S	N	S	N	S	N	S
DIAMETER												
2.0	5800	0.06	4700	0.05	6500	0.08	10500	0.17	2600	0.04	3100	0.08
3.0	4300	0.12	3500	0.09	4900	0.14	10500	0.27	1800	0.05	2100	0.09
4.0	3200	0.15	2600	0.13	3600	0.18	8000	0.33	1300	0.07	1600	0.11
5.0	2600	0.18	2100	0.16	2900	0.21	6500	0.39	1050	0.09	1250	0.17
6.0	2100	0.20	1700	0.18	2400	0.25	5200	0.46	900	0.10	1050	0.19
8.0	1600	0.24	1300	0.20	1800	0.29	4200	0.51	650	0.14	800	0.26
10.0	1300	0.27	1000	0.24	1500	0.32	3400	0.61	550	0.17	630	0.33
12.0	1100	0.29	850	0.26	1200	0.36	2700	0.73	450	0.20	530	0.39

N = R.P.M
S = Feed per Revolution (mm/rev.)

GOLDEX DRILLS (JOBBER)



WORK MATERIAL	CARBON STEELS		CARBON STEELS		ALLOY STEELS		STAINLESS STEELS		TITANIUM ALLOYS		ALUMINIUM ALLOYS, ZINC ALLOYS		MAGNESIUM ALLOYS	
	N	S	N	S	N	S	N	S	N	S	N	S	N	S
HARDNESS			~ HRc23		~ HRc23 ~ 34		HRc23							
STRENGTH	~570N/mm ²		~830N/mm ²		810~1110N/mm ²		~ 830N/mm ²		~ 410N/mm ²					
DIAMETER														
1	14000	0.02	12500	0.02	7700	0.02	7000	0.02	8050	0.02	30000	0.02	11500	0.03
2	7000	0.06	6100	0.06	3850	0.06	3500	0.06	4050	0.06	15000	0.06	5800	0.09
3	4650	0.10	4100	0.08	2550	0.08	2350	0.08	2700	0.08	9900	0.10	3850	0.13
4	3500	0.11	3050	0.11	1950	0.10	1750	0.10	2000	0.09	7450	0.11	2900	0.15
5	2800	0.12	2450	0.11	1550	0.10	1400	0.10	1600	0.10	5950	0.12	2300	0.17
6	2350	0.14	2050	0.13	1300	0.12	1150	0.12	1350	0.12	4950	0.14	1950	0.19
7	2000	0.16	1750	0.15	1100	0.14	1000	0.14	1150	0.14	4250	0.16	1650	0.22
8	1750	0.18	1550	0.18	960	0.15	875	0.15	1000	0.15	3700	0.18	1450	0.24
9	1550	0.20	1350	0.22	855	0.18	780	0.18	895	0.17	3300	0.20	1280	0.27
10	1400	0.21	1250	0.22	770	0.18	700	0.18	805	0.18	3000	0.23	1150	0.29
11	1250	0.22	1100	0.22	700	0.18	650	0.18	730	0.18	2700	0.23	1050	0.30
12	1150	0.23	1000	0.22	650	0.20	585	0.20	670	0.20	2480	0.23	960	0.31
13	1050	0.23	950	0.22	595	0.20	540	0.20	620	0.20	2300	0.23	890	0.31

N = R.P.M
S = Feed per Revolution (mm/rev.)

COBALT & HSS TWIST cutting condition



GOLD-P COATED DRILLS for DEEP HOLES

811505 

WORK MATERIAL	CARBON STEELS ALLOY STEELS		TOOL STEELS HARDENED STEELS		SOFT GREY CAST IRON		HARD GREY CAST IRON	
	HRc15 ~ 30		HRc20 ~ 40					
STRENGTH	700 ~ 1000 N/mm ²		800 ~ 1200 N/mm ²					
DIAMETER	N	S	N	S	N	S	N	S
1.0	8750	0.02	6300	0.02	16000	0.02	9800	0.02
2.0	4400	0.06	3150	0.06	7900	0.07	4900	0.07
3.0	2900	0.08	2100	0.08	5250	0.11	3250	0.11
4.0	2200	0.09	1600	0.09	3950	0.14	2450	0.14
5.0	1750	0.10	1250	0.10	3150	0.14	1950	0.14
6.0	1450	0.12	1050	0.12	2650	0.18	1650	0.18
7.0	1250	0.14	900	0.14	2250	0.20	1400	0.20
8.0	1100	0.15	790	0.15	1950	0.22	1250	0.22
9.0	975	0.17	700	0.17	1750	0.24	1100	0.24
10.0	875	0.18	630	0.18	1600	0.28	980	0.28
11.0	800	0.20	575	0.20	1450	0.28	890	0.28
12.0	730	0.20	525	0.20	1300	0.28	815	0.28
13.0	675	0.20	485	0.20	1200	0.28	755	0.28

N = R.P.M
S = Feed per Revolution (mm/rev.)

COBALT & HSS TWIST cutting condition



HSS & HSS 8% Cobalt DRILLS, DIN1897, DIN338, DIN340, DIN1869

820502, 820702, 820902, 820801, 821001, 810801 

WORK MATERIAL	CARBON STEELS		CARBON STEELS		CARBON STEELS		ALLOY STEELS		ALLOY STEELS		STAINLESS STEELS		TITANIUM ALLOYS	
	~570N/mm ²		~830N/mm ²		810~1110N/mm ²		810~1110N/mm ²		1110~1260N/mm ²		~830N/mm ²		~410N/mm ²	
HARDNESS			~ HRc23		~ HRc23 ~ 34		~ HRc23 ~34		~ HRc34 ~38		~ HRc23			
DIAMETER	N	S	N	S	N	S	N	S	N	S	N	S	N	S
2.5	3380	0.025	2550	0.025	1900	0.015	2380	0.020	1400	0.015	2550	0.025	1400	0.020
3.0	2700	0.050	2000	0.050	1500	0.025	1880	0.050	1100	0.020	2000	0.050	1100	0.025
5.0	1700	0.0630	1280	0.063	960	0.038	1190	0.063	700	0.025	1280	0.063	700	0.038
8.0	1050	.1300.	780	0.130	590	0.076	730	0.130	430	0.038	780	0.130	430	0.076
11.0	750	1500.2	560	0.150	425	0.076	520	0.180	310	0.050	560	0.150	430	0.076
19.0	440	30	330	0.230	255	0.130	300	0.230	180	0.050	330	0.230	180	0.130
31.0	260	0.280	195	0.280	145	0.180	180	0.180	107	0.076	195	0.280	107	0.180

WORK MATERIAL	TOOL STEELS		CAST IRON		ALUMINUM ALLOYS		MAGNESIUM ALLOYS		ZINC ALLOYS		PLASTICS	
	~ 270N/mm ²		~ 800N/mm ²									
HARDNESS			~ HRc21									
DIAMETER	N	S	N	S	N	S	N	S	N	S	N	S
2.5	3180	0.042	2250	0.025	6400	0.038	8600	0.038	6400	0.038	3380	0.025
3.0	2500	0.050	2000	0.050	5000	0.063	6800	0.063	5000	0.063	2700	0.050
5.0	1590	0.063	1280	0.063	3200	0.076	4300	0.076	3200	0.076	1700	0.063
8.0	970	0.130	780	0.130	2000	0.180	2600	0.180	2000	0.180	1050	0.130
11.0	700	0.180	560	0.150	1400	0.200	1900	0.200	1400	0.200	750	0.150
19.0	440	0.230	330	0.230	820	0.300	1100	0.300	820	0.300	440	0.230
31.0	240	0.300	195	0.280	490	0.380	660	0.380	490	0.380	260	0.280

N = R.P.M
S = Feed per Revolution (mm/rev.)

COBALT & HSS TWIST DRILLS

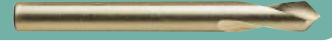
COBALT & HSS TWIST DRILLS

COBALT & HSS TWIST cutting condition



HSSCo8, NC-SPOTTING DRILLS 90°, 120°

821402, 822402



WORK MATERIAL	CARBON STEELS		ALLOY STEELS		ALLOY STEELS, TOOL STEELS, HARDENED STEELS		STAINLESS STEELS		ALUMINUM, ALUMINUM ALLOYS	
	N	S	N	S	N	S	N	S	N	S
DIAMETER										
3.0	2460	0.06	2110	0.06	1080	0.06	940	0.06	7040	0.14
4.0	1850	0.07	1580	0.07	800	0.07	700	0.07	5280	0.15
5.0	1510	0.08	1300	0.08	670	0.08	580	0.08	4400	0.17
6.0	1170	0.09	1030	0.09	540	0.09	460	0.09	3520	0.19
8.0	880	0.11	790	0.11	400	0.11	350	0.11	2640	0.22
10.0	700	0.12	630	0.12	320	0.12	290	0.12	2110	0.25
12.0	590	0.14	530	0.14	260	0.14	240	0.14	1760	0.28
16.0	460	0.20	400	0.20	200	0.20	180	0.20	1320	0.33
20.0	350	0.24	320	0.24	150	0.24	140	0.24	1060	0.45

N = R.P.M
S = Feed per Revolution (mm/rev.)

HSS DRILLS DIN345

821601



WORK MATERIAL	CARBON STEELS		CARBON STEELS		CARBON STEELS		ALLOY STEELS		ALLOY STEELS		STAINLESS STEELS		TITANIUM ALLOYS	
	N	S	N	S	N	S	N	S	N	S	N	S	N	S
HARDNESS			~ HRc23		~ HRc23 ~ 28		~ HRc23 ~ 34		~ HRc34 ~ 38		~ HRc23			
STRENGTH	~570N/mm²		~830N/mm²		830~950N/mm²		810~1110N/mm²		1110~1260N/mm²		~830N/mm²		~410N/mm²	
DIAMETER														
13.0	645	0.17	480	0.17	370	0.09	440	0.20	265	0.05	480	0.17	265	0.09
19.0	440	0.23	330	0.23	255	0.13	300	0.23	180	0.05	330	0.23	180	0.13
32.0	260	0.28	195	0.28	145	0.18	180	0.18	107	0.08	195	0.28	107	0.18
50.0	165	0.33	125	0.33	93	0.20	115	0.20	68	0.08	125	0.33	68	0.20
60.0	140	0.40	105	0.40	78	0.23	95	0.23	57	0.10	105	0.40	57	0.23

WORK MATERIAL	TOOL STEELS		CAST IRON		ALUMINUM ALLOYS		MAGNESIUM ALLOYS		ZINC ALLOYS		PLASTICS	
	N	S	N	S	N	S	N	S	N	S	N	S
HARDNESS			~ HRc21									
STRENGTH	~ 270N/mm²		~ 800N/mm²									
DIAMETER												
13.0	645	0.17	480	0.17	1200	0.26	1600	0.26	1200	0.26	645	0.17
19.0	440	0.23	330	0.23	820	0.30	1100	0.30	820	0.30	440	0.23
32.0	240	0.30	195	0.28	490	0.38	660	0.38	490	0.38	240	0.28
50.0	150	0.43	125	0.33	310	0.46	415	0.46	310	0.46	150	0.33
60.0	125	0.48	105	0.40	260	0.50	345	0.50	260	0.50	125	0.40

N = R.P.M
S = Feed per Revolution (mm/rev.)

COBALT & HSS TWIST cutting condition



HSS & HSS-EX, CENTER DRILLS

810334



WORK MATERIAL	MILD STEEL		ALLOY STEEL				STAINLESS STEEL	
	< 700 N/mm²		~ HRc 23		~ HRc 32			
HARDNESS								
DIAMETER	SPEED	FEED	SPEED	FEED	SPEED	FEED	SPEED	FEED
2.0	30 ~ 45	0.02~0.05	25 ~ 30	0.02~0.05	15 ~ 25	0.01~0.03	6 ~ 10	0.01~0.03
3.0		0.06		0.06		0.04		0.04
6.0		0.08		0.08		0.06		0.06
10.0		0.15		0.15		0.10		0.10

SPEED(Shank Dia.) = m/min
FEED(Drill Dia.) = mm/rev

HSS-E, DH100 TYPE WORM PATTERN DRILLS, DIN1897, DIN338, DIN340, DIN1869, DIN341

820116



WORK MATERIAL	CARBON STEELS ALLOY STEELS		TOOL STEELS HARDENED STEELS		SOFT GREY CAST IRON		HARD GREY CAST IRON	
	N	S	N	S	N	S	N	S
HARDNESS	HRc15 ~ 30		HRc20 ~ 40					
STRENGTH	700 ~ 1000 N/mm²		800 ~ 1200 N/mm²					
DIAMETER								
2.0	2630	0.03	2100	0.025	4200	0.06	1680	0.05
2.5	2100	0.04	1680	0.03	3300	0.08	1310	0.06
3.0	1680	0.05	1310	0.04	2630	0.10	1050	0.08
4.0	1310	0.06	1050	0.05	2100	0.13	840	0.10
5.0	1050	0.06	840	0.05	1680	0.13	660	0.10
6.0	840	0.08	660	0.06	1310	0.16	530	0.13
8.0	660	0.10	530	0.08	1050	0.20	420	0.17
10.0	530	0.13	420	0.10	840	0.25	330	0.21
13.0	420	0.13	330	0.10	660	0.25	260	0.21
16.0	330	0.15	260	0.13	530	0.30	210	0.25
20.0	260	0.20	210	0.15	420	0.40	170	0.30
25.0	210	0.25	170	0.20	330	0.50	130	0.50
30.0	170	0.25	130	0.20	260	0.50	110	0.50









N = R.P.M
S = Feed per Revolution (mm/rev.)

HSS & COBALT REAMERS CONTENTS

Europa Tool 11th Edition

HSS & COBALT REAMERS



PRODUCTS	SERIES	DESCRIPTION	PAGE
	450301	HSS HAND REAMER STRAIGHT FLUTE	482
	451301	HSS HAND REAMER LH SPIRAL FLUTE	483
	452302	HSS-E STRAIGHT SHANK CHUCKING REAMER STRAIGHT FLUTE	486
	453302	HSS-E STRAIGHT SHANK CHUCKING REAMER LH SPIRAL FLUTE	487
	454302	HSS-E STRAIGHT SHANK CHUCKING REAMER LH QUICK SPIRAL	488
	455302	HSS-E TAPER SHANK CHUCKING REAMER STRAIGHT FLUTE	489
	456302	HSS-E TAPER SHANK CHUCKING REAMER LH SPIRAL FLUTE	490
 NEW	457301	HSS TAPER SHANK MACHINE REAMER	491
CUTTING DATA			492

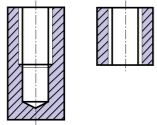
HSS HAND REAMER STRAIGHT FLUTE



HSS DIN 206 H7

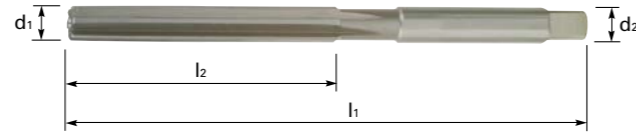
Series No. 450301

Hole type



- ▶ O.D.Tolerances : DIN 1420 for H7
- ▶ Shank Diameter \approx Nominal Reamer Diameter
- ▶ Straight Flutes / Right Hand Cut

- ▶ Chamfer Angle - tapered
- ▶ Type of center - Up to $\varnothing 3.75$: external centers
- Over $\varnothing 3.75$: internal centers



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

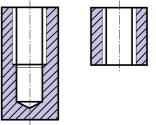
HSS HAND REAMER STRAIGHT FLUTE



HSS DIN 206 H7

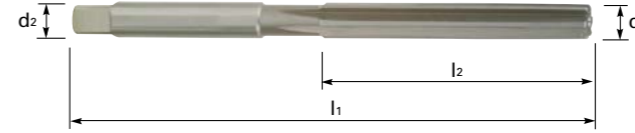
Series No. 450301

Hole type



- ▶ O.D.Tolerances : DIN 1420 for H7
- ▶ Shank Diameter \approx Nominal Reamer Diameter
- ▶ Straight Flutes / Right Hand Cut

- ▶ Chamfer Angle - tapered
- ▶ Type of center - Up to $\varnothing 3.75$: external centers
- Over $\varnothing 3.75$: internal centers



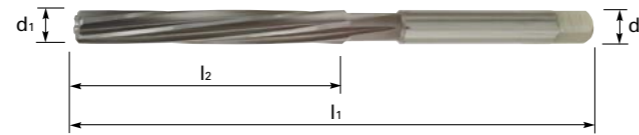
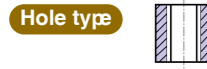
NOMINAL SIZE $d1 = d2$	FLUTE LENGTH $l1$	OVERALL LENGTH $l2$	NO.OF FLUTES	EUROPA CODE
25.0	115	231	8	4503012500
26.0	115	231	8	4503012600
27.0	124	247	10	4503012700
28.0	124	247	10	4503012800
29.0	124	247	10	4503012900
30.0	124	247	10	4503013000
31.0	133	265	10	4503013100
32.0	133	265	10	4503013200
33.0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

HSS HAND REAMER LH SPIRAL FLUTE



HSS DIN 206 H7 LH7°

Series No. 451301



- ▶ O.D.Tolerances : DIN 1420, H7
- ▶ Shank Diameter \approx Nominal Reamer Diameter
- ▶ LH Spiral Flutes / Right Hand Cut

- ▶ Chamfer Angle - tapered
- ▶ Type of center - Up to $\varnothing 3.75$: external centers
- Over $\varnothing 3.75$: internal centers

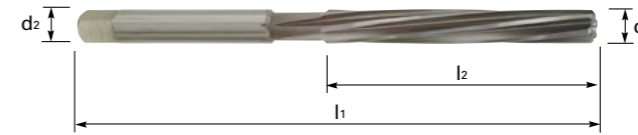
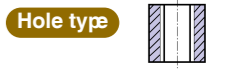
NOMINAL SIZE d1 = d2	FLUTE LENGTH l1	OVERALL LENGTH l2	NO.OF FLUTES	EUROPA CODE
2.0	25	50	4	4513010200
2.2	27	54	4	4513010220
2.5	29	58	4	4513010250
2.8	31	62	4	4513010280
3.0	31	62	6	4513010300
3.2	33	66	6	4513010320
3.5	35	71	6	4513010350
4.0	38	76	6	4513010400
4.5	41	81	6	4513010450
5.0	44	87	6	4513010500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

HSS HAND REAMER LH SPIRAL FLUTE



HSS DIN 206 H7 LH7°

Series No. 451301



- ▶ O.D.Tolerances : DIN 1420, H7
- ▶ Shank Diameter \approx Nominal Reamer Diameter
- ▶ LH Spiral Flutes / Right Hand Cut

- ▶ Chamfer Angle - tapered
- ▶ Type of center - Up to $\varnothing 3.75$: external centers
- Over $\varnothing 3.75$: internal centers

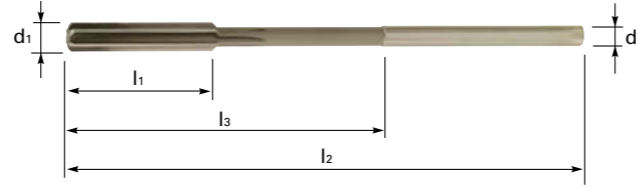
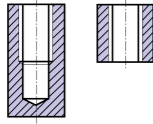
NOMINAL SIZE d1 = d2	FLUTE LENGTH l1	OVERALL LENGTH l2	NO.OF FLUTES	EUROPA CODE
25.0	115	231	8	4513012500
26.0	115	231	8	4513012600
27.0	124	247	10	4513012700
28.0	124	247	10	4513012800
29.0	124	247	10	4513012900
30.0	124	247	10	4513013000
31.0	133	265	10	4513013100
32.0	133	265	10	4513013200
33.0	133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

HSS-E STRAIGHT SHANK CHUCKING REAMER STRAIGHT FLUTE



Series No. 452302

Hole type



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

- ▶ Chamfer Angle - Up to Ø3.75 : 15° (DIN212-A)
- Over Ø3.75 : 45° (DIN212-C)

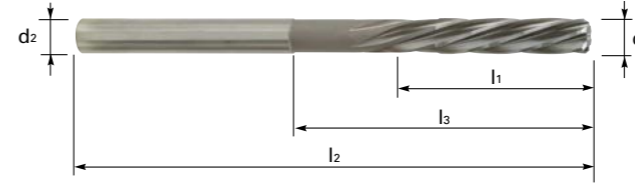
NOMINAL SIZE d1	SHANK DIAMETER d2	CUTTING LENGTH l1	NECK LENGTH l3	OVERALL LENGTH l2	NO. OF FLUTES	EUROPA CODE
2.0	2	11	-	49	4	4523020200
2.2	2.2	12	-	53	4	4523020220
2.5	2.5	14	-	57	4	4523020250
2.6	2.6	14	-	57	4	4523020260
2.8	2.8	15	-	61	4	4523020280
3.0	3	15	-	61	6	4523020300
3.1	3.1	16	-	65	6	4523020310
3.2	3.2	16	-	65	6	4523020320
3.5	3.5	18	-	70	6	4523020350
3.6	3.6	18	-	70	6	4523020360
3.7	3.7	18	-	70	6	4523020370
4.0	4	19	42	75	6	4523020400
4.3	4.5	21	46	80	6	4523020430
4.5	4.5	21	46	80	6	4523020450
4.6	4.5	21	46	80	6	4523020460
5.0	5	23	51	86	6	4523020500
5.5	5.6	26	56	93	6	4523020550
5.6	5.6	26	56	93	6	4523020560
6.0	5.6	26	56	93	6	4523020600
6.5	6.3	28	62	101	6	4523020650
7.0	7.1	31	68	109	6	4523020700
7.2	7.1	31	68	109	6	4523230720
8.0	8	33	74	117	6	4523020800
8.3	8	33	74	117	6	4523020830
8.5	8	33	74	117	6	4523020850
9.0	9	36	80	125	6	4523020900
9.5	9	36	80	125	6	4523020950
10.0	10	38	86	133	6	4523021000
10.5	10	38	86	133	6	4523021050
11.0	10	41	95	142	6	4523021100
12.0	10	44	104	151	6	4523021200
13.0	10	44	104	151	6	4523021300
14.0	12.5	47	108	160	8	4523021400
15.0	12.5	50	110	162	8	4523021500
16.0	12.5	52	118	170	8	4523021600
17.0	14	54	121	175	8	4523021700
18.0	14	56	128	182	8	4523021800
19.0	16	58	129	189	8	4523021900
20.0	16	60	135	195	8	4523022000

HSS-E STRAIGHT SHANK CHUCKING REAMER LH SPIRAL FLUTE



Series No. 453302

Hole type



- ▶ O.D.Tolerances : DIN 1420 for H7
- ▶ Shank Diameter Tolerances : h8
- ▶ LH Spiral Flutes / Right Hand Cut

- ▶ Chamfer Angle - Up to Ø3.75 : 15° (DIN212-B)
- Over Ø3.75 : 45° (DIN212-D)

NOMINAL SIZE d1	SHANK DIAMETER d2	CUTTING LENGTH l1	NECK LENGTH l3	OVERALL LENGTH l2	NO. OF FLUTES	EUROPA CODE
2.0	2	11	-	49	4	4533020200
2.2	2.2	12	-	53	4	4533020220
2.5	2.5	14	-	57	4	4533020250
2.6	2.6	14	-	57	4	4533020260
2.8	2.8	15	-	61	4	4533020280
3.0	3	15	-	61	6	4533020300
3.1	3.1	16	-	65	6	4533020310
3.2	3.2	16	-	65	6	4533020320
3.5	3.5	18	-	70	6	4533020350
3.6	3.6	18	-	70	6	4533020360
3.7	3.7	18	-	70	6	4533020370
4.0	4	19	42	75	6	4533020400
4.3	4.5	21	46	80	6	4533020430
4.5	4.5	21	46	80	6	4533020450
4.6	4.5	21	46	80	6	4533020460
5.0	5	23	51	86	6	4533020500
5.5	5.6	26	56	93	6	4533020550
5.6	5.6	26	56	93	6	4533020560
6.0	5.6	26	56	93	6	4533020600
6.5	6.3	28	62	101	6	4533020650
7.0	7.1	31	68	109	6	4533020700
7.2	7.1	31	68	109	6	4533020720
8.0	8	33	74	117	6	4533020800
8.3	8	33	74	117	6	4533020830
8.5	8	33	74	117	6	4533020850
9.0	9	36	80	125	6	4533020900
9.5	9	36	80	125	6	4533020950
10.0	10	38	86	133	6	4533021000
10.5	10	38	86	133	6	4533021050
11.0	10	41	95	142	6	4533021100
12.0	10	44	104	151	6	4533021200
13.0	10	44	104	151	6	4533021300
14.0	12.5	47	108	160	8	4533021400
15.0	12.5	50	110	162	8	4533021500
16.0	12.5	52	118	170	8	4533021600
17.0	14	54	121	175	8	4533021700
18.0	14	56	128	182	8	4533021800
19.0	16	58	129	189	8	4533021900
20.0	16	60	135	195	8	4533022000

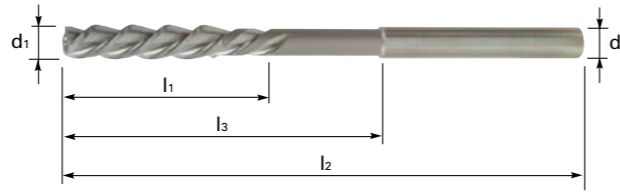
HSS-E STRAIGHT SHANK CHUCKING REAMER LH QUICK SPIRAL



HSS-E DIN 212 H7 45° FORM E

Series No. 454302

Hole type



- ▶ O.D.Tolerances : DIN 1420 for H7
- ▶ Shank Diameter Tolerances : h8

- ▶ Chamfer Angle - tapered
- ▶ LH High Spiral Flutes / Right Hand Cut

NOMINAL SIZE d1	SHANK DIAMETER d2	CUTTING LENGTH l1	NECK LENGTH l3	OVERALL LENGTH l2	NO.OF FLUTES	EUROPA CODE
4.0	4	19	42	75	3	4543020400
4.5	4.5	21	46	80	3	4543020450
5.0	5	23	51	86	3	4543020500
5.5	5.6	26	56	93	3	4543020550
6.0	5.6	26	56	93	3	4543020600
6.5	6.3	28	62	101	3	4543020650
7.0	7.1	31	68	109	3	4543020700
8.0	8	33	74	117	3	4543020800
8.5	8	33	74	117	3	4543020850
9.0	9	36	80	125	3	4543020900
9.5	9	36	80	125	3	4543020950
10.0	10	38	86	133	3	4543021000
11.0	10	41	95	142	3	4543021100
12.0	10	44	104	151	3	4543021200
13.0	10	44	104	151	3	4543021300
14.0	12.5	47	108	160	4	4543021400
15.0	12.5	50	110	162	4	4543021500
16.0	12.5	52	118	170	4	4543021600
17.0	14	54	121	175	4	4543021700
18.0	14	56	128	182	4	4543021800
19.0	16	58	129	189	4	4543021900
20.0	16	60	135	195	4	4543022000

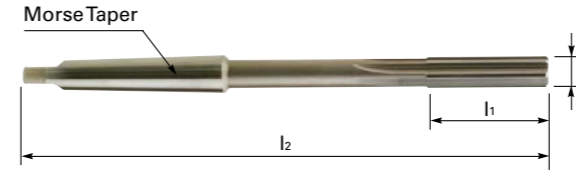
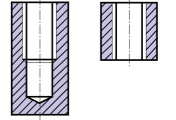
HSS-E TAPER SHANK CHUCKING REAMER STRAIGHT FLUTE



HSS-E DIN 208 H7 45°

Series No. 455302

Hole type



- ▶ O.D.Tolerances : DIN 1420 for H7
- ▶ Straight Flute / Right Hand Cut
- ▶ Chamfer Angle : 45°

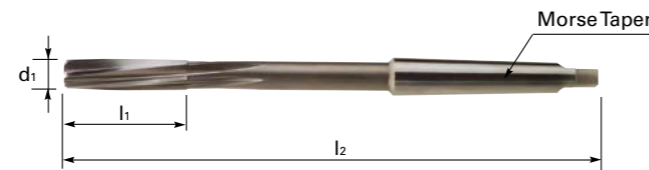
NOMINAL SIZE d1	NO. OF MORSE TAPER	CUTTING LENGTH l1	OVERALL LENGTH l2	NO.OF FLUTES	EUROPA CODE
10.0	1	38	168	6	4553021000
11.0	1	41	175	6	4553021100
12.0	1	44	182	6	4553021200
13.0	1	44	182	6	4553021300
14.0	1	47	189	8	4553021400
15.0	2	50	204	8	4553021500
16.0	2	52	210	8	4553021600
17.0	2	54	214	8	4553021700
18.0	2	56	219	8	4553021800
19.0	2	58	223	8	4553021900
20.0	2	60	228	8	4553022000
21.0	2	62	232	8	4553022100
22.0	2	64	237	8	4553022200
23.0	2	66	241	8	4553022300
24.0	3	68	268	8	4553022400
25.0	3	68	268	8	4553022500
26.0	3	70	273	8	4553022600
27.0	3	71	277	10	4553022700
28.0	3	71	277	10	4553022800
29.0	3	73	281	10	4553022900
30.0	3	73	281	10	4553023000
31.0	3	75	285	10	4553023100
32.0	4	77	317	10	4553023200
34.0	4	78	321	10	4553023400
35.0	4	78	321	10	4553023500
36.0	4	79	325	10	4553023600
38.0	4	81	329	10	4553023800
40.0	4	81	329	10	4553024000
41.0	4	82	333	12	4553024100
42.0	4	82	333	12	4553024200
43.0	4	83	336	12	4553024300
44.0	4	83	336	12	4553024400
45.0	4	83	336	12	4553024500
46.0	4	84	340	12	4553024600
47.0	4	84	340	12	4553024700
48.0	4	86	344	12	4553024800
50.0	4	86	344	12	4553025000

HSS-E TAPER SHANK CHUCKING REAMER LH SPIRAL FLUTE



HSS-E DIN 208 H7 LH7° 45°

Series No. 456302



- ▶ O.D.Tolerances : DIN 1420 for H7
- ▶ LH Spiral Flutes / Right Hand Cut
- ▶ Chamfer Angle : 45°

NOMINAL SIZE d1	NO. OF MORSE TAPER	CUTTING LENGTH l1	OVERALL LENGTH l2	NO.OF FLUTES	EUROPA CODE
10.0	1	38	168	6	4563021000
11.0	1	41	175	6	4563021100
12.0	1	44	182	6	4563021200
13.0	1	44	182	6	4563021300
14.0	1	47	189	8	4563021400
15.0	2	50	204	8	4563021500
16.0	2	52	210	8	4563021600
17.0	2	54	214	8	4563021700
18.0	2	56	219	8	4563021800
19.0	2	58	223	8	4563021900
20.0	2	60	228	8	4563022000
21.0	2	62	232	8	4563022100
22.0	2	64	237	8	4563022200
23.0	2	66	241	8	4563022300
24.0	3	68	268	8	4563022400
25.0	3	68	268	8	4563022500
26.0	3	70	273	8	4563022600
27.0	3	71	277	10	4563022700
28.0	3	71	277	10	4563022800
29.0	3	73	281	10	4563022900
30.0	3	73	281	10	4563023000
31.0	3	75	285	10	4563023100
32.0	4	77	317	10	4563023200
34.0	4	78	321	10	4563023400
35.0	4	78	321	10	4563023500
36.0	4	79	325	10	4563023600
38.0	4	81	329	10	4563023800
40.0	4	81	329	10	4563024000
41.0	4	82	333	12	4563024100
42.0	4	82	333	12	4563024200
43.0	4	83	336	12	4563024300
44.0	4	83	336	12	4563024400
45.0	4	83	336	12	4563024500
46.0	4	84	340	12	4563024600
47.0	4	84	340	12	4563024700
48.0	4	86	344	12	4563024800
50.0	4	86	344	12	4563025000

HSS TAPER SHANK MACHINE REAMER



HSS DIN 338 H7 LH7°

Series No. 457301



- ▶ O.D.Tolerances : DIN 1420 for H7
- ▶ LH Spiral Flutes / Right Hand Cut
- ▶ Chamfer Angle : 45°

Diameter	Length of Cut	Overall Length	Shank Mts No.	EUROPA CODE
3.0	31	104	1	4573010300
3.5	35	108	1	4573010350
4.0	38	112	1	4573010400
4.5	41	115	1	4573010450
5.0	44	118	1	4573010500
5.5	48	125	1	4573010550
6.0	48	125	1	4573010600
6.5	50	130	1	4573010650
7.0	54	134	1	4573010700
7.5	54	134	1	4573010750
8.0	58	138	1	4573010800
8.5	58	138	1	4573010850
9.0	62	141	1	4573010900
9.5	62	141	1	4573010950
10.0	67	146	1	4573011000
10.5	67	146	1	4573011050
11.0	71	151	1	4573011100
11.5	71	151	1	4573011150
12.0	76	156	1	4573011200
12.5	76	156	1	4573011250
13.0	76	156	1	4573011300
14.0	81	160	1	4573011400
15.0	81	181	2	4573011500
16.0	87	187	2	4573011600
17.0	87	187	2	4573011700
18.0	94	194	2	4573011800
19.0	94	194	2	4573011900
20.0	100	200	2	4573012000
21.0	100	200	2	4573012100
22.0	106	206	2	4573012200
23.0	106	206	2	4573012300
24.0	114	241	3	4573012400
25.0	114	241	3	4573012500
26.0	114	241	3	4573012600
27.0	124	251	3	4573012700
28.0	124	251	3	4573012800
30.0	124	251	3	4573012900
32.0	133	294	4	4573013200

RECOMMENDED CUTTING SPEED



Straight Flute Chucking Reamer, Spiral Flute Chucking Reamer

Material	Cutting Speed (m/min.)	Feed(mm/rev.)					
		Ø2 ~ Ø4	Ø5 ~ Ø8	Ø9 ~ Ø12	Ø13 ~ Ø20	Ø20 ~ Ø30	> Ø30
Steels < 500N/mm ²	12 ~ 16	0.05~0.15	0.10~0.20	0.15~0.25	0.20~0.30	0.25~0.40	0.35~0.50
Steels 500-700N/mm ²	10 ~ 12	0.05~0.15	0.10~0.20	0.15~0.25	0.20~0.30	0.25~0.40	0.35~0.50
Steels 700-800N/mm ²	6 ~ 8	0.05~0.10	0.08~0.16	0.10~0.20	0.15~0.25	0.20~0.30	0.30~0.40
Alloy Steel or Carbon Steel castings < 500N/mm ²	6 ~ 10	0.05~0.10	0.08~0.16	0.10~0.20	0.15~0.25	0.20~0.30	0.30~0.40
Alloy Steel or Carbon Steel castings > 500N/mm ²	4 ~ 6	0.05~0.10	0.08~0.16	0.10~0.20	0.15~0.25	0.20~0.30	0.30~0.40
Alloy Steel or Carbon Steel forgings	4 ~ 6	0.03~0.08	0.06~0.10	0.08~0.15	0.10~0.20	0.15~0.25	0.20~0.30
Cast Iron < 200HB	12 ~ 14	0.05~0.15	0.10~0.20	0.15~0.25	0.20~0.30	0.25~0.40	0.35~0.50
Cast Iron > 200HB	10 ~ 12	0.05~0.10	0.08~0.16	0.10~0.20	0.15~0.25	0.20~0.30	0.30~0.40
Aluminum or Aluminum Alloy	16 ~ 20	0.10~0.20	0.15~0.25	0.20~0.30	0.25~0.40	0.35~0.50	0.40~0.60
Magnesium or Magnesium Alloy	10 ~ 16	0.10~0.20	0.15~0.25	0.20~0.30	0.25~0.40	0.35~0.50	0.40~0.60
Copper, Brass	16 ~ 18	0.10~0.20	0.15~0.25	0.20~0.30	0.25~0.40	0.35~0.50	0.40~0.60
Stainless Steels	4 ~ 6	0.03~0.08	0.06~0.10	0.08~0.15	0.10~0.20	0.15~0.25	0.20~0.30
Plastics	8 ~ 12	0.10~0.20	0.20~0.30	0.30~0.40	0.40~0.50	0.50~0.60	0.60~0.80

Chucking Reamer-Quick Spiral


Material	Cutting Speed (m/min.)	Feed(mm/rev.)			
		Ø2 ~ Ø4	Ø5 ~ Ø8	Ø9 ~ Ø12	Ø13 ~ Ø20
Steels < 500N/mm ²	16 ~ 18	0.08~0.16	0.16~0.25	0.20~0.30	0.30~0.40
Steels 500-700N/mm ²	14 ~ 16	0.08~0.16	0.16~0.25	0.20~0.30	0.30~0.40
Aluminum or Aluminum Alloy	18 ~ 22	0.10~0.20	0.20~0.30	0.30~0.40	0.40~0.60
Magnesium or Magnesium Alloy	10 ~ 16	0.08~0.16	0.16~0.25	0.20~0.30	0.30~0.40
Copper, Brass	16 ~ 20	0.08~0.16	0.16~0.25	0.20~0.30	0.30~0.40
Plastics	12 ~ 14	0.10~0.20	0.20~0.30	0.30~0.40	0.40~0.60



Europa Tool 11th Edition

COUNTERSINKS



PRODUCTS	SERIES	DESCRIPTION	PAGE
 NEW	702301 702302	COUNTERSINKS HSS & COBALT	496
CUTTING DATA			497



COUNTERSINKS HSS & COBALT

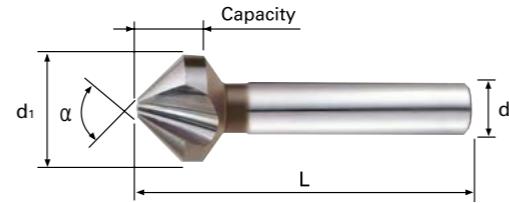


DIN 335C

Series No. 702301, 702302

NEW

► cutting conditions : p.497



Angle $\alpha(-1^\circ)$	Nominal Diameter D_1	Shank Diameter D_2	Overall Length $L(\pm 1)$	Capacity min/max	EUROPA CODE (uncoating) HSS	EUROPA CODE (uncoating) HSSCo8
90°	4.3	4	40	1.3 - 4.3	7023010430	7023020430
90°	5.0	4	40	1.5 - 5	7023010500	7023020500
90°	6.0	5	45	1.5 - 6	7023010600	7023020600
90°	6.3	5	45	1.5 - 6.3	7023010630	7023020630
90°	7.0	6	50	1.8 - 7	7023010700	7023020700
90°	8.0	6	50	2 - 8	7023010800	7023020800
90°	8.3	6	50	2 - 8.3	7023010830	7023020830
90°	10.0	6	50	2.5 - 10	7023011000	7023021000
90°	10.4	6	50	2.5 - 10.4	7023011040	7023021040
90°	11.5	8	56	2.8 - 11.5	7023011150	7023021150
90°	12.4	8	56	2.8 - 12.4	7023011240	7023021240
90°	15.0	10	60	3.2 - 15	7023011500	7023021500
90°	16.5	10	60	3.2 - 16.5	7023011650	7023021650
90°	19.0	10	63	3.5 - 19	7023011900	7023021900
90°	20.5	10	63	3.5 - 20.5	7023012050	7023022050
90°	23.0	10	67	3.8 - 23	7023012300	7023022300
90°	25.0	10	67	3.8 - 25	7023012500	7023022500
90°	30.0	12	71	4.2 - 30	7023013000	7023023000
90°	31.0	12	71	4.2 - 31	7023013100	7023023100

► TiN & TiCN coating are available on your request.

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

RECOMMENDED CUTTING CONDITIONS



Material	V	S		
		$\varnothing \leq 10$	$\varnothing \leq 20$	$\varnothing \leq 30$
STEELS $\leq 500\text{N/mm}^2$	17-22	0.30	0.32	0.36
STEELS 500-800N/mm ²	10-15	0.28	0.30	0.31
STEELS 800-1000N/mm ²	8-12	0.24	0.26	0.28
STEELS-STAINLESS STEEL 1000~1300N/mm ²	6-8	0.20	0.20	0.22
STAINLESS STEELS	4-6	0.08	0.09	0.10
CAST IRON	15-25	0.13	0.19	0.24
ALUMINUM	35-45	0.27	0.30	0.35
BRASS-BRONZE	20-30	0.30	0.30	0.31
COPPER	10-15	0.29	0.30	0.31
PLASTICS	35-70	0.40	0.45	0.50

V : Cutting Speed(mm/min)
S : Feed per Revolution(mm/rev)





TOOLBITS CONTENTS

Europa Tool 11th Edition

TOOLBITS



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PRODUCTS	SERIES	DESCRIPTION	PAGE
	7010	HSS SQUARE	500
	7310	HSS-E SQUARE	500
	7030	HSS ROUND	501
	7330	HSS-E ROUND	501

HSS SQUARE / HSS-E SQUARE



TOOLBITS

Series No. 7010, 7310



- PRODUCED FROM PREMIER STEELS
- DESIGNED FOR USE IN LATHE TOOL APPLICATIONS

A mm	Length	EUROPA CODE
4	63	70100406
6	63	70100606
6	100	70100610
6	160	70100616
8	100	70100810
8	160	70100816
10	100	70101010
10	160	70101016
10	200	70101020
12	100	70101210
12	160	70101216
12	200	70101220
14	160	70101416
16	200	70101620
20	200	70102020

A mm	Length	EUROPA CODE
4	63	73100406
5	63	73100506
6	63	73100606
6	80	73100608
6	100	73100610
8	63	73100806
8	80	73100808
8	100	73100810
8	160	73100816
10	80	73101008
10	100	73101010
10	160	73101016
10	200	73101020
12	80	73101208
12	100	73101210
12	160	73101216
12	200	73101220
14	100	73101410
14	160	73101416
14	200	73101420
16	100	73101610
16	160	73101616
16	200	73101620
20	160	73102016
20	200	73102020

HSS ROUND / HSS-E ROUND



TOOLBITS



Series No. 7030, 7330



- PRODUCED FROM PREMIER STEELS
- DESIGNED FOR USE IN LATHE TOOL APPLICATIONS

A mm	Length	EUROPA CODE
4	63	70300406
4	80	70300408
5	80	70300508
6	63	70300606
6	80	70300608
6	100	70300610
6	160	70300616
8	80	70300808
8	100	70300810
8	160	70300816
10	100	70301010
10	160	70301016
10	200	70301020
12	100	70301210
12	160	70301216
12	200	70301220
16	100	70301610
16	160	70301616
16	200	70301620
20	100	70302010
20	200	70302020

















A mm	Length	EUROPA CODE
4	63	73300406
4	80	73300408
5	80	73300508
6	63	73300606
6	80	73300608
6	100	73300610
6	160	73300616
8	80	73300808
8	100	73300810
8	160	73300816
10	100	73301010
10	160	73301016
10	200	73301020
12	100	73301210
12	160	73301216
12	200	73301220
16	100	73301610
16	160	73301616
16	200	73301620
20	100	73302010
20	200	73302020

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THREAD MILLS



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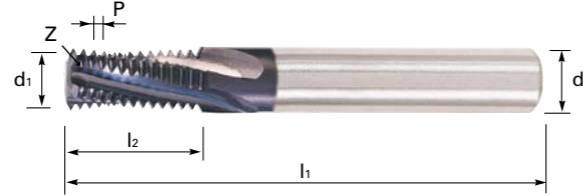
PRODUCTS	SERIES	DESCRIPTION	PAGE
SOLID CARBIDE TIALN THREAD MILL WITHOUT COOLANT HOLE			
	180323	SOLID CARBIDE THREAD MILL FOR ISO METRIC INTERNAL THREAD - DIN 13	504
	181323	SOLID CARBIDE THREAD MILL FOR ISO METRIC FINE INTERNAL THREAD - DIN 13	504
	182323	SOLID CARBIDE THREAD MILL FOR UNC INTERNAL THREAD - ANSI B 1.1	505
	183323	SOLID CARBIDE THREAD MILL FOR UNF INTERNAL THREAD - ANSI B 1.1	505
	183423	SOLID CARBIDE THREAD MILL FOR NPT INTERNAL THREAD	506
SOLID CARBIDE TIALN THREAD MILL WITH COOLANT HOLE			
	190323	SOLID CARBIDE THREAD MILL WITH COOLANT HOLE FOR ISO METRIC INTERNAL THREAD - DIN 13	506
	191323	SOLID CARBIDE THREAD MILL WITH COOLANT HOLE FOR ISO METRIC FINE INTERNAL THREAD - DIN 13	507
	183523	SOLID CARBIDE THREAD MILL WITH COOLANT HOLE FOR BSP(G) INTERNAL/EXTERNAL THREAD	507
SOLID CARBIDE TIALN THREAD MILL WITH COOLANT HOLE & CHAMFER			
	192323	SOLID CARBIDE THREAD MILL WITH COOLANT HOLE & CHAMFER FOR ISO METRIC INTERNAL THREAD - DIN 13	508
	193323	SOLID CARBIDE THREAD MILL WITH COOLANT HOLE & CHAMFER FOR ISO METRIC FINE INTERNAL THREAD - DIN 13	508
	194323	SOLID CARBIDE THREAD MILL WITH COOLANT HOLE & CHAMFER FOR UNC INTERNAL THREAD - ANSI B 1.1	509
	195323	SOLID CARBIDE THREAD MILL WITH COOLANT HOLE & CHAMFER UNF INTERNAL T EAD - ANSI B 1.1	509
	196323	SOLID CARBIDE THREAD MILL WITH COOLANT HOLE & CHAMFER FOR NPT THREAD - ANSI B 1.20.1	510
SOLID CARBIDE TIALN MINIATURE THREAD MILL			
	186323	SOLID CARBIDE MINIATURE THREAD MILL FOR ISO METRIC INTERNAL THREAD - DIN 13	510
	187323	SOLID CARBIDE MINIATURE THREAD MILL FOR UNC INTERNAL THREAD - ANSI B 1.1	511
SOLID CARBIDE TIALN DRILL/CHAMFER & THREAD MILL			
	198323	SOLID CARBIDE DRILL & THREAD MILL WITH CHAMFER FOR ISO METRIC INTERNAL THREAD - DIN 13	511
CUTTING DATA			512 ~ 513

SOLID CARBIDE THREAD MILL FOR ISO METRIC INTERNAL THREAD - DIN 13



Series No. 180323

MATERIAL : SOLID CARBIDE
SHANK : DIN6535 HA
SPRIAL ANGLE :15 DEG
THREAD LENGTH : 2XD



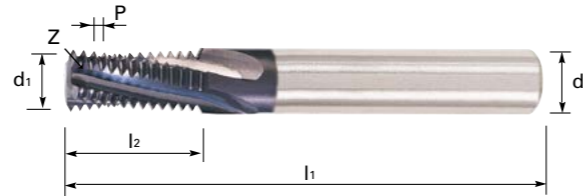
NOMINAL DIA. (D)	PITCH (P)	CUTTER DIA. d1	O/ALL LENGTH l1	THREAD LENGTH l2	SHK DIA. d2	NO.OF FLUTES (Z)	EUROPA CODE
M3	0.5	2.20	57	5	6	3	1803230300
M4	0.7	2.90	57	7	6	3	1803230400
M5	0.8	3.80	57	8	6	3	1803230500
M6	1.0	4.50	57	13	6	3	1803230600
M8	1.25	6.00	65	17.5	6	3	1803230800
M10	1.5	7.50	72	21	8	4	1803231000
M12	1.75	9.50	80	26.25	10	4	1803231200
M14	2.0	10.00	83	30	10	4	1803231400
M16	2.0	12.00	92	34	12	4	1803231600

SOLID CARBIDE THREAD MILL FOR ISO METRIC FINE INTERNAL THREAD - DIN 13



Series No. 181323

MATERIAL : SOLID CARBIDE
SHANK : DIN6535 HA
SPRIAL ANGLE :15 DEG
THREAD LENGTH : 1.5XD



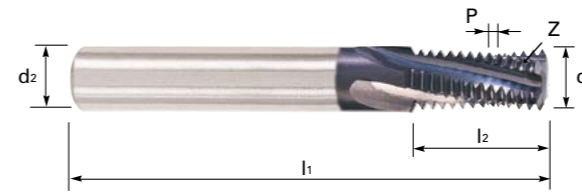
NOMINAL DIA. (D)	PITCH (P)	CUTTER DIA. d1	O/ALL LENGTH l1	THREAD LENGTH l2	SHK DIA. d2	NO.OF FLUTES (Z)	EUROPA CODE
M8	1.0	6.00	57	13	6	3	1813230800
M8	0.75	6.00	57	12.75	6	3	1813230801
M10	1.0	8.00	63	16	8	4	1813231000
M12	1.5	9.50	72	19.5	10	4	1813231200
M12	1.25	9.50	72	18.75	10	4	1813231201
M12	1.00	9.50	72	19	10	4	1813231202
M14	1.50	10.00	83	22.5	10	4	1813231400
M14	1.00	10.00	83	22	10	4	1813231401
M16	1.50	12.00	83	25.5	12	4	1813231600
M16	1.00	12.00	83	25	12	4	1813231601
M18	1.50	14.00	92	28.5	14	5	1813231800
M18	1.00	14.00	92	28	14	5	1813231801
M20	1.50	16.00	92	31.5	16	5	1813232000
M20	1.00	16.00	92	31	16	5	1813232001

SOLID CARBIDE THREAD MILL FOR UNC INTERNAL THREAD - ANSI B 1.1



Series No. 182323

MATERIAL : SOLID CARBIDE
SHANK : DIN6535 HA
SPRIAL ANGLE :15 DEG
THREAD LENGTH : 2XD



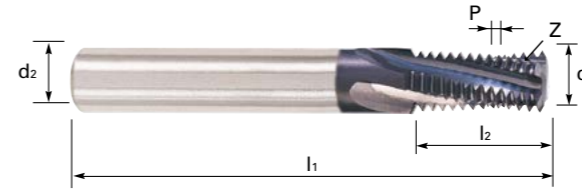
NOMINAL DIA. (D)	PITCH (P)	CUTTER DIA. d1	O/ALL LENGTH l1	THREAD LENGTH l2	SHK DIA. d2	NO.OF FLUTES (Z)	EUROPA CODE
1/4	20	4.50	57	14	6	3	1823230160
5/16	18	5.80	65	16.9	6	3	1823230200
3/8	16	7.00	72	20.6	8	4	1823230240
7/16	14	8.00	72	23.6	8	4	1823230280
1/2	13	9.50	80	27.4	10	4	1823230320
9/16	12	10.00	83	31.8	10	4	1823230360
5/8	11	12.00	92	34.6	12	4	1823230400
3/4	10	14.00	104	40.6	14	5	1823230480
7/8	9	15.90	100	39.51	16	4	1823230560
1"	8	19.20	120	38.1	20	4	1823230640
1.1/8	7	19.90	120	43.54	20	4	1823230720

SOLID CARBIDE THREAD MILL FOR UNF INTERNAL THREAD - ANSI B 1.1



Series No. 183323

MATERIAL : SOLID CARBIDE
SHANK : DIN6535 HA
SPRIAL ANGLE :15 DEG
THREAD LENGTH : 2XD



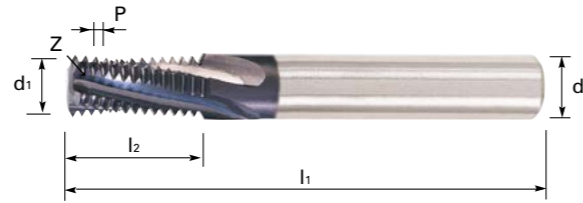
NOMINAL DIA. (D)	PITCH (P)	CUTTER DIA. d1	O/ALL LENGTH l1	THREAD LENGTH l2	SHK DIA. d2	NO.OF FLUTES (Z)	EUROPA CODE
1/4	28	5.00	57	13.6	6	3	1833230160
5/16	24	6.00	65	16.9	6	3	1833230200
3/8	24	8.00	72	20.1	8	4	1833230240
7/16	20	8.00	72	24.1	8	4	1833230280
1/2	20	10.00	80	26.7	10	4	1833230320
9/16	18	12.00	83	29.6	12	4	1833230360
5/8	18	12.00	92	33.9	12	4	1833230400
3/4	16	14.00	104	39.7	14	5	1833230480
7/8	14	15.90	100	39.91	16	4	1833230560
1-1/2	12	15.90	100	38.1	16	4	1833230640

SOLID CARBIDE THREAD MILL FOR NPT INTERNAL THREAD



Series No. 183423

MATERIAL : SOLID CARBIDE
SHANK : DIN6535 HA
SPRIAL ANGLE : 15 DEG
THREAD LENGTH : 2XD



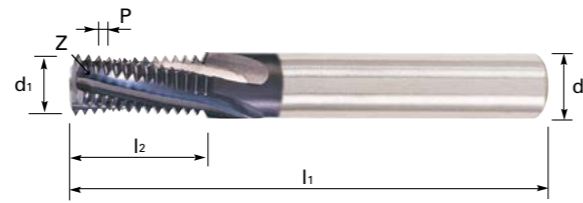
NOMINAL DIA. (D)	PITCH (P)	CUTTER DIA. d1	O/ALL LENGTH l1	THREAD LENGTH l2	SHK DIA. d2	NO.OF FLUTES (Z)	EUROPA CODE
1/8	27	7.6	60	9.41	8	4	1834230080
1/4-3/8	18	9.9	70	14.1	10	4	1834230160
1/2-3/4	14	15.9	100	19.96	16	4	1834230320
1-2.1/2	11.5	15.9	100	26.5	16	4	1834230640

SOLID CARBIDE THREAD MILL WITH COOLANT HOLE FOR ISO METRIC INTERNAL THREAD - DIN 13



Series No. 190323

Material : Solid Carbide
Shank : DIN6535 HA
Spiral Angle : 15°
Thread Length : 2 X D



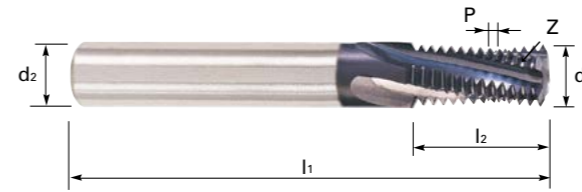
NOMINAL DIA. (D)	PITCH (P)	CUTTER DIA. d1	O/ALL LENGTH l1	THREAD LENGTH l2	SHK DIA. d2	NO.OF FLUTES (Z)	EUROPA CODE
M6	1	4.5	57	13	6	3	1903230600
M8	1.25	6	65	17.5	6	3	1903230800
M10	1.5	7.5	72	21	8	4	1903231000
M12	1.75	9.5	80	26.25	10	4	1903231200
M14	2	10	83	30	10	4	1903231400
M16	2	12	92	34	12	4	1903231600
M20	2.5	16	105	42.5	16	5	1903232000

SOLID CARBIDE THREAD MILL WITH COOLANT HOLE FOR ISO METRIC FINE INTERNAL THREAD - DIN 13



Series No. 191323

Material : Solid Carbide
Shank : DIN6535 HA
Spiral Angle : 15°
Thread Length : 1.5 X D



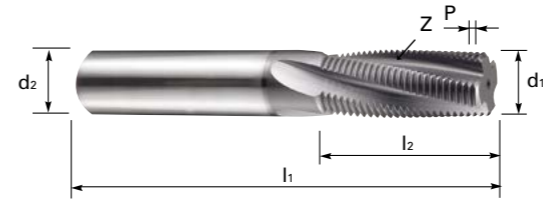
NOMINAL DIA. (D)	PITCH (P)	CUTTER DIA. d1	O/ALL LENGTH l1	THREAD LENGTH l2	SHK DIA. d2	NO.OF FLUTES (Z)	EUROPA CODE
M8	1	6	57	13	6	3	1913230800
M8	0.75	6	57	12.75	6	3	1913230801
M10	1	8	63	16	8	4	1913231000
M12	1.5	9.5	72	19.5	10	4	1913231200
M12	1.25	9.5	72	18.75	10	4	1913231201
M12	1	9.5	72	19	10	4	1913231202
M14	1.5	10	83	22.5	10	4	1913231400
M14	1	10	83	22	10	4	1913231401
M16	1.5	12	83	25.5	12	4	1913231600
M16	1	12	83	25	12	4	1913231601
M18	1.5	14	92	28.5	14	5	1913231800
M18	1	14	92	28	14	5	1913231801
M20	1.5	16	92	31.5	16	5	1913232000
M20	1	16	92	31	16	5	1913232001

SOLID CARBIDE THREAD MILL WITH COOLANT HOLE FOR BSP(G) INTERNAL/EXTERNAL THREAD



Series No. 183523

Material : Solid Carbide
Shank : DIN6535 HA
Spiral Angle : 15°
Internal Coolant Hole



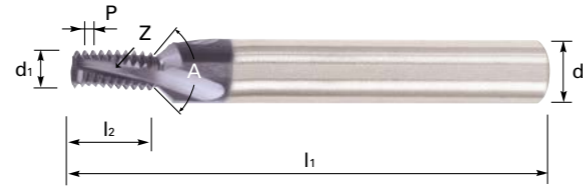
NOMINAL DIA. (D)	PITCH (P)	CUTTER DIA. d1	O/ALL LENGTH l1	THREAD LENGTH l2	SHK DIA. d2	NO.OF FLUTES (Z)	EUROPA CODE
1/16	28	5.9	65	16.3	6	3	1835230040
1/8	28	7.9	70	20.0	8	4	1835230080
1/4	19	9.9	80	26.7	10	4	1835230160
3/8	19	13.9	92	33.4	14	4	1835230240
1/2	14	15.9	104	43.5	16	5	1835230320
3/4	14	17.9	100	34.5	18	5	1835230480
1	11	19.9	100	34.6	20	5	1835230640

SOLID CARBIDE THREAD MILL WITH COOLANT HOLE & CHAMFER FOR ISO METRIC INTERNAL THREAD - DIN 13



Series No. 192323

Material : Solid Carbide
Shank : DIN6535 HA
Spiral Angle : 15°
Thread Length : 2 X D



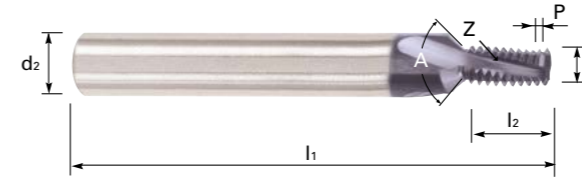
NOMINAL DIA. (D)	PITCH (P)	CUTTER DIA. d1	O/ALL LENGTH l1	THREAD LENGTH l2	SHK DIA. d2	NO.OF FLUTES (Z)	ANGLE (A)	EUROPA CODE
M6	1	4.8	62	12.4	8	3	90	1923230600
M8	1.25	6.5	74	16.8	10	3	90	1923230800
M10	1.5	8.2	80	20.15	12	4	90	1923231000
M12	1.75	9.9	90	25.25	14	4	90	1923231200
M14	2	11.6	100	28.85	16	4	90	1923231400
M16	2	13.6	102	32.85	18	4	90	1923231600

SOLID CARBIDE THREAD MILL WITH COOLANT HOLE & CHAMFER FOR UNC INTERNAL THREAD - ANSI B 1.1



Series No. 194323

Material : Solid Carbide
Shank : DIN6535 HA
Spiral Angle : 15°
Thread Length : 2 X D



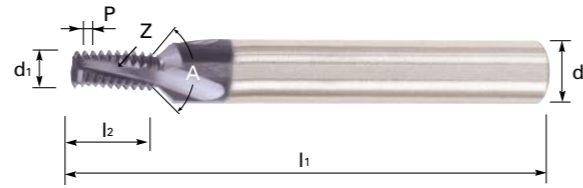
NOMINAL DIA. (D)	PITCH (P)	CUTTER DIA. d1	O/ALL LENGTH l1	THREAD LENGTH l2	SHK DIA. d2	NO.OF FLUTES (Z)	ANGLE (A)	EUROPA CODE
1/4	20	4.8	62	13.3	8	3	90	1943230160
5/16	18	6.2	74	16.18	10	3	90	1943230200
3/8	16	7.6	80	19.8	12	4	90	1943230240
7/16	14	8.9	80	22.62	12	4	90	1943230280
1/2	13	10.3	90	26.32	14	4	90	1943230320
9/16	12	11.7	100	30.63	16	4	90	1943230360
5/8	11	13.1	102	33.41	18	4	90	1943230400
3/4	10	16	110	39.29	20	5	90	1943230480

SOLID CARBIDE THREAD MILL WITH COOLANT HOLE & CHAMFER FOR ISO METRIC FINE INTERNAL THREAD-DIN 13



Series No. 193323

Material : Solid Carbide
Shank : DIN6535 HA
Spiral Angle : 15°
Thread Length : 1.5 X D



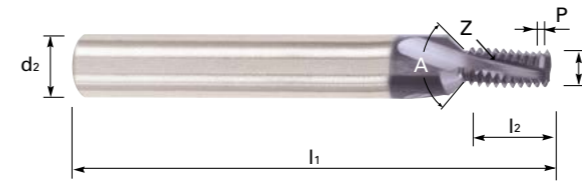
NOMINAL DIA. (D)	PITCH (P)	CUTTER DIA. d1	O/ALL LENGTH l1	THREAD LENGTH l2	SHK DIA. d2	NO.OF FLUTES (Z)	ANGLE (A)	EUROPA CODE
M8	1	6.7	74	12.4	10	3	90	1933230801
M10	1.25	8.3	80	15.9	12	4	90	1933231000
M10	1	8.7	80	15.4	12	4	90	1933231001
M12	1.5	10	90	18.65	14	4	90	1933231200
M12	1.25	10.3	80	18.3	14	4	90	1933231201
M12	1	10.7	90	18.4	14	4	90	1933231202
M14	1.5	12	100	21.65	16	4	90	1933231400
M16	1.5	14	102	24.65	18	5	90	1933231600

SOLID CARBIDE THREAD MILL WITH COOLANT HOLE & CHAMFER UNF INTERNAL THREAD - ANSI B 1.1



Series No. 195323

Material : Solid Carbide
Shank : DIN6535 HA
Spiral Angle : 15°
Thread Length : 2 X D



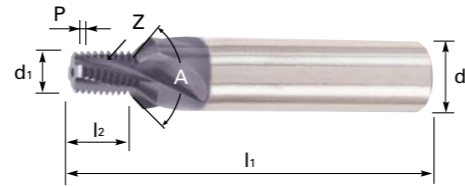
NOMINAL DIA. (D)	PITCH (P)	CUTTER DIA. d1	O/ALL LENGTH l1	THREAD LENGTH l2	SHK DIA. d2	NO.OF FLUTES (Z)	ANGLE (A)	EUROPA CODE
1/4	28	5.1	62	13.21	8	3	90	1953230160
5/16	24	6.5	74	16.37	10	3	90	1953230200
3/8	24	8.1	80	19.54	12	4	90	1953230240
7/16	20	9.4	80	22.19	12	4	90	1953230280
1/2	20	11	90	26	14	4	90	1953230320
9/16	18	12.4	100	28.88	16	4	90	1953230360
5/8	18	14	102	33.12	18	5	90	1953230400
3/4	16	17	110	38.86	20	5	90	1953230480

SOLID CARBIDE THREAD MILL WITH COOLANT HOLE & CHAMFER FOR NPT THREAD - ANSI B 1.20.1



Series No. 196323

Material : Solid Carbide
Shank : DIN6535 HA
Spiral Angle : 15°
Thread Length : 9 X P



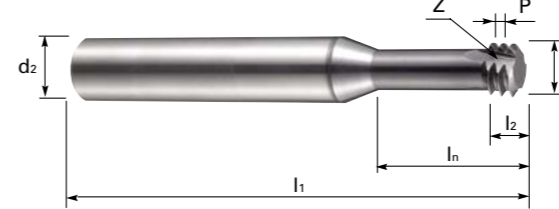
NOMINAL DIA. (D)	PITCH (P)	CUTTER DIA. d1	O/ALL LENGTH l1	THREAD LENGTH l2	SHK DIA. d2	NO.OF FLUTES (Z)	ANGLE (A)	EUROPA CODE
1/16	27	5.9	64	8.9	10	3	90	1963230040
1/8	27	7.8	70	8.9	12	4	90	1963230080
1/4	18	10.05	81	13.4	16	4	90	1963230160
3/8	18	13.45	81	13.4	18	4	90	1963230240

SOLID CARBIDE MINIATURE THREAD MILL FOR UNC INTERNAL THREAD - ANSI B 1.1



Series No. 187323

Material : Solid Carbide
Shank : DIN6535 HA
Spiral Angle : 15°
Thread Length : 3 X P



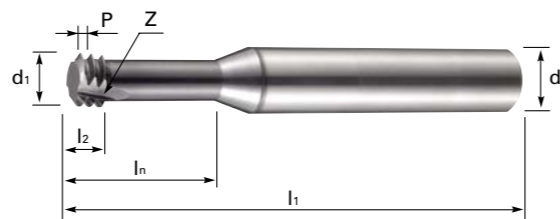
NOMINAL DIA. (D)	PITCH (P)	CUTTER DIA. d1	O/ALL LENGTH l1	THREAD LENGTH l2	SHK DIA. d2	NECK LENGTH ln	NO.OF FLUTES (Z)	EUROPA CODE
No.1	64	1.38	57	1.19	6	3.9	3	1873230100
No.2	56	1.64	57	1.36	6	4.6	3	1873230200
No.4	40	2.08	57	1.91	6	6	3	1873230400
No.6	32	2.55	57	2.38	6	7.4	3	1873230600
No.8	32	3.21	57	2.38	6	8.7	3	1873230800
No.10	24	3.56	57	3.18	6	10.1	3	1873231000
No.12	24	4.22	57	3.18	6	11.5	3	1873231200
1/4	20	4.83	57	3.81	6	13.3	3	1873230160
5/16	18	6.24	63	4.23	8	16.7	3	1873230200
3/8	16	7.62	63	4.76	8	20	3	1873230240
7/16	14	8.94	73	5.44	10	23.3	3	1873230280

SOLID CARBIDE MINIATURE THREAD MILL FOR ISO METRIC INTERNAL THREAD - DIN 13



Series No. 186323

Material : Solid Carbide
Shank : DIN6535 HA
Spiral Angle : 15°
Thread Length : 1.5 X D



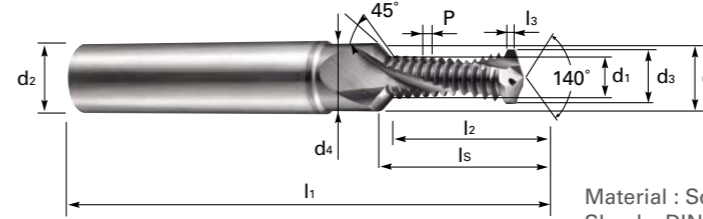
NOMINAL DIA. (D)	PITCH (P)	CUTTER DIA. d1	O/ALL LENGTH l1	THREAD LENGTH l2	SHK DIA. d2	NO.OF FLUTES (Z)	ANGLE (A)	EUROPA CODE
M1.6	0.35	1.18	30	1.05	3	3.4	3	1863230160
M2	0.4	1.52	57	1.2	6	4.2	3	1863230200
M2.2	0.45	1.66	57	1.35	6	4.6	3	1863230220
M2.5	0.45	1.96	57	1.35	6	5.3	3	1863230250
M3	0.5	2.4	57	1.5	6	6.3	3	1863230300
M4	0.7	3.16	57	2.1	6	8.4	3	1863230400
M5	0.8	4.04	57	2.4	6	10.5	3	1863230500
M6	1	4.8	57	3	6	12.6	3	1863230600
M8	1.25	6.5	63	3.75	8	16.8	3	1863230800
M10	1.5	8.2	73	4.5	10	21	3	1863231000
M12	1.75	9.9	73	5.25	10	25.2	3	1863231200

SOLID CARBIDE DRILL & THREAD MILL WITH CHAMFER FOR ISO METRIC INTERNAL THREAD - DIN 13



Series No. 198323

Material : Solid Carbide
Shank : DIN6535 HA
Thread Length : 2 X D
No. of Flute : 2
140° Drill Point, 90° Countersink
Drilling, Chamfering and Thread milling



NOMINAL DIA. (D)	PITCH (P)	CUTTER DIA. d1	Drill Dia. d3	THREAD LENGTH l2	Eff. Lgth ls	Eff. Dia. ds	Max c'sink d4	SHK DIA. d2	Drill lgth l3	O/ALL LENGTH l1	EUROPA CODE
M6	1	4.75	5	13	14.68	6.3	6.6	8	1	62	1983230600
M8	1.25	6.35	6.75	16.27	18.48	8.3	9	10	1.25	74	1983230800
M10	1.5	7.95	8.5	21.05	23.77	10.3	11	12	1.5	79	1983231000
M12	1.75	9.95	10.25	24.21	27.25	12.3	13.5	14	1.5	89	1983231200
M14	2	11.2	12	29.58	33.32	14.3	15.5	16	1.5	102	1983231400

ADVANTAGE OF THREAD MILLING



- Higher cutting speeds and feeds than tapping
- Reduce the horse power required(vs tapping)
- Make smaller, easier to remove, chips than taps
- Controlling chips load thanks to the cutting parameters.
- One tool for blind holes and through holes.
- In some cases, only one tool will machine both internal and external threads.
- Pitch diameter can be controlled by CNC offset.
- One tool for right and left hand threads
- Full thread to the bottom of a blind
- No reversal of the spindle required
- Consistent, predictable production even in exotic materials.
- Exact pitch, no widening of the thread
- Cut multiple lead threads with only program change
- Outstanding workpiece surface thanks to variation of the cutting parameters.

PROGRAMMING OF THREAD MILLING



Program Data

G Codes for Thread Milling

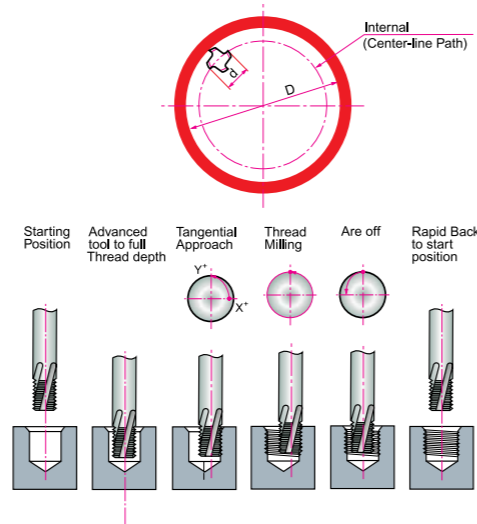
G00 Fast Feed Linear	G41 Cutter Radius Compensation Left	M08 Coolant On
G01 Linear Movement	G42 Cutter Radius Compensation Right	X Horizontal Co-ordinate
G02 Circular/Helical Interpolation C.W.	G43 Tool Length Compensation Plus	Y Horizontal Co-ordinate
G03 Circular/Helical Interpolation A.C.W.	G49 Tool Length Compensation Cancel	Z Vertical Co-ordinate
G17 X,Y Plane(Vertical Machining)	G90 Absolute Command	I X Co-ordinate to Center of Arc Travel
G18 Z, X Plane(Horizontal Machining)	G91 Incremental Command	J Y Co-ordinate to Center of Arc Travel
G19 Y, Z Plane(Using 90 Head)	M03 Clockwise Rotation of Spindle	S Spindle Speed R.P.M.
G40 Cutter Radius Compensation Cancel	M05 Spindle stop	F Feed mm/min

CNC Internal Thread Milling

G90	G00	X...	Y...	Z5	S...
G91	G00	Z...(A3+2)			
		Y...(A5)			
G41	G01	X...(A6)	F...		
G03	X...(A6)	Y...(A6)	Z...(A4)	I...(A6)	J0
G03	X0	Y0	Y...(A2)	I0	J...(A1)
G03	X...(A6)	Y...(A6)	Z...(A4)	I0	J...(A6)
G00	G40	X...(A6)	Y...(A5)		
G90	Z5				

<Explanation of Parameters>

- A1 : 1/2 Nominal Thread Diameter 1/2D
- A2 : Thread Pitch
- A3 : Thread Depth
- A4 : 1/4P(for climb milling and right-hand thread)
- A5 : Beginning of Contour in Y 0.5xP
- A6 : Arc Off (A1 - A5)



RECOMMENDED CUTTING SPEED



Material	Cutting Speed (m/min)	Feed per Tooth(fz)	
		Cutter Diameter ≤ Ø 8.0	Cutter Diameter > Ø 8.0
Low Carbon Steel Medium Carbon Steel	80-250	0.03 0.07	0.05 0.15
High Carbon Steel	50-250	0.03 0.07	0.05 0.15
Alloy Steel	50-180	0.02 0.05	0.05 0.12
Heat Treated Steel	50-180	0.02 0.05	0.05 0.12
Stainless Steel	80-200	0.03 0.07	0.05 0.12
Cast Iron	50-180	0.03 0.07	0.05 0.15
Chrome-Nickel Alloys Titanium Alloys	20-180	0.02 0.05	0.04 0.10
Non Ferrous Material	100-400	0.04 0.10	0.08 0.25

TO CALCULATE SPEED & FEED RATES



Calculate R.P.M of cutter

$$N = \frac{1000 \times V}{d \times \pi}$$

- N: R.P.M
- V: Recommended Cutting Speed
- d: Diameter of Cutter
- F₁: Feed at Cutting Edge
- fz: Recommended Feed per Tooth
- Z: Number of Teeth
- F₂: Feed at Center Line of Cutting
- F₁: Feed at Cutting Edge
- D: Major Diameter of Component

Calculate Feed per Revolution

$$F_1 = fz \times Z \times N$$

Finally Calculate Feed at Tool Center Line

$$F_2 = \frac{F_1 \times (D-d)}{D}$$



THREADING. INDEX





Europa Tool 11th Edition

APPLICATION MACHINE TAPS



www.europatool.co.uk

APPLICATION TAPS CONTENTS

PRODUCTS	TAPPING MATERIALS	THREAD FORM	DESCRIPTION	EUROPA EDP SERIES	PAGE
Spiral Point Tap					
	AL	METRIC COARSE	DIN371/376 HSSE 6H BRIGHT FINISH	TM0516	534
	VA/CS	METRIC COARSE	DIN371/376 HSSE 6HX STEAM TEMPERED	TM3130	538
	VA/CS	METRIC FINE	DIN374 HSSE 6HX STEAM TEMPERED	TM3630	545
	VA/CS	UNC	DIN371/376 HSSE 2B STEAM TEMPERED	TM6430	547
	VA/CS	UNF	DIN371/376 HSSE 2B STEAM TEMPERED	TM6730	549
	VA/CS	METRIC COARSE	DIN371/376 HSSE 6HX HARDSLICK COATED	TM8053	551
	HS	METRIC COARSE	DIN371/376 HSSE 6H BRIGHT FINISH	TM2716	558
	HS	METRIC COARSE	DIN371/376 HSSE 6H TIN COATED	TM2917	560
	GS	BSP	DIN5156 HSSE BRIGHT FINISH	TB0116	564
	GS	METRIC COARSE	DIN352 HSSE 6H BRIGHT FINISH	TM0116	566
	GS	METRIC COARSE	DIN371 HSSE 6H BRIGHT FINISH	TM0316	568
	GS	METRIC COARSE	DIN376 HSSE 6H BRIGHT FINISH	TM0416	569
	GS	METRIC COARSE	DIN371 HSSE 6H TIN COATED	TM1817	572
	GS	METRIC FINE	DIN374 HSSE 6H BRIGHT FINISH	TM3316	574
	GS	UNC	DIN371/376 HSSE 2B BRIGHT FINISH	TM6416	577
	GS	UNF	DIN371/374 HSSE 2B BRIGHT FINISH	TM6716	579
	TI&NI	METRIC COARSE	DIN371/376 HSS-PM 6H BRIGHT FINISH	TM7110	539
	NI	METRIC COARSE	DIN371/376 HSS-PM 6HTiAlN COATED	TM7328	540
Cold Forming Tap					
	GV	METRIC COARSE	DIN371/376 HSSE 6HX TIN COATED	TM3817	553
	GV	METRIC COARSE	DIN371/376 HSSE 6HX TiAlN COATED	TM3827	554
Straight Flute Tap					
	GG	METRIC COARSE	DIN371/376 HSSE 6H NITRIDED FINISH	TM0731	562
	GG	METRIC COARSE	DIN371/376 HSSE 6HX TIN COATED	TM0917	563
	GS	METRIC COARSE	DIN357 HSSE 6H BRIGHT FINISH NUTTAPS	TM5016	576

APPLICATION TAPS CONTENTS

PRODUCTS	TAPPING MATERIALS	THREAD FORM	DESCRIPTION	EUROPA EDP SERIES	PAGE
Spiral Flute Tap					
	AL	METRIC COARSE	DIN371/376 HSSE 6H BRIGHT FINISH	TM3716	535
	CS	METRIC COARSE	DIN371/376 HSSE 6H STEAM TEMPERED	TM1730	536
	VA/CS	METRIC COARSE	DIN371/376 HSSE 6H STEAM TEMPERED RECESSED	TM2530	537
	VA/CS	METRIC FINE	DIN374 HSSE 6H STEAM TEMPERED	TM3830	546
	VA/CS	UNC	DIN371/376 HSSE 2B STEAM TEMPERED	TM6530	548
	VA/CS	UNF	DIN371/376 HSSE 2B STEAM TEMPERED	TM6830	550
	VA/CS	METRIC COARSE	DIN371/376 HSSE 6HX HARDSLICK COATED	TM8153	552
	HS	METRIC COARSE	DIN371/376 HSSE 6H STEAM TEMPERED	TM1530	555
	HS	METRIC COARSE	DIN371/376 HSSE 6H STEAM TEMPERED RECESSED	TM2130	556
	HS	METRIC COARSE	DIN371/376 HSSE 6H STEAM TEMPERED	TM2330	557
	HS	METRIC COARSE	DIN371/376 HSSE 6H TIN COATED	TM2817	559
	HS	METRIC COARSE	DIN371/376 HSSE 6H BRIGHT FINISH	TM6316	561
	GS	BSP	DIN5156 HSSE BRIGHT FINISH	TB0216	565
	GS	METRIC COARSE	DIN352 HSSE 6H BRIGHT FINISH	TM0216	567
	GS	METRIC COARSE	DIN371/376 HSSE 6H 20DEG SPIRAL BRIGHT FINISH	TM1316	570
	GS	METRIC COARSE	DIN371/376 HSSE 6H BRIGHT FINISH	TM1716	571
	GS	METRIC COARSE	DIN371/376 HSSE 6H TIN COATED	TM1917	573
	GS	METRIC FINE	DIN374 HSSE 6H BRIGHT FINISH	TM3416	575
	GS	UNC	DIN371/376 HSSE 2B BRIGHT FINISH	TM6516	578
	GS	UNF	DIN371/374 HSSE 2B BRIGHT FINISH	TM6816	580
	TI&NI	METRIC COARSE	DIN371/376 HSS-PM 6H BRIGHT FINISH	TM7210	541
	NI	METRIC COARSE	DIN371/376 HSS-PM 6HTiAlN COATED	TM7428	542
Universal Taps					
	UNI	METRIC COARSE	UNITAP SPIRAL POINT FOR MULTI MATL	TM8140	543
	UNI	METRIC COARSE	UNITAP SPIRAL FLUTE FOR MULTI MATL	TM8040	544

EXPLANATION OF ABBREVIATIONS

SURFACE TREATMENT AND COATING

The High Speed Steels we use grant a good wear resistance and toughness. Therefore we normally deliver our taps with bright, untreated surface. In machining certain materials, various surface treatments are of advantage.

Working Materials

AL	Aluminium & Aluminium Alloys
GS	Steels with good machinability $R_m < 750 \text{ N/mm}^2$
HS	Heat treated and heat-resistant steels $R_m > 750 \text{ N/mm}^2$
VA	Stainless steels
CS	Carbon steels with low contents of alloy $R_m < 600 \text{ N/mm}^2$
GV	Any material with atleast 8-10% elongation
GG	Grey Cast Iron
TI	Titanium alloys
NI	Nickel alloys
UNI	Multi-Purpose
HS	High alloyed steels $R_m > 1,200 \text{ N/mm}^2$

❖ STEAM TEMPERED (vap)

The Steam Tempered is a Fe_3O_4 -oxyd-coating which reduces the friction between tool and workpiece and prevents cold welding.

❖ NITRIDING (NI)

We recommend this surface treatment for machining materials which effect a hard wear / abrasion, such as grey cast iron, alu-alloys with high Si-percentage more than 10%.

These are surface finishes of good value and suitable for many application. We do these surface treatments within our own company.

Further surface finishes are the various coatings.

❖ TiN-COATING (TiN)

The TiN-coating has a hardness of approx. **2,300 HV** and is temperature-resistant up to approx. **600°C**. This is an excellent all-round coating for normal applications.
Colour : **Golden** Coefficient of friction against steel : 0.4

❖ TiCN-COATING (TiCN)

TiCN takes place of TiN when the conditions require the coating to have a different hardness and toughness. The TiCN brings advantage in machining very difficult steels or cutting interrupted bores. The TiCN-coating has a hardness of approx. **3,000 HV**, but is temperature-resistant up to approx. **400°C** only. That means TiCN needs an excellent cooling for long service life.
Colour : **Blue-Grey** Coefficient of friction against steel : 0.4

❖ TiAlN-COATING (TiAlN)

This is a special coating for machining abrasive materials such as : grey cast iron, alu-alloys with silicon, fiber reinforced plastics, etc., or machining under high temperatures, which means with insufficient cooling, or high speeds $\geq 600 \text{ m/min}$. The TiAlN has a hardness of approx. **3,000 HV** and is temperature resistant up to approx. **800°C**.
Colour : **Violet-Grey** Coefficient of friction against steel : 0.4

❖ Hardslick-COATING (Hardslick)

Hardslick combines in a novel way the advantages of an extremely hard, thermally stable TiAlN-coating with the sliding and lubricating properties of an outer WC/C (Tungsten carbide/carbon)-coating. The Hardslick coating has a hardness of approx. **3,000 HV** and is temperature-resistant up to approx. **800°C**.
Colour : **Violet-Grey** Coefficient of friction against steel : 0.2

Surface Treatment and Coating

vap	Steam Tempered
TiN	TiN-Coated (Titanium Nitride)
NI	Nitrided
TiCN	TiCN-Coating (Titanium Carbon Nitride)
TiAlN	TiAlN-Coating (Titanium Aluminium Nitride)

Chamfer Lead acc. To DIN2197

A	Form A (Chamfer Lead 5-6Threads)
B	Form B (with GUN-Nose and Chamfer Lead 4-5Threads)
C	Form C (Chamfer Lead 2-3Threads)
D	Form D (Chamfer Lead 4-5Threads)
E	Form E (Chamfer Lead 1.5-2Threads)

EXAMPLES FOR APPLICATION MATERIAL GROUPS

NEW TOLERANCE NOTATIONS TO DIN EN 22857 For taps with metric ISO threads

The standard DIN 802 part 1 has been withdrawn and replaced by DIN EN 22857.

The following chart gives a comparison between the new standard DIN EN 22857 and the withdrawn standard DIN 802 part 1. An important change is the re-classification from tap tolerance classes to tap application classes.

11 Magnetic Soft Steels < 400 N/mm ²	12 Structure/Case Carburizing Steels < 700 N/mm ²	13 Plain Carbon Steels < 850 N/mm ²	14 Alloy Steels < 850 N/mm ²
1.1013 RFe 100 1.1014 RFe 80 1.1015 RFe 60 1.0718 9 S MnPb 28	1.0037 St 37-2 1.0050 St 50-2 1.0060 St 60-2 1.0070 St 70-2 1.0401 C 15 1.1141 Ck 15	1.0501 C 35 1.0503 C 45 1.0535 C 55 1.0601 C 60 1.1181 Ck 35 1.1191 Ck 45	1.2080 X210Cr12 1.2363 X100CrMoV5-1 1.3243 S 6-5-2-5 1.3343 S 6-5-2 1.7218 25CrMo4 1.7220 34CrMo4
15 Alloy, Hardened & Tempered Steels < 1,200 N/mm ²	16 Alloy, Hardened & Tempered Steels > 1,200 N/mm ²	21 Free machining stainless Steels < 850 N/mm ²	22 Austenitic stainless Steels < 850 N/mm ²
1.2581 X30WCrV9 3 1.2622 X60WCrMoV9 1.2550 60WCrV7 1.6580 30CrNiMo8 1.7361 32CrMo12 1.8515 31CrMo12	To this group belong most of the materials of group 15, but present a higher tensile strength.	1.4005 X12CrS13 1.4006 X10Cr13 1.4016 X6Cr17 1.4104 X12CrMoS17 1.4305 X10CrNiS18 9	1.4301 X5CrNi18 10 1.4406 X2CrNiMoN17 12 2 1.4435 X2CrNiMo18 14 3 1.4541 X6CrNiTi18 10 1.4571 X6CrNiMoTi17 12 2 1.4828 X15CrNiSi20 12
23 Martensitic/Ferritic/Fer.-Aus. Stainless Steels < 1,000 N/mm ²	31 Grey graphite cast irons < 500 N/mm ²	32 Grey graphite cast irons < 1,000 N/mm ²	33 Nodular graphite, Malleable cast irons < 700 N/mm ²
1.4112 X90CrMoV18 1.4125 X105CrMo17 1.4002 X6CrAl13 1.4512 X6CrTi12 1.4582 X4CrNiMoNb25 7 1.4821 X20CrNiSi25 4	0.6015 GG-15 0.6020 GG-20 0.6025 GG-25 0.6030 GG-30 0.6035 GG-35 0.6040 GG-40	0.6020 GG-20 0.6025 GG-25 0.6030 GG-30 0.6035 GG-35 0.6040 GG-40	0.7040 GGG-40 0.7043 GGG-40.3 0.7050 GGG-50 0.7060 GGG-60 0.7070 GGG-70 0.7080 GGG-80
34 Nodular graphite, Malleable cast irons < 1,000 N/mm ²	41 Titanium unalloys < 700 N/mm ²	42 Titanium alloys < 900 N/mm ²	43 Titanium alloys < 1,300 N/mm ²
0.7040 GGG-40 0.7043 GGG-40.3 0.7050 GGG-50 0.7060 GGG-60 0.7070 GGG-70 0.7080 GGG-80	3.7024 Ti99.5 3.7034 Ti99.7 3.7035 Ti2 3.7055 Ti99.4 3.7064 Ti99.2 3.7065 Ti4	TiA14Mn4 3.7114 TiA15Sn2 3.7124 TiCu2 3.7164 TiA16V4 3.7174 TiA16V6Sn2	3.7124 TiCu2 3.7144 TiA16Sn2Zr4Mo2 3.7154 TiAl6Zr5 3.7164 TiA16V4 3.7174 TiA16V6Sn2 3.7184 TiAl4Mo4Sn2
51 Nickel unalloys < 500 N/mm ²	52 Heat resisting Nickel alloys < 900 N/mm ²	53 Heat resisting Nickel alloys < 1,400 N/mm ²	61 Copper unalloys < 350 N/mm ²
2.1504 NiAlBz 2.4042 Ni99CrSi 2.4060 Ni99.6 2.4062 Ni99.4Fe	2.4360 Monel 400 2.4374 Monel 500 2.4665 Hastelloy X 2.4812 Hastelloy C 2.4816 Inconel 600 1.4876 Incoloy 800	2.4632 Nimonic90 2.4634 Nimonic105 2.4662 Nimonic901 2.4668 Inconel 718 2.4669 Inconel X-750	2.0060 E-Cu57 2.0070 SE-Cu 2.0090 SF-Cu 2.1356 CuMn3 2.1522 CuSi2Mn
62 Short chip Brass, Bronze copper alloys < 700N/mm ²	63 Long chip Brass, Bronze copper alloys < 700 N/mm ²	64 Cu-Al-Fe alloys < 1,500 N/mm ²	71 Aluminium-Magnesium unalloys < 350 N/mm ²
2.0360 CuZn40 (Ms60) 2.0380 CuZn39Pb2 (Ms58) 2.0410 CuZn44Pb2 2.0580 CuZn40Mn1Pb 2.1086 G-CuSn10Zn 2.1096 G-CuSn5ZnPb	2.0250 CuZn20 2.0321 CuZn37 2.1020 CuSn6 2.1080 CuSn6Zn6 2.1245 CuBel.7 2.1293 CuCrZr	Ampco 18 Ampco 20 Ampco 25	3.0250 Al99.5H 3.0280 Al99.8H 3.0305 Al99.9 3.3308 Al99.9Mg0.5
72 Aluminium alloys, Si < 0.5% < 600 N/mm ²	73 Aluminium alloys, 0.5-10% Si < 600 N/mm ²	74 Aluminium alloys, Si > 10% < 600 N/mm ²	81 Thermoplastics
3.0515 AlMn1 3.0525 AlMn1Mg0.5 3.1325 AlCuMg1 3.3315 AlMg1 3.3241 G-AlMg3Si 3.3292 GD-AlMg9	3.2134 G-AlSi5Cu1Mg 3.2152 GD-AlSi6Cu4 3.2162 GD-AlSi8Cu3 3.2373 G-AlSi9Mg	3.2381 G-AlSi10Mg 3.2383 G-AlSi10Mg(Cu) 3.2581 G-AlSi12 3.2583 G-AlSi12(Cu) 3.5662 G-MgA16 3.5812 G-MgA18Zn1	Delrin(POM) Teflon Nylon
82 Thermosetting plastics	83 Reinforced plastics materials	Reference: DIN	
Bakelit Novopan	Glass fiber reinforced Thermo and Duroplastics		

Application classes for taps to DIN EN 22857		Tolerance classes to withdrawn standard DIN 802 part 1	Allotment of the tolerance zones of the nut thread to be cut				
Name	Code		4H	5H	6H	7H	8H
Class 1	ISO 1	4H	4H	5H	-	-	-
Class 2	ISO 2	6H	4G	5G	6H	-	-
Class 3	ISO 3	6G	-	-	6G	7H	8H
-	-	7G	-	-	-	7G	8G

A suitable transition period is to be expected.

Codes for tolerance classes 7G/8G and <X> tolerance zones have not yet been standardised within DIN EN 22857 and the values from DIN 802 part 1 will continue to be valid.

CUTTING SPEED TABLE Cutting Speeds m/min. into revolutions per minute

Tool Dia.	Cutting Speed m/min.															
	Tool r.p.m.															
	1	2	3	4	5	6	8	10	12	15	20	25	30	40	50	60
1	318	637	955	1274	1592	1910	2548	3185	3822	4777	6396	7962	9554	12739	15924	19108
2	159	318	478	637	796	955	1274	1592	1911	2388	3185	3981	4777	6369	7962	9554
3	106	212	318	425	531	637	849	1062	1274	1592	2123	2654	3185	4246	5308	6369
4	80	159	239	318	398	478	637	796	955	1194	1592	1990	2389	3185	3981	4777
5	64	127	191	255	318	382	510	637	764	955	1274	1592	1911	2548	3185	3822
6	53	106	159	212	265	318	425	531	637	796	1062	1327	1592	2123	2653	3185
8	40	80	119	159	199	239	318	398	478	597	796	955	1194	1592	1990	2388
10	31	64	96	127	159	191	255	318	382	478	637	796	955	1274	1592	1911
12	26	53	80	106	133	159	212	265	318	398	531	663	796	1062	1327	1592
14	23	45	68	91	114	136	182	227	273	341	455	569	682	910	1137	1365
16	20	40	60	80	100	119	159	199	239	299	398	498	597	796	995	1194
18	18	35	53	71	88	106	142	177	212	265	354	442	531	708	885	1062
20	16	32	48	64	80	96	127	159	191	239	318	398	478	637	796	955
25	13	25	38	51	64	76	102	127	153	191	255	318	382	510	637	764
30	11	21	32	42	53	64	85	106	127	159	212	265	318	425	531	637
35	9	18	27	36	45	55	73	91	109	136	182	227	273	364	455	546
40	8	16	24	32	40	48	64	80	96	119	159	199	239	318	398	478

MATERIAL GROUP



STANDARDS

GERMANY		FRANCE AFNOR	GREAT BRITAIN B.S.	EN & OTHER CLASSIFICATIONS	U.S.A. AISI
W.Nr	DIN				

10. STEEL

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				
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/mm²

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

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STANDARDS

GERMANY		FRANCE AFNOR	GREAT BRITAIN B.S.	EN & OTHER CLASSIFICATIONS	U.S.A. AISI
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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 06-05-05-04-02	BM 35		M 35
1.3247	S 2-10-1-8	Z110DKCVV 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 - Alloy cast irons

1.5919	GS-15Cr Ni 6	16 NC 6			3115
1.7218	GS-25Cr Mo 4	25 C D 4	70 8A 25		4130
1.7220	GS-34Cr Mo 4	35 C D 4	70 8A 37		4135 4137
1.7379	GS-18 Cr Mo 9 10				

14.4 - 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

14.5 - 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		

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 CrW 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 WCrV 7	55WC 20	BS 1		S 1
1.2567	X 30 W Cr V 5 3	Z 32 WCV 5			

MATERIAL GROUP



APPLICATION MACHINE TAPS

STANDARDS					
GERMANY		FRANCE AFNOR	GREAT BRITAIN B.S.	EN & OTHER CLASSIFICATIONS	U.S.A. AISI
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15.3 -Hardened tempered steels - Hardness may be different 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			
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

20. STAINLESS STEELS

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 Cr Ni 18 10	Z 3 CN 18-07 Az	304 S 61		304 LN
1.4406	X 2 Cr Ni Mo N 17 12 2	Z 3 CND 17 11 02	316 S 61		316 LN
1.4433	X 2 Cr Ni Mo 18 15		316 S		
1.4435	X 2 Cr Ni Mo 18 14 3	Z3 CND 17-12-03	316 S 11		316 L
1.4539	X 1 Cr Ni Mo Cu 25 20 5	Z 1 NCDU 25-20	321 S 17		UNS N08904
1.4541	X 6 Cr Ni Ti 18 10	Z 6 CNT 18 10	321 S 18	EN 58 J, 316	321
1.4571	X 6 Cr Ni Mo Ti 17 12 2	Z 6 CNDT 17 12	320 S 18		316Ti
1.4573	X 10 Cr Ni Mo Ti 18 12		320 S 33		
1.4828	X 15 Cr Ni Si 20 12	Z 15 CNS 20-12	309 S 24		309

22.1 - Cast austenitic stainless steels

1.4308	G-X 6 Cr Ni 18 9	Z 6 CN 18.10 M	304 C 15(LT196)		CF-8
1.4313	G-X 5 Cr Ni 13 4	Z 8 CD 17-01	425 C 12		CA 6 -NM
1.4408	G-X 6 Cr Ni Mo 18 10		316 C 16(LT196)		CF-8M
1.4581	G-X 5 Cr Ni Mo Nb 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 Cr Ni 17 2	Z 15 CN 16-02	431 S 29		431
1.4112	X 90 Cr Mo V 18				
1.4116	X 45 Cr Mo V 15			EN 58, b.e.j.t	
1.4125	X 105 Cr Mo 17	Z 100 CD 17		Duplex alloys	440 C
1.4718	X 45 Cr Si 9 3	Z 45 CS 9	401 S 45		HNV 3
1.4747	X 80 Cr Ni Si 20	Z 80 CSN 20-02	443 S 65		HNV 6
1.4086	G-X 120 Cr 29				
1.4106	G-X 10 Cr Mo 13				
1.4138	G-X 120 Cr Mo 29 2				

24. 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		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			430Ti
1.4512	X 6 Cr Ti 12	Z 6 CT 12	409 S 19		409

25. Ferritic-Austenitic stainless steels - Hardness < 320 HB 30 - Tensile strength < 1,100 N/mm²

1.4460	X 8 Cr Ni Mo 27 5	Z 5 CND 27-05 Az			329
1.4582	X 4 Cr Ni Mo Nb 25 7				
1.4821	X 20 Cr Ni Si 25 4				

30. CAST IRONS

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

MATERIAL GROUP



APPLICATION MACHINE TAPS

STANDARDS					
GERMANY		FRANCE AFNOR	GREAT BRITAIN B.S.	EN & OTHER CLASSIFICATIONS	U.S.A. AISI
W.Nr	DIN				

31.1 - Meehanite - Hardness < 150 HB 30 - Tensile strength < 500 N/mm²

.....	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/mm²

.....	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/mm²

	SF 400				
	SPF 600				

34. Nodular graphite, tempered malleable cast irons - Hardness 200-300 HB 30 - Tensile strength 700-1,000 N/mm²

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

And materials from group 33 tempered

34.1 - Meehanite - Hardness 200-300 HB 30 - Tensile strength 700-1,000 N/mm²

	SH 800		420/12, P 440/7		
	SH 1000				

40. TITANIUM

41. Titanium, unalloys - 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

	Ti Al 4 Mn 4				
3.7144 LN	Ti Al 5 Sn 2				
3.7124 LN	Ti Cu 2		TA 10-14, TA 17	Ti - 2AL	
3.7164 LN	Ti Al 6 V 4		TA 18		
3.7174 LN	Ti Al 6 V 6 Sn 2				

43. Titanium, alloys - Hardness 270-300 HB 30 - Tensile strength 900-1,300 N/mm²

3.7124 LN	Ti Cu 2				
3.7144 LN	Ti Al 6 Sn 2 Zr4 Mo2			Ti AL	
3.7154 LN	Ti Al 6 Zr 5		TA 10-13, TA 28	3.7174LN, 3.7148LN	
3.7164 LN	Ti Al 6 V 4				
3.7174 LN	Ti Al 6 V Sn 2				
3.7184 LN	Ti Al 4 Mo 4 Sn 2				

50. NICKEL

51. Nickel, unalloys - 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				

MATERIAL GROUP



APPLICATION MACHINE TAPS

STANDARDS					
GERMANY		FRANCE AFNOR	GREAT BRITAIN B.S.	EN & OTHER CLASSIFICATIONS	U.S.A. AISI
W.Nr	DIN				

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			Haynes Alloys 263	
1.4876	Incoloy 800				
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 X-750				
2.4670 LN	Nimocast 713				
2.4674 LN	Nimocast PK 24				
2.4856	Inconel 625				
2.6554 LN	Waspaloy				

60. COPPER

61. Copper, unalloys - Hardness < 100 HB 30 - Tensile strength < 350 N/mm²

2.0060	E - Cu 57				
2.0070	SE - Cu			Commercially 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)				

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	

MATERIAL GROUP



APPLICATION MACHINE TAPS

STANDARDS					
GERMANY		FRANCE AFNOR	GREAT BRITAIN B.S.	EN & OTHER CLASSIFICATIONS	U.S.A. AISI
W.Nr	DIN				

70. ALUMINIUM - MAGNESIUM

71. Aluminium - Magnesium, unalloys - Hardness < 100 HB 30 - Tensile strength < 350 N/mm²

3.0250	Al 99.5 H				
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				
3.0516	S-Al Mn				
3.0525	Al Mn 1 Mg 0.5				
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 4Ti				
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				
3.2152	GD - Al Si 6 Cu 4				
3.2162	GD - AL SI 8 CU 3				
3.2373	G - AL SI 9 MG				

74. Aluminium alloys, Si > 10% - Hardness < 180 HB 30 - Tensile strength < 600 N/mm²

74.1 - Cast aluminium alloys

3.2381	G - AL SI 10 MG				
3.2383	G - AL SI 10 MG (CU)				
3.2581	G - AL SI 12				
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				

M ISO metric coarse threads DIN 13
Metrisches ISO-Gewinde DIN 13



HSS-E DIN 371/376 6H 60° B Bright

Cat.-No. TM0516

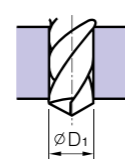
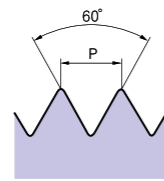
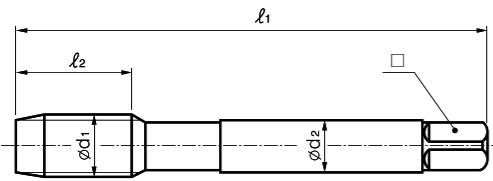
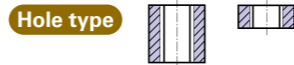


DIN 371

INTERRUPTED THREAD
ALUMINIUM & ALUMINIUM ALLOYS
SPIRAL POINT



See page : 528-533
61-71-72-73



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	8	45	2.8	2.1	1.6	TM05160200
M 2.5	X	0.45	9	50	2.8	2.1	2.05	TM05160250
M 3	X	0.5	6	56	3.5	2.7	2.5	TM05160300
M 4	X	0.7	7	63	4.5	3.4	3.3	TM05160400
M 5	X	0.8	8	70	6	4.9	4.2	TM05160500
M 6	X	1.0	10	80	6	4.9	5	TM05160600
M 8	X	1.25	13	90	8	6.2	6.8	TM05160800
M 10	X	1.5	15	100	10	8	8.5	TM05161000
M 12	X	1.75	18	110	9	7	10.2	TM06161200
M 14	X	2.0	26	110	11	9	12	TM06161400
M 16	X	2.0	20	110	12	9	14	TM06161600
M 18	X	2.5	30	125	14	11	15.5	TM06161800
M 20	X	2.5	32	140	16	12	17.5	TM06162000

ALL DIMENSIONS ARE IN MM
DIN 371(M2-M10) DIN 376(M12-M16)

M ISO metric coarse threads DIN 13
Metrisches ISO-Gewinde DIN 13



HSS-E DIN 371/376 6H 60° C Bright R45

Cat.-No. TM3716



DIN 371

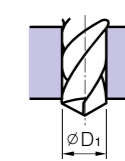
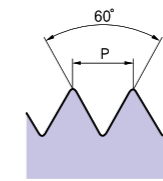
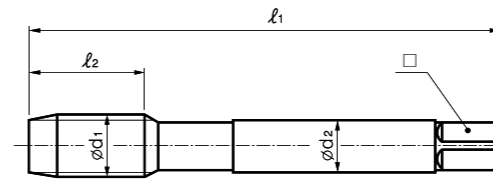
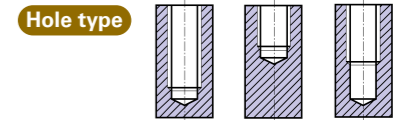


DIN 376

ALUMINIUM & ALUMINIUM ALLOYS
SPIRAL FLUTE



See page : 528-533
71-72-73



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	8	45	2.8	2.1	1.6	TM37160200
M 2.5	X	0.45	9	50	2.8	2.1	2.05	TM37160250
M 3	X	0.5	6	56	3.5	2.7	2.5	TM37160300
M 3.5	X	0.6	7	56	4	3	2.9	TM37160350
M 4	X	0.7	7	63	4.5	3.4	3.3	TM37160400
M 5	X	0.8	8	70	6	4.9	4.2	TM37160500
M 6	X	1.0	10	80	6	4.9	5	TM37160600
M 8	X	1.25	13	90	8	6.2	6.8	TM37160800
M 10	X	1.5	15	100	10	8	8.5	TM37161000
M 12	X	1.75	18	110	9	7	10.2	TM37161200
M 14	X	2.0	20	110	11	9	12	TM37161400
M 16	X	2.0	20	110	12	9	14	TM37161600
M 18	X	2.5	25	125	14	11	15.5	TM37161800
M 20	X	2.5	25	140	16	12	17.5	TM37162000

ALL DIMENSIONS ARE IN MM
DIN 371(M2-M10) DIN 376(M12-M20)

M ISO metric coarse threads DIN 13
Metrisches ISO-Gewinde DIN 13



Cat.-No. TM1730

CARBON STEELS WITH LOW
CONTENTS OF ALLOY UP TO 600NM
SPIRAL FLUTE



DIN 371

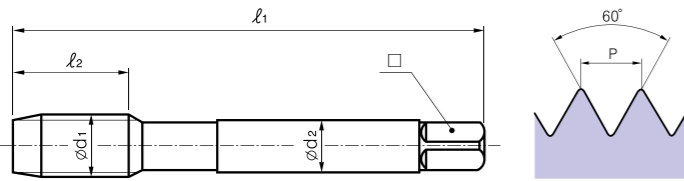
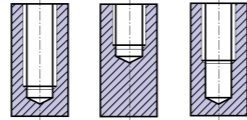


DIN 376



See page : 528-533
11-12-22

Hole type



Ød ₁ mm	X	P mm	l ₂	l ₁	d ₂	sq	Tapping drill diameter	EUROPA CODE
M 3	X	0.5	6	45	3.5	2.7	2.5	TM17300300
M 4	X	0.7	7	63	4.5	3.4	3.3	TM17300400
M 5	X	0.8	8	70	6	4.9	4.2	TM17300500
M 6	X	1.0	10	80	6	4.9	5	TM17300600
M 8	X	1.25	13	90	8	6.2	6.8	TM17300800
M 10	X	1.5	15	100	10	8	8.5	TM17301000
M 12	X	1.75	18	110	9	7	10.2	TM18301200
M 14	X	2.0	20	110	11	9	12	TM18301400
M 16	X	2.0	20	110	12	9	14	TM18301600
M 18	X	2.5	25	125	14	11	15.5	TM18301800
M 20	X	2.0	25	140	16	12	17.5	TM18302000

ALL DIMENSIONS ARE IN MM
DIN 371(M3-M10) DIN 376(M12-M20)

M ISO metric coarse threads DIN 13
Metrisches ISO-Gewinde DIN 13



Cat.-No. TM2530

WITH RECESSED THREADS
FOR STAINLESS STEELS & TOUGH MATERIALS
SPIRAL FLUTE



DIN 371



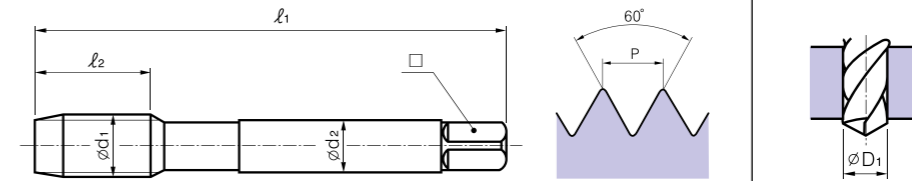
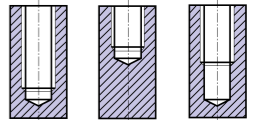
DIN 376

※ With recessed threads for machining tapping of deep blind holes.



See page : 528-533
11-12-21-22-23

Hole type



Ød ₁ mm	X	P mm	l ₂	l ₁	d ₂	sq	Tapping drill diameter	EUROPA CODE
M 3	X	0.5	6	56	3.5	2.7	2.5	TM25300300
M 4	X	0.7	7	63	4.5	3.4	3.3	TM25300400
M 5	X	0.8	8	70	6	4.9	4.2	TM25300500
M 6	X	1.0	10	80	6	4.9	5	TM25300600
M 8	X	1.25	13	90	8	6.2	6.8	TM25300800
M 10	X	1.5	15	100	10	8	8.5	TM25301000
M 12	X	1.75	18	110	9	7	10.2	TM26301200
M 14	X	2.0	20	110	11	9	12	TM26301400
M 16	X	2.0	20	110	12	9	14	TM26301600
M 18	X	2.5	25	125	14	11	15.5	TM26301800
M 20	X	2.5	25	140	16	12	17.5	TM26302000

ALL DIMENSIONS ARE IN MM
DIN 371(M4-M10) DIN 376(M12)

M ISO metric coarse threads DIN 13 Metrisches ISO-Gewinde DIN 13



HSS-E
DIN 371/376
6HX
60°
B
vap

Cat.-No. TM3130

FOR STAINLESS STEELS & TOUGH MATERIALS
SPIRAL POINT

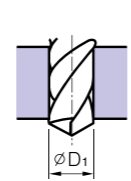
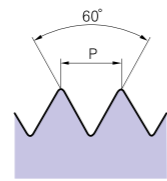
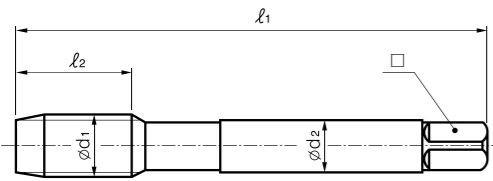
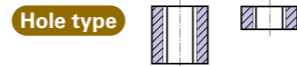


DIN 371

DIN 376



See page : 528-533
11-12-21-22-23



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	8	45	2.8	2.1	1.6	TM31300200
M 2.5	X	0.45	9	50	2.8	2.1	2.05	TM31300250
M 3	X	0.5	11	56	3.5	2.7	2.5	TM31300300
M 4	X	0.7	13	63	4.5	3.4	3.3	TM31300400
M 5	X	0.8	15	70	6	4.9	4.2	TM31300500
M 6	X	1.0	17	80	6	4.9	5	TM31300600
M 8	X	1.25	20	90	8	6.2	6.8	TM31300800
M 10	X	1.5	22	100	10	8	8.5	TM31301000
M 12	X	1.75	24	110	9	7	10.2	TM32301200
M	X	2.0	26	110	11	9	12	TM32301400
M 16	X	2.0	27	110	12	9	14	TM32301600
M	X	2.5	30	125	14	11	15.5	TM32301800
M 20	X	2.5	32	140	16	12	17.5	TM32302000

ALL DIMENSIONS ARE IN MM
DIN 371(M3-M10) DIN 376(M12-M20)

M ISO metric coarse threads DIN 13 Metrisches ISO-Gewinde DIN 13



HSS PM
DIN 371/376
6H
60°
B
Bright

Cat.-No. TM7110

Suitable for through holes with more cutting speed than other taps due to thick web and the best substrate.
SPIRAL POINT

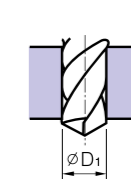
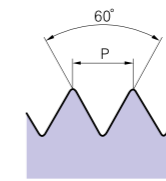
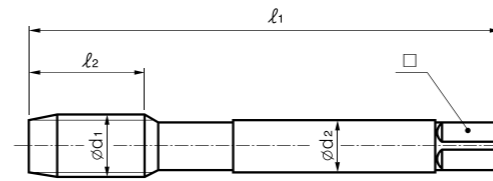
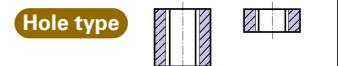


DIN 371

DIN 376



See page : 528-533
11-12-21-22-23



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	8	45	2.8	2.1	1.6	TM71100200
M 2.2	X	0.45	8	45	2.8	2.1	1.75	TM71100220
M 2.5	X	0.45	9	50	2.8	2.1	2.05	TM71100250
M 3	X	0.5	11	56	3.5	2.7	2.5	TM71100300
M 3.5	X	0.6	12	56	4	3	2.9	TM71100350
M 4	X	0.7	13	63	4.5	3.4	3.3	TM71100400
M 4.5	X	0.75	14	70	6	4.9	3.7	TM71100450
M 5	X	0.8	15	70	6	4.9	4.2	TM71100500
M 6	X	1.0	17	80	6	4.9	5	TM71100600
M 7	X	1.0	17	80	7	5.5	6	TM71100700
M 8	X	1.25	20	90	8	6.2	6.8	TM71100800
M 10	X	1.5	22	100	10	8	8.5	TM71101000
M 12	X	1.75	24	110	9	7	10.2	TM71101200

ALL DIMENSIONS ARE IN MM
DIN 371(M2-M10) DIN 376(M12-M20)

M ISO metric coarse threads DIN 13
Metrisches ISO-Gewinde DIN 13



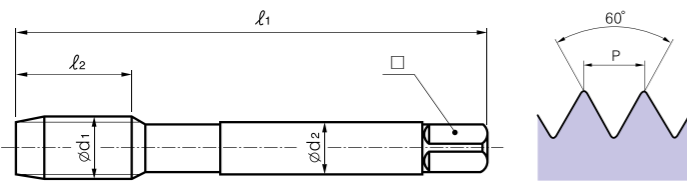
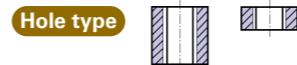
HSS PM DIN 371/376 6H 60° B TiAlN

Cat.-No. TM7328

For tapping Nickel alloys and heat resistant alloy steels which are used in aerospace and chemical industries.
SPIRAL POINT



Material groups **Ni** See page : 528-533
11-12-21-22-23



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	8	45	2.8	2.1	1.6	TM73280200
M 2.2	X	0.45	8	45	2.8	2.1	1.75	TM73280220
M 2.3	X	0.4	8	45	2.8	2.1	1.9	TM73280230
M 2.5	X	0.45	9	50	2.8	2.1	2.05	TM73280250
M 2.6	X	0.45	9	50	2.8	2.1	2.1	TM73280260
M 3	X	0.5	11	56	3.5	2.7	2.5	TM73280300
M 3.5	X	0.6	12	56	4	3	2.9	TM73280350
M 4	X	0.7	13	63	4.5	3.4	3.3	TM73280400
M 4.5	X	0.75	14	70	6	4.9	3.7	TM73280450
M 5	X	0.8	15	70	6	4.9	4.2	TM73280500
M 6	X	1.0	17	80	6	4.9	5	TM73280600
M 7	X	1.0	17	80	7	5.5	6	TM73280700
M 8	X	1.25	20	90	8	6.2	6.8	TM73280800
M 9	X	1.25	20	90	9	7	7.8	TM73280900
M 10	X	1.5	22	100	10	8	8.5	TM73281000
M 11	X	1.5	22	100	8	6.2	9.5	TM73281100
M 12	X	1.75	24	110	9	7	10.2	TM73281200
M 14	X	2.0	26	110	11	9	12	TM73281400
M 16	X	2.0	27	110	12	9	14	TM73281600
M 18	X	2.5	30	125	14	11	15.5	TM73281800
M 20	X	2.5	32	140	16	12	17.5	TM73282000
M 22	X	2.5	32	140	18	14.5	19.5	TM73282200
M 24	X	3.0	34	160	18	14.5	21	TM73282400
M 27	X	3.0	36	160	20	16	24	TM73282700
M 30	X	3.5	40	180	22	18	26.5	TM73283000

ALL DIMENSIONS ARE IN MM
DIN 371(M2-M10) DIN 376(M11-M30)

M ISO metric coarse threads DIN 13
Metrisches ISO-Gewinde DIN 13



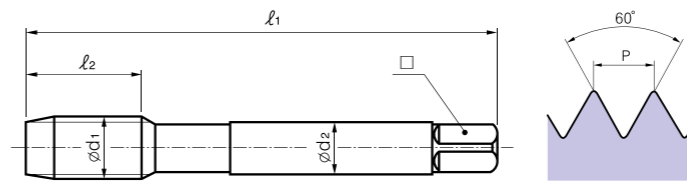
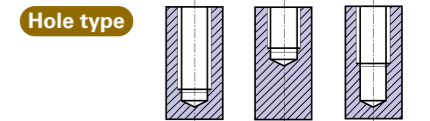
HSS PM DIN 371/376 6H 60° C Bright R40

Cat.-No. TM7210

Suitable for tapping blind holes due to special flute geometry and excellent chip evacuation.
SPIRAL FLUTE



Material groups **Ti Ni** See page : 528-533
11-12-21-22-23



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	8	45	2.8	2.1	1.6	TM72100200
M 2.2	X	0.45	8	45	2.8	2.1	1.75	TM72100220
M 2.5	X	0.45	9	50	2.8	2.1	2.05	TM72100250
M 3	X	0.5	6	56	3.5	2.7	2.5	TM72100300
M 3.5	X	0.6	7	56	4	3	2.9	TM72100350
M 4	X	0.7	7	63	4.5	3.4	3.3	TM72100400
M 4.5	X	0.75	8	70	6	4.9	3.7	TM72100450
M 5	X	0.8	8	70	6	4.9	4.2	TM72100500
M 6	X	1.0	10	80	6	4.9	5	TM72100600
M 7	X	1.0	10	80	7	5.5	6	TM72100700
M 8	X	1.25	13	90	8	6.2	6.8	TM72100800
M 10	X	1.5	15	100	10	8	8.5	TM72101000
M 12	X	1.75	18	110	9	7	10.2	TM72101200

ALL DIMENSIONS ARE IN MM
DIN 371(M2-M10) DIN 376(M12-M20)

M ISO metric coarse threads DIN 13
Metrisches ISO-Gewinde DIN 13



Cat.-No. TM7428

For tapping Nickel alloys and heat resistant alloy steels which are used in aerospace and chemical industries.
SPIRAL FLUTE



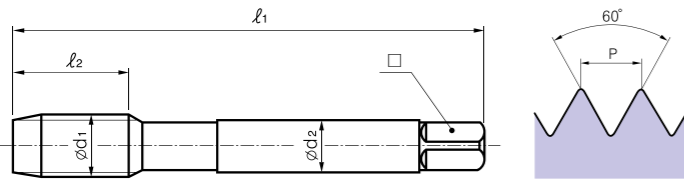
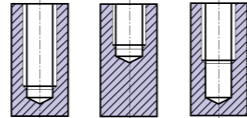
DIN 371



DIN 376

Ni See page : 528-533
11-12-21-22-23

Hole type



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	8	45	2.8	2.1	1.6	TM74280200
M 2.2	X	0.45	8	45	2.8	2.1	1.75	TM74280220
M 2.3	X	0.4	8	45	2.8	2.1	1.9	TM74280230
M 2.5	X	0.45	9	50	2.8	2.1	2.05	TM74280250
M 2.6	X	0.45	9	50	2.8	2.1	2.1	TM74280260
M 3	X	0.5	6	56	3.5	2.7	2.5	TM74280300
M 3.5	X	0.6	7	56	4	3	2.9	TM74280350
M 4	X	0.7	7	63	4.5	3.4	3.3	TM74280400
M 4.5	X	0.75	8	70	6	4.9	3.7	TM74280450
M 5	X	0.8	8	70	6	4.9	4.2	TM74280500
M 6	X	1.0	10	80	6	4.9	5	TM74280600
M 7	X	1.0	10	80	7	5.5	6	TM74280700
M 8	X	1.25	13	90	8	6.2	6.8	TM74280800
M 9	X	1.25	13	90	9	7	7.8	TM74280900
M 10	X	1.5	15	100	10	8	8.5	TM74281000
M 11	X	1.5	17	100	8	6.2	9.5	TM74281100
M 12	X	1.75	18	110	9	7	10.2	TM74281200
M 14	X	2.0	20	110	11	9	12	TM74281400
M 16	X	2.0	20	110	12	9	14	TM74281600
M 18	X	2.5	25	125	14	11	15.5	TM74281800
M 20	X	2.5	25	140	16	12	17.5	TM74282000
M 22	X	2.5	25	140	18	14.5	19.5	TM74282200
M 24	X	3.0	30	160	18	14.5	21	TM74282400
M 27	X	3.0	30	160	20	16	24	TM74282700
M 30	X	3.5	35	180	22	18	26.5	TM74283000

ALL DIMENSIONS ARE IN MM
DIN 371(M2-M10) DIN 376(M11-M30)

M ISO metric coarse threads DIN 13
Metrisches ISO-Gewinde DIN 13



Cat.-No. TM8140

UNI - TAP - For multi-purpose and correct thread profiles with long tool life due to special tap geometry. (patent)
SPIRAL POINT



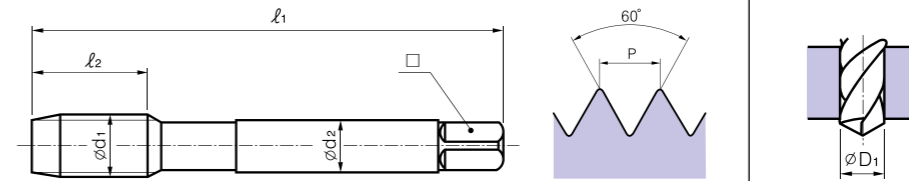
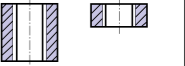
DIN 371



DIN 376

UNI See page : 528-533
11-12-21-22-23

Hole type



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 3	X	0.5	11	56	3.5	2.7	2.5	TM81400300
M 4	X	0.7	13	63	4.5	3.4	3.3	TM81400400
M 5	X	0.8	15	70	6	4.9	4.2	TM81400500
M 6	X	1.0	17	80	6	4.9	5	TM81400600
M 8	X	1.25	20	90	8	6.2	6.8	TM81400800
M 10	X	1.5	22	100	10	8	8.5	TM81401000
M 12	X	1.75	24	110	9	7	10.2	TM81401200
M 16	X	2.0	27	110	12	9	14	TM81401600
M 20	X	2.5	32	140	16	12	17.5	TM81402000

ALL DIMENSIONS ARE IN MM
DIN 371(M2-M10) DIN 376(M11-M20)

M ISO metric coarse threads DIN 13 Metrisches ISO-Gewinde DIN 13



Cat.-No. TM8040

UNI - TAP - For multi-purpose and correct thread profiles with long tool life due to special tap geometry. (patent) SPIRAL FLUTE



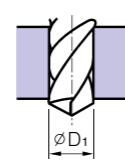
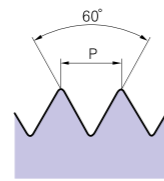
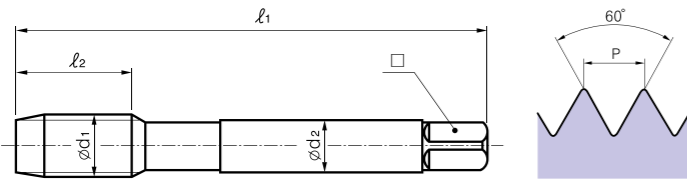
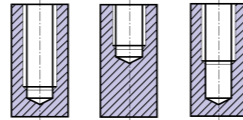
DIN 371



DIN 376

UNI See page : 528-533
11-12-21-22-23

Hole type



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 3	X	0.5	6	56	3.5	2.7	2.5	TM80400300
M 4	X	0.7	7	63	4.5	3.4	3.3	TM80400400
M 5	X	0.8	8	70	6	4.9	4.2	TM80400500
M 6	X	1.0	10	80	6	4.9	5	TM80400600
M 8	X	1.25	13	90	8	6.2	6.8	TM80400800
M 10	X	1.5	15	100	10	8	8.5	TM80401000
M 12	X	1.75	18	110	9	7	10.2	TM80401200
M 16	X	2.0	20	110	12	9	14	TM80401600
M 20	X	2.5	25	140	16	12	17.5	TM80402000

ALL DIMENSIONS ARE IN MM
DIN 371(M2-M10) DIN 376(M11-M20)

M ISO metric fine threads DIN 13 Metrisches ISO-Feingewinde DIN 13



Cat.-No. TM3630

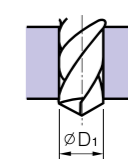
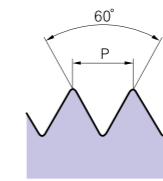
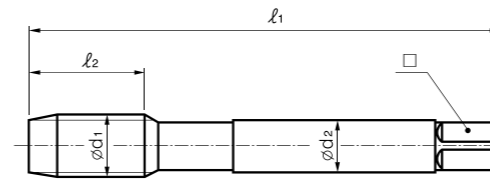
FOR STAINLESS STEELS & TOUGH MATERIALS SPIRAL POINT



DIN 374

VA CS See page : 528-533
11-12-21-22-23

Hole type



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 4	X	0.5	10	63	2.8	2.1	3.5	TM36300400
M 5	X	0.5	11	70	3.5	2.7	4.5	TM36300500
M 6	X	0.5	13	80	4.5	3.4	5.5	TM36300600
M 6	X	0.75	13	80	4.5	3.4	5.2	TM36300601
M 8	X	0.75	14	80	6	4.9	7.2	TM36300800
M 8	X	1.0	17	90	6	4.9	7	TM36300801
M 10	X	0.75	18	90	7	5.5	9.2	TM36301000
M 10	X	1.0	18	90	7	5.5	9	TM36301001
M 10	X	1.25	22	100	7	5.5	8.8	TM36301002
M 12	X	1.0	18	100	9	7	11	TM36301200
M 12	X	1.25	22	100	9	7	10.8	TM36301201
M 12	X	1.5	22	100	9	7	10.5	TM36301202
M 14	X	1.25	22	100	11	9	12.8	TM36301400
M 14	X	1.5	22	100	11	9	12.5	TM36301401
M 16	X	1.5	22	100	12	9	14.5	TM36301600
M 18	X	1.5	25	110	14	11	16.5	TM36301800
M 20	X	1.5	25	125	16	12	18.5	TM36302000
M 22	X	1.5	25	125	18	14.5	20.5	TM36302200
M 24	X	1.5	27	140	18	14.5	22.5	TM36302400

ALL DIMENSIONS ARE IN MM
DIN 374(M4-M24)

M ISO metric fine threads DIN 13 Metrisches ISO-Feingewinde DIN 13



Cat.-No. TM3830



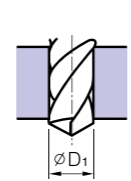
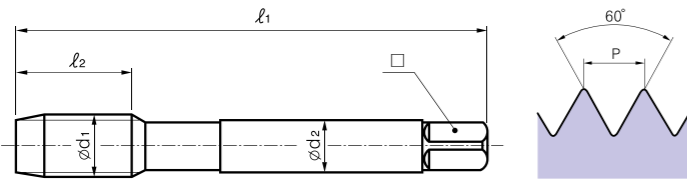
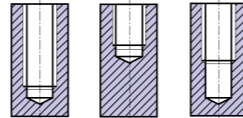
DIN 374

FOR STAINLESS STEELS & TOUGH MATERIALS
SPIRAL FLUTE



See page : 528-533
11-12-21-22-23

Hole type



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 4	X	0.5	5	63	2.8	2.1	3.5	TM38300400
M 5	X	0.5	5	70	3.5	2.7	4.5	TM38300500
M 6	X	0.5	5	80	4.5	3.4	5.5	TM38300600
M 6	X	0.75	8	80	4.5	3.4	5.2	TM38300601
M 8	X	0.75	8	80	6	4.9	7.2	TM38300800
M 8	X	1.0	10	90	6	4.9	7	TM38300801
M 10	X	0.75	10	90	7	5.5	9.2	TM38301000
M 10	X	1.0	10	90	7	5.5	9	TM38301001
M 10	X	1.25	16	100	7	5.5	8.8	TM38301002
M 12	X	1.0	11	100	9	7	11	TM38301200
M 12	X	1.25	15	100	9	7	10.8	TM38301201
M 12	X	1.5	15	100	9	7	10.5	TM38301202
M 14	X	1.25	15	100	11	9	12.8	TM38301400
M 14	X	1.5	15	100	11	9	12.5	TM38301401
M 16	X	1.5	15	100	12	9	14.5	TM38301600
M 18	X	1.5	17	110	14	11	16.5	TM38301800
M 20	X	1.5	17	125	16	12	18.5	TM38302000
M 22	X	1.5	17	125	18	14.5	20.5	TM38302200
M 24	X	1.5	20	140	18	14.5	22.5	TM38302400

UNC Unified coarse threads Unified Grobgewinde



Cat.-No. TM6430



DIN 371



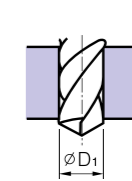
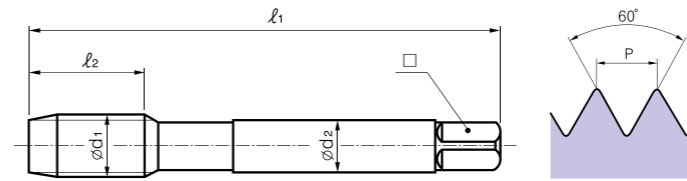
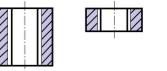
DIN 376

Suitable for through hole in more cutting speed than other taps due to thick web.
SPIRAL POINT



See page : 528-533
11-12-21-22-23

Hole type



Ød1 inch	X	P inch	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
4	X	40	11	56	3.5	2.7	2.3	TM64300400
5	X	40	11	56	3.5	2.7	2.6	TM64300500
6	X	32	12	56	4	3	2.85	TM64300600
8	X	32	13	63	4.5	3.4	3.5	TM64300800
10	X	24	15	70	6	4.9	3.9	TM64301000
12	X	24	16	80	6	4.9	4.5	TM64301200
1/4	X	20	17	80	7	5.5	5.2	TM64309160
5/16	X	18	20	90	8	6.2	6.6	TM64309200
3/8	X	16	22	100	9	7	8	TM64309240
7/16	X	14	22	100	8	6.2	9.4	TM64309280
1/2	X	13	25	110	9	7	10.75	TM64309320
9/16	X	12	26	110	11	9	12.25	TM64309360
5/8	X	11	27	110	12	9	13.5	TM64309400
3/4	X	10	30	125	14	11	16.5	TM64309480
7/8	X	9	32	140	18	14.5	19.5	TM64309560
1"	X	8	36	160	20	16	22.25	TM64309640

DIN 371(NO.4-3/8) DIN 376(7/10-1")

UNC Unified coarse threads Unified Grobgewinde



Cat.-No. TM6530

FOR STAINLESS STEELS & TOUGH MATERIALS
SPIRAL FLUTE

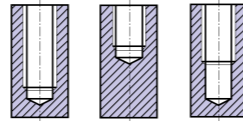


DIN 371

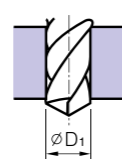
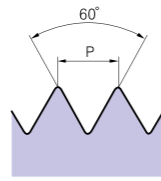
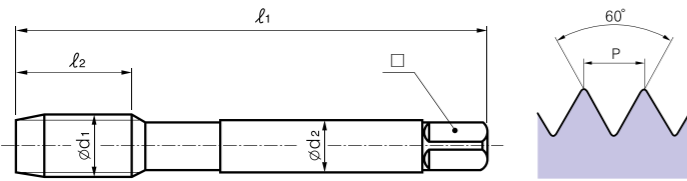


DIN 376

Hole type



See page : 528-533
11-12-21-22-23



Ød1 inch	X	P inch	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
4	X	40	6	56	3.5	2.7	2.3	TM65300400
5	X	40	7	56	3.5	2.7	2.6	TM65300500
6	X	32	7	56	4	3	2.85	TM65300600
8	X	32	8	63	4.5	3.4	3.5	TM65300800
10	X	24	10	70	6	4.9	3.9	TM65301000
12	X	24	10	80	6	4.9	4.5	TM65301200
1/4	X	20	13	80	7	5.5	5.2	TM65309160
5/16	X	18	14	90	8	6.2	6.6	TM65309200
3/8	X	16	16	100	9	7	8	TM65309240
7/16	X	14	17	100	8	6.2	9.4	TM65309280
1/2	X	13	20	110	9	7	10.75	TM65309320
9/16	X	12	20	110	11	9	12.25	TM65309360
5/8	X	11	22	110	12	9	13.5	TM65309400
3/4	X	10	25	125	14	11	16.5	TM65309480
7/8	X	9	27	140	18	14.5	19.5	TM65309560
1"	X	8	30	160	20	16	22.25	TM65309640

DIN 371(NO.4-3/8) DIN 376(7/16-1")

UNF Unified fine threads Unified Feingewinde



Cat.-No. TM6730

FOR STAINLESS STEELS & TOUGH MATERIALS
SPIRAL POINT

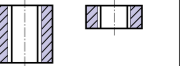


DIN 371

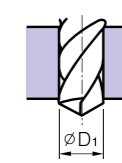
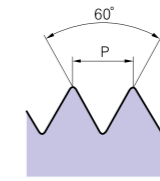
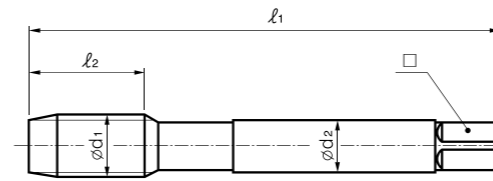


DIN 376

Hole type



See page : 528-533
11-12-21-22-23



Ød1 inch	X	P inch	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
4	X	48	11	56	3.5	2.7	2.4	TM67300400
5	X	44	11	56	3.5	2.7	2.7	TM67300500
6	X	40	12	56	4	3	3	TM67300600
8	X	36	13	63	4.5	3.4	3.5	TM67300800
10	X	32	13	70	6	4.9	4.1	TM67301000
12	X	28	16	80	6	4.9	4.7	TM67301200
1/4	X	28	17	80	7	5.5	5.5	TM67309160
5/16	X	24	17	90	8	6.2	6.9	TM67309200
3/8	X	24	18	100	9	7	5.8	TM67309240
7/16	X	20	22	100	8	6.2	9.9	TM67309280
1/2	X	20	22	100	9	7	11.5	TM67309320
9/16	X	18	22	100	11	9	12.9	TM67309360
5/8	X	18	22	100	12	9	14.5	TM67309400
3/4	X	16	25	110	14	11	17.5	TM67309480
7/8	X	14	26	125	18	14.5	20.5	TM67309560
1"	X	12	28	140	20	16	23.25	TM67309640

DIN 371(NO.4-3/8) DIN 376(7/16-1")

UNF Unified fine threads Unified Feingewinde



Cat.-No. TM6830

FOR STAINLESS STEELS & TOUGH MATERIALS
SPIRAL FLUTE

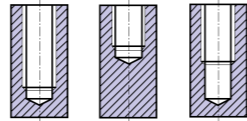


DIN 371



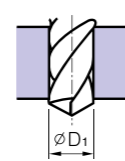
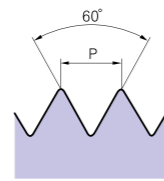
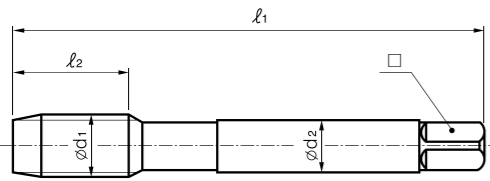
DIN 374

Hole type



Material groups
VA CS

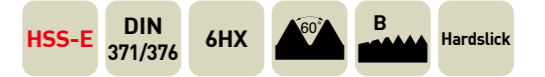
See page : 528-533
11-12-21-22-23



Ød1 inch	X	P inch	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
4	X	48	9	56	3.5	2.7	2.4	TM68300400
5	X	44	7	56	3.5	2.7	2.7	TM68300500
6	X	40	7	56	4	3	3	TM68300600
8	X	36	8	63	4.5	3.4	3.5	TM68300800
10	X	32	10	70	6	4.9	4.1	TM68301000
12	X	28	10	80	6	4.9	4.7	TM68301200
1/4	X	28	10	80	7	5.5	5.5	TM68309160
5/16	X	24	10	90	8	6.2	6.9	TM68309200
3/8	X	24	10	100	9	7	8.5	TM68309240
7/16	X	20	13	100	8	6.2	9.9	TM68309280
1/2	X	20	13	100	9	7	11.5	TM68309320
9/16	X	18	15	100	11	9	12.9	TM68309360
5/8	X	18	15	100	12	9	14.5	TM68309400
3/4	X	16	17	110	14	11	17.5	TM68309480
7/8	X	14	17	125	18	14.5	20.5	TM68309560
1"	X	12	20	140	20	16	23.25	TM68309640

DIN 371(NO.4-3/8) DIN 376(7/16-1")

M ISO metric coarse threads DIN 13 Metrisches ISO-Gewinde DIN 13



Cat.-No. TM8053

HARDSLICK TAPS
SUITABLE FOR STAINLESS STEEL
AUSTENITIC STAINLESS
MAGNETIC SOFT STEELS
STRUCTURAL STEELS
SPIRAL POINT

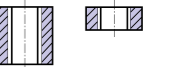


DIN 371



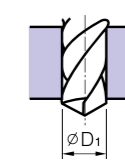
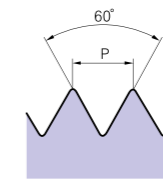
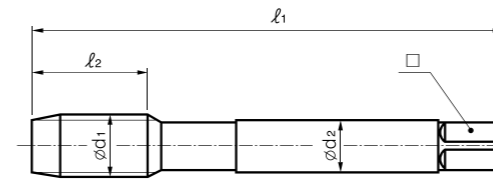
DIN 376

Hole type



Material groups
VA CS

See page : 528-533
11-12-21-22-23



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 3	X	0.5	11	56	3.5	2.7	2.5	TM80530300
M 4	X	0.7	13	63	4.5	3.4	3.3	TM80530400
M 5	X	0.8	15	70	6	4.9	4.2	TM80530500
M 6	X	1.0	17	80	6	4.9	5	TM80530600
M 8	X	1.25	20	90	8	6.2	6.8	TM80530800
M 10	X	1.5	22	100	10	8	8.5	TM80531000
M 12	X	1.75	24	110	9	7	10.2	TM80531200
M 14	X	2.0	26	110	11	9	12	TM80531400
M 16	X	2.0	27	110	12	9	14	TM80531600
M 18	X	2.5	30	125	14	11	15.5	TM80531800
M 20	X	2.5	32	140	16	12	17.5	TM80532000
M 22	X	2.5	32	140	18	14.5	19.5	TM80532200
M 24	X	3.0	34	160	18	14.5	21	TM80532400
M 27	X	3.0	36	160	20	16	24	TM80532700
M 30	X	3.5	40	180	22	18	26.5	TM80533000

ALL DIMENSIONS ARE IN MM
DIN 371(M3-M10) DIN 376(M12-M18)

M ISO metric coarse threads DIN 13 Metrisches ISO-Gewinde DIN 13



Cat.-No. TM8153

**HARDSLICK TAPS
WITH RECESSED THREADS
SUITABLE FOR STAINLESS STEEL
AUSTENITIC STAINLESS
MAGNETIC SOFT STEELS
STRUCTURAL STEELS
SPIRAL FLUTE**



DIN 371



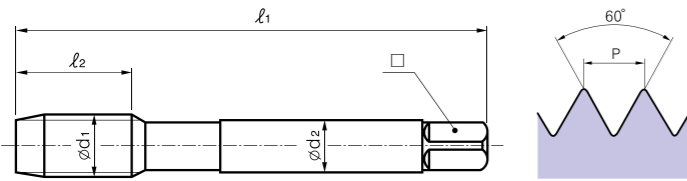
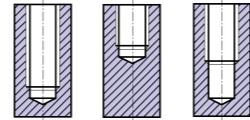
DIN 376

※ With recessed threads for machining tapping of deep blind holes.



See page : 528~533
11-12-21-22-23

Hole type



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 3	X	0.5	11	56	3.5	2.7	2.5	TM81530300
M 4	X	0.7	13	63	4.5	3.4	3.3	TM81530400
M 5	X	0.8	15	70	6	4.9	4.2	TM81530500
M 6	X	1.0	17	80	6	4.9	5	TM81530600
M 8	X	1.25	20	90	8	6.2	6.8	TM81530800
M 10	X	1.5	22	100	10	8	8.5	TM81531000
M 12	X	1.75	24	110	9	7	10.2	TM81531200
M 14	X	2.0	20	110	11	9	12	TM81531400
M 16	X	2.0	27	110	12	9	14	TM81531600
M 18	X	2.5	30	125	14	11	15.5	TM81531800
M 20	X	2.5	25	140	16	12	17.5	TM81532000
M 22	X	2.5	25	140	18	14.5	19.5	TM81532200
M 24	X	3.0	30	160	18	14.5	21	TM81532400
M 27	X	3.0	30	160	20	16	24	TM81532700
M 30	X	3.5	35	180	22	18	26.5	TM81533000

**ALL DIMENSIONS ARE IN MM
DIN 371(M3-M10) DIN 376(M12-M18)**

M ISO metric coarse threads DIN 13 Metrisches ISO-Gewinde DIN 13



Cat.-No. TM3817

**COLD FORMING TAPS
WITH OIL GROOVES
FOR BLIND & THROUGH HOLES IN STEELS UP TO 850NM
STAINLESS STEELS
NICKEL & COPPER UNALLOYS
ALUMINIUM MAGNESIUM
TITANIUM
COLD FORMING**

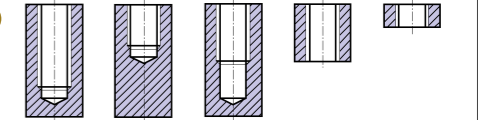


DIN 371

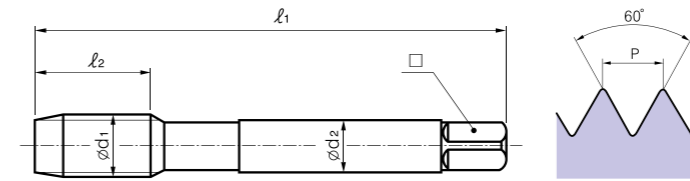


DIN 376

Hole type



See page : 528~533
11-12-13-14-21-22-41-51-61-71



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	8	45	2.8	2.1	1.83	TM38170200
M 3	X	0.5	11	56	3.5	2.7	2.8	TM38170300
M 4	X	0.7	13	63	4.5	.4	3.7	TM38170400
M 5	X	0.8	15	70	6	4.9	4.65	TM38170500
M 6	X	1.0	17	80	6	4.9	5.55	TM38170600
M 8	X	1.25	20	90	8	6.2	7.4	TM38170800
M 10	X	1.5	22	100	10	8	9.3	TM38171000
M 12	X	1.75	24	110	9	7	11.2	TM38171200
M 14	X	2.0	26	110	11	9	13	TM38171400
M 16	X	2.0	27	110	12	9	15	TM38171600
M 20	X	2.5	32	140	16	12	18.8	TM38172000

**ALL DIMENSIONS ARE IN MM
DIN 371(M2-M10) DIN 376(M12)**

M ISO metric coarse threads DIN 13
Metrisches ISO-Gewinde DIN 13



Cat.-No. TM3827

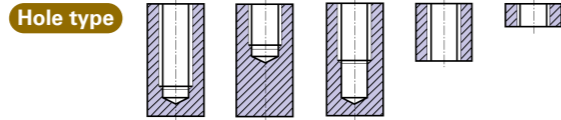
COLD FORMING TAPS
WITH OIL GROOVES
FOR BLIND & THROUGH HOLES IN STEELS UP TO 850NM
STAINLESS STEELS
NICKEL & COPPER
ALUMINIUM MAGNESIUM
TITANIUM
COLD FORMING



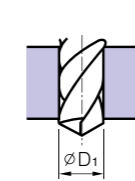
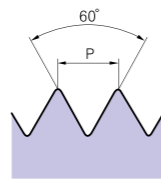
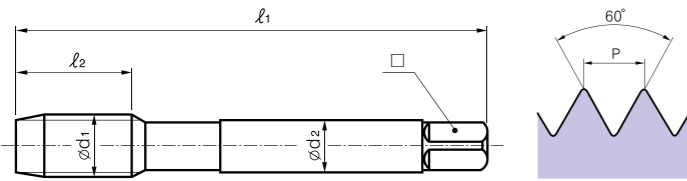
DIN 371



DIN 376



Material groups **GV** See page : 528-533
11-12-13-14-41-51-61-71



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	8	45	2.8	2.1	1.83	TM38270200
M 2.5	X	0.45	9	50	2.8	2.1	2.3	TM38270250
M 3	X	0.5	11	56	3.5	2.7	2.8	TM38270300
M 4	X	0.7	13	63	4.5	3.4	3.7	TM38270400
M 5	X	0.8	15	70	6	4.9	4.65	TM38270500
M 6	X	1.0	17	80	6	4.9	5.55	TM38270600
M 8	X	1.25	20	90	8	6.2	7.4	TM38270800
M 10	X	1.5	22	100	10	8	9.3	TM38271000
M 12	X	1.75	24	110	9	7	11.2	TM38271200
M 14	X	2.0	26	110	11	9	13	TM38271400
M 16	X	2.0	27	110	12	9	15	TM38271600
M 20	X	2.5	32	140	16	12	18.8	TM38272000

ALL DIMENSIONS ARE IN MM
DIN 371(M2-M10) DIN 376(M12)

M ISO metric coarse threads DIN 13
Metrisches ISO-Gewinde DIN 13



Cat.-No. TM1530

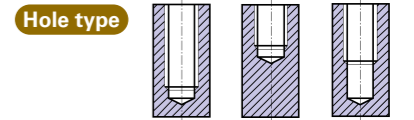
FOR HIGH TENSILE STEELS
HEAT TREATED & HEAT RESISTANT
UP TO 1200NM
SPIRAL FLUTE



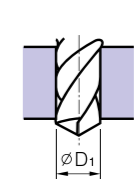
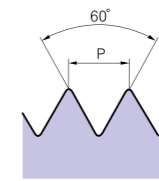
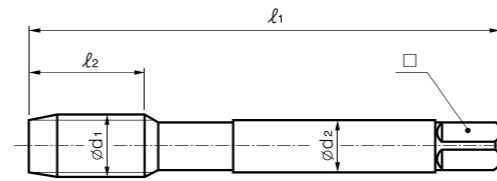
DIN 371



DIN 376



Material groups **HS** See page : 528-533
15



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	8	45	2.8	2.1	1.6	TM15300200
M 2.5	X	0.45	9	50	2.8	2.1	2.05	TM15300250
M 3	X	0.5	6	56	3.5	2.7	2.5	TM15300300
M 4	X	0.7	7	63	4.5	3.4	3.3	TM15300400
M 5	X	0.8	8	70	6	4.9	4.2	TM15300500
M 6	X	1.0	10	80	6	4.9	5	TM15300600
M 8	X	1.25	13	90	8	6.2	6.8	TM15300800
M 10	X	1.5	15	100	10	8	8.5	TM15301000
M 12	X	1.75	18	110	9	7	10.2	TM16301200
M 14	X	2.0	20	110	11	9	12	TM16301400
M 16	X	2.0	20	110	12	9	14	TM16301600
M 18	X	2.5	25	125	14	11	15.5	TM16301800
M 20	X	2.5	25	140	16	12	17.5	TM16302000
M 24	X	3.0	30	160	18	14.5	21	TM16302400
M 27	X	3.0	30	160	20	16	24	TM16302700
M 30	X	3.5	35	180	22	18	26.5	TM16303000

ALL DIMENSIONS ARE IN MM
DIN 371(M2-M10) DIN 376(M12-M24)

M ISO metric coarse threads DIN 13 Metrisches ISO-Gewinde DIN 13



Cat.-No. TM2130

WITH RECESSED THREADS
FOR DEEP BLIND HOLES IN STEELS
UP TO 1200NM & MALLEABLE CAST IRON
SPIRAL FLUTE



DIN 371

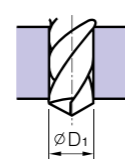
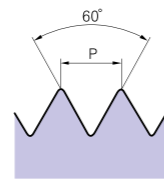
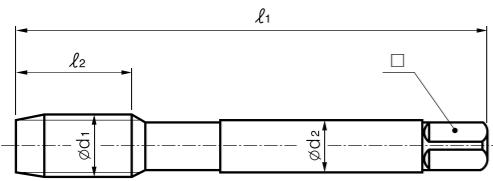
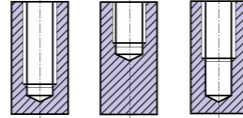


DIN 376

※ With recessed threads for machining tapping of deep blind holes.

HS See page : 528-533
15

Hole type



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 3	X	0.5	6	56	3.5	2.7	2.5	TM21300300
M 4	X	0.7	7	63	4.5	3.4	3.3	TM21300400
M 5	X	0.8	8	70	6	4.9	4.2	TM21300500
M 6	X	1.0	10	80	6	4.9	5	TM21300600
M 8	X	1.25	13	90	8	6.2	6.8	TM21300800
M 10	X	1.5	15	100	10	8	8.5	TM21301000
M 12	X	1.75	18	110	9	7	10.2	TM22301200
M 14	X	2.0	20	110	11	9	12	TM22301400
M 16	X	2.0	20	110	12	9	14	TM22301600
M 18	X	2.5	25	125	14	11	15.5	TM22301800
M 20	X	2.5	25	140	16	12	17.5	TM22302000

ALL DIMENSIONS ARE IN MM
DIN 371(M3-M10) DIN 376(M12-M20)

M ISO metric coarse threads DIN 13 Metrisches ISO-Gewinde DIN 13



Cat.-No. TM2330

FOR HIGH TENSILE STEELS
HEAT TREATED & HEAT RESISTANT
UP TO 1200NM
SPIRAL FLUTE



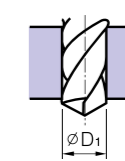
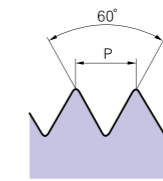
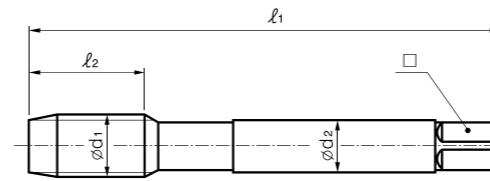
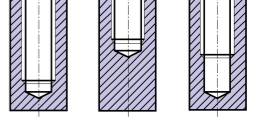
DIN 371



DIN 376

HS See page : 528-533
16-64

Hole type



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	8	45	2.8	2.1	1.6	TM23300200
M 2.5	X	0.45	9	50	2.8	2.1	2.05	TM23300250
M 3	X	0.5	6	56	3.5	2.7	2.5	TM23300300
M 4	X	0.7	7	663	4.5	3.4	3.3	TM23300400
M 5	X	0.8	8	70	6	4.9	4.2	TM23300500
M 6	X	1.0	10	80	6	4.9	5	TM23300600
M 8	X	1.25	13	90	8	6.2	6.8	TM23300800
M 10	X	1.5	15	100	10	8	8.5	TM23301000
M 12	X	1.75	18	110	9	7	10.2	TM24301200
M 14	X	2.0	20	110	11	9	12	TM24301400
M 16	X	2.0	20	110	12	9	14	TM24301600
M 18	X	2.5	25	125	14	11	15.5	TM24301800
M 20	X	2.5	25	140	16		17.5	TM24302000

ALL DIMENSIONS ARE IN MM
DIN 371(M2-M10) DIN 376(M12-M16)

M ISO metric coarse threads DIN 13
Metrisches ISO-Gewinde DIN 13



HSS-E DIN 371/376 6H 60° B Bright

Cat.-No. TM2716

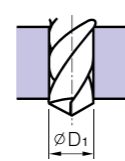
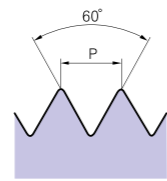
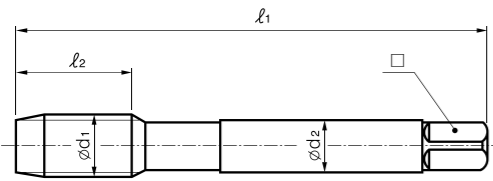
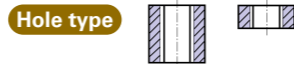
FOR HIGH TENSILE STEELS
HEAT TREATED & HEAT RESISTANT
UPTO 1200NM
SPIRAL POINT



DIN 371

DIN 376

Material groups **HS** See page : 528-533
15



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	8	45	2.8	2.1	1.6	TM27160200
M 2.5	X	0.45	9	50	2.8	2.1	2.05	TM27160250
M 3	X	0.5	11	56	3.5	2.7	2.5	TM27160300
M 3.5	X	0.6	12	56	4	3	2.9	TM27160350
M 4	X	0.7	13	63	4.5	3.4	3.3	TM27160400
M 4.5	X	0.75	14	70	6	4.9	3.7	TM27160450
M 5	X	0.8	15	70	6	4.9	4.2	TM27160500
M 6	X	1.0	17	80	6	4.9	5	TM27160600
M 8	X	1.25	20	90	8	6.2	6.8	TM27160800
M 10	X	1.5	22	100	10	8	8.5	TM27161000
M 12	X	1.75	24	110	9	7	10.2	TM28161200
M 14	X	2.0	26	110	11	9	12	TM28161400
M 16	X	2.0	27	110	12	9	14	TM28161600
M 18	X	2.5	30	125	14	11	15.5	TM28161800
M 20	X	2.5	32	140	16	12	17.5	TM28162000
M 22	X	2.5	32	140	18	14.5	19.5	TM28162200
M 24	X	3.0	34	160	18	14.5	21	TM28162400
M 27	X	3.0	36	160	20	16	24	TM28162700
M 30	X	3.5	40	180	22	18	26.5	TM28163000

ALL DIMENSIONS ARE IN MM
DIN 371(M2-M10) DIN 376(M12-M20)

M ISO metric coarse threads DIN 13
Metrisches ISO-Gewinde DIN 13



HSS-E DIN 371/376 6H 60° C TiN R40

Cat.-No. TM2817

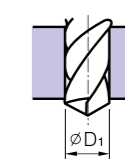
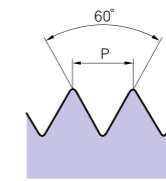
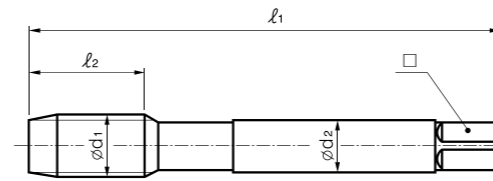
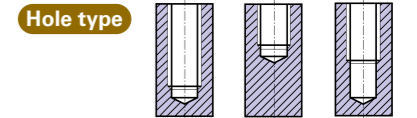
FOR HIGH TENSILE STEELS
HEAT TREATED & HEAT RESISTANT
UPTO 1200NM
SPIRAL FLUTE



DIN 371

DIN 376

Material groups **HS** See page : 528-533
15



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	8	45	2.8	2.1	1.6	TM28170200
M 3	X	0.5	6	56	3.5	2.7	2.5	TM28170300
M 4	X	0.7	7	63	4.5	3.4	3.3	TM28170400
M 5	X	0.8	8	70	6	4.9	4.2	TM28170500
M 6	X	1.0	10	80	6	4.9	5	TM28170600
M 8	X	1.25	13	90	8	6.2	6.8	TM28170800
M 10	X	1.5	15	100	10	8	8.5	TM28171000
M 12	X	1.75	18	110	9	7	10.2	TM28171200
M 14	X	2.0	20	110	11	9	12	TM28171400
M 16	X	2.0	20	110	12	9	14	TM28171600
M 20	X	2.5	25	140	16	12	17.5	TM28172000

ALL DIMENSIONS ARE IN MM
DIN 371(M3-M10) DIN 376(M12-M20)

M ISO metric coarse threads DIN 13
Metrisches ISO-Gewinde DIN 13



Cat.-No. TM2917

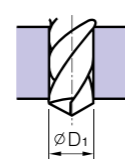
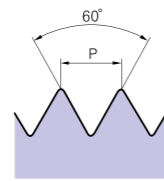
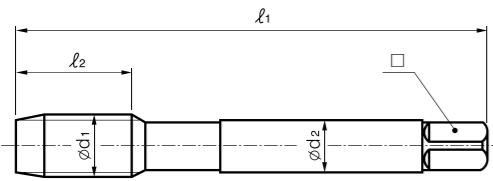
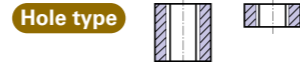
FOR HIGH TENSILE STEELS
HEAT TREATED & HEAT RESISTANT
UPTO 1200NM
SPIRAL POINT



DIN 371

DIN 376

HS See page : 528-533
15



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 3	X	0.5	6	56	3.5	2.7	2.5	TM29170300
M 4	X	0.7	7	63	4.5	3.4	3.3	TM29170400
M 5	X	0.8	8	70	6	4.9	4.2	TM29170500
M 6	X	1.0	10	80	6	4.9	5	TM29170600
M 8	X	1.25	13	90	8	6.2	6.8	TM29170800
M 10	X	1.5	15	100	10	8	8.5	TM29171000
M 12	X	1.75	18	110	9	7	10.2	TM30171200
M 14	X	2.0	20	110	11	9	12	TM30171400
M 16	X	2.0	20	110	12	9	14	TM30171600
M 20	X	2.5	25	140	16	12	17.5	TM30172000

ALL DIMENSIONS ARE IN MM
DIN 371(M3-M10) DIN 376(M12-M20)

M ISO metric coarse threads DIN 13
Metrisches ISO-Gewinde DIN 13



Cat.-No. TM6316

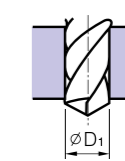
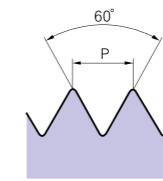
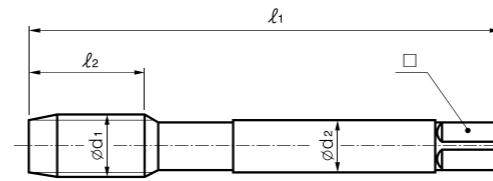
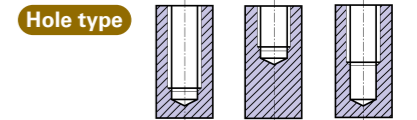
FOR HIGH TENSILE STEELS
HEAT TREATED & HEAT RESISTANT
UPTO 1200NM
SPIRAL FLUTE



DIN 371

DIN 376

HS See page : 528-533
15



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	8	45	2.8	2.1	1.6	TM63160200
M 2.2	X	0.45	8	45	2.8	2.1	1.75	TM63160220
M 2.5	X	0.45	9	50	2.8	2.1	2.05	TM63160250
M 3	X	0.5	6	56	3.5	2.7	2.5	TM63160300
M 3.5	X	0.6	7	56	4	3	2.9	TM63160350
M 4	X	0.7	7	63	4.5	3.4	3.3	TM63160400
M 5	X	0.8	8	70	6	4.9	4.2	TM63160500
M 6	X	1.0	10	80	6	4.9	5	TM63160600
M 8	X	1.25	13	90	8	6.2	6.8	TM63160800
M 10	X	1.5	15	100	10	8	8.5	TM63161000
M 12	X	1.75	18	110	9	7	10.2	TM63161200
M 14	X	2.0	20	110	11	9	12	TM63161400
M 16	X	2.0	20	110	12	9	14	TM63161600
M 18	X	2.5	25	125	14	11	15.5	TM63161800
M 20	X	2.5	25	140	16	12	17.5	TM63162000

ALL DIMENSIONS ARE IN MM
DIN 371(M2-M10) DIN 376(M12-M20)

M ISO metric coarse threads DIN 13 Metrisches ISO-Gewinde DIN 13



Cat.-No. TM0731

NITRIDED FOR GREY CAST IRON
STRAIGHT FLUTE



DIN 371

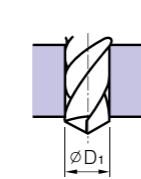
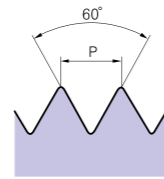
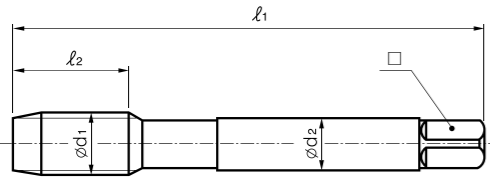
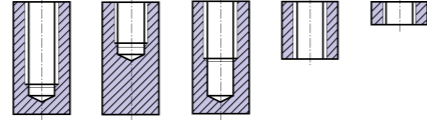


DIN 376



See page : 528-533
31-32-83

Hole type



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 3	X	0.5	11	56	3.5	2.7	2.5	TM07310300
M 4	X	0.7	13	63	4.5	3.4	3.3	TM07310400
M 5	X	0.8	15	70	6	4.9	4.2	TM07310500
M 6	X	1.0	17	80	6	4.9	5	TM07310600
M 7	X	1.0	17	80	7	5.5	6	TM07310700
M 8	X	1.25	20	90	8	6.2	6.8	TM07310800
M 10	X	1.5	22	100	10	8	8.5	TM07311000
M 12	X	1.75	24	110	9	7	10.2	TM08311200
M 14	X	2.0	26	110	11	9	12	TM08311400
M 16	X	2.0	27	110	12	9	14	TM08311600
M 18	X	2.5	30	125	14	11	15.5	TM08311800
M 20	X	2.5	32	140	16	12	17.5	TM08312000

ALL DIMENSIONS ARE IN MM
DIN 371(M3-M10) DIN 376(M12-M16)

M ISO metric coarse threads DIN 13 Metrisches ISO-Gewinde DIN 13



Cat.-No. TM0917

TIN COATED FOR GREY CAST IRON
STRAIGHT FLUTE



DIN 371

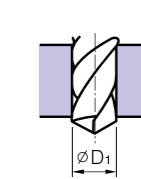
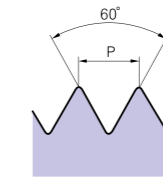
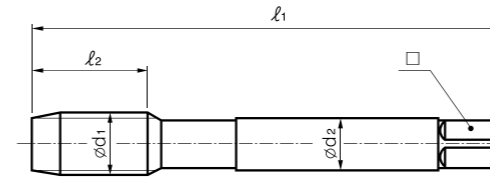
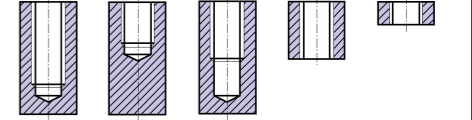


DIN 376



See page : 528-533
31-32-83

Hole type



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	8	45	2.8	2.1	1.6	TM09170200
M 3	X	0.5	11	56	3.5	2.7	2.5	TM09170300
M 4	X	0.7	13	63	4.5	3.4	3.3	TM09170400
M 5	X	0.8	15	70	6	4.9	4.2	TM09170500
M 6	X	1.0	17	80	6	4.9	5	TM09170600
M 8	X	1.25	20	90	8	6.2	6.8	TM09170800
M 10	X	1.5	22	100	10	8	8.5	TM09171000
M 12	X	1.75	24	110	9	7	10.2	TM10171200
M 16	X	2.0	27	110	12	9	14	TM10171600

ALL DIMENSIONS ARE IN MM
DIN 371(M3-M10) DIN 376(M12-M16)

BSP Whitworth Pipe Threads DIN ISO 228/1 Whitworth Rohrgewinde DIN ISO 228/1



Cat.-No. TB0116

FOR GENERAL STEELS UP TO 750NM
SPIRAL POINT



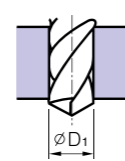
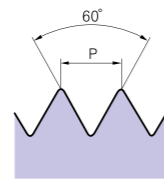
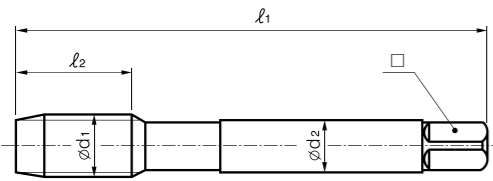
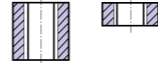
DIN 5156



See page : 528~533

12-13-14-33-34-63-74

Hole type



Ød ₁ inch	X	P inch	l ₂	l ₁	d ₂	sq	Tapping drill diameter	EUROPA CODE
1/8	X	28	18	90	7	5.5	8.8	TB01160080
1/4	X	19	22	100	11	9	11.8	TB01160160
3/8	X	19	22	100	12	9	15.25	TB01160240
1/2	X	14	25	125	16	12	19	TB01160320
3/4	X	14	28	140	20	16	24.5	TB01160480
1"	X	11	32	160	25	20	30.75	TB01160640

DIN 5156

BSP Whitworth pipe threads DIN ISO 228/1 Whitworth Rohrgewinde DIN ISO 228/1



Cat.-No. TB0216

FOR GENERAL STEELS UP TO 750NM
SPIRAL FLUTE



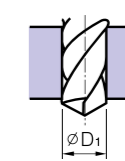
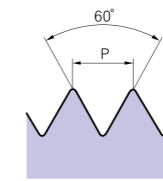
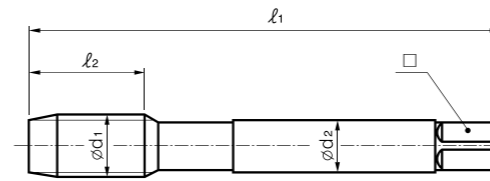
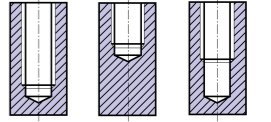
DIN 5156



See page : 528~533

12-13-14-33-34-63-74

Hole type



Ød ₁ inch	X	P inch	l ₂	l ₁	d ₂	sq	Tapping drill diameter	EUROPA CODE
1/8	X	28	10	90	7	5.5	8.8	TB02160080
1/4	X	19	14	100	11	9	11.8	TB02160160
3/8	X	19	15	100	12	9	15.25	TB02160240
1/2	X	14	17	125	16	12	19	TB02160320
3/4	X	14	20	140	20	16	24.5	TB02160480
1"	X	11	24	160	25	20	30.75	TB02160640

DIN 5156

M ISO metric coarse threads DIN 13 Metrisches ISO-Gewinde DIN 13



HSS-E DIN 352 6H 60° B Bright

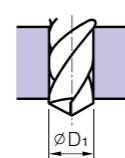
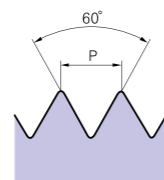
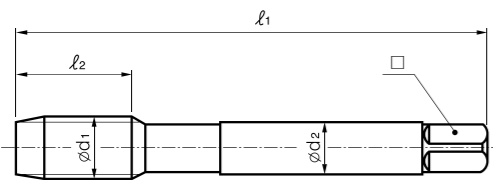
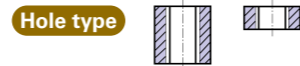
Cat.-No. TM0116



DIN 352

SHORT MACHINE TAPS
FOR GENERAL STEELS UP TO 750NM
SPIRAL POINT

Material groups **GS** See page : 528-533
12-13-14-33-34-63-74



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	8	36	2.8	2.1	1.6	TM01160200
M 2.5	X	0.45	9	40	2.8	2.1	2.05	TM01160250
M 3	X	0.5	11	40	3.5	2.7	2.5	TM01160300
M 4	X	0.7	13	45	4.5	3.4	3.3	TM01160400
M 5	X	0.8	16	52	6	4.9	4.2	TM01160500
M 6	X	1.0	18	56	6	4.9	5	TM01160600
M 8	X	1.25	20	63	6	4.9	6.8	TM01160800
M 10	X	1.5	22	70	7	5.5	8.5	TM01161000
M 12	X	1.75	24	80	9	7	10.2	TM01161200
M 14	X	2.0	26	80	11	9	12	TM01161400
M 16	X	2.0	27	80	12	9	14	TM01161600

ALL DIMENSIONS ARE IN MM
DIN 352 (M2-M16)

M ISO metric coarse threads DIN 13 Metrisches ISO-Gewinde DIN 13



HSS-E DIN 352 6H 60° C Bright R20

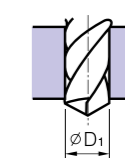
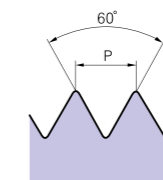
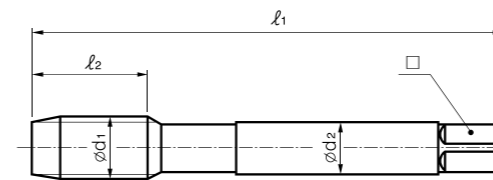
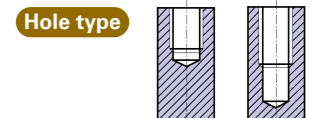
Cat.-No. TM0216



DIN 352

SHORT MACHINE TAPS
FOR AUTOMATIC LATHES
FOR GENERAL STEELS UP TO 750NM
SPIRAL FLUTE

Material groups **GS** See page : 528-533
12-13-14-33-34-63-74



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 3	X	0.5	11	40	3.5	2.7	2.5	TM02160300
M 4	X	0.7	13	45	4.5	3.4	3.3	TM02160400
M 5	X	0.8	16	52	6	4.9	4.2	TM02160500
M 6	X	1.0	18	56	6	4.9	5	TM02160600
M 8	X	1.25	20	63	6	4.9	6.8	TM02160800
M 10	X	1.5	22	70	7	5.5	8.5	TM02161000
M 12	X	1.75	24	80	9	7	10.2	TM02161200
M 14	X	2.0	26	80	11	9	12	TM02161400
M 16	X	2.0	27	80	12	9	14	TM02161600
M 18	X	2.5	30	95	14	11	15.5	TM02161800
M 20	X	2.5	32	95	16	12	17.5	TM02162000

ALL DIMENSIONS ARE IN MM
DIN 352(M3-M12)

M ISO metric coarse threads DIN 13
Metrisches ISO-Gewinde DIN 13



HSS-E DIN 371 6H B Bright

Cat.-No. TM0316

FOR GENERAL STEELS UP TO 750NM
SPIRAL POINT



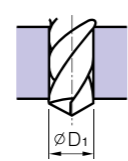
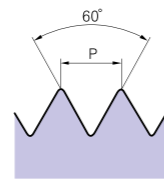
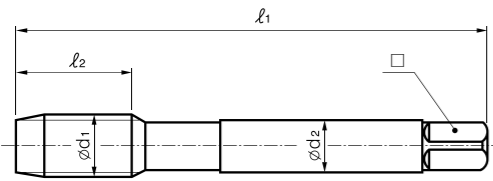
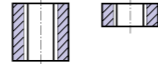
DIN 371

Material groups **GS**

See page : 528-533

12-13-14-33-34-63-74

Hole type



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	8	45	2.8	2.1	1.6	TM03160200
M 2.5	X	0.45	9	50	2.8	2.1	2.05	TM03160250
M 3	X	0.5	11	56	3.5	2.7	2.5	TM03160300
M 3.5	X	0.6	12	56	4	3	2.9	TM03160350
M 4	X	0.7	13	63	4.5	3.4	3.3	TM03160400
M 4.5	X	0.75	14	70	6	4.9	3.7	TM03160450
M 5	X	0.8	15	70	6	4.9	4.2	TM03160500
M 6	X	1.0	17	80	6	4.9	5	TM03160600
M 7	X	1.0	17	80	7	5.5	6	TM03160700
M 8	X	1.25	20	90	8	6.2	6.8	TM03160800
M 10	X	1.5	22	100	10	8	8.5	TM03161000
M 12	X	1.75	24	110	12	9	10.2	TM03161200

ALL DIMENSIONS ARE IN MM
DIN 371(M2-M10)

M ISO metric coarse threads DIN 13
Metrisches ISO-Gewinde DIN 13



HSS-E DIN 376 6H B Bright

Cat.-No. TM0416

FOR GENERAL STEELS UP TO 750NM
SPIRAL POINT



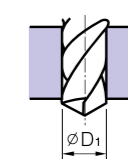
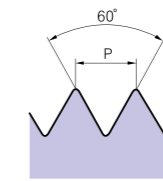
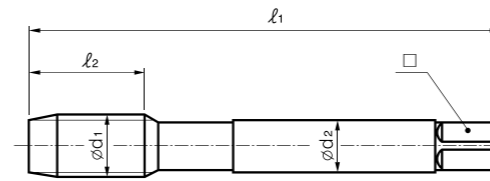
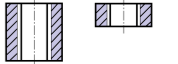
DIN 376

Material groups **GS**

See page : 528-533

12-13-14-33-34-63-74

Hole type



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 3	X	0.5	11	56	2.2	1.8	2.5	TM04160300
M 4	X	0.7	13	63	2.8	2.1	3.3	TM04160400
M 5	X	0.8	15	70	3.5	2.7	4.2	TM04160500
M 6	X	1.0	17	80	4.5	3.4	5	TM04160600
M 8	X	1.25	20	90	6	4.9	6.8	TM04160800
M 10	X	1.5	22	100	7	5.5	8.5	TM04161000
M 12	X	1.75	24	110	9	7	10.2	TM04161200
M 14	X	2.0	26	110	11	9	12	TM04161400
M 16	X	2.0	27	110	12	9	14	TM04161600
M 18	X	2.5	30	125	14	11	15.5	TM04161800
M 20	X	2.5	32	140	16	12	17.5	TM04162000
M 22	X	2.5	32	140	18	14.5	19.5	TM04162200
M 24	X	3.0	34	160	18	14.5	21	TM04162400
M 27	X	3.0	36	160	20	16	24	TM04162700

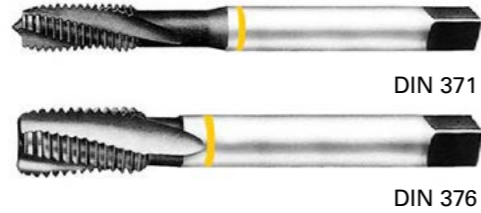
ALL DIMENSIONS ARE IN MM
DIN 376

M ISO metric coarse threads DIN 13 Metrisches ISO-Gewinde DIN 13



Cat.-No. TM1316

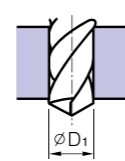
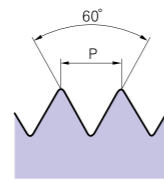
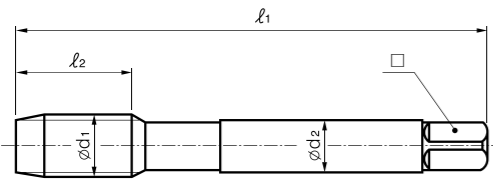
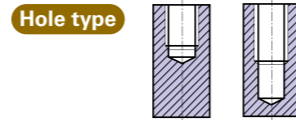
20 DEG SPIRAL FLUTE
FOR GENERAL STEELS UP TO 750NM
SPIRAL FLUTE



DIN 371

DIN 376

GS See page : 528-533
12-13-14-33-34-63-74



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	8	45	2.8	2.1	1.6	TM13160200
M 2.5	X	0.45	9	50	2.8	2.1	2.05	TM13160250
M 3	X	0.5	6	56	3.5	2.7	2.5	TM13160300
M 4	X	0.7	7	63	4.5	3.4	3.3	TM13160400
M 5	X	0.8	8	70	6	4.9	4.2	TM13160500
M 6	X	1.0	10	80	6	4.9	5	TM13160600
M 8	X	1.25	13	90	8	6.2	6.8	TM13160800
M 10	X	1.5	15	100	10	8	8.5	TM13161000
M 12	X	1.75	18	110	9	7	10.2	TM14161200
M 14	X	2.0	20	110	11	9	12	TM14161400
M 16	X	2.0	20	110	12	9	14	TM14161600
M 20	X	2.5	25	140	16	12	17.5	TM14162000

ALL DIMENSIONS ARE IN MM
DIN 371(M2-M10) DIN 376(M12-M20)

M ISO metric coarse threads DIN 13 Metrisches ISO-Gewinde DIN 13



Cat.-No. TM1716

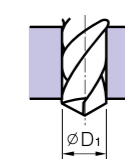
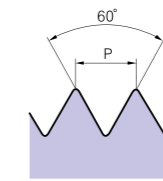
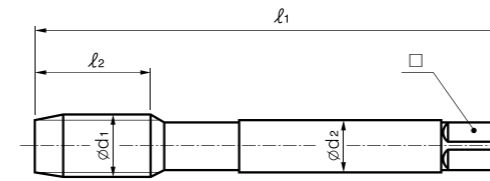
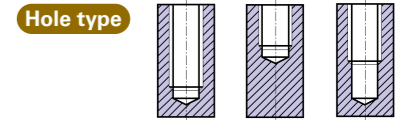
FOR GENERAL STEELS UP TO 750NM
SPIRAL FLUTE



DIN 371

DIN 376

GS See page : 528-533
12-13-14-33-34-63-74



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	5	45	2.8	2.1	1.6	TM17160200
M 3	X	0.5	6	56	3.5	2.7	2.5	TM17160300
M 4	X	0.7	7	63	4.5	3.4	3.3	TM17160400
M 5	X	0.8	8	70	6	4.9	4.2	TM17160500
M 6	X	1.0	10	80	6	4.9	5	TM17160600
M 8	X	1.25	13	90	8	6.2	6.8	TM17160800
M 10	X	1.5	15	100	10	8	8.5	TM17161000
M 12	X	1.75	18	110	9	7	10.2	TM17161200
M 14	X	2.0	20	110	11	9	12	TM17161400
M 16	X	2.0	20	110	12	9	14	TM17161600
M 18	X	2.5	25	125	14	11	15.5	TM17161800
M 20	X	2.5	25	140	16	12	17.5	TM17162000

ALL DIMENSIONS ARE IN MM
DIN 371(M2-M10) DIN 376(M12-M20)

M ISO metric coarse threads DIN 13
Metrisches ISO-Gewinde DIN 13



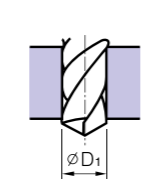
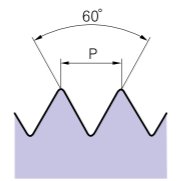
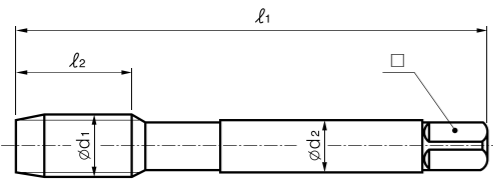
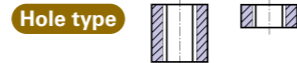
Cat.-No. TM1817

FOR GENERAL STEELS UPTO 900-1000NM
SPIRAL POINT



DIN 371

GS See page : 528-533
12-13-14-33-34-63-74



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	8	45	2.8	2.1	1.6	TM18170200
M 3	X	0.5	11	56	3.5	2.7	2.5	TM18170300
M 4	X	0.7	13	63	4.5	3.4	3.3	TM18170400
M 5	X	0.8	15	70	6	4.9	4.2	TM18170500
M 6	X	1.0	17	80	6	4.9	5	TM18170600
M 8	X	1.25	20	90	8	6.2	6.8	TM18170800
M 10	X	1.5	22	100	10	8	8.5	TM18171000
M 12	X	1.75	24	110	12	9	10.2	TM18171200

ALL DIMENSIONS ARE IN MM
DIN 371(M3-M12)

M ISO metric coarse threads DIN 13
Metrisches ISO-Gewinde DIN 13



Cat.-No. TM1917

FOR GENERAL STEELS 900-1000NM
SPIRAL FLUTE

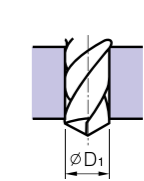
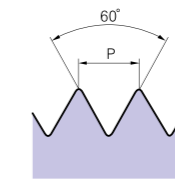
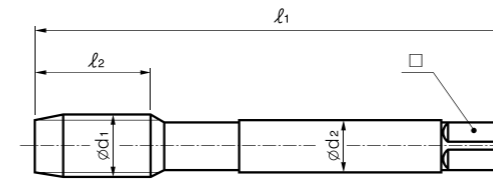
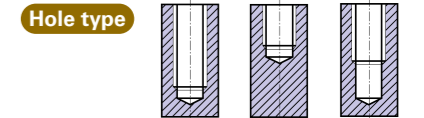


DIN 371



DIN 376

GS See page : 528-533
12-13-14-33-34-63-74



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 2	X	0.4	8	45	2.8	2.1	1.6	TM19170200
M 2.5	X	0.45	9	50	2.8	2.1	2.05	TM19170250
M 3	X	0.5	6	56	3.5	2.7	2.5	TM19170300
M 4	X	0.7	7	63	4.5	3.4	3.3	TM19170400
M 5	X	0.8	8	70	6	4.9	4.2	TM19170500
M 6	X	1.0	10	80	6	4.9	5	TM19170600
M 8	X	1.25	13	90	8	6.2	6.8	TM19170800
M 10	X	1.5	15	100	10	8	8.5	TM19171000
M 12	X	1.75	18	110	9	7	10.2	TM20171200
M 14	X	2.0	20	110	11	9	12	TM20171400
M 16	X	2.0	20	110	12	9	14	TM20171600
M 18	X	2.5	25	125	14	11	15.5	TM20171800
M 20	X	2.5	25	140	16	12	17.5	TM20172000
M 22	X	2.5	25	140	18	14.5	19.5	TM20172200
M 24	X	3.0	30	160	18	14.5	21	TM20172400
M 27	X	3.0	30	160	20	16	24	TM20172700
M 30	X	3.5	35	180	22	18	26.5	TM20173000

ALL DIMENSIONS ARE IN MM
DIN 371(M3-M10) DIN 376(M12-M30)

MF ISO metric fine threads DIN 13 Metrisches ISO-feingewinde DIN 13



HSS-E DIN 374 6H 60° B Bright

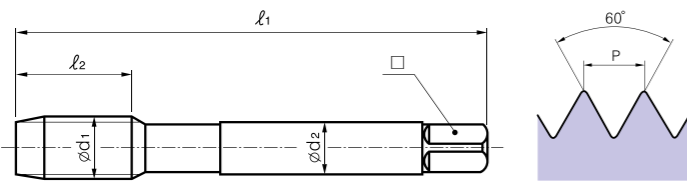
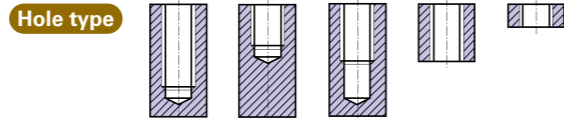
Cat.-No. TM3316



FOR GENERAL STEELS UPTO 750NM
SPIRAL POINT

DIN 374

Material groups **GS** See page : 528-533
12-13-14-33-34-63-74



Ød ₁ mm	X	P mm	l ₂	l ₁	d ₂	sq	Tapping drill diameter	EUROPA CODE
M 4	X	0.5	10	63	2.8	2.1	3.5	TM33160400
M 5	X	0.5	11	70	3.5	2.7	4.5	TM33160500
M 6	X	0.5	13	80	4.5	3.4	5.5	TM33160600
M 6	X	0.75	13	80	4.5	3.4	5.2	TM33160601
M 8	X	0.5	14	80	6	4.9	7.5	TM33160800
M 8	X	0.75	14	80	6	4.9	7.2	TM33160801
M 8	X	1.0	17	90	6	4.9	7	TM33160802
M 10	X	1.75	18	90	7	5.5	9.2	TM33161000
M 10	X	1.0	18	90	7	5.5	9	TM33161001
M 10	X	1.25	22	100	7	5.5	8.8	TM33161002
M 12	X	1.0	18	100	9	7	11	TM33161200
M 12	X	1.25	22	100	9	7	10.8	TM33161201
M 12	X	1.5	22	100	9	7	10.5	TM33161202
M 14	X	1.0	18	100	11	9	13	TM33161400
M 14	X	1.25	22	100	11	9	12.8	TM33161401
M 14	X	1.5	22	100	11	9	12.5	TM33161402
M 16	X	1.0	18	100	12	9	15	TM33161600
M 16	X	1.5	22	100	12	9	14.5	TM33161601
M 18	X	1.0	20	110	14	11	17	TM33161800
M 18	X	1.5	25	110	14	11	16.5	TM33161801
M 20	X	1.0	20	125	16	12	19	TM33162000
M 20	X	1.5	25	125	16	12	18.5	TM33162001
M 22	X	1.0	20	125	18	14.5	21	TM33162200
M 22	X	1.5	25	125	18	14.5	20.5	TM33162201
M 24	X	1.5	27	140	18	14.5	22.5	TM33162400
M 24	X	2.0	27	140	18	14.5	22	TM33162401
M 26	X	1.5	28	140	18	14.5	24.5	TM33162600
M 27	X	1.5	28	140	20	16	25.5	TM33162700
M 27	X	2.0	28	140	20	16	25	TM33162701
M 28	X	1.5	28	140	20	16	26.5	TM33162800
M 30	X	1.5	30	150	22	18	28.5	TM33163000
M 30	X	2.0	30	150	22	18	28	TM33163001

ALL DIMENSIONS ARE IN MM
DIN 374(M4-M30)

MF ISO metric fine threads DIN 13 Metrisches ISO-feingewinde DIN 13



HSS-E DIN 374 6H 60° C Bright R40

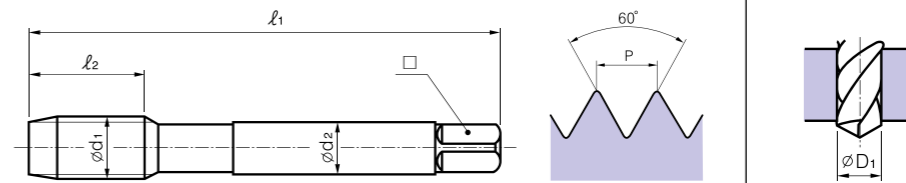
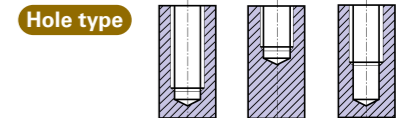
Cat.-No. TM3416



DIN 374

FOR GENERAL STEELS UPTO 750NM
SPIRAL FLUTE

Material groups **GS** See page : 528-533
12-13-14-33-34-63-74



Ød ₁ mm	X	P mm	l ₂	l ₁	d ₂	sq	Tapping drill diameter	EUROPA CODE
M 4	X	0.5	5	63	2.8	2.1	3.5	TM34160400
M 5	X	0.5	5	70	3.5	2.7	4.5	TM34160500
M 6	X	0.5	5	80	4.5	3.4	5.5	TM34160600
M 6	X	0.75	8	80	4.5	3.4	5.2	TM34160601
M 8	X	0.5	5	80	6	4.9	7.5	TM34160800
M 8	X	0.75	8	80	6	4.9	7.2	TM34160801
M 8	X	1.0	10	90	6	4.9	7	TM34160802
M 10	X	0.75	10	90	7	5.5	9.2	TM34161000
M 10	X	1.0	10	90	7	5.5	9	TM34161001
M 10	X	1.25	16	100	7	5.5	8.8	TM34161002
M 12	X	1.0	11	100	9	7	11	TM34161200
M 12	X	1.25	15	100	9	7	10.8	TM34161201
M 12	X	1.5	15	100	9	7	10.5	TM34161202
M 14	X	1.0	11	100	11	9	13	TM34161400
M 14	X	1.25	15	100	11	9	12.8	TM34161401
M 14	X	1.5	15	100	11	9	12.5	TM34161402
M 16	X	1.0	12	100	12	9	15	TM34161600
M 16	X	1.5	15	100	12	9	14.5	TM34161601
M 18	X	1.0	13	110	14	11	17	TM34161800
M 18	X	1.5	17	110	14	11	16.5	TM34161801
M 20	X	1.0	14	125	16	12	19	TM34162000
M 20	X	1.5	17	125	16	12	18.5	TM34162001
M 22	X	1.0	14	125	18	14.5	21	TM34162200
M 22	X	1.5	17	125	18	14.5	20.5	TM34162201
M 24	X	1.5	20	140	18	14.5	22.5	TM34162400
M 24	X	2.0	20	140	18	14.5	22	TM34162401
M 26	X	1.5	20	140	18	14.5	24.5	TM34162600
M 27	X	1.5	20	140	20	16	25.5	TM34162700
M 27	X	2.0	20	140	20	16	25	TM34162701
M 28	X	1.5	20	140	20	16	26.5	TM34162800
M 30	X	1.5	22	150	22	18	28.5	TM34163000
M 30	X	2.0	22	150	22	18	28	TM34163001

M ISO metric coarse threads DIN 13 Metrisches ISO-Gewinde DIN 13



HSS-E DIN 357 6H 60° LONG Bright

Cat.-No. TM5016



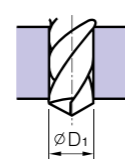
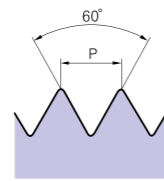
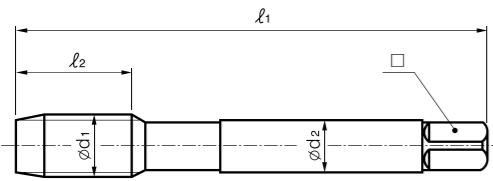
DIN 357

NUTTAPS
FOR GENERAL STEELS UP TO 750NM
STRAIGHT FLUTE

Material groups
GS

See page : 528-533
12-13-14-33-34-74

Hole type



Ød1 mm	X	P mm	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
M 4	X	0.7	25	90	2.8	2.1	3.3	TM50160400
M 5	X	0.8	28	100	3.5	2.7	4.2	TM50160500
M 6	X	1.0	32	110	4.5	3.4	5	TM50160600
M 8	X	1.25	40	125	6	4.9	6.8	TM50160800
M 10	X	1.5	45	140	7	5.5	8.5	TM50161000
M 12	X	1.75	50	180	9	7	10.2	TM50161200

ALL DIMENSIONS ARE IN MM
DIN 357(M4-M20)

UNC Unified coarse threads Unified Grobgewinde



HSS-E DIN 371/376 2B 60° B Bright

Cat.-No. TM6416



DIN 371



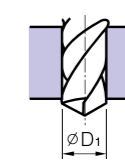
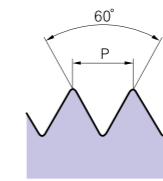
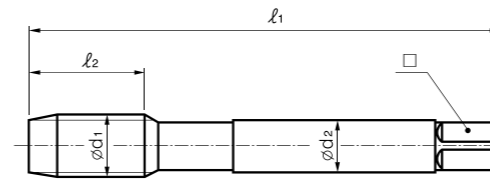
DIN 376

FOR GENERAL STEELS UP TO 750NM
SPIRAL POINT

Material groups
GS

See page : 528-533
12-13-14-33-34-63-74

Hole type



Ød1 inch	X	P inch	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
4	X	40	11	56	3.5	2.7	2.3	TM64160400
5	X	40	11	56	3.5	2.7	2.6	TM64160500
6	X	32	12	56	4	3	2.85	TM64160600
8	X	32	13	63	4.5	3.4	3.5	TM64160800
10	X	24	15	70	6	4.9	3.9	TM64161000
12	X	24	16	80	6	4.9	4.5	TM64161200
1/4	X	20	17	80	7	5.5	5.2	TM64169160
5/16	X	18	20	90	8	6.2	6.6	TM64169200
3/8	X	16	22	100	9	7	8	TM64169240
7/16	X	14	22	100	8	6.2	9.4	TM64169280
1/2	X	13	25	110	9	7	10.75	TM64169320
9/16	X	12	26	110	11	9	12.25	TM64169360
5/8	X	11	27	110	12	9	13.5	TM64169400
3/4	X	10	30	125	14	11	16.5	TM64169480
7/8	X	9	32	140	18	14.5	19.5	TM64169560
1"	X	8	36	160	20	16	22.25	TM64169640

DIN 371(NO.4-3/8) DIN 376(7/16-1")

UNC Unified coarse threads Unified Grobgewinde



Cat.-No. TM6516

FOR GENERAL STEELS UP TO 750NM
SPIRAL FLUTE



DIN 371

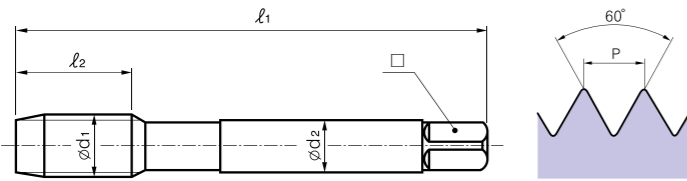
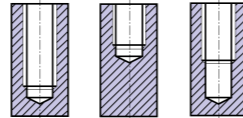
DIN 376



See page : 528-533

12-13-14-33-34-63-74

Hole type



Ød1 inch	X	P inch	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
4	X	40	6	56	3.5	2.7	2.3	TM65160400
5	X	40	7	56	3.5	2.7	2.6	TM65160500
6	X	32	7	56	4	3	2.85	TM65160600
8	X	32	8	63	4.5	3.4	3.5	TM65160800
10	X	24	10	70	6	4.9	3.9	TM65161000
12	X	24	10	80	6	4.9	4.5	TM65161200
1/4	X	20	13	80	7	5.5	5.2	TM65169160
5/16	X	18	14	90	8	6.2	6.6	TM65169200
3/8	X	16	16	100	9	7	8	TM65169240
7/16	X	14	17	100	8	6.2	9.4	TM65169280
1/2	X	13	20	110	9	7	10.75	TM65169320
9/16	X	12	20	110	11	9	12.25	TM65169360
5/8	X	11	22	110	12	9	13.5	TM65169400
3/4	X	10	25	125	14	11	16.5	TM65169480
7/8	X	9	27	140	18	14.5	19.5	TM65169560
1"	X	8	30	160	20	16	22.25	TM65169640

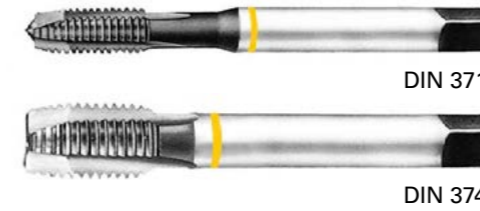
DIN 371(NO.4-3/8) DIN 376(7/16-1")

UNC Unified fine threads Unified Feingewinde



Cat.-No. TM6716

FOR GENERAL STEELS UP TO 750NM
SPIRAL POINT



DIN 371

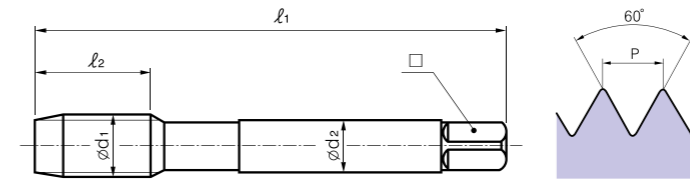
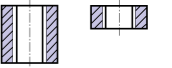
DIN 374



See page : 528-533

12-13-14-33-34-63-74

Hole type



Ød1 inch	X	P inch	l2	l1	d2	sq	Tapping drill diameter	EUROPA CODE
4	X	48	11	56	3.5	2.7	2.4	TM67160400
5	X	44	11	56	3.5	2.7	2.7	TM67160500
6	X	40	12	56	4	3	3	TM67160600
8	X	36	13	63	4.5	3.4	3.5	TM67160800
10	X	32	13	70	6	4.9	4.1	TM67161000
12	X	28	16	80	6	4.9	4.7	TM67161200
1/4	X	28	17	80	7	5.5	5.5	TM67169160
5/16	X	24	17	90	8	6.2	6.9	TM67169200
3/8	X	24	18	100	9	7	8.5	TM67169240
7/16	X	20	22	100	8	6.2	9.9	TM67169280
1/2	X	20	22	100	9	7	11.5	TM67169320
9/16	X	18	22	100	11	9	12.9	TM67169360
5/8	X	18	22	100	12	9	14.5	TM67169400
3/4	X	16	25	110	14	11	17.5	TM67169480
7/8	X	14	26	125	18	14.5	20.5	TM67169560
1"	X	12	28	140	20	16	23.25	TM67169640

DIN 371(NO.4-3/8) DIN 374(7/16-1")

UNF Unified fine threads Unified Feingewinde



Cat.-No. TM6816

FOR GENERAL STEELS UPTO 750NM
SPIRAL FLUTE



DIN 371



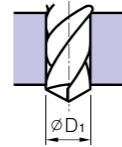
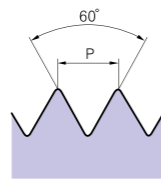
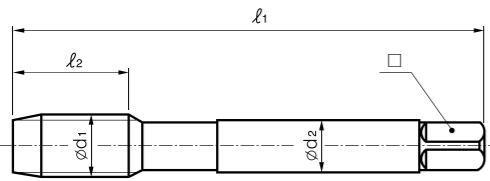
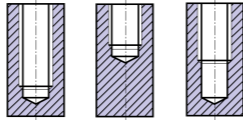
DIN 374



See page : 528-533

12-13-14-33-34-63-74

Hole type



Ød ₁ inch	X	P inch	l ₂	l ₁	d ₂	sq	Tapping drill diameter	EUROPA CODE
4	X	48	6	56	3.5	2.7	2.4	TM68160400
5	X	44	7	56	3.5	2.7	2.7	TM68160500
6	X	40	7	56	4	3	3	TM68160600
8	X	36	8	63	4.5	3.4	3.5	TM68160800
10	X	32	10	70	6	4.9	4.1	TM68161000
12	X	28	10	80	6	4.9	4.7	TM68161200
1/4	X	28	10	80	7	5.5	5.5	TM68169160
5/16	X	24	10	90	8	6.2	6.9	TM68169200
3/8	X	24	10	100	9	7	8.5	TM68169240
7/16	X	20	13	100	8	6.2	9.9	TM68169280
1/2	X	20	13	100	9	7	11.5	TM68169320
9/16	X	18	15	100	11	9	12.9	TM68169360
5/8	X	18	15	100	12	9	14.5	TM68169400
3/4	X	16	17	110	14	11	17.5	TM68169480
7/8	X	14	17	125	18	14.5	20.5	TM68169560
1"	X	12	20	140	20	16	23.25	TM68169640

DIN 371(NO.4-3/8) DIN 374(7/16-1")

SUPER CUTTING TAPS

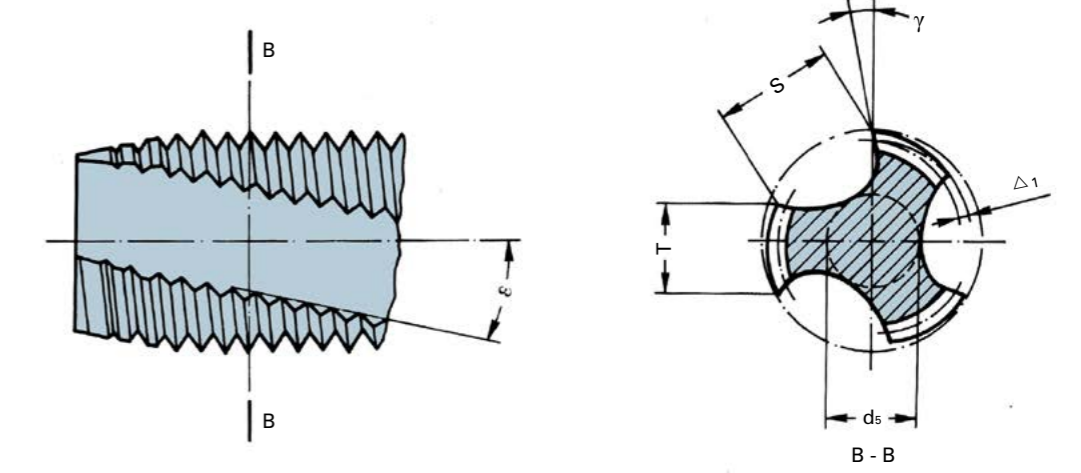
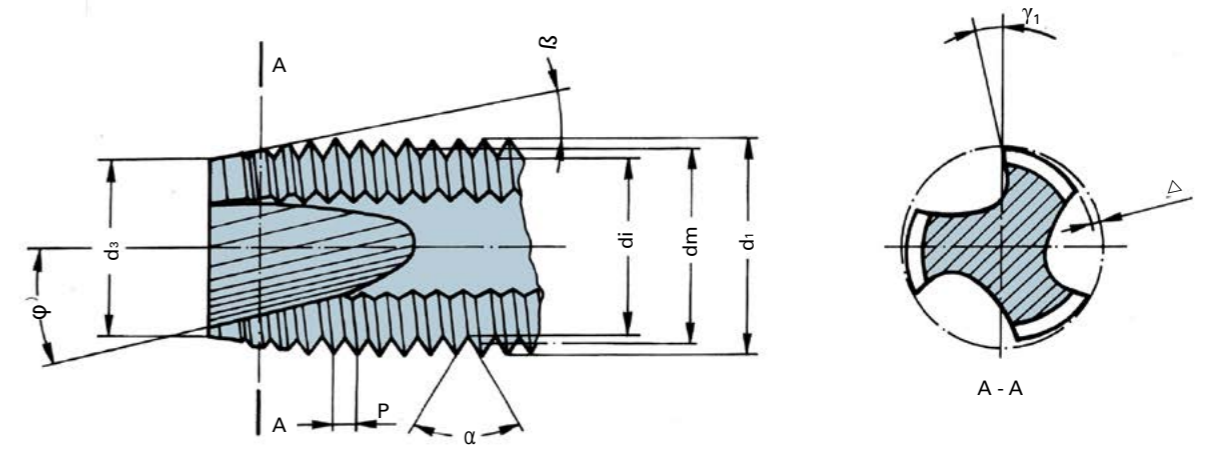
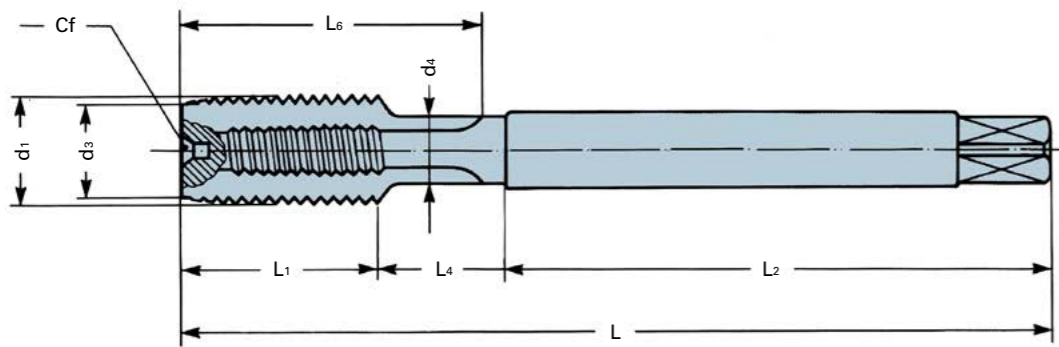
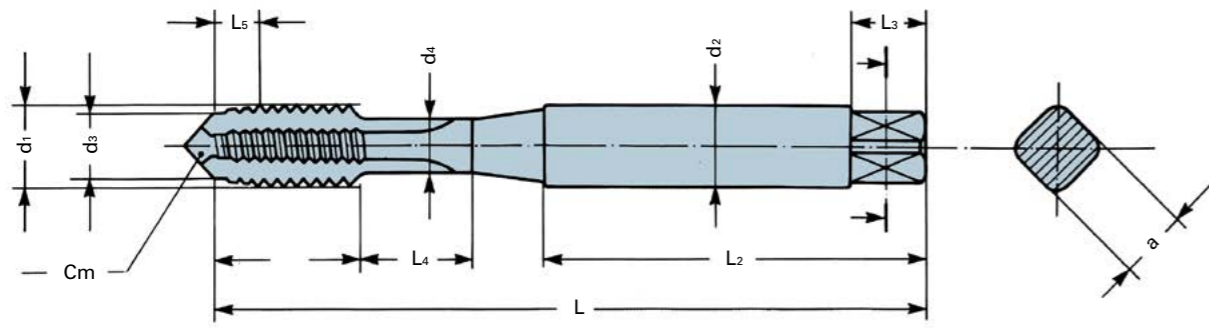
TECHNICAL INFORMATION

TAPS TERMINOLOGY

DRILL SIZES BEFORE TAPPING

METRIC ISO THREADS

APPLICATION AND USE OF THREADING TAPS



d ₁	Major diameter	d ₁	Diamètre externe nominal	d ₁	Nenn Aussendurchmesser
d ₂	Shank diameter	d ₂	Diamètre de la queue	d ₂	Schaftdurchmesser
d ₃	Chamfer diameter	d ₃	Diamètre de l'entrée	d ₃	Anschnittdurchmesser
d ₄	Neck diameter	d ₄	Diamètre de la collerette	d ₄	Bunddurchmesser
L	Total length	L	Longueur totale	L	Gesamtlänge
L ₁	Thread length	L ₁	Longueur de la partie filetée	L ₁	Gewindelänge
L ₂	Shank length	L ₂	Longueur de la queue	L ₂	Schaftlänge
L ₃	Square length	L ₃	Longueur du carré	L ₃	Vierkantlänge
L ₄	Neck length	L ₄	Longueur de la collerette	L ₄	Bundlänge
L ₅	Chamfer length	L ₅	Longueur de l'entrée	L ₅	Anschnittlänge
L ₆	Flutes length	L ₆	Longueur des goujures	L ₆	Nutenlänge
a	Square	a	Carré	a	Vierkantmaß
Cm	Center male	Cm	Centre male	Cm	Mittelpunkt des Aussengewindes
Cf	Center female	Cf	Centre femelle	Cf	Mittelpunkt des Innengewindes

d ₁	Major diameter	d ₁	Diamètre externe nominal	d ₁	Nenn Aussendurchmesser
d _m	Flank diameter	d _m	Diamètre moyen	d _m	Flankendurchmesser
d _i	Minor diameter	d _i	Diamètre interne	d _i	Kerndurchmesser
d ₃	Chamfer diameter	d ₃	Diamètre de l'entrée	d ₃	Anschnittdurchmesser
P	Pitch	P	Pas	P	Steigung
a	Flank angle	α	Angle du filet	a	Flankenwinkel
β	Chamfer angle	β	Demi-angle du cone d'entrée	β	Anschnittwinkel
φ	Gun nose angle	φ	Angle de l'entrée GUN	φ	Schälschnittwinkel
γ	Gun nose rake angle in front	γ ₁	Angle de coupe sur l'entrée GUN	γ ₁	Schälschnitt-Spanwinkel
Δ	Chamfer relief	Δ	Détalonnage sur l'entrée	Δ	Hinterschliff am Anschnitt
Δ ₁	Pitch diameter relief on the land	Δ ₁	Détalonnage sur le filet	Δ ₁	Flankenhinterschliff auf Zahnbreite
γ	Rake angle	γ	Angle de coupe frontale	γ	Spanwinkel
T	Width of land	T	Largeur des dents	T	Zahnstollenbreite
S	Flute width	S	Largeur des goujures	S	Nutenbreite
d ₅	Web tickness	d ₅	Diamètre de l'ame	d ₅	Seelendicke
ε	Angle of spiral flute	ε	Angle d'hélice des goujures	ε	Spiralwinkel

Metric-ISO threads coarse pitch				Metric-ISO threads fine pitch				Metric-ISO threads fine pitch			
M	Pitch mm.	Maximum core dia. mm.	Drill size mm.	MF	Pitch mm.	Maximum core dia. mm.	Drill size mm.	MF	Pitch mm.	Maximum core dia. mm.	Drill size mm.
1	0,25	0,785	0,75	2,5	0,35	2,221	2,15	25	2,00	23,210	23,00
1,1	0,25	0,885	0,85	3	0,35	2,271	2,65	26	1,50	24,676	24,50
1,2	0,25	0,985	0,95	3,5	0,35	3,221	3,15	27	1,00	26,153	26,00
1,4	0,30	1,160	1,10	4	0,50	3,599	3,50	27	1,50	25,676	25,50
1,6	0,35	1,321	1,25	4,5	0,50	4,099	4,00	27	2,00	25,210	25,00
1,7	0,35	1,346	1,30	5	0,50	4,599	4,50	28	1,00	27,153	27,00
1,8	0,35	1,521	1,45	5,5	0,50	5,099	5,00	28	1,50	26,676	26,50
2	0,40	1,679	1,60	6	0,75	5,378	5,20	28	2,00	26,210	26,00
2,2	0,45	1,838	1,75	7	0,75	6,378	6,20	30	1,00	29,153	29,00
2,3	0,40	1,920	1,90	8	0,75	7,378	7,20	30	1,50	28,676	28,50
2,5	0,45	2,138	2,05	8	1,00	7,153	7,00	30	2,00	28,210	28,00
2,6	0,45	2,176	2,10	9	0,75	8,378	8,20	30	3,00	27,252	27,00
3	0,50	2,599	2,50	9	1,00	8,153	8,00	32	1,50	30,675	30,50
3,5	0,60	3,010	2,90	10	0,75	9,378	9,20	32	2,00	30,210	30,00
4	0,70	3,422	3,30	10	1,00	9,153	9,00	33	1,50	31,676	31,50
4,5	0,75	3,878	3,70	10	1,25	8,912	8,80	33	2,00	31,210	31,00
5	0,80	4,334	4,20	11	0,75	10,378	10,20	33	3,00	30,252	30,00
6	1,00	5,153	5,00	11	1,00	10,153	10,00	35	1,50	33,676	33,50
7	1,00	6,153	6,00	12	1,00	11,153	11,00	36	1,50	34,676	34,50
8	1,25	6,912	6,80	12	1,25	10,912	10,80	36	2,00	34,210	34,00
9	1,25	7,912	7,80	12	1,50	10,676	10,50	36	3,00	33,252	33,00
10	1,50	8,676	8,50	14	1,00	13,153	13,00	38	1,50	36,676	36,50
11	1,50	9,676	9,50	14	1,25	12,912	12,80	39	1,50	37,676	37,50
12	1,75	10,441	10,20	14	1,50	12,676	12,50	39	2,00	37,210	37,00
14	2,00	12,210	12,00	15	1,00	14,153	14,00	39	3,00	36,252	36,00
16	2,00	14,210	14,00	15	1,50	13,676	13,50	40	1,50	38,676	38,50
18	2,50	15,744	15,50	16	1,00	15,153	15,00	40	2,00	38,210	38,00
20	2,50	17,744	17,50	16	1,50	14,676	14,50	40	3,00	37,252	37,00
22	2,50	19,744	19,50	17	1,00	16,153	16,00	42	1,50	40,676	40,50
24	3,00	21,252	21,00	17	1,50	15,676	15,50	42	2,00	40,210	40,00
27	3,00	24,252	24,00	18	1,00	17,153	17,00	42	3,00	39,252	39,00
30	3,50	26,771	26,50	18	1,50	16,676	16,50	45	1,50	43,676	43,50
33	3,50	29,771	29,50	18	2,00	16,210	16,00	45	2,00	43,210	43,00
36	4,00	32,270	32,00	20	1,00	19,153	19,00	45	3,00	42,252	42,00
39	4,00	35,270	35,00	20	1,50	18,676	18,50	48	1,50	46,676	46,50
42	4,50	37,799	37,50	20	2,00	18,210	18,00	48	2,00	46,210	46,00
45	4,50	40,799	40,50	22	1,00	21,153	21,00	48	3,00	45,252	45,00
48	5,00	43,297	43,00	22	1,50	20,676	20,50	50	1,50	48,676	48,50
52	5,00	47,297	47,00	22	2,00	20,210	20,00	50	2,00	48,210	48,00
56	5,50	50,796	50,50	24	1,00	23,153	23,00	50	3,00	47,252	47,00
60	5,50	54,796	54,50	24	1,50	22,676	22,50	52	1,50	50,676	50,50
64	6,00	58,305	58,00	24	2,00	22,210	22,00	52	2,00	50,210	50,00
68	6,00	62,305	62,00	25	1,00	24,153	24,00	52	3,00	49,252	49,00
				25	1,50	23,676	23,50				

Nominal dimensions UNI 4535-64
 Production tolerances on tap flank diameter for ISO 6H Nut threads
 Limit dimensions-Nut threads ISO 6H

Coarse pitch threads

Dimensions in mm

$$H = 0,86603P$$

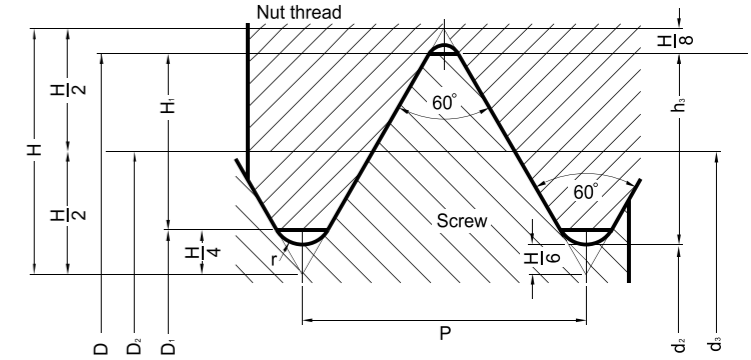
$$H_1 = \frac{5}{8} H = 0,54127P$$

$$h_3 = \frac{17}{24} H = 0,61343P$$

$$d_2 = D_2 = d - \frac{3}{4} H = d - 0,64952P$$

$$d_3 = d - 2h_3 = d - 1,22687P$$

$$r = \frac{H}{6} = 0,14434P$$



Nominal diameter d = D	Pitch P	Flank diameter d ₂ = D ₂	Minor diameter		Thread depth		Radius r	Flank diameter Tap tolerance 6H d ₂		Flank diameter Nut tolerance 6H	
			Screw d ₃	Nut D ₁	Screw h ₃	Nut H ₁		min.	max.	min.	max.
M 1,6	0,35	1,373	1,171	1,221	0,215	0,189	0,051	1,393	1,407	1,373	1,458
M 1,8	0,35	1,573	1,371	1,421	0,215	0,189	0,051	1,593	1,607	1,573	1,658
M 2	0,4	1,740	1,509	1,567	0,245	0,217	0,058	1,761	1,776	1,740	1,830
M 2,2	0,45	1,908	1,648	1,713	0,276	0,244	0,065	1,931	1,946	1,908	2,003
M 2,5	0,45	2,208	1,948	2,013	0,276	0,244	0,065	2,231	2,246	2,208	2,303
M 3	0,5	2,675	2,387	2,459	0,307	0,271	0,072	2,699	2,715	2,675	2,775
M 3,5	0,6	3,110	2,764	2,850	0,368	0,325	0,087	3,137	3,155	3,110	3,222
M 4	0,7	3,545	3,141	3,242	0,429	0,379	0,101	3,574	3,593	3,545	3,663
M 4,5	0,75	4,013	3,580	3,688	0,460	0,406	0,108	4,042	4,061	4,013	4,131
M 5	0,8	4,480	4,019	4,134	0,491	0,433	0,115	4,510	4,530	4,480	4,605
M 6	1	5,350	4,773	4,917	0,613	0,541	0,144	5,385	5,409	5,350	5,500
M 7	1	6,350	5,773	5,917	0,613	0,541	0,144	6,385	6,409	6,350	6,500
M 8	1,25	7,188	6,466	6,647	0,767	0,677	0,180	7,226	7,251	7,188	7,348
M 9	1,25	8,188	7,466	7,647	0,767	0,677	0,180	8,226	8,251	8,188	8,348
M 10	1,5	9,026	8,160	8,376	0,920	0,812	0,217	9,068	9,096	9,026	9,206
M 11	1,5	10,026	9,160	9,376	0,920	0,812	0,217	10,068	10,096	10,026	10,206
M 12	1,75	10,863	9,853	10,106	1,074	0,947	0,253	10,911	10,943	10,863	11,063
M 14	2	12,701	11,546	11,835	1,227	1,083	0,289	12,752	12,786	12,701	12,913
M 16	2	14,701	13,546	13,835	1,227	1,083	0,289	14,752	14,786	14,701	14,913
M 18	2,5	16,376	14,933	15,294	1,534	1,353	0,361	16,430	16,466	16,376	16,600
M 20	2,5	18,376	16,933	17,294	1,534	1,353	0,361	18,430	18,466	18,376	18,600
M 22	2,5	20,376	18,933	19,294	1,534	1,353	0,361	20,430	20,466	20,376	20,600
M 24	3	22,051	20,319	20,752	1,840	1,624	0,433	22,115	22,157	22,051	22,316
M 27	3	25,051	23,319	23,752	1,840	1,624	0,433	25,115	25,157	25,051	25,316
M 30	3,5	27,727	25,706	26,211	2,147	1,894	0,505	27,794	27,839	27,727	28,007
M 33	3,5	30,727	28,706	29,211	2,147	1,894	0,505	30,794	30,839	30,727	31,007
M 36	4	33,402	31,093	31,670	2,454	2,165	0,577	33,473	33,520	33,402	33,702
M 39	4	36,402	34,093	34,670	2,454	2,165	0,577	36,473	36,520	36,402	36,702
M 42	4,5	39,077	36,479	37,129	2,760	2,436	0,650	39,152	39,202	39,077	39,392
M 45	4,5	42,077	39,479	40,129	2,760	2,436	0,650	42,152	42,202	42,077	42,392
M 48	5	44,752	41,866	42,587	3,067	2,706	0,722	44,832	44,885	44,752	45,087
M 52	5	48,752	45,866	46,587	3,067	2,706	0,722	48,832	48,885	48,752	49,087
M 56	5,5	52,428	49,252	50,046	3,374	2,977	0,794	52,512	52,568	52,428	52,783
M 60	5,5	56,428	53,252	54,046	3,374	2,977	0,794	56,512	56,568	56,428	56,783
M 64	6	60,103	56,639	57,505	3,681	3,248	0,866	60,193	60,253	60,103	60,478
M 68	6	64,103	60,639	61,505	3,681	3,248	0,866	64,193	64,253	64,103	64,478

METRIC THREAD MA(OLD UNI 159 PROFILE)								NUT TOLERANCE SH8			
M 1,7	0,35	1,473	1,246	1,246	0,227	0,227	0,040	1,493	1,507	1,473	1,529
M 2,3	0,4	2,040	1,780	1,780	0,260	0,260	0,040	2,061	2,076	2,040	2,120
M 2,6	0,45	2,308	2,016	2,016	0,292	0,292	0,050	2,331	2,346	2,308	2,388



Trouble	Causes	Solutions
Tapped hole oversize	Incorrect tap in use (cutting geometry unsuitable for application)	Use tap selected from the relevant material group
	Faulty alignment	Ensure that the tap is correctly aligned with the core hole axis
	Cold welding	Improve lubrication and direction of coolant Adjust cutting speed
	Re-ground tap (lead-in is not concentric)	Regrind tap lead correctly on a suitable tap grinding machine

Trouble	Causes	Solutions
Stripped threads	Incorrect tap in use (cutting geometry incorrect for application)	Use a tap from the relevant material group.
	Spindle speed and feed rate not synchronized	Check feed rate programming and / or pitch of leading spindle Use a tapping spindle with axial float
	Insufficient start pressure exerted on tap with peel-cut	Increase start pressure

Trouble	Causes	Solutions
Bell mouthed tapped hole	Incorrect start pressure applied to tap	Use a tapping spindle with axial float

Trouble	Causes	Solutions
Unsatisfactory thread surface finish	Incorrect tap in use (Cutting geometry unsuitable for application)	Select tap from the relevant material group
	The tap is blunt	Replace or re-grind tap
	Tap badly re-ground	Re-grind tap again. Check that cutting geometry is suitable for material
	Coolant lacking in lubricating qualities and / or quantity	Ensure the use of suitable coolant and an ample supply



Trouble	Causes	Solutions
Partial chipping of tap	Swarf jamming	Check cutting speed Use alternative tap type
	Tap has jammed against bottom of core hole	Check hole and thread depths Drill core hole deeper
	Tap incorrectly re-ground (lead-in diameter too small therefore too few cutting teeth)	Ensure that original values are maintained when regrinding
	Irregular workpiece material structure	Adjust cutting speed Improve lubricating quality of coolant

Trouble	Causes	Solutions
Excessive tap wear	Incorrect cutting speed	Adjust cutting speed to suit workpiece material
	Coolant lacking in lubricating qualities and / or quantity	Ensure the use of a suitable coolant and an ample supply Check that coolant is reaching the cutting zone
	Surface of the core hole is compacted	Check core hole drilling conditions (drill carefully to reduce risk of surface compacting) Check drill cutting edges

Trouble	Causes	Solutions
TAP BREAKAGE	Incorrect tap in use (cutting geometry unsuitable for application)	Use tap from the relevant material group
	Centering error	Ensure that axes of tap and core hole are aligned
	Blunt tap	Re-grind tap Ensure that taps are stored carefully
	Tap has reached bottom of core hole	Use tapping spindle with axial float and slipping clutch
	Core hole too small	Select core hole as per chart, pages 142 143 of this catalogue


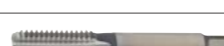




HAND AND ISO TAPS CONTENTS

Europa Tool 11th Edition

HAND AND ISO TAPS



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PRODUCTS	SERIES	DESCRIPTION	PAGE
STRAIGHT FLUTE HAND TAPS			
	F011	METRIC COARSE HAND TAPS	590
	G011	METRIC COARSE HAND TAPS SETS	590
	F021	METRIC FINE HAND TAPS	591
	G021	METRIC FINE HAND TAPS SETS	591
	F091	UNC HAND TAPS	592
	G091	UNC HAND TAPS SETS	592
	F101	UNF HAND TAPS	593
	G101	UNF HAND TAPS SETS	593
	F301	BSPF HAND TAPS	594
	G301	BSPF HAND TAPS SETS	594
	F311	BSPT HAND TAPS	594
	G311	BSPT HAND TAPS SETS	594
ISO SPIRAL POINT TAPS BLUE WIZARD			
	F013	BLUE WIZARD - SPIRAL POINT - METRIC COARSE	595
	F023 F033	BLUE WIZARD - SPIRAL POINT - METRIC FINE	596
	F093	BLUE WIZARD - SPIRAL POINT - UNC	597
	F103	BLUE WIZARD - SPIRAL POINT - UNF	598
ISO SPIRAL FLUTE TAPS BLUE MERLIN			
	F015	BLUE MERLIN - SPIRAL FLUTE - METRIC FINE	599
	F025 F035	BLUE MERLIN - SPIRAL FLUTE - METRIC FINE	599
	F095	BLUE MERLIN - SPIRAL FLUTE - UNC	600
	F105	BLUE MERLIN - SPIRAL FLUTE - UNF	601

METRIC COARSE HAND TAPS



HSS Bright ISO529/BS949 6H

Series No. F011, G011



Dia -meter	Pitch	Overall Length	Flute Length	Square Length	Shank Dia	a/flats	Z	EUROPA CODE			SET(3 TAPS) No.
								Taper Lead	Second Lead	Bottoming Lead	
1.0	0.25	38.50	5.50	4.00	2.50	2.00	3	F0110039	F0110040	F0110041	G0110039
1.4	0.30	40.00	7.00	4.00	2.50	2.00	3	F0110055	F0110056	F0110057	G0110055
1.6	0.35	41.00	8.00	4.00	2.50	2.00	3	F0110063	F0110064	F0110065	G0110063
1.8	0.35	41.00	8.00	4.00	2.50	2.00	3	F0110071	F0110072	F0110073	G0110071
2.0	0.40	41.00	9.50	4.00	2.50	2.00	3	F0110079	F0110080	F0110081	G0110079
2.2	0.45	44.50	9.50	5.00	2.80	2.24	3	F0110087	F0110088	F0110089	G0110087
2.5	0.45	44.50	9.50	5.00	2.80	2.24	3	F0110098	F0110099	F0110100	G0110098
3.0	0.50	48.00	15.00	5.00	3.15	2.50	3	F0110117	F0110118	F0110119	G0110117
3.5	0.60	50.00	17.00	5.00	3.55	2.80	3	F0110137	F0110138	F0110139	G0110137
4.0	0.70	53.00	17.00	6.00	4.00	3.15	3	F0110158	F0110159	F0110160	G0110158
4.5	0.75	53.00	17.00	6.00	4.50	3.55	3	F0110177	F0110178	F0110179	G0110177
5.0	0.80	58.00	16.00	7.00	5.00	4.00	3	F0110197	F0110198	F0110199	G0110197
6.0	1.00	66.00	19.00	8.00	6.30	5.00	3	F0110236	F0110237	F0110238	G0110236
7.0	1.00	66.00	19.00	8.00	7.10	5.60	4	F0110276	F0110277	F0110278	G0110276
8.0	1.25	72.00	22.00	9.00	8.00	6.30	4	F0110315	F0110316	F0110317	G0110315
9.0	1.25	72.00	22.00	10.00	9.00	7.10	4	F0110354	F0110355	F0110356	G0110354
10.0	1.50	80.00	24.00	11.00	10.00	8.00	4	F0110394	F0110395	F0110396	G0110394
11.0	1.50	85.00	25.00	9.00	8.00	6.30	4	F0110433	F0110434	F0110435	G0110433
12.0	1.75	89.00	29.00	10.00	9.00	7.10	4	F0110472	F0110473	F0110474	G0110472
14.0	2.00	95.00	30.00	12.00	11.20	9.00	4	F0110551	F0110552	F0110553	G0110551
16.0	2.00	102.00	32.00	13.00	12.50	10.00	4	F0110630	F0110631	F0110632	G0110630
18.0	2.50	112.00	37.00	14.00	14.00	11.20	4	F0110709	F0110710	F0110711	G0110709
20.0	2.50	112.00	37.00	14.00	14.00	11.20	4	F0110787	F0110788	F0110789	G0110787

► LARGER SIZES AVAILABLE ON REQUEST MANY STOCKED

METRIC FINE HAND TAPS



HSS Bright ISO529/BS949 6H

Series No. F021, G021



Dia -meter	Pitch	Overall Length	Flute Length	Square Length	Shank Dia	a/flats	Z	EUROPA CODE			SET(3 TAPS) No.
								Taper Lead	Second Lead	Bottoming Lead	
3.0	0.35	48.00	15.00	5.00	3.15	2.50	3	F0210117	F0210118	F0210119	G0210117
3.5	0.35	50.00	17.00	5.00	3.55	2.80	3	F0210137	F0210138	F0210139	G0210137
4.0	0.50	53.00	17.00	6.00	4.00	3.15	3	F0210158	F0210159	F0210160	G0210158
4.5	0.50	53.00	17.00	6.00	4.50	3.55	3	F0210177	F0210178	F0210179	G0210177
5.0	0.50	58.00	16.00	7.00	5.00	4.00	3	F0210197	F0210198	F0210199	G0210197
6.0	0.50	66.00	19.00	8.00	6.30	5.00	3	F0310236	F0310237	F0310238	G0310236
6.0	0.75	66.00	19.00	8.00	6.30	5.00	3	F0210236	F0210237	F0210238	G0210236
7.0	0.75	66.00	19.00	8.00	7.10	5.60	4	F0210276	F0210277	F0210278	G0210276
8.0	0.50	72.00	22.00	9.00	8.00	6.30	4	F0410315	F0410316	F0410317	G0410315
8.0	0.75	72.00	22.00	9.00	8.00	6.30	4	F0310315	F0310316	F0310317	G0310315
8.0	1.00	72.00	22.00	9.00	8.00	6.30	4	F0210315	F0210316	F0210317	G0210315
9.0	1.00	72.00	22.00	10.00	9.00	7.10	4	F0210354	F0210355	F0210356	G0210354
10.0	0.75	80.00	24.00	11.00	10.00	8.00	4	F0410394	F0410395	F0410396	G0410394
10.0	1.00	80.00	24.00	11.00	10.00	8.00	4	F0310394	F0310395	F0310396	G0310394
10.0	1.25	80.00	24.00	11.00	10.00	8.00	4	F0210394	F0210395	F0210396	G0210394
11.0	0.75	85.00	25.00	9.00	8.00	6.30	4	F0410433	F0410434	F0410435	G0410433
11.0	1.00	85.00	25.00	9.00	8.00	6.30	4	F0210433	F0210434	F0210435	G0210433
12.0	1.00	89.00	29.00	10.00	9.00	7.10	4	F0410472	F0410473	F0410474	G0410472
12.0	1.25	89.00	29.00	10.00	9.00	7.10	4	F0210472	F0210473	F0210474	G0210472
12.0	1.50	89.00	29.00	10.00	9.00	7.10	4	F0310472	F0310473	F0310474	G0310472
14.0	1.00	95.00	30.00	12.00	11.20	9.00	4	F0410551	F0410552	F0410553	G0410551
14.0	1.25	95.00	30.00	12.00	11.20	9.00	4	F0310551	F0310552	F0310553	G0310551
14.0	1.50	95.00	30.00	12.00	11.20	9.00	4	F0210551	F0210552	F0210553	G0210551
16.0	1.00	102.00	32.00	13.00	12.50	10.00	4	F0410630	F0410631	F0410632	G0410630
16.0	1.50	102.00	32.00	13.00	12.50	10.00	4	F0210630	F0210631	F0210632	G0210630
18.0	1.00	112.00	37.00	14.00	14.00	11.20	4	F0410709	F0410710	F0410711	G0410709
18.0	1.50	112.00	37.00	14.00	14.00	11.20	4	F0210709	F0210710	F0210711	G0210709
18.0	2.00	112.00	37.00	14.00	14.00	11.20	4	F0310709	F0310710	F0310711	G0310709
20.0	1.00	112.00	37.00	14.00	14.00	11.20	4	F0410787	F0410788	F0410789	G0410787
20.0	1.50	112.00	37.00	14.00	14.00	11.20	4	F0210787	F0210788	F0210789	G0210787
20.0	2.00	112.00	37.00	14.00	14.00	11.20	4	F0310787	F0310788	F0310789	G0310787

► LARGER SIZES AVAILABLE ON REQUEST MANY STOCKED

UNC HAND TAPS



HSS Bright ISO529/BS949 2B

Series No. F091, G091



Dia -meter	Pitch	Overall Length	Flute Length	Square Length	Shank Dia	a/flats	Z	EUROPA CODE			SET(3 TAPS) No.
								Taper Lead	Second Lead	Bottoming Lead	
No.1	64	41.00	8.00	4.00	2.50	2.00	3	F0910073	F0910074	F0910075	G0910073
No.2	56	44.50	9.50	5.00	2.80	2.24	3	F0910086	F0910087	F0910088	G0910086
No.3	48	44.50	9.50	5.00	2.80	2.24	3	F0910099	F0910100	F0910101	G0910099
No.4	40	48.00	15.00	5.00	3.15	2.50	3	F0910112	F0910113	F0910114	G0910112
No.5	40	48.00	15.00	5.00	3.15	2.50	3	F0910124	F0910125	F0910126	G0910124
No.6	32	50.00	17.00	5.00	3.55	2.80	3	F0910138	F0910139	F0910140	G0910138
No.8	32	53.00	17.00	6.00	4.50	3.55	3	F0910164	F0910165	F0910166	G0910164
No.10	24	58.00	16.00	7.00	5.00	4.00	3	F0910190	F0910191	F0910192	G0910190
No.12	24	62.00	17.00	7.00	5.60	4.50	3	F0910216	F0910217	F0910218	G0910216
1/4	20	66.00	19.00	8.00	6.30	5.00	4	F0910250	F0910251	F0910252	G0910250
5/16	18	72.00	22.00	9.00	8.00	6.30	4	F0910312	F0910313	F0910314	G0910312
3/8	16	80.00	24.00	11.00	10.00	8.00	4	F0910375	F0910376	F0910377	G0910375
7/16	14	85.00	25.00	9.00	8.00	6.30	4	F0910438	F0910439	F0910440	G0910438
1/2	13	89.00	29.00	10.00	9.00	7.10	4	F0910500	F0910501	F0910502	G0910500
9/16	12	95.00	30.00	12.00	11.20	9.00	4	F0910562	F0910563	F0910564	G0910562
5/8	11	102.00	32.00	13.00	12.50	10.00	4	F0910625	F0910626	F0910627	G0910625
3/4	10	112.00	37.00	14.00	14.00	11.20	4	F0910750	F0910751	F0910752	G0910750
7/8	9	118.00	38.00	16.00	16.00	12.50	4	F0910875	F0910876	F0910877	G0910875
1	8	130.00	45.00	18.00	18.00	14.00	4	F0911000	F0911001	F0911002	G0911000

► LARGER SIZES AVAILABLE ON REQUEST MANY STOCKED

UNF HAND TAPS



HSS Bright ISO529/BS949 2B

Series No. F101, G101



Dia -meter	Pitch	Overall Length	Flute Length	Square Length	Shank Dia	a/flats	Z	EUROPA CODE			SET(3 TAPS) No.
								Taper Lead	Second Lead	Bottoming Lead	
No.0	80	41.00	8.00	4.00	2.50	2.00	3	F1010060	F1010061	F1010062	G1010060
No.1	72	41.00	8.00	4.00	2.50	2.00	3	F1010073	F1010074	F1010075	G1010073
No.2	64	44.50	9.50	5.00	2.80	2.24	3	F1010086	F1010087	F1010088	G1010086
No.3	56	44.50	9.50	5.00	2.80	2.24	3	F1010099	F1010100	F1010101	G1010099
No.4	48	48.00	15.00	5.00	3.15	2.50	3	F1010112	F1010113	F1010114	G1010112
No.5	44	48.00	15.00	5.00	3.15	2.50	3	F1010124	F1010125	F1010126	G1010124
No.6	40	50.00	17.00	5.00	3.55	2.80	3	F1010138	F1010139	F1010140	G1010138
No.8	36	53.00	17.00	6.00	4.50	3.55	3	F1010164	F1010165	F1010166	G1010164
No.10	32	58.00	16.00	7.00	5.00	4.00	3	F1010190	F1010191	F1010192	G1010190
No.12	28	62.00	17.00	7.00	5.60	4.50	3	F1010216	F1010217	F1010218	G1010216
1/4	28	66.00	19.00	8.00	6.30	5.00	4	F1010250	F1010251	F1010252	G1010250
5/16	24	72.00	22.00	9.00	8.00	6.30	4	F1010312	F1010313	F1010314	G1010312
3/8	24	80.00	24.00	11.00	10.00	8.00	4	F1010375	F1010376	F1010377	G1010375
7/16	20	85.00	25.00	9.00	8.00	6.30	4	F1010438	F1010439	F1010440	G1010438
1/2	20	89.00	29.00	10.00	9.00	7.10	4	F1010500	F1010501	F1010502	G1010500
9/16	18	95.00	30.00	12.00	11.20	9.00	4	F1010562	F1010563	F1010564	G1010562
5/8	18	102.00	32.00	13.00	12.50	10.00	4	F1010625	F1010626	F1010627	G1010625
3/4	16	112.00	37.00	14.00	14.00	11.20	4	F1010750	F1010751	F1010752	G1010750
7/8	14	118.00	38.00	16.00	16.00	12.50	4	F1010875	F1010876	F1010877	G1010875
1	12	130.00	45.00	18.00	18.00	14.00	4	F1011000	F1011001	F1011002	G1011000

► LARGER SIZES AVAILABLE ON REQUEST MANY STOCKED

BSPF HAND TAPS



HSS Bright ISO2284 /BS949 G-Series

Series No. F301, G301



Dia -meter	Pitch	Overall Length	Flute Length	Square Length	Shank Dia	a/flats	Z	EUROPA CODE			SET(3 TAPS) No.
								Taper Lead	Second Lead	Bottoming Lead	
1/8	28	59.00	15.00	9.00	8.00	6.30	4	F3010125	F3010126	F3010127	G3010125
1/4	19	67.00	19.00	11.00	10.00	8.00	4	F3010250	F3010251	F3010252	G3010250
3/8	19	75.00	21.00	13.00	12.50	10.00	4	F3010375	F3010376	F3010377	G3010375
1/2	14	87.00	26.00	16.00	16.00	12.50	4	F3010500	F3010501	F3010502	G3010500
5/8	14	91.00	26.00	18.00	18.00	14.00	4	F3010625	F3010626	F3010627	G3010625
3/4	14	96.00	28.00	20.00	20.00	16.00	4	F3010750	F3010751	F3010752	G3010750
7/8	14	102.00	29.00	22.00	22.40	18.00	4	F3010875	F3010876	F3010877	G3010875
1	11	109.00	33.00	24.00	25.00	20.00	6	F3011000	F3011001	F3011002	G3011000

► LARGER SIZES AVAILABLE ON REQUEST MANY STOCKED

BSPT HAND TAPS



HSS Bright ISO2284 /BS949 Rc-Series

Series No. F311, G311



Dia -meter	Pitch	Overall Length	Flute Length	Square Length	Shank Dia	a/flats	Z	EUROPA CODE			SET(3 TAPS) No.
								Taper Lead	Second Lead	Bottoming Lead	
1/8	28	59.00	15.00	9.00	8.00	6.30	3	F3110125	F3110126	F3110127	G3110125
1/4	19	67.00	19.00	11.00	10.00	8.00	5	F3110250	F3110251	F3110252	G3110250
3/8	19	75.00	21.00	13.00	12.50	10.00	5	F3110375	F3110376	F3110377	G3110375
1/2	14	87.00	26.00	16.00	16.00	12.50	5	F3110500	F3110501	F3110502	G3110500
5/8	14	91.00	26.00	18.00	18.00	14.00	5	F3110625	F3110626	F3110627	G3110625
3/4	14	96.00	28.00	20.00	20.00	16.00	5	F3110750	F3110751	F3110752	G3110750
7/8	14	102.00	29.00	22.00	22.40	18.00	5	F3110875	F3110876	F3110877	G3110875
1	11	109.00	33.00	24.00	25.00	20.00	5	F3111000	F3111001	F3111002	G3111000

► LARGER SIZES AVAILABLE ON REQUEST MANY STOCKED

BLUE WIZARD - SPIRAL POINT - METRIC COARSE



HSS VAP ISO529 /BS949 6H

Series No. F013



Diameter	Pitch	overall length	Flute length	Square Length	Shank Dia	a/flats	Z	EUROPA CODE
1.6	0.35	41.00	8.00	4.00	2.50	2.00	2	F0130066
2.0	0.40	41.00	9.50	4.00	2.50	2.00	2	F0130082
2.5	0.45	44.50	9.50	5.00	2.80	2.24	2	F0130101
3.0	0.50	48.00	15.00	5.00	3.15	2.50	2	F0130120
3.5	0.60	50.00	17.00	5.00	3.55	2.80	2	F0130140
4.0	0.70	53.00	17.00	6.00	4.00	3.15	2	F0130161
4.5	0.75	53.00	17.00	6.00	4.50	3.55	2	F0130180
5.0	0.80	58.00	16.00	7.00	5.00	4.00	3	F0130200
6.0	1.00	66.00	19.00	8.00	6.30	5.00	3	F0130239
7.0	1.00	66.00	19.00	8.00	7.10	5.60	3	F0130279
8.0	1.25	72.00	22.00	9.00	8.00	6.30	3	F0130318
10.0	1.50	80.00	24.00	11.00	10.00	8.00	3	F0130397
12.0	1.75	89.00	29.00	10.00	9.00	7.10	3	F0130475
14.0	2.00	95.00	30.00	12.00	11.20	9.00	3	F0130554
16.0	2.00	102.00	32.00	13.00	12.50	10.00	3	F0130633
18.0	2.50	112.00	37.00	14.00	14.00	11.20	3	F0130712
20.0	2.50	112.00	37.00	14.00	14.00	11.20	3	F0130790

► LARGER SIZES AVAILABLE ON REQUEST MANY STOCKED

BLUE WIZARD - SPIRAL POINT - METRIC FINE



HSS VAP ISO529/BS949 6H

Series No. F023 / F033



Diameter	Pitch	overall length	Flute length	Square Length	Shank Dia	a/flats	Z	EUROPA CODE
4.0	0.50	53.00	17.00	6.00	4.00	3.15	2	F0230161
5.0	0.50	58.00	16.00	7.00	5.00	4.00	3	F0230200
6.0	0.75	66.00	19.00	8.00	6.30	5.00	3	F0230239
8.0	1.00	72.00	22.00	9.00	8.00	6.30	3	F0230318
10.0	1.00	80.00	24.00	11.00	10.00	8.00	3	F0330397
10.0	1.25	80.00	24.00	11.00	10.00	8.00	3	F0230397
12.0	1.25	89.00	29.00	10.00	9.00	7.10	3	F0230475
12.0	1.50	89.00	29.00	10.00	9.00	7.10	3	F0330475
14.0	1.25	95.00	30.00	12.00	11.20	9.00	3	F0330554
14.0	1.50	95.00	30.00	12.00	11.20	9.00	3	F0230554
16.0	1.50	102.00	32.00	13.00	12.50	10.00	3	F0230633
18.0	1.50	112.00	37.00	14.00	14.00	11.20	3	F0230712
20.0	1.50	112.00	37.00	14.00	14.00	11.20	3	F0230790

BLUE WIZARD - SPIRAL POINT - UNC



HSS VAP ISO529/BS949 2B

Series No. F093



Diameter	Pitch	overall length	Flute length	Square Length	Shank Dia	a/flats	Z	EUROPA CODE
No.1	64	41.00	8.00	4.00	2.50	2.00	2	F0930076
No.2	56	44.50	9.50	5.00	2.80	2.24	2	F0930089
No.3	48	44.50	9.50	5.00	2.80	2.24	2	F0930102
No.4	40	48.00	15.00	5.00	3.15	2.50	2	F0930115
No.5	40	48.00	15.00	5.00	3.15	2.50	2	F0930127
No.6	32	50.00	17.00	5.00	3.55	2.80	2	F0930141
No.8	32	53.00	17.00	6.00	4.50	3.55	2	F0930167
No.10	24	58.00	16.00	7.00	5.00	4.00	3	F0930193
No.12	24	62.00	17.00	7.00	5.60	4.50	3	F0930219
1/4	20	66.00	19.00	8.00	6.30	5.00	3	F0930253
5/16	18	72.00	22.00	9.00	8.00	6.30	3	F0930315
3/8	16	80.00	24.00	11.00	10.00	8.00	3	F0930378
7/16	14	85.00	25.00	9.00	8.00	6.30	3	F0930441
1/2	13	89.00	29.00	10.00	9.00	7.10	3	F0930503
9/16	12	95.00	30.00	12.00	11.20	9.00	3	F0930565
5/8	11	102.00	32.00	13.00	12.50	10.00	3	F0930628
3/4	10	112.00	37.00	14.00	14.00	11.20	3	F0930753
7/8	9	118.00	38.00	16.00	16.00	12.50	3	F0930878
1	8	130.00	45.00	18.00	18.00	14.00	3	F0931003

BLUE WIZARD - SPIRAL POINT - UNF



HSS VAP ISO529/BS949 2B

Series No. F103



Diameter	Pitch	overall length	Flute length	Square Length	Shank Dia	a/flats	Z	EUROPA CODE
No.0	80	41.00	8.00	4.00	2.50	2.00	2	F1030063
No.1	72	41.00	8.00	4.00	2.50	2.00	2	F1030076
No.2	64	44.50	9.50	5.00	2.80	2.24	2	F1030089
No.3	56	44.50	9.50	5.00	2.80	2.24	2	F1030102
No.4	48	48.00	15.00	5.00	3.15	2.50	2	F1030115
No.5	44	48.00	15.00	5.00	3.15	2.50	2	F1030127
No.6	40	50.00	17.00	5.00	3.55	2.80	2	F1030141
No.8	36	53.00	17.00	6.00	4.50	3.55	2	F1030167
No.10	32	58.00	16.00	7.00	5.00	4.00	3	F1030193
No.12	28	62.00	17.00	7.00	5.60	4.50	3	F1030219
1/4	28	66.00	19.00	8.00	6.30	5.00	3	F1030253
5/16	24	72.00	22.00	9.00	8.00	6.30	3	F1030315
3/8	24	80.00	24.00	11.00	10.00	8.00	3	F1030378
7/16	20	85.00	25.00	9.00	8.00	6.30	3	F1030441
1/2	20	89.00	29.00	10.00	9.00	7.10	3	F1030503
9/16	18	95.00	30.00	12.00	11.20	9.00	3	F1030565
5/8	18	102.00	32.00	13.00	12.50	10.00	3	F1030628
3/4	16	112.00	37.00	14.00	14.00	11.20	3	F1030753
7/8	14	118.00	38.00	16.00	16.00	12.50	3	F1030878
1	12	130.00	45.00	18.00	18.00	14.00	3	F1031003

BLUE MERLIN - SPIRAL FLUTE - METRIC FINE



HSS VAP ISO529/BS949 6H

Series No. F015



Diameter	Pitch	overall length	Flute length	Square Length	Shank Dia	a/flats	Z	EUROPA CODE
3.0	0.50	48.00	15.00	5.00	3.15	2.50	2	F0150121
3.5	0.60	50.00	17.00	5.00	3.55	2.80	2	F0150141
4.0	0.70	53.00	17.00	6.00	4.00	3.15	2	F0150161
5.0	0.80	58.00	16.00	7.00	5.00	4.00	3	F0150200
6.0	1.00	66.00	19.00	8.00	6.30	5.00	3	F0150240
7.0	1.00	66.00	19.00	8.00	7.10	5.60	3	F0150280
8.0	1.25	72.00	22.00	9.00	8.00	6.30	3	F0150319
10.0	1.50	80.00	24.00	11.00	10.00	8.00	3	F0150398
12.0	1.75	89.00	29.00	10.00	9.00	7.10	3	F0150476
14.0	2.00	95.00	30.00	12.00	11.20	9.00	3	F0150555
16.0	2.00	102.00	32.00	13.00	12.50	10.00	3	F0150634
18.0	2.50	112.00	37.00	14.00	14.00	11.20	3	F0150713
20.0	2.50	112.00	37.00	14.00	14.00	11.20	3	F0150791

► LARGER SIZES AVAILABLE ON REQUEST MANY STOCKED

BLUE MERLIN - SPIRAL FLUTE - METRIC FINE



HSS VAP ISO529/BS949 6H

Series No. F025 / F035



Diameter	Pitch	overall length	Flute length	Square Length	Shank Dia	a/flats	Z	EUROPA CODE
4.0	0.50	53.00	17.00	6.00	4.00	3.15	2	F0250161
5.0	0.50	58.00	16.00	7.00	5.00	4.00	3	F0250200
6.0	0.75	66.00	19.00	8.00	6.30	5.00	3	F0250240
8.0	1.00	72.00	22.00	9.00	8.00	6.30	3	F0250319
10.0	1.00	80.00	24.00	11.00	10.00	8.00	3	F0350398
10.0	1.25	80.00	24.00	11.00	10.00	8.00	3	F0250399
12.0	1.25	89.00	29.00	10.00	9.00	7.10	3	F0250476
12.0	1.50	89.00	29.00	10.00	9.00	7.10	3	F0350476
14.0	1.25	95.00	30.00	12.00	11.20	9.00	3	F0350555
14.0	1.50	95.00	30.00	12.00	11.20	9.00	3	F0250555
16.0	1.50	102.00	32.00	13.00	12.50	10.00	3	F0250634
18.0	1.50	112.00	37.00	14.00	14.00	11.20	3	F0250713
20.0	1.50	112.00	37.00	14.00	14.00	11.20	3	F0250791

BLUE MERLIN - SPIRAL FLUTE - UNC



HSS VAP ISO529/BS949 2B

Series No. F095



Diameter	Pitch	overall length	Flute length	Square Length	Shank Dia	a/flats	Z	EUROPA CODE
No.4	40	48.00	15.00	5.00	3.15	2.50	2	F0950116
No.5	40	48.00	15.00	5.00	3.15	2.50	2	F0950128
No.6	32	50.00	17.00	5.00	3.55	2.80	3	F0950142
No.8	32	53.00	17.00	6.00	4.50	3.55	3	F0950168
No.10	24	58.00	16.00	7.00	5.00	4.00	3	F0950194
1/4	20	66.00	19.00	8.00	6.30	5.00	3	F0950254
5/16	18	72.00	22.00	9.00	8.00	6.30	3	F0950316
3/8	16	80.00	24.00	11.00	10.00	8.00	3	F0950379
7/16	14	85.00	25.00	9.00	8.00	6.30	3	F0950442
1/2	13	89.00	29.00	10.00	9.00	7.10	3	F0950504
9/16	12	95.00	30.00	12.00	11.20	9.00	3	F0950566
5/8	11	102.00	32.00	13.00	12.50	10.00	3	F0950629
3/4	10	112.00	37.00	14.00	14.00	11.20	3	F0950754
7/8	9	118.00	38.00	16.00	16.00	12.50	3	F0950879
1	8	130.00	45.00	18.00	18.00	14.00	3	F0951004

BLUE MERLIN - SPIRAL FLUTE - UNF



HSS VAP ISO529/BS949 2B

Series No. F105



Diameter	Pitch	overall length	Flute length	Square Length	Shank Dia	a/flats	Z	EUROPA CODE
No.4	48	48.00	15.00	5.00	3.15	2.50	2	F1050116
No.5	44	48.00	15.00	5.00	3.15	2.50	2	F1050128
No.6	40	50.00	17.00	5.00	3.55	2.80	2	F1050142
No.8	36	53.00	17.00	6.00	4.50	3.55	2	F1050168
No.10	32	58.00	16.00	7.00	5.00	4.00	3	F1050194
1/4	28	66.00	19.00	8.00	6.30	5.00	3	F1050254
5/16	24	72.00	22.00	9.00	8.00	6.30	3	F1050316
3/8	24	80.00	24.00	11.00	10.00	8.00	3	F1050379
7/16	20	85.00	25.00	9.00	8.00	6.30	3	F1050442
1/2	20	89.00	29.00	10.00	9.00	7.10	3	F1050504
9/16	18	95.00	30.00	12.00	11.20	9.00	3	F1050566
5/8	18	102.00	32.00	13.00	12.50	10.00	3	F1050629
3/4	16	112.00	37.00	14.00	14.00	11.20	3	F1050754
7/8	14	118.00	38.00	16.00	16.00	12.50	3	F1050879
1	12	130.00	45.00	18.00	18.00	14.00	3	F1051004

CIRCULAR DIES & DIENUTS CONTENTS

Europa Tool 11th Edition

CIRCULAR DIES & DIENUTS



PRODUCTS	SERIES	DESCRIPTION	PAGE
CIRCULAR DIES			
	J011 - J015	METRIC COARSE	604
	J011 - J015	METRIC FINE	605
	J091 - J097	UNC FINE HAND	606
	J101 - J107	UNF FINE HAND	607
	J302 - J306	BSPF	608
	J5B2 - J5B6	BSPT	609
DIENUTS			
	J611	METRIC COARSE	610
	J612	METRIC FINE	611
	J641	UNC FINE HAND	612
	J651	UNF FINE HAND	613
	J701	BSPF	614
	J711	BSPT	615

CIRCULAR DIES - METRIC COARSE



HSS Bright BS1127 SPLIT

Series No. J011 - J015



Diameter	Pitch	overall length	Width	EUROPA CODE
1.6	0.35	13/16	1/4	J0110063
2.0	0.40	13/16	1/4	J0110079
2.5	0.45	13/16	1/4	J0110098
3.0	0.50	13/16	1/4	J0110118
3.5	0.60	13/16	1/4	J0110138
4.0	0.70	13/16	1/4	J0110159
4.0	0.70	1	3/8	J0120161
4.5	0.75	13/16	1/4	J0110178
5.0	0.80	13/16	1/4	J0110198
5.0	0.80	1	3/8	J0120200
6.0	1.00	13/16	1/4	J0110237
6.0	1.00	1	3/8	J0120238
6.0	1.00	1.5/16	7/16	J0130239
8.0	1.25	1	3/8	J0120316
8.0	1.25	1.5/16	7/16	J0130317
10.0	1.50	1	3/8	J0120396
10.0	1.50	1.5/16	7/16	J0130397
10.0	1.50	1.1/2	1/2	J0140398
12.0	1.75	1.5/16	7/16	J0130473
12.0	1.75	1.1/2	1/2	J0140474
12.0	1.75	2	5/8	J0150475
14.0	2.00	1.5/16	7/16	J0130553
14.0	2.00	1.1/2	1/2	J0140554
14.0	2.00	2	5/8	J0150555
16.0	2.00	1.1/2	1/2	J0140631
16.0	2.00	2	5/8	J0150632
18.0	2.50	1.1/2	1/2	J0140710
18.0	2.50	2	5/8	J0150710
20.0	2.50	1.1/2	1/2	J0140788
20.0	2.50	2	5/8	J0150788

► MORE SIZES AVAILABLE ON REQUEST

CIRCULAR DIES - METRIC FINE



HSS Bright BS1127 SPLIT

Series No. J011 - J015



Diameter	Pitch	overall length	Width	EUROPA CODE
3.0	0.35	13/16	1/4	J0110117
4.0	0.50	13/16	1/4	J0110158
5.0	0.50	13/16	1/4	J0110197
6.0	0.75	13/16	1/4	J0110236
8.0	1.00	1	3/8	J0120315
10.0	1.00	1	3/8	J0120394
10.0	1.25	1	3/8	J0130395
12.0	1.25	1.5/16	7/16	J0130472
14.0	1.50	1.5/16	7/16	J0130552
16.0	1.50	1.1/2	1/2	J0140630
18.0	1.50	1.1/2	1/2	J0140709
20.0	1.50	2	5/8	J0150787

► MORE SIZES AVAILABLE ON REQUEST

CIRCULAR DIES UNC



HSS Bright BS1127 SPLIT

Series No. J091 -J097



Diameter	Pitch	overall length	Width	EUROPA CODE
No.1	64	13/16	1/4	J0910073
No.2	56	13/16	1/4	J0910086
No.3	48	13/16	1/4	J0910099
No.4	40	13/16	1/4	J0910112
No.5	40	13/16	1/4	J0910124
No.6	32	13/16	1/4	J0910138
No.8	32	13/16	1/4	J0910164
No.10	24	13/16	1/4	J0910190
No.12	24	13/16	1/4	J0910216
1/4	20	13/16	1/4	J0910250
1/4	20	1	3/8	J0920251
1/4	20	1.5/16	7/16	J0930252
5/16	18	1	3/8	J0920312
5/16	18	1.5/16	7/16	J0930313
3/8	16	1	3/8	J0920375
3/8	16	1.5/16	7/16	J0930376
3/8	16	1.1/2	1/2	J0940377
7/16	14	1.5/16	7/16	J0930438
7/16	14	1.1/2	1/2	J0940439
1/2	13	1.5/16	7/16	J0930500
1/2	13	1.1/2	1/2	J0940501
1/2	13	2	5/8	J0950502
9/16	12	1.5/16	7/16	J0930562
9/16	12	1.1/2	1/2	J0940563
9/16	12	2	5/8	J0950564
5/8	11	1.1/2	1/2	J0940625
5/8	11	2	5/8	J0950626
3/4	10	1.1/2	1/2	J0940749
3/4	10	2	5/8	J0950750
7/8	9	2	5/8	J0950875
1	8	2	5/8	J0951000
1	8	3	7/8	J0971002

► MORE SIZES AVAILABLE ON REQUEST

CIRCULAR DIES UNF



HSS Bright BS1127 SPLIT

Series No. J101 - J107



Diameter	Pitch	overall length	Width	EUROPA CODE
No.0	80	13/16	1/4	J1010060
No.1	72	13/16	1/4	J1010073
No.2	64	13/16	1/4	J1010086
No.3	56	13/16	1/4	J1010099
No.4	48	13/16	1/4	J1010112
No.5	44	13/16	1/4	J1010124
No.6	40	13/16	1/4	J1010138
No.8	36	13/16	1/4	J1010164
No.10	32	13/16	1/4	J1010190
No.12	28	13/16	1/4	J1010216
1/4	28	13/16	1/4	J1010250
1/4	28	1	3/8	J1020251
1/4	28	1.5/16	7/16	J1030252
5/16	24	1	3/8	J1020312
5/16	24	1.5/16	7/16	J1030313
3/8	24	1	3/8	J1020375
3/8	24	1.5/16	7/16	J1030376
3/8	24	1.1/2	1/2	J1040377
7/16	20	1.5/16	7/16	J1030438
7/16	20	1.1/2	1/2	J1040439
1/2	20	1.5/16	7/16	J1030500
1/2	20	1.1/2	1/2	J1040501
1/2	20	2	5/8	J1050502
9/16	18	1.5/16	7/16	J1030562
9/16	18	1.1/2	1/2	J1040563
9/16	18	2	5/8	J1050564
5/8	18	1.1/2	1/2	J1040625
5/8	18	2	5/8	J1050626
3/4	16	1.1/2	1/2	J1040749
3/4	16	2	5/8	J1050750
7/8	14	2	5/8	J1050875
1	12	2	5/8	J1051000
1	12	3	7/8	J1071002

► MORE SIZES AVAILABLE ON REQUEST

CIRCULAR DIES BSPF



HSS Bright BS1127 SPLIT G-Series

Series No. J302 - J306



Diameter	Pitch	overall length	Width	EUROPA CODE
1/8	28	1	3/8	J3020125
1/8	28	1.5/16	7/16	J3030126
1/8	28	1.1/2	1/2	J3040127
1/4	19	1.5/16	7/16	J3030250
1/4	19	1.1/2	1/2	J3040251
1/4	19	2	5/8	J3050252
3/8	19	1.1/2	1/2	J3040375
3/8	19	2	5/8	J3050376
1/2	14	2	5/8	J3050500
5/8	14	2	5/8	J3050625
3/4	14	2	5/8	J3050750
1	11	2.1/4	11/16	J3061000

► MORE SIZES AVAILABLE ON REQUEST

CIRCULAR DIES BSPT



HSS Bright BS1127 SPLIT Rc-Series

Series No. J5B2 - J5B6



Diameter	Pitch	overall length	Width	EUROPA CODE
1/8	28	1	3/8	J5B20125
1/8	28	1.5/16	7/16	J5B30126
1/8	28	1.1/2	1/2	J5B40127
1/4	19	1.5/16	7/16	J5B30251
1/4	19	1.1/2	1/2	J5B40251
1/4	19	2	5/8	J5B50252
3/8	19	1.1/2	1/2	J5B40375
3/8	19	2	5/8	J5B50376
1/2	14	2	5/8	J5B50500
1/2	14	2.1/4	11/16	J5B60501
3/4	14	2	5/8	J5B50750
3/4	14	2.1/4	11/16	J5B60751
1	11	2.1/4	11/16	J5B61000

► MORE SIZES AVAILABLE ON REQUEST

DIENUTS- METRIC COARSE



HSS Bright BS1127

Series No. J611



Diameter	Pitch	A/F	Width	EUROPA CODE
3.0	0.50	0.710	1/4	J6110117
4.0	0.70	0.710	1/4	J6110158
5.0	0.80	0.710	1/4	J6110197
6.0	1.00	0.710	1/4	J6110236
8.0	1.25	0.820	5/16	J6110315
10.0	1.50	0.920	3/8	J6110394
12.0	1.75	1.100	1/2	J6110472
14.0	2.00	1.300	5/8	J6110551
16.0	2.00	1.300	5/8	J6110630
18.0	2.50	1.480	11/16	J6110709
20.0	2.50	1.480	11/16	J6110787

► MORE SIZES AVAILABLE ON REQUEST

DIENUTS- METRIC FINE



HSS Bright BS1127

Series No. J612



Diameter	Pitch	A/F	Width	EUROPA CODE
3.0	0.35	0.710	1/4	J6120117
4.0	0.50	0.710	1/4	J6120158
5.0	0.50	0.710	1/4	J6120197
6.0	0.75	0.710	1/4	J6120236
8.0	1.00	0.820	5/16	J6120315
10.0	1.00	0.920	3/8	J6120394
12.0	1.25	1.100	1/2	J6120472
14.0	1.50	1.300	1/2	J6120551
16.0	1.50	1.300	1/2	J6120630
18.0	1.50	1.480	1/2	J6120709
20.0	1.50	1.480	5/8	J6120787

► MORE SIZES AVAILABLE ON REQUEST

DIENUTS UNC



HSS Bright BS1127

Series No. J641



Diameter	Pitch	A/F	Width	EUROPA CODE
1/4	20	0.710	1/4	J6410250
5/16	18	0.820	5/16	J6410312
3/8	16	0.920	3/8	J6410375
7/16	14	1.010	7/16	J6410438
1/2	13	1.100	1/2	J6410500
9/16	12	1.300	5/8	J6410562
5/8	11	1.300	5/8	J6410625
3/4	10	1.480	11/16	J6410750
7/8	9	1.670	13/16	J6410875
1	8	2.050	15/16	J6411000

► MORE SIZES AVAILABLE ON REQUEST

DIENUTS UNF



HSS Bright BS1127

Series No. J651



Diameter	Pitch	A/F	Width	EUROPA CODE
No.10	32	0.710	1/4	J6510190
1/4	28	0.710	1/4	J6510250
5/16	24	0.820	5/16	J6510312
3/8	24	0.920	3/8	J6510375
7/16	20	1.010	7/16	J6510438
1/2	20	1.100	1/2	J6510500
9/16	18	1.300	5/8	J6510562
5/8	18	1.300	5/8	J6510625
3/4	16	1.480	11/16	J6510750
7/8	14	1.670	13/16	J6510875
1	12	2.050	15/16	J6511000

► MORE SIZES AVAILABLE ON REQUEST

DIENUTS BSPT



HSS Bright BS1127 G-Series

Series No. J701



Diameter	Pitch	A/F	Width	EUROPA CODE
1/8	28	0.920	1/4	J7010125
1/4	19	1.100	1/4	J7010250
3/8	19	1.300	3/8	J7010375
1/2	14	1.670	1/2	J7010500
3/4	14	2.050	15/16	J7010750
1	11	2.580	1.1/8	J7011000

► MORE SIZES AVAILABLE ON REQUEST

DIENUTS BSPT



HSS Bright BS1127 Rc-Series

Series No. J711



Diameter	Pitch	A/F	Width	EUROPA CODE
1/8	28	0.920	3/8	J7110125
1/4	19	1.100	1/4	J7110250
3/8	19	1.300	3/8	J7110375
1/2	14	1.670	1/2	J7110500
3/4	14	2.050	3/4	J7110750
1	11	2.580	1.1/8	J7111000

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ANCILLARY PRODUCTS CONTENTS

Europa Tool 11th Edition

ANCILLARY PRODUCTS



SERIES	DESCRIPTION	PAGE
J895	DIESTOCKS	618
J891 / 2 / 3	TAP WRENCH	619

DIESTOCKS



Series No. J895

Stock No.	Die Outside Dia.	Length mm	EUROPA CODE
DS1	13/16	165	J8950001
DS2	1	230	J8950002
DS3	1.5/16	280	J8950003
DS4	1.1/2	350	J8950004
DS5	2	550	J8950005
DS6	2.1/4	610	J8950006
DS7	3	790	J8950007
DS8	4	1075	J8950008

TAP WRENCH



Series No. J891 / 2 / 3

J891

Wrench No.	Nominal Tap Size					Length mm	EUROPA CODE
	Inch	UN	BA	mm	Pipe (inch)		
TW1	1/16 - 1/4	0 - 12	12 - 0	2.0 - 6.0	-	105	J8910001
TW2	1/8 - 1/2			3.0 - 12.0	1/8 - 1/4	160	J8910002

J892

Wrench No.	Nominal Tap Size					Length mm	EUROPA CODE
	Inch	UN	BA	mm	Pipe (inch)		
TW3	1/8 - 1/2	4.-12		3.0 - 12.0	1/8 - 1/4	270	J8920003
TW4	7/32 - 3/4			6.0 - 20.0	1/8 - 3/8	380	J8920004
TW5	7/16 - 1			12.0 - 27.0	1/4 - 5/8	500	J8920005
TW6	3/4 - 1.1/2			18.0 - 42.0	3/8. - 1	815	J8920006
TW7	1 - 2.1/2			>24	5/8 - 2.1/2	1300	J8920007

J893

Wrench No.	Nominal Tap Size					Length mm	EUROPA CODE
	Inch	UN	BA	mm	Pipe (inch)		
T1 STD	1/16 - 1/4	0 - 12	12 - 0	1.0 - 6.0		85	J8930001
T2 STD	1/4 - 1/2			6.0 - 12.0	1/8 - 1/4	110	J8930002
TL3 LONG	1/16 - 1/4	0 - 12	12 - 0	1.0 - 6.0		250	J8930003
TL4 LONG	1/4 - 1/2			6.0 - 12.0	1/8 - 1/4	300	J8930004

EDP No. INDEX



EDP No.	Page	EDP No.	Page	EDP No.	Page
PULSAR-IDX END MILL		112120	62	HX2 & HX2S END MILLS	
200120	11	112320	62	134123	129
200151	11	114320	64	134323	129
200320	8	115120	71	135123	130
200351	8	115320	71	135323	130
202350	9	116120	70	136123	125
203350	9	116320	70	136323	125
204350	10	118120	63	137123	126
205350	12	118320	63	137323	126
206350	12	120320	82	138123	127
PULSAR BLUE END MILL		130320	84	138323	127
100350	18	143320	80	139123	128
100450	19	145120	77	139323	128
101350	22	145320	77	146123	131
101450	23	147120	76	146323	131
101550	32	147320	76	156123	132
101650	34	148120	75	156323	132
101750	35	148320	75	157123	133
101950	36	149120	72	157323	133
102350	24	149320	72	158123	134
102950	39	150120	73	158323	134
103350	33	150320	73	159123	135
103950	40	155120	61	159323	135
104350	25	155320	61	164123	136
105350	26	156120	69	164323	136
106350	27	156320	69	167123	137
107350	31	157120	68	167323	137
108350	41	157320	68	168123	138
109350	28	158120	74	168323	138
110350	37	158320	74	169123	139
111350	38	ET1 END MILL		169323	139
PULSAR END MILL		107122	109	ALU-XP END MILL	
100120	59	117323	110	112303	153
100320	59	118123	108	112309	149
100320	78	118323	108	116309	150
102120	60	132123	106	125103	151
102320	60	132323	106	125303	151
103120	65	320123	107	126303	154
103320	65	320323	107	142303	152
105320	79	SPHERE & DIAMOND COATED END MILLS		143303	157
107320	81	113325	120	151303	146
108320	81	114325	121	153303	156
109120	66	152320	118	155309	148
109320	66	153320	118	157303	147
111120	67	154320	118	331303	155
111320	67				

EDP No. INDEX



EDP No.	Page	EDP No.	Page	EDP No.	Page
SOLID CARBIDE MILLING CUTTERS		519303	210	301202	304
100103	189	520303	211	302201	306
102103	190	SABRE ROUGHING		302202	306
109103	194	121240	238	304202	308
111103	195	190140	236	305202	309
120323	187	191140	237	307201	313
121323	188	192140	239	307202	313
140103	192	COBALT MILLING CUTTERS (FLATTED SHANK)		308201	315
140323	187	100102	246	308202	315
141103	193	101102	248	313201	316
142323	188	102102	249	313202	316
162303	191	103102	250	314201	317
197303	196	104102	251	314202	317
300303	169	105102	252	328102	310
301303	170	107102	253	329102	311
302303	171	108102	254	334102	312
303303	172	112102	255	501201	322
304303	173	114102	256	501202	322
305303	174	115102	257	502201	324
306303	181	116102	258	502202	324
307303	182	118102	265	504202	326
308303	183	119102	266	505202	327
309303	175	121102	272	507201	331
310303	176	121113	274	507202	331
311303	177	122102	273	508201	333
312303	178	124102	269	508202	333
313303	179	125102	270	513201	335
314303	180	126102	275	513202	335
315303	185	127102	271	514201	336
316303	186	128102	260	514202	336
317303	184	129102	261	518202	337
500303	197	131102	264	519202	338
501303	198	132102	259	521202	339
502303	199	133102	267	524202	340
506303	200	134102	268	528102	328
507303	201	135316	262	529102	329
508303	202	136316	263	530102	330
509303	203	137102	276	APPLICATION FORM MILLING CUTTER	
510303	204	138102	277	151201	353
511303	205	139102	278	152116	351
512303	206	HSS & COBALT MILLING CUTTERS (SCREWED SHANK)		152216	351
513303	207	118202	318	153116	348
514303	208	119202	319	153216	348
515303	213	121202	320	154116	348
516303	212	124202	321	154216	348
517303	214	301201	304	155116	349
518303	209			155216	349

EDP No. INDEX



EDP No.	Page	EDP No.	Page	EDP No.	Page
156116	349	830323	381	820323	414
156216	349	831308	382	821223	427
158116	350	831308	383	823323	415
158216	350	831308	384	825323	417
159102	352	831309	382	828323	419
SPADE DRILL		831309	383	843303	421
807304	367	831309	384	845303	423
807304	368	831323	382	848303	425
807304	369	831323	383	COBALT & HSS TWIST DRILLS	
807304	370	831323	384	810205	439
807304	371	832308	378	810334	464
807306	367	832308	379	810434	437
807306	368	832308	379	810504	445
807306	369	832309	378	810505	447
807306	370	832309	379	810801	460
807306	371	832323	379	811505	449
807326	367	834327	361	820116	469
807326	368	834327	362	820422	443
807326	369	834327	363	820434	435
807326	370	834523	364	820502	451
807326	371	834523	365	820601	465
807326	371	834523	366	820702	454
808317	372	82325 TO 86325	398	820801	458
808317	373	82325 TO 86325	393	820901	467
808317	374	86515 TO 87515	394	820902	456
808317	375	86515 TO 89515	391	821001	470
808318	372	8Y115 TO 84115	392	821402	461
808318	373	8Y215 TO 87215	392	821601	471
808318	374	8Y215 TO 89215	398	821901	462
808318	375	8Y325 TO 87425	393	822402	461
808327	372	8Y425 TO 85525	394	888301	463
808327	373	8Y425 TO 89425	390	HSS & COBALT REAMERS	
808327	374	8Y525 TO 85525	391	450301	482
808327	375	SP	395	451301	483
809305	376	SOLID CARBIDE DRILLS		452302	486
809305	377	800303	398	453302	487
809307	376	801303	400	454302	488
809307	377	802323	401	455302	489
809321	376	803323	408	456302	490
809321	377	804323	410	457301	491
828327	360	805323	412	COUNTERSINKS	
828327	360	806303	407	702301	496
828327	360	806403	407	702302	496
830308	380	807323	403	TOOLBITS	
830308	381	808323	405	7010	500
830309	380	810323	414		
830309	381	815323	414		
830323	380				

EDP No. INDEX



EDP No.	Page	EDP No.	Page	EDP No.	Page
7030	501	TM3716	535	CIRCULAR DIES & DIENUTS	
7310	500	TM3817	553	J011 - J015	604
7330	501	TM3827	554	J011 - J015	605
THREAD MILLS		TM3830	546	J091 - J097	606
180323	504	TM5016	576	J101 - J107	607
181323	504	TM6316	561	J302 - J306	608
182323	505	TM6416	577	J5B2 - J5B6	609
183323	505	TM6430	547	J611	610
183423	506	TM6516	578	J612	611
190323	506	TM6530	548	J641	612
191323	507	TM6716	579	J651	613
183523	507	TM6730	549	J701	614
192323	508	TM6816	580	J711	615
193323	508	TM6830	550	ANCILLARY	
194323	509	TM7110	539	J891	619
195323	509	TM7210	541	J892	619
196323	510	TM7328	540	J893	619
186323	510	TM7428	542	J895	618
187323	511	TM8040	544		
198323	511	TM8053	551		
APPLICATION TAPS		TM8140	543		
TB0116	564	TM8153	552		
TB0216	565	Hand and ISO TAPS			
TM0116	566	F011	590		
TM0216	567	F013	595		
TM0316	568	F015	599		
TM0416	569	F021	591		
TM0516	534	F023	596		
TM0731	562	F025	599		
TM0917	563	F033	596		
TM1316	570	F035	599		
TM1530	555	F091	592		
TM1716	571	F093	597		
TM1730	536	F095	600		
TM1817	572	F101	593		
TM1917	573	F103	598		
TM2130	556	F105	601		
TM2330	557	F301	594		
TM2530	537	F311	594		
TM2716	558	G011	590		
TM2817	559	G021	591		
TM2917	560	G091	592		
TM3130	538	G101	593		
TM3316	574	G301	594		
TM3416	575	G311	594		
TM3630	545				

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