



GENERAL CATALOGUE

taps - dies
thread mills - tapping attachments



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A15 S 6G	M	48
A15 S 6G TiN	M	48
A15 S 7G	M	49
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A15 S LH	M	50
A15 S LH TiN	M	50
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A17 S	MF	87
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A17 S 6G	MF	91
A17 S 6G TiN	MF	91
A18 S	G	124
A18 S VAP	G	124
A18 S TiCN	G	124
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A19 S TiN	UNC	106
A19 S TiCN	UNC	106
A19 S 3B	UNC	106
A19 S TiX2	UNC	107
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A20 S TiN	UNF	114
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A23 FC	MF	83
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A23 FC LH	MF	83
A24 FC	BSW	132
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A26 FC	G	122
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A27 FC TiN	UNC	104
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A28 FC	UNF	112
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A29 DIN 376 TiN	M	58
A29 L	M	59
A29 L TiN	M	59
A30	MF	92
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A31	BSW	133
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A32	G	125
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A33	UNC	108
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A34	UNF	116
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A59 S TiN	G	126
A59 S TiCN	G	126
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A60 S TiN	UNC	109
A60 S TiCN	UNC	109
A60 S TiX2	UNC	109
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A70 S	M	60
A70 S VAP	M	60
A70 S TiN	M	60
A70 S TiCN	M	60
A70 S 4H	M	61
A70 S 4H TiN	M	61
A70 S 6G	M	62
A70 S 6G TiN	M	62
A70 S 7G	M	63
A70 S 7G TiN	M	63
A70 SE	M	65
A70 SE TiN	M	65
A70 S LH	M	66
A70 S LH TiN	M	66
A71 S	MF	95
A71 S VAP	MF	95
A71 S TiN	MF	95
A71 S TiCN	MF	95
A71 S TiX2	MF	96
A71 S 6G	MF	97
A71 S 6G TiN	MF	97
A72	M	72
A72 TiH1	M	72
A76 S	M	67
A76 S TiN	M	67
A80 TiN	M	74
A80 TiCN	M	74

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A80 6GX TiN	M	75
A80 6GX TiCN	M	75
A80 N TiN	M	76
A80 N TiCN	M	76
A80 N 6GX TiN	M	77
A80 N 6GX TiCN	M	77
A81 TiN	MF	99
A81 TiCN	MF	99
A81 6GX TiN	MF	100
A81 6GX TiCN	MF	100
A81 N TiN	MF	101
A81 N TiCN	MF	101
A81 N 6GX TiN	MF	102
A81 N 6GX TiCN	MF	102
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A110 VAP	M	44
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A120 VAP	M	69
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A150 VAP	M	54
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A160 TiN	8-UN	120
A170 VAP	M	70
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A701 S	M	64
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TOOL CODE LIST

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P15 TiH1	M	143
P15 6GX TiH1	M	143
BP15 TiH1	M	143
P17 TiN	MF	158
P17 TiH1	MF	158
P17 6GX TiH1	MF	158
BP17 TiH1	MF	158
P18 TiN	G	164
P18 TiH1	G	164
P29	M	144
P29 TiN	M	144
P29 TiH1	M	144
BP29 TiH1	M	144
P29 E TiH1	M	145
P30	MF	159
P30 TiN	MF	159
P30 TiH1	MF	159
BP30 TiH1	MF	159
P43 V-MAXX	M	140
BP43 V-MAXX	M	140
P43 E V-MAXX	M	141
BP43 E V-MAXX	M	141
P45 V-MAXX	MF	157
BP45 V-MAXX	MF	157
P45 E V-MAXX	MF	157
BP45 E V-MAXX	MF	157
P59 TiN	G	165
P59 TiH1	G	165
P59 E TiH1	G	165
P70 TiN	M	146
P70 TiH1	M	146
BP70 TiH1	M	147
P70 6GX TiH1	M	146
P70 7GX TiH1	M	146
P70 E TiN	M	148
P70 E TiH1	M	148
P70 E 6GX TiH1	M	148
P71 TiN	MF	160
P71 TiH1	MF	160
P71 6GX TiH1	MF	160
BP71 TiH1	MF	160
P71 E TiH1	MF	161
P76 L TiH1	M	149
P80 TiN	M	150
P80 V-MAXX	M	150
P80 6GX TiN	M	150
P80 7GX TiN	M	150
P80 N TiN	M	151
P80 N V-MAXX	M	151
P80 N 6GX TiN	M	151
P80 N 7GX TiN	M	151
P80 E TiN	M	152
P80 N E TiN	M	152
P80 N E V-MAXX	M	152
P80 N E 6GX TiN	M	152
P80 N L TiN	M	155
P80 N LH TiN	M	154
BP80 N TiN	M	153
BP80 N R TiN	M	153
BP80 N R V-MAXX	M	153
BP80 N E V-MAXX	M	153
P81 TiN	MF	162
P81 V-MAXX	MF	162
P81 6GX TiN	MF	162
P81 N TiN	MF	163
P81 N V-MAXX	MF	163
P81 N 6GX TiN	MF	163
P82 N TiN	G	166
P82 N V-MAXX	G	166
P130	M	142
P130 V-MAXX	M	142
P180 N TiN	M	156
P180 N V-MAXX	M	156

S SERIES		
TOOL CODE	Thread	Page
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S15 TiH1	M	169
BS15 TiH1	M	169
S17 TiN	MF	173
S43 V-MAXX	M	168
BS43 V-MAXX	M	168
S43 E V-MAXX	M	168
BS43 E V-MAXX	M	168
S45 V-MAXX	MF	172
BS45 V-MAXX	MF	172
S70 TiN	M	170
S70 TiH1	M	170
BS70 TiH1	M	170
S71 TiN	MF	174
S80 N TiN	M	171
S80 N V-MAXX	M	171
S80 N 6GX TiN	M	171
BS80 N R TiN	M	171

H SERIES		
TOOL CODE	Thread	Page
HB29	M	177
HB29 V-MAXX	M	177
HB43	M	176
HB43 V-MAXX	M	176
HB43 E V-MAXX	M	176
HB45	MF	180
HB45 V-MAXX	MF	180
HB45 E V-MAXX	MF	180
HB80 N R V-MAXX	M	179
HB81 N R E V-MAXX	M	181
H130	M	178
H130 V-MAXX	M	178

F SERIES		
TOOL CODE	Thread	Page
X200	M	204
X200 LH	M	204
X201	MF	205
X202	BSW	211
X203	G	210
X204	UNC	208
X205	UNF	209
X206	NPT	212

VR SERIES		
TOOL CODE	Thread	Page
VR10 TiAIN	ISO	217
VR20 TiAIN	ISO	217
VR30 TiAIN	ISO	217
VR40 TiAIN	ISO	218
VR45 TiAIN	ISO	218
VR50 TiAIN	ISO	219
VR55 TiAIN	ISO	219
VR10 TiAIN	UN	220
VR20 TiAIN	UN	220
VR40 TiAIN	UN	221
VR45 TiAIN	UN	221
VR50 TiAIN	UN	222
VR55 TiAIN	UN	222
VR10 TiAIN	G	223
VR20 TiAIN	G	223

VA SERIES	
TOOL CODE	Page
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SK DIN 69871 AD+B	229
MAS 403 BT	230
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ER Collet	233
Assembly Support	234
Wrench	234

ARTICLE LEGEND

- A...

P...

S...

H...

B...
- Taps for Generic Applications

High Performance Taps

Synchronous Taps

Solid Carbide Taps

Taps with internal coolant supply
- ... FC

... FP

... S

... L

... N

... R

... E

... EG

... LH

... AZ
- Taps for blind holes

Taps for through holes

Taps with increased relief

Taps with long shank

Forming taps with oil grooves

Forming taps with internal coolant supply and radial outlet

Taps with short chamfer (Form E)

Taps for wire thread inserts

Taps with left hand thread

Taps with interrupted thread

- SERIES
- MATERIAL
- CHAMFER FORM
- TYPE OF HOLE
- COATING
- LUBRICATION

TAP MATERIAL

- HSS

HSSE

HSSK

HSSZ

HSSP

HM
- Conventional high speed steel

Conventional high speed steel

Powder metallurgy high speed steel

Powder metallurgy high speed steel

Powder metallurgy high speed steel

Solid Carbide

LUBRICATION

- E

O

ML
- Emulsion

Oil

Minimum quantity lubrication

TAP APPLICATION TABLE LEGEND

- A1

34

Product code / page
- 20-25

Ideal tap / cutting speed m/min
- 15-20

Suitable tap / cutting speed m/min

M	4H
	6H/6HX
	6G/6GX
	7G/7GX
	6H +0,1
MF	6H/6HX
	6G/6GX
UNC	2B/2BX
	3B
UNF	2B/2BX
	3B
8-UN	2B
G	ISO 5969/X
Rp (BSPP)	--
Rc (BSPT)	--
BSW	mc
NPT	--
NPTF	--

ISO 513	Material	Group	Application	R. N/mm ²	Lubrication
P	Steel	P.1	Mild / magnetic steel	200 - 400	E, O, MQL
		P.2	Construction steel, case hardening steel	350 - 700	E, O, MQL
		P.3	Carbon steel	350 - 850	E, O, MQL
		P.4	Alloyed steel / tempered steel	500 - 850	E, O, MQL
		P.5	Alloyed steel / tempered steel	850 - 1200	E, O, MQL
		P.6	Alloyed steel / high strength steel	1200 - 1600	O
		P.7	Ferritic stainless steel, martensitic stainless steel, precipitation hardening	< 1000	E, O, MQL
M	Stainless steel	M.1	Austenitic stainless steel	< 850	E, O, MQL
		M.2	Ferritic+austenitic (Duplex)	< 1000	O, MQL
K	Cast iron	K.1	Grey cast iron	< 1000	E, O, MQL
		K.2	Nodular cast iron, malleable cast iron, tempered cast iron	< 1000	E, O, MQL
		K.3	Austempered ductile iron (ADI)	< 1400	O, MQL
N	Aluminium Aluminium alloys	N.1	Pure aluminium	< 300	E, O, MQL
		N.2	Aluminium wrought and die cast alloys with Si < 0,5% (long chipping)	< 500	E, O, MQL
		N.3	Aluminium wrought and die cast alloys with Si < 10% (medium chipping)	< 500	E, O, MQL
		N.4	Aluminium die cast alloys with Si > 10% (short chipping)	< 600	E, O, MQL
	Copper Copper alloys Brass Bronze	N.5	Pure copper	250 - 350	E, O, MQL
		N.6	Copper alloys (long chipping), soft brass	< 700	E, O, MQL
		N.7	Copper alloys (short chipping), hard brass	< 700	E, O, MQL
		N.8	High strength bronze	700 - 1500	O
	Magnesium Magnesium alloys	N.9	Pure magnesium, magnesium alloys	120 - 300	E, O, MQL
		N.10	High strength magnesium alloys	240 - 400	E, O, MQL
S	Titanium Titanium alloys	S.1	Pure titanium	400 - 600	E, O, MQL
		S.2	Titanium alloys	600 - 1000	O, MQL
	Nickel Nickel alloys	S.3	Pure nickel	400 - 600	E, O, MQL
		S.4	Nickel alloys	600 - 1000	O, MQL
H	Hardened materials	H.1	Alloyed steel, hardness HRC 44-55	-	O
		H.2	Alloyed steel, hardness HRC 56-63	-	O

*For specific material examples see "Technical Information" section on page 248



General Catalogue n° 75 - EN

VERGNANO 1944 - 2019

With over 75 years of experience in the cutting tool industry, Vergnano is one of the world's leading manufacturers of high quality precision threading taps, hobs, end mills and threading dies.

While keeping a firm foothold in the honoured tradition of the Vergnano brand, Vergnano has established itself internationally and is renowned for quality, reliability, flexibility, innovation and commitment.



1944

Company foundation.
Production of end mills



1950

Construction and transfer to new
production plant in Corso Torino, Chieri

1949

Production of taps
commences



1960

Enlargement of
Corso Torino plant

1.000.000

1980

Production reaches 1 million taps per year



2002

Transfer to newly built production plant in Corso Olia, Chieri



2016

New office of German subsidiary opens in Achern



1992

German subsidiary opens, Vergnano GmbH



2008

South Korean subsidiary opens, Vergnano Korea



2019

75th Anniversary of company foundation

M
DIN 13

P
SERIES



P29E
New P29 version with chamfer form E for blind holes

R15

2xD

HSSP

P

K

N

S

M
DIN 13

P
SERIES



P70 7GX TiH1
New P70 version with tolerance 7GX for blind holes

R45

3xD

HSSP

P

M

K

N

S

M
DIN 13

P
SERIES



P76L TiH1
Long P70 version with long through shank for blind holes

R40

3xD

HSSP

P

M

K

N

S

M
DIN 13

P
SERIES



P80N LH TiN
New high performance forming taps for lefthand threads

3xD

HSSK

LH

P

M

N

S

M
DIN 13

P
SERIES



P80N L TiN
New high performance forming taps with long shank








P

M

N

S

M
DIN 13

H
SERIES



HB43E V-MAXX
New HB43 version with chamfer form E for blind holes







K

N

MF
DIN 13

H
SERIES



HB45E V-MAXX
New HB45 version with chamfer form E for blind holes







K

N

MF
DIN 13

H
SERIES



HB81NRE V-MAXX
New solid carbide forming taps with chamfer form E and internal radial coolant







P

M

N

S

GUIDE TO TAP APPLICATION TABLE

ARTICLE LEGEND

A... Taps for Generic Applications
P... High Performance Taps
S... Synchronous Taps
H... Solid Carbide Taps
B... Taps with internal coolant supply

...FC Taps for blind holes
...FP Taps for through holes
...K Taps in HSSK

...S Taps with increased relief
...L Taps with long shank
...N Forming taps with oil grooves
...R Forming taps with internal coolant supply
...E Taps with short chamfer (Form E)
...EG Taps for wire thread inserts
...LH Taps with left hand thread
...AZ Taps with interrupted thread

TAP MATERIAL

HSS Taps with interrupted thread
HSSE Taps with interrupted thread
HSSK Powder metallurgy high speed steel
HSSZ Powder metallurgy high speed steel
HSSP Powder metallurgy high speed steel
HM Solid Carbide

LUBRICATION

E Emulsion
O Oil
MQL Minimum quantity lubrication

TAP APPLICATION TABLE LEGEND

A1 34 Product code / page

● 20-25 Ideal tap speed m/min

○ 15-20 Suitable speed m/min

ISO 513	Material	Group
P	Steel	P.1 Mild / magnetic steel
		P.2 Construction steel, cast
		P.3 Carbon steel
		P.4 Alloyed steel / temper
		P.5 Alloyed steel / temper
		P.6 Alloyed steel / high str
		P.7 Ferritic stainless steel,
M	Stainless steel	M.1 Austenitic stainless ste
		M.2 Ferritic+austenitic (Dup
K	Cast iron	K.1 Grey cast iron
		K.2 Nodular cast iron, mal
		K.3 Austempered ductile i
N	Aluminium	N.1 Pure aluminium
		N.2 Aluminium wrought an
		N.3 Aluminium wrought an
		N.4 Aluminium die cast al
	Copper	N.5 Pure copper
		N.6 Copper alloys (long ch
		N.7 Copper alloys (short d
	Brass	N.8 High strength bronze
		N.9 Pure magnesium, mag
		N.10 High strength magnes
S	Titanium	S.1 Pure titanium
		S.2 Titanium alloys
	Nickel	S.3 Pure nickel
		S.4 Nickel alloys
H	Hardened materials	H.1 Alloyed steel, hardnes
		H.2 Alloyed steel, hardnes

VERGNANO TAP APPLICATION TABLE

ISO 513	Group	Product Code	Page
P	P.1	12-15	20-25
	P.2	10-12	15-20
	P.3	8-10	12-15
	P.4		12-15
	P.5		3-5
	P.6		
	P.7		5-7
	M	M.1	5-7
		M.2	2-3
	K	K.1	
	K.2	8-10	
	K.3	12-15	
N	N.1	12-15	20-25
	N.2	10-12	15-20
	N.3	10-12	15-20
	N.4		20-25
	N.5	10-12	15-20
	N.6	8-10	12-15
	N.7		
	N.8		
	N.9		
	N.10		
S	S.1		8-10
	S.2		
	S.3		
	S.4		
H	H.1		
	H.2		

**For specific material examples see "Technical Information" section c*

In order to select the correct tap, follow steps 1 to 9.

- 1 Material
- 2 Material subgroup
- 3 Hole type
- 4 Thread depth
- 5 Thread type
- 6 Tolerance
- 7 Coating
- 8 Tool code (page)
- 9 Cutting parameters

GUIDE TO TAP DATASHEETS

1

2

3

4

5

6

MF

DIN 13

VERGNANO

HIGH PERFORMANCE MACHINE TAPS for through holes

Straight flutes with spiral point

14

13

12

11

10

9

8

7

P17 TiN

P17 TiH1

P17 6GX TiH1

BP17 TiH1

DIN 374

6HX

B (4-5)

3xD

RH

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P17 TiN	P17 TiH1	P17 6GX TiH1	BP17 TiH1	
P.3	•	25-35	•	25-35	•	25-35
P.4	•	20-30	•	20-30	•	20-30
P.5	•	10-20	•	10-20	•	10-20
P.6	•	8-10	•	8-10	•	8-10
P.7	•	10-20	•	10-20	•	10-20
M.1	•	10-20	•	10-20	•	10-20
M.2	•	6-8	•	6-8	•	6-8
K.2	•	25-35	•	25-35	•	25-35
N.2-3	•	30-40	•	30-40	•	30-40
N.6	•	25-35	•	25-35	•	25-35

6HX

B (4-5)

3xD

RH

Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	Z	Ød ₂ h9	P17 TiN	P17 TiH1	P17 6GX TiH1	BP17 TiH1
M 8	1	90	16	-	6	4,9	3	7	•	•	•	•
10	1	90	18	-	7	5,5	3	9	•	•	•	•
10	1,25	100	18	-	7	5,5	3	8,8	•	•	•	•
12	1	100	22	-	9	7	4	11	•	•	•	•
12	1,25	100	22	-	9	7	4	10,8	•	•	•	•
12	1,5	100	22	-	9	7	4	10,5	•	•	•	•
14	1,5	100	22	-	11	9	4	12,5	•	•	•	•
16	1,5	100	22	-	12	9	4	14,5	•	•	•	•
18	1,5	110	25	-	14	11	4	16,5	•	•	•	•
20	1,5	125	25	-	16	12	4	18,5	•	•	•	•

158

€ P.46

1 Thread type

2 Application characteristics

3 Dimensional standard

4 Recommended application range

5 Sizes

6 Price list page reference

7 (•) Standard execution

8 Through coolant

9 Direction of cut

10 Hole type

11 Chamfer form

12 Tolerance

13 Coating

14 Tool code

9

GUIDE TO THREAD MILLS DATASHEETS

ISO
DIN 13

1

VERGNANO

SOLID CARBIDE THREAD MILLS
Spiral flutes

12

2

INT HM

VR40
TiAlN

11

VR45
TiAlN

3

10

INT

4

APPLICATION RANGE

ISO	VR40 TiAlN	VR45 TiAlN
P	•	•
M	•	•
K	•	•
N	•	•
S	•	•

For cutting data see page 215

9

3xD

8

RH

7

VR45038080160L

5

VR SERIES

P	M	ØD ₂ h6 [mm]	ØD [mm]	z	L ₂ [mm]	L ₁ [mm]	VR40 TiAlN	VR45 TiAlN
0,3	M1,4	3	1,05	3	4	39		VR450100300400
0,35	M1,6	3	1,2	3	4,8	39		VR450120350400
0,4	M2	6	1,53	3	4,5	58	VR400150400400	
0,4	M2	3	1,53	3	6	39		VR450150400600
0,5	M3	6	2,37	3	6,5	58	VR400230500600	
0,5	M3	6	2,37	3	9,5	58		VR450230500900
0,5	M3	6	2,37	3	9,5	105		VR45023050090L
0,7	M4	6	3,1	3	9	58	VR400310700900	
0,7	M4	6	3,1	3	12,5	58		VR450310701200
0,7	M4	6	3,1	3	12,5	105		VR45031070120L
0,8	M5	6	3,8	3	12,5	58	VR400380801200	
0,8	M5	6	3,8	3	16	58		VR450380801400
0,8	M5	6	3,8	3	16	105		VR45038080160L
1	M6	6	4,65	3	14	58	VR400461001400	
1	M6	6	4,65	3	20	58		VR450461002000
1	M6	6	4,65	3	20	105		VR45046100200L
1,25	M8	6	5,95	3	18	58	VR4005911251800	
1,25	M8	6	6	3	24	58		VR4506011252400
1,5	M10	8	7,8	3	23	64	VR4007811502300	
1,75	M12	10	9	3	26	73	VR4009011752600	
2	M16	12	11,8	4	35	84	VR401182003500	

6

218

€ P.64

- 1 Thread type
- 2 Application characteristics
- 3 Technical Drawing
- 4 Application range
- 5 Sizes
- 6 Price list page reference

- 7 Tool code
- 8 Direction of cut
- 9 Hole type
- 10 Thread
- 11 Coating
- 12 Tool code



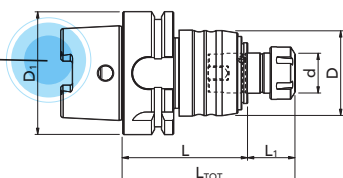
SYNCHRONOUS ER TAPPING ATTACHMENT with QUICK-CHANGE TAP ADAPTOR With internal through coolant capability (*)



DIN 69893 HSK A

1

2



3

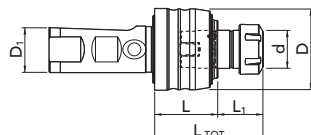
Article Code	Attachment	Tap Size	L	ø D	ø d	ER collet	L ₁	L _{TOT}
	ø D ₁ [mm]		[mm]	[mm]	[mm]		[mm]	[mm]
VA01A06302CH160	HSK-A63	M3 - M8	64	43	20	ER 16	20,5	84,5
VA01A06302CH250	HSK-A63	M6 - M20	97	60	32	ER 25	23,5	120,5
VA01A10002CH400	HSK-A100	M14 - M33	115	87	50	ER 40	28,5	143,5

4

SYNCHRONOUS ER TAPPING ATTACHMENT with QUICK-CHANGE TAP ADAPTOR With internal through coolant capability (*)



DIN 1835 B+E



VA
SERIES

Article Code	Attachment	Tap Size	L	ø D	ø d	ER collet	L ₁	L _{TOT}
	ø D ₁ [mm]		[mm]	[mm]	[mm]		[mm]	[mm]
VA01C02502CH160	25	M3 - M8	34	43	20	ER 16	20,5	54,5
VA01C02502CH250	25	M6 - M20	56	60	32	ER 25	23,5	79,5
VA01C04002CH400	40	M14 - M33	80	87	50	ER 40	28,5	108,5

(*) For coolant pressure above 50 bars a special nut screw is available on request

228

€ P.67

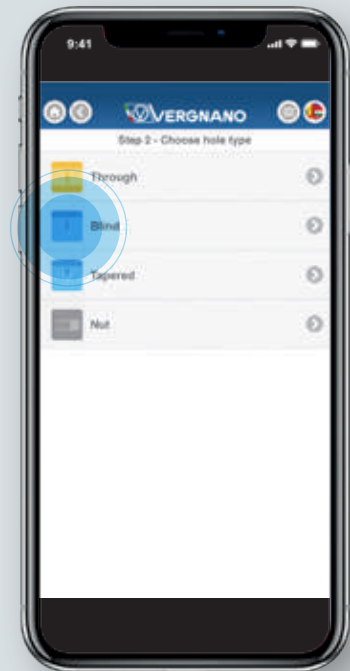
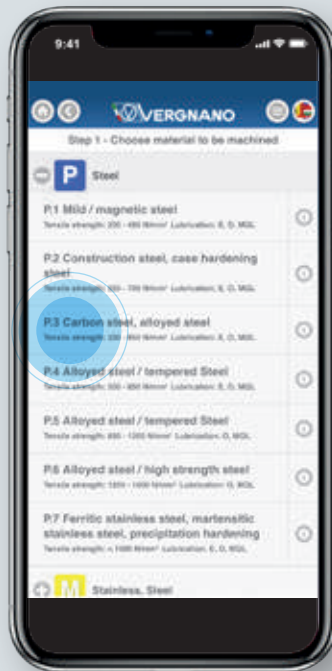
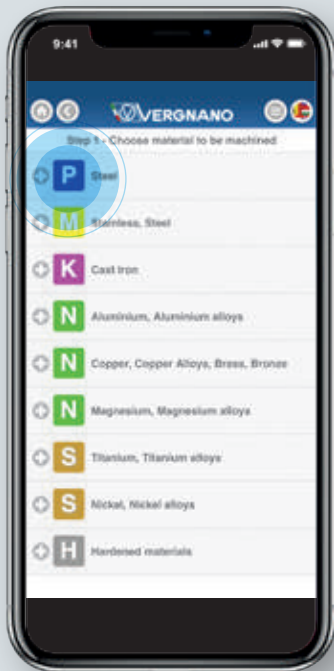
5

- 1 Application characteristics
- 2 Technical Drawing
- 3 Size
- 4 Tool code
- 5 Price list page reference

GUIDE TO TAPPFINDER APP

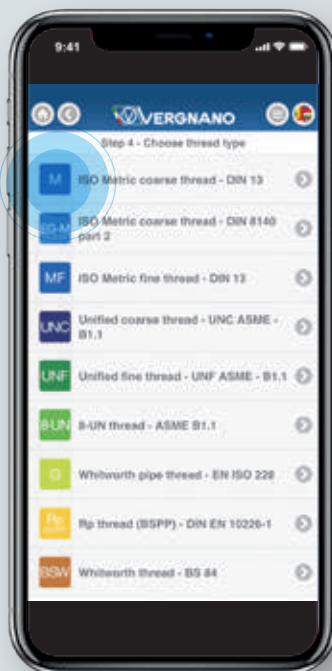
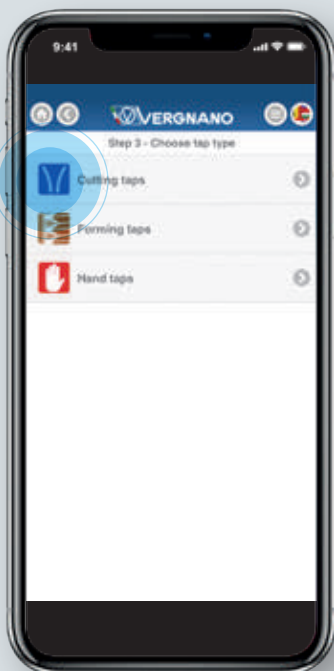


Download TappFinder for iOS or Android



1-2
Select material to machine

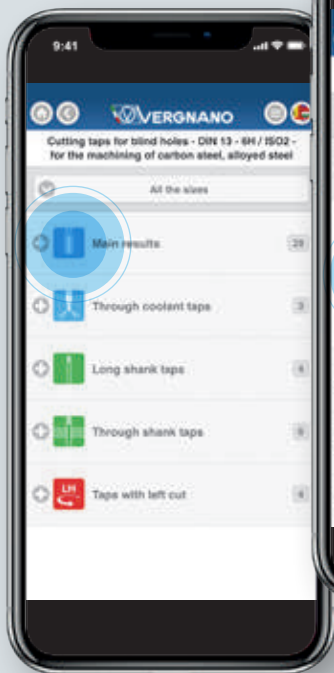
3
Select type of hole



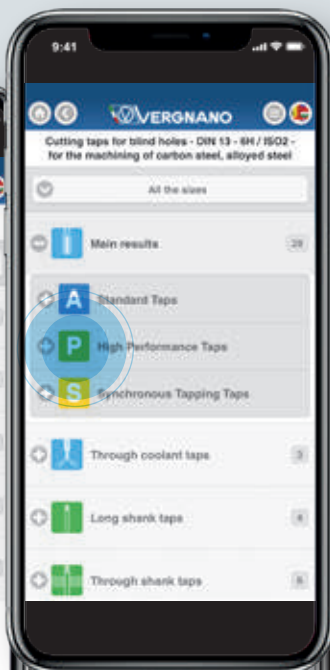
4
Select cutting or forming tap

5
Select thread type

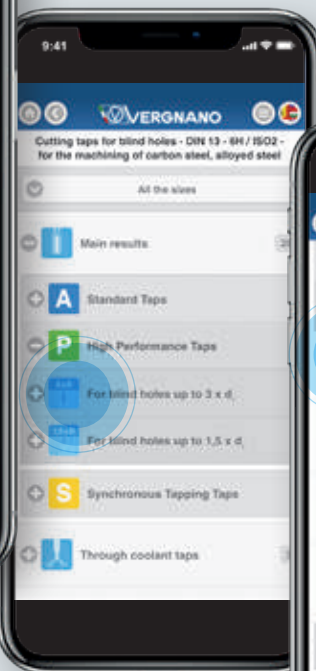
6
Select thread tolerance



7
From results select suitable tap



8
Select tap series



9
Select thread depth



10
Select tap



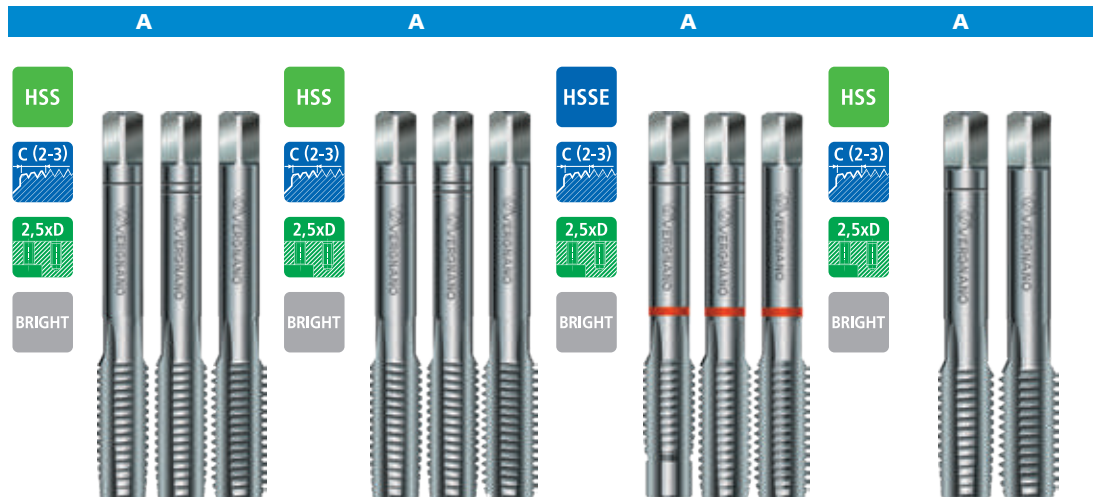
11
Browse available sizes



12
Browse technical properties



13
Browse working parameters



M	4H								
	6H/6HX	A1	34	A1 LH	36	A100	37		
	6G/6GX								
	7G/7GX								
	6H +0,1								
MF	6H/6HX							A2	79
	6G/6GX								
UNC	2B/2BX	A7	103						
	3B								
UNF	2B/2BX							A8	111
	3B								
8-UN	2B								
G	ISO 5969/X							A5	121
Rp (BSPP)	--								
Rc (BSPT)	--								
BSW	mc	A4	131						
NPT	--								
NPTF	--								
ISO 513	Group								
P	P.1	●		●		●		●	
	P.2	●		●		●		●	
	P.3	●		●		●		●	
	P.4	●		●		●		●	
	P.5					●			
	P.6								
	P.7	●		●		●		●	
M	M.1	○		○		●		○	
	M.2	○		○		●		○	
K	K.1	○		○		●		○	
	K.2	●		●		●		●	
	K.3					●			
N	N.1	●		●		●		●	
	N.2	●		●		●		●	
	N.3	●		●		●		●	
	N.4	○		○		●		○	
	N.5	●		●		●		●	
	N.6	●		●		●		●	
	N.7	●		●		●		●	
	N.8					●			
	N.9					●			
	N.10					●			
S	S.1	○		○		●		○	
	S.2					○			
	S.3	○		○		●		○	
	S.4					○			
H	H.1								
	H.2								

TAP APPLICATION TABLE



A2 LH	82

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

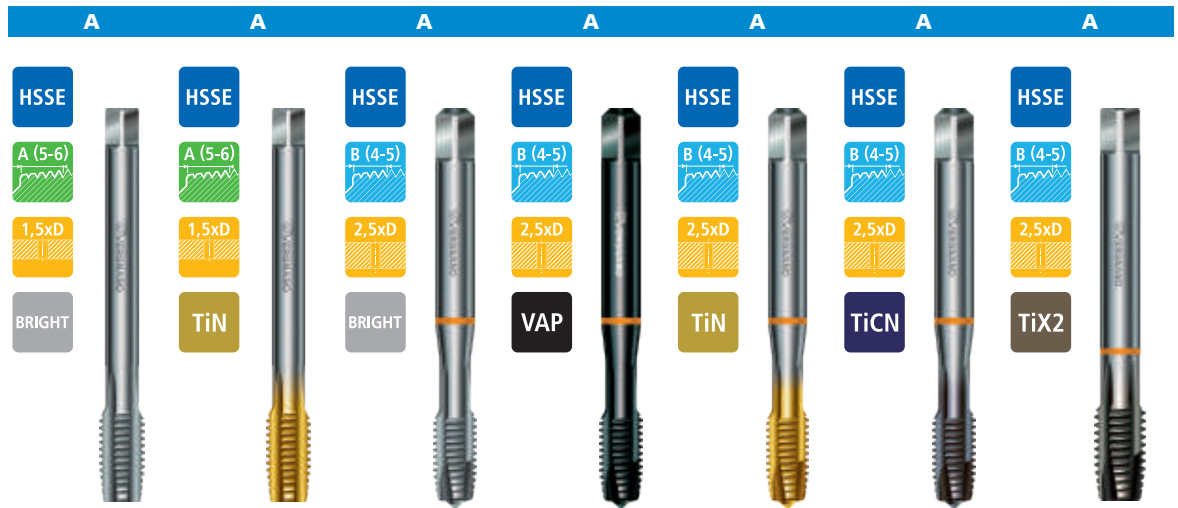
A9	73
A10	98

●	18-20
●	15-18
●	12-15
○	10-12

A6	130
A6 B	134
A6 F	136
A6 BZ	135
A6 FZ	137

○	12-15	●	12-15
●	10-15		
●	10-12		
●	8-10		
○	3-5		
○	2-3	●	2-3
○	2-3	●	2-3
		○	2-3
○	10-12		
●	10-12		
		●	12-15
○	12-15	●	12-15
○	10-12		
○	10-12		
		●	10-12
○	6-8	●	6-8
○	10-12		
○	2-3		
○	6-8		
○	2-3		
		○	5-8
		○	5-8

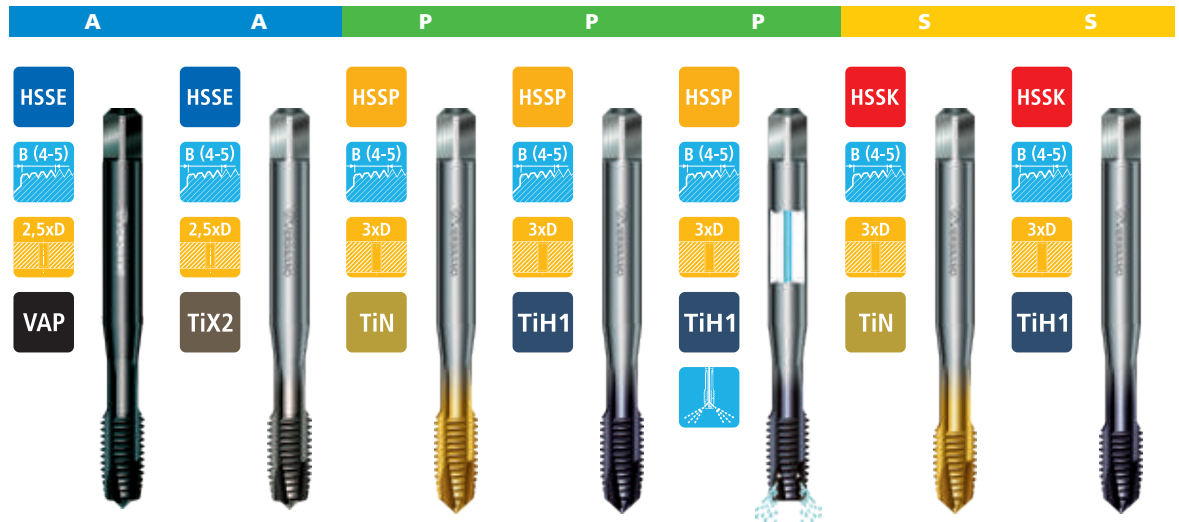
TAP APPLICATION TABLE



M	4H				A15 S	47			A15 S	47				
	6H/6HX				A15 S	45	A15 S	45	A15 S	45	A15 S	45		
	6G/6GX				A15 S	48			A15 S	48				
	7G/7GX				A15 S	49			A15 S	49				
	6H +0,1													
MF	6H/6HX				A17 S	87	A17 S	87	A17 S	87	A17 S	87	A17 S	90
	6G/6GX				A17 S	91			A17 S	91				
UNC	2B/2BX	A27 FP	104	A27 FP	104	A19 S	106		A19 S	106	A19 S	106	A19 S	107
	3B					A19 S	106							
UNF	2B/2BX	A28 FP	112	A28 FP	112	A20 S	114		A20 S	114	A20 S	114	A20 S	115
	3B					A20 S	114							
8-UN	2B					A119	119		A119	119				
G	ISO 5969/X	A26 FP	122			A18 S	124	A18 S	124		A18 S	124	A18 S	124
Rp (BSPP)	--													
Rc (BSPT)	--													
BSW	mc	A24 FP	132											
NPT	--													
NPTF	--													
ISO 513	Group													
P	P.1	○ 12-15	● 20-25	○ 18-20	○ 18-20	○ 30-35	○ 30-35							
	P.2	● 10-12	● 15-20	● 20-25	● 20-25	● 30-35	● 30-35							
	P.3	● 8-10	● 12-15	● 15-20	● 15-20	● 25-30	● 25-30							
	P.4			● 12-15	● 12-15	● 20-25	● 20-25							
	P.5			○ 3-5	○ 3-5	● 10-15	● 10-15							
	P.6													
	P.7			○ 5-7	○ 5-7	● 10-15	● 10-15	● 10-15						
M	M.1			○ 5-7	○ 5-7	● 10-15	● 10-15	● 10-15						
	M.2			○ 2-3	○ 2-3	○ 6-8	○ 6-8	○ 6-8						
K	K.1													
	K.2	● 8-10	● 12-15	● 15-20	● 15-20	● 25-30	● 25-30							
	K.3													
N	N.1	○ 12-15	● 20-25	○ 18-20	○ 18-20	○ 30-35	○ 30-35							
	N.2	○ 10-12	○ 15-20	● 20-25	● 20-25	● 30-35	● 30-35							
	N.3	○ 10-12	○ 15-20	● 20-25	● 20-25	● 30-35	● 30-35							
	N.4													
	N.5	○ 10-12	● 15-20	○ 15-18	○ 15-18	○ 25-30	○ 25-30							
	N.6	○ 8-10	○ 12-15	● 15-18	● 15-18	● 25-30	● 25-30							
	N.7													
	N.8													
	N.9													
	N.10													
S	S.1			○ 8-10	○ 8-10									
	S.2													
	S.3			○ 8-10	○ 8-10	○ 12-15	○ 12-15							
	S.4													
H	H.1													
	H.2													

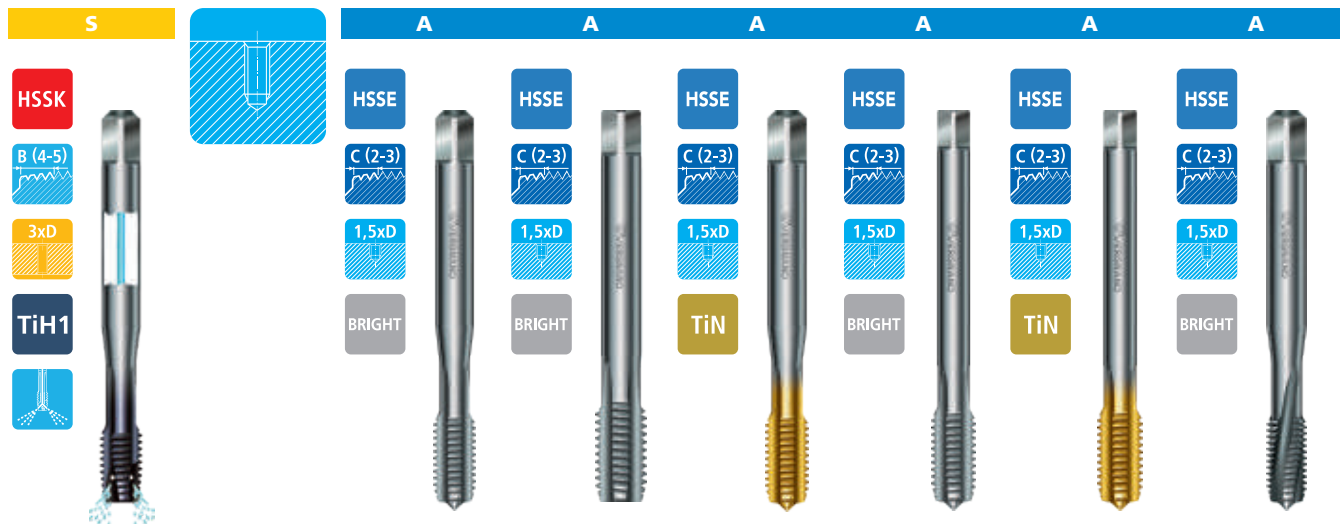


TAP APPLICATION TABLE



		A		A		P		P		P		S		S	
		HSSE		HSSE		HSSP		HSSP		HSSP		HSSK		HSSK	
		B (4-5)		B (4-5)		B (4-5)		B (4-5)		B (4-5)		B (4-5)		B (4-5)	
		2.5xD		2.5xD		3xD		3xD		3xD		3xD		3xD	
		VAP		TiX2		TiN		TiH1		TiH1		TiN		TiH1	
M	4H														
	6H/6HX	A150	54	A150	54	P15	143	P15	143	BP15	143	S15	169	S15	169
	6G/6GX							P15	143						
	7G/7GX														
MF	6H/6HX					P17	158	P17	158	BP17	158	S17	173		
	6G/6GX							P17	158						
UNC	2B/2BX														
	3B														
UNF	2B/2BX														
	3B														
8-UN	2B														
G	ISO 5969/X					P18	164	P18	164						
Rp (BSPP)	--														
Rc (BSPT)	--														
BSW	mc														
NPT	--														
NPTF	--														
ISO 513	Group														
P	P.1											●	50-60	●	50-60
	P.2					○	30-40	○	30-40	○	30-40	●	50-60	●	50-60
	P.3					●	25-35	●	25-35	●	25-30	●	45-55	●	45-55
	P.4					●	20-30	●	20-30	●	20-30	●	40-50	●	40-50
	P.5					●	10-20	●	10-20	●	10-20	●	15-25	●	15-25
	P.6					●	8-10	●	8-10	●	8-10				
	P.7	●	10-12	●	18-20	●	10-20	●	10-20	●	10-20	●	15-25	●	15-25
M	M.1	●	10-12	●	18-20	●	10-20	●	10-20	●	10-20	●	15-25	●	15-25
	M.2	●	8-10	●	10-12	●	6-8	●	6-8	●	6-8	●	10-20	●	10-20
K	K.1														
	K.2					●	25-35	●	25-35	●	25-35	●	45-55	●	45-55
	K.3														
N	N.1											●	50-60	●	50-60
	N.2					●	30-40	●	30-40	●	30-40	●	45-55	●	45-55
	N.3					●	30-40	●	30-40	●	30-40	●	45-55	●	45-55
	N.4														
	N.5											●	40-50	●	40-50
	N.6					●	25-30	●	25-30	●	25-30	●	35-45	●	35-45
	N.7														
	N.8														
	N.9														
	N.10														
S	S.1													●	15-25
	S.2							○	12-18	○	12-18			○	10-20
	S.3											●	15-25	●	15-25
	S.4					○	12-18	○	12-18	○	12-18	○	10-20	○	10-20
H	H.1														
	H.2														

TAP APPLICATION TABLE



BS15	169
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● 50-60
● 50-60
● 45-55
● 40-50
● 15-25

● 15-25
● 15-25
● 10-20

● 45-55

● 50-60
● 45-55
● 45-55

● 40-50
● 35-45

● 15-25
○ 10-20
● 15-25
○ 10-20

A21 FC	38		A21 FC	38	A22 FC	40	A22 FC	40	A29	55
									A29	57
A23 FC	83	A23 FC LH	83	A23 FC	83				A30	92
A27 FC	104			A27 FC	104				A33	108
									A33	108
A28 FC	112			A28 FC	112				A34	116
									A34	116
A26 FC	122								A32	125
A24 FC	132								A31	133

○ 12-15	○ 12-15	● 20-25	○ 12-15	● 20-25	● 18-20
● 10-12	● 10-12	● 15-20	● 10-12	● 15-20	● 15-18
● 8-10	● 8-10	● 12-15	● 8-10	● 12-15	● 12-15
					● 10-12

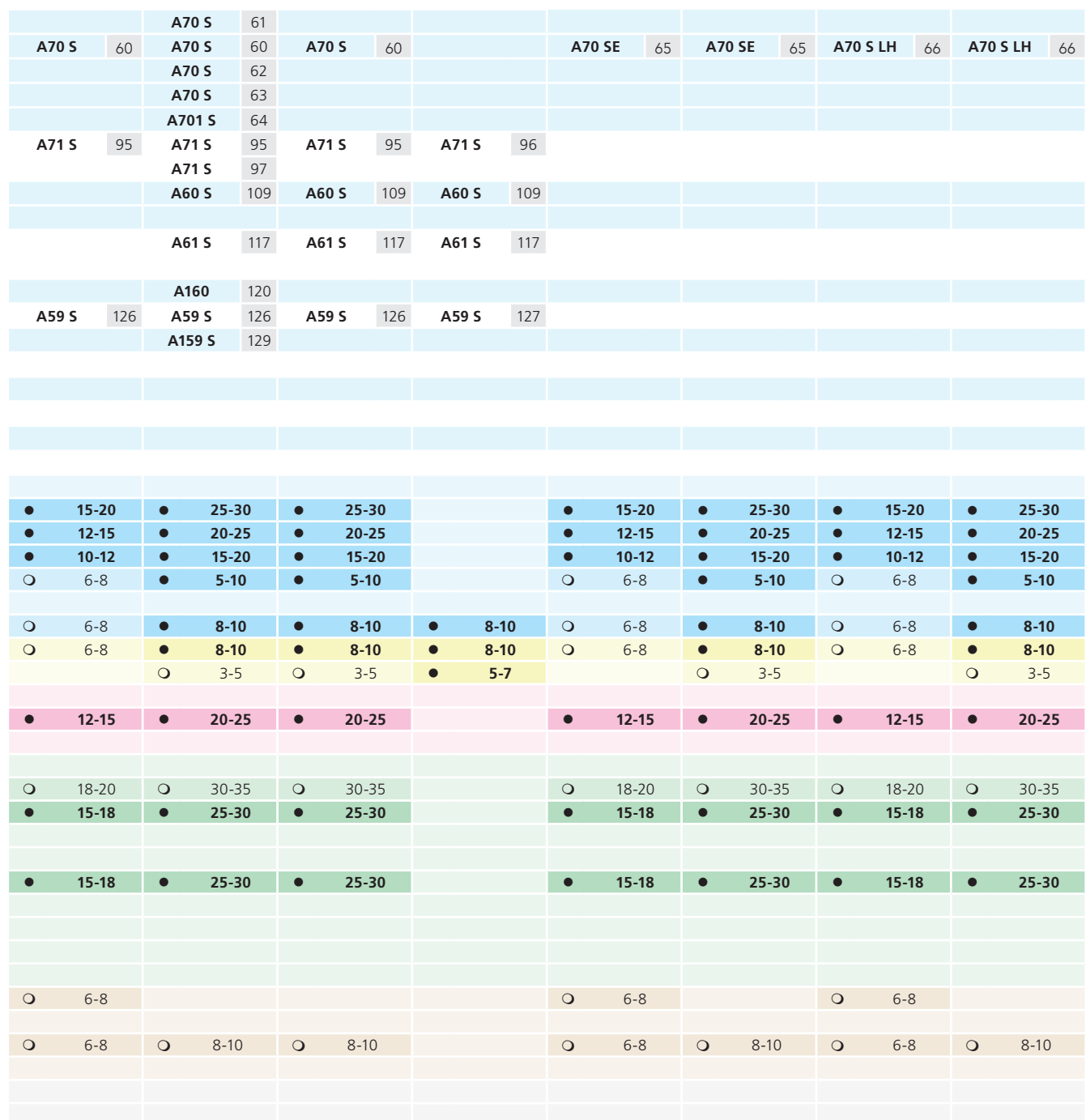
● 8-10	● 8-10	● 12-15	● 8-10	● 12-15	● 12-15
--------	--------	---------	--------	---------	---------

○ 12-15	○ 12-15	● 20-25	○ 12-15	● 20-25	● 18-20
○ 10-12	○ 10-12	○ 15-20	○ 10-12	○ 15-20	● 15-18
○ 10-12	○ 10-12	○ 15-20	○ 10-12	○ 15-20	● 15-18
○ 10-12	○ 10-12	● 15-20	○ 10-12	● 15-20	● 15-18
○ 8-10	○ 8-10	○ 12-15	○ 8-10	○ 12-15	● 12-15

					○ 6-8
					○ 6-8



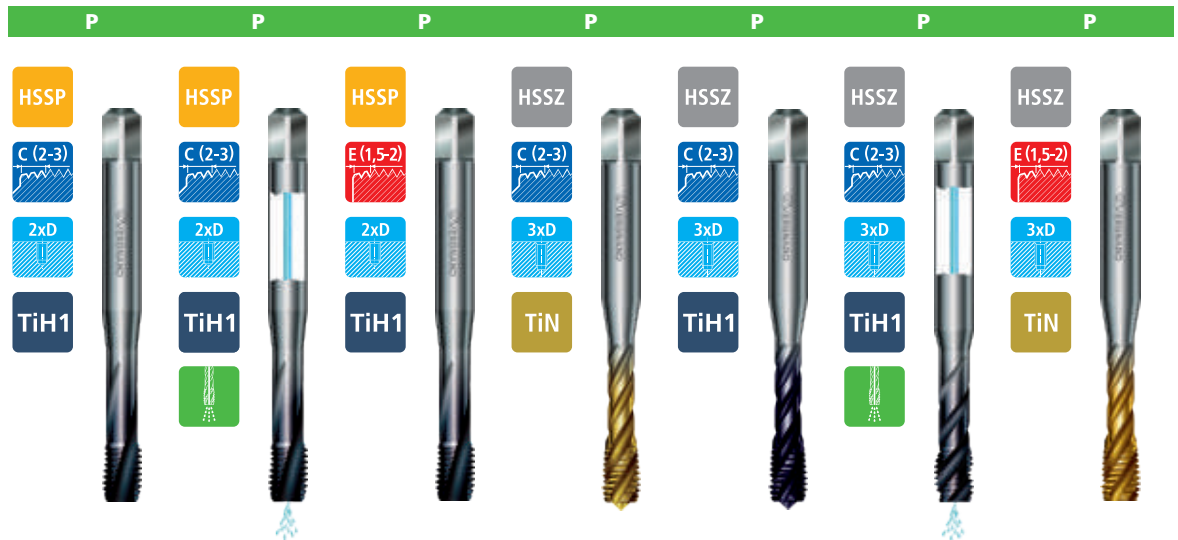
		A		A		A		A		A		A		A	
		HSSE		HSSE		HSSE		HSSE		HSSE		HSSE		HSSE	
		C (2-3)		C (2-3)		C (2-3)		C (2-3)		C (2-3)		C (2-3)		C (2-3)	
		1.5xD		1.5xD		1.5xD		1.5xD		1.5xD		1.5xD		2.5xD	
		VAP		TiN		BRIGHT		TiN		BRIGHT		TiN		BRIGHT	
M	4H													A70 S	61
	6H/6HX	A29	55	A29	55	A29 376	58	A29 376	58	A29 L	59	A29 L	59	A70 S	60
	6G/6GX			A29	57									A70 S	62
	7G/7GX													A70 S	63
	6H +0,1													A701 S	64
MF	6H/6HX			A30	92									A71 S	95
	6G/6GX													A71 S	97
UNC	2B/2BX			A33	108									A60 S	109
	3B														
UNF	2B/2BX			A34	116									A61 S	117
	3B														
8-UN	2B													A160	120
G	ISO 5969/X			A32	125									A59 S	126
Rp (BSPP)	--													A159 S	129
Rc (BSPT)	--														
BSW	mc			A31	133										
NPT	--														
NPTF	--														
ISO 513	Group														
P	P.1	●	18-20	●	30-35	●	18-20	●	30-35	●	18-20	●	30-35	●	15-20
	P.2	●	15-18	●	25-30	●	15-18	●	25-30	●	15-18	●	25-30	●	12-15
	P.3	●	12-15	●	20-25	●	12-15	●	20-25	●	12-15	●	20-25	●	10-12
	P.4	●	10-12	●	15-20	●	10-12	●	15-20	●	10-12	●	15-20	●	6-8
	P.5			●	5-10			●	5-10			●	5-10	○	6-8
	P.6													○	6-8
	P.7													○	6-8
M	M.1													○	6-8
	M.2														
K	K.1														
	K.2	●	12-15	●	20-25	●	12-15	●	20-25	●	12-15	●	20-25	●	12-15
	K.3														
N	N.1	●	18-20	○	30-35	●	18-20	○	30-35	●	18-20	○	30-35	○	18-20
	N.2	●	15-18	●	25-30	●	15-18	●	25-30	●	15-18	●	25-30	○	15-18
	N.3	●	15-18	●	25-30	●	15-18	●	25-30	●	15-18	●	25-30	●	15-18
	N.4														
	N.5	●	15-18	○	25-30	●	15-18	○	25-30	●	15-18	○	25-30		
	N.6	●	12-15	●	20-25	●	12-15	●	20-25	●	12-15	●	20-25	●	15-18
	N.7														
	N.8														
	N.9														
	N.10														
S	S.1	○	6-8			○	6-8			○	6-8			○	6-8
	S.2														
	S.3	○	6-8	○	8-10	○	6-8	○	8-10	○	6-8	○	8-10	○	6-8
	S.4														
H	H.1														
	H.2														





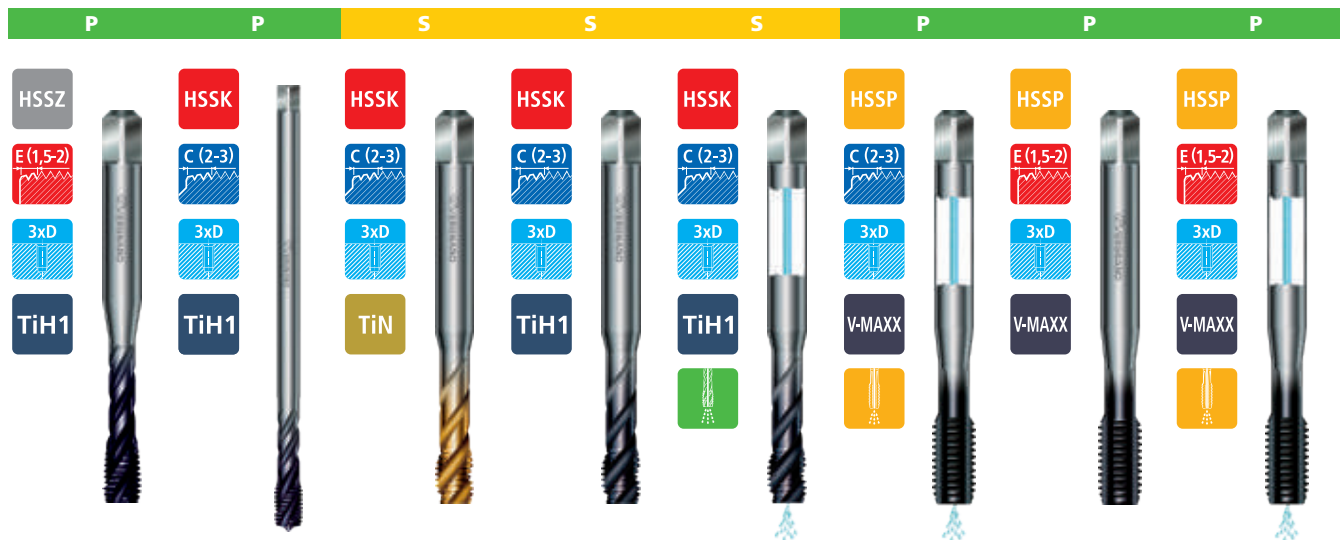
M	4H								
	6H/6HX	A76 S	67	A76 S	67	A70 L	68	A70 L	68
	6G/6GX								
	7G/7GX								
	6H +0,1								
MF	6H/6HX								
	6G/6GX								
UNC	2B/2BX								
	3B								
UNF	2B/2BX								
	3B								
8-UN	2B								
G	ISO 5969/X								
Rp (BSPP)	--								
Rc (BSPT)	--								
BSW	mc								
NPT	--								
NPTF	--								
ISO 513	Group								
P	P.1				● 12-15	● 25-30	● 12-15	● 12-15	● 25-30
	P.2	● 15-20	● 25-30	● 10-15	● 20-25	● 10-15	● 10-15	● 10-15	● 20-25
	P.3	● 12-15	● 20-25	○ 8-10	○ 15-20	○ 8-10	○ 8-10	○ 8-10	○ 15-20
	P.4	● 10-12	● 15-20						
	P.5	○ 6-8	● 5-10						
	P.6								
	P.7	○ 6-8	● 8-10						
M	M.1	○ 6-8	● 8-10						
	M.2		○ 3-5						
K	K.1								
	K.2	● 12-15	● 20-25	○ 8-10	○ 15-20	○ 8-10	○ 8-10	○ 8-10	○ 15-20
	K.3								
N	N.1			● 12-15	○ 25-30	● 12-15	● 12-15	○ 25-30	
	N.2	○ 18-20	○ 30-35	● 12-15	● 25-30	● 12-15	● 12-15	● 25-30	
	N.3	● 15-18	● 25-30	○ 10-12	○ 20-25	○ 10-12	○ 10-12	○ 20-25	
	N.4								
	N.5			● 10-12	○ 20-25	● 10-12	● 10-12	○ 20-25	
	N.6	● 15-18	● 25-30	● 10-12	● 20-25	● 10-12	● 10-12	● 20-25	
	N.7								
	N.8								
	N.9								
	N.10								
S	S.1	○ 6-8							
	S.2								
	S.3	○ 6-8	○ 8-10						
	S.4								
H	H.1								
	H.2								

23



		P		P		P		P		P		P		P	
		HSSP		HSSP		HSSP		HSSZ		HSSZ		HSSZ		HSSZ	
		C (2-3)		C (2-3)		E (1,5-2)		C (2-3)		C (2-3)		C (2-3)		E (1,5-2)	
		2xD		2xD		2xD		3xD		3xD		3xD		3xD	
		TiH1		TiH1		TiH1		TiN		TiH1		TiH1		TiN	
															
															
M	4H														
	6H/6HX	P29	144	BP29	144	P29 E	145	P70	146	P70	146	BP70	147	P70 E	148
	6G/6GX									P70	146				
	7G/7GX									P70	146				
	6H +0,1														
MF	6H/6HX	P30	159	BP30	159			P71	160	P71	160	BP71	160		
	6G/6GX									P71	160				
UNC	2B/2BX														
	3B														
UNF	2B/2BX														
	3B														
8-UN	2B														
G	ISO 5969/X							P59	165	P59	165				
Rp (BSPP)	--														
Rc (BSPT)	--														
BSW	mc														
NPT	--														
NPTF	--														
ISO 513	Group														
P	P.1							○	25-35	○	25-35	○	25-35	○	25-35
	P.2														
	P.3	●	25-30	●	25-30	●	25-30	●	20-30	●	20-30	●	20-30	●	20-30
	P.4	●	20-25	●	20-25	●	20-25	●	15-25	●	15-25	●	15-25	●	15-25
	P.5	●	10-15	●	10-15	●	10-15	●	5-15	●	5-15	●	5-15	●	5-15
	P.6	●	5-10	●	5-10	●	5-10	○	5-8	○	5-8	○	5-8	○	5-8
	P.7	●	10-15	●	10-15	●	10-15	●	10-15	●	10-15	●	10-15	●	10-15
M	M.1							●	10-15	●	10-15	●	10-15	●	10-15
	M.2							●	5-7	●	5-7	●	5-7	●	5-7
K	K.1														
	K.2	●	25-30	●	25-30	●	25-30	●	20-30	●	20-30	●	20-30	●	20-30
	K.3														
N	N.1														
	N.2							○	30-40	○	30-40	○	30-40	○	30-40
	N.3	●	25-30	●	25-30	●	25-30	●	25-35	●	25-35	●	25-35	●	25-35
	N.4														
	N.5														
	N.6	●	25-30	●	25-30	●	25-30	●	25-35	●	25-35	●	25-35	●	25-35
	N.7	●	20-25	●	20-25	●	20-25								
	N.8														
	N.9														
	N.10														
S	S.1									●	10-15	●	10-15		
	S.2	●	2-3	●	2-3	●	2-3								
	S.3							●	10-15	●	10-15	●	10-15	●	10-15
	S.4	●	2-3	●	2-3	●	2-3								
H	H.1														
	H.2														

TAP APPLICATION TABLE

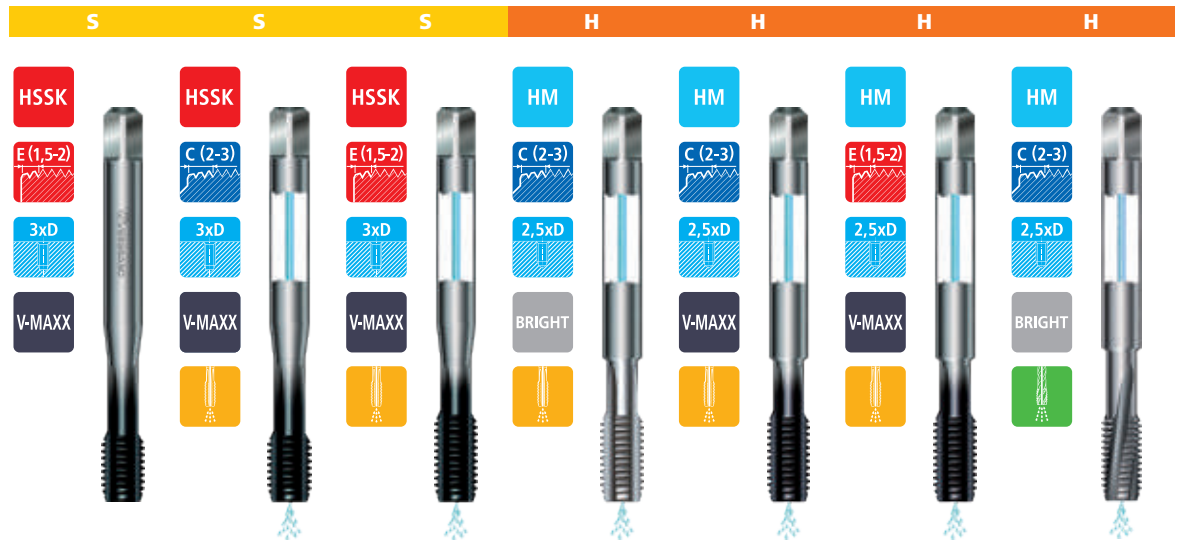


P70 E	148	P76 L	149	S70	170	S70	170	BS70	170	BP43	140	P43 E	141	BP43 E	141
P70 E	148														
P71 E	161			S71	174					BP45	157	P45 E	157	BP45 E	157

P59 E	165														

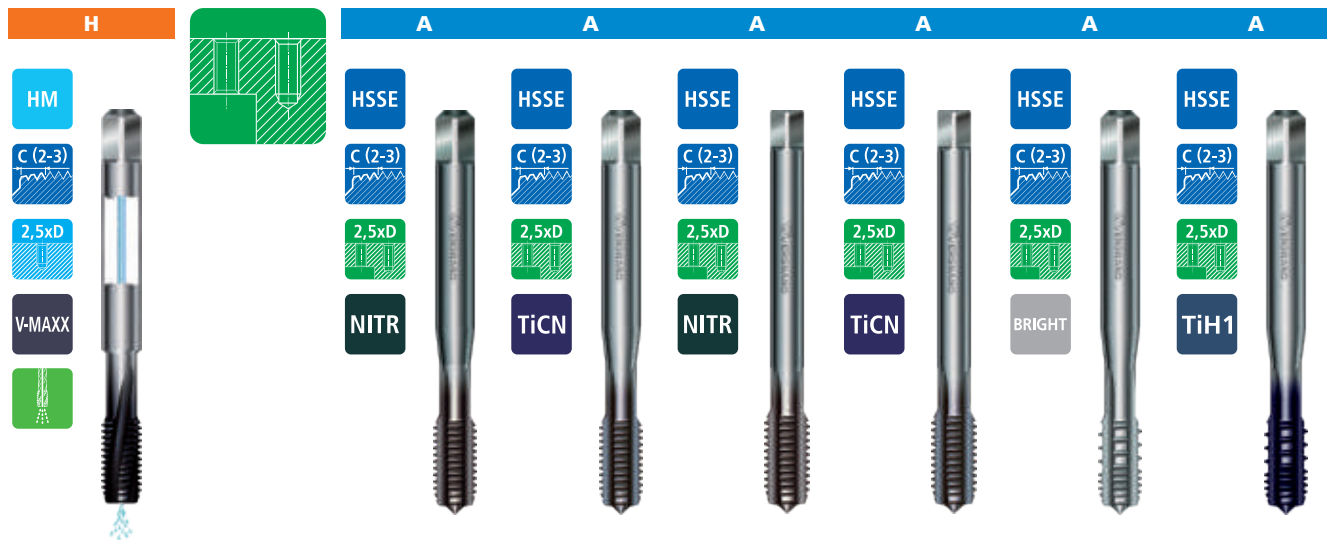
○ 25-35	○ 25-35	● 45-55	● 45-55	● 45-55			
● 20-30	● 20-30	● 45-55	● 45-55	● 45-55			
● 15-25	● 15-25	● 40-50	● 40-50	● 40-50			
● 5-15	● 5-15	● 35-45	● 35-45	● 35-45			
○ 5-8	○ 5-8	● 15-20	● 15-20	● 15-20			
● 10-15	● 10-15	● 15-20	● 15-20	● 15-20			
● 10-15	● 10-15	● 15-20	● 15-20	● 15-20			
● 5-7	● 5-7						
● 20-30	● 20-30	● 40-50	● 40-50	● 40-50	● 40-50	● 40-50	● 40-50
					○ 10-20	○ 10-20	○ 10-20
○ 30-40	○ 30-40	● 45-55	● 45-55	● 45-55			
● 25-35	● 25-35	● 40-50	● 40-50	● 40-50			
		● 40-50	● 40-50	● 40-50	● 40-50	● 40-50	● 40-50
		● 35-45	● 35-45	● 35-45			
● 25-35	● 25-35	● 30-40	● 30-40	● 30-40			
					● 40-50	● 40-50	● 40-50
					● 45-55	● 45-55	● 45-55
● 10-15	● 10-15		● 15-20	● 15-20			
● 10-15	● 10-15	● 15-20	○ 5-15	○ 5-15			
		○ 5-15	○ 5-15	○ 5-15			

TAP APPLICATION TABLE



		S		S		S		H		H		H		H	
M	4H														
	6H/6HX	S43 E	168	BS43	168	BS43 E	168	HB43	176	HB43	176	HB43 E	176	HB29	177
	6G/6GX														
	7G/7GX														
	6H +0,1														
MF	6H/6HX			BS45	172			HB45	180	HB45	180	HB45 E	180		
	6G/6GX														
UNC	2B/2BX														
	3B														
UNF	2B/2BX														
	3B														
8-UN	2B														
G	ISO 5969/X														
Rp (BSPP)	--														
Rc (BSPT)	--														
BSW	mc														
NPT	--														
NPTF	--														
ISO 513	Group														
P	P.1														
	P.2														
	P.3														
	P.4														
	P.5														
	P.6														
	P.7														
M	M.1														
	M.2														
K	K.1	●	55-65	●	55-65	●	55-65	●	40-50	●	55-65	●	55-65	○	15-40
	K.2													○	10-20
	K.3	○	20-30	○	20-30	○	20-30	○	10-20	○	20-30	○	20-30		
N	N.1													●	15-30
	N.2													●	15-30
	N.3													●	20-30
	N.4	●	55-65	●	55-65	●	55-65	●	40-50	●	55-65	●	55-65	●	15-20
	N.5														
	N.6														
	N.7	●	55-65	●	55-65	●	55-65	●	40-50	●	55-65	●	55-65	●	20-25
	N.8														
	N.9	●	55-65	●	55-65	●	55-65	●	45-55	●	55-65	●	55-65		
	N.10	●	55-65	●	55-65	●	55-65	●	45-55	●	55-65	●	55-65		
S	S.1														
	S.2														
	S.3														
	S.4														
H	H.1														
	H.2														

TAP APPLICATION TABLE



HB29	177

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○	40-80
○	15-40

●	25-50
●	25-50
●	30-50
●	25-40

●	30-40
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A43	41	A43	41	A44	42	A44	42	A67	43	A67	43

A45	86	A45	86								
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A49	105	A49	105								
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A50	113	A50	113								
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A48	123	A48	123								
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						●	12-15	●	20-25		
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●	15-20	●	40-45	●	15-20	●	40-45				
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						●	12-15	●	20-25		
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						●	10-12	●	15-20		
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●	15-20	●	40-45	●	15-20	●	40-45				
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						●	10-12	●	15-20		
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						●	8-10	●	12-15		
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●	15-20	●	40-45	●	15-20	●	40-45				
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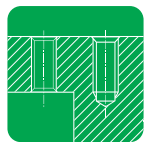
●	20-25	●	45-50	●	20-25	●	45-50				
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●	20-25	●	45-50	●	20-25	●	45-50				
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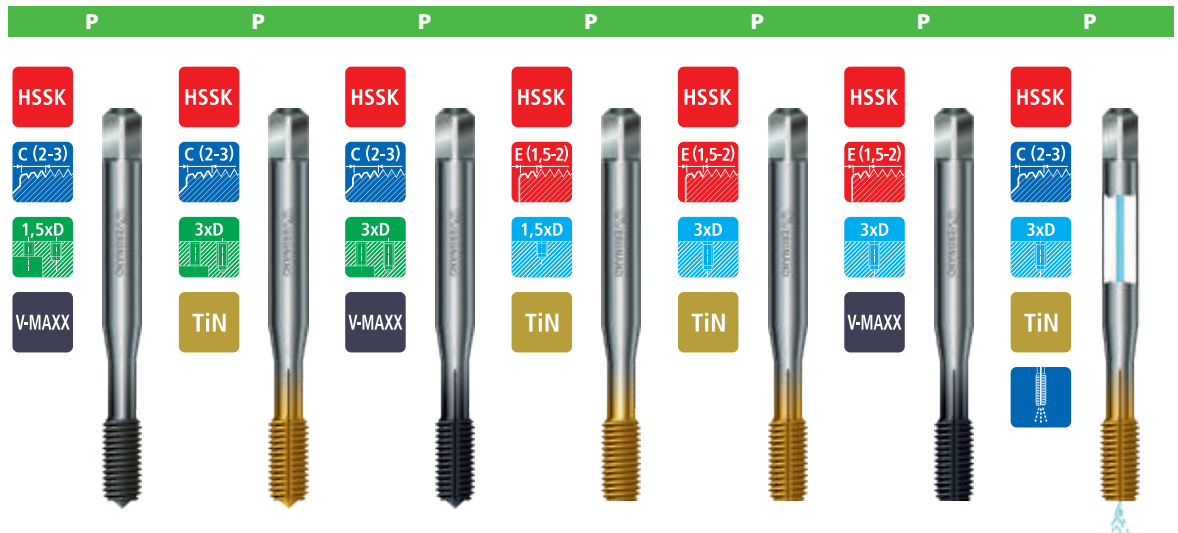
TAP APPLICATION TABLE



M	4H														
	6H/6HX	A110	44	A110	44	A190-EG	78	P43	140	P130	142	P130	142	S43	168
	6G/6GX														
	7G/7GX														
MF	6H +0,1														
	6H/6HX 6G/6GX	P45 157 S45 172													
UNC	2B/2BX														
	3B														
UNF	2B/2BX 3B														
8-UN	2B														
G	ISO 5969/X														
Rp (BSPP)	--														
Rc (BSPT)	--														
BSW	mc														
NPT	--														
NPTF	--														
ISO 513	Group														
P	P.1					○	12-15								
	P.2					●	10-12								
	P.3					●	8-10								
	P.4														
	P.5														
	P.6									●	2-3	●	5-8		
	P.7														
M	M.1														
	M.2														
K	K.1							●	40-50					●	55-65
	K.2					●	8-10								
	K.3							○	10-20					○	20-30
N	N.1					○	12-15								
	N.2					○	10-12								
	N.3					○	10-12								
	N.4							●	40-50					●	55-65
	N.5					○	10-12								
	N.6					○	8-10								
	N.7							●	40-50					●	55-65
	N.8									●	3-5	●	8-10		
	N.9							●	45-55					●	55-65
	N.10							●	45-55					●	55-65
S	S.1	●	6-8	●	10-12										
	S.2	●	3-5	●	6-8										
	S.3														
	S.4														
H	H.1														
	H.2														

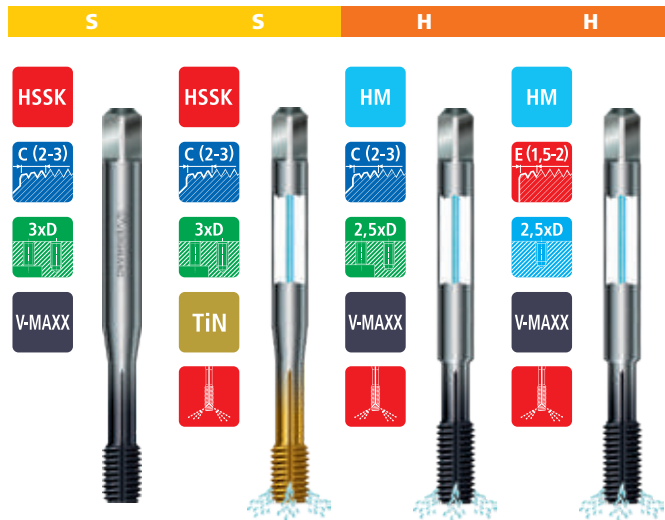


●	1-2	●	2-4
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M	4H														
	6H/6HX	P80	150	P80 N	151	P80 N	151	P80 E	152	P80 N E	152	P80 N E	152	BP80 N	153
	6G/6GX			P80 N	151					P80 N E	152				
	7G/7GX			P80 N	151										
	6H +0,1														
MF	6H/6HX	P81	162	P81 N	163	P81 N	163								
	6G/6GX			P81 N	163										
UNC	2B/2BX														
	3B														
UNF	2B/2BX														
	3B														
8-UN	2B														
G	ISO 5969/X			P82 N	166	P82 N	166								
Rp (BSPP)	--														
Rc (BSPT)	--														
BSW	mc														
NPT	--														
NPTF	--														
ISO 513	Group														
P	P.1	●	40-45	●	40-45	●	40-45	●	40-45	●	40-45	●	40-45	●	40-45
	P.2	●	40-45	●	40-45	●	40-45	●	40-45	●	40-45	●	40-45	●	40-45
	P.3	●	35-40	●	35-40	●	35-40	●	35-40	●	35-40	●	35-40	●	35-40
	P.4	●	30-35	●	30-35	●	30-35	●	30-35	●	30-35	●	30-35	●	30-35
	P.5	●	15-20	●	15-20	●	15-20	●	15-20	●	15-20	●	15-20	●	15-20
	P.6														
	P.7	●	15-20	●	15-20	●	15-20	●	15-20	●	15-20	●	15-20	●	15-20
M	M.1	●	15-20	●	15-20	●	15-20	●	15-20	●	15-20	●	15-20	●	15-20
	M.2														
K	K.1														
	K.2														
	K.3														
N	N.1	●	40-45	●	40-45	●	40-45	●	40-45	●	40-45	●	40-45	●	40-45
	N.2	●	40-45	●	40-45	●	40-45	●	40-45	●	40-45	●	40-45	●	40-45
	N.3	●	35-40	●	35-40	●	35-40	●	35-40	●	35-40	●	35-40	●	35-40
	N.4														
	N.5	●	40-45	●	40-45	●	40-45	●	40-45	●	40-45	●	40-45	●	40-45
	N.6	●	40-45	●	40-45	●	40-45	●	40-45	●	40-45	●	40-45	●	40-45
	N.7														
	N.8														
	N.9														
	N.10														
S	S.1														
	S.2														
	S.3	●	10-15	●	10-15	●	10-15	●	10-15	●	10-15	●	10-15	●	10-15
	S.4	○	5-10	○	5-10	○	5-10	○	5-10	○	5-10	○	5-10	○	5-10
H	H.1														
	H.2														





TAPPING OIL



M	4H				
	6H/6HX	S80 N	171	BS80 N R	171
	6G/6GX				
	7G/7GX				
MF	6H/6HX				
	6G/6GX				HB81 N R E 181
UNC	2B/2BX				
	3B				
UNF	2B/2BX				
	3B				
8-UN	2B				
G	ISO 5969/X				
Rp (BSPP)	--				
Rc (BSPT)	--				
BSW	mc				
NPT	--				
NPTF	--				
ISO 513	Group				
P	P.1	●	50-60	●	50-60
	P.2	●	50-60	●	50-60
	P.3	●	45-55	●	45-55
	P.4	●	40-50	●	40-50
	P.5	●	20-30	●	20-30
	P.6				
	P.7	●	25-35	●	25-35
M	M.1	●	25-35	●	25-35
	M.2	●	15-25	●	15-25
K	K.1				
	K.2				
	K.3				
N	N.1	●	50-60	●	50-60
	N.2	●	50-60	●	50-60
	N.3	●	45-55	●	45-55
	N.4				
	N.5	●	50-60	●	50-60
	N.6	●	50-60	●	50-60
	N.7				
	N.8				
	N.9				
	N.10				
S	S.1				
	S.2				
	S.3	●	10-20	●	10-20
	S.4	○	5-15	○	5-15
H	H.1				
	H.2				

VTO-100

Suitable for tapping with cutting or forming taps on all materials. Available only in EU countries

€ P.69

A SERIES

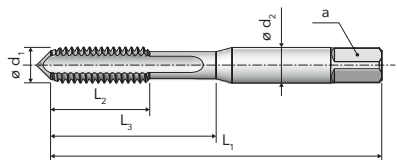
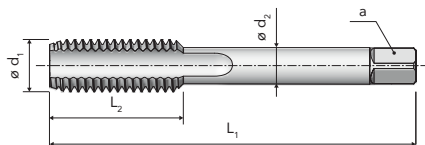
Taps for Generic Applications

HAND TAPS for blind and through holes

In sets of three pieces



HSS

A1
ROUGHINGA1
SECONDA1
FINISHINGA1
SETDIN 352
≤ M6DIN 352
≥ M7

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A1 ROUGHING	A1 SECOND	A1 FINISHING	A1 SET
P	P.1-4	•	•	•	•
	P.7	•	•	•	•
K	K.2	•	•	•	•
N	N.1-3	•	•	•	•
	N.5-7	•	•	•	•



Ød1 [mm]	P [mm]	L1 js 16 [mm]	L2 [mm]	L3 [mm]	Ød2 h9 [mm]	a h12 [mm]	z [-]		A1 ROUGHING	A1 SECOND	A1 FINISHING	A1 SET
M 2	0,4	36	7,5	12	2,8	2,1	3	1,6	•	•	•	•
2,2	0,45	36	8,5	13,5	2,8	2,1	3	1,75	•	•	•	•
2,3	0,4	36	8,5	13,5	2,8	2,1	3	1,9	•	•	•	•
2,5	0,45	40	8,5	14,5	2,8	2,1	3	2,05	•	•	•	•
2,6	0,45	40	8,5	14,5	2,8	2,1	3	2,1	•	•	•	•
3	0,5	40	10	18	3,5	2,7	3	2,5	•	•	•	•
3,5	0,6	45	11	20	4	3	3	2,9	•	•	•	•
4	0,7	45	12	21	4,5	3,4	3	3,3	•	•	•	•
4,5	0,75	50	13	23	6	4,9	3	3,7	•	•	•	•
5	0,8	50	14	24	6	4,9	3	4,2	•	•	•	•
6	1	56	16	28	6	4,9	3	5	•	•	•	•
7	1	56	19	-	6	4,9	3	6	•	•	•	•
8	1,25	63	22	-	6	4,9	3	6,8	•	•	•	•
9	1,25	63	22	-	7	5,5	3	7,8	•	•	•	•
10	1,5	70	24	-	7	5,5	3	8,5	•	•	•	•
11	1,5	70	24	-	8	6,2	3	9,5	•	•	•	•
12	1,75	75	28	-	9	7	4	10,2	•	•	•	•
14	2	80	30	-	11	9	4	12	•	•	•	•
16	2	80	32	-	12	9	4	14	•	•	•	•
18	2,5	95	34	-	14	11	4	15,5	•	•	•	•
20	2,5	95	34	-	16	12	4	17,5	•	•	•	•
22	2,5	100	34	-	18	14,5	4	19,5	•	•	•	•
24	3	110	38	-	18	14,5	4	21	•	•	•	•
27	3	110	38	-	20	16	4	24	•	•	•	•
30	3,5	125	45	-	22	18	4	26,5	•	•	•	•
33	3,5	125	50	-	25	20	4	29,5	•	•	•	•



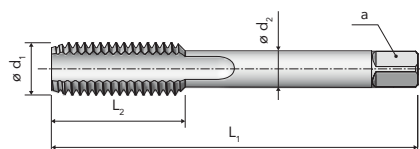
A1
ROUGHING

A1
SECOND

A1
FINISHING

A1
SET

DIN 352



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A1 ROUGHING	A1 SECOND	A1 FINISHING	A1 SET
P	P.1-4	•	•	•	•
	P.7	•	•	•	•
K	K.2	•	•	•	•
N	N.1-3	•	•	•	•
	N.5-7	•	•	•	•



A SERIES

«

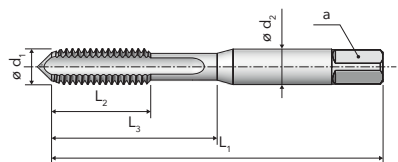
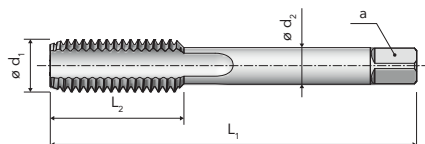
Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A1 ROUGHING	A1 SECOND	A1 FINISHING	A1 SET
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 36	4	150	56	-	28	22	4	32	•	•	•	•
39	4	150	60	-	32	24	4	35	•	•	•	•
42	4,5	150	60	-	32	24	4	37,5	•	•	•	•
45	4,5	160	65	-	36	29	4	40,5	•	•	•	•
48	5	180	70	-	36	29	4	43	•	•	•	•
52	5	180	70	-	40	32	5	47	•	•	•	•
56	5,5	180	70	-	40	32	5	50,5	•	•	•	•

HAND TAPS for blind and through holes

In sets of three pieces



HSS

A1 LH
ROUGHINGA1 LH
SECONDA1 LH
FINISHINGA1 LH
SETDIN 352
≤ M6DIN 352
≥ M8

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A1 LH ROUGHING	A1 LH SECOND	A1 LH FINISHING	A1 LH SET
P	P.1-4	•	•	•	•
	P.7	•	•	•	•
K	K.2	•	•	•	•
N	N.1-3	•	•	•	•
	N.5-7	•	•	•	•



Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	Z	Ød ₁	A1 LH ROUGHING	A1 LH SECOND	A1 LH FINISHING	A1 LH SET
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 2,6	0,45	40	8,5	14,5	2,8	2,1	3	2,1	•	•	•	•
3	0,5	40	10	18	3,5	2,7	3	2,5	•	•	•	•
3,5	0,6	45	11	20	4	3	3	2,9	•	•	•	•
4	0,7	45	12	21	4,5	3,4	3	3,3	•	•	•	•
5	0,8	50	14	24	6	4,9	3	4,2	•	•	•	•
6	1	56	16	28	6	4,9	3	5	•	•	•	•
8	1,25	63	22	-	6	4,9	3	6,8	•	•	•	•
10	1,5	70	24	-	7	5,5	3	8,5	•	•	•	•
12	1,75	75	28	-	9	7	4	10,2	•	•	•	•
14	2	80	30	-	11	9	4	12	•	•	•	•
16	2	80	32	-	12	9	4	14	•	•	•	•
18	2,5	95	34	-	14	11	4	15,5	•	•	•	•
20	2,5	95	34	-	16	12	4	17,5	•	•	•	•
22	2,5	100	34	-	18	14,5	4	19,5	•	•	•	•
24	3	110	38	-	18	14,5	4	21	•	•	•	•
27	3	110	38	-	20	16	4	24	•	•	•	•
30	3,5	125	45	-	22	18	4	26,5	•	•	•	•



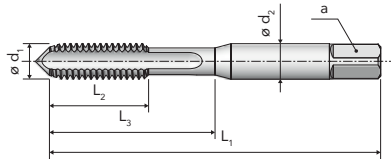
A100
ROUGHING

A100
SECOND

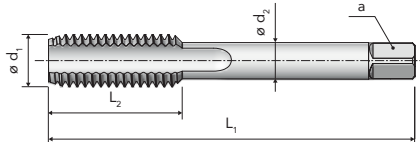
A100 FINISHING

A100
SET

DIN 352
≤ M6



DIN 352
≥ M8



A SERIES

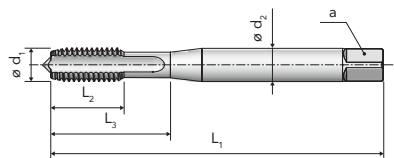
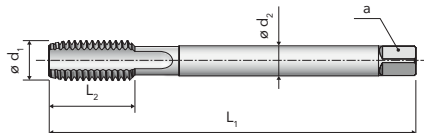
APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A100 ROUGHING	A100 SECOND	A100 FINISHING	A100 SET
P	P.1-5	●	●	●	●
	P.7	●	●	●	●
M	M.1-2	●	●	●	●
K	K.1-3	●	●	●	●
N	N.1-10	●	●	●	●
S	S.1	●	●	●	●
	S.3	●	●	●	●

[illegible]


A21 FC
 BRIGHT

A21 FC
 TiN

DIN 371
 $\leq M10$

DIN 376
 $\geq M11$

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A21 FC BRIGHT	A21 FC TiN		
P	P.1		• 20-25		
	P.2	• 10-12	• 15-20		
	P.3	• 8-10	• 12-15		
K	K.2	• 8-10	• 12-15		
N	N.1		• 20-25		
	N.5		• 15-20		

ISO2
6H

ISO2
6H

1,5xD

1,5xD

RH

RH

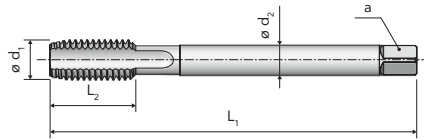

Ød1	P	L1 js 16	L2	L3	Ød2 h9	a h12	Z		A21 FC BRIGHT	A21 FC TiN		
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 2	0,4	45	7	11	2,8	2,1	3	1,6	•	•		
2,5	0,45	50	9	15	2,8	2,1	3	2,05	•	•		
3	0,5	56	10	18	3,5	2,7	3	2,5	•	•		
3,5	0,6	56	11	20	4	3	3	2,9	•	•		
4	0,7	63	12	21	4,5	3,4	3	3,3	•	•		
5	0,8	70	14	24,5	6	4,9	3	4,2	•	•		
6	1	80	16	29	6	4,9	3	5	•	•		
7	1	80	16	29	7	5,5	3	6	•	•		
8	1,25	90	18	33	8	6,2	3	6,8	•	•		
9	1,25	90	18	33	9	7	3	7,8	•	•		
10	1,5	100	20	36	10	8	3	8,5	•	•		
11	1,5	100	22	-	8	6,2	3	9,5	•	•		
12	1,75	110	24	-	9	7	3	10,2	•	•		
14	2	110	25	-	11	9	3	12	•	•		
16	2	110	28	-	12	9	3	14	•	•		
18	2,5	125	32	-	14	11	3	15,5	•	•		
20	2,5	140	32	-	16	12	4	17,5	•	•		
22	2,5	140	32	-	18	14,5	4	19,5	•	•		
24	3	160	36	-	18	14,5	4	21	•	•		
27	3	160	36	-	20	16	4	24	•	•		
30	3,5	180	40	-	22	18	4	26,5	•	•		
33	3,5	180	40	-	25	20	4	29,5	•	•		
36	4	200	55	-	28	22	4	32	•	•		
39	4	200	60	-	32	24	4	35	•			
42	4,5	200	60	-	32	24	4	37,5	•			
45	4,5	220	65	-	36	29	4	40,5	•			



HSSE

A21 FC
BRIGHT

DIN 376



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A21 FC BRIGHT			
P	P.2	● 10-12			
	P.3	● 8-10			
K	K.2	● 8-10			

ISO2
6H



<<

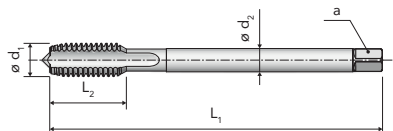
[illegible]



A22 FC
BRIGHT

A22 FC
TiN

DIN 376



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A22 FC BRIGHT	A22 FC TiN		
P	P.1		● 20-25		
	P.2	● 10-12	● 15-20		
	P.3	● 8-10	● 12-15		
K	K.2	● 8-10	● 12-15		
N	N.1		● 20-25		
	N.5		● 15-20		

ISO2
6H

ISO2
6H



1,5xD

1,5xD

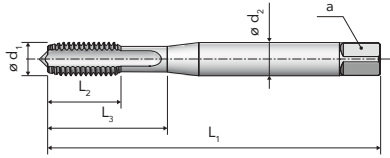
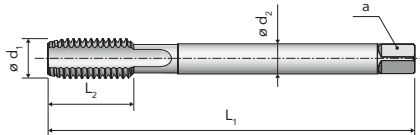
[illegible]



HSSE

A43
NITRIDED

A43
TiCN

DIN 371
≤ M10

DIN 376
≥ M11


APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A43 NITRIDED	A43 TiCN		
K	K.1	● 15-20	● 40-45		
N	N.4	● 15-20	● 40-45		
	N.7	● 15-20	● 40-45		
	N.9-10	● 20-25	● 45-50		

6HX

6HX



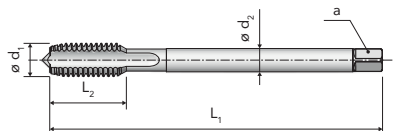
Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A43 NITRIDED	A43 TiCN		
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 3	0,5	56	10	18	3,5	2,7	3	2,5	●	●		
3,5	0,6	56	11	20	4	3	3	2,9	●	●		
4	0,7	63	12	21	4,5	3,4	3	3,3	●	●		
5	0,8	70	14	24,5	6	4,9	3	4,2	●	●		
6	1	80	16	29	6	4,9	4	5	●	●		
7	1	80	16	29	7	5,5	4	6	●	●		
8	1,25	90	18	33	8	6,2	4	6,8	●	●		
9	1,25	90	18	33	9	7	4	7,8	●	●		
10	1,5	100	20	36	10	8	4	8,5	●	●		
11	1,5	100	22	-	8	6,2	4	9,5	●	●		
12	1,75	110	24	-	9	7	4	10,2	●	●		
14	2	110	25	-	11	9	4	12	●	●		
16	2	110	28	-	12	9	4	14	●	●		
18	2,5	125	32	-	14	11	4	15,5	●	●		
20	2,5	140	32	-	16	12	4	17,5	●	●		
22	2,5	140	32	-	18	14,5	4	19,5	●	●		
24	3	160	36	-	18	14,5	5	21	●	●		
27	3	160	36	-	20	16	5	24	●	●		
30	3,5	180	40	-	22	18	5	26,5	●	●		
33	3,5	180	40	-	25	20	5	29,5	●	●		
36	4	200	55	-	28	22	5	32	●	●		



A44
NITRIDED

A44
TiCN

DIN 376



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A44 NITRIDED	A44 TiCN		
K	K.1	● 15-20	● 40-45		
N	N.4	● 15-20	● 40-45		
	N.7	● 15-20	● 40-45		
	N.9-10	● 20-25	● 45-50		

6HX

6HX

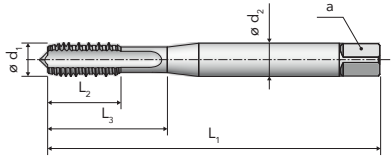
[illegible]



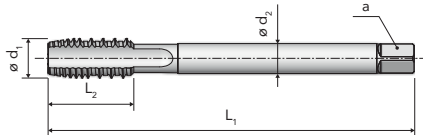
A67
BRIGHT

A67
TiH1

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A67 BRIGHT	A67 TiH1		
P	P.1	• 12-15	• 20-25		
N	N.1	• 12-15	• 20-25		
	N.2	• 10-12	• 15-20		
	N.5	• 10-12	• 15-20		
	N.6	• 8-10	• 12-15		

ISO2
6H

ISO2
6H



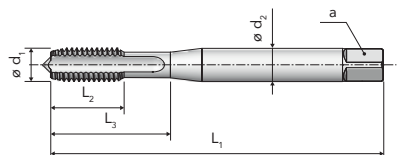
Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A67 BRIGHT	A67 TiH1		
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 3	0,5	56	10	18	3,5	2,7	3	2,5	•	•		
4	0,7	63	12	21	4,5	3,4	3	3,3	•	•		
5	0,8	70	14	24,5	6	4,9	3	4,2	•	•		
6	1	80	16	29	6	4,9	3	5	•	•		
8	1,25	90	18	33	8	6,2	3	6,8	•	•		
10	1,5	100	20	36	10	8	3	8,5	•	•		
12	1,75	110	24	-	9	7	3	10,2	•	•		
14	2	110	25	-	11	9	3	12	•	•		
16	2	110	28	-	12	9	3	14	•	•		
18	2,5	125	32	-	14	11	3	15,5	•	•		
20	2,5	140	32	-	16	12	3	17,5	•	•		



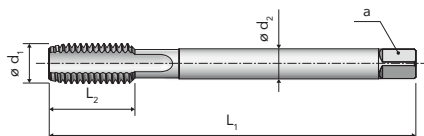
A110
VAP

A110
CrN

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A110 VAP	A110 CrN		
S	S.1	● 6-8	● 10-12		
	S.2	● 3-5	● 6-8		

ISO2
6H

ISO2
6H

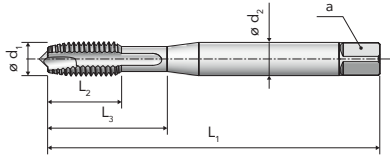
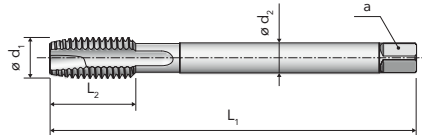
[illegible]


A15 S
BRIGHT

A15 S
VAP

A15 S
TiN

A15 S
TiCN

DIN 371
≤ M10

DIN 376
≥ M11

A
SERIES

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A15 S BRIGHT	A15 S VAP	A15 S TiN	A15 S TiCN
P	P.2	• 20-25	• 20-25	• 30-35	• 30-35
	P.3	• 15-20	• 15-20	• 25-30	• 25-30
	P.4	• 12-15	• 12-15	• 20-25	• 20-25
	P.5			• 10-15	• 10-15
	P.7			• 10-15	• 10-15
M	M.1			• 10-15	• 10-15
K	K.2	• 15-20	• 15-20	• 25-30	• 25-30
N	N.2-3	• 20-25	• 20-25	• 30-35	• 30-35
	N.6	• 15-18	• 15-18	• 25-30	• 25-30

ISO2
6H

ISO2
6H

ISO2
6H

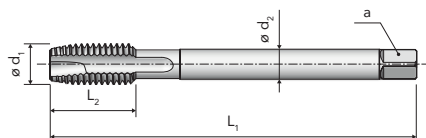
ISO2
6H


Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A15 S BRIGHT	A15 S VAP	A15 S TiN	A15 S TiCN
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 2	0,4	45	7	11	2,8	2,1	2	1,6	•	•	•	•
2,2	0,45	45	8	13	2,8	2,1	2	1,75	•	•	•	•
2,3	0,4	45	8	13	2,8	2,1	2	1,9	•	•	•	•
2,5	0,45	50	9	15	2,8	2,1	3	2,05	•	•	•	•
2,6	0,45	50	9	15	2,8	2,1	3	2,1	•	•	•	•
3	0,5	56	10	18	3,5	2,7	3	2,5	•	•	•	•
3,5	0,6	56	11	20	4	3	3	2,9	•	•	•	•
4	0,7	63	12	21	4,5	3,4	3	3,3	•	•	•	•
5	0,8	70	14	24,5	6	4,9	3	4,2	•	•	•	•
6	1	80	16	29	6	4,9	3	5	•	•	•	•
7	1	80	16	29	7	5,5	3	6	•	•	•	•
8	1,25	90	18	33	8	6,2	3	6,8	•	•	•	•
9	1,25	90	18	33	9	7	3	7,8	•	•	•	•
10	1,5	100	20	36	10	8	3	8,5	•	•	•	•
11	1,5	100	22	-	8	6,2	3	9,5	•	•	•	•
12	1,75	110	24	-	9	7	4	10,2	•	•	•	•
14	2	110	25	-	11	9	4	12	•	•	•	•
16	2	110	28	-	12	9	4	14	•	•	•	•
18	2,5	125	32	-	14	11	4	15,5	•	•	•	•
20	2,5	140	32	-	16	12	4	17,5	•	•	•	•
22	2,5	140	32	-	18	14,5	4	19,5	•	•	•	•
24	3	160	36	-	18	14,5	4	21	•	•	•	•
27	3	160	36	-	20	16	4	24	•	•	•	•
30	3,5	180	40	-	22	18	4	26,5	•	•	•	•
33	3,5	180	40	-	25	20	5	29,5	•	•	•	•
36	4	200	55	-	28	22	5	32	•	•	•	•



A15 S
BRIGHT

DIN 376



APPLICATION RANGE - CUTTING SPEED m/min

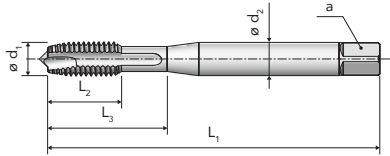
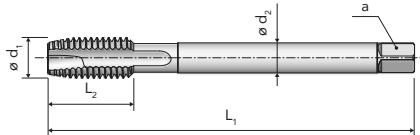
ISO	MG	A15 S BRIGHT			
P	P.2	● 20-25			
	P.3	● 15-20			
	P.4	● 12-15			
K	K.2	● 15-20			
N	N.2-3	● 20-25			
	N.6	● 15-18			

ISO2
6H

[illegible]


A15 S 4H
BRIGHT

A15 S 4H
TiN

DIN 371
≤ M10

DIN 376
≥ M12


APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A15 S 4H BRIGHT	A15 S 4H TiN		
P	P.2	• 20-25	• 30-35		
	P.3	• 15-20	• 25-30		
	P.4	• 12-15	• 20-25		
	P.5		• 10-15		
	P.7		• 10-15		
M	M.1		• 10-15		
K	K.2	• 15-20	• 25-30		
N	N.2-3	• 20-25	• 30-35		
	N.6	• 15-18	• 25-30		

ISO1
4H

ISO1
4H


Ød1	P	L1 js 16	L2	L3	Ød2 h9	a h12	Z		A15 S 4H BRIGHT	A15 S 4H TiN		
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 2	0,4	45	7	11	2,8	2,1	2	1,6	•	•		
2,5	0,45	50	9	15	2,8	2,1	3	2,05	•	•		
3	0,5	56	10	18	3,5	2,7	3	2,5	•	•		
4	0,7	63	12	21	4,5	3,4	3	3,3	•	•		
5	0,8	70	14	24,5	6	4,9	3	4,2	•	•		
6	1	80	16	29	6	4,9	3	5	•	•		
8	1,25	90	18	33	8	6,2	3	6,8	•	•		
10	1,5	100	20	36	10	8	3	8,5	•	•		
12	1,75	110	24	-	9	7	4	10,2	•	•		
14	2	110	25	-	11	9	4	12	•	•		
16	2	110	28	-	12	9	4	14	•	•		

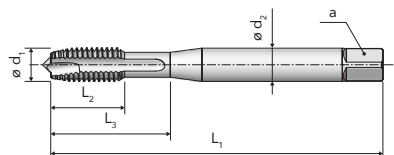


A15 S 6G
BRIGHT

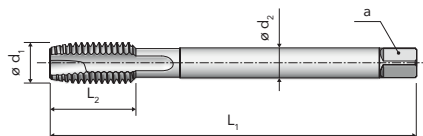
A15 S 6G
TiN

A
SERIES

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A15 S 6G BRIGHT	A15 S 6G TiN		
P	P.2	● 20-25	● 30-35		
	P.3	● 15-20	● 25-30		
	P.4	● 12-15	● 20-25		
	P.5		● 10-15		
	P.7		● 10-15		
M	M.1		● 10-15		
K	K.2	● 15-20	● 25-30		
N	N.2-3	● 20-25	● 30-35		
	N.6	● 15-18	● 25-30		

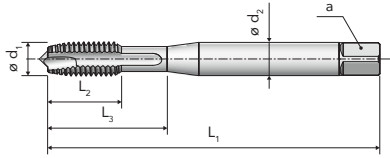
[illegible]



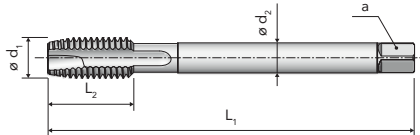
A15 S 7G
BRIGHT

A15 S 7G
TiN

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A15 S 7G BRIGHT	A15 S 7G TiN		
P	P.2	● 20-25	● 30-35		
	P.3	● 15-20	● 25-30		
	P.4	● 12-15	● 20-25		
	P.5		● 10-15		
	P.7		● 10-15		
M	M.1		● 10-15		
K	K.2	● 15-20	● 25-30		
N	N.2-3	● 20-25	● 30-35		
	N.6	● 15-18	● 25-30		

7G

7G

[illegible]

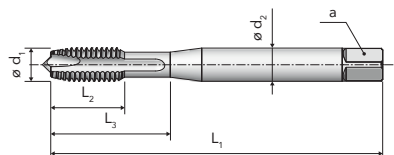


A15 S LH
BRIGHT

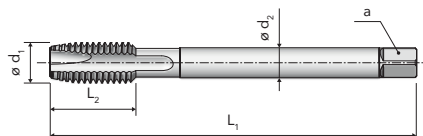
A15 S LH
TiN

A
SERIES

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A15 S LH BRIGHT	A15 S LH TiN		
P	P.2	● 20-25	● 30-35		
	P.3	● 15-20	● 25-30		
	P.4	● 12-15	● 20-25		
	P.5		● 10-15		
	P.7		● 10-15		
M	M.1		● 10-15		
K	K.2	● 15-20	● 25-30		
N	N.2-3	● 20-25	● 30-35		
	N.6	● 15-18	● 25-30		

ISO26H



ISO2
6H

[illegible]

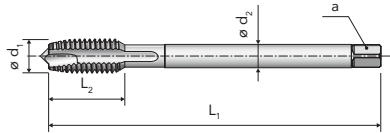
MACHINE TAPS for through holes
Straight flutes with spiral point / through shank



A16 S
BRIGHT

A16 S
TiN

DIN 376



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A16 S BRIGHT	A16 S TiN		
P	P.2	● 20-25	● 30-35		
	P.3	● 15-20	● 25-30		
	P.4	● 12-15	● 20-25		
	P.5		● 10-15		
	P.7		● 10-15		
M	M.1		● 10-15		
K	K.2	● 15-20	● 25-30		
N	N.2-3	● 20-25	● 30-35		
	N.6	● 15-18	● 25-30		

ISO2
6H



ISO2
6H

[illegible]

MACHINE TAPS for through holes

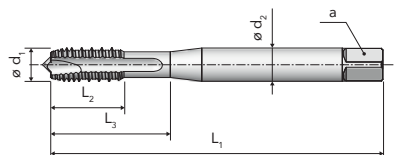
Straight flutes with spiral point / interrupted thread



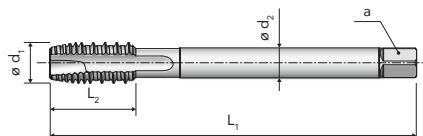
A15 AZ
BRIGHT

A15 AZ
TiH1

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A15 AZ BRIGHT	A15 AZ TiH1		
P	P.1	● 18-20	● 30-35		
N	N.1	● 18-20	● 30-40		
	N.2	● 15-18	● 30-40		
	N.5	● 15-18	● 30-35		
	N.6	● 12-15	● 30-35		

ISO2
6H

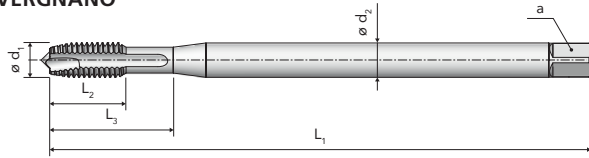
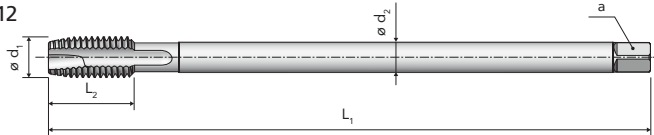
ISO2
6H



Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	Z		Ød ₂ h9	A15 AZ BRIGHT	A15 AZ TiH1		
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]	[mm]				
M 3	0,5	56	10	18	3,5	2,7	3	2,5		●	●		
4	0,7	63	12	21	4,5	3,4	3	3,3		●	●		
5	0,8	70	14	24,5	6	4,9	3	4,2		●	●		
6	1	80	16	29	6	4,9	3	5		●	●		
8	1,25	90	18	33	8	6,2	3	6,8		●	●		
10	1,5	100	20	36	10	8	3	8,5		●	●		
12	1,75	110	24	-	9	7	3	10,2		●	●		
14	2	110	25	-	11	9	3	12		●	●		
16	2	110	28	-	12	9	3	14		●	●		


A15 L
BRIGHT

A15 L
TiN

NORM VERGNANO
≤ M10

NORM VERGNANO
≥ M12


APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A15 L BRIGHT	A15 L TiN		
P	P.1	• 18-20	• 30-35		
	P.2	• 15-18	• 25-30		
	P.3	• 12-15	• 20-25		
N	N.1	• 18-20			
	N.2	• 15-18	• 25-30		
	N.5	• 15-18			
	N.6	• 12-15	• 20-25		

ISO2
6H

ISO2
6H


Ød1	P	L1 js 16	L2	L3	Ød2 h9	a h12	z		A15 L BRIGHT	A15 L TiN		
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 3	0,5	112	10	18	3,5	2,7	3	2,5	•	•		
4	0,7	112	12	21	4,5	3,4	3	3,3	•	•		
5	0,8	125	14	24,5	6	4,9	3	4,2	•	•		
6	1	125	16	29	6	4,9	3	5	•	•		
8	1,25	140	18	33	8	6,2	3	6,8	•	•		
10	1,5	160	20	36	10	8	3	8,5	•	•		
12	1,75	180	24	-	9	7	3	10,2	•	•		
16	2	200	28	-	12	9	3	14	•	•		
20	2,5	225	32	-	16	12	4	17,5	•	•		

MACHINE TAPS for through holes
Straight flutes with spiral point / for stainless steel



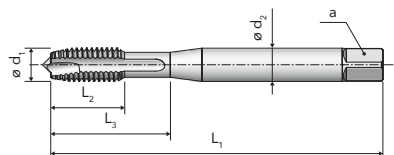
HSSE

A150
VAP

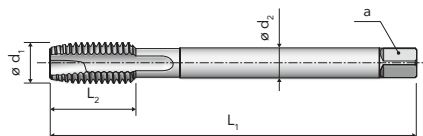
A150
TiX₂

A
SERIES

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A150 VAP	A150 TiX2		
P	P.7	● 10-12	● 18-20		
M	M.1	● 10-12	● 18-20		
	M.2	● 8-10	● 10-20		

6HX

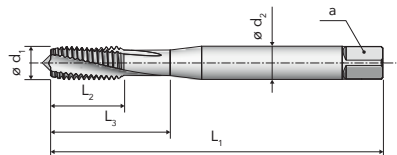
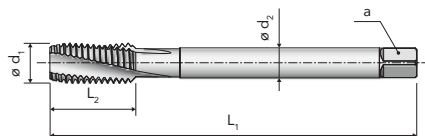
6HX

[illegible]


A29
BRIGHT

A29
VAP

A29
TiN

DIN 371
≤ M10

DIN 376
≥ M11

A
SERIES

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A29 BRIGHT	A29 VAP	A29 TiN
P	P.1	• 18-20	• 18-20	• 30-35
	P.2	• 15-18	• 15-18	• 25-30
	P.3	• 12-15	• 12-15	• 20-25
	P.4	• 10-12	• 10-12	• 15-20
	P.5			• 5-10
K	K.2	• 12-15	• 12-15	• 20-25
N	N.1	• 18-20	• 18-20	
	N.2-3	• 15-18	• 15-18	• 25-30
	N.5	• 15-18	• 15-18	
	N.6	• 12-15	• 12-15	• 20-25

ISO2
6H

ISO2
6H

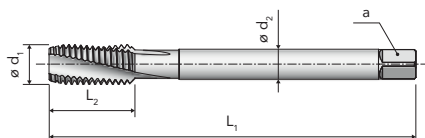
ISO2
6H


Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A29 BRIGHT	A29 VAP	A29 TiN
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]			
M 2	0,4	45	7	11	2,8	2,1	3	1,6	•	•	•
2,2	0,45	45	8	13	2,8	2,1	3	1,75	•		
2,3	0,4	45	8	13	2,8	2,1	3	1,9	•		
2,5	0,45	50	9	15	2,8	2,1	3	2,05	•	•	•
2,6	0,45	50	9	15	2,8	2,1	3	2,1	•		
3	0,5	56	10	18	3,5	2,7	3	2,5	•	•	•
3,5	0,6	56	11	20	4	3	3	2,9	•	•	•
4	0,7	63	12	21	4,5	3,4	3	3,3	•	•	•
4,5	0,75	70	14	24,5	6	4,9	3	3,7	•		
5	0,8	70	14	24,5	6	4,9	3	4,2	•	•	•
6	1	80	16	29	6	4,9	3	5	•	•	•
7	1	80	16	29	7	5,5	3	6	•	•	•
8	1,25	90	18	33	8	6,2	3	6,8	•	•	•
9	1,25	90	18	33	9	7	3	7,8	•	•	•
10	1,5	100	20	36	10	8	3	8,5	•	•	•
11	1,5	100	22	-	8	6,2	3	9,5	•		
12	1,75	110	24	-	9	7	3	10,2	•	•	•
14	2	110	25	-	11	9	3	12	•	•	•
16	2	110	28	-	12	9	3	14	•	•	•
18	2,5	125	32	-	14	11	3	15,5	•	•	•
20	2,5	140	32	-	16	12	4	17,5	•	•	•
22	2,5	140	32	-	18	14,5	4	19,5	•	•	•
24	3	160	36	-	18	14,5	4	21	•	•	•
27	3	160	36	-	20	16	4	24	•	•	•
30	3,5	180	40	-	22	18	4	26,5	•	•	•
33	3,5	180	40	-	25	20	5	29,5	•	•	•



A29
BRIGHT

DIN 376



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A29 BRIGHT			
P	P.1	● 18-20			
	P.2	● 15-18			
	P.3	● 12-15			
	P.4	● 10-12			
K	K.2	● 12-15			
N	N.1	● 18-20			
	N.2-3	● 15-18			
	N.5	● 15-18			
	N.6	● 12-15			

ISO2
6H



«

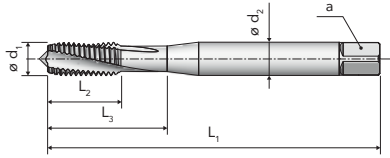
[illegible]



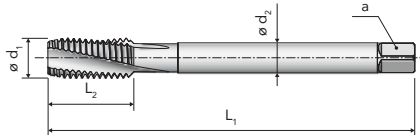
A29 6G
BRIGHT

A29 6G
TiN

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A29 6G BRIGHT	A29 6G TiN		
P	P.1	● 18-20	● 30-35		
	P.2	● 15-18	● 25-30		
	P.3	● 12-15	● 20-25		
	P.4	● 10-12	● 15-20		
	P.5		● 5-10		
K	K.2	● 12-15	● 20-25		
N	N.1	● 18-20			
	N.2-3	● 15-18	● 25-30		
	N.5	● 15-18			
	N.6	● 12-15	● 20-25		

[illegible]



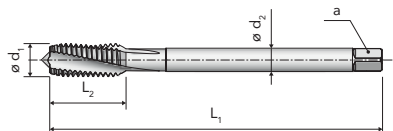
A29 DIN 376 **A29 DIN 376**
BRIGHT TiN

A29 DIN 376

BRIGHT

TiN

DIN 376



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A29 DIN 376	A29 DIN 376		
		BRIGHT	TiN		
P	P.1	● 18-20	● 30-35		
	P.2	● 15-18	● 25-30		
	P.3	● 12-15	● 20-25		
	P.4	● 10-12	● 15-20		
	P.5		● 5-10		
K	K.2	● 12-15	● 20-25		
N	N.1	● 18-20			
	N.2-3	● 15-18	● 25-30		
	N.5	● 15-18			
	N.6	● 12-15	● 20-25		

ISO2
6H



1,5xD



RH



ISO2
6H



1,5xD



RH

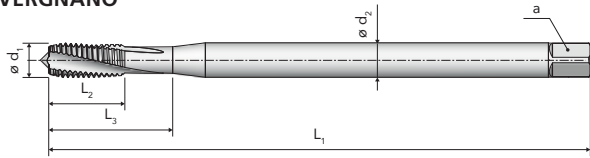
[illegible]



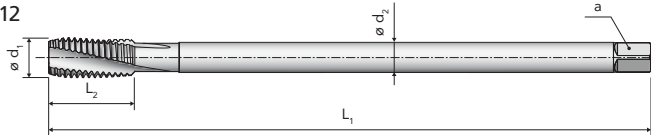
A29 L
BRIGHT

A29 L
TiN

NORM VERGNANO
≤ M10



NORM VERGNANO
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

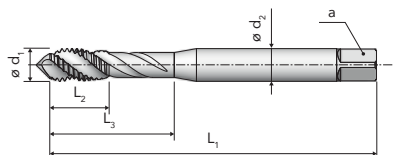
ISO	MG	A29 L BRIGHT	A29 L TiN		
P	P.1	● 18-20	● 30-35		
	P.2	● 15-18	● 25-30		
	P.3	● 12-15	● 20-25		
	P.4	● 10-12	● 15-20		
	P.5		● 5-10		
K	K.2	● 12-15	● 20-25		
N	N.1	● 18-20			
	N.2-3	● 15-18	● 25-30		
	N.5	● 15-18			
	N.6	● 12-15	● 20-25		

ISO2
6H



ISO2
6H

[illegible]

A70 S
BRIGHTA70 S
VAPA70 S
TiNA70 S
TiCNDIN 371
≤ M10DIN 376
≥ M11

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A70 S BRIGHT	A70 S VAP	A70 S TiN	A70 S TiCN
P	P.2	● 15-20	● 15-20	● 25-30	● 25-30
	P.3	● 12-15	● 12-15	● 20-25	● 20-25
	P.4	● 10-12	● 10-12	● 15-20	● 15-20
	P.5			● 5-10	● 5-10
M	M.1			● 8-10	● 8-10
	M.2			● 8-10	● 8-10
K	K2	● 12-15	● 12-15	● 20-25	● 20-25
N	N.3	● 15-18	● 15-18	● 25-30	● 25-30
	N.6	● 15-18	● 15-18	● 25-30	● 25-30

ISO2
6HISO2
6HISO2
6HISO2
6H

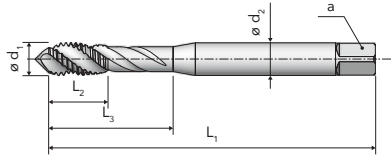
Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A70 S BRIGHT	A70 S VAP	A70 S TiN	A70 S TiCN
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 2	0,4	45	6	12	2,8	2,1	3	1,6	●	●	●	●
2,5	0,45	50	6,5	15	2,8	2,1	3	2,05	●	●	●	●
3	0,5	56	7	15	3,5	2,7	3	2,5	●	●	●	●
3,5	0,6	56	8	18,5	4	3	3	2,9	●	●	●	●
4	0,7	63	8,5	21	4,5	3,4	3	3,3	●	●	●	●
5	0,8	70	10	24,5	6	4,9	3	4,2	●	●	●	●
6	1	80	12	29	6	4,9	3	5	●	●	●	●
7	1	80	12	29	7	5,5	3	6	●	●	●	●
8	1,25	90	15	33	8	6,2	3	6,8	●	●	●	●
9	1,25	90	15	33	9	7	3	7,8	●	●	●	●
10	1,5	100	17,5	38	10	8	3	8,5	●	●	●	●
11	1,5	100	17,5	-	8	6,2	3	9,5	●	●	●	●
12	1,75	110	18	-	9	7	4	10,2	●	●	●	●
14	2	110	20,5	-	11	9	4	12	●	●	●	●
16	2	110	20,5	-	12	9	4	14	●	●	●	●
18	2,5	125	25,5	-	14	11	4	15,5	●	●	●	●
20	2,5	140	29,5	-	16	12	4	17,5	●	●	●	●
22	2,5	140	29,5	-	18	14,5	4	19,5	●	●	●	●
24	3	160	35,5	-	18	14,5	4	21	●	●	●	●
27	3	160	37,5	-	20	16	5	24	●	●	●	●
30	3,5	180	42	-	22	18	5	26,5	●	●	●	●
33	3,5	180	43,5	-	25	20	5	29,5	●	●	●	●
36	4	200	47	-	28	22	5	32	●	●	●	●
42	4,5	200	55	-	32	24	6	37,5	●	●	●	●
48	5	250	59,5	-	36	29	6	43	●	●	●	●
52	5	250	59,5	-	40	32	6	47	●	●	●	●



A70 S 4H
BRIGHT

A70 S 4H
TiN

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A70 S 4H BRIGHT	A70 S 4H TiN		
P	P.2	● 15-20	● 25-30		
	P.3	● 12-15	● 20-25		
	P.4	● 10-12	● 15-20		
	P.5		● 5-10		
	P.7		● 8-10		
M	M.1		● 8-10		
K	K2	● 12-15	● 20-25		
N	N.3	● 15-18	● 25-30		
	N.6	● 15-18	● 25-30		

ISO1
4H



ISO1
4H

[illegible]

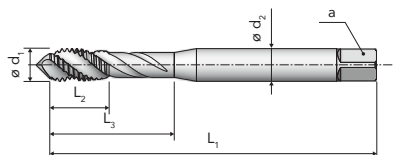
MACHINE TAPS for blind holes
40° spiral flutes / back tapered



A70 S 6G
BRIGHT

A70 S 6G
TiN

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A70 S 6G BRIGHT	A70 S 6G TiN		
P	P.2	● 15-20	● 25-30		
	P.3	● 12-15	● 20-25		
	P.4	● 10-12	● 15-20		
	P.5		● 5-10		
	P.7		● 8-10		
M	M.1		● 8-10		
K	K.2	● 12-15	● 20-25		
N	N.3	● 15-18	● 25-30		
	N.6	● 15-18	● 25-30		

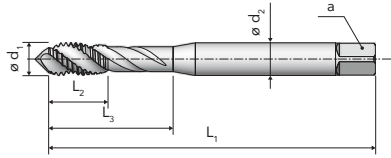
[illegible]



A70 S 7G
BRIGHT

A70 S 7G
TiN

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A70 S 7G BRIGHT	A70 S 7G TiN		
P	P.2	● 15-20	● 25-30		
	P.3	● 12-15	● 20-25		
	P.4	● 10-12	● 15-20		
	P.5		● 5-10		
	P.7		● 8-10		
M	M.1		● 8-10		
K	K2	● 12-15	● 20-25		
N	N.3	● 15-18	● 25-30		
	N.6	● 15-18	● 25-30		

7G

7G

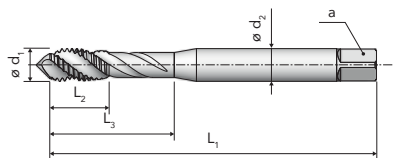
[illegible]



A701 S
BRIGHT

A701 S
TiN

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A701 S BRIGHT	A701 S TIN		
P	P.2	● 15-20	● 25-30		
	P.3	● 12-15	● 20-25		
	P.4	● 10-12	● 15-20		
	P.5		● 5-10		
	P.7		● 8-10		
M	M.1		● 8-10		
K	K.2	● 12-15	● 20-25		
N	N.3	● 15-18	● 25-30		
	N.6	● 15-18	● 25-30		

6H
+0,1mm

6H
+0,1mm

[illegible]

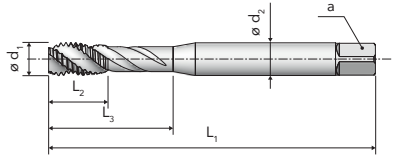
MACHINE TAPS for blind holes
40° spiral flutes / back tapered / chamfer form E



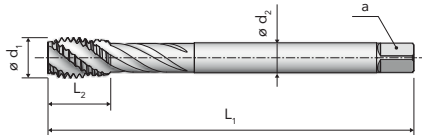
A70 SE
BRIGHT

A70 SE
TiN

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A70 SE BRIGHT	A70 SE TiN		
P	P.2	● 15-20	● 25-30		
	P.3	● 12-15	● 20-25		
	P.4	● 10-12	● 15-20		
	P.5		● 5-10		
	P.7		● 8-10		
M	M.1		● 8-10		
K	K2	● 12-15	● 20-25		
N	N.3	● 15-18	● 25-30		
	N.6	● 15-18	● 25-30		

ISO2
6H

ISO2
6H

[illegible]

MACHINE TAPS for blind holes
40° spiral flutes / back tapered

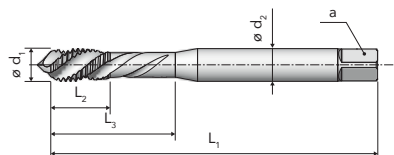


A70 S LH
BRIGHT

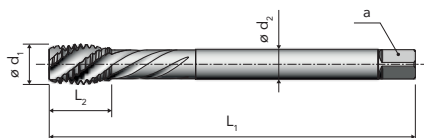
A70 S LH
TiN

A
SERIES

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A70 S LH BRIGHT	A70 S LH TIN		
P	P.2	● 15-20	● 25-30		
	P.3	● 12-15	● 20-25		
	P.4	● 10-12	● 15-20		
	P.5		● 5-10		
	P.7		● 8-10		
M	M.1		● 8-10		
K	K2	● 12-15	● 20-25		
N	N.3	● 15-18	● 25-30		
	N.6	● 15-18	● 25-30		

ISO2
6H



ISO2
6H

[illegible]

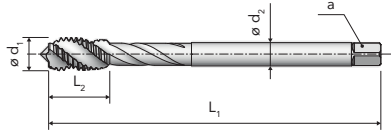
MACHINE TAPS for blind holes
40° spiral flutes / back tapered / through shank



A76 S
BRIGHT

A76 S
TiN

DIN 376



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A76 S BRIGHT	A76 S TiN		
P	P.2	● 15-20	● 25-30		
	P.3	● 12-15	● 20-25		
	P.4	● 10-12	● 15-20		
	P.5		● 5-10		
	P.7		● 8-10		
M	M.1		● 8-10		
K	K2	● 12-15	● 20-25		
N	N.3	● 15-18	● 25-30		
	N.6	● 15-18	● 25-30		

ISO2
6H

ISO2
6H

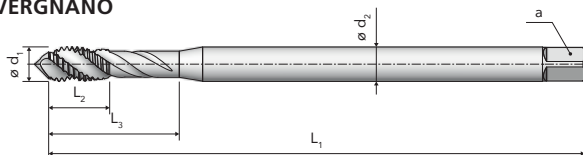
[illegible]



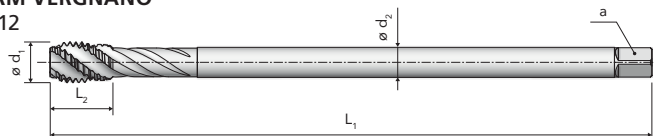
A70 L
BRIGHT

A70 L
TiN

NORM VERGNANO
≤ M10



NORM VERGNANO
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A70 L BRIGHT	A70 L TIN		
P	P.1	● 12-15	● 25-30		
	P.2	● 10-15	● 20-25		
N	N.1	● 12-15			
	N.2	● 12-15	● 25-30		
	N.5	● 10-12			
	N.6	● 10-12	● 20-25		

ISO2
6H



2,5xD



RH



ISO2
6H



2,5xD



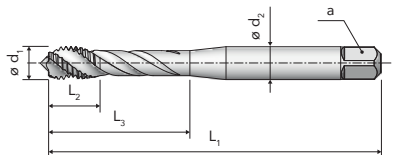
RH

[illegible]


A120
BRIGHT

A120
VAP

A120
TiN

DIN 371
≤ M10

DIN 376
≥ M12


APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A120 BRIGHT	A120 VAP	A120 TiN
P	P.1	• 12-15	• 12-15	• 25-30
	P.2	• 10-15	• 10-15	• 20-25
N	N.1	• 12-15	• 12-15	
	N.2	• 12-15	• 12-15	• 25-30
	N.5	• 10-12	• 10-12	
	N.6	• 10-12	• 10-12	• 20-25

ISO2
6H

ISO2
6H

ISO2
6H

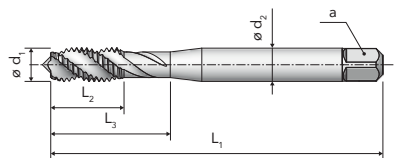

Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A120 BRIGHT	A120 VAP	A120 TiN
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]			
M 2	0,4	45	5	14	2,8	2,1	3	1,6	•	•	•
2,5	0,45	50	5	18	2,8	2,1	3	2,05	•	•	•
3	0,5	56	5	21	3,5	2,7	3	2,5	•	•	•
4	0,7	63	5	27	4,5	3,4	3	3,3	•	•	•
5	0,8	70	6,5	30	6	4,9	3	4,2	•	•	•
6	1	80	7	34,5	6	4,9	3	5	•	•	•
8	1,25	90	9	38,5	8	6,2	3	6,8	•	•	•
10	1,5	100	11	43	10	8	3	8,5	•	•	•
12	1,75	110	13	-	9	7	3	10,2	•	•	•
14	2	110	16,5	-	11	9	3	12	•	•	•
16	2	110	19,5	-	12	9	3	14	•	•	•
18	2,5	125	24	-	14	11	3	15,5	•	•	•
20	2,5	140	25,5	-	16	12	3	17,5	•	•	•
22	2,5	140	25,5	-	18	14,5	3	19,5	•	•	•
24	3	160	32	-	18	14,5	3	21	•	•	•



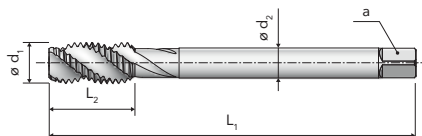
A170
VAP

A170
TiX₂

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A170			
		VAP	TiX2		
P	P.7	●	6-8	●	8-10
M	M.1	●	6-8	●	8-10
	M.2			●	5-7

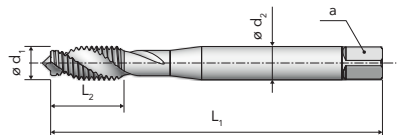
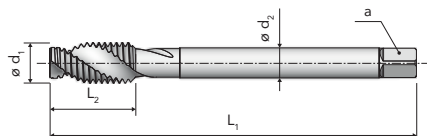
6HX

6HX

[illegible]


A62
BRIGHT

A62
TiH1

DIN 371
≤ M10

DIN 376
≥ M11


APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A62 BRIGHT	A62 TiH1		
N	N.1-2	• 12-15	• 25-30		
	N.5-6	• 10-12	• 20-25		
S	S.1	• 6-8	• 10-12		
	S.3	• 6-8	• 10-12		

ISO2
6H

ISO2
6H


Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A62 BRIGHT	A62 TiH1		
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 2	0,4	45	7	11	2,8	2,1	2	1,6	•	•		
2,2	0,45	45	8	13	2,8	2,1	2	1,75	•	•		
2,3	0,4	45	8	13	2,8	2,1	2	1,9	•	•		
2,5	0,45	50	9	15	2,8	2,1	2	2,05	•	•		
2,6	0,45	50	9	15	2,8	2,1	2	2,1	•	•		
3	0,5	56	10	18	3,5	2,7	2	2,5	•	•		
3,5	0,6	56	11	20	4	3	2	2,9	•	•		
4	0,7	63	12	21	4,5	3,4	2	3,3	•	•		
5	0,8	70	14	24,5	6	4,9	2	4,2	•	•		
6	1	80	16	29	6	4,9	2	5	•	•		
7	1	80	16	29	7	5,5	2	6	•	•		
8	1,25	90	18	33	8	6,2	2	6,8	•	•		
9	1,25	90	18	33	9	7	2	7,8	•	•		
10	1,5	100	20	36	10	8	2	8,5	•	•		
11	1,5	100	20	-	8	6,2	2	9,5	•	•		
12	1,75	110	24	-	9	7	2	10,2	•	•		
14	2	110	25	-	11	9	2	12	•	•		
16	2	110	28	-	12	9	3	14	•	•		

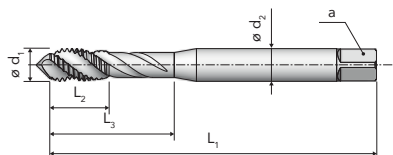
MACHINE TAPS for blind holes
40° spiral flutes / back tapered / for light alloys



A72
BRIGHT

A72
TiH1

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A72 BRIGHT	A72 TIH1		
P	P.1	● 12-15	● 25-30		
N	N.1-2	● 12-15	● 25-30		
	N.3	● 10-12	● 20-25		
	N.5-6	● 10-12	● 20-25		

ISO2
6H

ISO2
6H



2,5xD

2,5xD

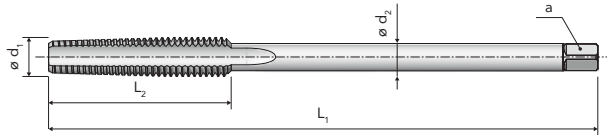
[illegible]



HSSE

A9
BRIGHT

DIN 357



APPLICATION RANGE - CUTTING SPEED m/min

ISO2
6H

ISO	MG	A9 BRIGHT			
P	P.1	● 18-20			
	P.2	● 15-18			
	P.3	● 12-15			

[illegible]

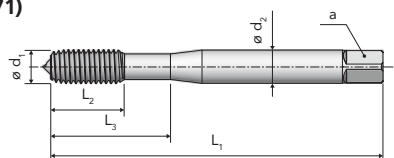


HSSE

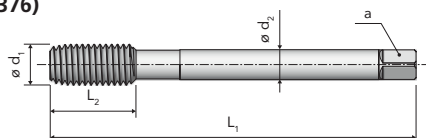
A80
TiN

A80
TiCN

DIN 2174 (371)
≤ M10



DIN 2174 (376)
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A80 TiN	A80 TiCN		
P	P.1-2	● 40-45	● 40-45		
	P.3	● 35-40	● 35-40		
N	N.1-2	● 40-45	● 40-45		
	N.3	● 35-40	● 35-40		
	N.5-6	● 40-45	● 40-45		

6HX

6HX



1,5xD

1,5xD

[illegible]

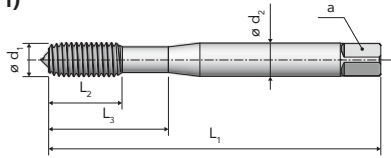


HSSE

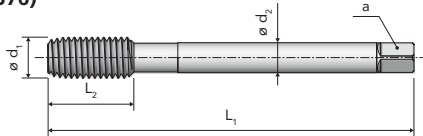
A80 6GX
TiN

A80 6GX
TiCN

DIN 2174 (371)
≤ M10



DIN 2174 (376)
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A80 6GX TiN	A80 6GX TiCN		
P	P.1-2	● 40-45	● 40-45		
	P.3	● 35-40	● 35-40		
N	N.1-2	● 40-45	● 40-45		
	N.3	● 35-40	● 35-40		
	N.5-6	● 40-45	● 40-45		

6GX

6GX

[illegible]

COLD FORMING TAPS for blind and through holes

With oil grooves

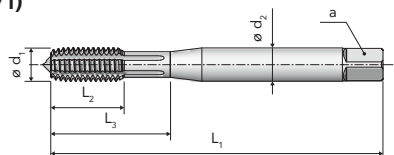


HSSE

A80 N
TiNA80 N
TiCN

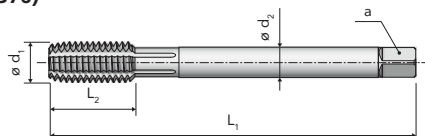
DIN 2174 (371)

≤ M10



DIN 2174 (376)

≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A80 N TiN	A80 N TiCN		
P	P.1-2	● 40-45	● 40-45		
	P.3	● 35-40	● 35-40		
N	N.1-2	● 40-45	● 40-45		
	N.3	● 35-40	● 35-40		
	N.5-6	● 40-45	● 40-45		

6HX

6HX



Ød1	P	L1 js 16	L2	L3	Ød2 h9	a h12	Z			A80 N TiN	A80 N TiCN		
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]					
M 2	0,4	45	7	11	2,8	2,1	3	1,85		●	●		
2,5	0,45	50	9	15	2,8	2,1	3	2,3		●	●		
3	0,5	56	10	18	3,5	2,7	4	2,8		●	●		
3,5	0,6	56	11	20	4	3	4	3,25		●	●		
4	0,7	63	12	21	4,5	3,4	5	3,7		●	●		
5	0,8	70	14	24,5	6	4,9	5	4,65		●	●		
6	1	80	16	29	6	4,9	5	5,55		●	●		
8	1,25	90	18	33	8	6,2	5	7,4		●	●		
10	1,5	100	20	36	10	8	5	9,3		●	●		
12	1,75	110	24	-	9	7	5	11,2		●	●		
14	2	110	25	-	11	9	6	13,1		●	●		
16	2	110	28	-	12	9	6	15,1		●	●		
18	2,5	125	28	-	14	11	8	16,9		●	●		
20	2,5	140	30	-	16	12	8	18,9		●	●		



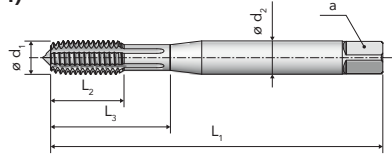
HSSE

A80 N 6GX **A80 N 6GX**
TiN TiCN

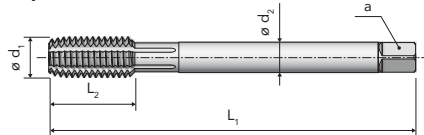
TiN

TiCN

DIN 2174 (371)
≤ M10



DIN 2174 (376)
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A80 N 6GX	A80 N 6GX		
		TiN	TiCN		
P	P.1-2	● 40-45	● 40-45		
	P.3	● 35-40	● 35-40		
N	N.1-2	● 40-45	● 40-45		
	N.3	● 35-40	● 35-40		
	N.5-6	● 40-45	● 40-45		

6GX

6GX

[illegible]

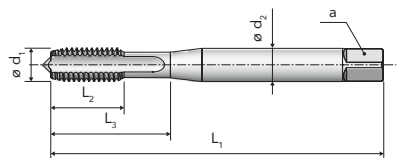


HSSE

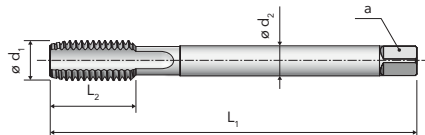
A190
BRIGHT

A
SERIES

DIN 40435
≤ EG-M8



DIN 40435
≥ EG-M10



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A190 BRIGHT			
P	P.2	● 10-12			
	P.3	● 8-10			
K	K.2	● 8-10			

6H mod

[illegible]

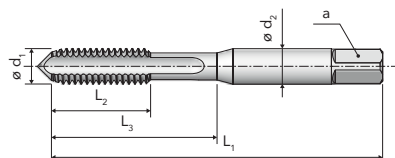


A2
ROUGHING

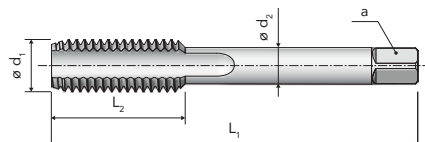
A2
FINISHING

A2
SET

DIN 2181
≤ M6



DIN2181
≥ M7



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A2 ROUGHING	A2 FINISHING	A2 SET
P	P.1-4	•	•	•
	P.7	•	•	•
K	K.2	•	•	•
N	N.1-3	•	•	•
	N.5-7	•	•	•



ISO2
6H



ISO2
6H



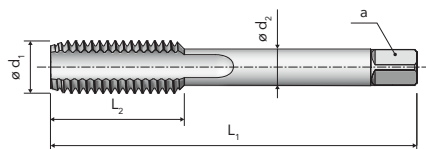
Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A2 ROUGHING	A2 FINISHING	A2 SET
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]			
M 2	0,25	36	7,5	12	2,8	2,1	3	1,75	•	•	•
2,3	0,25	36	8,5	13,5	2,8	2,1	3	2,05	•	•	•
2,5	0,35	40	8,5	14,5	2,8	2,1	3	2,15	•	•	•
2,6	0,35	40	8,5	14,5	2,8	2,1	3	2,25	•	•	•
3	0,35	40	8	18	3,5	2,7	3	2,65	•	•	•
3,5	0,35	45	9	19	4	3	3	3,15	•	•	•
4	0,5	45	10	21	4,5	3,4	3	3,5	•	•	•
4,5	0,5	50	12	23	6	4,9	3	4	•	•	•
5	0,5	50	12	24	6	4,9	3	4,5	•	•	•
6	0,5	56	14	28	6	4,9	3	5,5	•	•	•
6	0,75	56	14	28	6	4,9	3	5,2	•	•	•
7	0,75	56	14	-	6	4,9	3	6,2	•	•	•
8	0,75	56	18	-	6	4,9	3	7,2	•	•	•
8	1	63	22	-	6	4,9	3	7	•	•	•
9	1	63	22	-	7	5,5	3	8	•	•	•
10	0,75	63	20	-	7	5,5	4	9,2	•	•	•
10	1	63	20	-	7	5,5	4	9	•	•	•
10	1,25	70	24	-	7	5,5	3	8,8	•	•	•
11	1	63	20	-	8	6,2	4	10	•	•	•
12	0,75	70	22	-	9	7	4	11,2	•	•	•
12	1	70	22	-	9	7	4	11	•	•	•
12	1,25	70	22	-	9	7	4	10,8	•	•	•
12	1,5	70	22	-	9	7	4	10,5	•	•	•
14	1	70	22	-	11	9	4	13	•	•	•
14	1,25	70	22	-	11	9	4	12,8	•	•	•
14	1,5	70	22	-	11	9	4	12,5	•	•	•

HAND TAPS for blind and through holes
In sets of two pieces

HSS

A2
ROUGHINGA2
FINISHINGA2
SET

DIN 2181



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A2 ROUGHING	A2 FINISHING	A2 SET
P	P.1-4	•	•	•
	P.7	•	•	•
K	K.2	•	•	•
N	N.1-3	•	•	•
	N.5-7	•	•	•



«

Ød ₁ [mm]	P [mm]	L ₁ js 16 [mm]	L ₂ [mm]	L ₃ [mm]	Ød ₂ h9 [mm]	a h12 [mm]	Z [-]	 [mm]	A2 ROUGHING	A2 FINISHING	A2 SET
M 15	1	70	22	-	12	9	4	14	•	•	•
15	1,5	70	22	-	12	9	4	13,5	•	•	•
16	1	70	22	-	12	9	4	15	•	•	•
16	1,25	70	22	-	12	9	4	14,8	•	•	•
16	1,5	70	22	-	12	9	4	14,5	•	•	•
18	1	80	22	-	14	11	4	17	•	•	•
18	1,5	80	22	-	14	11	4	16,5	•	•	•
18	2	80	22	-	14	11	4	16	•	•	•
20	1	80	22	-	16	12	4	19	•	•	•
20	1,5	80	22	-	16	12	4	18,5	•	•	•
20	2	80	22	-	16	12	4	18	•	•	•
22	1	80	22	-	18	14,5	4	21	•	•	•
22	1,5	80	22	-	18	14,5	4	20,5	•	•	•
22	2	80	22	-	18	14,5	4	20	•	•	•
24	1	90	22	-	18	14,5	4	23	•	•	•
24	1,5	90	22	-	18	14,5	4	22,5	•	•	•
24	2	90	22	-	18	14,5	4	22	•	•	•
25	1,5	90	22	-	18	14,5	4	23,5	•	•	•
25	2	90	22	-	18	14,5	4	23	•	•	•
26	1,5	90	22	-	18	14,5	4	24,5	•	•	•
26	2	90	22	-	18	14,5	4	24	•	•	•
27	1,5	90	22	-	20	16	4	25,5	•	•	•
27	2	90	22	-	20	16	4	25	•	•	•
28	1,5	90	22	-	20	16	4	26,5	•	•	•
28	2	90	22	-	20	16	4	26	•	•	•
30	1,5	90	22	-	22	18	4	28,5	•	•	•

»

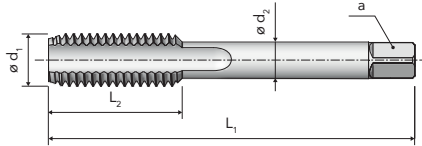


A2
ROUGHING

A2
FINISHING

A2
SET

DIN 2181



A SERIES

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A2 ROUGHING	A2 FINISHING	A2 SET
P	P.1-4	•	•	•
	P.7	•	•	•
K	K.2	•	•	•
N	N.1-3	•	•	•
	N.5-7	•	•	•



ISO2
6H



ISO2
6H



«

Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A2 ROUGHING	A2 FINISHING	A2 SET
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]			
M 30	2	90	22	-	22	18	4	28	•	•	•
32	1,5	90	22	-	22	18	5	30,5	•	•	•
32	2	90	22	-	22	18	4	30	•	•	•
33	2	100	25	-	25	20	4	31	•	•	•
35	1,5	100	25	-	28	22	5	33,5	•	•	•
35	2	125	30	-	28	22	5	33	•	•	•
36	1,5	100	25	-	28	22	5	34,5	•	•	•
36	2	125	30	-	28	22	5	34	•	•	•
36	3	125	40	-	28	22	4	33	•	•	•
38	1,5	100	25	-	28	22	5	36,5	•	•	•
39	2	125	32	-	32	24	5	37	•	•	•
39	3	125	40	-	32	24	4	36	•	•	•
40	1,5	110	25	-	32	24	6	38,5	•	•	•
40	2	125	32	-	32	24	5	38	•	•	•
40	3	125	40	-	32	24	4	37	•	•	•
42	1,5	110	25	-	32	24	6	40,5	•	•	•
42	2	125	32	-	32	24	5	40	•	•	•
42	3	125	40	-	32	24	4	39	•	•	•
45	1,5	110	25	-	36	29	6	43,5	•	•	•
45	2	125	32	-	36	29	5	43	•	•	•
45	3	125	40	-	36	29	5	42	•	•	•
48	1,5	140	25	-	36	29	6	46,5	•	•	•
48	2	140	32	-	36	29	6	46	•	•	•
48	3	140	40	-	36	29	5	45	•	•	•

HAND TAPS for blind and through holes
In sets of two pieces



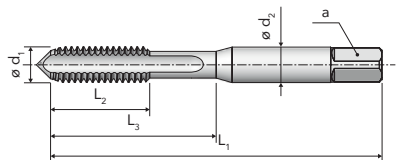
HSS

A2 LH
ROUGHING

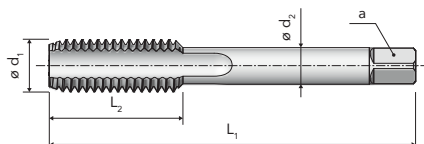
A2 LH FINISHING

A2 LH
SET

DIN 2181
≤ M6



DIN 2181
≥ M8



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A2 LH ROUGHING	A2 LH FINISHING	A2 LH SET	
P	P.1-4	●	●	●	
	P.7	●	●	●	
K	K.2	●	●	●	
N	N.1-3	●	●	●	
	N.5-7	●	●	●	

[illegible]

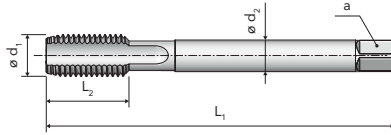


A23 FC
BRIGHT

A23 FC
TiN

A23 FC LH
BRIGHT

DIN 374



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A23 FC BRIGHT	A23 FC TiN	A23 FC LH BRIGHT
P	P.1		• 20-25	
	P.2	• 10-12	• 15-20	• 10-12
	P.3	• 8-10	• 12-15	• 8-10
K	K.2	• 8-10	• 12-15	• 8-10
N	N.1		• 20-25	
	N.5		• 15-20	

ISO2
6H



ISO2
6H



ISO2
6H



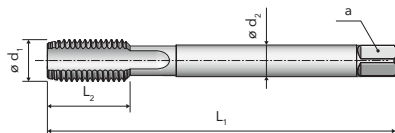
Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A23 FC BRIGHT	A23 FC TiN	A23 FC LH BRIGHT
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]			
M 3	0,35	56	8	-	2,2	-	3	2,65	•		
3,5	0,35	56	9	-	2,5	2,1	3	3,15	•		
4	0,5	63	12	-	2,8	2,1	3	3,5	•		
5	0,5	70	14	-	3,5	2,7	3	4,5	•		
6	0,5	80	16	-	4,5	3,4	3	5,5	•	•	
6	0,75	80	16	-	4,5	3,4	3	5,2	•	•	•
7	0,75	80	16	-	5,5	4,3	3	6,2	•	•	
8	0,75	80	16	-	6	4,9	3	7,2	•		
8	1	90	16	-	6	4,9	3	7	•	•	•
9	1	90	16	-	7	5,5	3	8	•		
10	0,5	90	18	-	7	5,5	4	9,5	•	•	
10	0,75	90	18	-	7	5,5	3	9,2	•		
10	1	90	18	-	7	5,5	3	9	•	•	•
10	1,25	100	18	-	7	5,5	3	8,8	•	•	•
11	1	90	20	-	8	6,2	3	10	•		
12	0,75	100	22	-	9	7	4	11,2	•	•	
12	1	100	22	-	9	7	4	11	•	•	
12	1,25	100	22	-	9	7	3	10,8	•	•	•
12	1,5	100	22	-	9	7	3	10,5	•	•	•
14	1	100	22	-	11	9	4	13	•	•	
14	1,25	100	22	-	11	9	3	12,8	•	•	
14	1,5	100	22	-	11	9	3	12,5	•	•	•
15	1	100	22	-	12	9	4	14	•		
15	1,5	100	22	-	12	9	3	13,5	•		
16	1	100	22	-	12	9	4	15	•	•	
16	1,25	100	22	-	12	9	4	14,8	•	•	


A23 FC
 BRIGHT

A23 FC
 TiN

A23 FC LH
 BRIGHT

DIN 374



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A23 FC BRIGHT	A23 FC TiN	A23 FC LH BRIGHT
P	P.1		• 20-25	
	P.2	• 10-12	• 15-20	• 10-12
	P.3	• 8-10	• 12-15	• 8-10
K	K.2	• 8-10	• 12-15	• 8-10
N	N.1		• 20-25	
	N.5		• 15-20	

ISO2
6HISO2
6HISO2
6H

«

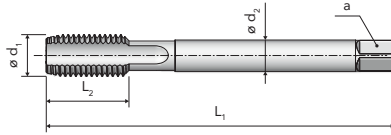
Ød1	P	L1 js 16	L2	L3	Ød2 h9	a h12	Z		A23 FC BRIGHT	A23 FC TiN	A23 FC LH BRIGHT
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]			
M 16	1,5	100	22	-	12	9	3	14,5	•	•	•
17	1	100	22	-	12	9	4	16	•		
17	1,5	100	22	-	12	9	4	15,5	•		
18	1	110	25	-	14	11	4	17	•		
18	1,5	110	25	-	14	11	4	16,5	•	•	•
18	2	125	28	-	14	11	4	16	•		
20	1	125	25	-	16	12	4	19	•		
20	1,5	125	25	-	16	12	4	18,5	•	•	•
20	2	140	28	-	16	12	4	18	•		
22	1	125	25	-	18	14,5	4	21	•		
22	1,5	125	25	-	18	14,5	4	20,5	•	•	
22	2	140	28	-	18	14,5	4	20	•		
24	1	140	25	-	18	14,5	4	23	•		
24	1,5	140	25	-	18	14,5	4	22,5	•		
24	2	140	28	-	18	14,5	4	22	•		
25	1	140	25	-	18	14,5	4	24	•		
25	1,5	140	25	-	18	14,5	4	23,5	•		
25	2	140	28	-	18	14,5	4	23	•		
26	1	140	25	-	18	14,5	4	25	•		
26	1,5	140	25	-	18	14,5	4	24,5	•		
26	2	140	28	-	18	14,5	4	24	•		
27	1,5	140	28	-	20	16	4	25,5	•		
27	2	140	28	-	20	16	4	25	•		
28	1,5	140	28	-	20	16	4	26,5	•		
28	2	140	28	-	20	16	4	26	•		
30	1	150	25	-	22	18	5	29	•		

»



A23 FC
BRIGHT

DIN 374



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A23 FC BRIGHT			
P	P.2	• 10-12			
	P.3	• 8-10			
K	K.2	• 8-10			

ISO2
6H



A
SERIES

«

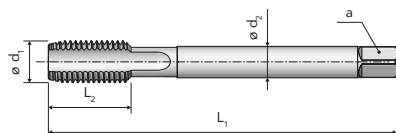
Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A23 FC BRIGHT			
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 30	1,5	150	28	-	22	18	4	28,5	•			
30	2	150	28	-	22	18	4	28	•			
32	1,5	150	28	-	22	18	5	30,5	•			
32	2	150	28	-	22	18	4	30	•			
33	1,5	160	30	-	25	20	5	31,5	•			
33	2	160	30	-	25	20	4	31	•			
35	1,5	170	30	-	28	22	5	33,5	•			
35	2	170	30	-	28	22	5	33	•			
36	1,5	170	30	-	28	22	5	34,5	•			
36	2	170	30	-	28	22	5	34	•			
36	3	200	56	-	28	22	4	33	•			
39	3	200	60	-	32	24	5	36	•			
40	1,5	170	30	-	32	24	5	38,5	•			
40	2	170	30	-	32	24	5	38	•			
40	3	200	60	-	32	24	5	37	•			
42	1,5	170	30	-	32	24	6	40,5	•			
42	2	170	30	-	32	24	5	40	•			
42	3	200	60	-	32	24	5	39	•			
45	1,5	180	32	-	36	29	6	43,5	•			
45	2	180	32	-	36	29	5	43	•			
45	3	200	50	-	36	29	5	42	•			
48	1,5	190	32	-	36	29	6	46,5	•			
48	2	190	32	-	36	29	6	46	•			
48	3	225	50	-	36	29	5	45	•			
52	1,5	190	32	-	40	32	6	50,5	•			
52	2	190	32	-	40	32	6	50	•			
52	3	225	50	-	40	32	5	49	•			



HSSE

A45
NITRIDEDA45
TiCN

DIN 374



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A45 NITRIDED	A45 TiCN		
K	K.1	● 15-20	● 40-45		
N	N.4	● 15-20	● 40-45		
	N.7	● 15-20	● 40-45		
	N.9-10	● 20-25	● 45-50		

6HX

6HX



Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A45 NITRIDED	A45 TiCN		
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 4	0,5	63	10	-	2,8	2,1	3	3,5	●	●		
5	0,5	70	12	-	3,5	2,7	3	4,5	●	●		
6	0,75	80	14	-	4,5	3,4	3	5,2	●	●		
8	1	90	16	-	6	4,9	4	7	●	●		
9	1	90	16	-	7	5,5	4	8	●			
10	1	90	18	-	7	5,5	4	9	●	●		
10	1,25	100	18	-	7	5,5	4	8,8	●	●		
11	1	90	20	-	8	6,2	4	10	●			
12	1	100	22	-	9	7	4	11	●			
12	1,25	100	22	-	9	7	4	10,8	●	●		
12	1,5	100	22	-	9	7	4	10,5	●	●		
14	1	100	22	-	11	9	4	13	●			
14	1,25	100	22	-	11	9	4	12,8	●	●		
14	1,5	100	22	-	11	9	4	12,5	●	●		
16	1	100	22	-	12	9	4	15	●			
16	1,5	100	22	-	12	9	4	14,5	●	●		
18	1,5	110	25	-	14	11	4	16,5	●	●		
20	1,5	125	25	-	16	12	4	18,5	●	●		
22	1,5	125	25	-	18	14,5	4	20,5	●			
24	1,5	140	25	-	18	14,5	5	22,5	●			
24	2	140	28	-	18	14,5	5	22	●			
27	1,5	140	28	-	20	16	5	25,5	●			
27	2	140	28	-	20	16	5	25	●			
30	1,5	150	28	-	22	18	5	28,5	●			
30	2	150	28	-	22	18	5	28	●			



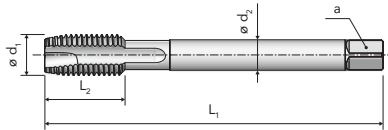
A17 S
BRIGHT

A17 S
VAP

A17 S
TiN

A17 S
TiCN

DIN 374



A SERIES

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A17 S BRIGHT	A17 S VAP	A17 S TiN	A17 S TiCN
P	P.2	• 20-25	• 20-25	• 30-35	• 30-35
	P.3	• 15-20	• 15-20	• 25-30	• 25-30
	P.4	• 12-15	• 12-15	• 20-25	• 20-25
	P.5			• 10-15	• 10-15
	P.7			• 10-15	• 10-15
M	M.1			• 10-15	• 10-15
K	K.2	• 15-20	• 15-20	• 25-30	• 25-30
N	N.2-3	• 20-25	• 20-25	• 30-35	• 30-35
	N.6	• 15-18	• 15-18	• 25-30	• 25-30

ISO2
6H



ISO2
6H



ISO2
6H



ISO2
6H

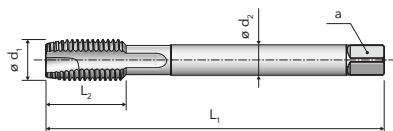


Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A17 S BRIGHT	A17 S VAP	A17 S TiN	A17 S TiCN
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 4	0,5	63	12	-	2,8	2,1	3	3,5	•			
5	0,5	70	14	-	3,5	2,7	3	4,5	•			
6	0,75	80	16	-	4,5	3,4	3	5,2	•	•	•	•
7	0,75	80	16	-	5,5	4,3	3	6,2	•			
8	0,75	80	16	-	6	4,9	3	7,2	•			
8	1	90	16	-	6	4,9	3	7	•	•	•	•
9	1	90	16	-	7	5,5	3	8	•			
10	0,75	90	18	-	7	5,5	4	9,2	•			
10	1	90	18	-	7	5,5	4	9	•	•	•	•
10	1,25	100	18	-	7	5,5	3	8,8	•	•	•	•
11	1	90	20	-	8	6,2	4	10	•			
12	1	100	22	-	9	7	4	11	•	•	•	•
12	1,25	100	22	-	9	7	4	10,8	•	•	•	•
12	1,5	100	22	-	9	7	3	10,5	•	•	•	•
14	1	100	22	-	11	9	4	13	•			
14	1,25	100	22	-	11	9	4	12,8	•	•	•	•
14	1,5	100	22	-	11	9	4	12,5	•	•	•	•
15	1	100	22	-	12	9	4	14	•			
15	1,5	100	22	-	12	9	4	13,5	•			
16	1	100	22	-	12	9	4	15	•			
16	1,5	100	22	-	12	9	4	14,5	•	•	•	•
18	1	110	25	-	14	11	4	17	•			
18	1,5	110	25	-	14	11	4	16,5	•	•	•	•
20	1	125	25	-	16	12	4	19	•			
20	1,5	125	25	-	16	12	4	18,5	•	•	•	•
22	1	125	25	-	18	14,5	4	21	•			


A17 S
 BRIGHT

A17 S
 TiN

DIN 374



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A17 S BRIGHT	A17 S TiN		
P	P.2	• 20-25	• 30-35		
	P.3	• 15-20	• 25-30		
	P.4	• 12-15	• 20-25		
	P.5		• 10-15		
M	M.1		• 10-15		
K	K.2	• 15-20	• 25-30		
N	N.2-3	• 20-25	• 30-35		
	N.6	• 15-18	• 25-30		

ISO2
6H
ISO2
6H


«

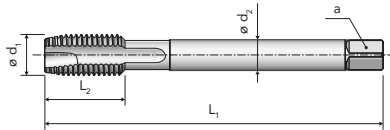
Ød1	P	L1 js 16	L2	L3	Ød2 h9	a h12	Z		A17 S BRIGHT	A17 S TiN		
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 22	1,5	125	25	-	18	14,5	4	20,5	•	•		
24	1	140	25	-	18	14,5	5	23	•			
24	1,5	140	25	-	18	14,5	4	22,5	•	•		
24	2	140	28	-	18	14,5	4	22	•			
25	1,5	140	25	-	18	14,5	4	23,5	•			
25	2	140	28	-	18	14,5	4	23	•			
26	1,5	140	25	-	18	14,5	4	24,5	•			
26	2	140	28	-	18	14,5	4	24	•			
27	1,5	140	28	-	20	16	4	25,5	•	•		
27	2	140	28	-	20	16	4	25	•			
28	1,5	140	28	-	20	16	4	26,5	•			
28	2	140	28	-	20	16	4	26	•			
30	1,5	150	28	-	22	18	4	28,5	•	•		
30	2	150	28	-	22	18	4	28	•			
32	1,5	150	28	-	22	18	5	30,5	•			
32	2	150	28	-	22	18	4	30	•			
36	1,5	170	30	-	28	22	5	34,5	•			
36	2	170	30	-	28	22	5	34	•			
36	3	200	56	-	28	22	4	33	•			
40	1,5	170	30	-	32	24	5	38,5	•			
40	2	170	30	-	32	24	5	38	•			
40	3	200	60	-	32	24	4	37	•			
42	1,5	170	30	-	32	24	5	40,5	•			
42	2	170	30	-	32	24	5	40	•			
42	3	200	60	-	32	24	5	39	•			
45	1,5	180	32	-	36	29	6	43,5	•			

»



A17 S
BRIGHT

DIN 374



A SERIES

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A17 S BRIGHT			
P	P.2	● 20-25			
	P.3	● 15-20			
	P.4	● 12-15			
K	K.2	● 15-20			
N	N.2-3	● 20-25			
	N.6	● 15-18			

ISO2
6H



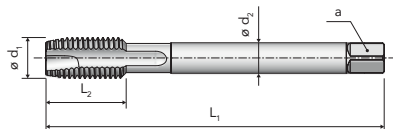
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[illegible]



A17 S
TiX₂

DIN 374



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A17 S TIX2			
P	P.7	● 10-15			
M	M.1	● 10-15			

ISO2
6H

B (4-5)

2,5xD

RH

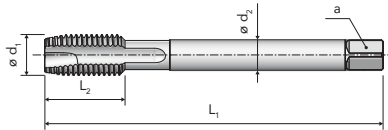
[illegible]



A17 S 6G
BRIGHT

A17 S 6G
TiN

DIN 374



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A17 S 6G BRIGHT	A17 S 6G TiN		
P	P.2	● 20-25	● 30-35		
	P.3	● 15-20	● 25-30		
	P.4	● 12-15	● 20-25		
	P.5		● 10-15		
	P.7		● 10-15		
M	M.1		● 10-15		
K	K.2	● 15-20	● 25-30		
N	N.2-3	● 20-25	● 30-35		
	N.6	● 15-18	● 25-30		

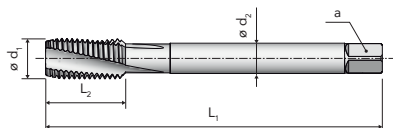
[illegible]



A30
BRIGHT

A30
TiN

DIN 374



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A30 BRIGHT	A30 TiN		
P	P.1	● 18-20	● 30-35		
	P.2	● 15-18	● 25-30		
	P.3	● 12-15	● 20-25		
	P.4	● 10-12	● 15-20		
	P.5		● 5-10		
K	K.2	● 12-15	● 20-25		
N	N.1	● 18-20			
	N.2-3	● 15-18	● 25-30		
	N.5	● 15-18			
	N.6	● 12-15	● 20-25		

ISO2
6HISO2
6H

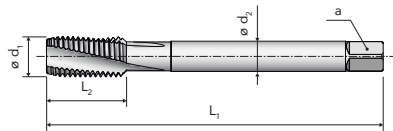
Ød1	P	L1 js 16	L2	L3	Ød2 h9	a h12	Z		A30 BRIGHT	A30 TiN		
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 3	0,35	56	8	-	2,2	-	3	2,65	●			
3,5	0,35	56	9	-	2,5	2,1	3	3,15	●			
4	0,5	63	12	-	2,8	2,1	3	3,5	●			
5	0,5	70	14	-	3,5	2,7	3	4,5	●			
6	0,75	80	16	-	4,5	3,4	3	5,2	●	●		
7	0,75	80	16	-	5,5	4,3	3	6,2	●			
8	0,75	80	16	-	6	4,9	3	7,2	●			
8	1	90	16	-	6	4,9	3	7	●	●		
9	1	90	16	-	7	5,5	3	8	●			
10	0,75	90	18	-	7	5,5	3	9,2	●			
10	1	90	18	-	7	5,5	3	9	●	●		
10	1,25	100	18	-	7	5,5	3	8,8	●	●		
11	1	90	20	-	8	6,2	3	10	●			
12	1	100	22	-	9	7	3	11	●	●		
12	1,25	100	22	-	9	7	3	10,8	●	●		
12	1,5	100	22	-	9	7	3	10,5	●	●		
14	1	100	22	-	11	9	3	13	●			
14	1,25	100	22	-	11	9	3	12,8	●	●		
14	1,5	100	22	-	11	9	3	12,5	●	●		
15	1	100	22	-	12	9	4	14	●			
15	1,5	100	22	-	12	9	3	13,5	●			
16	1	100	22	-	12	9	4	15	●			
16	1,25	100	22	-	12	9	4	14,8	●			
16	1,5	100	22	-	12	9	4	14,5	●	●		
17	1	100	22	-	12	9	4	16	●			
17	1,5	100	22	-	12	9	4	15,5	●			



A30
BRIGHT

A30
TiN

DIN 374



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A30 BRIGHT	A30 TiN		
P	P.1	• 18-20	• 30-35		
	P.2	• 15-18	• 25-30		
	P.3	• 12-15	• 20-25		
	P.4	• 10-12	• 15-20		
	P.5		• 5-10		
K	K.2	• 12-15	• 20-25		
N	N.1	• 18-20			
	N.2-3	• 15-18	• 25-30		
	N.5	• 15-18			
	N.6	• 12-15	• 20-25		

ISO2
6H



ISO2
6H



A
SERIES

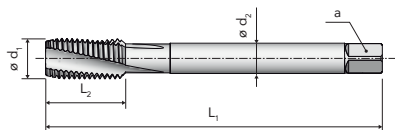
«

Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A30 BRIGHT	A30 TiN		
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 18	1	110	25	-	14	11	4	17	•			
18	1,5	110	25	-	14	11	4	16,5	•	•		
20	1	125	25	-	16	12	4	19	•			
20	1,5	125	25	-	16	12	4	18,5	•	•		
22	1	125	25	-	18	14,5	4	21	•			
22	1,5	125	25	-	18	14,5	4	20,5	•	•		
24	1	140	25	-	18	14,5	4	23	•			
24	1,5	140	25	-	18	14,5	4	22,5	•	•		
24	2	140	28	-	18	14,5	4	22	•			
25	1	140	25	-	18	14,5	4	24	•			
25	1,5	140	25	-	18	14,5	4	23,5	•			
25	2	140	28	-	18	14,5	4	23	•			
26	1	140	25	-	18	14,5	4	25	•			
26	1,5	140	25	-	18	14,5	4	24,5	•			
26	2	140	28	-	18	14,5	4	24	•			
27	1,5	140	28	-	20	16	4	25,5	•	•		
27	2	140	28	-	20	16	4	25	•			
28	1,5	140	28	-	20	16	4	26,5	•			
28	2	140	28	-	20	16	4	26	•			
30	1	150	25	-	22	18	5	29	•			
30	1,5	150	28	-	22	18	4	28,5	•	•		
30	2	150	28	-	22	18	4	28	•			
32	1,5	150	28	-	22	18	5	30,5	•			
32	2	150	28	-	22	18	4	30	•			
36	1,5	170	30	-	28	22	5	34,5	•			
36	2	170	30	-	28	22	5	34	•			

»


A30
 BRIGHT

DIN 374



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A30 BRIGHT			
P	P.1	• 18-20			
	P.2	• 15-18			
	P.3	• 12-15			
	P.4	• 10-12			
K	K.2	• 12-15			
N	N.1	• 18-20			
	N.2-3	• 15-18			
	N.5	• 15-18			
	N.6	• 12-15			

ISO2
6H


<<

Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	Z		A30 BRIGHT			
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 36	3	200	56	-	28	22	4	33	•			
40	1,5	170	30	-	32	24	5	38,5	•			
40	2	170	30	-	32	24	5	38	•			
40	3	200	60	-	32	24	5	37	•			
42	1,5	170	30	-	32	24	6	40,5	•			
42	2	170	30	-	32	24	5	40	•			
42	3	200	60	-	32	24	5	39	•			
45	1,5	180	32	-	36	29	6	43,5	•			
45	2	180	32	-	36	29	5	43	•			
45	3	200	50	-	36	29	5	42	•			
48	1,5	190	32	-	36	29	6	46,5	•			
48	2	190	32	-	36	29	6	46	•			
48	3	225	50	-	36	29	5	45	•			

MACHINE TAPS for blind holes
40° spiral flutes / back tapered



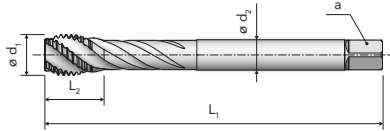
A71 S
BRIGHT

A71 S
VAP

A71 S
TiN

A71 S
TiCN

DIN 374



A SERIES

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A71 S BRIGHT	A71 S VAP	A71 S TiN	A71 S TiCN
P	P.2	● 15-20	● 15-20	● 25-30	● 25-30
	P.3	● 12-15	● 12-15	● 20-25	● 20-25
	P.4	● 10-12	● 10-12	● 15-20	● 15-20
	P.5			● 5-10	● 5-10
	P.7			● 8-10	● 8-10
M	M.1			● 8-10	● 8-10
K	K.2	● 12-15	● 12-15	● 20-25	● 20-25
N	N.3	● 15-18	● 15-18	● 25-30	● 25-30
	N.6	● 15-18	● 15-18	● 25-30	● 25-30

ISO2
6H



ISO2
6H



ISO2
6H



ISO2
6H

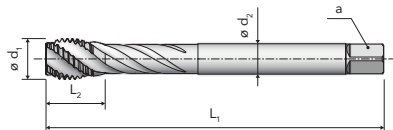


Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A71 S BRIGHT	A71 S VAP	A71 S TiN	A71 S TiCN
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 6	0,75	80	7,5	-	4,5	3,4	3	5,2	●	●	●	●
8	1	90	10	-	6	4,9	3	7	●	●	●	●
10	1	90	10	-	7	5,5	3	9	●	●	●	●
10	1,25	100	11,5	-	7	5,5	3	8,8	●	●	●	●
12	1	100	13	-	9	7	4	11	●	●	●	●
12	1,25	100	13,5	-	9	7	4	10,8	●	●	●	●
12	1,5	100	14	-	9	7	4	10,5	●	●	●	●
14	1,5	100	15,5	-	11	9	4	12,5	●	●	●	●
16	1,5	100	15,5	-	12	9	4	14,5	●	●	●	●
18	1,5	110	16	-	14	11	4	16,5	●	●	●	●
20	1	125	15	-	16	12	4	19	●	●	●	●
20	1,5	125	17	-	16	12	4	18,5	●	●	●	●
22	1,5	125	19	-	18	14,5	4	20,5	●	●	●	●
24	1,5	140	21	-	18	14,5	4	22,5	●	●	●	●
24	2	140	26	-	18	14,5	4	22	●	●	●	●
26	1,5	140	23	-	18	14,5	4	24,5	●	●	●	●
27	1,5	140	23	-	20	16	4	25,5	●	●	●	●
27	2	140	28	-	20	16	4	25	●	●	●	●
28	1,5	140	23	-	20	16	4	26,5	●	●	●	●
30	1,5	150	25	-	22	18	5	28,5	●	●	●	●
30	2	150	29	-	22	18	5	28	●	●	●	●
36	3	200	46	-	28	22	5	33	●	●	●	●
42	3	200	51	-	32	24	6	39	●	●	●	●



A71 S
TiX2

DIN 374



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A71 S TiX2			
P	P.7	● 8-10			
M	M.1	● 8-10			
	M.2	● 5-7			

ISO2
6H

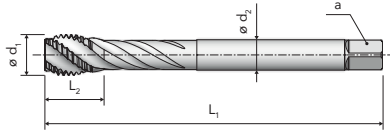
[illegible]



A71 S 6G
BRIGHT

A71 S 6G
TiN

DIN 374



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A71 S 6G BRIGHT	A71 S 6G TiN		
P	P.2	● 15-20	● 25-30		
	P.3	● 12-15	● 20-25		
	P.4	● 10-12	● 15-20		
	P.5		● 5-10		
	P.7		● 8-10		
M	M.1		● 8-10		
K	K.2	● 12-15	● 20-25		
N	N.3	● 15-18	● 25-30		
	N.6	● 15-18	● 25-30		

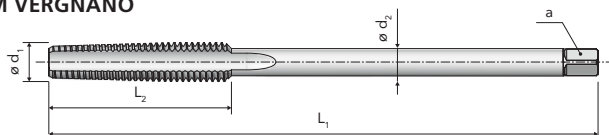
[illegible]



HSSE

A10
BRIGHT

NORM VERGNANO



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A10 BRIGHT			
P	P.1	● 18-20			
	P.2	● 15-18			
	P.3	● 12-15			

ISO2
6H



RH

[illegible]

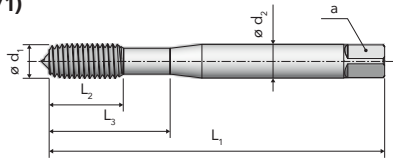


HSSE

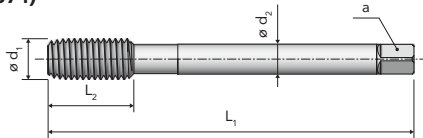
A81
TiN

A81
TiCN

DIN 2174 (371)
≤ M10x1,25



DIN 2174 (374)
≥ M12x1



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A81 TiN	A81 TiCN		
P	P.1-2	● 40-45	● 40-45		
	P.3	● 35-40	● 35-40		
N	N.1-2	● 40-45	● 40-45		
	N.3	● 35-40	● 35-40		
	N.5-6	● 40-45	● 40-45		

6HX

6HX

[illegible]



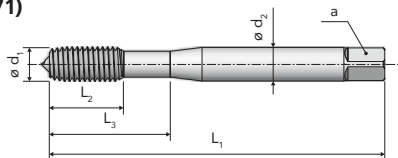
HSSE

A81 6GX
TiN

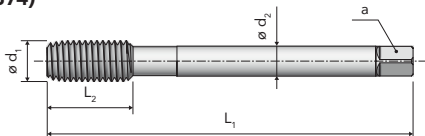
A81 6GX
TiCN

A
SERIES

DIN 2174 (371)
≤ M10x1,25



DIN 2174 (374)
≥ M12x1



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A81 6GX TIN	A81 6GX TICN		
P	P.1-2	● 40-45	● 40-45		
	P.3	● 35-40	● 35-40		
N	N.1-2	● 40-45	● 40-45		
	N.3	● 35-40	● 35-40		
	N.5-6	● 40-45	● 40-45		

6GX

6GX

[illegible]

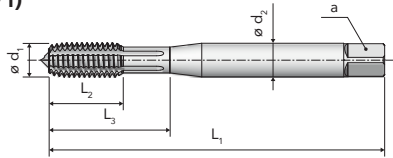


HSSE

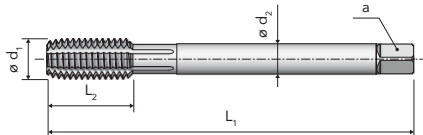
A81 N
TiN

A81 N
TiCN

DIN 2174 (371)
≤ M10x1,25



DIN 2174 (374)
≥ M12x1



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A81 N TiN	A81 N TiCN		
P	P.1-2	● 40-45	● 40-45		
	P.3	● 35-40	● 35-40		
N	N.1-2	● 40-45	● 40-45		
	N.3	● 35-40	● 35-40		
	N.5-6	● 40-45	● 40-45		

6HX

6HX



Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A81 N TiN	A81 N TiCN		
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 3	0,35	56	10	18	3,5	2,7	4	2,85	●	●		
4	0,5	63	12	21	4,5	3,4	5	3,8	●	●		
5	0,5	70	14	24,5	6	4,9	5	4,8	●	●		
6	0,75	80	16	29	6	4,9	5	5,65	●	●		
8	1	90	18	33	8	6,2	5	7,55	●	●		
10	1	90	18	34	10	8	6	9,55	●	●		
10	1,25	100	20	36	10	8	6	9,4	●	●		
12	1	100	22	-	9	7	6	11,55	●	●		
12	1,25	100	22	-	9	7	6	11,4	●	●		
12	1,5	100	22	-	9	7	6	11,3	●	●		
14	1,25	100	22	-	11	9	6	13,4	●	●		
14	1,5	100	22	-	11	9	6	13,3	●	●		
16	1,5	100	22	-	12	9	6	15,3	●	●		
18	1,5	110	22	-	14	11	8	17,3	●	●		
20	1,5	125	25	-	16	12	8	19,3	●	●		

A SERIES



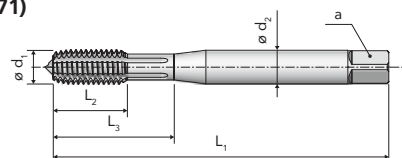
HSSE

A81 N 6GX **A81 N 6GX**
TiN TiCN

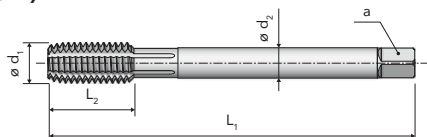
TiN

TiCN

DIN 2174 (371)
≤ M10x1,25



DIN 2174 (374)
≥ M12x1



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A81 N 6GX TiN	A81 N 6GX TiCN		
P	P.1-2	● 40-45	● 40-45		
	P.3	● 35-40	● 35-40		
N	N.1-2	● 40-45	● 40-45		
	N.3	● 35-40	● 35-40		
	N.5-6	● 40-45	● 40-45		

6GX

6GX

[illegible]



HSS

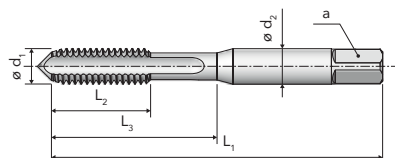
A7
ROUGHING

A7
SECOND

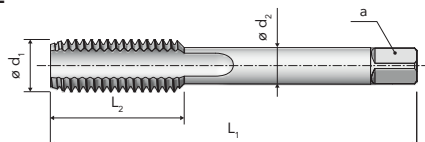
A7
FINISHING

A7
SET

DIN 2184-2
≤ Ø 1/4"



DIN 2184-2
≥ Ø 5/16"



A SERIES

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A7 ROUGHING	A7 SECOND	A7 FINISHING	A7 SET
P	P.1-4	•	•	•	•
	P.7	•	•	•	•
K	K.2	•	•	•	•
N	N.1-3	•	•	•	•
	N.5-7	•	•	•	•



UNC	P	Ød ₁	L ₁	L ₂	L ₃	Ød ₂	a	z	z		A7 ROUGHING	A7 SECOND	A7 FINISHING	A7 SET
	[TPI]	[mm]	js 16 [mm]	[mm]	[mm]	h9 [mm]	h12 [mm]	[-]	[mm]					
Nr.1	64	1,854	36	7,5	12	2,8	2,1	3	1,55		•	•	•	•
Nr.2	56	2,184	36	8,5	13,5	2,8	2,1	3	1,85		•	•	•	•
Nr.3	48	2,515	40	8,5	14,5	2,8	2,1	3	2,1		•	•	•	•
Nr.4	40	2,845	40	10	18	3,5	2,7	3	2,35		•	•	•	•
Nr.5	40	3,175	40	10	18	3,5	2,7	3	2,65		•	•	•	•
Nr.6	32	3,505	45	11	20	4	3	3	2,85		•	•	•	•
Nr.8	32	4,166	45	12	21	4,5	3,4	3	3,5		•	•	•	•
Nr.10	24	4,826	50	14	23	6	4,9	3	3,9		•	•	•	•
Nr.12	24	5,486	56	16	28	6	4,9	3	4,5		•	•	•	•
1/4"	20	6,35	56	16	28	6	4,9	3	5,1		•	•	•	•
5/16"	18	7,938	63	22	-	6	4,9	3	6,6		•	•	•	•
3/8"	16	9,525	70	24	-	7	5,5	3	8		•	•	•	•
7/16"	14	11,113	70	24	-	8	6,2	3	9,4		•	•	•	•
1/2"	13	12,7	75	28	-	9	7	3	10,8		•	•	•	•
9/16"	12	14,288	80	28	-	11	9	4	12,2		•	•	•	•
5/8"	11	15,875	80	30	-	12	9	4	13,5		•	•	•	•
3/4"	10	19,05	95	32	-	14	11	4	16,5		•	•	•	•
7/8"	9	22,225	100	32	-	18	14,5	4	19,5		•	•	•	•
1"	8	25,4	110	36	-	18	14,5	4	22,25		•	•	•	•
1 1/8"	7	28,575	125	40	-	22	18	4	25		•	•	•	•
1 1/4"	7	31,75	125	40	-	22	18	4	28		•	•	•	•

MACHINE TAPS for blind holes (FC) and for through holes (FP) Straight flutes



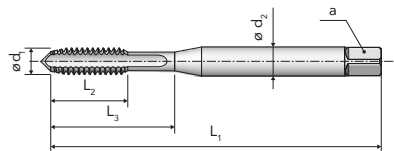
A27 FC
BRIGHT

A27 FC
TiN

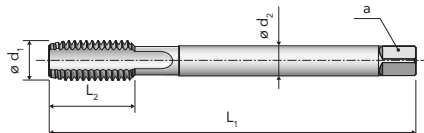
A27 FP
BRIGHT

A27 FP
TiN

DIN 2184-1
≤ Ø 1/4"



DIN 2184-1
≥ Ø 5/16"



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A27 FC BRIGHT	A27 FC TiN	A27 FP BRIGHT	A27 FP TiN
P	P.1		• 20-25		• 20-25
	P.2	• 10-12	• 15-20	• 10-12	• 15-20
	P.3	• 8-10	• 12-15	• 8-10	• 12-15
K	K.2	• 8-10	• 12-15	• 8-10	• 12-15
N	N.1		• 20-25		• 20-25
	N.5		• 15-20		• 15-20

2B



2B



2B



2B



UNC	P	Ød ₁	L ₁	L ₂	L ₃	Ød ₂	a	z	Ød ₂	A27 FC	A27 FC	A27 FP	A27 FP
	[TPI]	[mm]	js 16	[mm]	[mm]	h9	h12	[-]	[mm]	BRIGHT	TiN	BRIGHT	TiN
Nr.2	56	2,184	45	9	13	2,8	2,1	3	1,85	•	•	•	•
Nr.3	48	2,515	50	9	15	2,8	2,1	3	2,1	•	•	•	•
Nr.4	40	2,845	56	10	18	3,5	2,7	3	2,35	•	•	•	•
Nr.5	40	3,175	56	10	18	3,5	2,7	3	2,65	•	•	•	•
Nr.6	32	3,505	56	11	20	4	3	3	2,85	•	•	•	•
Nr.8	32	4,166	63	13	22	4,5	3,4	3	3,5	•	•	•	•
Nr.10	24	4,826	70	16	26,5	6	4,9	3	3,9	•	•	•	•
Nr.12	24	5,486	80	16	26,5	6	4,9	3	4,5	•	•	•	•
1/4"	20	6,35	80	17	30	7	5,5	3	5,1	•	•	•	•
5/16"	18	7,938	90	18	-	6	4,9	3	6,6	•	•	•	•
3/8"	16	9,525	100	22	-	7	5,5	3	8	•	•	•	•
7/16"	14	11,113	100	24	-	8	6,2	3	9,4	•	•	•	•
1/2"	13	12,7	110	26	-	9	7	3	10,8	•	•	•	•
9/16"	12	14,288	110	28	-	11	9	3	12,2	•	•	•	•
5/8"	11	15,875	110	28	-	12	9	3	13,5	•	•	•	•
3/4"	10	19,05	125	32	-	14	11	4	16,5	•	•	•	•
7/8"	9	22,225	140	32	-	18	14,5	4	19,5	•	•	•	•
1"	8	25,4	160	36	-	18	14,5	4	22,25	•	•	•	•
1 1/8"	7	28,575	180	40	-	22	18	4	25	•	•	•	•
1 1/4"	7	31,75	180	40	-	22	18	4	28	•	•	•	•
1 3/8"	6	34,925	200	50	-	28	22	4	30,75	•	•	•	•
1 1/2"	6	38,1	200	50	-	28	22	4	34	•	•	•	•

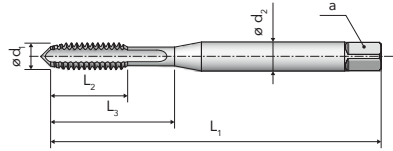


HSSE

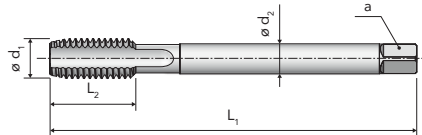
A49
NITRIDED

A49
TiCN

DIN 2184-1
≤ Ø 1/4"



DIN 2184-1
≥ Ø 5/16"



APPLICATION RANGE - CUTTING SPEED m/min

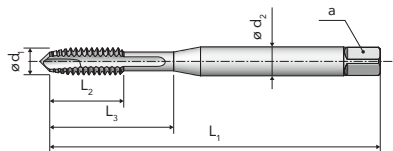
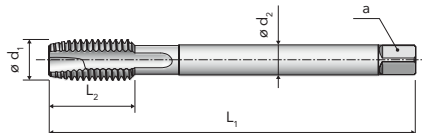
ISO	MG	A49 NITRIDED	A49 TiCN		
K	K.1	● 15-20	● 40-45		
N	N.4	● 15-20	● 40-45		
	N.7	● 15-20	● 40-45		
	N.9-10	● 20-25	● 45-50		

2BX

2BX



UNC	P [TPI]	Ød ₁ [mm]	L ₁ js 16 [mm]	L ₂ [mm]	L ₃ [mm]	Ød ₂ h9 [mm]	a h12 [mm]	z		A49 NITRIDED	A49 TiCN		
Nr.2	56	2,184	45	9	13	2,8	2,1	3	1,85	●	●		
Nr.3	48	2,515	50	9	15	2,8	2,1	3	2,1	●	●		
Nr.4	40	2,845	56	10	18	3,5	2,7	3	2,35	●	●		
Nr.5	40	3,175	56	10	18	3,5	2,7	3	2,65	●	●		
Nr.6	32	3,505	56	11	20	4	3	3	2,85	●	●		
Nr.8	32	4,166	63	13	22	4,5	3,4	3	3,5	●	●		
Nr.10	24	4,826	70	16	26,5	6	4,9	3	3,9	●	●		
Nr.12	24	5,486	80	16	26,5	6	4,9	3	4,5	●	●		
1/4"	20	6,35	80	17	30	7	5,5	3	5,1	●	●		
5/16"	18	7,938	90	18	-	6	4,9	4	6,6	●	●		
3/8"	16	9,525	100	22	-	7	5,5	4	8	●	●		
7/16"	14	11,113	100	24	-	8	6,2	4	9,4	●	●		
1/2"	13	12,7	110	26	-	9	7	4	10,8	●	●		
9/16"	12	14,288	110	28	-	11	9	4	12,2	●	●		
5/8"	11	15,875	110	28	-	12	9	4	13,5	●	●		
3/4"	10	19,05	125	32	-	14	11	4	16,5	●	●		
7/8"	9	22,225	140	32	-	18	14,5	4	19,5	●	●		
1"	8	25,4	160	36	-	18	14,5	5	22,25	●	●		
1 1/8"	7	28,575	180	40	-	22	18	5	25	●			
1 1/4"	7	31,75	180	40	-	22	18	5	28	●			
1 3/8"	6	34,925	200	50	-	28	22	5	30,75	●			
1 1/2"	6	38,1	200	50	-	28	22	5	34	●			

A19 S
BRIGHTA19 S
TiNA19 S
TiCNA19 S 3B
BRIGHTDIN 2184-1
≤ Ø 1/4"DIN 2184-1
≥ Ø 5/16"

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A19 S BRIGHT	A19 S TiN	A19 S TiCN	A19 S 3B BRIGHT
P	P.2	● 20-25	● 30-35	● 30-35	● 20-25
	P.3	● 15-20	● 25-30	● 25-30	● 15-20
	P.4	● 12-15	● 20-25	● 20-25	● 12-15
	P.5		● 10-15	● 10-15	
M	M.1		● 10-15	● 10-15	
	K.2	● 15-20	● 25-30	● 25-30	● 15-20
N	N.2-3	● 20-25	● 30-35	● 30-35	● 20-25
	N.6	● 15-18	● 25-30	● 25-30	● 15-18

2B



2B



2B



3B

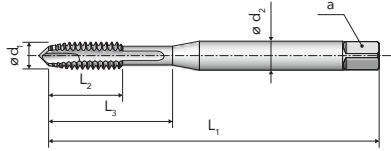


UNC	P	Ød1	L1 js 16	L2	L3	Ød2 h9	a h12	z		A19 S BRIGHT	A19 S TiN	A19 S TiCN	A19 S 3B BRIGHT
[TPI]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
Nr.2	56	2,184	45	8	13	2,8	2,1	2	1,85	●	●	●	
Nr.3	48	2,515	50	9	15	2,8	2,1	3	2,1	●	●	●	
Nr.4	40	2,845	56	10	18	3,5	2,7	3	2,35	●	●	●	
Nr.5	40	3,175	56	10	18	3,5	2,7	3	2,65	●	●	●	
Nr.6	32	3,505	56	11	20	4	3	3	2,85	●	●	●	●
Nr.8	32	4,166	63	13	22	4,5	3,4	3	3,5	●	●	●	●
Nr.10	24	4,826	70	16	26,5	6	4,9	3	3,9	●	●	●	●
Nr.12	24	5,486	80	16	26,5	6	4,9	3	4,5	●	●	●	●
1/4"	20	6,35	80	17	30	7	5,5	3	5,1	●	●	●	●
5/16"	18	7,938	90	18	-	6	4,9	3	6,6	●	●	●	●
3/8"	16	9,525	100	22	-	7	5,5	3	8	●	●	●	●
7/16"	14	11,113	100	24	-	8	6,2	3	9,4	●	●	●	●
1/2"	13	12,7	110	26	-	9	7	3	10,8	●	●	●	●
9/16"	12	14,288	110	28	-	11	9	3	12,2	●	●	●	●
5/8"	11	15,875	110	28	-	12	9	3	13,5	●	●	●	●
3/4"	10	19,05	125	32	-	14	11	4	16,5	●	●	●	●
7/8"	9	22,225	140	32	-	18	14,5	4	19,5	●	●	●	●
1"	8	25,4	160	36	-	18	14,5	4	22,25	●	●	●	
1 1/4"	7	31,75	180	40	-	22	18	4	28	●			
1 1/2"	6	38,1	200	50	-	28	22	4	34	●			

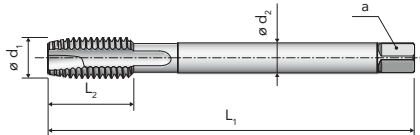


A19 S
TiX₂

DIN 2184-1
≤ Ø 1/4"



DIN 2184-1
 $\geq \varnothing 5/16''$



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A19 S TiX2			
P	P.7	● 10-15			
M	M.1	● 10-15			

2B



2,5xD

[illegible]



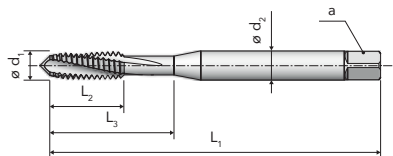
A33
BRIGHT

A33
TiN

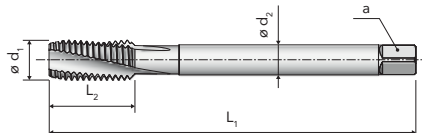
A33 3B
BRIGHT

A
SERIES

DIN 2184-1
≤ Ø 1/4"



DIN 2184-1
≥ Ø 5/16"



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A33 BRIGHT	A33 TiN	A33 3B BRIGHT
P	P.1	● 18-20	● 30-35	● 18-20
	P.2	● 15-18	● 25-30	● 15-18
	P.3	● 12-15	● 20-25	● 12-15
	P.4	● 10-12	● 15-20	● 10-12
	P.5		● 5-10	
K	K.2	● 12-15	● 20-25	● 12-15
N	N.1	● 18-20		● 18-20
	N.2-3	● 15-18	● 25-30	● 15-18
	N.5	● 15-18		● 15-18
	N.6	● 12-15	● 20-25	● 12-15

2B



2B



3B



UNC	P	Ød ₁	L ₁	L ₂	L ₃	Ød ₂	a	z	z	z	A33 BRIGHT	A33 TiN	A33 3B BRIGHT
	[TPI]	[mm]	js 16 [mm]	[mm]	[mm]	h9 [mm]	h12 [mm]	[-]	[mm]	[mm]			
Nr.2	56	2,184	45	8	13	2,8	2,1	3	1,85		●	●	
Nr.3	48	2,515	50	9	15	2,8	2,1	3	2,1		●	●	
Nr.4	40	2,845	56	10	18	3,5	2,7	3	2,35		●	●	
Nr.5	40	3,175	56	10	18	3,5	2,7	3	2,65		●	●	
Nr.6	32	3,505	56	11	20	4	3	3	2,85		●	●	●
Nr.8	32	4,166	63	13	20	4,5	3,4	3	3,5		●	●	●
Nr.10	24	4,826	70	16	26,5	6	4,9	3	3,9		●	●	●
Nr.12	24	5,486	80	16	29	6	4,9	3	4,5		●	●	●
1/4"	20	6,35	80	17	30	7	5,5	3	5,1		●	●	●
5/16"	18	7,938	90	18	-	6	4,9	3	6,6		●	●	●
3/8"	16	9,525	100	22	-	7	5,5	3	8		●	●	●
7/16"	14	11,113	100	24	-	8	6,2	3	9,4		●	●	●
1/2"	13	12,7	110	26	-	9	7	3	10,8		●	●	●
9/16"	12	14,288	110	28	-	11	9	3	12,2		●	●	●
5/8"	11	15,875	110	28	-	12	9	3	13,5		●	●	●
3/4"	10	19,05	125	32	-	14	11	4	16,5		●	●	●
7/8"	9	22,225	140	32	-	18	14,5	4	19,5		●	●	
1"	8	25,4	160	36	-	18	14,5	4	22,25		●	●	
1 1/8"	7	28,575	180	40	-	22	18	4	25		●		
1 1/4"	7	31,75	180	40	-	22	18	4	28		●		
1 3/8"	6	34,925	200	50	-	28	22	4	30,75		●		
1 1/2"	6	38,1	200	50	-	28	22	4	34		●		



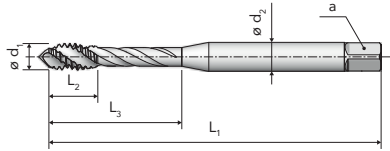
A60 S
BRIGHT

A60 S
TiN

A60 S
TiCN

A60 S
TiX2

DIN 2184-1
≤ Ø 1/4"



DIN 2184-1
≥ Ø 5/16"



A
SERIES

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A60 S BRIGHT	A60 S TiN	A60 S TiCN	A60 S TiX2
P	P.2	● 15-20	● 25-30	● 25-30	
	P.3	● 12-15	● 20-25	● 20-25	
	P.4	● 10-12	● 15-20	● 15-20	
	P.5		● 5-10	● 5-10	
	P.7		● 8-10	● 8-10	● 8-10
M	M.1		● 8-10	● 8-10	● 8-10
	M.2				● 5-7
K	K.2	● 12-15	● 20-25	● 20-25	
N	N.3	● 15-18	● 25-30	● 25-30	
	N.6	● 15-18	● 25-30	● 25-30	



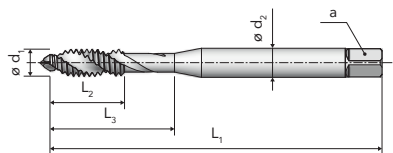
UNC	P	Ød ₁	L ₁	L ₂	L ₃	Ød ₂	a	z	z	z	A60 S BRIGHT	A60 S TiN	A60 S TiCN	A60 S TiX2
	[TPI]	[mm]	js 16 [mm]	[mm]	[mm]	h9 [mm]	h12 [mm]	[-]	[mm]	[mm]				
Nr.2	56	2,184	45	6	13	2,8	2,1	3	1,85		●	●	●	●
Nr.3	48	2,515	50	6	15	2,8	2,1	3	2,1		●	●	●	●
Nr.4	40	2,845	56	6,5	21	3,5	2,7	3	2,35		●	●	●	●
Nr.5	40	3,175	56	6,5	21	3,5	2,7	3	2,65		●	●	●	●
Nr.6	32	3,505	56	7,5	22,5	4	3	3	2,85		●	●	●	●
Nr.8	32	4,166	63	7,5	26	4,5	3,4	3	3,5		●	●	●	●
Nr.10	24	4,826	70	10	28,5	6	4,9	3	3,9		●	●	●	●
Nr.12	24	5,486	80	10	28,5	6	4,9	3	4,5		●	●	●	●
1/4"	20	6,35	80	11,5	32	7	5,5	3	5,1		●	●	●	●
5/16"	18	7,938	90	13	-	6	4,9	3	6,6		●	●	●	●
3/8"	16	9,525	100	14	-	7	5,5	3	8		●	●	●	●
7/16"	14	11,113	100	17	-	8	6,2	3	9,4		●	●	●	●
1/2"	13	12,7	110	19	-	9	7	4	10,8		●	●	●	●
9/16"	12	14,288	110	21	-	11	9	4	12,2		●	●	●	●
5/8"	11	15,875	110	22,5	-	12	9	4	13,5		●	●	●	●
3/4"	10	19,05	125	26	-	14	11	4	16,5		●	●	●	●
7/8"	9	22,225	140	30	-	18	14,5	4	19,5		●	●	●	●
1"	8	25,4	160	36,5	-	18	14,5	4	22,25		●	●	●	●
1 1/4"	7	31,75	180	42	-	22	18	5	28		●			
1 1/2"	6	38,1	200	49	-	28	22	5	34		●			



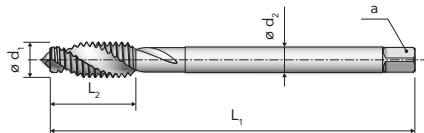
A65
BRIGHT

A
SERIES

DIN 2184-1
≤ Ø 1/4"



DIN 2184-1
 $\geq \varnothing 5/16''$



APPLICATION RANGE - CUTTING SPEED m/min

2B



2,5xD



ISO	MG	A65 BRIGHT			
N	N.1-2	● 12-15			
	N.5-6	● 10-15			
S	S.1	● 6-8			
	S.3	● 6-8			

[illegible]

HAND TAPS for blind and through holes
In sets of two pieces



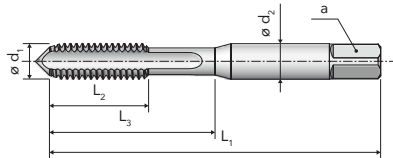
HSS

A8
ROUGHING

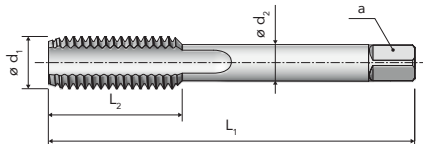
A8
FINISHING

A8
SET

DIN 2184-2
≤ Ø 1/4"



DIN 2184-2
≥ Ø 5/16"

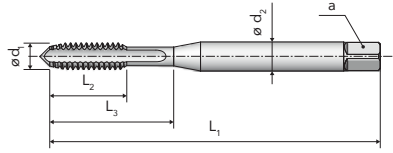
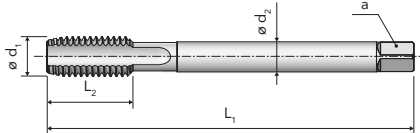


APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A8 ROUGHING	A8 FINISHING	A8 SET
P	P.1-4	•	•	•
	P.7	•	•	•
K	K.2	•	•	•
N	N.1-3	•	•	•
	N.5-7	•	•	•



UNF	P	Ød ₁	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A8 ROUGHING	A8 FINISHING	A8 SET
[TPI]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]			
Nr.2	64	2,184	36	9	15	2,8	2,1	3	1,85	•	•	•
Nr.3	56	2,515	40	9	15	2,8	2,1	3	2,15	•	•	•
Nr.4	48	2,845	40	10	18	3,5	2,7	3	2,4	•	•	•
Nr.5	44	3,175	40	10	18	3,5	2,7	3	2,7	•	•	•
Nr.6	40	3,505	45	11	20	4	3	3	2,95	•	•	•
Nr.8	36	4,166	45	12	21	4,5	3,4	3	3,5	•	•	•
Nr.10	32	4,826	50	14	23	6	4,9	3	4,1	•	•	•
Nr.12	28	5,486	56	16	28	6	4,9	3	4,6	•	•	•
1/4"	28	6,35	56	16	28	6	4,9	3	5,5	•	•	•
5/16"	24	7,938	63	18	-	6	4,9	3	6,9	•	•	•
3/8"	24	9,525	63	18	-	7	5,5	3	8,5	•	•	•
7/16"	20	11,113	70	20	-	8	6,2	3	9,9	•	•	•
1/2"	20	12,7	70	20	-	9	7	4	11,5	•	•	•
9/16"	18	14,288	70	22	-	11	9	4	12,9	•	•	•
5/8"	18	15,875	70	22	-	12	9	4	14,5	•	•	•
3/4"	16	19,05	80	22	-	14	11	4	17,5	•	•	•
7/8"	14	22,225	80	22	-	18	14,5	4	20,4	•	•	•
1"	12	25,4	90	22	-	18	14,5	4	23,25	•	•	•
1 1/8"	12	28,575	90	22	-	22	18	4	26,5	•	•	•
1 1/4"	12	31,75	90	22	-	22	18	4	29,5	•	•	•

A28 FC
BRIGHTA28 FC
TiNA28 FP
BRIGHTA28 FP
TiNDIN 2184-1
≤ Ø 1/4"DIN 2184-1
≥ Ø 5/16"

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A28 FC BRIGHT	A28 FC TiN	A28 FP BRIGHT	A28 FP TiN
P	P.1		• 20-25		• 20-25
	P.2	• 10-12	• 15-20	• 10-12	• 15-20
	P.3	• 8-10	• 12-15	• 8-10	• 12-15
K	K.2	• 8-10	• 12-15	• 8-10	• 12-15
N	N.1		• 20-25		• 20-25
	N.5		• 15-20		• 15-20

2B

2B

2B

2B



UNF	P	Ød ₁	L ₁	L ₂	L ₃	Ød ₂	a	z	Ø	A28 FC BRIGHT	A28 FC TiN	A28 FP BRIGHT	A28 FP TiN
	[TPI]	[mm]	js 16 [mm]	[mm]	[mm]	h9 [mm]	h12 [mm]	[-]	[mm]				
Nr.2	64	2,184	45	9	13	2,8	2,1	3	1,85	•	•	•	•
Nr.3	56	2,515	50	9	15	2,8	2,1	3	2,15	•	•	•	•
Nr.4	48	2,845	56	10	18	3,5	2,7	3	2,4	•	•	•	•
Nr.5	44	3,175	56	10	18	3,5	2,7	3	2,7	•	•	•	•
Nr.6	40	3,505	56	11	20	4	3	3	2,95	•	•	•	•
Nr.8	36	4,166	63	12	21	4,5	3,4	3	3,5	•	•	•	•
Nr.10	32	4,826	70	14	24,5	6	4,9	3	4,1	•	•	•	•
Nr.12	28	5,486	80	16	26,5	6	4,9	3	4,6	•	•	•	•
1/4"	28	6,35	80	16	30	7	5,5	3	5,5	•	•	•	•
5/16"	24	7,938	90	18	-	6	4,9	3	6,9	•	•	•	•
3/8"	24	9,525	90	18	-	7	5,5	3	8,5	•	•	•	•
7/16"	20	11,113	100	20	-	8	6,2	3	9,9	•	•	•	•
1/2"	20	12,7	100	22	-	9	7	3	11,5	•	•	•	•
9/16"	18	14,288	100	22	-	11	9	3	12,9	•	•	•	•
5/8"	18	15,875	100	22	-	12	9	3	14,5	•	•	•	•
3/4"	16	19,05	110	25	-	14	11	4	17,5	•	•	•	•
7/8"	14	22,225	125	25	-	18	14,5	4	20,4	•	•	•	•
1"	12	25,4	140	28	-	18	14,5	4	23,25	•	•	•	•
1 1/8"	12	28,575	150	28	-	22	18	4	26,5	•	•	•	•
1 1/4"	12	31,75	150	28	-	22	18	4	29,5	•	•	•	•
1 3/8"	12	34,925	170	30	-	28	22	4	32,75	•	•	•	•
1 1/2"	12	38,1	170	30	-	28	22	5	36	•	•	•	•

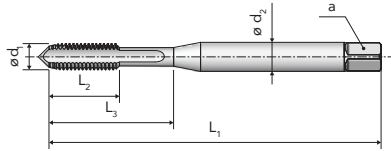
MACHINE TAPS for blind and through holes
Straight flutes / for cast iron



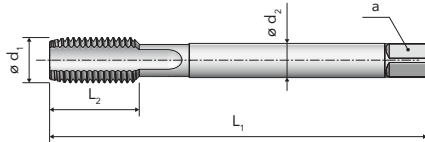
A50
NITRIDED

A50
TiCN

DIN 2184-1
≤ Ø 1/4"



DIN 2184-1
≥ Ø 5/16"



APPLICATION RANGE - CUTTING SPEED m/min

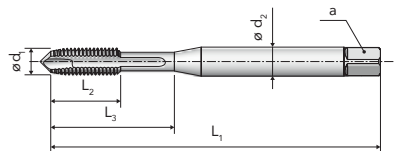
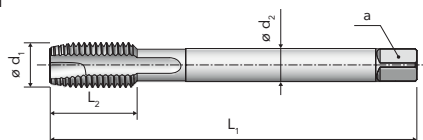
ISO	MG	A50 NITRIDED	A50 TiCN		
K	K.1	● 15-20	● 40-45		
N	N.4	● 15-20	● 40-45		
	N.7	● 15-20	● 40-45		
	N.9-10	● 20-25	● 45-50		

2BX

2BX



UNF	P [TPI]	Ød ₁ [mm]	L ₁ js 16 [mm]	L ₂ [mm]	L ₃ [mm]	Ød ₂ h9 [mm]	a h12 [mm]	z		A50 NITRIDED	A50 TiCN		
Nr.8	36	4,166	63	12	21	4,5	3,4	3	3,5	●	●		
Nr.10	32	4,826	70	14	24,5	6	4,9	3	4,1	●	●		
Nr.12	28	5,486	80	16	26,5	6	4,9	3	4,6	●	●		
1/4"	28	6,35	80	16	30	7	5,5	3	5,5	●	●		
5/16"	24	7,938	90	18	-	6	4,9	4	6,9	●	●		
3/8"	24	9,525	90	18	-	7	5,5	4	8,5	●	●		
7/16"	20	11,113	100	20	-	8	6,2	4	9,9	●	●		
1/2"	20	12,7	100	22	-	9	7	4	11,5	●	●		
9/16"	18	14,288	100	22	-	11	9	4	12,9	●	●		
5/8"	18	15,875	100	22	-	12	9	4	14,5	●	●		
3/4"	16	19,05	110	25	-	14	11	4	17,5	●	●		
7/8"	14	22,225	125	25	-	18	14,5	4	20,4	●	●		
1"	12	25,4	140	28	-	18	14,5	5	23,25	●	●		
1 1/8"	12	28,575	150	28	-	22	18	5	26,5	●			
1 1/4"	12	31,75	150	28	-	22	18	5	29,5	●			
1 3/8"	12	34,925	170	30	-	28	22	5	32,75	●			
1 1/2"	12	38,1	170	30	-	28	22	5	36	●			

A20 S
BRIGHTA20 S
TiNA20 S
TiCNA20 S 3B
BRIGHTA
SERIESDIN 2184-1
≤ Ø 1/4"DIN 2184-1
≥ Ø 5/16"

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A20 S BRIGHT	A20 S TiN	A20 S TiCN	A20 S 3B BRIGHT
P	P.2	● 20-25	● 30-35	● 30-35	● 20-25
	P.3	● 15-20	● 25-30	● 25-30	● 15-20
	P.4	● 12-15	● 20-25	● 20-25	● 12-15
	P.5		● 10-15	● 10-15	
M	M.1		● 10-15	● 10-15	
	M.2	● 15-20	● 25-30	● 25-30	● 15-20
N	N.2-3	● 20-25	● 30-35	● 30-35	● 20-25
	N.6	● 15-18	● 25-30	● 25-30	● 15-18

2B

2B

2B

3B

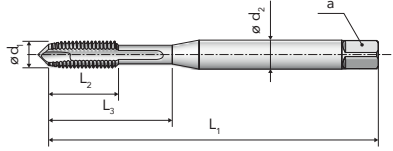


UNF	P [TPI]	Ød1 [mm]	L1 js 16 [mm]	L2 [mm]	L3 [mm]	Ød2 h9 [mm]	a h12 [mm]	z [-]		A20 S BRIGHT	A20 S TiN	A20 S TiCN	A20 S 3B BRIGHT
Nr.2	64	2,184	45	8	13	2,8	2,1	2	1,85	●	●	●	
Nr.3	56	2,515	50	9	15	2,8	2,1	3	2,15	●	●	●	
Nr.4	48	2,845	56	10	18	3,5	2,7	3	2,4	●	●	●	
Nr.5	44	3,175	56	10	18	3,5	2,7	3	2,7	●	●	●	
Nr.6	40	3,505	56	11	20	4	3	3	2,95	●	●	●	●
Nr.8	36	4,166	63	12	21	4,5	3,4	3	3,5	●	●	●	●
Nr.10	32	4,826	70	14	24,5	6	4,9	3	4,1	●	●	●	●
Nr.12	28	5,486	80	16	26,5	6	4,9	3	4,6	●	●	●	●
1/4"	28	6,35	80	16	30	7	5,5	3	5,5	●	●	●	●
5/16"	24	7,938	90	18	-	6	4,9	3	6,9	●	●	●	●
3/8"	24	9,525	90	18	-	7	5,5	3	8,5	●	●	●	●
7/16"	20	11,113	100	20	-	8	6,2	3	9,9	●	●	●	●
1/2"	20	12,7	100	22	-	9	7	4	11,5	●	●	●	●
9/16"	18	14,288	100	22	-	11	9	4	12,9	●	●	●	●
5/8"	18	15,875	100	22	-	12	9	4	14,5	●	●	●	●
3/4"	16	19,05	110	25	-	14	11	4	17,5	●	●	●	●
7/8"	14	22,225	125	25	-	18	14,5	4	20,4	●	●	●	●
1"	12	25,4	140	28	-	18	14,5	4	23,25	●	●	●	
1 1/4"	12	31,75	150	28	-	22	18	4	29,5	●			
1 1/2"	12	38,1	170	30	-	28	22	5	36	●			

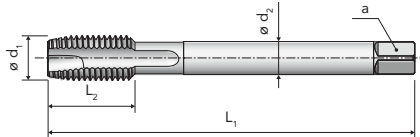


A20 S
TiX2

DIN 2184-1
≤ Ø 1/4"



DIN 2184-1
 $\geq \varnothing 5/16''$



APPLICATION RANGE - CUTTING SPEED m/min

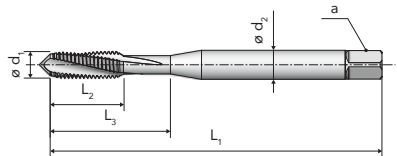
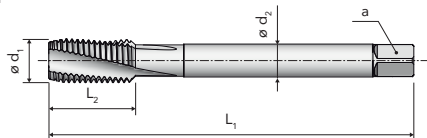
ISO	MG	A20 S TiX2			
P	P.7	● 10-15			
M	M.1	● 10-15			

2B



2,5xD



A34
BRIGHTA34
TiNA34 3B
BRIGHTDIN 2184-1
≤ Ø 1/4"DIN 2184-1
≥ Ø 5/16"

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A34 BRIGHT	A34 TiN	A34 3B BRIGHT	
P	P.1	● 18-20	● 30-35	● 18-20	
	P.2	● 15-18	● 25-30	● 15-18	
	P.3	● 12-15	● 20-25	● 12-15	
	P.4	● 10-12	● 15-20	● 10-12	
	P.5		● 5-10		
K	K.2	● 12-15	● 20-25	● 12-15	
N	N.1	● 18-20		● 18-20	
	N.2-3	● 15-18	● 25-30	● 15-18	
	N.5	● 15-18		● 15-18	
	N.6	● 12-15	● 20-25	● 12-15	

2B



2B



3B



UNF	P	Ød ₁	L ₁	L ₂	L ₃	Ød ₂	a	z		A34 BRIGHT	A34 TiN	A34 3B BRIGHT
	[TPI]	[mm]	js 16 [mm]	[mm]	[mm]	h9 [mm]	h12 [mm]	[-]	[mm]			
Nr.2	64	2,184	45	8	13	2,8	2,1	3	1,85	●	●	
Nr.3	56	2,515	50	9	15	2,8	2,1	3	2,15	●	●	
Nr.4	48	2,845	56	10	18	3,5	2,7	3	2,4	●	●	
Nr.5	44	3,175	56	10	18	3,5	2,7	3	2,7	●	●	
Nr.6	40	3,505	56	11	20	4	3	3	2,95	●	●	●
Nr.8	36	4,166	63	12	21	4,5	3,4	3	3,5	●	●	●
Nr.10	32	4,826	70	14	24,5	6	4,9	3	4,1	●	●	●
Nr.12	28	5,486	80	16	26,5	6	4,9	3	4,6	●	●	●
1/4"	28	6,35	80	16	30	7	5,5	3	5,5	●	●	●
5/16"	24	7,938	90	18	-	6	4,9	3	6,9	●	●	●
3/8"	24	9,525	90	18	-	7	5,5	3	8,5	●	●	●
7/16"	20	11,113	100	20	-	8	6,2	3	9,9	●	●	●
1/2"	20	12,7	100	22	-	9	7	3	11,5	●	●	●
9/16"	18	14,288	100	22	-	11	9	3	12,9	●	●	●
5/8"	18	15,875	100	22	-	12	9	3	14,5	●	●	●
3/4"	16	19,05	110	25	-	14	11	4	17,5	●	●	●
7/8"	14	22,225	125	25	-	18	14,5	4	20,4	●	●	
1"	12	25,4	140	28	-	18	14,5	4	23,25	●	●	
1 1/8"	12	28,575	150	28	-	22	18	4	26,5	●		
1 1/4"	12	31,75	150	28	-	22	18	4	29,5	●		
1 3/8"	12	34,925	170	30	-	28	22	5	32,75	●		
1 1/2"	12	38,1	170	30	-	28	22	5	36	●		

MACHINE TAPS for blind holes
40° spiral flutes / back tapered



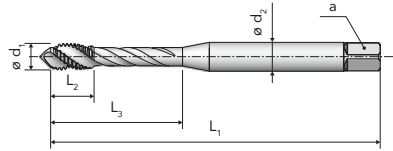
A61 S
BRIGHT

A61 S
TiN

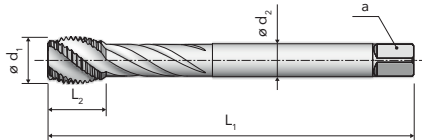
A61 S
TiCN

A61 S
TiX2

DIN 2184-1
≤ Ø 1/4"



DIN 2184-1
≥ Ø 5/16"



A
SERIES

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A61 S BRIGHT	A61 S TiN	A61 S TiCN	A61 S TiX2
P	P.2	● 15-20	● 25-30	● 25-30	
	P.3	● 12-15	● 20-25	● 20-25	
	P.4	● 10-12	● 15-20	● 15-20	
	P.5		● 5-10	● 5-10	
	P.7		● 8-10	● 8-10	● 8-10
M	M.1		● 8-10	● 8-10	● 8-10
	M.2				● 5-7
K	K.2	● 12-15	● 20-25	● 20-25	
N	N.3	● 15-18	● 25-30	● 25-30	
	N.6	● 15-18	● 25-30	● 25-30	

2B



2B



2B



2B



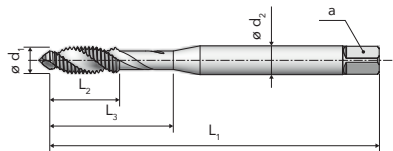
UNF	P	Ød ₁	L ₁	L ₂	L ₃	Ød ₂	a	z	z		A61 S BRIGHT	A61 S TiN	A61 S TiCN	A61 S TiX2
	[TPI]	[mm]	js 16 [mm]	[mm]	[mm]	h9 [mm]	h12 [mm]	[-]	[mm]					
Nr.2	64	2,184	45	5,5	13	2,8	2,1	3	1,85		●	●	●	
Nr.3	56	2,515	50	6	18	2,8	2,1	3	2,15		●	●	●	
Nr.4	48	2,845	56	6	18	3,5	2,7	3	2,4		●	●	●	
Nr.5	44	3,175	56	6	18	3,5	2,7	3	2,7		●	●	●	
Nr.6	40	3,505	56	6,5	22	4	3	3	2,95		●	●	●	●
Nr.8	36	4,166	63	7	26,5	4,5	3,4	3	3,5		●	●	●	●
Nr.10	32	4,826	70	8	29	6	4,9	3	4,1		●	●	●	●
Nr.12	28	5,486	80	9	29,5	6	4,9	3	4,6		●	●	●	●
1/4"	28	6,35	80	10	32	7	5,5	3	5,5		●	●	●	●
5/16"	24	7,938	90	11	-	6	4,9	3	6,9		●	●	●	●
3/8"	24	9,525	90	12	-	7	5,5	3	8,5		●	●	●	●
7/16"	20	11,113	100	13,5	-	8	6,2	3	9,9		●	●	●	●
1/2"	20	12,7	100	14,5	-	9	7	4	11,5		●	●	●	●
9/16"	18	14,288	100	15,5	-	11	9	4	12,9		●	●	●	●
5/8"	18	15,875	100	16	-	12	9	4	14,5		●	●	●	●
3/4"	16	19,05	110	18	-	14	11	4	17,5		●	●	●	●
7/8"	14	22,225	125	23,5	-	18	14,5	4	20,4		●	●	●	●
1"	12	25,4	140	26	-	18	14,5	4	23,25		●	●	●	●
1 1/4"	12	31,75	150	26	-	22	18	5	29,5		●			
1 1/2"	12	38,1	170	29	-	28	22	5	36		●			



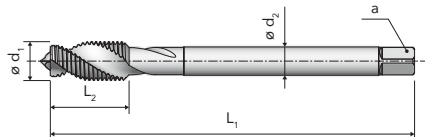
A66
BRIGHT

A
SERIES

DIN 2184-1
≤ Ø 1/4"



DIN 2184-1
 $\geq \varnothing 5/16''$



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A66 BRIGHT			
N	N.1-2	● 12-15			
	N.5-6	● 10-15			
S	S.1	● 6-8			
	S.3	● 6-8			

2B

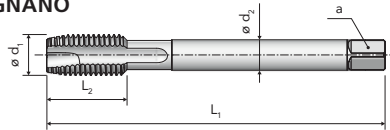
[illegible]



A119
BRIGHT

A119
TiN

NORM VERGNANO



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A119 BRIGHT	A119 TiN		
P	P.2	● 20-25	● 30-35		
	P.3	● 15-20	● 25-30		
	P.4	● 12-15	● 20-25		
	P.5		● 10-15		
	P.7		● 10-15		
M	M.1		● 10-15		
K	K.2	● 15-20	● 25-30		
N	N.2-3	● 20-25	● 30-35		
	N.6	● 15-18	● 25-30		

2B

2B



2,5xD





A160
BRIGHT

A160
TiN

NORM VERGNANO



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A160 BRIGHT	A160 TiN		
P	P.2	● 15-20	● 25-30		
	P.3	● 12-15	● 20-25		
	P.4	● 10-12	● 15-20		
	P.5		● 5-10		
	P.7		● 8-10		
M	M.1		● 8-10		
K	K.2	● 12-15	● 20-25		
N	N.3	● 15-18	● 25-30		
	N.6	● 15-18	● 25-30		

2B

2B





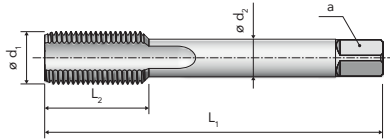
HSS

A5
ROUGHING

A5 FINISHING

A5
SET

DIN 5157



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A5 ROUGHING	A5 FINISHING	A5 SET	
P	P.1-4	●	●	●	
	P.7	●	●	●	
K	K.2	●	●	●	
N	N.1-3	●	●	●	
	N.5-7	●	●	●	



G	P	Ød ₁	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A5 ROUGHING	A5 FINISHING	A5 SET	
	[TPI]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
1/8"	28	9,728	63	18	-	7	5,5	3	8,8	●	●	●	
1/4"	19	13,157	70	20	-	11	9	4	11,8	●	●	●	
3/8"	19	16,662	70	20	-	12	9	4	15,25	●	●	●	
1/2"	14	20,955	80	22	-	16	12	4	19	●	●	●	
5/8"	14	22,911	80	22	-	18	14,5	4	21	●	●	●	
3/4"	14	26,441	90	22	-	20	16	4	24,5	●	●	●	
7/8"	14	30,201	90	22	-	22	18	4	28,25	●	●	●	
1"	11	33,249	100	25	-	25	20	4	30,75	●	●	●	
1 1/8"	11	37,897	125	32	-	28	22	5	35,5	●	●	●	
1 1/4"	11	41,91	125	32	-	32	24	5	39,5	●	●	●	
1 1/2"	11	47,803	140	32	-	36	29	6	45,25	●	●	●	
1 3/4"	11	53,746	140	36	-	40	32	6	51	●	●	●	
2"	11	59,614	160	36	-	45	35	6	57	●	●	●	

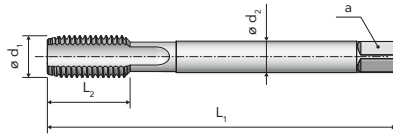


HSSE

A26 FC
BRIGHT

A26 FP
BRIGHT

DIN 5156



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A26 FC BRIGHT	A26 FP BRIGHT		
P	P.2	● 10-12	● 10-12		
	P.3	● 8-10	● 8-10		
K	K.2	● 8-10	● 8-10		

**ISO
5969**

**ISO
5969**

[illegible]

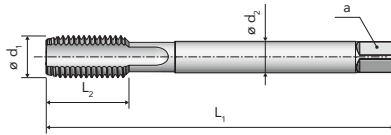


HSSE

A48
NITRIDED

A48
TiCN

DIN 5156



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A48 NITRIDED	A48 TiCN		
K	K.1	● 15-20	● 40-45		
N	N.4	● 15-20	● 40-45		
	N.7	● 15-20	● 40-45		
	N.9-10	● 20-25	● 45-50		

ISO
5969 X

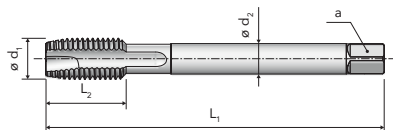
ISO
5969 X



G	P	Ød ₁	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A48 NITRIDED	A48 TiCN		
	[TPI]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
1/8"	28	9,728	90	18	-	7	5,5	4	8,8	●	●		
1/4"	19	13,157	100	22	-	11	9	4	11,8	●	●		
3/8"	19	16,662	100	22	-	12	9	4	15,25	●	●		
1/2"	14	20,955	125	25	-	16	12	4	19	●	●		
5/8"	14	22,911	125	25	-	18	14,5	4	21	●	●		
3/4"	14	26,441	140	28	-	20	16	5	24,5	●	●		
7/8"	14	30,201	150	28	-	22	18	5	28,25	●	●		
1"	11	33,249	160	30	-	25	20	5	30,75	●	●		
1 1/8"	11	37,897	170	30	-	28	22	6	35,5	●			
1 1/4"	11	41,91	170	30	-	32	24	6	39,5	●			
1 1/2"	11	47,803	190	32	-	36	29	6	45,25	●			

A18 S
BRIGHTA18 S
VAPA18 S
TiCNA18 S
TiX2

DIN 5156



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A18 S BRIGHT	A18 S VAP	A18 S TiCN	A18 S TiX2
P	P.2	• 20-25	• 20-25	• 30-35	
	P.3	• 15-20	• 15-20	• 25-30	
	P.4	• 12-15	• 12-15	• 20-25	
	P.5			• 10-15	
	P.7			• 10-15	• 10-15
M	M.1			• 10-15	• 10-15
K	K.2	• 15-20	• 15-20	• 25-30	
N	N.2-3	• 20-25	• 20-25	• 30-35	
	N.6	• 15-18	• 15-18	• 25-30	

ISO
5969ISO
5969ISO
5969ISO
5969

B (4-5)

B (4-5)

B (4-5)

B (4-5)

2,5xD

2,5xD

2,5xD

2,5xD

RH

RH

RH

RH

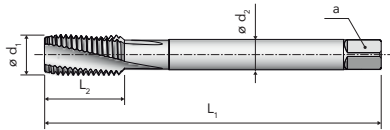
G	P	Ød ₁	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A18 S BRIGHT	A18 S VAP	A18 S TiCN	A18 S TiX2
[TPI]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
1/8"	28	9,728	90	18	-	7	5,5	4	8,8	•	•	•	•
1/4"	19	13,157	100	22	-	11	9	4	11,8	•	•	•	•
3/8"	19	16,662	100	22	-	12	9	4	15,25	•	•	•	•
1/2"	14	20,955	125	25	-	16	12	4	19	•	•	•	•
5/8"	14	22,911	125	25	-	18	14,5	4	21	•	•	•	•
3/4"	14	26,441	140	28	-	20	16	4	24,5	•	•	•	•
7/8"	14	30,201	150	28	-	22	18	4	28,25	•	•	•	•
1"	11	33,249	160	30	-	25	20	4	30,75	•	•	•	•
1 1/8"	11	37,897	170	30	-	28	22	5	35,5	•			
1 1/4"	11	41,91	170	30	-	32	24	5	39,5	•			
1 1/2"	11	47,803	190	32	-	36	29	5	45,25	•			



A32
BRIGHT

A32
TiN

DIN 5156



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A32 BRIGHT	A32 TiN		
P	P.1	● 18-20	● 30-35		
	P.2	● 15-18	● 25-30		
	P.3	● 12-15	● 20-25		
	P.4	● 10-12	● 15-20		
	P.5		● 5-10		
K	K.2	● 12-15	● 20-25		
N	N.1	● 18-20			
	N.2-3	● 15-18	● 25-30		
	N.5	● 15-18			
	N.6	● 12-15	● 20-25		

**ISO
5969**

**ISO
5969**

[illegible]



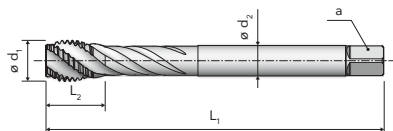
A59 S
BRIGHT

A59 S
VAP

A59 S
TiN

A59 S
TiCN

DIN 5156



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A59 S BRIGHT	A59 S VAP	A59 S TiN	A59 S TiCN
P	P.2	● 15-20	● 15-20	● 25-30	● 25-30
	P.3	● 12-15	● 12-15	● 20-25	● 20-25
	P.4	● 10-12	● 10-12	● 15-20	● 15-20
	P.5			● 5-10	● 5-10
	P.7			● 8-10	● 8-10
M	M.1			● 8-10	● 8-10
K	K.2	● 12-15	● 12-15	● 20-25	● 20-25
N	N.3	● 15-18	● 15-18	● 25-30	● 25-30
	N.6	● 15-18	● 15-18	● 25-30	● 25-30

**ISO
5969**



**ISO
5969**



**ISO
5969**



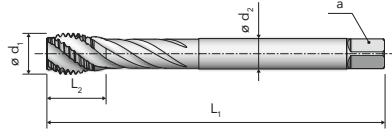
**ISO
5969**

[illegible]



A59 S
TiX2

DIN 5156



A SERIES

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A59 S TiX2			
P	P.7	● 8-10			
M	M.1	● 8-10			
	M.2	● 5-7			

**ISO
5969**

[illegible]

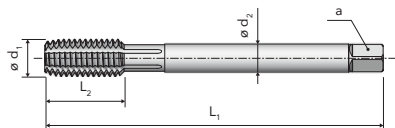


HSSE

A82 N
TiN

A82 N
TiCN

DIN 2189



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A82 N TiN	A82 N TiCN		
P	P.1-2	● 40-45	● 40-45		
	P.3	● 35-40	● 35-40		
N	N.1-2	● 40-45	● 40-45		
	N.3	● 35-40	● 35-40		
	N.5-6	● 40-45	● 40-45		

ISO
5969 X

ISO
5969 X

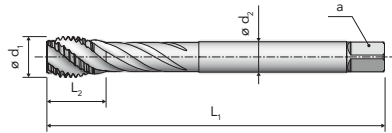
[illegible]



A159 S
BRIGHT

A159 S
TiN

DIN 5156



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A159 S BRIGHT	A159 S TiN		
P	P.2	● 15-20	● 25-30		
	P.3	● 12-15	● 20-25		
	P.4	● 10-12	● 15-20		
	P.5		● 5-10		
	P.7		● 8-10		
M	M.1		● 8-10		
K	K.2	● 12-15	● 20-25		
N	N.3	● 15-18	● 25-30		
	N.6	● 15-18	● 25-30		

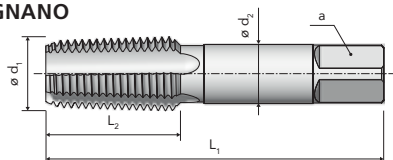
[illegible]



HSSE

A6
BRIGHT

NORM VERGNANO



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A6 BRIGHT			
P	P.2	● 10-15			
	P.3	● 10-12			
	P.4	● 8-10			
K	K.2	● 10-12			

[illegible]

(a) = Cylindrical hole (see page 256)



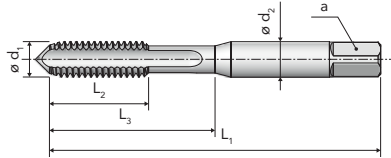
A4
ROUGHING

A4
SECOND

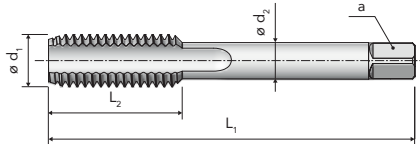
A4
FINISHING

A4
SET

DIN 2184-2
≤ Ø 1/4"



DIN 2184-2
≥ Ø 5/16"



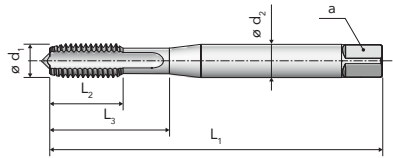
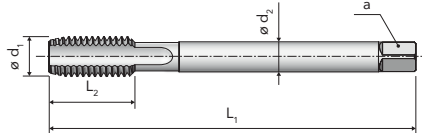
A
SERIES

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A4 ROUGHING	A4 SECOND	A4 FINISHING	A4 SET
P	P.1-4	•	•	•	•
	P.7	•	•	•	•
K	K.2	•	•	•	•
N	N.1-3	•	•	•	•
	N.5-7	•	•	•	•



BSW	P [TPI]	Ød ₁ [mm]	L ₁ js 16 [mm]	L ₂ [mm]	L ₃ [mm]	Ød ₂ h9 [mm]	a h12 [mm]	z		A4 ROUGHING	A4 SECOND	A4 FINISHING	A4 SET
3/32"	48	2,381	40	9	15	2,8	2,1	3	1,9	•	•	•	•
1/8"	40	3,175	40	10	18	3,5	2,7	3	2,55	•	•	•	•
5/32"	32	3,969	45	12	21	4,5	3,4	3	3,2	•	•	•	•
3/16"	24	4,763	50	14	23	6	4,9	3	3,7	•	•	•	•
7/32"	24	5,556	56	16	28	6	4,9	3	4,5	•	•	•	•
1/4"	20	6,35	56	16	28	6	4,9	3	5,1	•	•	•	•
5/16"	18	7,938	63	22	-	6	4,9	3	6,5	•	•	•	•
3/8"	16	9,525	70	24	-	7	5,5	3	7,9	•	•	•	•
7/16"	14	11,113	70	24	-	8	6,2	3	9,25	•	•	•	•
1/2"	12	12,7	75	28	-	9	7	4	10,5	•	•	•	•
9/16"	12	14,288	80	28	-	11	9	4	12	•	•	•	•
5/8"	11	15,875	80	30	-	12	9	4	13,5	•	•	•	•
3/4"	10	19,05	95	32	-	14	11	4	16,4	•	•	•	•
7/8"	9	22,225	100	32	-	18	14,5	4	19,25	•	•	•	•
1"	8	25,4	110	36	-	18	14,5	4	22	•	•	•	•
1 1/8"	7	28,575	125	40	-	22	18	4	24,75	•	•	•	•
1 1/4"	7	31,75	125	40	-	22	18	4	27,75	•	•	•	•

A24 FC
BRIGHTA24 FP
BRIGHTDIN 2184-1
≤ Ø 3/8"DIN 2184-1
≥ Ø 7/16"

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A24 FC BRIGHT	A24 FP BRIGHT		
P	P.2	• 10-12	• 10-12		
	P.3	• 8-10	• 8-10		
K	K.2	• 8-10	• 8-10		

mc

mc



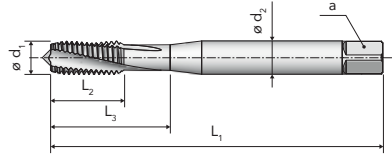
BSW	P [TPI]	Ød1 [mm]	L1 js 16 [mm]	L2 [mm]	L3 [mm]	Ød2 h9 [mm]	a h12 [mm]	z		A24 FC BRIGHT	A24 FP BRIGHT		
3/32"	48	2,381	50	9	15	2,8	2,1	3	1,9	•	•		
1/8"	40	3,175	56	11	17	3,5	2,7	3	2,55	•	•		
5/32"	32	3,969	63	12	21	4,5	3,4	3	3,2	•	•		
3/16"	24	4,763	70	14	24	6	4,9	3	3,7	•	•		
7/32"	24	5,556	80	15	28	6	4,9	3	4,5	•	•		
1/4"	20	6,35	80	16	29	7	5,5	3	5,1	•	•		
5/16"	18	7,938	90	18	33	8	6,2	3	6,5	•	•		
3/8"	16	9,525	100	20	36	10	8	3	7,9	•	•		
7/16"	14	11,113	100	22	-	8	6,2	3	9,25	•	•		
1/2"	12	12,7	110	25	-	9	7	3	10,5	•	•		
9/16"	12	14,288	110	27	-	11	9	3	12	•	•		
5/8"	11	15,875	110	28	-	12	9	3	13,5	•	•		
3/4"	10	19,05	125	32	-	14	11	4	16,4	•	•		
7/8"	9	22,225	140	32	-	18	14,5	4	19,25	•	•		
1"	8	25,4	160	36	-	18	14,5	4	22	•	•		
1 1/8"	7	28,575	180	40	-	22	18	4	24,75	•	•		
1 1/4"	7	31,75	180	40	-	22	18	4	27,75	•	•		



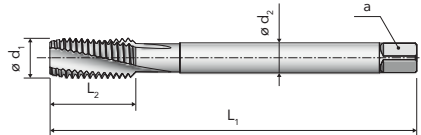
A31
BRIGHT

A31
TiN

DIN 2184-1
≤ Ø 3/8"



DIN 2184-1
≥ Ø 7/16"



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A31 BRIGHT	A31 TiN		
P	P.1	● 18-20	● 30-35		
	P.2	● 15-18	● 25-30		
	P.3	● 12-15	● 20-25		
	P.4	● 10-12	● 15-20		
	P.5		● 5-10		
K	K.2	● 12-15	● 20-25		
N	N.1	● 18-20			
	N.2-3	● 15-18	● 25-30		
	N.5	● 15-18			
	N.6	● 12-15	● 20-25		

mc

mc

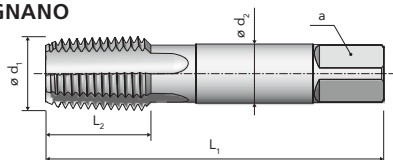


BSW	P	Ød1	L1 js 16	L2	L3	Ød2 h9	a h12	z		A31 BRIGHT	A31 TiN		
[TPI]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
3/32"	48	2,381	50	9	15	2,8	2,1	3	1,9	●	●		
1/8"	40	3,175	56	11	17	3,5	2,7	3	2,55	●	●		
5/32"	32	3,969	63	12	21	4,5	3,4	3	3,2	●	●		
3/16"	24	4,763	70	14	24	6	4,9	3	3,7	●	●		
7/32"	24	5,556	80	15	28	6	4,9	3	4,5	●	●		
1/4"	20	6,35	80	16	29	7	5,5	3	5,1	●	●		
5/16"	18	7,938	90	18	33	8	6,2	3	6,5	●	●		
3/8"	16	9,525	100	20	36	10	8	3	7,9	●	●		
7/16"	14	11,113	100	22	-	8	6,2	3	9,25	●	●		
1/2"	12	12,7	110	25	-	9	7	3	10,5	●	●		
9/16"	12	14,288	110	27	-	11	9	3	12	●	●		
5/8"	11	15,875	110	28	-	12	9	3	13,5	●	●		
3/4"	10	19,05	125	32	-	14	11	4	16,4	●	●		
7/8"	9	22,225	140	32	-	18	14,5	4	19,25	●	●		
1"	8	25,4	160	36	-	18	14,5	4	22	●	●		
1 1/8"	7	28,575	180	40	-	22	18	4	24,75	●			
1 1/4"	7	31,75	180	40	-	22	18	4	27,75	●			



A6 B
BRIGHT

NORM VERGNANO



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A6 B BRIGHT			
P	P.2	● 10-15			
	P.3	● 10-12			
	P.4	● 8-10			
K	K.2	● 10-12			

[illegible]

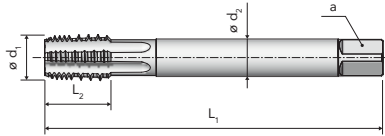
(a) = Cylindrical hole (see page 256)



HSSE

A6 BZ
BRIGHT

DIN 374



A SERIES

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A6 BZ BRIGHT			
P	P.1	● 12-15			
	P.7	● 2-3			
M	M.1	● 2-3			
N	N.1-2	● 12-15			
	N.5	● 10-12			
	N.6	● 6-8			

[illegible]

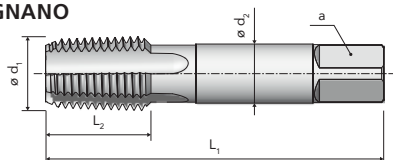
(a) = Cylindrical hole (see page 256)



HSSE

A6 F
BRIGHT

NORM VERGNANO



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A6 F BRIGHT			
P	P.2	● 10-15			
	P.3	● 10-12			
	P.4	● 8-10			
K	K 2	● 10-12			

[illegible]

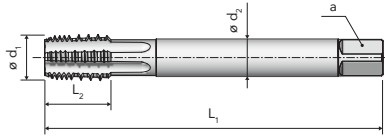
(a) = Cylindrical hole (see page 256)



HSSE

A6 FZ
BRIGHT

DIN 374



A SERIES

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	A6 FZ BRIGHT			
P	P.1	● 12-15			
	P.7	● 2-3			
M	M.1	● 2-3			
N	N.1-2	● 12-15			
	N.5	● 10-12			
	N.6	● 6-8			

[illegible]

(a) = Cylindrical hole (see page 256)

P SERIES

High Performance Taps



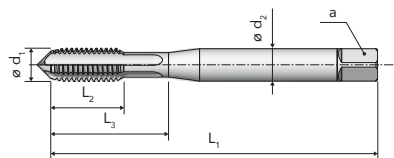
HSSP



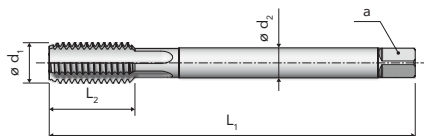
P43
V-MAXX

BP43
V-MAXX

DIN 371
≤ M10



DIN 376
≥ M12



6HX

6HX



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P43 V-MAXX	BP43 V-MAXX		
K	K.1	● 40-50	● 40-50		
N	N.4	● 40-50	● 40-50		
	N.7	● 40-50	● 40-50		
	N.9-10	● 45-55	● 45-55		

Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		P43 V-MAXX	BP43 V-MAXX		
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 3	0,5	56	10	18	3,5	2,7	3	2,5	●			
4	0,7	63	12	21	4,5	3,4	4	3,3	●			
5	0,8	70	14	24,5	6	4,9	4	4,2	●	●		
6	1	80	16	29	6	4,9	4	5	●	●		
8	1,25	90	18	33	8	6,2	4	6,8	●	●		
10	1,5	100	20	36	10	8	4	8,5	●	●		
12	1,75	110	24	-	9	7	4	10,2	●	●		
14	2	110	25	-	11	9	4	12	●	●		
16	2	110	28	-	12	9	4	14	●	●		
18	2,5	125	32	-	14	11	4	15,5	●	●		
20	2,5	140	32	-	16	12	4	17,5	●	●		

HIGH PERFORMANCE MACHINE TAPS for blind holes



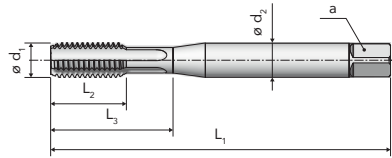
HSSP



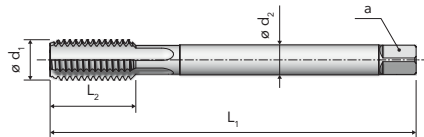
P43 E
V-MAXX

BP43 E
V-MAXX

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P43 E V-MAXX	BP43 E V-MAXX		
K	K.1	● 40-50	● 40-50		
N	N.4	● 40-50	● 40-50		
	N.7	● 40-50	● 40-50		
	N.9-10	● 45-55	● 45-55		

6HX

6HX

[illegible]



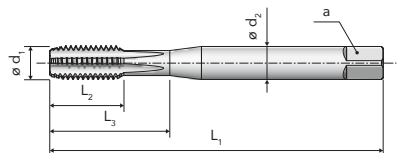
HSSP



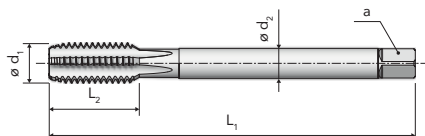
P130
BRIGHT

P130
V-MAXX

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P130 BRIGHT	P130 V-MAXX		
P	P.6	● 2-3	● 5-8		
N	N.8	● 3-5	● 8-10		

6HX

6HX

[illegible]

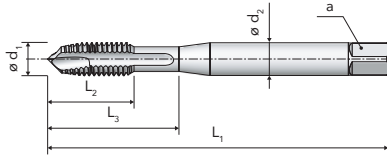
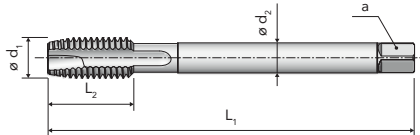
(*) = The hole diameters are oversized


P15
TiN

P15
TiH1

P15 6GX
TiH1

BP15
TiH1

DIN 371
≤ M10

DIN 376
≥ M12


APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P15 TiN	P15 TiH1	P15 6GX TiH1	BP15 TiH1
P	P.3	• 25-35	• 25-35	• 25-35	• 25-35
	P.4	• 20-30	• 20-30	• 20-30	• 20-30
	P.5	• 10-20	• 10-20	• 10-20	• 10-20
	P.6	• 8-10	• 8-10	• 8-10	• 8-10
	P.7	• 10-20	• 10-20	• 10-20	• 10-20
M	M.1	• 10-20	• 10-20	• 10-20	• 10-20
	M.2	• 6-8	• 6-8	• 6-8	• 6-8
K	K.2	• 25-35	• 25-35	• 25-35	• 25-35
N	N.2-3	• 30-40	• 30-40	• 30-40	• 30-40
	N.6	• 25-35	• 25-35	• 25-35	• 25-35

6HX



6HX



6GX



6HX



P SERIES

Ød1	P	L1 js 16	L2	L3	Ød2 h9	a h12	z		P15 TiN	P15 TiH1	P15 6GX TiH1	BP15 TiH1
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 1(*)	0,25	40	5,5	7,5	2,5	2,1	2	0,75	•	•		
1,2(*)	0,25	40	5,5	7,5	2,5	2,1	2	0,95	•	•		
1,4(*)	0,3	40	7	10	2,5	2,1	2	1,1	•	•		
1,6	0,35	40	8	11	2,5	2,1	2	1,25	•	•		
1,7	0,35	40	8	11	2,5	2,1	2	1,35	•	•		
1,8	0,35	40	8	11	2,5	2,1	2	1,45	•	•		
2	0,4	45	7	11	2,8	2,1	3	1,6	•	•		
2,5	0,45	50	9	15	2,8	2,1	3	2,05	•	•		
3	0,5	56	10	18	3,5	2,7	3	2,5	•	•		
4	0,7	63	12	21	4,5	3,4	3	3,3	•	•	•	
5	0,8	70	14	24,5	6	4,9	3	4,2	•	•	•	•
6	1	80	16	29	6	4,9	3	5	•	•	•	•
8	1,25	90	18	33	8	6,2	3	6,8	•	•	•	•
10	1,5	100	20	36	10	8	3	8,5	•	•	•	•
12	1,75	110	24	-	9	7	4	10,2	•	•	•	•
14	2	110	25	-	11	9	4	12	•	•	•	•
16	2	110	28	-	12	9	4	14	•	•	•	•
18	2,5	125	32	-	14	11	4	15,5	•	•		
20	2,5	140	32	-	16	12	4	17,5	•	•		
24	3	160	36	-	18	14,5	4	21	•	•		
27	3	160	36	-	20	16	4	24	•	•		
30	3,5	180	40	-	22	18	4	26,5	•	•		
33	3,5	180	40	-	25	20	5	29,5	•	•		
36	4	200	55	-	28	22	5	32	•	•		

(*) = Tolerance 5HX

HIGH PERFORMANCE MACHINE TAPS for blind holes 15° spiral flutes



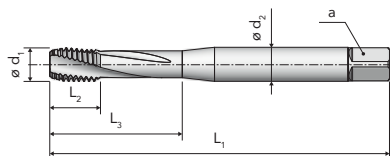
P29
BRIGHT

P29
TiN

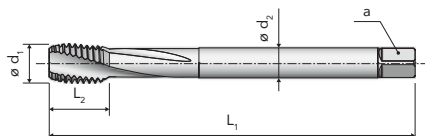
P29
TiH1

BP29
TiH1

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P29 BRIGHT	P29 TiN	P29 TiH1	BP29 TiH1
P	P.3	● 15-18	● 25-30	● 25-30	● 25-30
	P.4	● 12-15	● 20-25	● 20-25	● 20-25
	P.5	● 8-10	● 10-15	● 10-15	● 10-15
	P.6	● 3-5	● 5-10	● 5-10	● 5-10
	P.7	● 8-10	● 10-15	● 10-15	● 10-15
K	K.2	● 15-18	● 25-30	● 25-30	● 25-30
N	N.3	● 15-18	● 25-30	● 25-30	● 25-30
	N.6	● 15-18	● 25-30	● 25-30	● 25-30
	N.7	● 12-15	● 20-25	● 20-25	● 20-25
S	S.2	● 2-3		● 2-3	● 2-3
	S.4	● 2-3	● 2-3	● 2-3	● 2-3



6HX



6HX



6HX



6HX

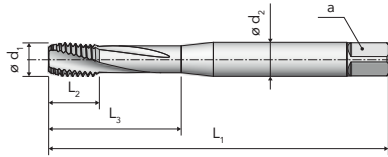


Ød1	P	L1 js 16	L2	L3	Ød2 h9	a h12	Z	Ød1 [mm]	P29 BRIGHT	P29 TiN	P29 TiH1	BP29 TiH1
M 2	0,4	45	5	12	2,8	2,1	3	1,6	● NEW	● NEW	● NEW	
2,5	0,45	50	6	15	2,8	2,1	3	2,05	● NEW	● NEW	● NEW	
3	0,5	56	5	18	3,5	2,7	3	2,5	●	●	●	
4	0,7	63	7	21	4,5	3,4	3	3,3	●	●	●	
5	0,8	70	9	25	6	4,9	3	4,2	●	●	●	●
6	1	80	11	30	6	4,9	3	5	●	●	●	●
8	1,25	90	12	35	8	6,2	3	6,8	●	●	●	●
10	1,5	100	13	39	10	8	3	8,5	●	●	●	●
12	1,75	110	15	-	9	7	3	10,2	●	●	●	●
14	2	110	18	-	11	9	3	12	●	●	●	●
16	2	110	18	-	12	9	3	14	●	●	●	●
18	2,5	125	20	-	14	11	4	15,5	●	●	●	●
20	2,5	140	20	-	16	12	4	17,5	●	●	●	●
24	3	160	25	-	18	14,5	4	21	●	●	●	
27	3	160	25	-	20	16	4	24	●	●	●	
30	3,5	180	29	-	22	18	4	26,5	●	●	●	
36	4	200	34	-	28	22	4	32	●	●	●	

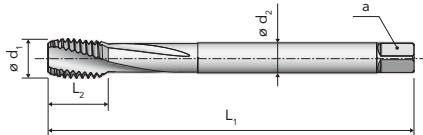


P29 E
TiH1

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P29 E TiH1			
P	P.3	● 25-30			
	P.4	● 20-25			
	P.5	● 10-15			
	P.6	● 5-10			
	P.7	● 10-15			
K	K.2	● 25-30			
N	N.3	● 25-30			
	N.6	● 25-30			
	N.7	● 20-25			
S	S.2	● 2-3			
	S.4	● 2-3			

6HX

[illegible]

HIGH PERFORMANCE MACHINE TAPS for blind holes 45° spiral flutes / back tapered



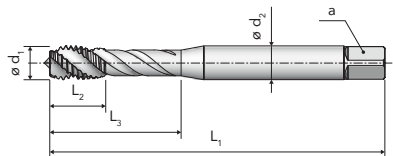
P70
TiN

P70
TiH1

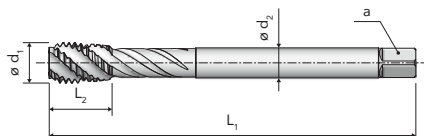
P70 6GX
TiH1

P70 7GX
TiH1

DIN 371
≤ M10



DIN 376
≥ M12



6HX



6HX



6GX



7GX



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P70 TiN	P70 TiH1	P70 6GX TiH1	P70 7GX TiH1
P	P.3	• 20-30	• 20-30	• 20-30	• 20-30
	P.4	• 15-25	• 15-25	• 15-25	• 15-25
	P.5	• 5-15	• 5-15	• 5-15	• 5-15
	P.7	• 10-15	• 10-15	• 10-15	• 10-15
M	M.1	• 10-15	• 10-15	• 10-15	• 10-15
	M.2	• 5-7	• 5-7	• 5-7	• 5-7
K	K.2	• 20-30	• 20-30	• 20-30	• 20-30
N	N.3	• 25-35	• 25-35	• 25-35	• 25-35
	N.6	• 25-35	• 25-35	• 25-35	• 25-35
S	S.1		• 10-15	• 10-15	• 10-15
	S.3	• 10-15	• 10-15	• 10-15	• 10-15

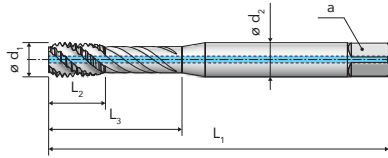
Ød1	P	L1 js 16	L2	L3	Ød2 h9	a h12	Z	Ød1 [mm]	P70 TiN	P70 TiH1	P70 6GX TiH1	P70 7GX TiH1
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 2	0,4	45	6	12	2,8	2,1	3	1,6	•	•		
2,5	0,45	50	6,5	15	2,8	2,1	3	2,05	•	•		
3	0,5	56	7	15	3,5	2,7	3	2,5	•	•	•	• NEW
4	0,7	63	8,5	21	4,5	3,4	3	3,3	•	•	•	• NEW
5	0,8	70	10	24,5	6	4,9	3	4,2	•	•	•	• NEW
6	1	80	12	29	6	4,9	3	5	•	•	•	• NEW
8	1,25	90	14	33	8	6,2	3	6,8	•	•	•	• NEW
10	1,5	100	17	39	10	8	3	8,5	•	•	•	• NEW
12	1,75	110	18	-	9	7	4	10,2	•	•	•	• NEW
14	2	110	20,5	-	11	9	4	12	•	•	•	
16	2	110	20,5	-	12	9	4	14	•	•	•	
18	2,5	125	25,5	-	14	11	4	15,5	•	•	•	
20	2,5	140	25,5	-	16	12	4	17,5	•	•	•	
24	3	160	32	-	18	14,5	4	21	•	•		
27	3	160	32	-	20	16	5	24	•	•		
30	3,5	180	37	-	22	18	5	26,5	•	•		
33	3,5	180	37	-	25	20	5	29,5	•	•		
36	4	200	42	-	28	22	5	32	•	•		
42	4,5	200	45	-	32	24	5	37,5	• NEW	• NEW		

HIGH PERFORMANCE MACHINE TAPS for blind holes
45° spiral flutes / back tapered / internal coolant

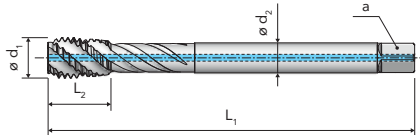


BP70
TiH1

DIN 371
≤ M10



DIN 376
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	BP70 TiH1			
P	P.3	● 20-30			
	P.4	● 15-25			
	P.5	● 5-15			
	P.7	● 10-15			
M	M.1	● 10-15			
	M.2	● 5-7			
K	K.2	● 20-30			
N	N.3	● 25-35			
	N.6	● 25-35			
S	S.1	● 10-15			
	S.3	● 10-15			

6HX

[illegible]

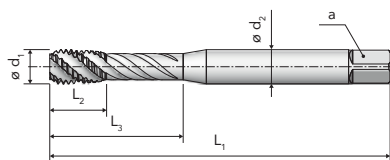


P70 E
TiN

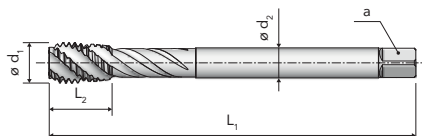
P70 E
TiH1

P70 E 6GX
TiH1

DIN 371
≤ M10



DIN 376
≥ M12



6HX

6HX

6GX



APPLICATION RANGE - CUTTING SPEED m/min					
ISO	MG	P70 E TiN	P70 E TiH1	P70 E 6GX TiH1	
P	P.3	● 20-30	● 20-30	● 20-30	
	P.4	● 15-25	● 15-25	● 15-25	
	P.5	● 5-15	● 5-15	● 5-15	
	P.7	● 10-15	● 10-15	● 10-15	
M	M.1	● 10-15	● 10-15	● 10-15	
	M.2	● 5-7	● 5-7	● 5-7	
K	K.2	● 20-30	● 20-30	● 20-30	
N	N.3	● 25-35	● 25-35	● 25-35	
	N.6	● 25-35	● 25-35	● 25-35	
S	S.1		● 10-15	● 10-15	
	S.3	● 10-15	● 10-15	● 10-15	

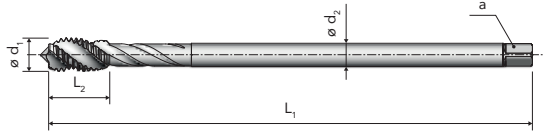
[illegible]

HIGH PERFORMANCE MACHINE TAPS for blind holes



P76 L
TiH1

NORM VERGNANO



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P76 L TiH1			
P	P.3	● 20-30			
	P.4	● 15-25			
	P.5	● 5-15			
	P.7	● 10-15			
M	M.1	● 10-15			
	M.2	● 5-7			
K	K.2	● 20-30			
N	N.3	● 25-35			
	N.6	● 25-35			
S	S.1	● 10-15			
	S.3	● 10-15			

6HX

[illegible]



HSSK



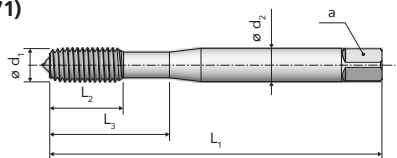
P80
TiN

P80
V-MAXX

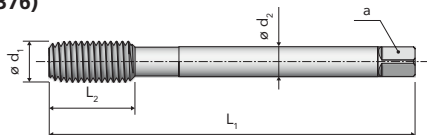
P80 6GX
TiN

P80 7GX
TiN

DIN 2174 (371)
≤ M10



DIN 2174 (376)
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P80 TiN	P80 V-MAXX	P80 6GX TiN	P80 7GX TiN
P	P.1-2	● 40-45	● 40-45	● 40-45	● 40-45
	P.3	● 35-40	● 35-40	● 35-40	● 35-40
	P.4	● 30-35	● 30-35	● 30-35	● 30-35
	P.5	● 15-20	● 15-20	● 15-20	● 15-20
	P.7	● 15-20	● 15-20	● 15-20	● 15-20
M	M.1	● 15-20	● 15-20	● 15-20	● 15-20
N	N.1-2	● 40-45	● 40-45	● 40-45	● 40-45
	N.3	● 35-40	● 35-40	● 35-40	● 35-40
	N.5-6	● 40-45	● 40-45	● 40-45	● 40-45
S	S.3	● 10-15	● 10-15	● 10-15	● 10-15

6HX



6HX



6GX



7GX

[illegible]



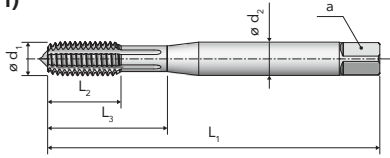
P80 N
TiN

P80 N
V-MAXX

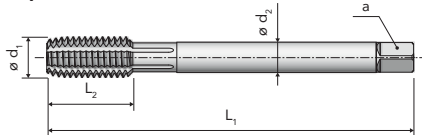
P80 N 6GX
TiN

P80 N 7GX
TiN

DIN 2174 (371)
≤ M10



DIN 2174 (376)
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P80 N TiN	P80 N V-MAXX	P80 N 6GX TiN	P80 N 7GX TiN
P	P.1-2	● 40-45	● 40-45	● 40-45	● 40-45
	P.3	● 35-40	● 35-40	● 35-40	● 35-40
	P.4	● 30-35	● 30-35	● 30-35	● 30-35
	P.5	● 15-20	● 15-20	● 15-20	● 15-20
	P.7	● 15-20	● 15-20	● 15-20	● 15-20
M	M.1	● 15-20	● 15-20	● 15-20	● 15-20
N	N.1-2	● 40-45	● 40-45	● 40-45	● 40-45
	N.3	● 35-40	● 35-40	● 35-40	● 35-40
	N.5-6	● 40-45	● 40-45	● 40-45	● 40-45
S	S.3	● 10-15	● 10-15	● 10-15	● 10-15

6HX

6HX

6GX

7GX



P SERIES

[illegible]



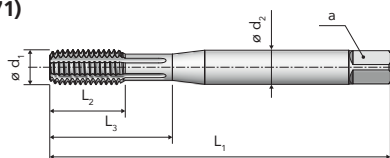
P80 E
TiN

P80 N E
TiN

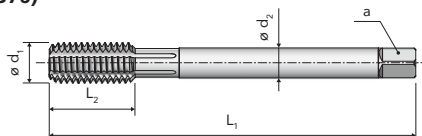
P80 N E
V-MAXX

P80 N E 6GX
TiN

DIN 2174 (371)
≤ M10



DIN 2174 (376)
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P80 E TIN	P80 N E TIN	P80 N E V-MAXX	P80 N E 6GX TIN
P	P.1-2	● 40-45	● 40-45	● 40-45	● 40-45
	P.3	● 35-40	● 35-40	● 35-40	● 35-40
	P.4	● 30-35	● 30-35	● 30-35	● 30-35
	P.5	● 15-20	● 15-20	● 15-20	● 15-20
M	P.7	● 15-20	● 15-20	● 15-20	● 15-20
	M.1	● 15-20	● 15-20	● 15-20	● 15-20
N	N.1-2	● 40-45	● 40-45	● 40-45	● 40-45
	N.3	● 35-40	● 35-40	● 35-40	● 35-40
	N.5-6	● 40-45	● 40-45	● 40-45	● 40-45
S	S.3	● 10-15	● 10-15	● 10-15	● 10-15

6HX



6HX



6HX



6GX

[illegible]



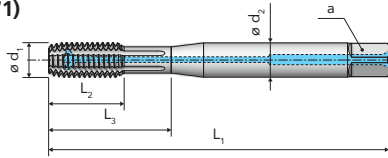
BP80 N
TiN

BP80 N R
TiN

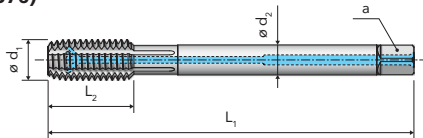
BP80 N R
V-MAXX

BP80 N E
V-MAXX

DIN 2174 (371)
≤ M10



DIN 2174 (376)
≥ M12



p SERIES

APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	BP80 N TIN	BP80 N R TIN	BP80 N R V-MAXX	BP80 N E V-MAXX
P	P.1-2	● 40-45	● 40-45	● 40-45	● 40-45
	P.3	● 35-40	● 35-40	● 35-40	● 35-40
	P.4	● 30-35	● 30-35	● 30-35	● 30-35
	P.5	● 15-20	● 15-20	● 15-20	● 15-20
	P.7	● 15-20	● 15-20	● 15-20	● 15-20
M	M.1	● 15-20	● 15-20	● 15-20	● 15-20
N	N.1-2	● 40-45	● 40-45	● 40-45	● 40-45
	N.3	● 35-40	● 35-40	● 35-40	● 35-40
	N.5-6	● 40-45	● 40-45	● 40-45	● 40-45
S	S.3	● 10-15	● 10-15	● 10-15	● 10-15

6HX



6H2



6HX



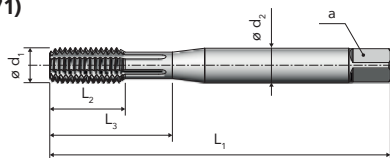
6HX

[illegible]

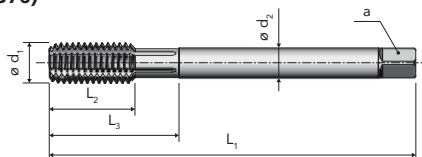


P80 N LH
TiN

DIN 2174 (371)
≤ M10



DIN 2174 (376)
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P80 N LH TiN			
P	P.1-2	● 40-45			
	P.3	● 35-40			
	P.4	● 30-35			
	P.5	● 15-20			
	P.7	● 15-20			
M	M.1	● 15-20			
N	N.1-2	● 40-45			
	N.3	● 35-40			
	N.5-6	● 40-45			
S	S.3	● 10-15			

6HX

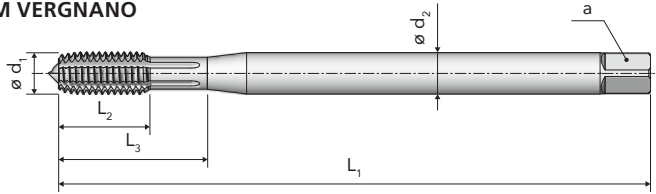
[illegible]

HIGH PERFORMANCE COLD FORMING TAPS for blind and through holes
With oil grooves / long and reinforced shank



P80 N L
TiN

NORM VERGNANO



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P80 N L TiN			
P	P.1-2	● 40-45			
	P.3	● 35-40			
	P.4	● 30-35			
	P.5	● 15-20			
	P.7	● 15-20			
M	M.1	● 15-20			
N	N.1-2	● 40-45			
	N.3	● 35-40			
	N.5-6	● 40-45			
S	S.3	● 10-15			

6HX



3xD



RH





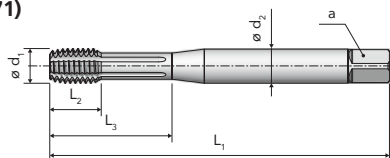
HSSZ



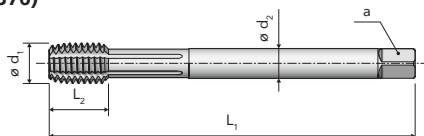
P180 N
TiN

P180 N
V-MAXX

DIN 2174 (371)
≤ M10



DIN 2174 (376)
≥ M12



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P180 N TiN	P180 N V-MAXX		
P	P.7	● 15-20	● 15-20		
M	M.1	● 10-15	● 10-15		
	M.2	● 8-10	● 8-10		

6HX

6HX



HIGH PERFORMANCE MACHINE TAPS for blind and through holes Straight flutes / for cast iron



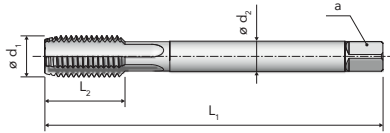
P45
V-MAXX

BP45
V-MAXX

P45 E
V-MAXX

BP45 E
V-MAXX

DIN 374



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P45 V-MAXX	BP45 V-MAXX	P45 E V-MAXX	BP45 E V-MAXX
K	K.1	• 40-50	• 40-50	• 40-50	• 40-50
N	N.4	• 40-50	• 40-50	• 40-50	• 40-50
	N.7	• 40-50	• 40-50	• 40-50	• 40-50
	N.9-10	• 45-55	• 45-55	• 45-55	• 45-55

6HX



6HX



6HX



6HX



P SERIES

Ød ₁ [mm]	P [mm]	L ₁ js 16 [mm]	L ₂ [mm]	L ₃ [mm]	Ød ₂ h9 [mm]	a h12 [mm]	z	z [mm]	Ød ₂ h9 [mm]	P45 V-MAXX	BP45 V-MAXX	P45 E V-MAXX	BP45 E V-MAXX
M 8	1	90	16	-	6	4,9	4	7	7	•	•	•	•
10	1	90	18	-	7	5,5	4	9	9	•	•	•	•
10	1,25	100	18	-	7	5,5	4	8,8	8,8	•	•	•	•
12	1,25	100	22	-	9	7	4	10,8	10,8	•	•	•	•
12	1,5	100	22	-	9	7	4	10,5	10,5	•	•	•	•
14	1,25	100	22	-	11	9	4	12,8	12,8	•	•	•	•
14	1,5	100	22	-	11	9	4	12,5	12,5	•	•	•	•
16	1,5	100	22	-	12	9	4	14,5	14,5	•	•	•	•
20	1,5	125	25	-	16	12	4	18,5	18,5	•	•	•	•



HSSP



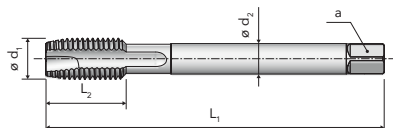
P17
TiN

P17
TiH1

P17 6GX
TiH1

BP17
TiH1

DIN 374



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P17 TiN	P17 TiH1	P17 6GX TiH1	BP17 TiH1
P	P.3	● 25-35	● 25-35	● 25-35	● 25-35
	P.4	● 20-30	● 20-30	● 20-30	● 20-30
	P.5	● 10-20	● 10-20	● 10-20	● 10-20
	P.6	● 8-10	● 8-10	● 8-10	● 8-10
	P.7	● 10-20	● 10-20	● 10-20	● 10-20
M	M.1	● 10-20	● 10-20	● 10-20	● 10-20
	M.2	● 6-8	● 6-8	● 6-8	● 6-8
K	K.2	● 25-35	● 25-35	● 25-35	● 25-35
N	N.2-3	● 30-40	● 30-40	● 30-40	● 30-40
	N.6	● 25-35	● 25-35	● 25-35	● 25-35

6HX

6HX

6GX

6HX





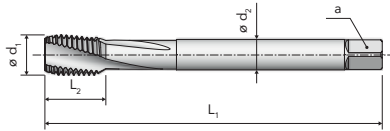
P30
BRIGHT

P30
TiN

P30
TiH1

BP30
TiH1

DIN 374



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P30 BRIGHT	P30 TiN	P30 TiH1	BP30 TiH1
P	P.3	● 15-18	● 25-30	● 25-30	● 25-30
	P.4	● 12-15	● 20-25	● 20-25	● 20-25
	P.5	● 8-10	● 10-15	● 10-15	● 10-15
	P.6	● 3-5	● 5-10	● 5-10	● 5-10
	P.7	● 8-10	● 10-15	● 10-15	● 10-15
K	K.2	● 15-18	● 25-30	● 25-30	● 25-30
N	N.3	● 15-18	● 25-30	● 25-30	● 25-30
	N.6	● 15-18	● 25-30	● 25-30	● 25-30
	N.7	● 12-15	● 20-25	● 20-25	● 20-25
S	S.2	● 2-3		● 2-3	● 2-3
	S.4	● 2-3	● 2-3	● 2-3	● 2-3

6HX



6HX



6HX



6HX



P SERIES

Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		P30 BRIGHT	P30 TiN	P30 TiH1	BP30 TiH1
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 8	1	90	10	-	6	4,9	3	7	●	●	●	
10	1	90	11	-	7	5,5	3	9	●	●	●	
10	1,25	100	12	-	7	5,5	3	8,8	●	●	●	●
12	1,25	100	14	-	9	7	3	10,8	●	●	●	●
12	1,5	100	15	-	9	7	3	10,5	●	●	●	●
14	1,5	100	16	-	11	9	3	12,5	●	●	●	●
16	1,5	100	16	-	12	9	3	14,5	●	●	●	●
18	1,5	110	18	-	14	11	4	16,5	●	●	●	●
20	1,5	125	18	-	16	12	4	18,5	●	●	●	●



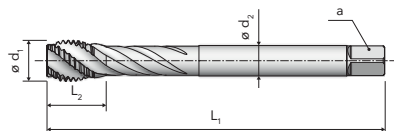
P71
TiN

P71
TiH1

P71 6GX
TiH1

BP71
TiH1

DIN 374



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P71 TiN	P71 TiH1	P71 6GX TiH1	BP71 TiH1
P	P.3	● 20-30	● 20-30	● 20-30	● 20-30
	P.4	● 15-25	● 15-25	● 15-25	● 15-25
	P.5	● 5-15	● 5-15	● 5-15	● 5-15
	P.7	● 10-15	● 10-15	● 10-15	● 10-15
M	M.1	● 10-15	● 10-15	● 10-15	● 10-15
	M.2	● 5-7	● 5-7	● 5-7	● 5-7
K	K.2	● 20-30	● 20-30	● 20-30	● 20-30
N	N.3	● 25-35	● 25-35	● 25-35	● 25-35
	N.6	● 25-35	● 25-35	● 25-35	● 25-35
S	S.1		● 10-15	● 10-15	● 10-15
	S.3	● 10-15	● 10-15	● 10-15	● 10-15

6HX

6HX

6GX

6HX

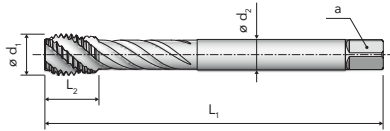
[illegible]

HIGH PERFORMANCE MACHINE TAPS for blind holes



P71 E
TiH1

DIN 374



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P71 E TiH1			
P	P.3	● 20-30			
	P.4	● 15-25			
	P.5	● 5-15			
	P.7	● 10-15			
M	M.1	● 10-15			
	M.2	● 5-7			
K	K.2	● 20-30			
N	N.3	● 25-35			
	N.6	● 25-35			
S	S.1	● 10-15			
	S.3	● 10-15			

6HX

[illegible]

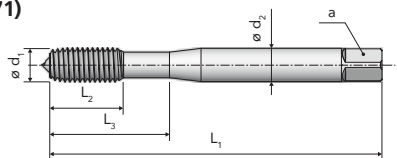


P81
TiN

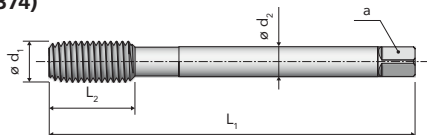
P81
V-MAXX

P81 6GX
TiN

DIN 2174 (371)
≤ M10x1,25



DIN 2174 (374)
≥ M12x1



6HX

6HX

6GX



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P81 TIN	P81 V-MAXX	P81 6GX TIN	
P	P.1-2	● 40-45	● 40-45	● 40-45	
	P.3	● 35-40	● 35-40	● 35-40	
	P.4	● 30-35	● 30-35	● 30-35	
	P.5	● 15-20	● 15-20	● 15-20	
	P.7	● 15-20	● 15-20	● 15-20	
M	P.1	● 15-20	● 15-20	● 15-20	
N	N.1-2	● 40-45	● 40-45	● 40-45	
	N.3	● 35-40	● 35-40	● 35-40	
	N.5-6	● 40-45	● 40-45	● 40-45	
S	S.3	● 10-15	● 10-15	● 10-15	

HIGH PERFORMANCE COLD FORMING TAPS for blind and through holes

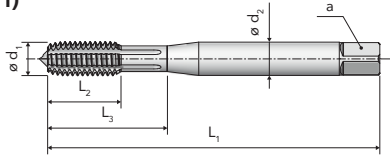


P81 N
TiN

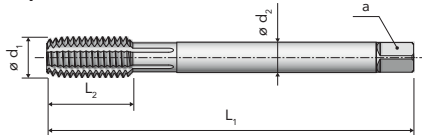
P81 N
V-MAXX

P81 N 6GX
TiN

DIN 2174 (371)
≤ M10x1,25



DIN 2174 (374)
≥ M12x1



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P81 N TiN	P81 N V-MAXX	P81 N 6GX TiN	
P	P.1-2	● 40-45	● 40-45	● 40-45	
	P.3	● 35-40	● 35-40	● 35-40	
	P.4	● 30-35	● 30-35	● 30-35	
	P.5	● 15-20	● 15-20	● 15-20	
	P.7	● 15-20	● 15-20	● 15-20	
M	P.1	● 15-20	● 15-20	● 15-20	
N	N.1-2	● 40-45	● 40-45	● 40-45	
	N.3	● 35-40	● 35-40	● 35-40	
	N.5-6	● 40-45	● 40-45	● 40-45	
S	S.3	● 10-15	● 10-15	● 10-15	

6HX



6HX



6GX



P SERIES



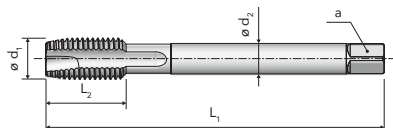
HSSP



P18
TiN

P18
TiH1

DIN 5156



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P18 TiN	P18 TiH1		
P	P.3	● 25-35	● 25-35		
	P.4	● 20-30	● 20-30		
	P.5	● 10-20	● 10-20		
	P.6	● 8-10	● 8-10		
	P.7	● 10-20	● 10-20		
M	M.1	● 10-20	● 10-20		
	M.2	● 6-8	● 6-8		
K	K.2	● 25-35	● 25-35		
N	N.2-3	● 30-40	● 30-40		
	N.6	● 25-35	● 25-35		

ISO
5969 X

ISO
5969 X



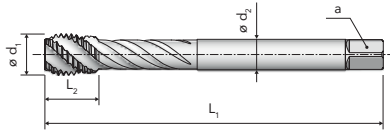


P59
TiN

P59
TiH1

P59 E
TiH1

DIN 5156



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	P59 TiN	P59 TiH1	P59 E TiH1	
P	P.3	● 20-30	● 20-30	● 20-30	
	P.4	● 15-25	● 15-25	● 15-25	
	P.5	● 5-15	● 5-15	● 5-15	
	P.7	● 10-15	● 10-15	● 10-15	
M	M.1	● 10-15	● 10-15	● 10-15	
	M.2	● 5-7	● 5-7	● 5-7	
K	K.2	● 20-30	● 20-30	● 20-30	
N	N.3	● 25-35	● 25-35	● 25-35	
	N.6	● 25-35	● 25-35	● 25-35	
S	S.1		● 10-15	● 10-15	
	S.3	● 10-15	● 10-15	● 10-15	

ISO
5969 X



ISO
5969 X



ISO
5969 X

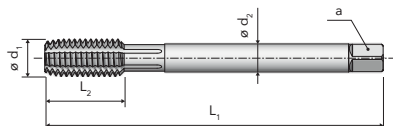




P82 N
TiN

P82 N
V-MAXX

DIN 2189



ISO
5969 X

ISO
5969 X



APPLICATION RANGE - CUTTING SPEED m/min					
ISO	MG	P82 N TiN	P82 N V-MAXX		
P	P.1-2	● 40-45	● 40-45		
	P.3	● 35-40	● 35-40		
	P.4	● 30-35	● 30-35		
	P.5	● 15-20	● 15-20		
	P.7	● 15-20	● 15-20		
M	M.1	● 15-20	● 15-20		
N	N.1-2	● 40-45	● 40-45		
	N.3	● 35-40	● 35-40		
	N.5-6	● 40-45	● 40-45		
S	S.3	● 10-15	● 10-15		

S SERIES

Synchronous Taps

MACHINE TAPS FOR SYNCHRONOUS TAPPING for blind and through holes

Straight flutes / for cast iron



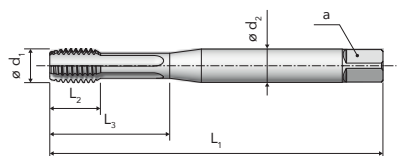
S43
V-MAXX

BS43
V-MAXX

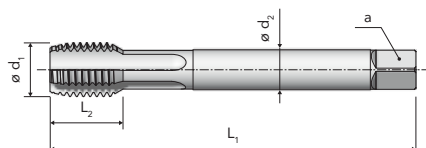
S43 E
V-MAXX

BS43 E
V-MAXX

~DIN 371
≤ M12 (*)



~DIN 376
≥ M16 (*)



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	S43 V-MAXX	BS43 V-MAXX	S43 E V-MAXX	BS43 E V-MAXX
K	K.1	● 55-65	● 55-65	● 55-65	● 55-65
N	N.4	● 55-65	● 55-65	● 55-65	● 55-65
	N.7	● 55-65	● 55-65	● 55-65	● 55-65
	N.9-10	● 55-65	● 55-65	● 55-65	● 55-65



6HX

6HX

6HX

6HX

C (2-3)

C (2-3)

E (1,5-2)

E (1,5-2)

3xD

3xD

3xD

3xD

RH

RH

RH

RH



Ød1 [mm]	P [mm]	L1 js 16 [mm]	L2 [mm]	L3 [mm]	Ød2 h6 [mm]	a h12 [mm]	Z [-]		S43 V-MAXX	BS43 V-MAXX	S43 E V-MAXX	BS43 E V-MAXX
M 3	0,5	70	5	15	6	4,9	3	2,5	●			
4	0,7	70	7	18	6	4,9	3	3,3	●		●	
5	0,8	70	8	23	6	4,9	3	4,2	●	●	●	●
6	1	80	10	29	6	4,9	4	5	●	●	●	●
8	1,25	90	11	33	8	6,2	4	6,8	●	●	●	●
10	1,5	100	13	36	10	8	4	8,5	●	●	●	●
12	1,75	110	16	42	12	9	4	10,2	●	●	●	●
16	2	110	18	-	12	9	4	14	●	●	●	●
20	2,5	140	23	-	16	12	4	17,5	●	●	●	●

(*) = DIN 1835-B on request

MACHINE TAPS FOR SYNCHRONOUS TAPPING for through holes
Straight flutes with spiral point

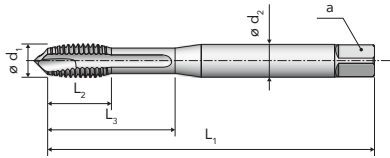


S15
TiN

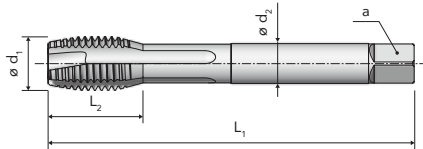
S15
TiH1

BS15
TiH1

~DIN 371
≤ M12 (*)

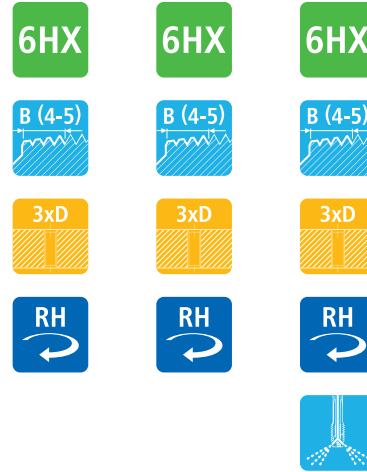


~DIN 376
≥ M14 (*)



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	S15 TiN	S15 TiH1	BS15 TiH1	
P	P.1-2	● 50-60	● 50-60	● 50-60	
	P.3	● 45-55	● 45-55	● 45-55	
	P.4	● 40-50	● 40-50	● 40-50	
	P.5	● 15-25	● 15-25	● 15-25	
	P.7	● 15-25	● 15-25	● 15-25	
M	M.1	● 15-25	● 15-25	● 15-25	
	M.2	● 10-20	● 10-20	● 10-20	
K	K.2	● 45-55	● 45-55	● 45-55	
N	N.1	● 50-60	● 50-60	● 50-60	
	N.2-3	● 45-55	● 45-55	● 45-55	
	N.5	● 40-50	● 40-50	● 40-50	
	N.6	● 35-45	● 35-45	● 35-45	
S	S.1		● 15-25	● 15-25	
	S.3	● 15-25	● 15-25	● 15-25	



SERIES

(*) = DIN 1835-B on request

MACHINE TAPS FOR SYNCHRONOUS TAPPING for blind holes
40° spiral flutes / back tapered

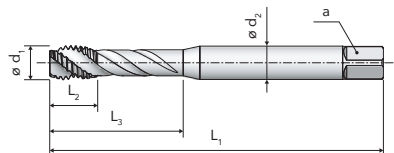


S70
TiN

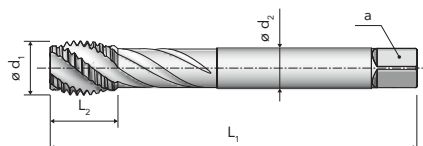
S70
TiH1

BS70
TiH1

~DIN 371
≤ M12 (*)



~DIN 376
≥ M14 (*)



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	S70 TiN	S70 TiH1	BS70 TiH1	
P	P.1-2	● 45-55	● 45-55	● 45-55	
	P.3	● 40-50	● 40-50	● 40-50	
	P.4	● 35-45	● 35-45	● 35-45	
	P.5	● 15-20	● 15-20	● 15-20	
	P.7	● 15-20	● 15-20	● 15-20	
M	M.1	● 15-20	● 15-20	● 15-20	
K	K.2	● 40-50	● 40-50	● 40-50	
N	N.1	● 45-55	● 45-55	● 45-55	
	N.2-3	● 40-50	● 40-50	● 40-50	
	N.5	● 35-45	● 35-45	● 35-45	
	N.6	● 30-40	● 30-40	● 30-40	
S	S.1		● 15-20	● 15-20	
	S.3	● 15-20	● 15-20	● 15-20	

6HX



6HX



6HX

[illegible]

(*) = DIN 1835-B on request

COLD FORMING TAPS FOR SYNCHRONOUS TAPPING for blind and through holes
With oil grooves



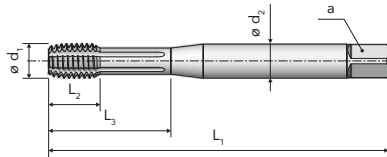
S80 N
TiN

S80 N
V-MAXX

S80 N 6GX
TiN

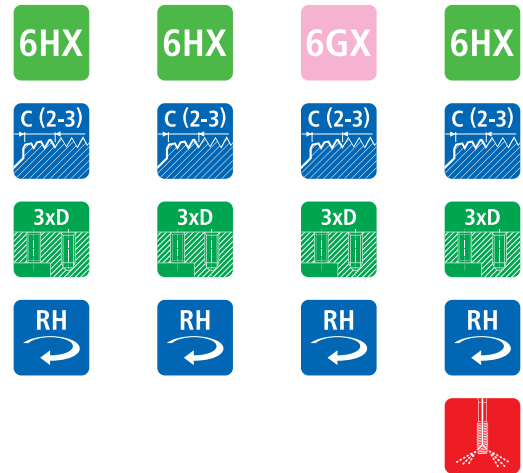
BS80 N R
TiN

~DIN 371 (*)



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	S80 N TiN	S80 N V-MAXX	S80 N 6GX TiN	BS80 N R TiN
P	P.1-2	● 50-60	● 50-60	● 50-60	● 50-60
	P.3	● 45-55	● 45-55	● 45-55	● 45-55
	P.4	● 40-50	● 40-50	● 40-50	● 40-50
	P.5	● 20-30	● 20-30	● 20-30	● 20-30
M	P.7	● 25-35	● 25-35	● 25-35	● 25-35
	M.1	● 25-35	● 25-35	● 25-35	● 25-35
N	M.2	● 15-25	● 15-25	● 15-25	● 15-25
	N.1-2	● 50-60	● 50-60	● 50-60	● 50-60
	N.3	● 45-55	● 45-55	● 45-55	● 45-55
	N.5-6	● 50-60	● 50-60	● 50-60	● 50-60
S	S.3	● 10-20	● 10-20	● 10-20	● 10-20



SERIES

[illegible]

(*) = DIN 1835-B on request

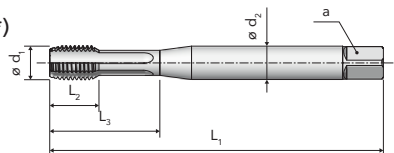
MACHINE TAPS FOR SYNCHRONOUS TAPPING for blind and through holes
Straight flutes / for cast iron



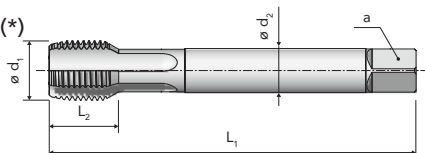
S45
V-MAXX

BS45
V-MAXX

~DIN 371
≤ M12x1,5 (*)



~DIN 376
≥ M14x1,5 (*)



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	S45 V-MAXX	B545 V-MAXX		
K	K.1	● 55-65	● 55-65		
N	N.4	● 55-65	● 55-65		
	N.7	● 55-65	● 55-65		
	N.9-10	● 55-65	● 55-65		

6HX

6HX

[illegible]

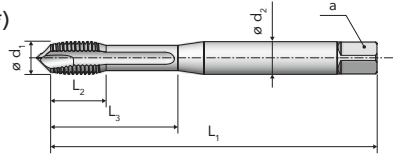
(*) = DIN 1835-B on request

MACHINE TAPS FOR SYNCHRONOUS TAPPING for through holes
Straight flutes with spiral point

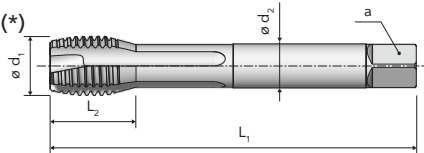


S17
TiN

~DIN 371
≤ M12x1,5 (*)



~DIN 376
≥ M14x1,5 (*)



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	S17 TiN			
P	P.1-2	● 50-60			
	P.3	● 45-55			
	P.4	● 40-50			
	P.5	● 15-25			
	P.7	● 15-25			
M	M.1	● 15-25			
	M.2	● 10-20			
K	K.2	● 45-55			
N	N.1	● 50-60			
	N.2-3	● 45-55			
	N.5	● 40-50			
	N.6	● 35-45			
	S.3	● 15-25			

6HX



SERIES

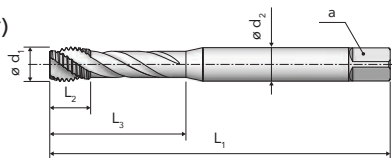
Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h6	a h12	z		S17 TiN			
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 8	1	90	10	35	8	6,2	3	7	●			
10	1	90	10	39	10	8	3	9	●			
10	1,25	100	12,5	39	10	8	3	8,8	●			
12	1,25	100	12,5	42	12	9	3	10,8	●			
12	1,5	100	15	42	12	9	3	10,5	●			
14	1,5	100	15	-	12	9	3	12,5	●			
16	1,5	100	15	-	12	9	4	14,5	●			

(*) = DIN 1835-B on request

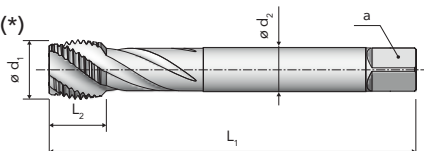


S71
TiN

~DIN 371
≤ M12x1,5 (*)



~DIN 376
≥ M14x1,5 (*)



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	S71 TiN			
P	P.1-2	● 45-55			
	P.3	● 40-50			
	P.4	● 35-45			
	P.5	● 15-20			
	P.7	● 15-20			
M	M.1	● 15-20			
K	K.2	● 40-50			
N	N.1	● 45-55			
	N.2-3	● 40-50			
	N.5	● 35-45			
	N.6	● 30-40			
S	S.3	● 15-20			

6HX

[illegible]

(*) = DIN 1835-B on request

H SERIES

Solid Carbide Taps

SOLID CARBIDE MACHINE TAPS for blind holes
Straight flutes / internal coolant / for cast iron



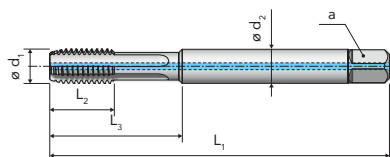
HM

HB43
BRIGHT

HB43
V-MAXX

HB43 E
V-MAXX

DIN 371



6HX

6HX

6HX

C (2-3)

C (2-3)

E (1,5-2)

2,5xD

2,5xD



2,5xD

RH

RH

RH



APPLICATION RANGE - CUTTING SPEED m/min					
ISO	MG	HB43 BRIGHT	HB43 V-MAXX	HB43 E V-MAXX	
K	K.1	● 40-50	● 55-65	● 55-65	
N	N.4	● 40-50	● 55-65	● 55-65	
	N.7	● 40-50	● 55-65	● 55-65	
	N 9-10	● 45-55	● 55-65	● 55-65	

(*) = Taps without through coolant

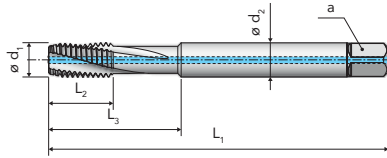
SOLID CARBIDE MACHINE TAPS for blind holes
15° spiral flutes / internal coolant



HB29
BRIGHT

HB29
V-MAXX

DIN 371



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	HB29 BRIGHT	HB29 V-MAXX		
N	N.1-2	● 15-30	● 25-50		
	N.3	● 20-30	● 30-50		
	N.4	● 15-20	● 25-40		
	N.7	● 20-25	● 30-40		

6HX

6HX

[illegible]

(*) = Taps without through coolant

SOLID CARBIDE MACHINE TAPS for blind and through holes
Straight flutes / for high strength materials

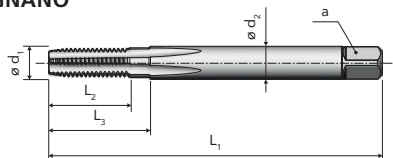


HM

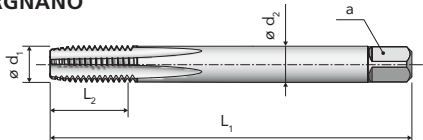
H130
BRIGHT

H130
V-MAXX

NORM VERGNANO
≤ M5



NORM VERGNANO
≥ M6



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	H130 BRIGHT	H130 V-MAXX		
H	H.1	● 2-3	● 3-6		
	H.2	● 1-2	● 2-4		

ISO26H

ISO26H

[illegible]

(*) = The hole diameters are oversized

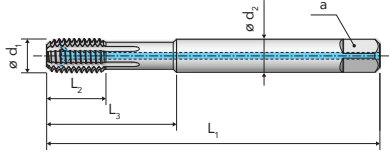
SOLID CARBIDE COLD FORMING TAPS for blind and through holes
With oil grooves / internal coolant



HM

HB80 N R
V-MAXX

DIN 371



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	HB80 N R V-MAXX			
P	P.1-2	● 40-50			
	P.3	● 35-45			
	P.4	● 30-40			
	P.5	● 15-25			
	P.7	● 15-25			
M	M.1	● 15-25			
N	N.1-2	● 40-50			
	N.3	● 35-45			
	N.5-6	● 40-50			
S	S.3	● 10-20			

6HX

[illegible]

(*) = Taps without through coolant

SOLID CARBIDE MACHINE TAPS for blind holes
Straight flutes / internal coolant / for cast iron



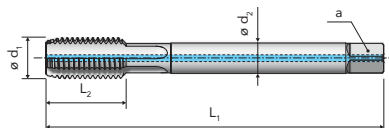
HM

HB45
BRIGHT

HB45
V-MAXX

HB45 E
V-MAXX

DIN 374



6HX

6HX

6HX

C (2-3)

C (2-3)

E (1,5-2)

2,5xD

2,5xD

2,5xD



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	HB45 BRIGHT	HB45 V-MAXX	HB45 E V-MAXX	
K	K.1	● 40-50	● 55-65	● 55-65	
N	N.4	● 40-50	● 55-65	● 55-65	
	N.7	● 40-50	● 55-65	● 55-65	
	N.9-10	● 45-55	● 55-65	● 55-65	

H
SERIES

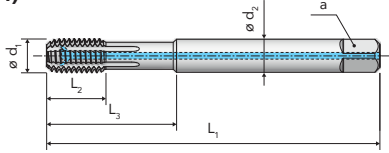
SOLID CARBIDE COLD FORMING TAPS for blind and through holes
With oil grooves / internal coolant / chamfer form E



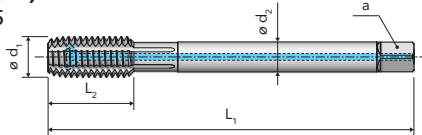
HM

HB81 N R E
V-MAXX

DIN 2174 (371)
≤ M10x1,25



DIN 2174 (374)
≥ M12x1,25



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	HB81 N R E			
V-MAXX					
P	P.1-2	● 40-50			
	P.3	● 35-45			
	P.4	● 30-40			
	P.5	● 15-25			
	P.7	● 15-25			
M	M.1	● 15-25			
N	N.1-2	● 40-50			
	N.3	● 35-45			
	N.5-6	● 40-50			
S	S.3	● 10-20			

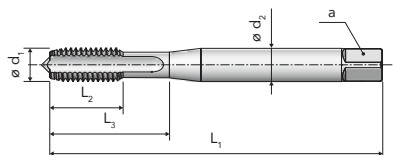
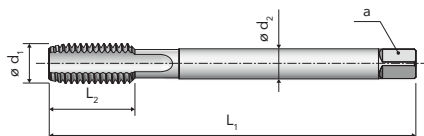
6HX

H
SERIES

E

Discontinued Taps


A21 FC LH
 BRIGHT

DIN 371
 $\leq M10$

DIN 376
 $\geq M12$


ARTICLE SUBSTITUTED WITH

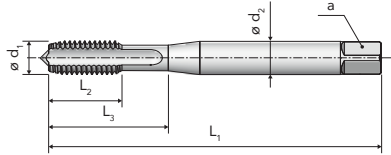
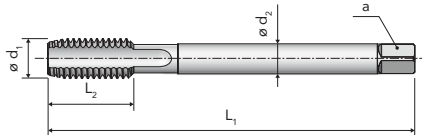
A70S LH
 (pp. 66)

ISO2
6H


Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	Z		A21 FC LH BRIGHT			
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 3	0,5	56	10	18	3,5	2,7	3	2,5	•			
4	0,7	63	12	21	4,5	3,4	3	3,3	•			
5	0,8	70	14	24,5	6	4,9	3	4,2	•			
6	1	80	16	29	6	4,9	3	5	•			
8	1,25	90	18	33	8	6,2	3	6,8	•			
10	1,5	100	20	36	10	8	3	8,5	•			
12	1,75	110	24	-	9	7	3	10,2	•			
14	2	110	25	-	11	9	3	12	•			
16	2	110	28	-	12	9	3	14	•			
18	2,5	125	32	-	14	11	3	15,5	•			
20	2,5	140	32	-	16	12	4	17,5	•			
22	2,5	140	32	-	18	14,5	4	19,5	•			
24	3	160	36	-	18	14,5	4	21	•			
27	3	160	36	-	20	16	4	24	•			
30	3,5	180	40	-	22	18	4	26,5	•			


A21 FP
BRIGHT

A21 FP
TiN

DIN 371
≤ M10

DIN 376
≥ M11


ARTICLE SUBSTITUTED WITH

A15 S
(pp. 45)

ISO2
6H

ISO2
6H

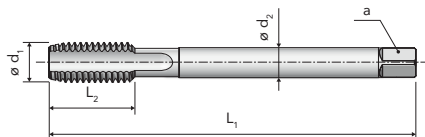

Ød ₁ [mm]	P [mm]	L ₁ js 16 [mm]	L ₂ [mm]	L ₃ [mm]	Ød ₂ h9 [mm]	a h12 [mm]	z	 [mm]	A21 FP BRIGHT	A21 FP TiN		
M 2	0,4	45	7	11	2,8	2,1	3	1,6	•	•		
2,2	0,45	45	8	13	2,8	2,1	3	1,75	•	•		
2,3	0,4	45	8	13	2,8	2,1	3	1,9	•	•		
2,5	0,45	50	9	15	2,8	2,1	3	2,05	•	•		
2,6	0,45	50	9	15	2,8	2,1	3	2,1	•	•		
3	0,5	56	10	18	3,5	2,7	3	2,5	•	•		
3,5	0,6	56	11	20	4	3	3	2,9	•	•		
4	0,7	63	12	21	4,5	3,4	3	3,3	•	•		
5	0,8	70	14	24,5	6	4,9	3	4,2	•	•		
6	1	80	16	29	6	4,9	3	5	•	•		
7	1	80	16	29	7	5,5	3	6	•	•		
8	1,25	90	18	33	8	6,2	3	6,8	•	•		
9	1,25	90	18	33	9	7	3	7,8	•	•		
10	1,5	100	20	36	10	8	3	8,5	•	•		
11	1,5	100	22	-	8	6,2	3	9,5	•	•		
12	1,75	110	24	-	9	7	3	10,2	•	•		
14	2	110	25	-	11	9	3	12	•	•		
16	2	110	28	-	12	9	3	14	•	•		
18	2,5	125	32	-	14	11	3	15,5	•	•		
20	2,5	140	32	-	16	12	4	17,5	•	•		
22	2,5	140	32	-	18	14,5	4	19,5	•	•		
24	3	160	36	-	18	14,5	4	21	•	•		
27	3	160	36	-	20	16	4	24	•	•		
30	3,5	180	40	-	22	18	4	26,5	•	•		
33	3,5	180	40	-	25	20	4	29,5	•	•		
36	4	200	55	-	28	22	4	32	•	•		



HSSE

A21 FP
BRIGHT

DIN 376



ARTICLE SUBSTITUTED WITH

A15 S
(pp. 45)

ISO2
6H



1,5xD



RH



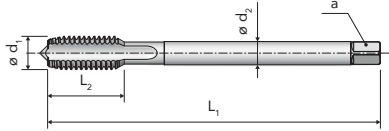
<<



A22 FP
BRIGHT

A22 FP
TiN

DIN 376



ARTICLE SUBSTITUTED WITH

A16 S
(pp. 51)



ISO2
6H

ISO2
6H



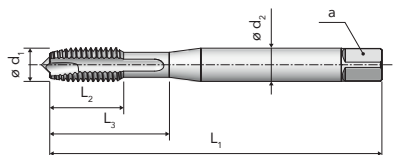
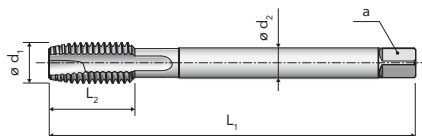
1,5xD

[illegible]


A15
 BRIGHT

A15
 VAP

A15
 TiN

DIN 371
 $\leq M10$

DIN 376
 $\geq M12$


ARTICLE SUBSTITUTED WITH

A15 S
 (pp. 45)

ISO2
6H
ISO2
6H
ISO2
6H


Ød ₁ [mm]	P [mm]	L ₁ js 16 [mm]	L ₂ [mm]	L ₃ [mm]	Ød ₂ h9 [mm]	a h12 [mm]	Z [-]	 [mm]	A15 BRIGHT	A15 VAP	A15 TiN
M 2	0,4	45	7	11	2,8	2,1	2	1,6	•	•	•
2,5	0,45	50	9	15	2,8	2,1	3	2,05	•	•	•
3	0,5	56	10	18	3,5	2,7	3	2,5	•	•	•
3,5	0,6	56	11	20	4	3	3	2,9	•	•	•
4	0,7	63	12	21	4,5	3,4	3	3,3	•	•	•
5	0,8	70	14	24,5	6	4,9	3	4,2	•	•	•
6	1	80	16	29	6	4,9	3	5	•	•	•
8	1,25	90	18	33	8	6,2	3	6,8	•	•	•
10	1,5	100	20	36	10	8	3	8,5	•	•	•
12	1,75	110	24	-	9	7	3	10,2	•	•	•
14	2	110	25	-	11	9	3	12	•	•	•
16	2	110	28	-	12	9	3	14	•	•	•
18	2,5	125	32	-	14	11	4	15,5	•	•	•
20	2,5	140	32	-	16	12	4	17,5	•	•	•
22	2,5	140	32	-	18	14,5	4	19,5	•	•	•
24	3	160	36	-	18	14,5	4	21	•	•	•
27	3	160	36	-	20	16	4	24	•	•	•
30	3,5	180	40	-	22	18	4	26,5	•	•	•

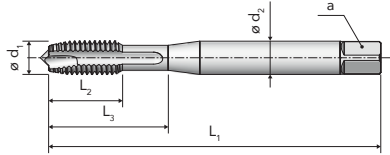


HSSE

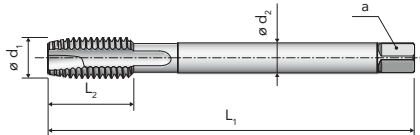
A15 6G
BRIGHT

A15 6G
TiN

DIN 371
≤ M10



DIN 376
≥ M12



ARTICLE SUBSTITUTED WITH

A15 S 6G
(pp. 48)

**ISO3
6G**

**IS03
6G**

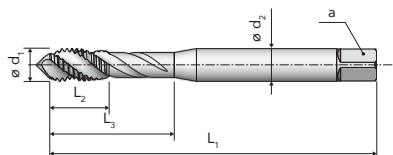
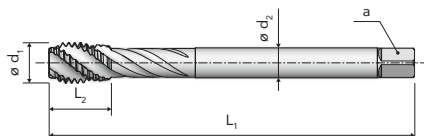


Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	z		A15 6G BRIGHT	A15 6G TiN		
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 2	0,4	45	7	11	2,8	2,1	2	1,6	●	●		
2,5	0,45	50	9	15	2,8	2,1	3	2,05	●	●		
3	0,5	56	10	18	3,5	2,7	3	2,5	●	●		
4	0,7	63	12	21	4,5	3,4	3	3,3	●	●		
5	0,8	70	14	24,5	6	4,9	3	4,2	●	●		
6	1	80	16	29	6	4,9	3	5	●	●		
8	1,25	90	18	33	8	6,2	3	6,8	●	●		
10	1,5	100	20	36	10	8	3	8,5	●	●		
12	1,75	110	24	-	9	7	3	10,2	●	●		
14	2	110	25	-	11	9	3	12	●	●		
16	2	110	28	-	12	9	3	14	●	●		


A70
 BRIGHT

A70
 VAP

A70
 TiN

DIN 371
 $\leq M10$

DIN 376
 $\geq M12$


ARTICLE SUBSTITUTED WITH

A70 S
 (pp. 60)

ISO2
6H
ISO2
6H
ISO2
6H


$\varnothing d_1$ [mm]	P [mm]	L_1 js 16 [mm]	L_2 [mm]	L_3 [mm]	$\varnothing d_2$ h9 [mm]	a h12 [mm]	z	 [mm]	A70 BRIGHT	A70 VAP	A70 TiN
M 2	0,4	45	6	12	2,8	2,1	3	1,6	•	•	•
2,5	0,45	50	6,5	15	2,8	2,1	3	2,05	•	•	•
3	0,5	56	7	15	3,5	2,7	3	2,5	•	•	•
4	0,7	63	8,5	21	4,5	3,4	3	3,3	•	•	•
5	0,8	70	10	24,5	6	4,9	3	4,2	•	•	•
6	1	80	12	29	6	4,9	3	5	•	•	•
8	1,25	90	15	33	8	6,2	3	6,8	•	•	•
10	1,5	100	17,5	38	10	8	3	8,5	•	•	•
12	1,75	110	18	-	9	7	4	10,2	•	•	•
14	2	110	20,5	-	11	9	4	12	•	•	•
16	2	110	20,5	-	12	9	4	14	•	•	•
18	2,5	125	25,5	-	14	11	4	15,5	•	•	•
20	2,5	140	29,5	-	16	12	4	17,5	•	•	•
22	2,5	140	29,5	-	18	14,5	4	19,5	•	•	•
24	3	160	35,5	-	18	14,5	4	21	•	•	•
27	3	160	37,5	-	20	16	4	24	•	•	•
30	3,5	180	42	-	22	18	4	26,5	•	•	•
33	3,5	180	43,5	-	25	20	4	29,5	•	•	•
36	4	200	47	-	28	22	4	32	•	•	•

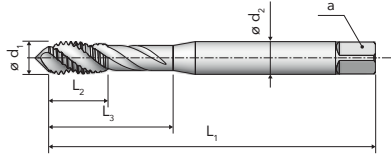


A70 6G
BRIGHT

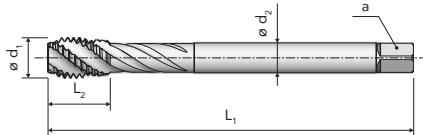
A70 6G
VAP

A70 6G
TiN

DIN 371
≤ M10



DIN 376
≥ M12



ARTICLE SUBSTITUTED WITH

A70 S 6G
(pp. 62)

**ISO3
6G**



**ISO3
6G**

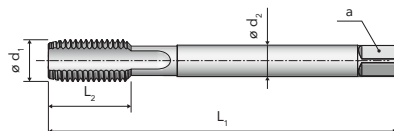
[illegible]


A23 FP
 BRIGHT

A23 FP
 TiN

A23 FP LH
 BRIGHT

DIN 374


A23 FP
 BRIGHT

A23 FP
 TiN

A23 FP LH
 BRIGHT

ARTICLE SUBSTITUTED WITH

A17 S
 (pp. 87)

A17 S
 (pp. 87)

A23 FC LH
 (pp. 83)

ISO2
6H
ISO2
6H
ISO2
6H


Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	Z		A23 FP BRIGHT	A23 FP TiN	A23 FP LH BRIGHT
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]			
M 3	0,35	56	8	-	2,2	-	3	2,65	•		
3,5	0,35	56	9	-	2,5	2,1	3	3,15	•		
4	0,5	63	10	-	2,8	2,1	3	3,5	•		
5	0,5	70	12	-	3,5	2,7	3	4,5	•		
6	0,5	80	14	-	4,5	3,4	3	5,5	•	•	
6	0,75	80	14	-	4,5	3,4	3	5,2	•	•	•
7	0,75	80	14	-	5,5	4,3	3	6,2	•	•	
8	0,75	80	16	-	6	4,9	3	7,2	•		
8	1	90	16	-	6	4,9	3	7	•	•	•
9	1	90	16	-	7	5,5	3	8	•		
10	0,5	90	18	-	7	5,5	4	9,5	•	•	
10	0,75	90	18	-	7	5,5	3	9,2	•		
10	1	90	18	-	7	5,5	3	9	•	•	•
10	1,25	100	18	-	7	5,5	3	8,8	•	•	•
11	1	90	20	-	8	6,2	3	10	•		
12	0,75	100	22	-	9	7	4	11,2	•	•	
12	1	100	22	-	9	7	4	11	•	•	
12	1,25	100	22	-	9	7	3	10,8	•	•	•
12	1,5	100	22	-	9	7	3	10,5	•	•	•
14	1	100	22	-	11	9	4	13	•	•	
14	1,25	100	22	-	11	9	3	12,8	•	•	
14	1,5	100	22	-	11	9	3	12,5	•	•	•
15	1	100	22	-	12	9	4	14	•		
15	1,5	100	22	-	12	9	3	13,5	•		
16	1	100	22	-	12	9	4	15	•	•	
16	1,25	100	22	-	12	9	4	14,8	•	•	

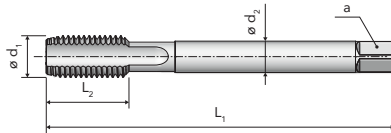


A23 FP
BRIGHT

A23 FP
TiN

A23 FP LH
BRIGHT

DIN 374



A23 FP
BRIGHT

A23 FP
TiN

A23 FP LH
BRIGHT

ARTICLE SUBSTITUTED WITH

A17 S
(pp. 87)

A17 S
(pp. 87)

A23 FC LH
(pp. 84)

ISO2
6H

ISO2
6H

ISO2
6H

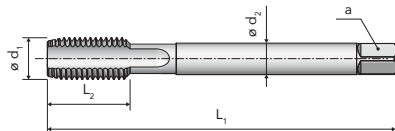


E

«	Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	Z		A23 FP BRIGHT	A23 FP TiN	A23 FP LH BRIGHT
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]			
M 16	1,5	100	22	-	12	9	3	14,5	•	•	•	
17	1	100	22	-	12	9	4	16	•			
17	1,5	100	22	-	12	9	4	15,5	•			
18	1	110	25	-	14	11	4	17	•			
18	1,5	110	25	-	14	11	4	16,5	•	•	•	
18	2	125	28	-	14	11	4	16	•			
20	1	125	25	-	16	12	4	19	•			
20	1,5	125	25	-	16	12	4	18,5	•	•	•	
20	2	140	28	-	16	12	4	18	•			
22	1	125	25	-	18	14,5	4	21	•			
22	1,5	125	25	-	18	14,5	4	20,5	•	•		
22	2	140	28	-	18	14,5	4	20	•			
24	1	140	25	-	18	14,5	4	23	•			
24	1,5	140	25	-	18	14,5	4	22,5	•			
24	2	140	28	-	18	14,5	4	22	•			
25	1	140	25	-	18	14,5	4	24	•			
25	1,5	140	25	-	18	14,5	4	23,5	•			
25	2	140	28	-	18	14,5	4	23	•			
26	1	140	25	-	18	14,5	4	25	•			
26	1,5	140	25	-	18	14,5	4	24,5	•			
26	2	140	28	-	18	14,5	4	24	•			
27	1,5	140	28	-	20	16	4	25,5	•			
27	2	140	28	-	20	16	4	25	•			
28	1,5	140	28	-	20	16	4	26,5	•			
28	2	140	28	-	20	16	4	26	•			
30	1	150	25	-	22	18	5	29	•			


A23 FP
 BRIGHT

DIN 374



ARTICLE SUBSTITUTED WITH

A17 S
 (pp. 88-89)

ISO2
6H


«

Ød ₁ [mm]	P [mm]	L ₁ js 16 [mm]	L ₂ [mm]	L ₃ [mm]	Ød ₂ h9 [mm]	a h12 [mm]	Z [-]	 [mm]	A23 FP BRIGHT			
M 30	1,5	150	28	-	22	18	4	28,5	•			
30	2	150	28	-	22	18	4	28	•			
32	1,5	150	28	-	22	18	5	30,5	•			
32	2	150	28	-	22	18	4	30	•			
33	1,5	160	30	-	25	20	5	31,5	•			
33	2	160	30	-	25	20	4	31	•			
35	1,5	170	30	-	28	22	5	33,5	•			
35	2	170	30	-	28	22	5	33	•			
36	1,5	170	30	-	28	22	5	34,5	•			
36	2	170	30	-	28	22	5	34	•			
36	3	200	56	-	28	22	4	33	•			
39	3	200	60	-	32	24	5	36	•			
40	1,5	170	30	-	32	24	5	38,5	•			
40	2	170	30	-	32	24	5	38	•			
40	3	200	60	-	32	24	5	37	•			
42	1,5	170	30	-	32	24	6	40,5	•			
42	2	170	30	-	32	24	5	40	•			
42	3	200	60	-	32	24	5	39	•			
45	1,5	180	32	-	36	29	6	43,5	•			
45	2	180	32	-	36	29	5	43	•			
45	3	200	50	-	36	29	5	42	•			
48	1,5	190	32	-	36	29	6	46,5	•			
48	2	190	32	-	36	29	6	46	•			
48	3	225	50	-	36	29	5	45	•			
52	1,5	190	32	-	40	32	6	50,5	•			
52	2	190	32	-	40	32	6	50	•			
52	3	225	50	-	40	32	5	49	•			

MACHINE TAPS for through holes Straight flutes with spiral point

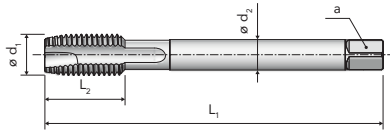


A17
BRIGHT

A17
VAP

A17
TiN

DIN 374



ARTICLE SUBSTITUTED WITH

A17 S
(pp. 87)

ISO2
6H

ISO2
6H

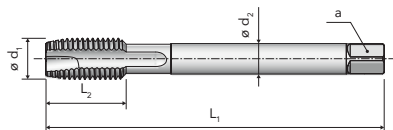
ISO2
6H



Ød ₁ [mm]	P [mm]	L ₁ js 16 [mm]	L ₂ [mm]	L ₃ [mm]	Ød ₂ h9 [mm]	a h12 [mm]	z		A17 BRIGHT	A17 VAP	A17 TiN
M 4	0,5	63	10	-	2,8	2,1	3	3,5	•		
5	0,5	70	12	-	3,5	2,7	3	4,5	•		
6	0,75	80	14	-	4,5	3,4	3	5,2	•	•	•
7	0,75	80	14	-	5,5	4,3	3	6,2	•		
8	0,75	80	16	-	6	4,9	3	7,2	•		
8	1	90	16	-	6	4,9	3	7	•	•	•
9	1	90	16	-	7	5,5	3	8	•		
10	0,75	90	18	-	7	5,5	4	9,2	•		
10	1	90	18	-	7	5,5	4	9	•	•	•
10	1,25	100	18	-	7	5,5	3	8,8	•	•	•
11	1	90	20	-	8	6,2	4	10	•		
12	1	100	22	-	9	7	4	11	•	•	•
12	1,25	100	22	-	9	7	4	10,8	•	•	•
12	1,5	100	22	-	9	7	3	10,5	•	•	•
14	1	100	22	-	11	9	4	13	•		
14	1,25	100	22	-	11	9	4	12,8	•	•	•
14	1,5	100	22	-	11	9	4	12,5	•	•	•
15	1	100	22	-	12	9	4	14	•		
15	1,5	100	22	-	12	9	4	13,5	•		
16	1	100	22	-	12	9	4	15	•		
16	1,5	100	22	-	12	9	4	14,5	•	•	•
18	1	110	25	-	14	11	4	17	•		
18	1,5	110	25	-	14	11	4	16,5	•	•	•
20	1	125	25	-	16	12	4	19	•		
20	1,5	125	25	-	16	12	4	18,5	•	•	•
22	1	125	25	-	18	14,5	4	21	•		


A17
 BRIGHT

DIN 374



ARTICLE SUBSTITUTED WITH

A17 S
 (pp. 88)

ISO2
6H


«

Ød ₁	P	L ₁ js 16	L ₂	L ₃	Ød ₂ h9	a h12	Z		A17 BRIGHT			
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[-]	[mm]				
M 22	1,5	125	25	-	18	14,5	4	20,5	•			
24	1	140	25	-	18	14,5	5	23	•			
24	1,5	140	25	-	18	14,5	4	22,5	•			
24	2	140	28	-	18	14,5	4	22	•			
25	1,5	140	25	-	18	14,5	4	23,5	•			
25	2	140	28	-	18	14,5	4	23	•			
26	1,5	140	25	-	18	14,5	4	24,5	•			
26	2	140	28	-	18	14,5	4	24	•			
27	1,5	140	28	-	20	16	4	25,5	•			
27	2	140	28	-	20	16	4	25	•			
28	1,5	140	28	-	20	16	4	26,5	•			
28	2	140	28	-	20	16	4	26	•			
30	1,5	150	28	-	22	18	4	28,5	•			
30	2	150	28	-	22	18	4	28	•			
32	1,5	150	28	-	22	18	5	30,5	•			
32	2	150	28	-	22	18	4	30	•			
36	1,5	170	30	-	28	22	5	34,5	•			
36	2	170	30	-	28	22	5	34	•			
36	3	200	56	-	28	22	4	33	•			
40	1,5	170	30	-	32	24	5	38,5	•			
40	2	170	30	-	32	24	5	38	•			
40	3	200	60	-	32	24	4	37	•			
42	1,5	170	30	-	32	24	5	40,5	•			
42	2	170	30	-	32	24	5	40	•			
42	3	200	60	-	32	24	5	39	•			
45	1,5	180	32	-	36	29	6	43,5	•			

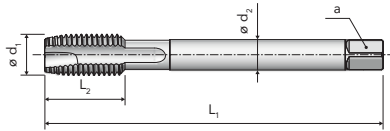
»



HSSE

A17
BRIGHT

DIN 374



ARTICLE SUBSTITUTED WITH

A17 S
(pp. 89)

ISO2
6H



<<

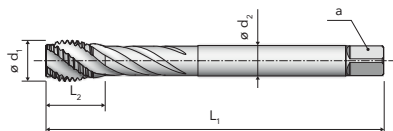
[illegible]



A71
BRIGHT

A71
TiN

DIN 374



ARTICLE SUBSTITUTED WITH

A71 S
(pp. 95)

ISO2
6H

ISO2
6H



2,5xD

[illegible]

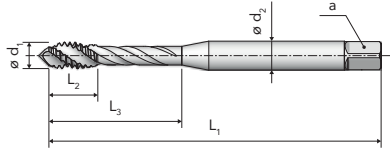
MACHINE TAPS for blind holes
40° spiral flutes / back tapered



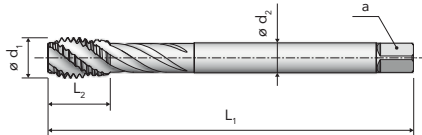
A60
BRIGHT

A60
TiN

DIN 2184-1
≤ Ø 1/4"



DIN 2184-1
≥ Ø 5/16"



ARTICLE SUBSTITUTED WITH

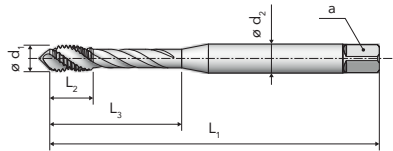
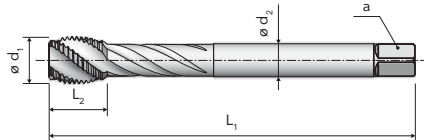
A60 S
(pp. 109)

2B

2B



UNC	P [TPI]	Ød ₁ [mm]	L ₁ js 16 [mm]	L ₂ [mm]	L ₃ [mm]	Ød ₂ h9 [mm]	a h12 [mm]	z		A60 BRIGHT	A60 TiN		
Nr.2	56	2,184	45	6	13	2,8	2,1	3	1,85	•	•		
Nr.3	48	2,515	50	6	15	2,8	2,1	3	2,1	•	•		
Nr.4	40	2,845	56	6,5	21	3,5	2,7	3	2,35	•	•		
Nr.5	40	3,175	56	6,5	21	3,5	2,7	3	2,65	•	•		
Nr.6	32	3,505	56	7,5	22,5	4	3	3	2,85	•	•		
Nr.8	32	4,166	63	7,5	26	4,5	3,4	3	3,5	•	•		
Nr.10	24	4,826	70	10	28,5	6	4,9	3	3,9	•	•		
Nr.12	24	5,486	80	10	28,5	6	4,9	3	4,5	•	•		
1/4"	20	6,35	80	11,5	32	7	5,5	3	5,1	•	•		
5/16"	18	7,938	90	13	-	6	4,9	3	6,6	•	•		
3/8"	16	9,525	100	14	-	7	5,5	3	8	•	•		
7/16"	14	11,113	100	17	-	8	6,2	3	9,4	•	•		
1/2"	13	12,7	110	19	-	9	7	4	10,8	•	•		
9/16"	12	14,288	110	21	-	11	9	4	12,2	•	•		
5/8"	11	15,875	110	22,5	-	12	9	4	13,5	•	•		
3/4"	10	19,05	125	26	-	14	11	4	16,5	•	•		
7/8"	9	22,225	140	30	-	18	14,5	4	19,5	•	•		
1"	8	25,4	160	36,5	-	18	14,5	4	22,25	•	•		

A61
BRIGHTA61
TiNDIN 2184-1
≤ Ø 1/4"DIN 2184-1
≥ Ø 5/16"

ARTICLE SUBSTITUTED WITH

A61 S
(pp. 117)

2B

2B



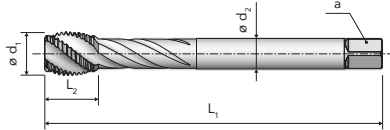
UNF	P [TPI]	Ød ₁ [mm]	L ₁ js 16 [mm]	L ₂ [mm]	L ₃ [mm]	Ød ₂ h9 [mm]	a h12 [mm]	z		A61 BRIGHT	A61 TiN		
Nr.2	64	2,184	45	5,5	13	2,8	2,1	3	1,85	•	•		
Nr.3	56	2,515	50	6	18	2,8	2,1	3	2,15	•	•		
Nr.4	48	2,845	56	6	18	3,5	2,7	3	2,4	•	•		
Nr.5	44	3,175	56	6	18	3,5	2,7	3	2,7	•	•		
Nr.6	40	3,505	56	6,5	22	4	3	3	2,95	•	•		
Nr.8	36	4,166	63	7	26,5	4,5	3,4	3	3,5	•	•		
Nr.10	32	4,826	70	8	29	6	4,9	3	4,1	•	•		
Nr.12	28	5,486	80	9	29,5	6	4,9	3	4,6	•	•		
1/4"	28	6,35	80	10	32	7	5,5	3	5,5	•	•		
5/16"	24	7,938	90	11	-	6	4,9	3	6,9	•	•		
3/8"	24	9,525	90	12	-	7	5,5	3	8,5	•	•		
7/16"	20	11,113	100	13,5	-	8	6,2	3	9,9	•	•		
1/2"	20	12,7	100	14,5	-	9	7	4	11,5	•	•		
9/16"	18	14,288	100	15,5	-	11	9	4	12,9	•	•		
5/8"	18	15,875	100	16	-	12	9	4	14,5	•	•		
3/4"	16	19,05	110	18	-	14	11	4	17,5	•	•		
7/8"	14	22,225	125	23,5	-	18	14,5	4	20,4	•	•		
1"	12	25,4	140	26	-	18	14,5	4	23,25	•	•		



A59
BRIGHT

A59
TiN

DIN 5156



ARTICLE SUBSTITUTED WITH

A59 S
(pp. 126)

**ISO
5969**

**ISO
5969**

[illegible]

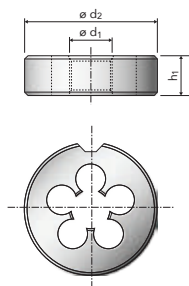
F SERIES

Dies


X200
 BRIGHT

X200 LH
 BRIGHT

DIN EN 22568



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	X200 BRIGHT	X200 LH BRIGHT		
P	P.1-4	•	•		
	P.7	•	•		
M	M.1	•	•		
K	K.2	•	•		
N	N.1-3	•	•		
	N.5-7	•	•		

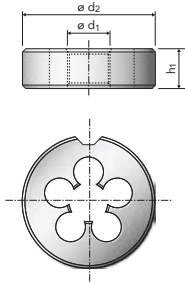


$\varnothing d_1$	P	$\varnothing d_2$	h1	X200 BRIGHT	X200 LH BRIGHT
[mm]	[mm]	[mm]	[mm]		
M 2	0,4	16	5	•	
2,2	0,45	16	5	•	
2,5	0,45	16	5	•	
3	0,5	20	5	•	•
3,5	0,6	20	5	•	
4	0,7	20	5	•	•
5	0,8	20	7	•	•
6	1	20	7	•	•
7	1	25	9	•	
8	1,25	25	9	•	•
9	1,25	25	9	•	
10	1,5	30	11	•	•
11	1,5	30	11	•	
12	1,75	38	14	•	•
14	2	38	14	•	•
16	2	45	18	•	
18	2,5	45	18	•	
20	2,5	45	18	•	
22	2,5	55	22	•	
24	3	55	22	•	
27	3	65	25	•	
30	3,5	65	25	•	
33	3,5	65	25	•	
36	4	65	25	•	
39	4	75	30	•	



X201
BRIGHT

DIN EN 22568



APPLICATION RANGE - CUTTING SPEED m/min

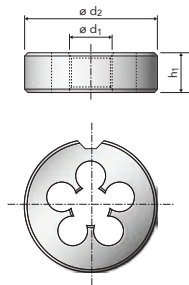
ISO	MG	X201 BRIGHT			
P	P.1-4	•			
	P.7	•			
M	M.1	•			
K	K.2	•			
N	N.1-3	•			
	N.5-7	•			



$\varnothing d_1$	P	$\varnothing d_2$	h1	X201 BRIGHT	
[mm]	[mm]	[mm]	[mm]		
M 2	0,25	16	5	•	
2,2	0,25	16	5	•	
2,5	0,35	16	5	•	
3	0,35	20	5	•	
4	0,5	20	5	•	
5	0,5	20	5	•	
6	0,75	20	7	•	
7	0,75	25	9	•	
8	0,75	25	9	•	
8	1	25	9	•	
9	1	25	9	•	
10	0,75	30	11	•	
10	1	30	11	•	
10	1,25	30	11	•	
11	1	30	11	•	
12	1	38	10	•	
12	1,25	38	10	•	
12	1,5	38	10	•	
14	1	38	10	•	
14	1,25	38	10	•	
14	1,5	38	10	•	
15	1	38	10	•	
15	1,5	38	10	•	
16	1	45	14	•	
16	1,5	45	14	•	
18	1	45	14	•	


X201
 BRIGHT

DIN EN 22568



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	X201 BRIGHT			
P	P.1-4	•			
	P.7	•			
M	M.1	•			
K	K.2	•			
N	N.1-3	•			
	N.5-7	•			



«

Ød ₁	P	Ød ₂	h ₁	X201 BRIGHT	
[mm]	[mm]	[mm]	[mm]		
M 18	1,5	45	14	•	
18	2	45	14	•	
20	1	45	14	•	
20	1,5	45	14	•	
20	2	45	14	•	
22	1	55	16	•	
22	1,5	55	16	•	
22	2	55	16	•	
24	1	55	16	•	
24	1,5	55	16	•	
24	2	55	16	•	
25	1	55	16	•	
25	1,5	55	16	•	
25	2	55	16	•	
26	1,5	55	16	•	
27	1,5	65	18	•	
27	2	65	18	•	
28	1,5	65	18	•	
28	2	65	18	•	
30	1	65	18	•	
30	1,5	65	18	•	
30	2	65	18	•	
32	1,5	65	18	•	
32	2	65	18	•	
33	2	65	18	•	
35	1,5	65	18	•	

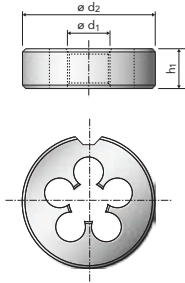
»



HSS

X201
BRIGHT

DIN EN 22568



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	X201 BRIGHT			
P	P.1-4	●			
	P.7	●			
M	M.1	●			
K	K.2	●			
N	N.1-3	●			
	N.5-7	●			

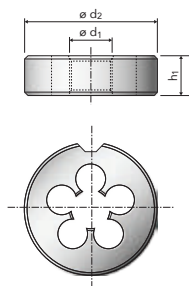
ISO
6g



«

X204
BRIGHT

DIN EN 22568



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	X204 BRIGHT			
P	P.1-4	•			
	P.7	•			
M	M.1	•			
K	K.2	•			
N	N.1-3	•			
	N.5-7	•			

2A

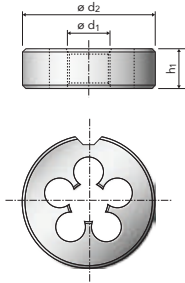


UNC	P	Ød ₁	Ød ₂	h ₁	X204 BRIGHT	
	[TPI]	[mm]	[mm]	[mm]		
Nr. 2	56	2,184	16	5	•	
Nr. 4	40	2,845	20	5	•	
Nr. 5	40	3,175	20	5	•	
Nr. 6	32	3,505	20	7	•	
Nr. 8	32	4,166	20	7	•	
Nr. 10	24	4,826	20	7	•	
Nr. 12	24	5,486	20	7	•	
1/4"	20	6,35	20	7	•	
5/16"	18	7,938	25	9	•	
3/8"	16	9,525	30	11	•	
7/16"	14	11,113	30	11	•	
1/2"	13	12,7	38	14	•	
9/16"	12	14,288	38	14	•	
5/8"	11	15,875	45	18	•	
3/4"	10	19,05	45	18	•	
7/8"	9	22,225	55	22	•	
1"	8	25,4	55	22	•	



X205
BRIGHT

DIN EN 22568



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	X205 BRIGHT			
P	P.1-4	•			
	P.7	•			
M	M.1	•			
K	K.2	•			
N	N.1-3	•			
	N.5-7	•			

2A



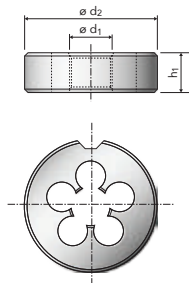
UNF	P	Ød ₁	Ød ₂	h ₁	X205 BRIGHT	
	[TPI]	[mm]	[mm]	[mm]		
Nr. 3	56	2,515	16	5	•	
Nr. 4	48	2,845	20	5	•	
Nr. 5	44	3,175	20	5	•	
Nr. 6	40	3,505	20	5	•	
Nr. 8	36	4,166	20	7	•	
Nr. 10	32	4,826	20	7	•	
Nr. 12	28	5,486	20	7	•	
1/4"	28	6,35	20	7	•	
5/16"	24	7,938	25	9	•	
3/8"	24	9,525	30	11	•	
7/16"	20	11,113	30	11	•	
1/2"	20	12,7	38	10	•	
9/16"	18	14,288	38	10	•	
5/8"	18	15,875	45	14	•	
3/4"	16	19,05	45	14	•	
7/8"	14	22,225	55	16	•	
1"	12	25,4	55	16	•	



HSS

X203
BRIGHT

DIN EN 24231



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	X203 BRIGHT			
P	P.1-4	•			
	P.7	•			
M	M.1	•			
K	K.2	•			
N	N.1-3	•			
	N.5-7	•			

A



RH

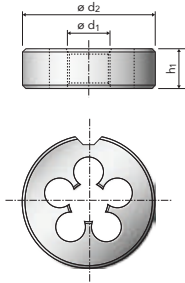
G	P	$\varnothing d_1$	$\varnothing d_2$	h1	X203 BRIGHT	
	[TPI]	[mm]	[mm]	[mm]		
1/8"	28	9,728	30	11	•	
1/4"	19	13,157	38	10	•	
3/8"	19	16,662	45	14	•	
1/2"	14	20,955	45	14	•	
5/8"	14	22,911	55	16	•	
3/4"	14	26,441	55	16	•	
7/8"	14	30,201	65	18	•	
1"	11	33,249	65	18	•	
1 1/4"	11	41,91	75	20	•	
1 1/2"	11	47,803	90	22	•	
2"	11	59,614	105	22	•	



HSS

X202
BRIGHT

DIN EN 22568



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	X202 BRIGHT			
P	P.1-4	●			
	P.7	●			
M	M.1	●			
K	K.2	●			
N	N.1-3	●			
	N.5-7	●			

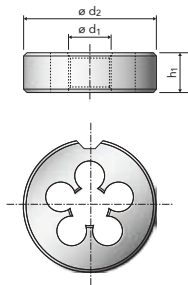
[illegible]



HSS

X206
BRIGHT

DIN EN 22568



APPLICATION RANGE - CUTTING SPEED m/min

ISO	MG	X206 BRIGHT			
P	P.1-4	●			
	P.7	●			
M	M.1	●			
K	K.2	●			
N	N.1-3	●			
	N.5-7	●			

[illegible]

VR SERIES

Thread Mills

APPLICATION AND CUTTING SPEED TABLE

VR10 - VR20 - VR30															
ISO 513	Material	Group	Application	N/mm²	Vc m/min	Feed (mm/tooth)									
						Ø2	Ø3	Ø4	Ø6	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20
P	Steel	P.1	Mild / magnetic steel	200 - 400	100-250	0,03	0,04	0,04	0,06	0,07	0,08	0,09	0,11	0,12	0,15
		P.2	Construction steel, case hardening steel	350 - 700	100-250	0,03	0,04	0,04	0,06	0,07	0,08	0,09	0,11	0,12	0,15
		P.3	Carbon steel	350 - 850	100-250	0,03	0,04	0,04	0,06	0,07	0,08	0,09	0,11	0,12	0,15
		P.4	Alloyed steel, tempered steel	500 - 850	110-180	0,02	0,03	0,03	0,05	0,06	0,07	0,08	0,09	0,1	0,12
		P.5	Alloyed steel, tempered steel	850 - 1200	90-160	0,02	0,02	0,03	0,03	0,04	0,05	0,05	0,06	0,07	0,08
		P.6	Alloyed steel / high strength steel	1200 - 1600	90-140	0,02	0,02	0,02	0,02	0,03	0,04	0,04	0,05	0,06	0,07
		P.7	Ferritic / martensitic stainless steel	< 1000	110-180	0,02	0,03	0,03	0,05	0,06	0,07	0,08	0,09	0,1	0,12
M	Stainless steel	M.1	Austenitic	< 850	60-120	0,02	0,02	0,03	0,03	0,04	0,05	0,05	0,06	0,07	0,08
		M.2	Ferritic-austenitic (Duplex)	< 1000	50-100	0,02	0,02	0,03	0,03	0,04	0,05	0,05	0,06	0,07	0,08
K	Cast iron	K.1	Grey cast iron	< 1000	70-150	0,03	0,04	0,04	0,06	0,07	0,08	0,09	0,11	0,12	0,15
		K.2	Nodular cast iron	< 1000	100-250	0,03	0,04	0,04	0,06	0,07	0,08	0,09	0,11	0,12	0,15
		K.3	Austempered ductile iron (ADI)	< 1400	70-120	0,03	0,03	0,03	0,04	0,05	0,06	0,07	0,08	0,09	0,1
N	Aluminium alloys	N.1	Pure aluminium	< 300	150-350	0,03	0,04	0,04	0,06	0,07	0,08	0,09	0,11	0,12	0,15
		N.2	Aluminium alloys Si < 0,5% (long chipping)	< 500	150-350	0,03	0,04	0,04	0,06	0,07	0,08	0,09	0,11	0,12	0,15
		N.3	Aluminium alloys Si < 10% (medium chipping)	< 500	150-350	0,03	0,04	0,04	0,06	0,07	0,08	0,09	0,11	0,12	0,15
		N.4	Aluminium alloys Si > 10% (short chipping)	< 600	100-250	0,02	0,02	0,03	0,03	0,04	0,05	0,05	0,06	0,07	0,08
	Copper alloys	N.5	Pure copper	250 - 350	150-350	0,03	0,04	0,04	0,06	0,07	0,08	0,09	0,11	0,12	0,15
		N.6	Copper alloys, Brass (long chipping)	< 700	150-350	0,03	0,04	0,04	0,06	0,07	0,08	0,09	0,11	0,12	0,15
		N.7	Copper alloys, Brass (short chipping)	< 700	100-250	0,02	0,02	0,03	0,03	0,04	0,05	0,05	0,06	0,07	0,08
		N.8	High strength bronze	700 - 1500	90-140	0,02	0,02	0,02	0,02	0,03	0,04	0,04	0,05	0,06	0,07
	Magnesium alloys	N.9	Pure Magnesium / Magnesium alloys	120 - 300	150-350	0,03	0,04	0,04	0,06	0,07	0,08	0,09	0,11	0,12	0,15
		N.10	High strength Magnesium alloys	240 - 400	150-350	0,03	0,04	0,04	0,06	0,07	0,08	0,09	0,11	0,12	0,15
S	Titanium alloys	S.1	Pure titanium	400 - 600	20-90	0,02	0,02	0,02	0,03	0,04	0,04	0,04	0,05	0,05	0,05
		S.2	Titanium alloys	600 - 1000	20-80	0,02	0,02	0,02	0,03	0,03	0,03	0,03	0,04	0,04	0,04
	Nickel alloys	S.3	Pure nickel	400 - 600	20-90	0,02	0,02	0,02	0,03	0,04	0,04	0,04	0,05	0,05	0,05
		S.4	Nickel alloys	600 - 1000	20-80	0,02	0,02	0,02	0,03	0,03	0,03	0,03	0,04	0,04	0,04

APPLICATION AND CUTTING SPEED TABLE

VR40 - VR45

ISO 513	Material	Group	Application	N/mm²	Vc, m/min	Feed (mm/tooth)													
						Ø1	Ø1,5	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	Ø9	Ø10	Ø12	Ø14	Ø16
P	Steel	P.1	Mild / magnetic steel	200 - 400	60-120	0,04	0,05	0,05	0,07	0,09	0,11	0,13	0,14	0,15	0,16	0,16	0,17	0,18	0,18
		P.2	Construction steel, case hardening steel	350 - 700	60-120	0,04	0,05	0,05	0,07	0,09	0,11	0,13	0,14	0,15	0,16	0,16	0,17	0,18	0,18
		P.3	Carbon steel	350 - 850	60-120	0,04	0,05	0,05	0,07	0,09	0,11	0,13	0,14	0,15	0,16	0,16	0,17	0,18	0,18
		P.4	Alloyed steel, tempered steel	500 - 850	60-90	0,03	0,04	0,05	0,06	0,08	0,09	0,1	0,12	0,13	0,14	0,14	0,16	0,17	0,18
		P.5	Alloyed steel, tempered steel	850 - 1200	50-80	0,03	0,04	0,04	0,05	0,05	0,06	0,07	0,07	0,08	0,09	0,1	0,12	0,13	0,14
		P.6	Alloyed steel / high strength steel	1200 - 1600	50-70	0,02	0,02	0,02	0,03	0,04	0,05	0,06	0,06	0,07	0,08	0,09	0,1	0,12	0,13
		P.7	Ferritic / martensitic stainless steel	< 1000	60-90	0,03	0,04	0,05	0,06	0,08	0,09	0,1	0,12	0,13	0,14	0,14	0,16	0,17	0,18
M	Stainless steel	M.1	Austenitic	< 850	60-90	0,02	0,03	0,03	0,04	0,05	0,06	0,06	0,07	0,08	0,09	0,1	0,11	0,12	0,13
		M.2	Ferritic-austenitic (Duplex)	< 1000	50-80	0,02	0,03	0,03	0,04	0,05	0,06	0,06	0,07	0,08	0,09	0,1	0,11	0,12	0,13
K	Cast iron	K.1	Grey cast iron	< 1000	40-80	0,04	0,05	0,05	0,07	0,09	0,11	0,13	0,14	0,15	0,16	0,16	0,17	0,18	0,18
		K.2	Nodular cast iron	< 1000	60-120	0,04	0,05	0,05	0,07	0,09	0,11	0,13	0,14	0,15	0,16	0,16	0,17	0,18	0,18
		K.3	Austempered ductile iron (ADI)	< 1400	40-70	0,04	0,04	0,04	0,05	0,05	0,06	0,07	0,08	0,09	0,1	0,11	0,12	0,12	0,12
N	Aluminium alloys	N.1	Pure aluminium	< 300	100-200	0,04	0,05	0,05	0,07	0,09	0,11	0,13	0,14	0,15	0,16	0,16	0,17	0,18	0,18
		N.2	Aluminium alloys Si < 0,5% (long chipping)	< 500	100-200	0,04	0,05	0,05	0,07	0,09	0,11	0,13	0,14	0,15	0,16	0,16	0,17	0,18	0,18
		N.3	Aluminium alloys Si < 10% (medium chipping)	< 500	100-200	0,04	0,05	0,05	0,07	0,09	0,11	0,13	0,14	0,15	0,16	0,16	0,17	0,18	0,18
		N.4	Aluminium alloys Si > 10% (short chipping)	< 600	60-140	0,03	0,03	0,03	0,04	0,05	0,06	0,06	0,07	0,08	0,09	0,1	0,11	0,13	0,14
	Copper alloys	N.5	Pure copper	250 - 350	100-200	0,04	0,05	0,05	0,07	0,09	0,11	0,13	0,14	0,15	0,16	0,16	0,17	0,18	0,18
		N.6	Copper alloys, Brass (long chipping)	< 700	100-200	0,04	0,05	0,05	0,07	0,09	0,11	0,13	0,14	0,15	0,16	0,16	0,17	0,18	0,18
		N.7	Copper alloys, Brass (short chipping)	< 700	60-140	0,03	0,03	0,03	0,04	0,05	0,06	0,06	0,07	0,08	0,09	0,1	0,11	0,13	0,14
		N.8	High strength bronze	700 - 1500	60-100	0,03	0,03	0,03	0,03	0,04	0,04	0,05	0,05	0,06	0,08	0,08	0,09	0,09	0,1
	Magnesium alloys	N.9	Pure Magnesium / Magnesium alloys	120 - 300	100-200	0,04	0,05	0,05	0,07	0,09	0,11	0,13	0,14	0,15	0,16	0,16	0,17	0,18	0,18
		N.10	High strength Magnesium alloys	240 - 400	100-200	0,04	0,05	0,05	0,07	0,09	0,11	0,13	0,14	0,15	0,16	0,16	0,17	0,18	0,18
S	Titanium alloys	S.1	Pure titanium	400 - 600	20-50	0,03	0,03	0,03	0,04	0,05	0,06	0,06	0,06	0,07	0,07	0,08	0,08	0,08	0,08
		S.2	Titanium alloys	600 - 1000	20-40	0,03	0,03	0,03	0,04	0,04	0,05	0,06	0,06	0,06	0,07	0,07	0,07	0,08	0,08
	Nickel alloys	S.3	Pure nickel	400 - 600	20-50	0,03	0,03	0,03	0,04	0,05	0,06	0,06	0,06	0,07	0,07	0,08	0,08	0,08	0,08
		S.4	Nickel alloys	600 - 1000	20-40	0,03	0,03	0,03	0,04	0,04	0,05	0,06	0,06	0,06	0,07	0,07	0,07	0,08	0,08

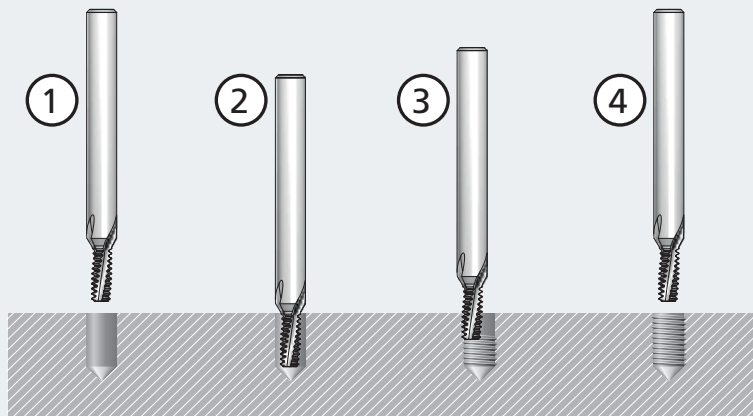
APPLICATION AND CUTTING SPEED TABLE

VR50 - VR55

ISO 513	Material	Group	Application	N/mm ²	Vc m/min	Feed (mm/tooth)													
						Ø1	Ø1,5	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	Ø9	Ø10	Ø12	Ø14	Ø16
S	Titanium alloys	S.2	Titanium alloys	600 - 1000	20-40	0,03	0,03	0,03	0,04	0,04	0,05	0,06	0,06	0,06	0,07	0,07	0,07	0,08	0,08
	Nickel alloys	S.4	Nickel alloys	600 - 1000	20-40	0,03	0,03	0,03	0,04	0,04	0,05	0,06	0,06	0,06	0,07	0,07	0,07	0,08	0,08
H	Hardened materials	H.1	Alloyed steel, hardness HRC 44-55	-	50-60	0,02	0,03	0,03	0,04	0,04	0,05	0,05	0,06	0,06	0,07	0,07	0,08	0,09	0,1
		H.2	Alloyed steel, hardness HRC 56-62	-	40-50	0,01	0,02	0,02	0,03	0,03	0,04	0,05	0,05	0,06	0,06	0,06	0,07	0,08	0,09

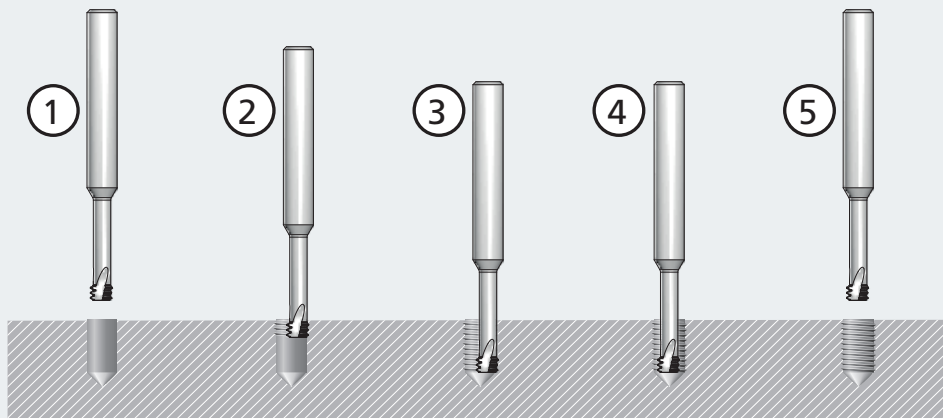
PROCESS DESCRIPTION

VR10 - VR20 - VR30



- 1 Start point - center position
- 2 Axial movement down to required thread depth, then 45° arc entrance
- 3 Thread milling (360°)
- 4 45° arc exit, then axial movement to start point

VR40 - VR45 - VR50 - VR55



- 1 Start point - center position
- 2 45° arc entrance
- 3 Thread milling to required thread depth
- 4 45° arc exit
- 5 Axial movement to start point

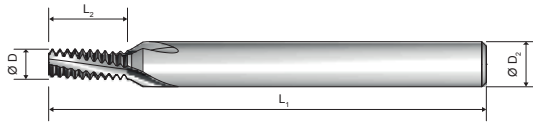
INT

HM

VR10
TiAlN

VR20
TiAlN

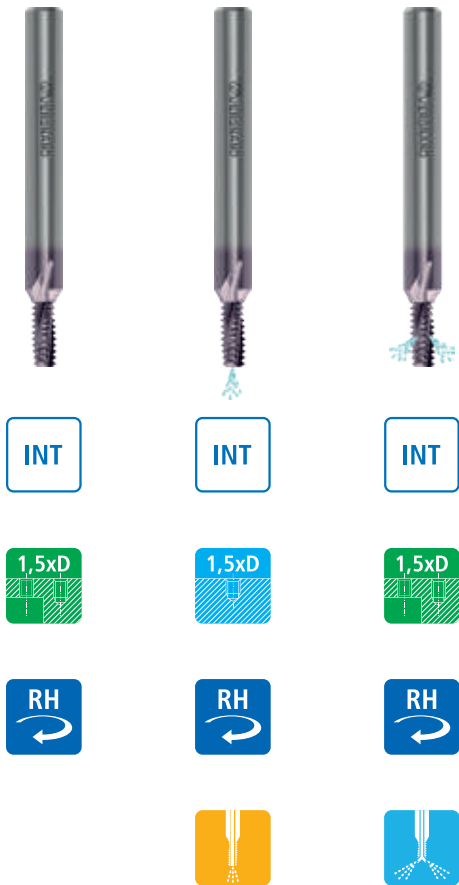
VR30
TiAlN



APPLICATION RANGE

ISO	VR10 TiAlN	VR20 TiAlN	VR30 TiAlN
P	•	•	•
M	•	•	•
K	•	•	•
N	•	•	•
S	•	•	•

For cutting data see page 214



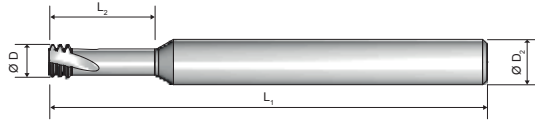
P	M	MF	ØD ₂ h6	ØD	z	L ₂	L ₁	VR10 TiAlN	VR20 TiAlN	VR30 TiAlN
[mm]			[mm]	[mm]	[-]	[mm]	[mm]			
0,5		M5x0,5	6	3,8	3	10,3	58	VR10038I0501000		
0,7	M4		6	3,1	3	7,4	58	VR10031I0700700	VR20031I0700700	
0,75		M6x0,75	6	4,5	3	10,1	58		VR20045I0751000	
0,8	M5		6	3,6	3	9,2	58	VR10036I0800900	VR20038I0800900	
1	M6		6	4	3	10,5	58	VR10040I1001000		
1	M6		6	4	3	14,5	58	VR10040I1001400		
1	M6		6	4,8	3	10,5	58			VR30048I1001000
1	M6	M7x1	6	4,6	3	14,5	58		VR20046I1001400	
1		M10x1	8	8	4	16,5	64	VR10080I1001600	VR20080I1001600	VR30080I1001600
1		M12x1	10	10	4	24,5	73		VR20100I1002400	
1,25	M8	M10x1,25	6	5	3	14,4	58	VR10050I1251400		
1,25	M8	M10x1,25	6	6	3	14,4	58		VR20060I1251400	
1,25	M8	M10x1,25	6	5	3	19,4	58	VR10050I1251900		
1,25	M8	M10x1,25	6	6	3	19,4	58		VR20060I1251900	VR30060I1251900
1,5	M10	M12x1,5	8	7	3	17,3	64	VR10070I1501700		
1,5	M10	M12x1,5	8	7	3	24,8	76	VR10070I1502400		
1,5	M10	M12x1,5	8	7,8	3	17	64		VR20078I1501700	VR30078I1501700
1,5		M14x1,5	10	10	4	21,8	73	VR10100I1502100		VR30100I1502100
1,5		M16x1,5	12	12	4	26,3	84		VR20120I1502600	VR30120I1502600
1,75	M12		8	8	3	20,1	64	VR10080I1752000		
1,75	M12		10	9	3	20,1	73		VR20090I1752000	
2	M16		12	11,8	4	27	84		VR20118I2002700	
2,5	M20		16	15	5	48,8	105		VR20150I2504800	
3	M24		20	18	4	58,5	120		VR20180I3005800	

INT

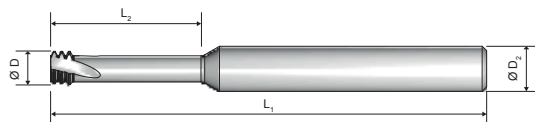
HM

VR40
TiAlNVR45
TiAlN

VR40



VR45



INT

INT



APPLICATION RANGE

ISO	VR40 TiAlN	VR45 TiAlN	
P	•	•	
M	•	•	
K	•	•	
N	•	•	
S	•	•	

For cutting data see page 215

P	M	ØD ₂ h6	ØD	z	L ₂	L ₁	VR40 TiAlN	VR45 TiAlN
[mm]		[mm]	[mm]	[-]	[mm]	[mm]		
0,3	M1,4	3	1,05	3	4	39		VR45010I0300400
0,35	M1,6	3	1,2	3	4,8	39		VR45012I0350400
0,4	M2	6	1,53	3	4,5	58	VR40015I0400400	
0,4	M2	3	1,53	3	6	39		VR45015I0400600
0,5	M3	6	2,37	3	6,5	58	VR40023I0500600	
0,5	M3	6	2,37	3	9,5	58		VR45023I0500900
0,5	M3	6	2,37	3	9,5	105		VR45023I050090L
0,7	M4	6	3,1	3	9	58	VR40031I0700900	
0,7	M4	6	3,1	3	12,5	58		VR45031I0701200
0,7	M4	6	3,1	3	12,5	105		VR45031I070120L
0,8	M5	6	3,8	3	12,5	58	VR40038I0801200	
0,8	M5	6	3,8	3	16	58		VR45038I0801600
0,8	M5	6	3,8	3	16	105		VR45038I080160L
1	M6	6	4,65	3	14	58	VR40046I1001400	
1	M6	6	4,65	3	20	58		VR45046I1002000
1	M6	6	4,65	3	20	105		VR45046I100200L
1,25	M8	6	5,95	3	18	58	VR40059I1251800	
1,25	M8	6	6	3	24	58		VR45060I1252400
1,5	M10	8	7,8	3	23	64	VR40078I1502300	
1,75	M12	10	9	3	26	73	VR40090I1752600	
2	M16	12	11,8	4	35	84	VR40118I2003500	

SOLID CARBIDE THREAD MILLS for hardened materials Lefthand spiral flutes

DIN 13

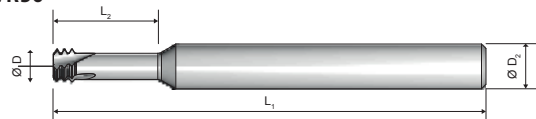
INT

HM

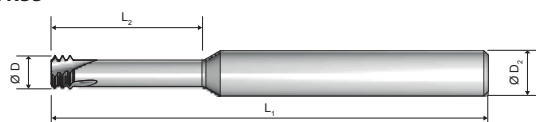
VR50
TiAlN

VR55
TiAlN

VR50



VR55



APPLICATION RANGE

ISO	VR50 TiAlN	VR55 TiAlN	
S	•	•	
H	•	•	

For cutting data see page 216

INT

INT

2xD

3xD

LH

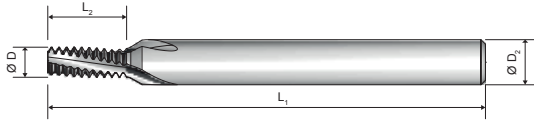
LH

P	M	ØD ₂ h6	ØD	z	L ₂	L ₁	VR50 TiAlN	VR55 TiAlN
[mm]		[mm]	[mm]	[-]	[mm]	[mm]		
0,4	M2	6	1,53	3	4,5	58	VR50015I0400400	
0,5	M3	6	2,37	3	6,5	58	VR50023I0500600	
0,7	M4	6	3,1	3	9	58	VR50031I0700900	
0,7	M4	6	3,1	3	12,5	58		VR55031I0701200
0,8	M5	6	3,8	3	12,5	58	VR50038I0801200	
0,8	M5	6	3,8	3	16	58		VR55038I0801600
1	M6	6	4,65	3	14	58	VR50046I1001400	
1	M6	6	4,65	3	20	58		VR55046I1002000
1,25	M8	6	6	3	18	58	VR50060I1251800	
1,25	M8	6	6	3	24	58		VR55060I1252400
1,5	M10	8	7,8	3	23	64	VR50078I1502300	
1,75	M12	10	9	3	26	73	VR50090I1752600	
2	M16	12	11,8	4	35	84	VR50118I2003500	

VR
SERIES

INT

HM

VR10
TiAlNVR20
TiAlN

INT

INT



APPLICATION RANGE

ISO	VR10 TiAlN	VR20 TiAlN	
P	•	•	
M	•	•	
K	•	•	
N	•	•	
S	•	•	

For cutting data see page 214

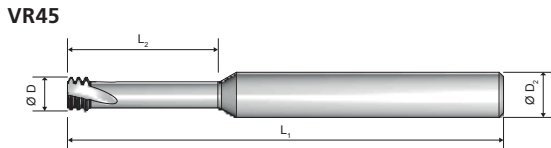
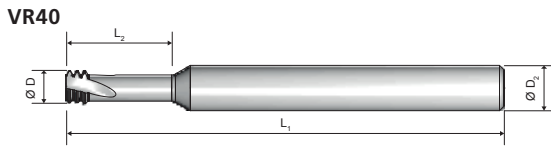
P (TPI)	UNC	UNF	ØD ₂ h6 [mm]	ØD [mm]	z	L ₂ [mm]	L ₁ [mm]	VR10 TiAlN	VR20 TiAlN	
28		1/4"	6	4	3	11,3	58	VR10040U28T1100		
28		1/4"	6	5	3	11,3	58		VR20050U28T1100	
24		5/16"	6	5	3	14,3	58	VR10050U24T1400		
24		3/8"	8	7	3	20,6	64	VR10070U24T2000		
24		5/16"	8	6,6	3	14,3	64		VR20066U24T1400	
24		3/8"	8	8	4	20,6	64		VR20080U24T2000	
20	1/4"		6	4,5	3	12,1	58	VR10045U20T1200		
20		7/16"-1/2"	8	7	3	21	64	VR10070U20T2100		
20	1/4"		6	4,7	3	12,1	58		VR20047U20T1200	
20		7/16"	8	8	3	21	64		VR20080U20T2100	
20		1/2"	10	10	4	22,3	73		VR20100U20T2200	
18	5/16"		6	5	3	14,8	58	VR10050U18T1400		
18	5/16"		6	5,6	3	14,8	58		VR20056U18T1400	
16	3/8"		6	6	3	16,7	58	VR10060U16T1600		
16	3/8"		8	6,7	3	16,7	64		VR20067U16T1600	
14	7/16"		8	7	3	20,9	64	VR10070U14T2000		
14	7/16"		8	7,7	3	20,9	64		VR20077U14T2000	
13	1/2"		8	8	3	22,5	64	VR10080U13T2200		
13	1/2"		10	9,2	3	22,5	73		VR20092U13T2200	
11	5/8"		10	10	3	28,9	73	VR10100U11T2800		
11	5/8"		12	11,4	3	28,9	84		VR20114U11T2800	

INT

HM

VR40
TiAlN

VR45
TiAlN



APPLICATION RANGE

ISO	VR40 TiAlN	VR45 TiAlN	
P	●	●	
M	●	●	
K	●	●	
N	●	●	
S	●	●	

For cutting data see page 215

INT

INT

2xD

3xD

RH

RH

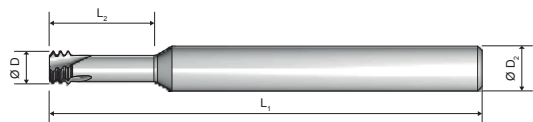
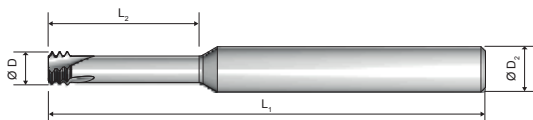
[illegible]

INT

HM

VR50
TiAlN

VR55
TiAlN

VR50**VR55**

INT

INT

2xD

3xD

LH

LH

APPLICATION RANGE

ISO	VR50 TiAlN	VR55 TiAlN	
S	●	●	
H	●	●	

For cutting data see page 216

[illegible]

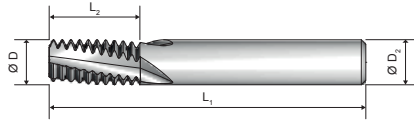
INT

EXT

HM

VR10
TiAlN

VR20
TiAlN



APPLICATION RANGE

ISO	VR10 TiAlN	VR20 TiAlN	
P	●	●	
M	●	●	
K	●	●	
N	●	●	
S	●	●	

For cutting data see page 214

INT

EXT

INT

EXT

[illegible]

VA SERIES

Synchronous Tapping Attachments

Vergnano Sincro synchronous tapping attachments are specifically designed to enhance the performance of the Vergnano S-Series taps for synchronous tapping processes.

SYNCHRONOUS TAPPING ATTACHMENTS

In modern CNC machine tools with synchronous spindles, the rotational and axial movements of the spindle are coordinated by the numeric control of the machine. On these modern machine tools standard compensated tapping attachments are not recommended since the large compensation in extension can negatively influence the performance of the tool. Vergnano Sincro synchronous tapping attachments are specifically designed for synchronous tapping: micro-compensation reduces the axial and radial forces generated during the tapping process and enhances tool life. Since machine, tapping attachment and tool are synchronised it is possible to reach high machining speeds. This advantage, together with increased tool life, leads to improved productivity.

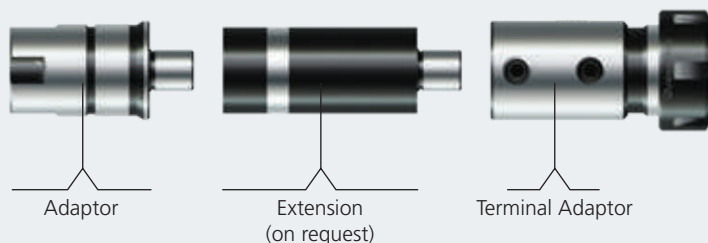
Quick-Change System

Vergnano offers a new system consisting in tapping attachment and quick-change adaptor which allows worn tools to be substituted without changing the entire tapping attachment thereby saving precious machining time.

It is recommended to have a second quick-change adaptor (in addition to that delivered with the tapping attachment) sold separately to exploit this advantage.

Also available are extended quick-change adaptors which permit extension of the tapping attachment in order to reach threads in difficult positions.

This versatile and cost-saving system covers a wide range of applications with just one tapping attachment.



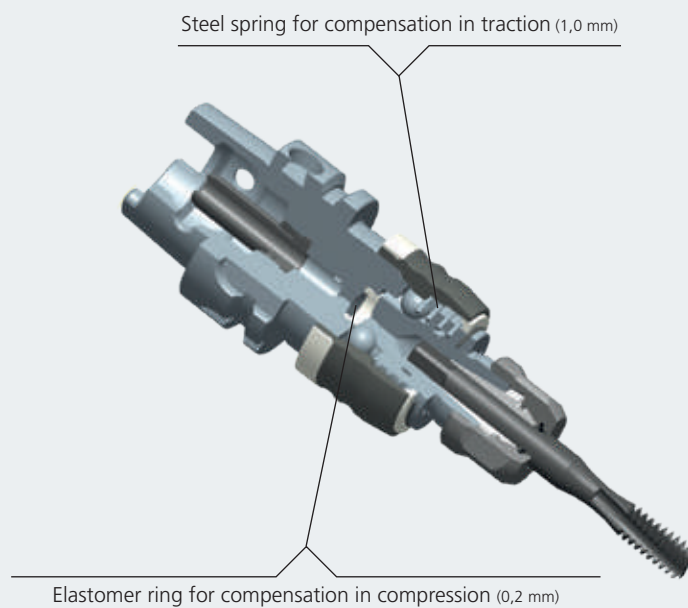
The extended adaptor is sold assembled and consists of two parts (adaptor and terminal adaptor). Further extensions are available on request.



Micro-Compensation

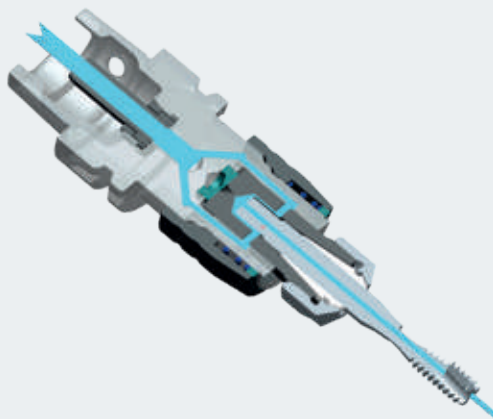
During tap reversal high axial forces are generated on the tap which cause mechanical stresses and micro-wear. This in turn leads to reduced tool life and tool precision. For this reason Vergnano synchronous tapping attachments are designed with differential micro-compensation in traction and compression which compensates the stresses on the tap.

Compensation in traction (1 mm) is obtained by steel springs which guarantee greater reliability while compensation in compression (0,2 mm) is obtained by elastomer rings.



Through Coolant Capability

All Vergnano synchronous tapping attachments are designed for use with internal lubrication up to 50 bars. For higher values a special pressure-tight nut screw is available on request. The special attachment design forces the through coolant to enter the tap adaptor from the sides without interfering with the compensation length.

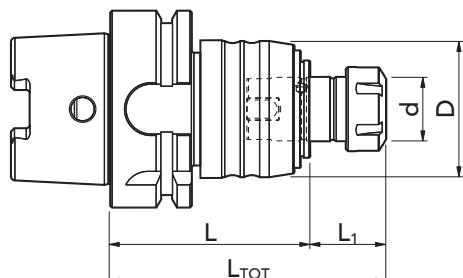


SYNCHRONOUS ER TAPPING ATTACHMENT with QUICK-CHANGE TAP ADAPTOR

With internal through coolant capability ⁽¹⁾



DIN 69893 HSK A



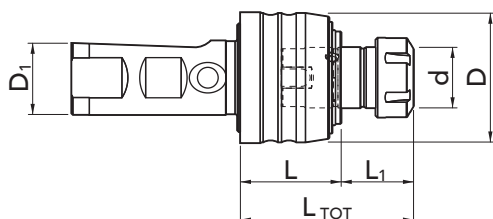
Article Code	Attachment	Tap Size	L	ø D	ø d	ER collet	L ₁	L _{TOT}
			[mm]	[mm]	[mm]		[mm]	[mm]
VA01A06302CH160	HSK-A63	M3 - M8	64	43	20	ER 16	20,5	84,5
VA01A06302CH250	HSK-A63	M6 - M20	97	60	32	ER 25	23,5	120,5
VA01A10002CH400	HSK-A100	M14 - M33	115	87	50	ER 40	28,5	143,5

SYNCHRONOUS ER TAPPING ATTACHMENT with QUICK-CHANGE TAP ADAPTOR

With internal through coolant capability ⁽¹⁾



DIN 1835 B+E



Article Code	Attachment	Tap Size	L	ø D	ø d	ER collet	L ₁	L _{TOT}
	ø D ₁ [mm]		[mm]	[mm]	[mm]		[mm]	[mm]
VA01C02502CH160	25	M3 - M8	34	43	20	ER 16	20,5	54,5
VA01C02502CH250	25	M6 - M20	56	60	32	ER 25	23,5	79,5
VA01C04002CH400	40	M14 - M33	80	87	50	ER 40	28,5	108,5

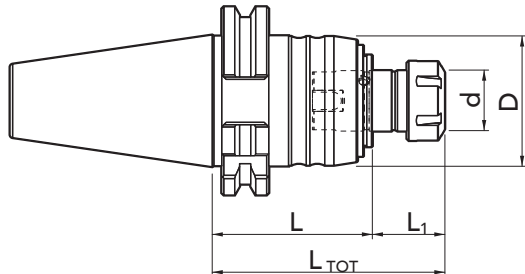
⁽¹⁾ For coolant pressure above 50 bars a special nut screw is available on request

SYNCHRONOUS ER TAPPING ATTACHMENT with QUICK-CHANGE TAP ADAPTOR

With internal through coolant capability ⁽¹⁾



SK DIN 69871 AD



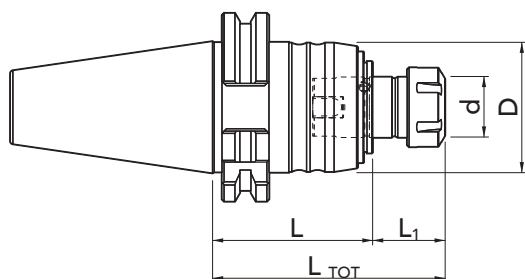
Article Code	Attachment	Tap Size	L [mm]	ø D [mm]	ø d [mm]	ER collet	L ₁ [mm]	L _{TOT} [mm]
VA01B04002CH160	SK 40 AD	M3 - M8	53	43	20	ER 16	20,5	73,5
VA01B05002CH160	SK 50 AD	M3 - M8	53	43	20	ER 16	20,5	73,5
VA01B04002CH250	SK 40 AD	M6 - M20	90	60	32	ER 25	23,5	113,5
VA01B05002CH250	SK 50 AD	M6 - M20	74	60	32	ER 25	23,5	97,5

SYNCHRONOUS ER TAPPING ATTACHMENT with QUICK-CHANGE TAP ADAPTOR

With internal through coolant capability ⁽¹⁾



SK DIN 69871 AD+B



Article Code	Attachment	Tap Size	L [mm]	ø D [mm]	ø d [mm]	ER collet	L ₁ [mm]	L _{TOT} [mm]
VA01B05002CH400	SK 50 B	M14 - M33	115	87	50	ER 40	28,5	143,5

VA SERIES

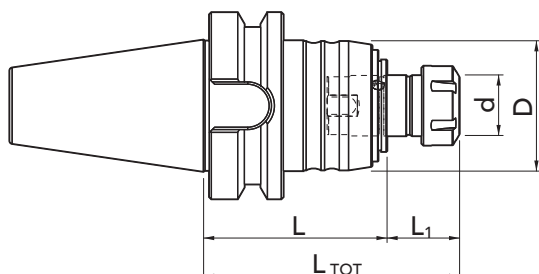
⁽¹⁾ For coolant pressure above 50 bars a special nut screw is available on request

SYNCHRONOUS ER TAPPING ATTACHMENT with QUICK-CHANGE TAP ADAPTOR

With internal through coolant capability ⁽¹⁾



MAS 403 BT



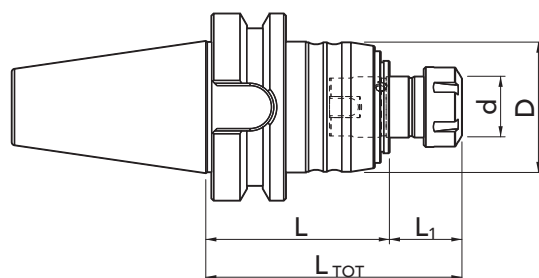
Article Code	Attachment	Tap Size	L [mm]	ø D [mm]	ø d [mm]	ER collet	L ₁ [mm]	L _{TOT} [mm]
VA01M04002CH160	BT 40	M3 - M8	61	43	20	ER 16	20,5	81,5
VA01M05002CH160	BT 50	M3 - M8	72	43	20	ER 16	20,5	92,5
VA01M04002CH250	BT 40	M6 - M20	82	60	32	ER 25	23,5	105,5
VA01M05002CH250	BT 50	M6 - M20	93	60	32	ER 25	23,5	116,5

SYNCHRONOUS ER TAPPING ATTACHMENT with QUICK-CHANGE TAP ADAPTOR

With internal through coolant capability ⁽¹⁾



MAS 403 BT - B



Article Code	Attachment	Tap Size	L [mm]	ø D [mm]	ø d [mm]	ER collet	L ₁ [mm]	L _{TOT} [mm]
VA01M05002CH400	BT 50 B	M14 - M33	124	87	50	ER 40	28,5	152,5

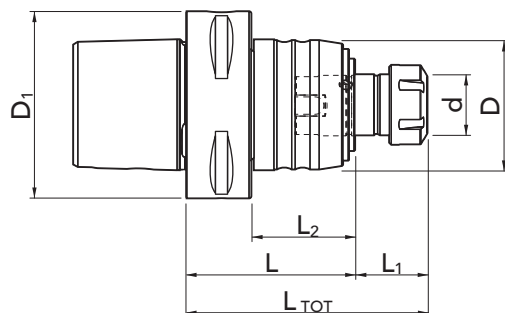
⁽¹⁾ For coolant pressure above 50 bars a special nut screw is available on request

SYNCHRONOUS ER TAPPING ATTACHMENT with QUICK-CHANGE TAP ADAPTOR

With internal through coolant capability ⁽¹⁾



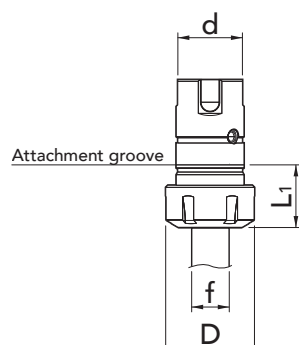
POLIGONAL Attachment ISO 26623-1



Article Code	Attachment	Tap Size	L	L ₂	ø D	ø d	ER collet	L ₁	L _{TOT}
	ø D ₁ [mm]		[mm]	[mm]	[mm]	[mm]		[mm]	[mm]
VA01P04002CH160	C40	M3 - M8	55	35	43	20	ER 16	20,5	75,5
VA01P05002CH160	C50	M3 - M8	55	35	43	20	ER 16	20,5	75,5
VA01P06302CH160	C63	M3 - M8	57	35	43	20	ER 16	20,5	77,5
VA01P08002CH160	C80	M3 - M8	66	36	43	20	ER 16	20,5	86,5
VA01P04002CH250	C40	M6 - M20	75	55	60	32	ER 25	23,5	98,5
VA01P05002CH250	C50	M6 - M20	75	55	60	32	ER 25	23,5	98,5
VA01P06302CH250	C63	M6 - M20	77	55	60	32	ER 25	23,5	100,5
VA01P08002CH250	C80	M6 - M20	86	56	60	32	ER 25	23,5	109,5
VA01P08002CH400	C80	M14 - M33	116	86	87	50	ER 40	28,5	144,5

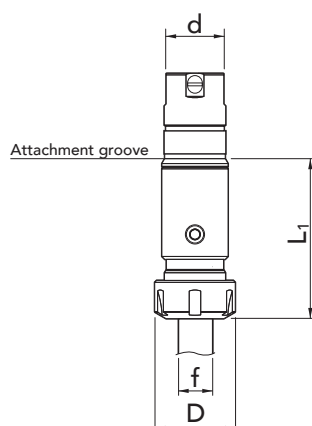
⁽¹⁾ For coolant pressure above 50 bars a special nut screw is available on request

QUICK-CHANGE TAP ADAPTOR



Article Code	Tap Size	Shaft $\varnothing$ f [mm]	$\varnothing$ d [mm]	$\varnothing$ D [mm]	L ₁ [mm]	ER collet
*CHADAP160310000	M3 - M8	3 - 8	20	28	20,5	ER 16
CHADAP250316000	M6 - M20	3 - 16	32	42	23,5	ER 25
CHADAP400626000	M14 - M33	6 - 25	50	63	28,5	ER 40

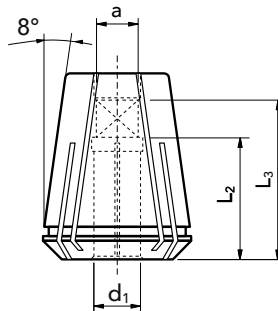
EXTENDED QUICK-CHANGE TAP ADAPTOR



Article Code	Tap Size	Shaft $\varnothing$ f [mm]	$\varnothing$ d [mm]	$\varnothing$ D [mm]	L ₁ [mm]	ER collet
*CHEXAD160310000	M3 - M8	3 - 8	20	28	51,5	ER 16
CHEXAD250316000	M6 - M20	3 - 16	32	42	80,5	ER 25
CHEXAD400626000	M14 - M33	6 - 25	50	63	90,5	ER 40

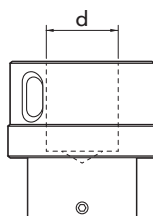
* Hexagonal nut screw

DIN 6499



Article Code	ER collet	ø d ₁ [mm]	a [mm]	L ₂ [mm]	L ₃ [mm]
SLERGB160103500	ER 16	3,5	2,7	18	24
SLERGB160104500	ER 16	4,5	3,4	18	24
SLERGB160105500	ER 16	5,5	4,3	18	25
SLERGB160106000	ER 16	6	4,9	18	26
SLERGB160107000	ER 16	7	5,5	18	26
SLERGB160108000	ER 16	8	6,2	22	31
SLERGB250103500	ER 25	3,5	2,7	18	24
SLERGB250104500	ER 25	4,5	3,4	18	24
SLERGB250105500	ER 25	5,5	4,3	18	25
SLERGB250106000	ER 25	6	4,9	18	26
SLERGB250107000	ER 25	7	5,5	18	26
SLERGB250108000	ER 25	8	6,2	22	31
SLERGB250109000	ER 25	9	7	22	32
SLERGB250110000	ER 25	10	8	25	36
SLERGB250111000	ER 25	11	9	25	37
SLERGB250112000	ER 25	12	9	25	37
SLERGB250114000	ER 25	14	11	25	39
SLERGB250116000	ER 25	16	12	25	40
SLERGB400106000	ER 40	6	4,9	18	26
SLERGB400107000	ER 40	7	5,5	18	26
SLERGB400108000	ER 40	8	6,2	22	31
SLERGB400109000	ER 40	9	7	22	32
SLERGB400110000	ER 40	10	8	25	36
SLERGB400111000	ER 40	11	9	25	37
SLERGB400112000	ER 40	12	9	25	37
SLERGB400114000	ER 40	14	11	25	39
SLERGB400116000	ER 40	16	12	25	40
SLERGB400118000	ER 40	18	14,5	25	42
SLERGB400120000	ER 40	20	16	28	47
SLERGB400122000	ER 40	22	18	28	49
SLERGB400125000	ER 40	25	20	33	56

ASSEMBLY SUPPORT



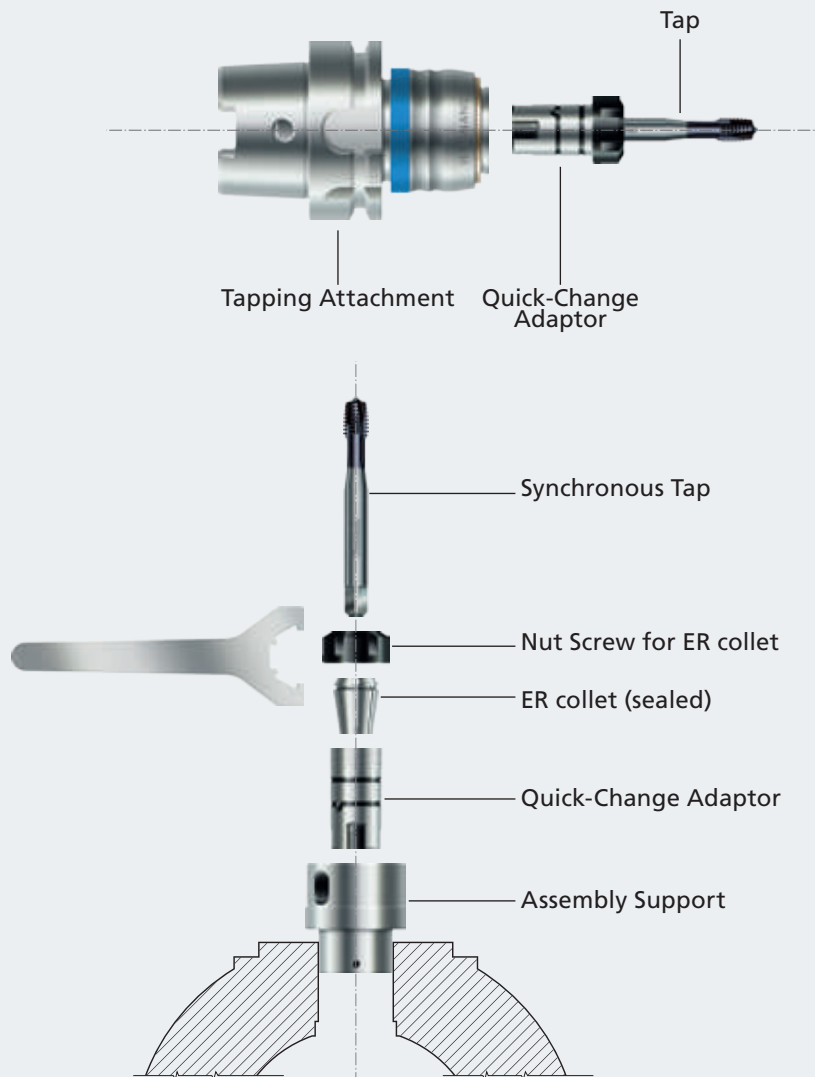
Article Code	ER collet	ø d [mm]				
ASCHADAP1620000	ER 16	20				
ASCHADAP2532000	ER 25	32				
ASCHADAP4050000	ER 40	50				

WRENCH for nut screw



Article Code	Nut Screw	ER collet				
KE02ER160200000	Hexagonal	ER 16				
KE04ER250200000	Standard	ER 25				
KE04ER400200000	Standard	ER 40				

TAPPING ATTACHMENTS: TERMINOLOGY AND ASSEMBLY INSTRUCTIONS

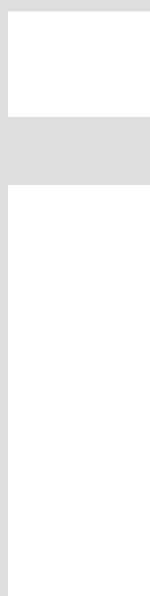


- 1 Place the quick-change adaptor in the assembly support
- 2 Insert the ER collet in the nut screw
- 3 Partially tighten the nut screw on the quick-change adaptor
- 4 Insert the tap in the quick-change adaptor until it stops
- 5 Securely tighten the nut screw with a wrench
- 6 Insert the quick-change adaptor into the tapping attachment by pulling back the sleeve

TIGHTENING TORQUE TABLE

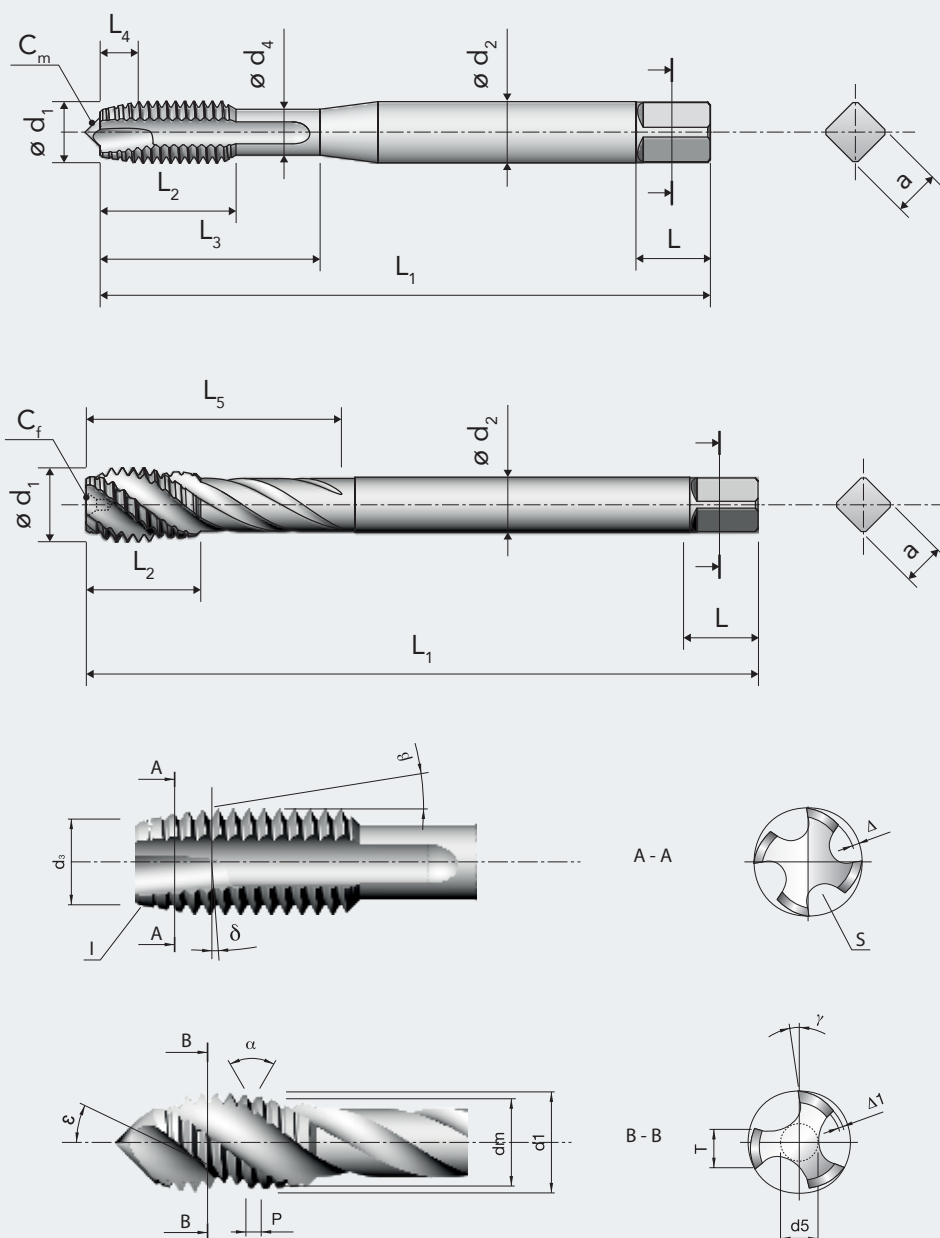
It is recommended to tighten the nut screws with the torque values shown in the table below.

ER Collet	Torque [Nm]
ER 16	45
ER 25	70
ER 40	150



TECHNICAL INFORMATION

TAP TERMINOLOGY



d_1

Nominal diameter

the diameter used for the purpose of general identification.

d_m

Pitch diameter

the diameter measured where the width of the thread is equal to half the pitch.

d_2

Shank diameter

the diameter of the shank, important for the tapping attachment.

d_3

Chamfer diameter

the diameter at the leading end of the chamfer.

d_4

Neck diameter

the diameter of the reduced section between the thread and shank of the tap.

d_5

Core diameter

the diameter of a circle tangent to the bottom of the flutes.

I

Chamfer

the taper on the threads at the front end of the tap made by grinding and relieving the crests of the first few teeth.

a

Square

the square with rounded corners formed by four flats parallel to the tap axis. The square serves to drive the tap.

TAP TERMINOLOGY

L

Square length

the length of the flats that form the square.

L₁

Total length

the complete length of the tap from end to end, excluding external centres.

L₂

Thread length

the length of the threaded section of the tap.

L₃

Usable length

the length measured from the front end of the tap to the end of the neck section. This length determines the maximum threadable depth on taps with reinforced shank.

L₄

Chamfer length

the length of the chamfer measured parallel to the tap axis, excluding the chamfer bevel.

L₅

Flute length

the axial length of the flute including the cutter sweep.

C_m

External centre

the pointed end of the tap.

C_f

Internal centre

the countersink in one or both ends of the tap.

P

Pitch

the distance, measured parallel to the tap axis, between two corresponding and successive points on the thread profile.

α

Angle of thread

the angle between the flanks of the thread (measured in an axial plane).

δ

Thread lead angle

the angle made by the spiral of the thread and a plane perpendicular to the tap axis, measured on the pitch diameter line.

β

Chamfer angle

the angle between the chamfer and the tap axis, measured in an axial plane.

γ

Rake angle

the angle between the cutting face of the tap and a radial line passing through the crest of the tooth at the cutting edge.

T

Land width

the chordal width of material between two successive flutes.

S

Flute

the longitudinal channels in a tap which create cutting edges. The flutes provide space for chips and passage for coolant/lubricant.

Δ1

Pitch diameter relief

the radial reduction of the pitch and/or major diameter behind the cutting edge of the tap. The relief confers cutting properties and provides clearance between the part being threaded and the tap threads.

Δ

Chamfer relief

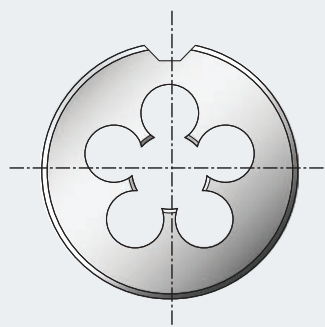
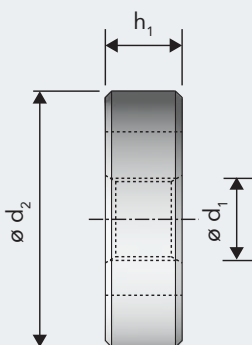
the radial reduction of the major diameter on the tap chamfer behind the cutting edge. The chamfer relief confers cutting properties to the tap.

ε

Spiral flute angle

the angle formed by the flutes and the tap axis.

DIE TERMINOLOGY



d₁

nominal diameter

d₂

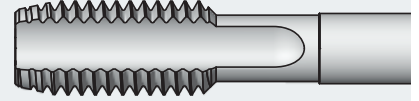
outside diameter

h₁

thickness

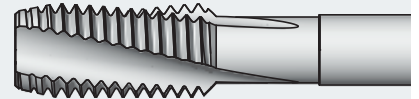
STRAIGHT FLUTES

These taps are used on steels with normal strength and toughness ($R=750 \text{ N/mm}^2$) as well as on short-chipping abrasive materials (grey cast iron, bronze, etc.).



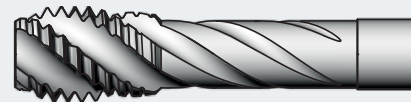
SPIRAL FLUTES, 15° RIGHTHAND SPIRAL

These taps improve chip evacuation and are well suited when tapping blind holes of medium depth on tough materials.



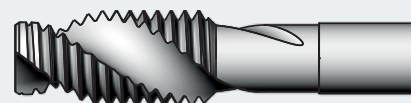
SPIRAL FLUTES, 40° RIGHTHAND SPIRAL

The high helix angle ensures the evacuation of chips from deep blind holes.



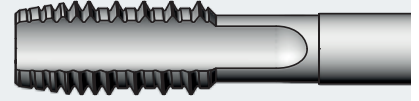
SPIRAL FLUTES, 40° RIGHTHAND SPIRAL, FOR LIGHT ALLOYS

The large flutes and high helix angle ensure efficient chip removal on long-chipping light alloys such as aluminium.



STRAIGHT FLUTES WITH INTERRUPTED THREADS

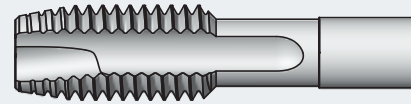
For tapping soft and mild materials such as iron, aluminium etc. The interrupted threads avoid chips sticking to the thread flanks and consequent damage of the tap.



SPIRAL POINT

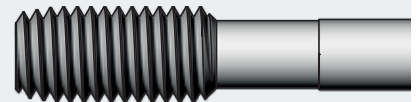
The spiral point or gun nose is produced by a high helix angle combined with an increased rake angle in the front area of the tap. This design ensures spontaneous chip evacuation in the feed direction.

This geometry is suitable when tapping through holes on materials which produce continuous chips.



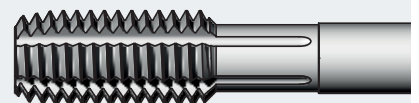
FORMING TAPS WITHOUT OIL GROOVES

These tools produce threads through plastic deformation of the workpiece material. No chips are produced during the tapping process.



FORMING TAPS WITH OIL GROOVES

The oil grooves improve lubrication in the chamfer area making these taps suitable for threading deep holes.



TYPES OF CHAMFER FORMS

The types of chamfer are defined in standards DIN 2175 and DIN 2197 for forming taps and cutting taps, respectively.

	Form A	Form B	Form C			Form D	Form E			Form F
Chamfer form and length										
Flute type										 
										

TYPES OF CENTRES

The tap manufacturer, according to the diameter and the application, defines the types of centres. Types of centre and chamfer are generally combined together as in the following table, but for specific applications exceptions are possible.

		Form A	Form B	Form C	Form D	Form E
Male centre 	M	$M2 \leq \emptyset \leq M8$	$M2 \leq \emptyset \leq M8$	$M2 \leq \emptyset \leq M8$	$M2 \leq \emptyset \leq M8$	-
	MF	$M2 \leq \emptyset \leq M6$	$M4 \leq \emptyset \leq M6$	$M2 \leq \emptyset \leq M6$	$M5 \leq \emptyset \leq M6$	-
	UNC	$Nr.2-56 \leq \emptyset \leq 1/4"-18$	$Nr.2-56 \leq \emptyset \leq 1/4"-18$	$Nr.2-56 \leq \emptyset \leq 1/4"-18$	$Nr.2-56 \leq \emptyset \leq 1/4"-18$	-
	UNF	$Nr.2-64 \leq \emptyset \leq 1/4"-28$	$Nr.2-64 \leq \emptyset \leq 1/4"-28$	$Nr.2-64 \leq \emptyset \leq 1/4"-28$	-	-
	G	-	-	-	-	-
Half centre 	M	$M8 < \emptyset \leq M10$	$M8 < \emptyset \leq M10$	$M8 < \emptyset \leq M10$	$M8 < \emptyset \leq M10$	-
	MF	$M6 < \emptyset \leq M10$	$M6 < \emptyset \leq M10$	$M6 < \emptyset \leq M10$	$M6 < \emptyset \leq M10$	-
	UNC	$5/16"-18 \leq \emptyset \leq 3/8"-16$	$5/16"-18 \leq \emptyset \leq 3/8"-16$	$5/16"-18 \leq \emptyset \leq 3/8"-16$	-	-
	UNF	$5/16"-24 \leq \emptyset \leq 3/8"-24$	$5/16"-24 \leq \emptyset \leq 3/8"-24$	$5/16"-24 \leq \emptyset \leq 3/8"-24$	-	-
	G	$\emptyset = 1/8"-28$	$\emptyset = 1/8"-28$	$\emptyset = 1/8"-28$	-	-
Female centre 	M	$\emptyset > M10$	$\emptyset > M10$	$\emptyset > M10$	$\emptyset > M10$	ALL SIZES
	MF	$\emptyset > M10$	$\emptyset > M10$	$\emptyset > M10$	$\emptyset > M10$	ALL SIZES
	UNC	$\emptyset \geq 7/16"-14$	$\emptyset \geq 7/16"-14$	$\emptyset \geq 7/16"-14$	$\emptyset \geq 5/16"-18$	-
	UNF	$\emptyset \geq 7/16"-20$	$\emptyset \geq 7/16"-20$	$\emptyset \geq 7/16"-20$	-	-
	G	$\emptyset \geq 1/4"-19$	$\emptyset \geq 1/4"-19$	$\emptyset \geq 1/4"-19$	-	-

F O R M U L A E

Parameter	Formula	Unit of Measurement
Cutting speed	$V_c = \frac{N \cdot \pi \cdot d_1}{1000}$	$\frac{m}{min}$
Rotational speed	$N = \frac{1000 \cdot V_c}{\pi \cdot d_1}$	rpm
Torque (*)	$M_t = \frac{K_c \cdot p^2 \cdot z^{0.6} \cdot d_1}{10^4}$	N · m
Spindle power	$P = \frac{M_t \cdot 2 \cdot \pi \cdot N}{60}$	W
Nominal diameter	d ₁	mm
Feed	p · N	$\frac{mm}{min}$
p	Thread pitch	mm
z	Number of flutes	-
K _c	Cutting force coefficient (function of the material and of tap wear)	$\frac{N}{mm^2}$

(*) The torque value is valid for a new cutting tap.
For worn-out taps, the value can increase up to 2-3 times.
For forming taps, the value must be multiplied by 1,5-2 times.

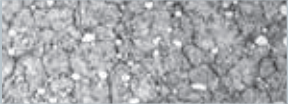
M.G.	Kc [N/mm²]
P.1	1300
P.2	1400
P.3	1400
P.4	1600
P.5	1700
P.6	2000
P.7	1400
M.1	1600
M.2	1800
K.1	1100
K.2	1500
K.3	1600
N.1	600
N.2	800
N.3	900
N.4	1000
N.5	700
N.6	850
N.7	900
N.8	2500
N.9	400
N.10	500
S.1	1200
S.2	1900
S.3	1300
S.4	2400

CONVERSION TABLE HARDNESS VS TENSILE STRENGTH

Tensile Strength	Hardness		
	R [N/mm²]	HB Brinell	HRC Rockwell C
3400	700	68	1008
3120	688	67	955
2960	676	66	920
2890	670	65	885
2770	659	64	850
2240	650	63	826
2190	635	62	797
2140	627	61	772
2100	613	60	746
2050	600	59	720
2010	587	58	693
1970	574	57	666
1930	561	56	646
1890	548	55	623
1850	536	54	604
1810	524	53	585
1780	512	52	567
1730	500	51	549
1680	488	50	528
1630	476	49	513
1590	464	48	497
1560	453	47	482
1520	442	46	468
1480	430	45	453
1440	419	44	440

Tensile Strength	Hardness		
	R [N/mm²]	HB Brinell	HRC Rockwell C
1400	408	43	427
1360	398	42	416
1320	389	41	404
1300	377	40	391
1260	367	39	381
1230	357	38	371
1190	347	37	357
1150	337	36	345
1120	327	35	332
1100	319	34	323
1060	309	33	314
1040	301	32	304
1010	294	31	296
980	286	30	288
960	279	29	280
940	272	28	273
910	265	27	266
890	259	26	259
870	253	25	253
850	247	24	247
830	241	23	241
810	235	22	235
790	230	21	230
770	225	20	225

HIGH SPEED STEEL AND SOLID CARBIDE FOR TAPS

Vergnano Designation	Designation according to ISO 11054	Hardness	Toughness	Applications	Structure (500x)
HSS	HSS	•	•	Used exclusively for hand taps (except A100).	
HSSE	HSS-E	•	••	For general applications.	
HSSK	HSS-E-PM	••	•••	Used in applications where a compromise between high hardness and high toughness is needed.	
HSSZ	HSS-E-PM	••	•••	For applications where extremely high performance and productivity are requested.	
HSSP	HSS-E-PM	•••	••	For tough materials and extreme applications.	
HM	-	•••	-	For heat-treated steels and abrasive materials.	

COATINGS AND SURFACE TREATMENTS - PROPERTIES

Type of coating / treatment	Structure	Hardness	Friction Coefficient	Oxidation Temperature	Features
TiN	Mono-layer	• •	• •	•	Wear resistance
TiCN	Mono-layer	• •	• •	•	Wear resistance
TiX2	Multi-layer	• • •	• • •	• •	Oxidation and wear resistance, chip evacuation
TiH1	Multi-layer	• • •	• • •	• •	Oxidation and wear resistance, chip evacuation
CrN	Mono-layer	•	• •	• •	Oxidation and wear resistance
V-MAXX	Mono-layer	• • •	• •	• • •	Wear resistance, chip evacuation
VAP	Surface oxidation	-	• •	•	Chip evacuation
NiTR	Surface hardening	•	•	•	Wear resistance

Excellent • • •
 Very good • •
 Good •

COATINGS - APPLICATIONS FOR CUTTINGS TAPS

COATINGS RECOMMENDED FOR CUTTINGS TAPS				TiN	TiCN	TiX2	TiH1	CrN	V-MAXX	VAP	NiTR
ISO	Material	Group	Application	Coating							
P	Steel	P.1	Mild / magnetic steel	○			○			●	
		P.2	Construction steel, case hardening steel	●			○			○	
		P.3	Carbon steel	●			○				
		P.4	Alloyed steel / tempered steel	○	○		●				
		P.5	Alloyed steel / tempered steel	○	○		●				
		P.6	Alloyed steel / high strength steel	○	○		●				
		P.7	Ferritic stainless steel, martensitic stainless steel, precipitation hardening	○		●				○	
M	Stainless Steel	M.1	Austenitic stainless steel			●	○			○	
		M.2	Ferritic+austenitic (Duplex)			●	○			○	
K	Cast iron	K.1	Grey cast iron		○				●		○
		K.2	Nodular cast iron, malleable cast iron, tempered cast iron	●			○				
		K.3	Austempered ductile iron (ADI)						●		
N	Aluminium Aluminium alloys	N.1	Pure aluminium				●			○	
		N.2	Aluminium wrought and die cast alloys with Si < 0,5% (long chipping)	○			●			○	
		N.3	Aluminium wrought and die cast alloys with Si > 10% (medium chipping)	○			●			○	
		N.4	Aluminium die cast alloys with Si > 10% (short chipping)		○				●		○
	Copper Copper alloys Brass Bronze	N.5	Pure copper				●			○	
		N.6	Copper alloys (long chipping), soft brass	○			●			○	
		N.7	Copper alloys (short chipping), hard brass		●						○
		N.8	High strength bronze		○				●		○
	Magnesium Magnesium alloys	N.9	Pure magnesium, magnesium alloys		○						●
		N.10	High strength magnesium alloys		○						●
S	Titanium Titanium alloys	S.1	Pure titanium				○	●			
		S.2	Titanium alloys				○	●			
	Nickel Nickel alloys	S.3	Pure nickel	○			●				
		S.4	Nickel alloys	○			●				
H	Hardened materials	H.1	Alloyed steel, hardness HRC 44-55						○		
		H.2	Alloyed steel, hardness HRC 56-63						○		

COATINGS - APPLICATIONS FOR COLD FORMING TAPS

COATINGS RECOMMENDED FOR COLD FORMING TAPS				TiN	TiCN	V-MAXX	VAP
ISO	Material	Group	Application	Coating			
P	Steel	P.1	Mild / magnetic steel	○			●
		P.2	Construction steel, case hardening steel	●			○
		P.3	Carbon steel	●	○	○	
		P.4	Alloyed steel / tempered steel	●	○	●	
		P.5	Alloyed steel / tempered steel	●	○	●	
		P.7	Ferritic stainless steel, martensitic stainless steel, precipitation hardening	○		●	
M	Stainless Steel	M.1	Austenitic stainless steel	○		●	
		M.2	Ferritic+austenitic (Duplex)	○		●	
N	Aluminium Aluminium alloys	N.1	Pure aluminium	○			●
		N.2	Aluminium wrought and die cast alloys with Si < 0,5% (long chipping)	●	○	○	○
		N.3	Aluminium wrought and die cast alloys with Si < 10 % (medium chipping)	●	○	○	○
	Copper Copper alloys Brass/Bronze	N.5	Pure copper	○		●	
		N.6	Copper alloys (long chipping), soft brass	●	○		○
		N.8	High strength bronze				
S	Titanium Titanium alloys	S.1	Pure titanium			●	
		S.2	Titanium alloys			●	
	Nickel Nickel alloys	S.3	Pure nickel	○		●	
		S.4	Nickel alloys	○		●	

- Ideal
- Suitable

TROUBLESHOOTING

Tapping is a complex process and often the last machining operation performed on the workpiece. Therefore, incorrect or faulty tapping can compromise the quality of the entire workpiece. Numerous factors influence the process: cutting parameters, drilling parameters, lubrication, machine conditions. The choice of the correct tool is paramount in order to obtain high quality threads.

The following table summarises the most common problems encountered during tapping and their possible solutions.

Problem	Solution
Chipped teeth on tap	• Choose correct tap, with lower rake angle or longer chamfer. • Reduce cutting speed. • Check drilled hole size is not too small. • Check tap alignment and run-out of tap on tapping attachment. • For deep blind holes ($\geq 2,5xD$) use taps with back-tapering.
Excessive tap wear	• Improve quality (richer emulsion, neat oil) and quantity (higher pressure) of lubrication. • Use correct tap, with more relief or longer chamfer if possible. • Choose coating suitable for specific application. • Use recommended cutting parameters for specific application.
Chips clogging flutes	• Use tap with lower spiral flute angle. • Choose correct tap with suitable rake angle and relief for specific application. • Use tap with sharp cutting edge (bright tap or vapourised tap).
Poor finish on threaded workpiece	• Check wear on tap. If necessary, sharpen or change tap. • Improve quality and quantity of lubrication. • Choose correct tap with suitable rake angle and relief for specific application. • Use recommended cutting parameters for specific application.
Built-up-edge	• Choose correct tap with lower rake angle and/or higher relief. • Choose coating suitable for specific application. • Increase cutting speed. • Improve quality and quantity of lubrication.

TROUBLESHOOTING

Problem	Solution
Tap sticking	• Choose correct tap with lower rake angle and/or higher relief. • Choose coating suitable for specific application. • Increase cutting speed. • Improve quality and quantity of lubrication.
Crater wear	• Choose suitable tap, with base material in HSSE-PM. • Use coated tap. • Improve quality and quantity of lubrication.
Tap breakage	• Check drilled hole size. • Check alignment between tap and drilled hole. • Reduce cutting speed. • On blind holes, check that tapping depth is less than hole depth. • Use tapping attachment with slip clutch. • Use compensated tapping attachment.
Oversized thread	• Check tap tolerance is compatible with requested workpiece (nut) tolerance. • Choose correct tap with suitable rake angle and relief for specific application. • Reduce feed rate (revs x pitch) or use rigid / synchronous tapping attachment. • Reduce cutting speed. • Check tap alignment and that workpiece is fastened steadily. • Remove clogged chips from flutes.
Undersized thread	• Check drilled hole size is not too small. • Check tap tolerance is compatible with requested workpiece (nut) tolerance. • Use coated tap to avoid tap sticking. • On forming taps, use slightly larger drilled hole size. • Check wear on tap. If necessary, sharpen or change tap. • Choose correct tap with higher rake angle and relief. • Use rigid / synchronous tapping attachment. • Improve quality and quantity of lubrication.
Excessive power requirement	• On high strength materials, increase drilled hole size. • Check wear on tap. If necessary, sharpen or change tap. • Choose correct tap with higher rake angle and relief. • Improve quality and quantity of lubrication.

MATERIAL EXAMPLES

			Germany	Italy	France	United States
ISO 513	Application	W.Nr.	DIN	UNI	AFNOR	AISI/SAE/ASTM
P STEEL	Mild/magnetic	1.1015	RFe60			
		1.1014	RFe80			
		1.1013	RFe100			
	Structural	1.0037	St 37-2	Fe360B	E 24-2	1013
		1.0044	St 44-2	Fe430B	E 28-2	1021
		1.0050	St 50-2	Fe490	A 50-2	A 570 (50)
		1.0060	St 60-2	Fe590	A 60-2	A 572 (65)
		1.0570	St 52-3	Fe510B	E 36-3	1024
		1.0301	C10	C10	C10	1010
	Case hardening	1.0401	C15	C15	C18	1015
		1.7131	16MnCr5	16MnCr5	16 MC 5	5115
		1.7147	20MnCr5	20MnCr5	20 MC 5	5120
		1.7243	18CrMo4	18CrMo4		
		1.5919	15CrNi6	16CrNi4	16 NC 6	4320
		1.6523	21NiCrMo2	20NiCrMo2	20 NCD 2	8620
		1.6587	17CrNiMo1106	18NiCrMo5-7	18 NCD6/18 NCD7	4320
	Nitriding	1.8515	31CrMo12	31CrMo12	30 CD 12	A/B
		1.8519	31CrMoV9	31CrMoV10		
		1.8507	34CrAlMo5	34CrAlMo7	30 CAD 6.12	A355Cl.D
		1.8509	41CrAlMo7	41CrAlMo7	40 CAD 6.12	E7140
	Free cutting	1.0711	9S20	9S20		1212
		1.0715	9SMn28	9SMn28	S 250	1213
		1.0718	9SMnPb28	9SMnPb28	S 250 Pb	12 L 13
		1.0726	35S20	35S20	35 MF 4	1140
		1.0736	9SMn36	9SMn36	S 300	1215
		1.0737	9SMnPb36	9SMnPb36	S 300 Pb	12 L 14
	Heat-treatable	1.0406	C25	C25	AF 50 C 30	1025
		1.0528	C30	C30		1030
		1.0501	C35	C35	AF 55 C 35	1035
		1.0511	C40	C40	AF 60 C 40	1040
		1.0503	C45	C45	AF 65 C 45	1045
		1.0540	C50	C50		1050
		1.0535	C55	C55	C54	1055
		1.0601	C60	C60	C60	1060
		1.7035	41Cr4	41Cr4	41Cr4	5140
		1.8159	51CrV4	51CrV4	50 CV 4	6150
		1.7218	25CrMo4	25CrMo4	25 CD 4	4130
		1.7220	34CrMo4	34CrMo4	35 CD 4	4137
		1.7225	42CrMo4	42CrMo4	42 CD 4	4140
		1.7228	50CrMo4	50CrMo4	50CrMo4	4150
		1.6580	30CrNiMo8	30CrNiMo8	30 NCD 8	
		1.6582	34CrNiMo6	34CrNiMo6	35 NCD 6	4337
		1.6511	36CrNiMo4	36CrNiMo4	40 NCD 3	9840
		1.6773	36NiCrMo16	36NiCrMo16		
	Ball bearing	1.3505	100Cr6	100Cr6	100C6	52100
		1.3536	100CrMo7-3	100CrMo7		
	Spring	1.1231	Ck67	C67	XC 68	1070
		1.1248	Ck75	C75		1074
		1.1269	Ck85	C85	C90	1086
		1.1274	Ck101	C100	C100	1095
		1.5021		48Si7		
		1.5026	55Si7	55Si7	56SC7	9255
		1.5027		60Si7	60Si7	9260
		1.7108	60SiCr7	60SiCr8		9262
		1.8159	51CrV4	51CrV4	50 CV 4	6150
		1.7176	55Cr3	55Cr3	55 C 3	5155
		1.7701	51CrMoV4	51CrMoV4		
	Superficial hardening	1.1183	Cf 35	C36	XC 68 H1TS	
		1.1193	Cf 45	C43	XC 42 H1TS	
		1.1213	Cf 53	C53	XC 48 H1TS	1050
		1.7005	45Cr2	45Cr2		
		1.7043	38Cr4	38Cr4		
		1.7034	37Cr4	36CrMn4	38 C 4	5135
		1.7223	41CrMo4	41CrMo4	42 CD 4 TS	4142

Russia	Japan	China	India				
GOST	JIS	GB	IS	MG Vergnano	Application	ISO 513	
20860				P.1	Mild/magnetic	P STEEL	
20880				P.1			
20895				P.1			
St3kp/St3ps	STKM12C	Q235A		P.2	Structural		
St4ps/St4sp	STK400	Q275B	Fe440	P.2			
St5ps/St5sp	SS490	Q275	Fe490	P.2			
St6ps/St6sp	S45C	45	Fe570	P.2			
17G1S	STK490	16Mn	Fe540	P.2			
10	S10C	10		P.2	Case hardening		
15	S15C	15	14C6	P.2			
18ChG	SCR415	20CrMn	16Mn5Cr4	P.2			
18 ChG	SMnC420H	20CrMn	20Mn5Cr5	P.2			
				P.2			
15ChGN2T	SNCM415M		15Cr6Ni6	P.2			
20ChGNM	SNCM220M	20CrNiMo		P.2			
20ChN2M			16Ni6Cr7Mo3	P.2			
	SBV1A/SBV1B			P.4	Nitriding		
				P.5			
				P.4			
38Ch2MJuA	SACM645	38CrMoAl	40Cr7Al10Mo2	P.5			
A11	SUM21	Y12		P.1	Free cutting		
	SUM22	Y15		P.1			
	SUM22L	Y15Pb		P.1			
A35		Y35		P.2			
	SUM25			P.1			
	SUM24L			P.1			
25	S25C	25	25C4	P.3	Heat-treatable		
30	S30C	30	30C8	P.3			
35	S35C	35	35C8	P.3			
40	S40C	40	40C8	P.3			
45	S45C	45	45C8	P.3			
50	S50C	50	50C8	P.3			
55	S55C	55	55C8	P.3			
60	S58C	60	C604	P.3			
40Ch	SCr440(H)	40Cr	40Cr4	P.4 (norm.) / P.5 (Q+T)			
50Ch	SUP10	50CrVA	50Cr4V2	P.4 (norm.) / P.5 (Q+T)			
30ChM	SCCrM1	30CrMo	21Cr4Mo2	P.4 (norm.) / P.5 (Q+T)			
35ChML	SCM435	35CrMo		P.4 (norm.) / P.5 (Q+T)			
38ChA	SCM440	42CrMo	40CrMoH	P.4 (norm.) / P.5 (Q+T)			
50Ch	SCM445(H)	ZG50Cr1Mo		P.4 (norm.) / P.5 (Q+T)			
	SNCM431			P.5 (norm.) / P.6 (Q+T)			
38Ch2N2MA	SNCM439			P.5 (norm.) / P.6 (Q+T)			
40ChGMN		40CrNiMoA		P.4 (norm.) / P.5 (Q+T)			
				P.5 (norm.) / P.6 (Q+T)			
SChCh15	SUJ2/SUJ4	GCr15		P.4 (norm.)			Ball bearing
				P.4 (norm.)			
65	S70C-CSP	65	70C6	P.3	Spring		
75A	S75CM	75		P.3			
85A	SK85	85		P.3			
	SK4-CSP	T10A	98C6	P.3			
				P.4 (norm.) / P.5 (Q+T)			
55S2/55S2A		55Si2Mn	55Si7	P.4 (norm.) / P.5 (Q+T)			
60S2	SUP6	60Si2Mn	60Si7	P.4 (norm.) / P.5 (Q+T)			
60S2G		60Si2CrA		P.4 (norm.) / P.5 (Q+T)			
50Ch	SUP10	50CrVA	50Cr4V2	P.4 (norm.) / P.6 (Q+T)			
50ChGA	SUP9(A)	55CrMnA	55Cr3	P.4 (norm.) / P.6 (Q+T)			
				P.4 (norm.) / P.6 (Q+T)			
				P.3	Superficial hardening		
				P.3			
50	S50C			P.3			
				P.4			
		38CrA		P.5			
35Ch	SCr435H	35Cr		P.5			
40ChFA	SNB22	42CrMo	40Cr4Mo3	P.5			

MATERIAL EXAMPLES

ISO 513	Application	W.Nr.	Germany DIN	Italy UNI	France AFNOR	United States AISI/SAE/ASTM
P STEEL	Hot-work	1.2767	45NiCrMo16	40NiCrMoV16 KU	Y35NCD16	
		1.2713	55NiCrMoV7	55NiCrMoV7 KU	55NiCrMoV7	L6
		1.2311		35CrMo8 KU		
		1.2365	32CrMoV12-28	30CrMoV12-27 KU	32CDV12-28	H10
		1.2343	X38CrMoV5-1	X37CrMoV5-1 KU	Z38CDV5	H11
		1.2344	X40CrMoV5-1	X40CrMoV5-1-1 KU	Z40CDV5	H13
		1.2567	X30WCrV5-3	X30WCrV5-3 KU	Z32WCV5	H14
		1.2581	X30WCrV9-3	X30WCrV9-3 KU	Z30WCV9	H21
	Ferritic stainless steel	1.4002	X6CrAl13	X6CrAl13	Z 8 CA 12	405
		1.4512	X2CrTi12	X6CrTi12	Z 3 CT 12	409
		1.4016	X6Cr17	X8Cr17	Z 8 C 17	430
		1.4104	X14CrMoS17	X10CrS17	Z 13 CF 17	430F
	Martensitic stainless steel	1.4006	X12Cr13	X12Cr13	Z 10 C 13	410
		1.4005	X12CrS13	X12CrS13	Z 11 CF 13	416
		1.4021	X20Cr13	X20Cr13	Z 20 C 13	420
		1.4028	X30Cr13	X30Cr13	Z 30 C 13	420
		1.4057	X17CrNi16-2	X16CrNi16	Z 15 CN 16-02	431
		1.4125	X105CrMo17		Z 100 CD 17	440C
	Precipitation hardening	1.4542	X5CrNiCuNb16-4		Z 7 CNU 15-05	630
M STAINLESS STEEL	Austenitic	1.4319	X3CrNi17-8	X10CrNi1809		302
		1.4305	X8CrNiS18-9	X10CrNiS1809	Z 8 CNF 18-09	303
		1.4301	X5CrNi18-10	X5CrNi1810	Z 4 CN 19-10 FF	304
		1.4306	X2CrNi19-11	X2CrNi1811	Z 1 CN 18-12	304L
		1.4303	X4CrNi18-12	X8CrNi1812	Z 5 CN 18-11 FF	305
		1.4828	X15CrNiSi20-12	X16CrNi2314	Z 9 CN 24-13	309
		1.4841	X15CrNiSi25-20	X22CrNiSi2520	Z 15 CNS 25-20	310
		1.4401	X5CrNiMo17-12-2	X5CrNiMo1712	Z 3 CND 17-11-01	316
		1.4404	X2CrNiMo17-12-2	X2CrNiMo1712	Z 2 CND 17-12	316L
		1.4541	X6CrNiTi18-10	X6CrNiTi1811	Z 6 CNT 18-10	321
		1.4550	X6CrNiNb18-10	X6CrNiNb1811	Z 6 CNNb 18-10	347
	Duplex	1.4462	X2CrNiMoN22-5-3	X2CrNiMoN22-5-3	Z 3 CND 22-05 Az	S31803
		1.4501	X2CrNiMoCuWN25-7-4	X2CrNiMoCuWN25-7-4		S32760
K CAST IRON	Grey cast iron	0.6010	GG10	G10	Ft10D	A48-20B
		0.6015	GG15	G15	Ft15D	A48-25B
		0.6020	GG20	G20	Ft20D	A48-30B
		0.6025	GG25	G25	Ft25D	A48-40B
		0.6030	GG30	G30	Ft30D	A48-45B
		0.6035	GG35	G35	Ft35D	A48-50B
		0.6040	GG40	G40	Ft40D	A48-60B
	Nodular cast iron / tempered	0.7040	GGG40	GS400-12	FGS400-12	60-40-18
		0.7050	GGG50	GS500-7	FGS500-7	65-45-12
		0.7060	GGG60	GS600-3	FGS600-3	80-55-06
		0.7070	GGG70	GS700-2	FGS700-2	100-70-03
	Malleable cast iron	0.8035	GTW35-04			
		0.8055	GTW55			
	Austempered ductile iron		EN-GJS-800-8			
			EN-GJS-1000-5			
			EN-GJS-1200-2			
			EN-GJS-1400-1			
N NON-FERROUS METALS	Pure aluminium	3.0205	Al99	9001/1	1200 (A4)	1200
		3.0305	Al99.9			
	Al wrought alloys	3.0505	AlMn0.5Mg0.5		3105	
		3.0915	AlFeSi	8011	8011	
		3.3315	AlMg1	9005/1	5005 (AlMg1)	5005
		3.3525	AlMg2Mn0.3		5251	5251
		3.3527	AlMg2Mn0.8		5049	5049
		3.3545	AlMg4Mn	9005/4	5086 (AG4MC)	5086
		3.3555	AlMg5			
		3.0615	AlMgSiPb		6012	

Russia	Japan	China	India			
GOST	JIS	GB	IS	MG Vergnano	Application	ISO 513
5ChNM	SKT4	5CrNiMo	T55Ni7Cr3Mo3V1	P.5 (annealed)	Hot-work	P STEEL
				P.4 (annealed)		
				P.4 (annealed)		
3Ch3M3F	SKD7	4Cr3Mo3SiV		P.4 (annealed)		
4Ch5MFS	SKD6	4Cr5MoSiV	XT35Cr5Mo1V3	P.4 (annealed)		
4Ch5MF1S	SKD61	4Cr5MoSiV1	XT35Cr5Mo1V1	P.4 (annealed)		
4Ch2W5MF	SKD4	30W4Cr2VA		P.4 (annealed)		
3Ch3W8F	SKD5	3Cr2W8V	XT33W9Cr3V4	P.4 (annealed)	Ferritic stainless steel	
	SUS405	0Cr13Al	X04Cr13	P.7		
	SUS409TB	022Cr11NbTi		P.7		
	SUS430	1Cr17	X07Cr17	P.7		
	SUS430F	Y1Cr17		P.7		
	SUS410	1Cr13	X12Cr12	P.7	Martensitic stainless steel	
	SUS416	Y1Cr13		P.7		
20Ch13	SUS420J1	2Cr13	X20Cr13	P.7		
30Ch13	SUS420J2	3Cr13	X30Cr13	P.7		
14Ch17N2	SUS431	1Cr17Ni2	X15Cr16Ni2	P.7		
95Ch18	SUS440C	108Cr17	X108Cr17Mo	P.7	Precipitation hardening	
	SUS630/SCS24	0Cr17Ni4Cu4Nb		M.2		
	SUS302			M.1	Austenitic	M STAINLESS STEEL
	SUS303			M.1		
08Ch18N10	SUS304	0Cr18Ni9	X04Cr18Ni10	M.1		
03Ch18N11	SUS304L/SCS19	00Cr19Ni10	X02Cr19Ni10	M.1		
12Ch18N12T	SUS305J1	1Cr18Ni12		M.1		
	SUH309	1Cr20Ni14Si2	X15Cr24Ni13	M.1		
20Ch25N20S2	SUH310	1Cr25Ni20Si2	X20Cr25Ni20	M.1		
08Ch16N11M3	SUS316	0Cr17Ni12Mo2	X04Cr17Ni12Mo2	M.1		
	SUS316L	00Cr17Ni14Mo2	X02Cr17Ni12Mo2	M.1		
08Ch18N10T	SUS321	0Cr18Ni10Ti	X04Cr18Ni10Ti	M.1		
08Ch18N12B	SUS347	0Cr18Ni11Nb	X04Cr18Ni10Nb	M.1	Duplex	
	SUS329J3L	022Cr22Ni5Mo3N		M.2		
		022Cr25Ni7Mo3WCuN		M.2		
Sc10	FC10			K.1	Grey cast iron	K CAST IRON
Sc15	FC15	HT150	FG150	K.1		
Sc20	FC20	HT200	FG200	K.1		
Sc25	FC25	HT250	FG260	K.1		
Sc30	FC30	HT300	FG300	K.1		
Sc35	FC35			K.1		
Sc40				K.1	Nodular cast iron / tempered	
VC 42-12	FCD40	QT400-15		K.2		
VC 50-2	FCD50	QT500-7	SG500/7	K.2		
VC 60-2	FCD60	QT600-3	SG600/3	K.2		
VC 70-2	FCD70	QT700-2	SG700/2	K.2	Malleable cast iron	
				K.2		
				K.3	Austempered ductile iron	
				K.3		
				K.3		
				K.3		
	A1200			N.1	Pure aluminium	N NON-FERROUS METALS
				N.1	Al wrought alloys	
	A3105			N.2		
				N.2		
	A5005			N.2		
				N.2		
				N.2		
	A5086			N.2		
	A5056			N.2		
				N.2		

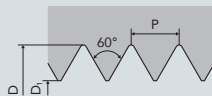
MATERIAL EXAMPLES

			Germany	Italy	France	United States
ISO 513	Application	W.Nr.	DIN	UNI	AFNOR	AISI/SAE/ASTM
N	Al wrought alloys	3.1255	AlCuSiMn	9002/3	2014	2014
		3.1325	AlCuMg1	9002/2	2017 A (AU4G)	2017A
		3.1355	AlCuMg2	9002/4	2024 (AU4G1)	2024
		3.1645	AlCuMgPb	9002/8	2030 (AU4PB)	2030
		3.4335	AlZn4.5Mg1	9007/1	7020 (AZ5G)	7020
	Al casting alloys	3.1371	G-AlCu4TiMg			
		3.2134	G-AlSi5Cu1Mg			
		3.3241	G-AlMg3Si			
		3.3261	G-AlMg5Si			
		3.3541	G-AlMg3			
		3.2373	G-AlSi9Mg			
		3.2381	G-AlSi10Mg			
		3.2383	G-AlSi10Mg(Cu)			
		3.2581	G-AlSi12			
		3.2583	G-AlSi12(Cu)			
	Pure copper	2.0060	E-Cu57			C11000
		2.0065	E-Cu58	5649	CuA1	C11000
	Cu wrought alloys	2.1525	CuSi3Mn	CuSi3Mn1		C65500
		2.0855	CuNi2Si	CuNi2Si		C64700
		2.1247	CuBe2	Classe IV		C17200
		2.1285	CuCo2Be	Classe III		C17510
	Brass	2.0240	CuZn15			
		2.0250	CuZn20			
		2.0265	CuZn30			C26000
		2.0280	CuZn33			
		2.0321	CuZn37			C27450
		2.0360	CuZn40			C28000
		2.0410	CuZn44Pb2	CuZn43Pb2Al		C38000
		2.0550	CuZn40Al2	CuZn37Mn3Al2PbSi		C67410
	Bronze	2.1016	CuSn4			
		2.1020	CuSn6			
		2.1030	CuSn8			
		2.1086	G-CuSn10Zn	7013	U-E12P7U-E8Z2	C90500
		2.0978	CuAl11Ni6Fe6	CuAl11Fe6Ni6		
		2.0940	CuAl10Fe	5274		C95400
		2.0882	CuNi30Mn1Fe			
		3.5312	MgAl3Zn			
		3.5632	MgAl6Zn3			
		3.5912	MgAl9Zn1			
S	Pure titanium	3.7024	Ti99.5			
		3.7034	Ti99.7			
	Titanium alloys	3.7165	TiAl6V4		T-A6V	
		3.7174	TiAl6V4Sn2			
	Pure Nickel	1.3911	RNi24			
		1.3926	RNi12			
	Nickel alloys	2.4858	NiCr21Mo (Incoloy 825)			
		2.4668	NiCr19Fe19NbMo (Inconel 718)		INCONEL 718	
		2.4630	Ni-Cr20Ti (Nimonic 75)		NIMONIC 75	
H	Ball bearing	2.4665	NiCr22Fe18Mo (Hastelloy X)			
		1.3505	100Cr6	100Cr6	100C6	52100
	Hot-work	1.3536	100CrMo6	100CrMo7	100CD7	3
		1.2767	45NiCrMo16	40NiCrMoV16 KU	Y35NCD16	
		1.2713	55NiCrMoV7	55NiCrMoV7 KU	55NiCrMoV7	L6
		1.2311		35CrMo8 KU		
		1.2365	32CrMoV12-28	30CrMoV12-27 KU	32CDV12-28	H10
		1.2343	X38CrMoV5-1	X37CrMoV5-1 KU	Z38CDV5	H11
		1.2344	X40CrMoV5-1	X40CrMoV5-1-1 KU	Z40CDV5	H13
		1.2567	X30WCrV5-3	X30WCrV5-3 KU	Z32WCV5	H14
		1.2581	X30WCrV9-3	X30WCrV9-3 KU	Z30WCV9	H21

Russia	Japan	China	India			
GOST	JIS	GB	IS	MG Vergnano	Application	ISO 513
	A2014			N.2	Al wrought alloys	NON-FERROUS METALS
	A2017			N.2		
	A2024			N.2		
				N.2		
	A7N01			N.2	Al casting alloys	
	AC1B			N.2		
	AC4D			N.3		
				N.2		
				N.2		
				N.2		
	AC4A			N.3		
				N.4		
	ADC3			N.4		
	AC3A			N.4		
	ADC1			N.4		
	C1100			N.5	Pure copper	
	C1100			N.5	Cu wrought alloys	
				N.6		
				N.6		
				N.6		
				N.6		
	C2600			N.6	Brass	
				N.6		
	C2700			N.6		
	C2800			N.7		
				N.7		
				N.7		
				N.6	Bronze	
				N.6		
				N.6		
	CAC403C (BC3)			N.7		
				N.8		
	CAC702C			N.8		
				N.8		
				N.9		
				N.9		
				N.9		
				N.10		
				S.1	Pure titanium	
				S.1	Titanium alloys	
				S.2		
				S.2	Pure Nickel	
				S.3		
				S.3		
	NCF825			S.4	Nickel alloys	
				S.4		
				S.4		
				S.4		
SChCh15	SUJ2/SUJ4	GCr15		H.2 (Q+T)	Ball bearing	HARDENED MATERIALS
				H.2 (Q+T)		
	SKT6			H.1 (Q+T)	Hot-work	
5ChNM	SKT4	5CrNiMo	T55Ni7Cr3Mo3V1	H.1 (Q+T)		
				H.1 (Q+T)		
3Ch3M3F	SKD7	4Cr3Mo3SiV		H.1 (Q+T)		
4Ch5MFS	SKD6	4Cr5MoSiV	XT35Cr5Mo1V3	H.1 (Q+T)		
4Ch5MF1S	SKD61	4Cr5MoSiV1	XT35Cr5Mo1V1	H.1 (Q+T)		
4Ch2W5MF	SKD4	30W4Cr2VA		H.1 (Q+T)		
3Ch3W8F	SKD5	3Cr2W8V	XT33W9Cr3V4	H.1 (Q+T)		

DRILL SIZE CUTTING TAPS

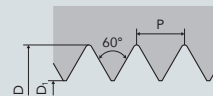
M



ISO Metric coarse thread DIN 13

M	Pitch [mm]	Maximum core diam. (tol. 6H) [mm] D ₁	Drill size* [mm]
M 1	0,25	0,785 ⁽¹⁾	0,75
1,1	0,25	0,885 ⁽¹⁾	0,85
1,2	0,25	0,985 ⁽¹⁾	0,95
1,4	0,3	1,142 ⁽¹⁾	1,1
1,6	0,35	1,321	1,25
1,7 ⁽³⁾	0,35	1,421	1,35
1,8	0,35	1,521	1,45
2	0,4	1,679	1,6
2,2	0,45	1,838	1,75
2,3 ⁽³⁾	0,4	1,938	1,9
2,5	0,45	2,138	2,05
2,6 ⁽³⁾	0,45	2,238	2,1
3	0,5	2,599	2,5
3,5	0,6	3,010	2,9
4	0,7	3,422	3,3
4,5	0,75	3,878	3,7
5	0,8	4,334	4,2
6	1	5,153	5
7	1	6,153	6
8	1,25	6,912	6,8
9	1,25	7,912	7,8
10	1,5	8,676	8,5
11	1,5	9,676	9,5
12	1,75	10,441	10,2
14	2	12,210	12
16	2	14,210	14
18	2,5	15,744	15,5
20	2,5	17,744	17,5
22	2,5	19,744	19,5
24	3	21,252	21
27	3	24,252	24
30	3,5	26,771	26,5
33	3,5	29,771	29,5
36	4	32,270	32
39	4	35,270	35
42	4,5	37,799	37,5
45	4,5	40,799	40,5
48	5	43,297	43
52	5	47,297	47
56	5,5	50,796	50,5
60 ⁽³⁾	5,5	54,796	54,5
64 ⁽³⁾	6	58,305	58
68 ⁽³⁾	6	62,305	62

MF



ISO Metric fine thread DIN 13

M	Pitch [mm]	Maximum core diam. (tol. 6H) [mm] D ₁	Drill size* [mm]	M	Pitch [mm]	Maximum core diam. (tol. 6H) [mm] D ₁	Drill size* [mm]
M 2 ⁽³⁾	0,25	1,774 ⁽²⁾	1,75	M 25	1	24,153	24
2,3 ⁽³⁾	0,25	2,085	2,05	25	1,5	23,676	23,5
2,5	0,35	2,221	2,15	25	2	23,210	23
3	0,35	2,721	2,65	26	1,5	24,676	24,5
3,5	0,35	3,221	3,15	27	1	26,153	26
4	0,5	3,599	3,5	27	1,5	25,676	25,5
4,5	0,5	4,099	4	27	2	25,210	25
5	0,5	4,599	4,5	28	1	27,153	27
5,5	0,5	5,099	5	28	1,5	26,676	26,5
6	0,75	5,378	5,2	28	2	26,210	26
7	0,75	6,378	6,2	30	1	29,153	29
8	0,75	7,378	7,2	30	1,5	28,676	28,5
8	1	7,153	7	30	2	28,210	28
9	0,75	8,378	8,2	30	3	27,252	27
9	1	8,153	8	32	1,5	30,676	30,5
10	0,75	9,378	9,2	32	2	30,210	30
10	1	9,153	9	33	1,5	31,676	31,5
10	1,25	8,912	8,8	33	2	31,210	31
11	0,75	10,378	10,2	33	3	30,252	30
11	1	10,153	10	35	1,5	33,676	33,5
12 ⁽³⁾	0,75	11,378	11,2	36	1,5	34,676	34,5
12	1	11,153	11	36	2	34,210	34
12	1,25	10,912	10,8	36	3	33,252	33
12	1,5	10,676	10,5	38	1,5	36,676	36,5
14	1	13,153	13	39	1,5	37,676	37,5
14	1,25	12,912	12,8	39	2	37,210	37
14	1,5	12,676	12,5	39	3	36,252	36
15	1	14,153	14	40	1,5	38,676	38,5
15	1,5	13,676	13,5	40	2	38,210	38
16	1	15,153	15	40	3	37,252	37
16	1,5	14,676	14,5	42	1,5	40,676	40,5
17	1	16,153	16	42	2	40,210	40
17	1,5	15,676	15,5	42	3	39,252	39
18	1	17,153	17	45	1,5	43,676	43,5
18	1,5	16,676	16,5	45	2	43,210	43
18	2	16,210	16	45	3	42,252	42
20	1	19,153	19	48	1,5	46,676	46,5
20	1,5	18,676	18,5	48	2	46,210	46
20	2	18,210	18	48	3	45,252	45
22	1	21,153	21	50	1,5	48,676	48,5
22	1,5	20,676	20,5	50	2	48,210	48
22	2	20,210	20	50	3	47,252	47
24	1	23,153	23	52	1,5	50,676	50,5
24	1,5	22,676	22,5	52	2	50,210	50
24	2	22,210	22	52	3	49,252	49

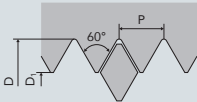
(*) Drill size according to DIN 336

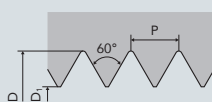
(¹) Tolerance 5H

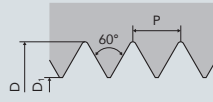
(²) Tolerance 4H

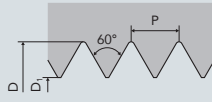
(³) Size not included in DIN 336

DRILL SIZE CUTTING TAPS

EG-M 	
ISO Metric coarse thread DIN 8140 Part 2	
EG-M	Drill size* [mm]
EG-M 3	3,15
4	4,2
5	5,25
6	6,3
8	8,4
10	10,5
12	12,5
14	14,5
16	16,5

8-UN 			
8-UN thread ASME B1.1			
8-UN	Pitch [TPI]	Maximum core diam. (tol. 3B) [mm] D ₁	Drill size* [mm]
1 1/8"	8	25,519	25,4
1 1/4"	8	28,694	28,6
1 3/8"	8	31,869	31,8
1 1/2"	8	35,044	35,0
1 5/8"	8	38,219	38,1
1 3/4"	8	41,394	41,3
1 7/8"	8	44,569	44,5
2"	8	47,744	47,7

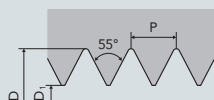
UNC 			
Unified coarse thread UNC ASME - B1.1			
UNC	Pitch [TPI]	Maximum core diam. (tol. 3B) [mm] D ₁	Drill size* [mm]
Nr. 1	64	1,582	1,55
Nr. 2	56	1,872	1,85
Nr. 3	48	2,146	2,1
Nr. 4	40	2,385	2,35
Nr. 5	40	2,697	2,65
Nr. 6	32	2,896	2,85
Nr. 8	32	3,528	3,5
Nr. 10	24	3,950	3,9
Nr. 12	24	4,590	4,5
1/4"	20	5,250	5,1
5/16"	18	6,680	6,6
3/8"	16	8,082	8
7/16"	14	9,441	9,4
1/2"	13	10,881	10,8
9/16"	12	12,301	12,2
5/8"	11	13,693	13,5
3/4"	10	16,624	16,5
7/8"	9	19,520	19,5
1"	8	22,344	22,25
1 1/8"	7	25,082	25
1 1/4"	7	28,258	28
1 3/8"	6	30,851	30,75
1 1/2"	6	34,026	34
1 3/4"	5	39,560	39,5
2"	4,5	45,367	45

UNF 			
Unified fine thread UNF ASME - B1.1			
UNF	Pitch [TPI]	Maximum core diam. (tol. 3B) [mm] D ₁	Drill size* [mm]
Nr. 0	80	1,306	1,25
Nr. 1	72	1,613	1,55
Nr. 2	64	1,913	1,85
Nr. 3	56	2,197	2,15
Nr. 4	48	2,459	2,4
Nr. 5	44	2,741	2,7
Nr. 6	40	3,012	2,95
Nr. 8	36	3,597	3,5
Nr. 10	32	4,168	4,1
Nr. 12	28	4,717	4,6
1/4"	28	5,563	5,5
5/16"	24	6,995	6,9
3/8"	24	8,565	8,5
7/16"	20	9,947	9,9
1/2"	20	11,524	11,5
9/16"	18	12,969	12,9
5/8"	18	14,554	14,5
3/4"	16	17,546	17,5
7/8"	14	20,493	20,4
1"	12	23,363	23,25
1 1/8"	12	26,538	26,5
1 1/4"	12	29,713	29,5
1 3/8"	12	32,888	32,75
1 1/2"	12	36,063	36

(*) Drill size according to DIN 336

DRILL SIZE CUTTING TAPS

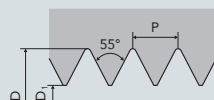
BSW



**Whitworth thread
BSW - BS 84**

BSW	Pitch [TPI]	Maximum core diam. [mm] D_1	Drill size [mm]
3/32"	48	1,912	1,9
1/8"	40	2,591	2,55
5/32"	32	3,214	3,2
3/16"	24	3,744	3,7
7/32"	24	4,539	4,5
1/4"	20	5,156	5,1
5/16"	18	6,589	6,5
3/8"	16	7,988	7,9
7/16"	14	9,332	9,25
1/2"	12	10,589	10,5
9/16"	12	12,177	12
5/8"	11	13,559	13,5
3/4"	10	16,485	16,4
7/8"	9	19,355	19,25
1"	8	22,149	22
1 1/8"	7	24,831	24,75
1 1/4"	7	28,006	27,75
1 3/8"	6	30,528	30,3
1 1/2"	6	33,703	33,5
1 5/8"	5	35,961	35,5
1 3/4"	5	39,136	39
1 7/8"	4,5	41,702	41,5
2"	4,5	44,877	44,5
2 1/4"	4	50,465	50
2 1/2"	4	56,815	56,3
2 3/4"	3,5	62,182	61,5
3"	3,5	68,532	68

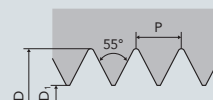
G



**Whitworth pipe thread
EN - ISO 228**

G	Pitch [TPI]	Maximum core diam. [mm] D_1	Drill size* [mm]
G 1/8"	28	8,848	8,8
1/4"	19	11,890	11,8
3/8"	19	15,395	15,25
1/2"	14	19,172	19
5/8"	14	21,128	21
3/4"	14	24,658	24,5
7/8"	14	28,418	28,25
1"	11	30,931	30,75
1 1/8"	11	35,579	35,5
1 1/4"	11	39,592	39,5
1 3/8"	11	42,005	41,9
1 1/2"	11	45,485	45,25
1 3/4"	11	51,428	51
2"	11	57,296	57
2 1/4"	11	63,392	63,3
2 3/8"	11	67,080	67
2 1/2"	11	72,866	72,8
2 3/4"	11	79,216	79,1
3"	11	85,566	85,5
3 1/4"	11	91,662	91,5
3 1/2"	11	98,012	98
3 3/4"	11	104,362	104
4"	11	110,712	110,5

**Rp
(BSPP)**

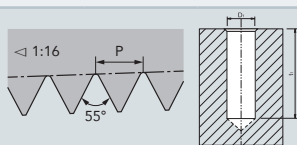


**Rp thread (BSPP)
DIN EN 10226-1**

Rp	Pitch [TPI]	Maximum core diam. [mm] D_1	Drill size* [mm]
1/8"	28	8,637	8,6
1/4"	19	11,549	11,5
3/8"	19	15,054	15,0
1/2"	14	18,773	18,5
3/4"	14	24,259	24,0

(*) Drill size according to DIN 336

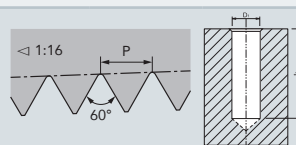
**Rc
(BSPT)**



**Conical gas thread Rc
(BSPT) - DIN EN 10226-2**

Rc	Pitch [TPI]	Drill size** [mm] D_1	t1 [mm]
1/16"	28	6,2	11,9
1/8"	28	8,2	11,9
1/4"	19	11	17,7
3/8"	19	14,5	18,1
1/2"	14	18	24
3/4"	14	23,5	25,3
1"	11	29,5	30,6
1 1/4"	11	38	32,9
1 1/2"	11	44	32,9
2"	11	55,5	37,2

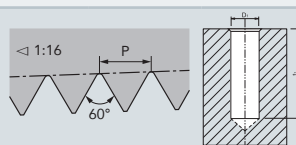
NPT



**National pipe thread
NPT - ANSI B1.20.1**

NPT	Pitch [TPI]	Drill size** [mm] D_1	t1 [mm]
1/16"	27	6,15	12
1/8"	27	8,5	12
1/4"	18	11	17,5
3/8"	18	14,5	17,6
1/2"	14	17,85	22,9
3/4"	14	23,2	23
1"	11,5	29	27,4
1 1/4"	11,5	37,8	28,1
1 1/2"	11,5	44	28,4
2"	11,5	56	28,4

NPTF



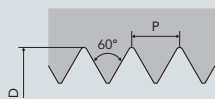
**Dryseal national pipe thread
NPTF - ANSI B1.20.3**

NPTF	Pitch [TPI]	Drill size** [mm] D_1	t1 [mm]
1/16"	27	6,15	12
1/8"	27	8,5	12
1/4"	18	11	17,5
3/8"	18	14,5	17,6
1/2"	14	17,8	22,9
3/4"	14	23	23
1"	11,5	29	27,4
1 1/4"	11,5	37,8	28,1
1 1/2"	11,5	43,8	28,4
2"	11,5	56	28,4

** For conical threads tapered drill holes are preferable.
Please request specific tables.

DRILL SIZE FORMING TAPS

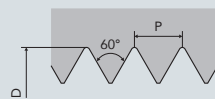
M



**ISO Metric coarse thread
DIN 13**

M	Pitch [mm]	Drill size [mm]
M 2	0,4	1,85 ± 0,03
2,5	0,45	2,30 ± 0,03
3	0,5	2,80 ± 0,03
3,5	0,6	3,25 ± 0,03
4	0,7	3,70 ± 0,03
5	0,8	4,65 ± 0,03
6	1	5,55 ± 0,05
8	1,25	7,40 ± 0,05
10	1,5	9,30 ± 0,05
12	1,75	11,20 ± 0,05
14	2	13,10 ± 0,05
16	2	15,10 ± 0,05
18	2,5	16,90 ± 0,05
20	2,5	18,90 ± 0,05
24	3	22,70 ± 0,05
27	3	25,70 ± 0,05
30	3,5	28,45 ± 0,05

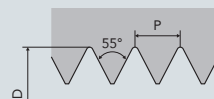
MF



**ISO Metric fine thread
DIN 13**

MF	Pitch [mm]	Drill size [mm]
M 3	0,35	2,85 ± 0,03
4	0,5	3,80 ± 0,03
5	0,5	4,80 ± 0,03
6	0,75	5,65 ± 0,03
8	1	7,55 ± 0,05
10	1	9,55 ± 0,05
10	1,25	9,40 ± 0,05
12	1	11,55 ± 0,05
12	1,25	11,40 ± 0,05
12	1,5	11,30 ± 0,05
14	1,25	13,40 ± 0,05
14	1,5	13,30 ± 0,05
16	1,5	15,30 ± 0,05
18	1,5	17,30 ± 0,05
20	1,5	19,30 ± 0,05

G



**Whitworth pipe thread
EN - ISO 228**

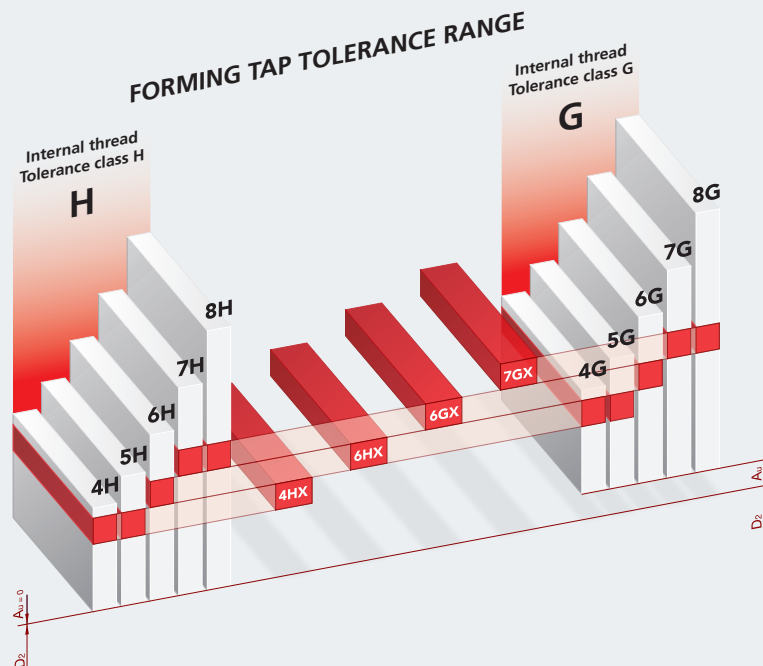
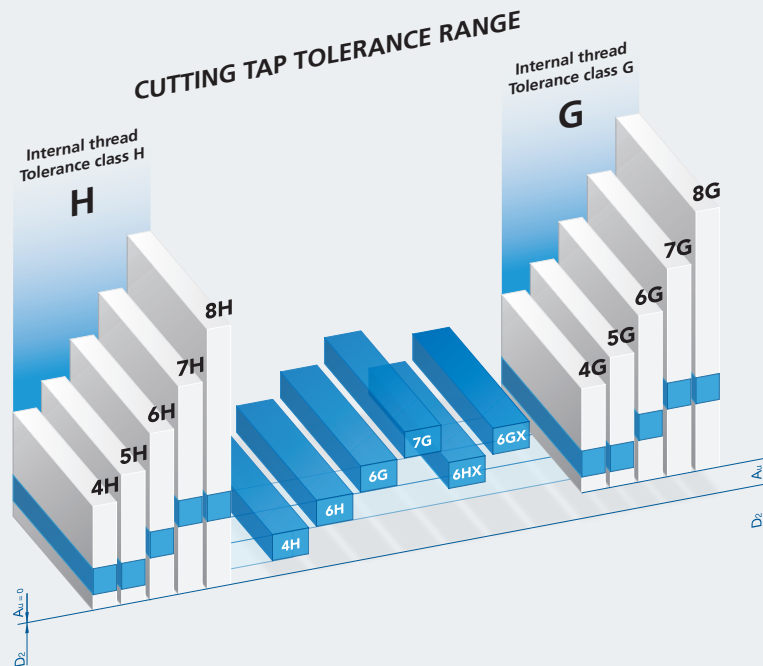
G	Pitch [TPI]	Drill size [mm]
G 1/8 "	28	9,25 ± 0,05
1/4 "	19	12,50 ± 0,05
3/8 "	19	16,00 ± 0,05
1/2 "	14	20,00 ± 0,05
3/4 "	14	25,50 ± 0,05
1 "	11	32,00 ± 0,05

Other drill sizes = theoretical flank diameter + pitch/5

In order to obtain the requested tolerance, the formation of a complete internal thread and guarantee the tap tool life, it is important to respect the drill hole diameters and their tight tolerances.

The core diameter of the internal thread obtained by forming is not only a function of the drill hole diameter but also depends on the workpiece material properties. For this reason the tolerance on the core diameter is 7H compared to 6H for cutting taps. For more detailed information see the DIN 13-50 standard.

TAP TOLERANCE



Standard fit for a thread corresponds to tolerance class ISO 2/6H. For more precise fits, without allowance on thread flank, tolerance class ISO 1/4H must be chosen. ISO 3/6G is used in case of loose fits, with large allowance, which is often required for subsequent coatings.

Between classes 6H and 6G, as well as between classes 6G and 7G, tap manufacturers produce taps with tolerance 6HX and 6GX. These taps are used for tapping abrasive materials, such as cast iron or Al-Si alloys, in order to increase their tool life. Another important application is on forming taps, which create the thread by plastic deformation and not by cutting. In this case, due to the elastic return of the material, in order to obtain a thread 6H tolerance, a 6HX tap must be used.

The tolerances described above are collected in the European standard EN 22857.

TOLERANCE TABLE

Nominal diameter (mm)		Pitch (mm)	Limits on pitch diameter (µm)*					
			Class					
>	≤		4H (ISO1)	6H (ISO2)	6G (ISO3)	7G		
0,99	1,4	0,2	+ 15	-	-	-		
			+ 5	-	-	-		
		0,25	+ 17	-	-	-		
			+ 6	-	-	-		
		0,3	+ 18	+ 30	-	-		
			+ 6	+ 18	-	-		
1,4	2,8	0,2	+ 16	-	-	-		
			+ 5	-	-	-		
		0,25	+ 18	-	-	-		
			+ 6	-	-	-		
		0,35	+ 20	+ 34	-	-		
			+ 7	+ 20	-	-		
		0,4	+ 21	+ 36	-	-		
			+ 7	+ 21	-	-		
		0,45	+ 23	+ 38	-	-		
			+ 8	+ 23	-	-		
2,8	5,6	0,35	+ 21	+ 36	-	-		
			+ 7	+ 21	-	-		
		0,5	+ 24	+ 40	+ 56	+ 70		
			+ 8	+ 24	+ 40	+ 55		
		0,6	+ 27	+ 45	+ 63	+ 81		
			+ 9	+ 27	+ 45	+ 63		
		0,7	+ 29	+ 48	+ 67	+ 86		
			+ 10	+ 29	+ 48	+ 67		
		0,75	+ 29	+ 48	+ 67	+ 86		
			+ 10	+ 29	+ 48	+ 67		
		0,8	+ 30	+ 50	+ 70	+ 90		
			+ 10	+ 30	+ 50	+ 70		
		5,6	11,2	0,75	+ 32	+ 53	+ 74	-
					+ 11	+ 32	+ 53	-
1	+ 35			+ 59	+ 83	+ 107		
	+ 12			+ 35	+ 59	+ 83		
1,25	+ 38			+ 63	+ 88	+ 113		
	+ 13			+ 38	+ 63	+ 88		
1,5	+ 42			+ 70	+ 98	+ 126		
	+ 14			+ 42	+ 70	+ 98		
11,2	22,4	1	+ 38	+ 63	+ 88	+ 113		
			+ 13	+ 38	+ 63	+ 88		
		1,25	+ 42	+ 70	+ 98	+ 126		
			+ 14	+ 42	+ 70	+ 98		
		1,5	+ 45	+ 75	+ 105	+ 135		
			+ 15	+ 45	+ 75	+ 105		
		1,75	+ 48	+ 80	+ 112	+ 144		
			+ 16	+ 48	+ 80	+ 112		
		2	+ 51	+ 85	+ 119	+ 153		
			+ 17	+ 51	+ 85	+ 119		
		2,5	+ 54	+ 90	+ 126	+ 162		
			+ 18	+ 54	+ 90	+ 126		
22,4	45	1	+ 40	+ 66	+ 92	+ 118		
			+ 13	+ 40	+ 66	+ 92		
		1,5	+ 48	+ 80	+ 112	+ 144		
			+ 16	+ 48	+ 80	+ 112		
		2	+ 54	+ 90	+ 126	+ 162		
			+ 18	+ 54	+ 90	+ 126		
		3	+ 64	+ 106	+ 148	+ 190		
			+ 21	+ 64	+ 106	+ 148		
		3,5	+ 67	+ 112	+ 157	+ 202		
			+ 22	+ 67	+ 112	+ 157		
		4	+ 71	+ 118	+ 165	+ 212		
			+ 24	+ 71	+ 118	+ 165		
		4,5	+ 75	+ 125	+ 175	+ 225		
			+ 25	+ 75	+ 125	+ 125		
45	90	1,5	+ 51	+ 85	+ 119	+ 153		
			+ 17	+ 51	+ 85	+ 119		
		2	+ 57	+ 95	+ 133	+ 171		
			+ 19	+ 57	+ 95	+ 133		
		3	+ 67	+ 112	+ 157	+ 202		
			+ 22	+ 67	+ 112	+ 157		
		4	+ 75	+ 125	+ 175	+ 225		
			+ 25	+ 75	+ 125	+ 175		
		5	+ 80	+ 133	+ 186	+ 239		
			+ 27	+ 80	+ 133	+ 186		
		5,5	+ 84	+ 140	+ 196	+ 252		
			+ 28	+ 84	+ 140	+ 196		
		6	+ 90	+ 150	+ 210	+ 270		
			+ 30	+ 90	+ 150	+ 210		

(*) According to EN 22857

ICON DESCRIPTION

TAP AND DIE GEOMETRY



Hand tap



Tap with straight flutes



Tap with straight flutes and spiral point



Tap with straight flutes with interrupted thread



Tap with straight flutes and spiral point with interrupted thread



Tap with 15° right hand spiral



Tap with 15° left hand spiral



Tap with 40° right hand spiral and 2 flutes



Tap with 40° right hand spiral



Tap with 40° right hand spiral
Left hand cut



Tap with 45° right hand spiral



Forming tap without oil grooves



Forming tap with oil grooves



Through coolant tap with internal axial hole,
for blind holes



Through coolant tap with internal axial and
radial holes, for through holes



Through coolant tap with internal axial hole,
for blind holes



Through coolant forming tap with internal
axial hole, for blind holes



Through coolant forming tap with internal
axial and radial holes, for through holes



Thread Mills with internal axial coolant



Thread Mills with internal radial coolant



Die



Back tapering



Tap with through shank



Tap with long shank

HOLE TYPE AND DEPTH



Through



Through, up to 1 x d_1



Through, up to 1,5 x d_1



Through, up to 2,5 x d_1



Through, up to 3 x d_1



Blind



Blind, up to 1,5 x d_1



Blind, up to 2 x d_1



Blind, up to 2,5 x d_1



Blind, up to 3 x d_1



Blind and through



Blind and through, up to 1,5 x d_1



Blind and through, up to 2 x d_1



Blind and through, up to 2,5 x d_1



Blind and through, up to 3 x d_1



Tapered hole

ICON DESCRIPTION



Nut

DIRECTION OF CUT



Right hand cut



Left hand cut

TYPE OF CHIP



Short chipping



Medium chipping



Medium to long chipping



Long chipping



Plastic deformation without chip formation

COLOURED RING



Orange ring - Taps for tough materials



Red ring - Hand taps A100 series

TAP AND DIE TOLERANCE



Tolerance 4H / ISO1



Tolerance 6H / ISO2



Tolerance 6G / ISO3



Tolerance 7G



Tolerance 6HX



Tolerance 6GX



Tolerance 7GX



Tolerance 6H + 0,1 mm



Modified 6H Tolerance



Tolerance 3B



Tolerance 2B



Tolerance 2BX



Tolerance ISO 5969



Tolerance ISO 5969X



Medium Tolerance



Tolerance ISO 6g



Tolerance 2A



Tolerance Class A

MATERIAL



Material: solid carbide



Material: conventional high speed steel



Material: conventional high speed steel



Material: powder metallurgy high speed steel



Material: high performance powder metallurgy high speed steel



Material: high performance powder metallurgy high speed steel

THREAD TYPE



ISO Metric coarse thread



ISO Metric fine thread

ICON DESCRIPTION

UNC	Unified coarse thread - UNC ASME B1.1	APPLICATION INFORMATION	
UNF	Unified fine thread - UNF ASME B1.1		Tap only for rigid tapping attachment (synchronous)
8-UN	8-UN thread - ASME B1.1		High recommended cutting speed
G	Whitworth pipe thread - EN ISO 228		High tool life
Rp (BSPP)	Rp thread (BSPP) - DIN EN 10226-1	THREAD MILLS	
Rc (BSPT)	Conical gas thread Rc (BSPT) taper 1:16 - BS 21 and DIN EN 10226-2	INT	For internal threads
BSW	Whitworth thread - BS 84	EXT	For external threads
NPT	National pipe thread, taper 1:16 - ASME/ANSI B1.20.1		
NPTF	Dryseal National pipe thread, taper 1:16 - ASME/ANSI B1.20.3		
EG-M	ISO Metric coarse thread - DIN 8140-2		
ISO	ISO thread DIN 13		
UN	American Unified Thread ASME B1.1		
GAS	GAS thread EN ISO 228		

CHAMFER FORM

A (5-6)	Chamfer form A: 5 - 6 threads for through holes
B (4-5)	Chamfer form B: 4 - 5 threads for through holes
C (2-3)	Chamfer form C: 2 - 3 threads for blind and through holes
D (4-5)	Chamfer form D: 4 - 5 threads for through holes
E (1,5-2)	Chamfer form E: 1,5 - 2 threads for blind holes
1,75xP	Die chamfer form: 1,75 x P

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FRESE / END MILLS / SCHAFTFRÄSER

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65

Con i suoi 75 anni di esperienza nell'industria degli utensili da taglio di alta precisione, Vergnano è tra le aziende leader nella produzione di maschi filettatori, creatori, frese e filiere. Un'azienda ormai storica, di impronta familiare ma con assetto di respiro internazionale. Alla forte identità, caratterizzata dal rispetto dei valori tradizionali, Vergnano affianca una consolidata cultura aziendale fatta di qualità, affidabilità, ricerca, flessibilità, dinamismo e rapidità di risposta.

With over 75 years of experience in the cutting tool industry, Vergnano is one of the world's leading manufacturers of high quality precision threading taps, hobs, end mills and threading dies. While keeping a firm foothold in the honoured tradition of the Vergnano brand, Vergnano has established itself internationally and is renowned for quality, reliability, flexibility, innovation and commitment.

Mit über 75 Jahren Erfahrung auf dem Sektor der Hochpräzisionswerkzeuge gehört Vergnano zu den führenden Unternehmen bei der Herstellung von Gewindewerkzeugen, Schaftfräsern, Abwälzfräsern und Schneideisen.

Mit der Herkunftsregion eng verbunden und unter Bewahrung gewachsener Traditionen steht Vergnano auf dem Weltmarkt gleichzeitig für Qualität, Zuverlässigkeit, Flexibilität, Innovation und Einsatzbereitschaft.



LEGENDA TIPOLOGIA ARTICOLI / ARTICLE LEGEND / ARTIKEL LEGENDE

- FH...** Frese in metallo duro per impiego generico
Solid carbide end mills for generic applications
VHM-Schaftfräser für den allgemeinen Einsatz
- FP...** Frese in metallo duro ad alte prestazioni
High performance solid carbide end mills
Hochleistungs-VHM-Schaftfräser
- FA...** Frese in acciaio per impiego generico
High speed steel end mills for generic applications
HSS-Schaftfräser für den allgemeinen Einsatz
- ...W** Frese con Weldon / End mills with Weldon / Schaftfräser mit Weldon-Spannfläche
- ...E** Frese con smusso a 90° / End mills with 90° corner chamfer / Schaftfräser mit 90° Fase
- ...R** Frese raggate / End mills with corner radius / Schaftfräser mit Eckradius
- ...X** Serie extra corta / Extra short series / Ausführung extra kurz
- ...S** Serie corta / Short series / Ausführung kurz
- ...L** Serie lunga / Long series / Ausführung lang

LEGENDA MATERIALI / MATERIALS LEGEND / SCHNEIDSTOFF LEGENDE

- HM** Metallo duro / Solid carbide / Hartmetall
- HSSY** Acciaio super-rapido da polveri / Powder metallurgy high speed steel / Pulvermetallurgischer Schnellarbeitsstahl

ISO 513	Materiale Material Werkstoff	Applicazione Application Anwendung
P	Acciaio Steel Stahl	Acciaio / Steel / Stahl <800 N/mm²
		Acciaio / Steel / Stahl <1000 N/mm²
		Acciaio / Steel / Stahl <1300 N/mm²
		Acciaio altolegato / High strength steel / Stahl mit erhöhter Festigkeit
M	Acciaio inossidabile Stainless steel Rostfreier Stahl	Ferritico / Ferritic / Ferritisch
		Austenitico / Austenitic / Austenitisch
		Duplex
K	Ghisa Cast iron Gusswerkstoffe	Ghisa grigia / Grey cast iron / Grauguss
N	Leghe leggere Light alloys Leichtmetalle	Alluminio e leghe / Al and Al alloys / Al und Al-Legierungen
		Rame e leghe / Copper and Copper alloys / Kupfer und Kupfer-Legierungen
S	Superleghe Superalloys Superlegierungen	Leghe di Titanio / Titanium alloys / Titan Legierungen
		Leghe di Nichel / Nickel alloys / Nickel Legierungen
O	Altri materiali Other materials Andere Werkstoffe	Termoplastici / Thermoplastics / Thermoplaste

FH / FP / FA S E R I E S

Frese / End mills / Schaftfräser

INDICE ARTICOLI / TOOL CODE LIST / ARTIKEL INDEX

FH SERIES		FP SERIES		FA SERIES	
CODE		CODE		CODE	
FH700 V-MAXX	6	FP710 V-MAXX	26	FA300SE V-MAXX	34
FH700W V-MAXX	6	FP710W V-MAXX	26	FA300WSE V-MAXX	35
FH700E V-MAXX	7	FP710E V-MAXX	27	FA405E V-MAXX	36
FH700WE V-MAXX	7	FP710WE V-MAXX	27	FA405WE V-MAXX	37
FH700R V-MAXX	8	FP720 V-MAXX	28	FA425E V-MAXX	38
FH700WR V-MAXX	8	FP720W V-MAXX	28	FA425WE V-MAXX	39
FH700L V-MAXX	9	FP750 V-MAXX	29	FA465E V-MAXX	40
FH700WL V-MAXX	9	FP750W V-MAXX	29	FA465WE V-MAXX	41
FH700S V-MAXX	10	FP765 V-MAXX	30	FA505S V-MAXX	42
FH700WS V-MAXX	10	FP765W V-MAXX	30	FA505WS V-MAXX	43
FH700SE V-MAXX	11	FP765E V-MAXX	31	FA545 V-MAXX	44
FH700WSE V-MAXX	11	FP765WE V-MAXX	31	FA545W V-MAXX	45
FH710 V-MAXX	12	FP795E ALU-MAXX	32		
FH710W V-MAXX	12	FP795WE ALU-MAXX	32		
FH710L V-MAXX	13				
FH710WL V-MAXX	13				
FH740XE V-MAXX	14				
FH745 V-MAXX	15				
FH745W V-MAXX	15				
FH750 V-MAXX	16				
FH750W V-MAXX	16				
FH760E V-MAXX	17				
FH760WE V-MAXX	17				
FH770E	18				
FH770WE	18				
FH780	19				
FH780W	19				
FH790XE V-MAXX	20				
FH800R V-MAXX	21				
FH800WR V-MAXX	21				
FH960W V-MAXX	22				
FH990W V-MAXX	23				

LEGENDA ICONE / ICON LEGEND / IKONEN LEGENDE

TIPOLOGIA DI LAVORAZIONE TYPE OF MACHINING / BEARBEITUNGSART



Cava / Slotting / Nutfräsen



Contornatura / Contouring / Eckfräsen



Dinamica / Dynamic / Dynamisch



Rampa / Diagonal plunging
Eintauchfräsen



Interpolazione elicoidale / Helical interpolation
Spiralförmige Interpolation



Foratura / Drilling / Bohren



Copiatura 3D / 3D Copying
3D-Radiuskopierfräsen



Smussatura / Chamfering / Fasen

NUMERO DI TAGLIENTI / NUMBER OF FLUTES NUTENZAHL



4 taglienti, con divisione irregolare
4 flutes, with unequal flute spacing
Vierschneider, ungleiche Teilung



4 taglienti / 4 flutes / Vierschneider



3 taglienti, con divisione irregolare
3 flutes, with unequal flute spacing
Dreischneider, ungleiche Teilung



3 taglienti / 3 flutes / Dreischneider



2 taglienti / 2 flutes / Zweischneider



Semisferica 2 taglienti
Ball nose 2 flutes
Radiusfräser Zweischneider

DIREZIONE DI AVANZAMENTO FEED DIRECTION / VORSCHUBRICHTUNG



ANGOLO DELL'ELICA / SPIRAL FLUTE ANGLE DRALLWINKEL



$\Delta=30^\circ$



$\Delta=35^\circ$



$\Delta=38^\circ$



$\Delta=38^\circ/40^\circ$



$\Delta=42^\circ$



$\Delta=45^\circ$



$\Delta=55^\circ$

INDICAZIONE SERIE / SERIES TYPE AUSFÜHRUNG



Serie lunga / Long series / Ausführung lang



Serie normale / Normal series
Ausführung normal



Serie corta / Short series / Ausführung kurz



Serie extra corta / Extra short series
Ausführung extra kurz

MATERIALE / MATERIAL / SCHNEIDSTOFF



HM Metallo duro / Solid carbide / Hartmetall



HSSY Acciaio super-rapido da polveri
Powder metallurgy high speed steel
Pulvermetallurgischer Schnellarbeitsstahl

PROFILO ROMPITRUCIOLO / ROUGHING PROFILE SCHRUPP-PROFIL



Profilo Vergnano
Vergnano roughing profile
Vergnano Werksnorm Schrapp-Profil

LEGENDA ICONE / ICON LEGEND / IKONEN LEGENDE

NORMA DI DIMENSIONAMENTO DIMENSIONAL STANDARD / BAU-NORM



RIBASSAMENTO / NECK RELIEF HALSFREISTICH



NORMA DEL GAMBO / SHANK STANDARD SCHAFT-NORM



GEOMETRIA FRONTALE / FRONTAL GEOMETRY STIRN GEOMETRIE



Smusso a 45° / 45° Corner chamfer / 45° Fase



Smusso a 90° / 90° Corner chamfer / 90° Fase



Punta a 60° / 60° chamfering / 60° Entgrater



Punta a 90° / 90° chamfering / 90° Entgrater



Smusso raggiato / Corner radius / Eckradius



Testa raggiata / Ball nose / Radiusfräser

FH S E R I E S

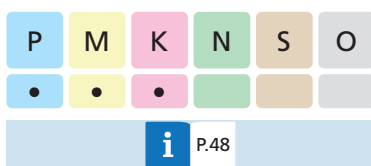
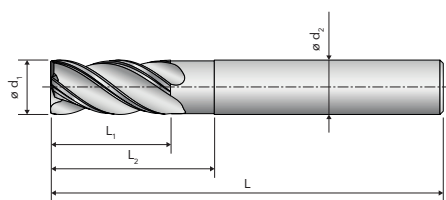
Frese in metallo duro per impiego generico
Solid carbide end mills for generic applications
VHM-Schaftfräser für den allgemeinen Einsatz

Fresa 4 taglienti serie normale con divisione irregolare
 End mill 4 flutes, with unequal flute spacing
 VHM-Schaftfräser, Vierschneider, Ungleichteilung



FH700
V-MAXX

FH700W
V-MAXX



FH700
V-MAXX

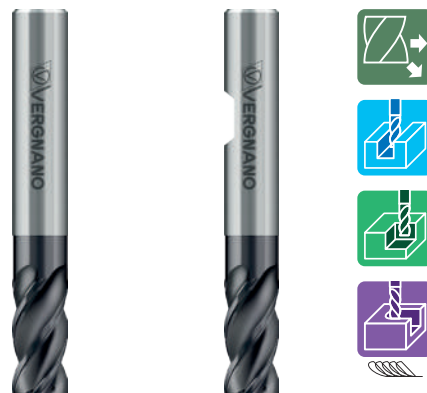
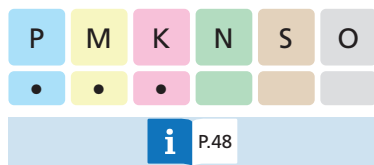
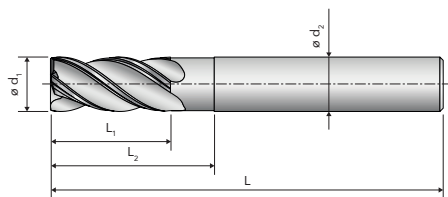
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FH700030A0VC000	3,0	6	57	8	11	0,10	0,05	4
FH700040A0VC000	4,0	6	57	9	16	0,10	0,10	4
FH700050A0VC000	5,0	6	57	13	18	0,10	0,10	4
FH700060A0VC000	6,0	6	57	13	20	0,15	0,10	4
FH700080A0VC000	8,0	8	63	19	25	0,15	0,15	4
FH700100A0VC000	10,0	10	72	22	30	0,15	0,15	4
FH700120A0VC000	12,0	12	83	26	36	0,20	0,15	4
FH700140A0VC000	14,0	14	83	26	36	0,20	0,15	4
FH700160A0VC000	16,0	16	92	32	42	0,20	0,20	4
FH700180A0VC000	18,0	18	92	32	42	0,20	0,20	4
FH700200A0VC000	20,0	20	104	38	52	0,20	0,20	4

FH700W
V-MAXX

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FH700030A1VC000	3,0	6	57	8	11	0,10	0,05	4
FH700040A1VC000	4,0	6	57	9	16	0,10	0,10	4
FH700050A1VC000	5,0	6	57	13	18	0,10	0,10	4
FH700060A1VC000	6,0	6	57	13	20	0,15	0,10	4
FH700080A1VC000	8,0	8	63	19	25	0,15	0,15	4
FH700100A1VC000	10,0	10	72	22	30	0,15	0,15	4
FH700120A1VC000	12,0	12	83	26	36	0,20	0,15	4
FH700140A1VC000	14,0	14	83	26	36	0,20	0,15	4
FH700160A1VC000	16,0	16	92	32	42	0,20	0,20	4
FH700180A1VC000	18,0	18	92	32	42	0,20	0,20	4
FH700200A1VC000	20,0	20	104	38	52	0,20	0,20	4

Fresa 4 taglienti serie normale con divisione irregolare
 End mill 4 flutes, with unequal flute spacing
 VHM-Schaftfräser, Vierschneider, Ungleichteilung


FH700E
 V-MAXX

FH700WE
 V-MAXX

FH700E
 V-MAXX

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	z [-]
FH700030A0VE000	3,0	6	57	8	11	0,10	4
FH700040A0VE000	4,0	6	57	9	16	0,10	4
FH700050A0VE000	5,0	6	57	13	18	0,10	4
FH700060A0VE000	6,0	6	57	13	20	0,15	4
FH700080A0VE000	8,0	8	63	19	25	0,15	4
FH700100A0VE000	10,0	10	72	22	30	0,15	4
FH700120A0VE000	12,0	12	83	26	36	0,20	4
FH700140A0VE000	14,0	14	83	26	36	0,20	4
FH700160A0VE000	16,0	16	92	32	42	0,20	4
FH700180A0VE000	18,0	18	92	32	42	0,20	4
FH700200A0VE000	20,0	20	104	38	52	0,20	4

FH700WE
 V-MAXX

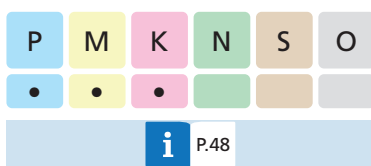
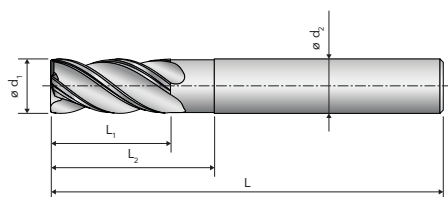
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FH700030A1VE000	3,0	6	57	8	11	0,10	4
FH700040A1VE000	4,0	6	57	9	16	0,10	4
FH700050A1VE000	5,0	6	57	13	18	0,10	4
FH700060A1VE000	6,0	6	57	13	20	0,15	4
FH700080A1VE000	8,0	8	63	19	25	0,15	4
FH700100A1VE000	10,0	10	72	22	30	0,15	4
FH700120A1VE000	12,0	12	83	26	36	0,20	4
FH700140A1VE000	14,0	14	83	26	36	0,20	4
FH700160A1VE000	16,0	16	92	32	42	0,20	4
FH700180A1VE000	18,0	18	92	32	42	0,20	4
FH700200A1VE000	20,0	20	104	38	52	0,20	4

Fresa 4 taglienti serie normale raggiata con divisione irregolare
 End mill 4 flutes, with unequal flute spacing
 VHM-Schaftfräser, Vierschneider, Ungleichteilung



FH700R
 V-MAXX

FH700WR
 V-MAXX



FH700R
 V-MAXX

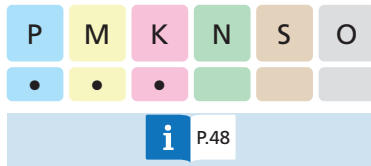
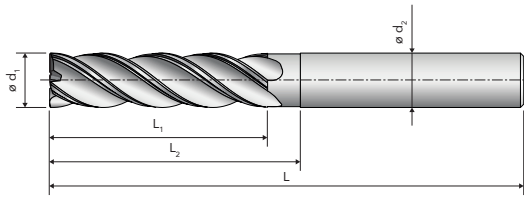
Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	Cr [mm]	z [-]
FH700030F0VR000	3,0	6	57	8	11	0,10	0,5	4
FH700040F0VR000	4,0	6	57	9	16	0,10	0,5	4
FH700050K0VR000	5,0	6	57	13	18	0,10	1,0	4
FH700060F0VR000	6,0	6	57	13	20	0,15	0,5	4
FH700060K0VR000	6,0	6	57	13	20	0,15	1,0	4
FH700080F0VR000	8,0	8	63	19	25	0,15	0,5	4
FH700080K0VR000	8,0	8	63	19	25	0,15	1,0	4
FH700100F0VR000	10,0	10	72	22	30	0,15	0,5	4
FH700100K0VR000	10,0	10	72	22	30	0,15	1,0	4
FH700100M0VR000	10,0	10	72	22	30	0,15	2,0	4
FH700120F0VR000	12,0	12	83	26	36	0,20	0,5	4
FH700120K0VR000	12,0	12	83	26	36	0,20	1,0	4
FH700120M0VR000	12,0	12	83	26	36	0,20	2,0	4

FH700WR
 V-MAXX

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	Cr [mm]	z [-]
FH700030F1VR000	3,0	6	57	8	11	0,10	0,5	4
FH700040F1VR000	4,0	6	57	9	16	0,10	0,5	4
FH700050K1VR000	5,0	6	57	13	18	0,10	1,0	4
FH700060F1VR000	6,0	6	57	13	20	0,15	0,5	4
FH700060K1VR000	6,0	6	57	13	20	0,15	1,0	4
FH700080F1VR000	8,0	8	63	19	25	0,15	0,5	4
FH700080K1VR000	8,0	8	63	19	25	0,15	1,0	4
FH700100F1VR000	10,0	10	72	22	30	0,15	0,5	4
FH700100K1VR000	10,0	10	72	22	30	0,15	1,0	4
FH700100M1VR000	10,0	10	72	22	30	0,15	2,0	4
FH700120F1VR000	12,0	12	83	26	36	0,20	0,5	4
FH700120K1VR000	12,0	12	83	26	36	0,20	1,0	4
FH700120M1VR000	12,0	12	83	26	36	0,20	2,0	4

Fresa 4 taglienti serie lunga con divisione irregolare
 End mill 4 flutes, long version, with unequal flute spacing
 VHM-Schaftfräser, Vierschneider lang, Ungleichteilung


FH700L
 V-MAXX

FH700WL
 V-MAXX

FH700L
 V-MAXX

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FH700050A0VC600	5,0	6	74	20	25	0,10	0,10	4
FH700060A0VC600	6,0	6	74	24	30	0,15	0,10	4
FH700080A0VC600	8,0	8	80	32	40	0,15	0,15	4
FH700100A0VC600	10,0	10	87	40	46	0,15	0,15	4
FH700120A0VC600	12,0	12	105	48	58	0,20	0,15	4
FH700140A0VC600	14,0	14	105	48	58	0,20	0,15	4
FH700160A0VC600	16,0	16	125	64	68	0,20	0,20	4
FH700200A0VC600	20,0	20	160	70	80	0,20	0,20	4

FH700WL
 V-MAXX

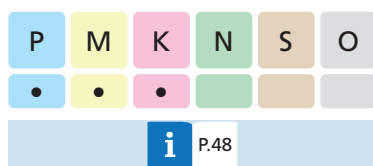
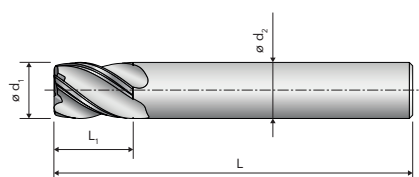
Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FH700050A1VC600	5,0	6	74	20	25	0,10	0,10	4
FH700060A1VC600	6,0	6	74	24	30	0,15	0,10	4
FH700080A1VC600	8,0	8	80	32	40	0,15	0,15	4
FH700100A1VC600	10,0	10	87	40	46	0,15	0,15	4
FH700120A1VC600	12,0	12	105	48	58	0,20	0,15	4
FH700140A1VC600	14,0	14	105	48	58	0,20	0,15	4
FH700160A1VC600	16,0	16	125	64	68	0,20	0,20	4
FH700200A1VC600	20,0	20	160	70	80	0,20	0,20	4

Fresa 4 taglienti serie corta con divisione irregolare
 End mill 4 flutes, short version, with unequal flute spacing
 VHM-Schaftfräser, Vierschneider kurz, Ungleichteilung



FH700S
 V-MAXX

FH700WS
 V-MAXX



FH700S
 V-MAXX

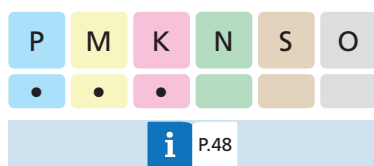
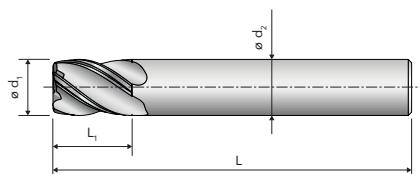
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FH700030A0VC400	3,0	6	54	6	-	-	0,05	4
FH700040A0VC400	4,0	6	54	8	-	-	0,10	4
FH700050A0VC400	5,0	6	54	9	-	-	0,10	4
FH700060A0VC400	6,0	6	54	10	-	-	0,10	4
FH700080A0VC400	8,0	8	57	12	-	-	0,15	4
FH700100A0VC400	10,0	10	66	14	-	-	0,15	4
FH700120A0VC400	12,0	12	73	16	-	-	0,15	4
FH700140A0VC400	14,0	14	75	18	-	-	0,15	4
FH700160A0VC400	16,0	16	82	22	-	-	0,20	4
FH700180A0VC400	18,0	18	84	24	-	-	0,20	4
FH700200A0VC400	20,0	20	92	26	-	-	0,20	4

FH700WS
 V-MAXX

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FH700030A1VC400	3,0	6	54	6	-	-	0,05	4
FH700040A1VC400	4,0	6	54	8	-	-	0,10	4
FH700050A1VC400	5,0	6	54	9	-	-	0,10	4
FH700060A1VC400	6,0	6	54	10	-	-	0,10	4
FH700080A1VC400	8,0	8	57	12	-	-	0,15	4
FH700100A1VC400	10,0	10	66	14	-	-	0,15	4
FH700120A1VC400	12,0	12	73	16	-	-	0,15	4
FH700140A1VC400	14,0	14	75	18	-	-	0,15	4
FH700160A1VC400	16,0	16	82	22	-	-	0,20	4
FH700180A1VC400	18,0	18	84	24	-	-	0,20	4
FH700200A1VC400	20,0	20	92	26	-	-	0,20	4

Fresa 4 taglienti serie corta con divisione irregolare
 End mill 4 flutes, short version, with unequal flute spacing
 VHM-Schaftfräser, Vierschneider kurz, Ungleichteilung


FH700SE
 V-MAXX

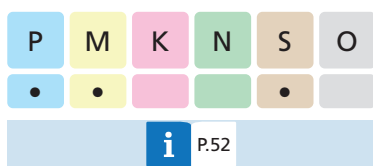
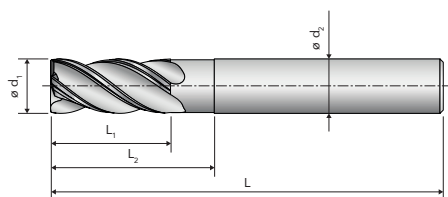
FH700WSE
 V-MAXX


FH700SE V-MAXX							
Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	z [-]
FH700030A0VE400	3,0	6	54	6	-	-	4
FH700040A0VE400	4,0	6	54	8	-	-	4
FH700050A0VE400	5,0	6	54	9	-	-	4
FH700060A0VE400	6,0	6	54	10	-	-	4
FH700080A0VE400	8,0	8	57	12	-	-	4
FH700100A0VE400	10,0	10	66	14	-	-	4
FH700120A0VE400	12,0	12	73	16	-	-	4
FH700140A0VE400	14,0	14	75	18	-	-	4
FH700160A0VE400	16,0	16	82	22	-	-	4
FH700180A0VE400	18,0	18	84	24	-	-	4
FH700200A0VE400	20,0	20	92	26	-	-	4

FH700WSE V-MAXX							
Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	z [-]
FH700030A1VE400	3,0	6	54	6	-	-	4
FH700040A1VE400	4,0	6	54	8	-	-	4
FH700050A1VE400	5,0	6	54	9	-	-	4
FH700060A1VE400	6,0	6	54	10	-	-	4
FH700080A1VE400	8,0	8	57	12	-	-	4
FH700100A1VE400	10,0	10	66	14	-	-	4
FH700120A1VE400	12,0	12	73	16	-	-	4
FH700140A1VE400	14,0	14	75	18	-	-	4
FH700160A1VE400	16,0	16	82	22	-	-	4
FH700180A1VE400	18,0	18	84	24	-	-	4
FH700200A1VE400	20,0	20	92	26	-	-	4

Fresa 4 taglienti serie normale con divisione irregolare - per acciai inox, acciai dolci e leghe di titanio
 End mill 4 flutes, with unequal flute spacing - for stainless steel, mild steel and Titanium alloys
 VHM-Schaftfräser, Vierschneider, Ungleichenteilung - für VA-Stähle, Baustähle und Titan-Legierungen


FH710
 V-MAXX

FH710W
 V-MAXX

FH710
 V-MAXX

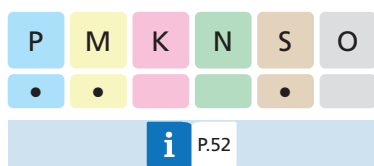
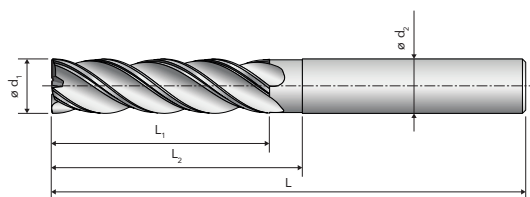
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FH710030A0VC000	3,0	6	57	8	11	0,10	0,10	4
FH710040A0VC000	4,0	6	57	9	16	0,10	0,10	4
FH710050A0VC000	5,0	6	57	13	18	0,10	0,10	4
FH710060A0VC000	6,0	6	57	13	20	0,15	0,10	4
FH710080A0VC000	8,0	8	63	19	25	0,15	0,15	4
FH710100A0VC000	10,0	10	72	22	30	0,15	0,15	4
FH710120A0VC000	12,0	12	83	26	36	0,20	0,15	4
FH710140A0VC000	14,0	14	83	26	36	0,20	0,15	4
FH710160A0VC000	16,0	16	92	32	42	0,20	0,20	4
FH710180A0VC000	18,0	18	92	32	42	0,20	0,20	4
FH710200A0VC000	20,0	20	104	38	52	0,20	0,20	4

FH710W
 V-MAXX

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FH710030A1VC000	3,0	6	57	8	11	0,10	0,10	4
FH710040A1VC000	4,0	6	57	9	16	0,10	0,10	4
FH710050A1VC000	5,0	6	57	13	18	0,10	0,10	4
FH710060A1VC000	6,0	6	57	13	20	0,15	0,10	4
FH710080A1VC000	8,0	8	63	19	25	0,15	0,15	4
FH710100A1VC000	10,0	10	72	22	30	0,15	0,15	4
FH710120A1VC000	12,0	12	83	26	36	0,20	0,15	4
FH710140A1VC000	14,0	14	83	26	36	0,20	0,15	4
FH710160A1VC000	16,0	16	92	32	42	0,20	0,20	4
FH710180A1VC000	18,0	18	92	32	42	0,20	0,20	4
FH710200A1VC000	20,0	20	104	38	52	0,20	0,20	4

Fresa 4 taglienti serie lunga con divisione irregolare - per acciai inox, acciai dolci e leghe di titanio
 End mill 4 flutes, long version, with unequal flute spacing - for stainless steel, mild steel and Titanium alloys
 VHM-Schaftfräser, Vierschneider lang, Ungleichteilung - für VA-Stähle, Baustähle und Titan-Legierungen


FH710L
 V-MAXX

FH710WL
 V-MAXX

FH710L
 V-MAXX

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FH710050A0VC600	5,0	6	74	20	25	0,10	0,10	4
FH710060A0VC600	6,0	6	74	24	30	0,15	0,10	4
FH710080A0VC600	8,0	8	80	32	40	0,15	0,15	4
FH710100A0VC600	10,0	10	87	40	46	0,15	0,15	4
FH710120A0VC600	12,0	12	105	48	58	0,20	0,15	4
FH710140A0VC600	14,0	14	105	48	58	0,20	0,15	4
FH710160A0VC600	16,0	16	125	64	68	0,20	0,20	4
FH710200A0VC600	20,0	20	160	70	80	0,20	0,20	4

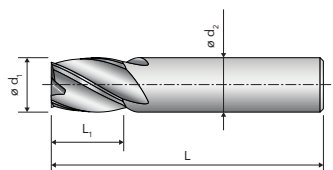
FH710WL
 V-MAXX

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FH710050A1VC600	5,0	6	74	20	25	0,10	0,10	4
FH710060A1VC600	6,0	6	74	24	30	0,15	0,10	4
FH710080A1VC600	8,0	8	80	32	40	0,15	0,15	4
FH710100A1VC600	10,0	10	87	40	46	0,15	0,15	4
FH710120A1VC600	12,0	12	105	48	58	0,20	0,15	4
FH710140A1VC600	14,0	14	105	48	58	0,20	0,15	4
FH710160A1VC600	16,0	16	125	64	68	0,20	0,20	4
FH710200A1VC600	20,0	20	160	70	80	0,20	0,20	4

Fresa 4 taglienti serie extra corta
End mill 4 flutes, extra short version
VHM-Schaftfräser, Vierschneider extra kurz



FH740XE
V-MAXX

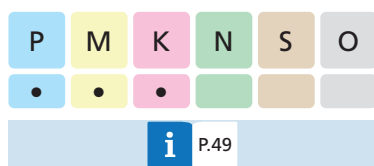
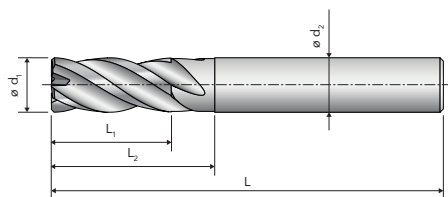


FH740XE
V-MAXX

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	z
FH740020A0VE200	2,0	6	38	4	-	-	4
FH740030A0VE200	3,0	6	38	5	-	-	4
FH740040A0VE200	4,0	6	38	7	-	-	4
FH740050A0VE200	5,0	6	38	8	-	-	4
FH740060A0VE200	6,0	6	38	8	-	-	4
FH740080A0VE200	8,0	8	43	11	-	-	4
FH740100A0VE200	10,0	10	50	13	-	-	4

Fresa universale 4 taglienti serie normale con divisione irregolare - per fresatura in rampa
 Multi-purpose end mill, with unequal flute spacing - for ramp milling
 Universal VHM-Schaftfräser, Vierschneider, Ungleichteilung - zum Rampenfräsen


FH745
 V-MAXX

FH745W
 V-MAXX

FH745
 V-MAXX

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FH745040A0VC000	4,0	6	57	11	15	0,15	0,20	4
FH745050A0VC000	5,0	6	57	13	18	0,15	0,20	4
FH745060A0VC000	6,0	6	57	13	20	0,15	0,25	4
FH745080A0VC000	8,0	8	63	19	25	0,15	0,30	4
FH745100A0VC000	10,0	10	72	22	30	0,15	0,35	4
FH745120A0VC000	12,0	12	83	26	36	0,20	0,40	4
FH745160A0VC000	16,0	16	92	32	42	0,20	0,45	4
FH745200A0VC000	20,0	20	104	38	52	0,20	0,50	4

FH745W
 V-MAXX

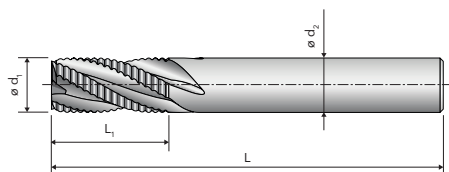
Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FH745040A1VC000	4,0	6	57	11	15	0,15	0,20	4
FH745050A1VC000	5,0	6	57	13	18	0,15	0,20	4
FH745060A1VC000	6,0	6	57	13	20	0,15	0,25	4
FH745080A1VC000	8,0	8	63	19	25	0,15	0,30	4
FH745100A1VC000	10,0	10	72	22	30	0,15	0,35	4
FH745120A1VC000	12,0	12	83	26	36	0,20	0,40	4
FH745160A1VC000	16,0	16	92	32	42	0,20	0,45	4
FH745200A1VC000	20,0	20	104	38	52	0,20	0,50	4

Fresa 4 taglienti serie normale con rompitruciolo e divisione irregolare
Roughing end mill 4 flutes, with unequal flute spacing
VHM-Schrupp-Schaftfräser, Vierschneider, Ungleichteilung



FH750
V-MAXX

FH750W
V-MAXX



FH750
V-MAXX

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FH750040A0VC000	4,0	6	57	13	-	-	0,40	4
FH750050A0VC000	5,0	6	57	13	-	-	0,50	4
FH750060A0VC000	6,0	6	57	13	-	-	0,50	4
FH750080A0VC000	8,0	8	63	19	-	-	0,50	4
FH750100A0VC000	10,0	10	72	22	-	-	0,50	4
FH750120A0VC000	12,0	12	83	26	-	-	0,50	4
FH750160A0VC000	16,0	16	92	32	-	-	0,60	4

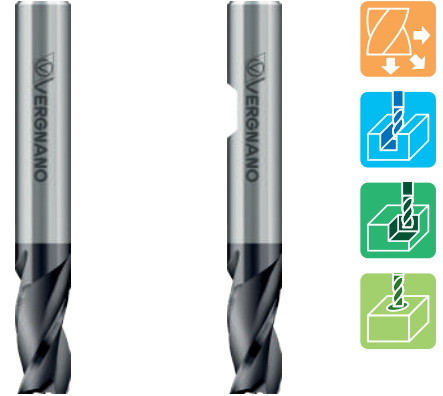
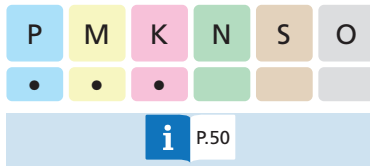
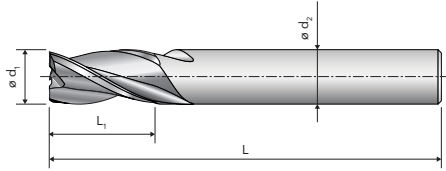
FH750W
V-MAXX

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FH750040A1VC000	4,0	6	57	13	-	-	0,40	4
FH750050A1VC000	5,0	6	57	13	-	-	0,50	4
FH750060A1VC000	6,0	6	57	13	-	-	0,50	4
FH750080A1VC000	8,0	8	63	19	-	-	0,50	4
FH750100A1VC000	10,0	10	72	22	-	-	0,50	4
FH750120A1VC000	12,0	12	83	26	-	-	0,50	4
FH750160A1VC000	16,0	16	92	32	-	-	0,60	4



FH760E
V-MAXX

FH760WE
V-MAXX



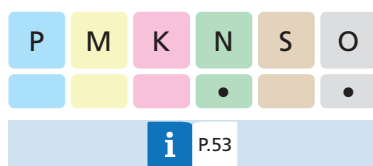
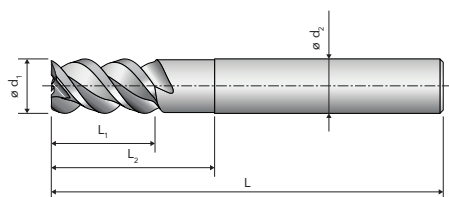
FH760E V-MAXX							
Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	z [-]
FH760020A0VE000	2,0	4	50	5	-	-	3
FH760030A0VE000	3,0	4	50	7	-	-	3
FH760040A0VE000	4,0	4	50	8	-	-	3
FH760050A0VE000	5,0	5	50	10	-	-	3
FH760060A0VE000	6,0	6	57	10	-	-	3
FH760080A0VE000	8,0	8	63	16	-	-	3
FH760100A0VE000	10,0	10	72	19	-	-	3
FH760120A0VE000	12,0	12	83	22	-	-	3
FH760160A0VE000	16,0	16	92	26	-	-	3
FH760200A0VE000	20,0	20	104	32	-	-	3

FH760WE V-MAXX							
Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	z [-]
FH760060A1VE000	6,0	6	57	10	-	-	3
FH760080A1VE000	8,0	8	63	16	-	-	3
FH760100A1VE000	10,0	10	72	19	-	-	3
FH760120A1VE000	12,0	12	83	22	-	-	3
FH760160A1VE000	16,0	16	92	26	-	-	3
FH760200A1VE000	20,0	20	104	32	-	-	3

Fresa 3 taglienti serie normale - per alluminio e leghe leggere

End mill 3 flutes - for aluminium and light alloys

VHM-Schaftfräser, Dreischneider - für Alu und Leichtmetalle

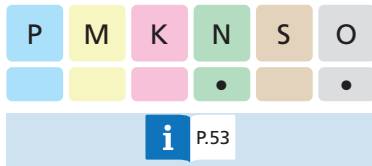
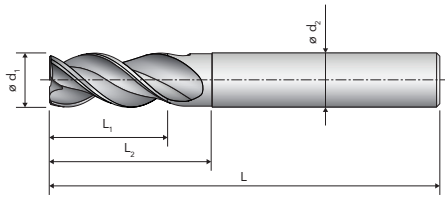

FH770E
FH770WE

FH770E

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	z [-]
FH770040A0AE000	4,0	4	50	8	19	0,10	3
FH770050A0AE000	5,0	5	50	10	21	0,10	3
FH770060A0AE000	6,0	6	57	10	21	0,15	3
FH770070A0AE000	7,0	7	60	13	24	0,15	3
FH770080A0AE000	8,0	8	63	16	27	0,15	3
FH770090A0AE000	9,0	9	67	16	27	0,15	3
FH770100A0AE000	10,0	10	72	19	30	0,15	3
FH770120A0AE000	12,0	12	83	22	38	0,20	3
FH770140A0AE000	14,0	14	83	22	38	0,20	3
FH770160A0AE000	16,0	16	92	26	42	0,20	3
FH770200A0AE000	20,0	20	104	32	54	0,20	4

FH770WE

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	z [-]
FH770060A1AE000	6,0	6	57	10	21	0,15	3
FH770070A1AE000	7,0	7	60	13	24	0,15	3
FH770080A1AE000	8,0	8	63	16	27	0,15	3
FH770090A1AE000	9,0	9	67	16	27	0,15	3
FH770100A1AE000	10,0	10	72	19	30	0,15	3
FH770120A1AE000	12,0	12	83	22	38	0,20	3
FH770140A1AE000	14,0	14	83	22	38	0,20	3
FH770160A1AE000	16,0	16	92	26	42	0,20	3
FH770200A1AE000	20,0	20	104	32	54	0,20	4

Fresa 3 taglienti serie normale con divisione irregolare - per alluminio e leghe leggere
 End mill 3 flutes, with unequal flute spacing - for aluminium and light alloys
 VHM-Schaftfräser, Dreischneider, Ungleichteilung - für Alu und Leichtmetalle

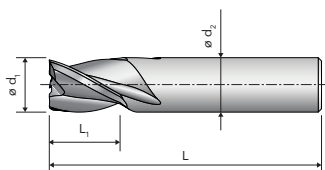

FH780
FH780W


FH780								
Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FH780030A0AC000	3,0	6	57	8	-	-	0,05	3
FH780040A0AC000	4,0	6	57	11	-	-	0,05	3
FH780050A0AC000	5,0	6	57	13	-	-	0,10	3
FH780060A0AC000	6,0	6	57	13	20	0,15	0,10	3
FH780080A0AC000	8,0	8	63	19	25	0,15	0,15	3
FH780100A0AC000	10,0	10	72	22	30	0,15	0,20	3
FH780120A0AC000	12,0	12	83	26	36	0,20	0,25	3
FH780160A0AC000	16,0	16	92	32	42	0,20	0,30	3
FH780200A0AC000	20,0	20	104	38	52	0,20	0,35	3

FH780W								
Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FH780030A1AC000	3,0	6	57	8	-	-	0,05	3
FH780040A1AC000	4,0	6	57	11	-	-	0,05	3
FH780050A1AC000	5,0	6	57	13	-	-	0,10	3
FH780060A1AC000	6,0	6	57	13	20	0,15	0,10	3
FH780080A1AC000	8,0	8	63	19	25	0,15	0,15	3
FH780100A1AC000	10,0	10	72	22	30	0,15	0,20	3
FH780120A1AC000	12,0	12	83	26	36	0,20	0,25	3
FH780160A1AC000	16,0	16	92	32	42	0,20	0,30	3
FH780200A1AC000	20,0	20	104	38	52	0,20	0,35	3



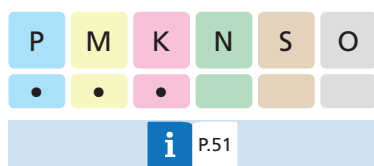
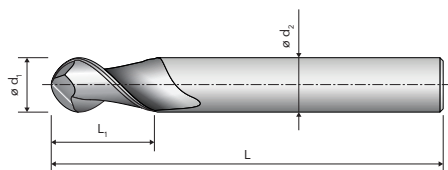
FH790XE
V-MAXX



FH790XE V-MAXX							
Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	z
FH790020A0VE200	2,0	6	38	4	-	-	3
FH790025A0VE200	2,5	6	38	4	-	-	3
FH790030A0VE200	3,0	6	38	5	-	-	3
FH790035A0VE200	3,5	6	38	6	-	-	3
FH790040A0VE200	4,0	6	38	7	-	-	3
FH790045A0VE200	4,5	6	38	8	-	-	3
FH790050A0VE200	5,0	6	38	8	-	-	3
FH790060A0VE200	6,0	6	38	8	-	-	3
FH790070A0VE200	7,0	8	43	11	-	-	3
FH790080A0VE200	8,0	8	43	11	-	-	3
FH790090A0VE200	9,0	10	50	13	-	-	3
FH790100A0VE200	10,0	10	50	13	-	-	3

Fresa semisferica 2 taglienti serie normale
 Ball nose end mill 2 flutes
 VHM-Radiusfräser, Zweischneider


FH800R
 V-MAXX

FH800WR
 V-MAXX

FH800R
 V-MAXX

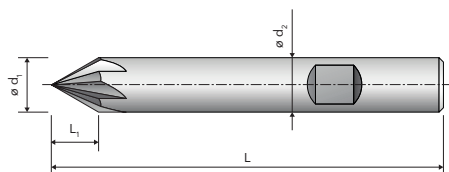
Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	z [-]
FH800020A0VR000	2,0	4	50	5	-	-	2
FH800030A0VR000	3,0	4	50	7	-	-	2
FH800040A0VR000	4,0	4	50	8	-	-	2
FH800050A0VR000	5,0	5	50	10	-	-	2
FH800060A0VR000	6,0	6	57	10	-	-	2
FH800080A0VR000	8,0	8	63	16	-	-	2
FH800100A0VR000	10,0	10	72	19	-	-	2
FH800120A0VR000	12,0	12	83	22	-	-	2
FH800140A0VR000	14,0	14	83	22	-	-	2
FH800160A0VR000	16,0	16	92	26	-	-	2
FH800200A0VR000	20,0	20	104	32	-	-	2

FH800WR
 V-MAXX

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	z [-]
FH800060A1VR000	6,0	6	57	10	-	-	2
FH800080A1VR000	8,0	8	63	16	-	-	2
FH800100A1VR000	10,0	10	72	19	-	-	2
FH800120A1VR000	12,0	12	83	22	-	-	2
FH800140A1VR000	14,0	14	83	22	-	-	2
FH800160A1VR000	16,0	16	92	26	-	-	2
FH800200A1VR000	20,0	20	104	32	-	-	2



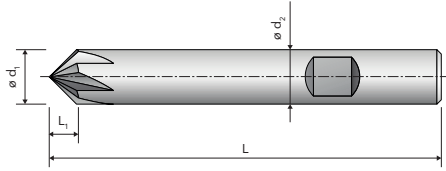
FH960W
V-MAXX



FH960W
V-MAXX

Cod.	d ₁ e8 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FH960030A1VC000	3,0(*)	4	50	2,5	-	-	-	4
FH960040A1VC000	4,0(*)	4	50	3,5	-	-	-	4
FH960060A1VC000	6,0	6	57	5,0	-	-	-	6
FH960080A1VC000	8,0	8	63	7,0	-	-	-	6
FH960100A1VC000	10,0	10	72	8,5	-	-	-	6
FH960120A1VC000	12,0	12	83	10,5	-	-	-	6
FH960160A1VC000	16,0	16	92	14,0	-	-	-	6
FH960200A1VC000	20,0	20	104	17,0	-	-	-	6

(*) = Senza Weldon / without Weldon / ohne Weldon-Spannfläche


FH990W
 V-MAXX


FH990W V-MAXX								
Cod.	d ₁ e8 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FH990030A1VC000	3,0(*)	4	50	1,5	-	-	-	4
FH990040A1VC000	4,0(*)	4	50	2,0	-	-	-	4
FH990060A1VC000	6,0	6	57	3,0	-	-	-	6
FH990080A1VC000	8,0	8	63	4,0	-	-	-	6
FH990100A1VC000	10,0	10	72	5,0	-	-	-	6
FH990120A1VC000	12,0	12	83	6,0	-	-	-	6
FH990160A1VC000	16,0	16	92	8,0	-	-	-	6
FH990200A1VC000	20,0	20	104	10,0	-	-	-	6

(*) = Senza Weldon / without Weldon / ohne Weldon-Spannfläche

FP S E R I E S

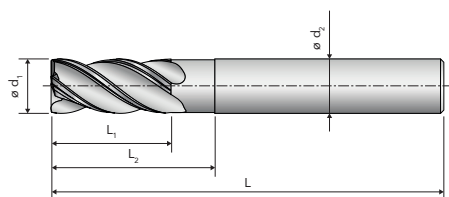
Frese in metallo duro ad alte prestazioni
High performance solid carbide end mills
Hochleistungs-VHM-Schaftfräser

Fresa 4 taglienti serie normale con divisione irregolare - per acciai inox e superleghe
End mill 4 flutes, with unequal flute spacing - for stainless steel and superalloys
VHM-Schaftfräser, Vierschneider, Ungleichteilung - für VA-Stähle und Superlegierungen



FP710
V-MAXX

FP710W
V-MAXX



FP710 V-MAXX

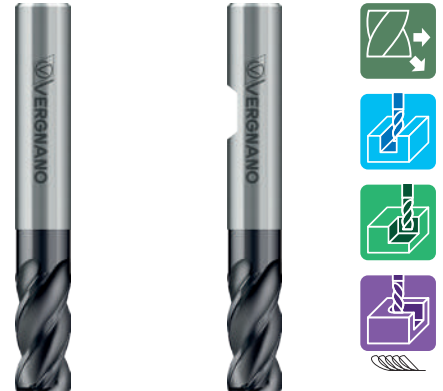
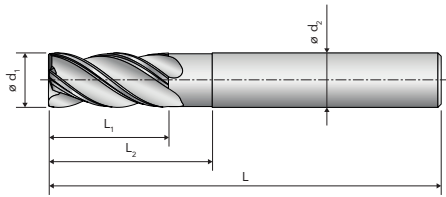
Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FP710030A0VC000	3,0	6	57	8	11	0,10	0,10	4
FP710040A0VC000	4,0	6	57	9	16	0,10	0,10	4
FP710050A0VC000	5,0	6	57	13	18	0,10	0,10	4
FP710060A0VC000	6,0	6	57	13	20	0,15	0,10	4
FP710080A0VC000	8,0	8	63	19	25	0,15	0,15	4
FP710100A0VC000	10,0	10	72	22	30	0,15	0,15	4
FP710120A0VC000	12,0	12	83	26	36	0,20	0,15	4
FP710160A0VC000	16,0	16	92	32	42	0,20	0,20	4
FP710200A0VC000	20,0	20	104	38	52	0,20	0,20	4
FP710250A0VC000	25,0	25	125	45	65	0,25	0,20	4

FP710W V-MAXX

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FP710030A1VC000	3,0	6	57	8	11	0,10	0,10	4
FP710040A1VC000	4,0	6	57	9	16	0,10	0,10	4
FP710050A1VC000	5,0	6	57	13	18	0,10	0,10	4
FP710060A1VC000	6,0	6	57	13	20	0,15	0,10	4
FP710080A1VC000	8,0	8	63	19	25	0,15	0,15	4
FP710100A1VC000	10,0	10	72	22	30	0,15	0,15	4
FP710120A1VC000	12,0	12	83	26	36	0,20	0,15	4
FP710160A1VC000	16,0	16	92	32	42	0,20	0,20	4
FP710200A1VC000	20,0	20	104	38	52	0,20	0,20	4
FP710250A1VC000	25,0	25	125	45	65	0,25	0,20	4

Fresa 4 taglienti serie normale con divisione irregolare - per acciai inox e superleghe
 End mill 4 flutes, with unequal flute spacing - for stainless steel and superalloys
 VHM-Schaftfräser, Vierschneider, Ungleichteilung - für VA-Stähle und Superlegierungen


FP710E
 V-MAXX

FP710WE
 V-MAXX

FP710E
 V-MAXX

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	z [-]
FP710030A0VE000	3,0	6	57	8	11	0,10	4
FP710040A0VE000	4,0	6	57	9	16	0,10	4
FP710050A0VE000	5,0	6	57	13	18	0,10	4
FP710060A0VE000	6,0	6	57	13	20	0,15	4
FP710080A0VE000	8,0	8	63	19	25	0,15	4
FP710100A0VE000	10,0	10	72	22	30	0,15	4
FP710120A0VE000	12,0	12	83	26	36	0,20	4
FP710160A0VE000	16,0	16	92	32	42	0,20	4
FP710200A0VE000	20,0	20	104	38	52	0,20	4
FP710250A0VE000	25,0	25	124	45	65	0,25	4

FP710WE
 V-MAXX

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	z [-]
FP710030A1VE000	3,0	6	57	8	11	0,10	4
FP710040A1VE000	4,0	6	57	9	16	0,10	4
FP710050A1VE000	5,0	6	57	13	18	0,10	4
FP710060A1VE000	6,0	6	57	13	20	0,15	4
FP710080A1VE000	8,0	8	63	19	25	0,15	4
FP710100A1VE000	10,0	10	72	22	30	0,15	4
FP710120A1VE000	12,0	12	83	26	36	0,20	4
FP710160A1VE000	16,0	16	92	32	42	0,20	4
FP710200A1VE000	20,0	20	104	38	52	0,20	4
FP710250A1VE000	25,0	25	124	45	65	0,25	4

Fresa 4 taglienti serie normale con eliche differenziate e divisione irregolare

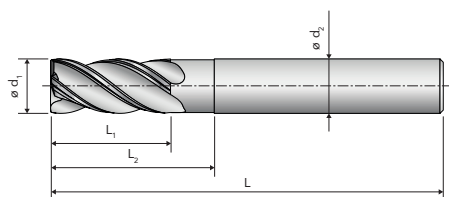
End mill 4 flute with unequal flute spacing and variable helix

VHM-Schaftfräser, Vierschneider, Ungleiche Teilung u. Drallsteigung



FP720
V-MAXX

FP720W
V-MAXX



FP720
V-MAXX

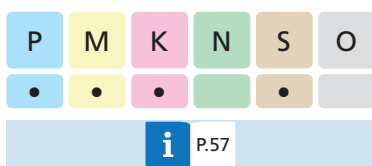
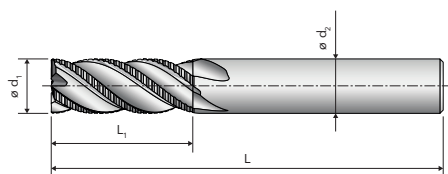
Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FP720030A0VC000	3,0	6	57	8	-	-	0,05	4
FP720040A0VC000	4,0	6	57	11	-	-	0,05	4
FP720050A0VC000	5,0	6	57	13	-	-	0,05	4
FP720060A0VC000	6,0	6	57	13	20	0,15	0,05	4
FP720070A0VC000	7,0	7	60	16	22	0,15	0,05	4
FP720080A0VC000	8,0	8	63	19	25	0,15	0,05	4
FP720090A0VC000	9,0	9	67	19	28	0,15	0,05	4
FP720100A0VC000	10,0	10	72	22	30	0,15	0,05	4
FP720120A0VC000	12,0	12	83	26	36	0,20	0,05	4
FP720140A0VC000	14,0	14	83	26	36	0,20	0,05	4
FP720160A0VC000	16,0	16	92	32	42	0,20	0,05	4
FP720200A0VC000	20,0	20	104	38	52	0,20	0,05	4

FP720W
V-MAXX

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FP720030A1VC000	3,0	6	57	8	-	-	0,05	4
FP720040A1VC000	4,0	6	57	11	-	-	0,05	4
FP720050A1VC000	5,0	6	57	13	-	-	0,05	4
FP720060A1VC000	6,0	6	57	13	20	0,15	0,05	4
FP720070A1VC000	7,0	7	60	16	22	0,15	0,05	4
FP720080A1VC000	8,0	8	63	19	25	0,15	0,05	4
FP720090A1VC000	9,0	9	67	19	28	0,15	0,05	4
FP720100A1VC000	10,0	10	72	22	30	0,15	0,05	4
FP720120A1VC000	12,0	12	83	26	36	0,20	0,05	4
FP720140A1VC000	14,0	14	83	26	36	0,20	0,05	4
FP720160A1VC000	16,0	16	92	32	42	0,20	0,05	4
FP720200A1VC000	20,0	20	104	38	52	0,20	0,05	4

Fresa 4 taglienti serie normale con rompitruciolo, eliche differenziate e divisione irregolare
 Roughing end mill 4 flute with unequal flute spacing and variable helix
 VHM-Schrupp-Schaftfräser, Vierschneider, Ungleiche Teilung u. Drallsteigung


FP750
 V-MAXX

FP750W
 V-MAXX


FP750 V-MAXX								
Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FP750030A0VC000	3,0	6	57	6	-	-	0,15	3
FP750040A0VC000	4,0	6	57	8	-	-	0,15	3
FP750050A0VC000	5,0	6	57	10	-	-	0,15	3
FP750060A0VC000	6,0	6	57	15	-	-	0,15	4
FP750080A0VC000	8,0	8	63	20	-	-	0,20	4
FP750100A0VC000	10,0	10	72	25	-	-	0,30	4

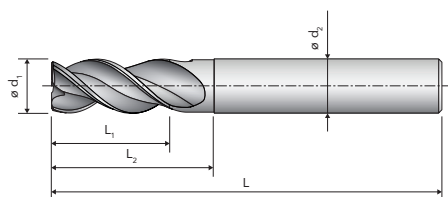
FP750W V-MAXX								
Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FP750030A1VC000	3,0	6	57	6	-	-	0,15	3
FP750040A1VC000	4,0	6	57	8	-	-	0,15	3
FP750050A1VC000	5,0	6	57	10	-	-	0,15	3
FP750060A1VC000	6,0	6	57	15	-	-	0,15	4
FP750080A1VC000	8,0	8	63	20	-	-	0,20	4
FP750100A1VC000	10,0	10	72	25	-	-	0,30	4
FP750120A1VC000	12,0	12	83	30	-	-	0,40	4
FP750140A1VC000	14,0	14	92	35	-	-	0,45	4
FP750160A1VC000	16,0	16	104	40	-	-	0,50	4
FP750200A1VC000	20,0	20	104	40	-	-	0,60	4

Fresa 3 taglienti serie normale con divisione irregolare - per acciai inox e superleghe
End mill 3 flutes, with unequal flute spacing - for stainless steel and superalloys
VHM-Schaftfräser, Dreischneider, Ungleichteilung - für VA-Stähle und Superlegierungen



FP765
V-MAXX

FP765W
V-MAXX



FP765
V-MAXX

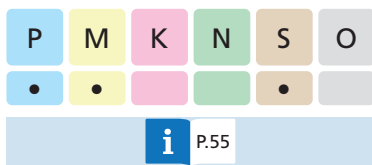
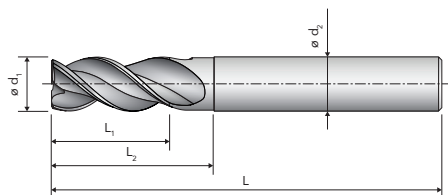
Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FP765020A0VC000	2,0	6	57	5	8	0,10	0,05	3
FP765025A0VC000	2,5	6	57	6	9	0,10	0,05	3
FP765030A0VC000	3,0	6	57	8	11	0,10	0,10	3
FP765035A0VC000	3,5	6	57	8	13	0,10	0,10	3
FP765040A0VC000	4,0	6	57	9	16	0,10	0,10	3
FP765045A0VC000	4,5	6	57	10	16	0,10	0,10	3
FP765050A0VC000	5,0	6	57	13	18	0,10	0,10	3
FP765060A0VC000	6,0	6	57	13	20	0,15	0,10	3
FP765080A0VC000	8,0	8	63	19	25	0,15	0,15	3
FP765100A0VC000	10,0	10	72	22	30	0,15	0,15	3
FP765120A0VC000	12,0	12	83	26	36	0,20	0,15	3
FP765160A0VC000	16,0	16	92	32	42	0,20	0,20	3
FP765200A0VC000	20,0	20	104	38	52	0,20	0,20	3

FP765W
V-MAXX

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	45° [mm]	z [-]
FP765020A1VC000	2,0	6	57	5	8	0,10	0,05	3
FP765025A1VC000	2,5	6	57	6	9	0,10	0,05	3
FP765030A1VC000	3,0	6	57	8	11	0,10	0,10	3
FP765035A1VC000	3,5	6	57	8	13	0,10	0,10	3
FP765040A1VC000	4,0	6	57	9	16	0,10	0,10	3
FP765045A1VC000	4,5	6	57	10	16	0,10	0,10	3
FP765050A1VC000	5,0	6	57	13	18	0,10	0,10	3
FP765060A1VC000	6,0	6	57	13	20	0,15	0,10	3
FP765080A1VC000	8,0	8	63	19	25	0,15	0,15	3
FP765100A1VC000	10,0	10	72	22	30	0,15	0,15	3
FP765120A1VC000	12,0	12	83	26	36	0,20	0,15	3
FP765160A1VC000	16,0	16	92	32	42	0,20	0,20	3
FP765200A1VC000	20,0	20	104	38	52	0,20	0,20	3

Fresa 3 taglienti serie normale con divisione irregolare - per acciai inox e superleghe
 End mill 3 flutes, with unequal flute spacing - for stainless steel and superalloys
 VHM-Schaftfräser, Dreischneider, Ungleichteilung - für VA-Stähle und Superlegierungen


FP765E
 V-MAXX

FP765WE
 V-MAXX

FP765E
 V-MAXX

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	z [-]
FP765020A0VE000	2,0	6	57	5	8	0,10	3
FP765025A0VE000	2,5	6	57	6	9	0,10	3
FP765030A0VE000	3,0	6	57	8	11	0,10	3
FP765035A0VE000	3,5	6	57	8	13	0,10	3
FP765040A0VE000	4,0	6	57	9	16	0,10	3
FP765045A0VE000	4,5	6	57	10	16	0,10	3
FP765050A0VE000	5,0	6	57	13	18	0,10	3
FP765060A0VE000	6,0	6	57	13	20	0,15	3
FP765070A0VE000	7,0	8	63	19	25	0,15	3
FP765080A0VE000	8,0	8	63	19	25	0,15	3
FP765090A0VE000	9,0	10	72	22	30	0,15	3
FP765100A0VE000	10,0	10	72	22	30	0,15	3
FP765120A0VE000	12,0	12	83	26	36	0,20	3
FP765140A0VE000	14,0	14	83	30	40	0,20	3
FP765160A0VE000	16,0	16	92	32	42	0,20	3
FP765200A0VE000	20,0	20	104	38	52	0,20	3

FP765WE
 V-MAXX

Cod.	d ₁ h10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	z [-]
FP765020A1VE000	2,0	6	57	5	8	0,10	3
FP765025A1VE000	2,5	6	57	6	9	0,10	3
FP765030A1VE000	3,0	6	57	8	11	0,10	3
FP765035A1VE000	3,5	6	57	8	13	0,10	3
FP765040A1VE000	4,0	6	57	9	16	0,10	3
FP765045A1VE000	4,5	6	57	10	16	0,10	3
FP765050A1VE000	5,0	6	57	13	18	0,10	3
FP765060A1VE000	6,0	6	57	13	20	0,15	3
FP765070A1VE000	7,0	8	63	19	25	0,15	3
FP765080A1VE000	8,0	8	63	19	25	0,15	3
FP765090A1VE000	9,0	10	72	22	30	0,15	3
FP765100A1VE000	10,0	10	72	22	30	0,15	3
FP765120A1VE000	12,0	12	83	26	36	0,20	3
FP765140A1VE000	14,0	14	83	30	40	0,20	3
FP765160A1VE000	16,0	16	92	32	42	0,20	3
FP765200A1VE000	20,0	20	104	38	52	0,20	3

Fresa 2 taglienti serie normale - per alluminio e leghe leggere

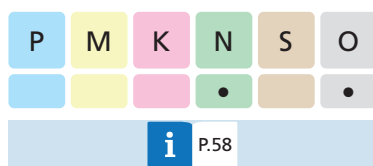
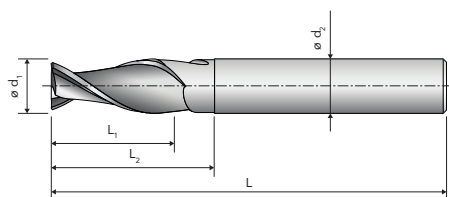
End mill 2 flutes - for aluminium and light alloys

VHM-Schaftfräser, Zweischneider - für Alu und Leichtmetalle



FP795E
ALU-MAXX

FP795WE
ALU-MAXX



FP795E ALU-MAXX

Cod.	d ₁ h6 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	z [-]
FP795020A0WE000	2,0	3	50	6	-	-	2
FP795030A0WE000	3,0	3	50	7	18	0,10	2
FP795040A0WE000	4,0	4	50	8	19	0,10	2
FP795050A0WE000	5,0	5	50	10	21	0,10	2
FP795060A0WE000	6,0	6	57	10	21	0,15	2
FP795080A0WE000	8,0	8	63	16	27	0,15	2
FP795100A0WE000	10,0	10	72	19	30	0,15	2
FP795120A0WE000	12,0	12	83	22	38	0,20	2
FP795140A0WE000	14,0	14	83	22	38	0,20	2
FP795160A0WE000	16,0	16	92	26	42	0,20	2
FP795200A0WE000	20,0	20	104	32	54	0,20	2
FP795250A0WE000	25,0	25	121	40	68	0,20	2

FP795WE ALU-MAXX

Cod.	d ₁ h6 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	z [-]
FP795060A1WE000	6,0	6	57	10	21	0,15	2
FP795080A1WE000	8,0	8	63	16	27	0,15	2
FP795100A1WE000	10,0	10	72	19	30	0,15	2
FP795120A1WE000	12,0	12	83	22	38	0,20	2
FP795140A1WE000	14,0	14	83	22	38	0,20	2
FP795160A1WE000	16,0	16	92	26	42	0,20	2
FP795200A1WE000	20,0	20	104	32	54	0,20	2
FP795250A1WE000	25,0	25	121	40	68	0,20	2

FA S E R I E S

Frese in acciaio per impiego generico

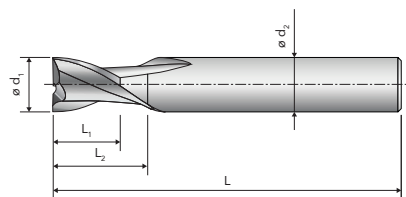
High speed steel end mills for generic applications

HSS-Schaftfräser für den allgemeinen Einsatz

Fresa 2 taglienti serie corta, per cave
End mill for slots 2 flutes, short version
Bohrnutenfräser, Zweischneider kurz



FA300SE
V-MAXX



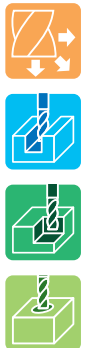
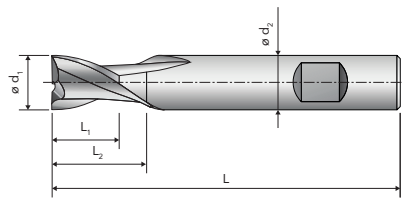
FA300SE
V-MAXX

Cod.	d ₁ e8 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	z [-]
FA300020A0VE400	2,0	6	48	4	6	-	2
FA300025A0VE400	2,5	6	49	5	9	-	2
FA300030A0VE400	3,0	6	49	5	11	-	2
FA300035A0VE400	3,5	6	50	6	12	-	2
FA300040A0VE400	4,0	6	51	7	13	-	2
FA300045A0VE400	4,5	6	51	7	13	-	2
FA300050A0VE400	5,0	6	52	8	15	-	2
FA300055A0VE400	5,5	6	52	8	18	-	2
FA300060A0VE400	6,0	6	52	8	-	-	2
FA300065A0VE400	6,5	10	60	10	17	-	2
FA300070A0VE400	7,0	10	60	10	17	-	2
FA300075A0VE400	7,5	10	60	10	17	-	2
FA300080A0VE400	8,0	10	61	11	18	-	2
FA300085A0VE400	8,5	10	61	11	18,5	-	2
FA300090A0VE400	9,0	10	61	11	19	-	2
FA300095A0VE400	9,5	10	61	11	23	-	2
FA300100A0VE400	10,0	10	63	13	-	-	2
FA300105A0VE400	10,5	12	70	13	21	-	2
FA300110A0VE400	11,0	12	70	13	21	-	2
FA300115A0VE400	11,5	12	70	13	25	-	2
FA300120A0VE400	12,0	12	73	16	-	-	2
FA300125A0VE400	12,5	12	73	16	26	0,40	2
FA300130A0VE400	13,0	12	73	16	26	0,65	2
FA300135A0VE400	13,5	12	73	16	26	0,90	2
FA300140A0VE400	14,0	12	73	16	26	1,15	2
FA300145A0VE400	14,5	12	73	16	26	1,40	2
FA300150A0VE400	15,0	12	73	16	26	1,65	2
FA300160A0VE400	16,0	16	79	19	29	0,30	2
FA300170A0VE400	17,0	16	79	19	29	0,80	2
FA300180A0VE400	18,0	16	79	19	29	1,30	2
FA300190A0VE400	19,0	16	79	19	29	1,80	2
FA300200A0VE400	20,0	20	88	22	34	0,50	2
FA300220A0VE400	22,0	20	88	22	34	1,50	2
FA300250A0VE400	25,0	25	102	26	40	0,50	2

Fresa 2 taglienti serie corta, per cave
 End mill for slots 2 flutes, short version
 Bohrnutenfräser, Zweischneider kurz



FA300WSE
 V-MAXX



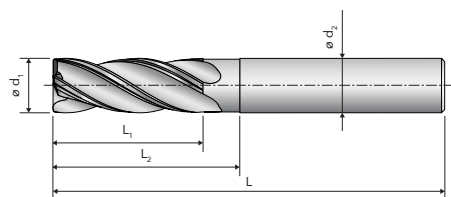
FA300WSE
 V-MAXX

Cod.	d ₁ e8 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	z
FA300020A1VE400	2,0	6	48	4	6	-	2
FA300025A1VE400	2,5	6	49	5	9	-	2
FA300030A1VE400	3,0	6	49	5	11	-	2
FA300035A1VE400	3,5	6	50	6	12	-	2
FA300040A1VE400	4,0	6	51	7	13	-	2
FA300045A1VE400	4,5	6	51	7	13	-	2
FA300050A1VE400	5,0	6	52	8	15	-	2
FA300055A1VE400	5,5	6	52	8	18	-	2
FA300060A1VE400	6,0	6	52	8	-	-	2
FA300065A1VE400	6,5	10	60	10	17	-	2
FA300070A1VE400	7,0	10	60	10	17	-	2
FA300075A1VE400	7,5	10	60	10	17	-	2
FA300080A1VE400	8,0	10	61	11	18	-	2
FA300085A1VE400	8,5	10	61	11	18,5	-	2
FA300090A1VE400	9,0	10	61	11	19	-	2
FA300095A1VE400	9,5	10	61	11	23	-	2
FA300100A1VE400	10,0	10	63	13	-	-	2
FA300105A1VE400	10,5	12	70	13	21	-	2
FA300110A1VE400	11,0	12	70	13	21	-	2
FA300115A1VE400	11,5	12	70	13	25	-	2
FA300120A1VE400	12,0	12	73	16	-	-	2
FA300125A1VE400	12,5	12	73	16	26	0,40	2
FA300130A1VE400	13,0	12	73	16	26	0,65	2
FA300135A1VE400	13,5	12	73	16	26	0,90	2
FA300140A1VE400	14,0	12	73	16	26	1,15	2
FA300145A1VE400	14,5	12	73	16	26	1,40	2
FA300150A1VE400	15,0	12	73	16	26	1,65	2
FA300160A1VE400	16,0	16	79	19	29	0,30	2
FA300170A1VE400	17,0	16	79	19	29	0,80	2
FA300180A1VE400	18,0	16	79	19	29	1,30	2
FA300190A1VE400	19,0	16	79	19	29	1,80	2
FA300200A1VE400	20,0	20	88	22	34	0,50	2
FA300220A1VE400	22,0	20	88	22	34	1,50	2
FA300250A1VE400	25,0	25	102	26	40	0,50	2

Fresa 4 taglienti serie normale
End mill 4 flutes
Schaftfräser, Vierschneider

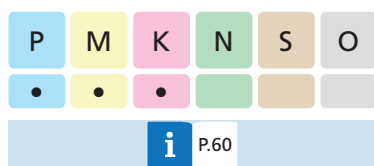
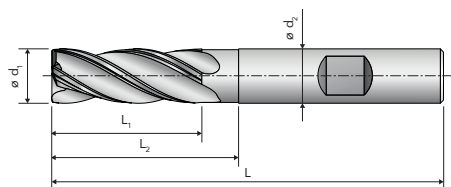


FA405E
V-MAXX

[illegible]



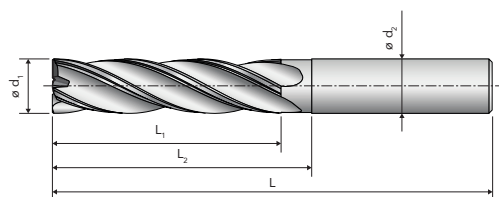
FA405WE
V-MAXX

[illegible]

Fresa 4 taglienti serie lunga
End mill 4 flutes, long version
Schaftfräser, Vierschneider lang



FA425E
V-MAXX

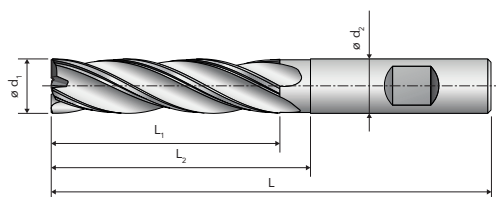


FA425E
V-MAXX

[illegible]



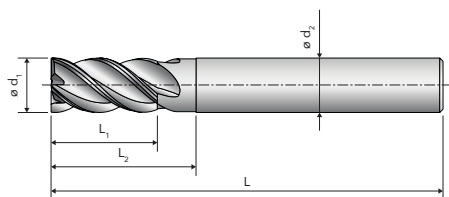
FA425WE
V-MAXX

[illegible]

Fresa 3 taglienti serie normale, elica 45°
End mill 3 flutes, 45° helix
Schaftfräser, Dreischneider, Drallwinkel 45°



FA465E
V-MAXX



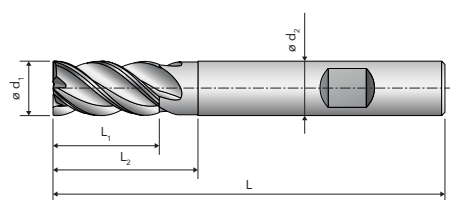
FA465E
V-MAXX

Cod.	d ₁ k10 [mm]	d ₂ h6 [mm]	L [mm]	L ₁ [mm]	L ₂ [mm]	a [mm]	z [-]
FA465060A0VE000	6,0	6	57	13	-	-	3
FA465080A0VE000	8,0	10	69	19	26	-	3
FA465100A0VE000	10,0	10	72	22	-	-	3
FA465120A0VE000	12,0	12	83	26	-	-	3
FA465140A0VE000	14,0	12	83	26	36	1,15	3
FA465160A0VE000	16,0	16	92	32	42	0,25	3
FA465180A0VE000	18,0	16	92	32	42	1,25	3
FA465200A0VE000	20,0	20	104	38	50	0,50	4
FA465220A0VE000	22,0	20	104	38	50	1,50	4
FA465250A0VE000	25,0	25	121	45	57	0,50	4

Fresa 3 taglienti serie normale, elica 45°
End mill 3 flutes, 45° helix
Schafffräser, Dreischneider, Drallwinkel 45°



FA465WE
V-MAXX



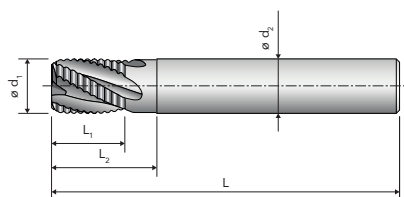
FA465WE
V-MAXX

[illegible]

Fresa a sgrossare serie corta, rompitruciolo fine
 Roughing end mill, short version, fine pitch profile
 Schrapp-Schaftfräser, kurz, Kordel fein



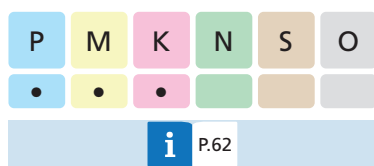
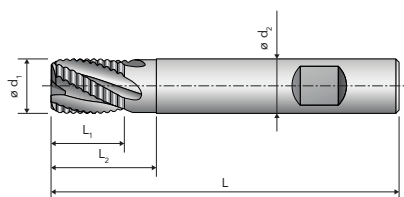
FA505S
V-MAXX

[illegible]

Fresa a sgrossare serie corta, rompitruciolo fine
 Roughing end mill, short version, fine pitch profile
 Schrubb-Schaftfräser, kurz, Kordel fein



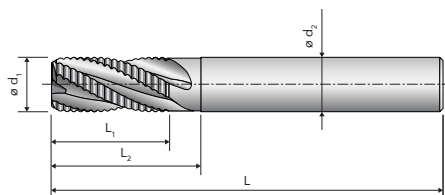
FA505WS
V-MAXX

[illegible]

Fresa a sgrossare serie normale, rompitruciolo fine
Roughing end mill, fine pitch profile
Schrupp-Schaftfräser, Kordel fein



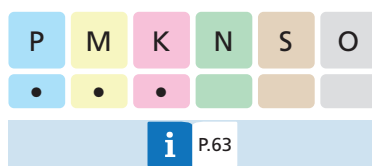
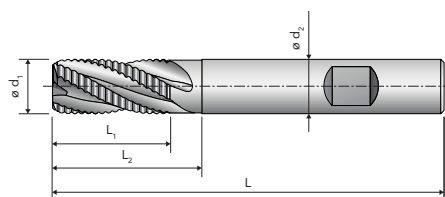
FA545
V-MAXX

[illegible]

Fresa a sgrossare serie normale, rompitruciolo fine
 Roughing end mill, fine pitch profile
 Schrupp-Schaftfräser, Kordel fein



FA545W
V-MAXX

[illegible]



INFORMAZIONI TECNICHE
TECHNICAL INFORMATION
TECHNISCHE INFORMATIONEN

Parametri di lavoro frese in metallo duro per impiego generico
Working parameters for solid carbide end mills for generic applications
Schnittparameter für VHM-Schaftfräser für den allgemeinen Einsatz

FH700 / FH700E / FH700R / FH700S / FH700SE							FH700L							
MATERIAL	DIAMETER	 1 x D			 0,2 x D			DIAMETER	 D			 FULL		
Steel <800 N/mm²	m/min	Vc = 140			Vc = 160			m/min	Vc = 120			Vc = 135		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	2	-	-	-	-	-	-	2	-	-	-	-	-	-
	3	0,010	594	14854	0,010	679	16977	3	-	-	-	-	-	-
	4	0,015	668	11141	0,015	764	12732	4	-	-	-	-	-	-
	5	0,020	713	8913	0,020	815	10186	5	0,017	519	7639	0,017	584	8594
	6	0,030	891	7427	0,030	1019	8488	6	0,026	649	6366	0,026	731	7162
	8	0,045	1003	5570	0,045	1146	6366	8	0,038	731	4775	0,038	822	5371
	10	0,060	1070	4456	0,060	1222	5093	10	0,051	779	3820	0,051	877	4297
	12	0,070	1040	3714	0,070	1188	4244	12	0,060	758	3183	0,060	852	3581
	14	0,072	917	3183	0,072	1048	3638	14	0,061	668	2728	0,061	751	3069
16	0,075	836	2785	0,075	955	3183	16	0,064	609	2387	0,064	685	2686	
18	0,079	777	2476	0,083	934	2829	18	-	-	-	-	-	-	
20	0,082	731	2228	0,090	917	2546	20	0,070	532	1910	0,077	657	2149	
Steel <1000 N/mm² - Cast iron	m/min	Vc = 115			Vc = 125			m/min	Vc = 100			Vc = 105		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	2	-	-	-	-	-	-	2	-	-	-	-	-	-
	3	0,010	488	12202	0,010	531	13263	3	-	-	-	-	-	-
	4	0,015	549	9151	0,015	597	9947	4	-	-	-	-	-	-
	5	0,020	586	7321	0,020	637	7958	5	0,017	433	6366	0,017	455	6685
	6	0,030	732	6101	0,030	796	6631	6	0,026	541	5305	0,026	568	5570
	8	0,045	824	4576	0,045	895	4974	8	0,038	609	3979	0,038	639	4178
	10	0,060	879	3661	0,060	955	3979	10	0,051	649	3183	0,051	682	3342
	12	0,070	854	3050	0,070	928	3316	12	0,060	631	2653	0,060	663	2785
	14	0,072	753	2615	0,072	819	2842	14	0,061	557	2274	0,061	584	2387
16	0,075	686	2288	0,075	746	2487	16	0,064	507	1989	0,064	533	2089	
18	0,079	639	2034	0,083	729	2210	18	-	-	-	-	-	-	
20	0,082	600	1830	0,090	716	1989	20	0,070	444	1592	0,077	511	1671	
Steel <1300 N/mm²	m/min	Vc = 85			Vc = 95			m/min	Vc = 75			Vc = 80		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	2	-	-	-	-	-	-	2	-	-	-	-	-	-
	3	0,010	361	9019	0,010	403	10080	3	-	-	-	-	-	-
	4	0,015	406	6764	0,015	454	7560	4	-	-	-	-	-	-
	5	0,020	433	5411	0,020	484	6048	5	0,017	325	4775	0,017	346	5093
	6	0,030	541	4509	0,030	605	5040	6	0,026	406	3979	0,026	433	4244
	8	0,045	609	3382	0,045	680	3780	8	0,038	457	2984	0,038	487	3183
	10	0,060	649	2706	0,060	726	3024	10	0,051	487	2387	0,051	519	2546
	12	0,070	631	2255	0,070	706	2520	12	0,060	473	1989	0,060	505	2122
	14	0,072	557	1933	0,072	622	2160	14	0,061	417	1705	0,061	445	1819
16	0,075	507	1691	0,075	567	1890	16	0,064	380	1492	0,064	406	1592	
18	0,079	472	1503	0,083	554	1680	18	-	-	-	-	-	-	
20	0,082	444	1353	0,090	544	1512	20	0,070	333	1194	0,077	390	1273	
High strength steel	m/min	Vc = 45			Vc = 50			m/min	Vc = 40			Vc = 45		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	2	-	-	-	-	-	-	2	-	-	-	-	-	-
	3	0,010	191	4775	0,010	212	5305	3	-	-	-	-	-	-
	4	0,015	215	3581	0,015	239	3979	4	-	-	-	-	-	-
	5	0,020	229	2865	0,020	255	3183	5	0,017	173	2546	0,017	195	2865
	6	0,030	286	2387	0,030	318	2653	6	0,026	216	2122	0,026	244	2387
	8	0,045	322	1790	0,045	358	1989	8	0,038	244	1592	0,038	274	1790
	10	0,060	344	1432	0,060	382	1592	10	0,051	260	1273	0,051	292	1432
	12	0,070	334	1194	0,070	371	1326	12	0,060	253	1061	0,060	284	1194
	14	0,072	295	1023	0,072	327	1137	14	0,061	223	909	0,061	250	1023
16	0,075	269	895	0,075	298	995	16	0,064	203	796	0,064	228	895	
18	0,079	250	796	0,083	292	884	18	-	-	-	-	-	-	
20	0,082	235	716	0,090	286	796	20	0,070	177	637	0,077	219	716	
Stainless steel	m/min	Vc = 35			Vc = 45			m/min	Vc = 30			Vc = 40		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	2	-	-	-	-	-	-	2	-	-	-	-	-	-
	3	0,010	149	3714	0,010	191	4775	3	-	-	-	-	-	-
	4	0,015	167	2785	0,015	215	3581	4	-	-	-	-	-	-
	5	0,020	178	2228	0,020	229	2865	5	0,017	130	1910	0,017	173	2546
	6	0,030	223	1857	0,030	286	2387	6	0,026	162	1592	0,026	216	2122
	8	0,045	251	1393	0,045	322	1790	8	0,038	183	1194	0,038	244	1592
	10	0,060	267	1114	0,060	344	1432	10	0,051	195	955	0,051	260	1273
	12	0,070	260	928	0,070	334	1194	12	0,060	189	796	0,060	253	1061
	14	0,072	229	796	0,072	295	1023	14	0,061	167	682	0,061	223	909
16	0,075	209	696	0,075	269	895	16	0,064	152	597	0,064	203	796	
18	0,079	194	619	0,083	263	796	18	-	-	-	-	-	-	
20	0,082	183	557	0,090	258	716	20	0,070	133	477	0,077	195	637	

FH740XE					FH745										
MATERIAL	DIAMETER	 0,2 x D			DIAMETER	 D Df=1,6÷1,9xD	 2 x D	 1 x D	 0,2 x D						
Steel <800 N/mm²	m/min	Vc = 150			m/min	α = 12° Vc = 140		Vc = 140			Vc = 160				
	D mm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	
	2	0,002	191	23873	2	-	-	-	-	-	-	-	-	-	
	3	0,004	255	15915	3	-	-	-	-	-	-	-	-	-	
	4	0,007	334	11937	4	0,015	668	11141	0,015	668	11141	0,015	764	12732	
	5	0,012	458	9549	5	0,020	713	8913	0,020	713	8913	0,020	815	10186	
	6	0,016	509	7958	6	0,030	891	7427	0,030	891	7427	0,030	1019	8488	
	8	0,020	477	5968	8	0,045	1003	5570	0,045	1003	5570	0,045	1146	6366	
	10	0,025	477	4775	10	0,060	1070	4456	0,060	1070	4456	0,060	1222	5093	
	12	-	-	-	12	0,070	1040	3714	0,070	1040	3714	0,070	1188	4244	
14	-	-	-	14	-	-	-	-	-	-	-	-	-		
16	-	-	-	16	0,075	836	2785	0,075	836	2785	0,075	955	3183		
18	-	-	-	18	-	-	-	-	-	-	-	-	-		
20	-	-	-	20	0,082	731	2228	0,082	731	2228	0,090	917	2546		
Steel <1000 N/mm² - Cast iron	m/min	Vc = 125			m/min	α = 12° Vc = 115		Vc = 115			Vc = 125				
	D mm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	
	2	0,002	159	19894	2	-	-	-	-	-	-	-	-	-	
	3	0,004	212	13263	3	-	-	-	-	-	-	-	-	-	
	4	0,007	279	9947	4	0,015	549	9151	0,015	549	9151	0,015	597	9947	
	5	0,012	382	7958	5	0,020	586	7321	0,020	586	7321	0,020	637	7958	
	6	0,016	424	6631	6	0,030	732	6101	0,030	732	6101	0,030	796	6631	
	8	0,020	398	4974	8	0,045	824	4576	0,045	824	4576	0,045	895	4974	
	10	0,025	398	3979	10	0,060	879	3661	0,060	879	3661	0,060	955	3979	
	12	-	-	-	12	0,070	854	3050	0,070	854	3050	0,070	928	3316	
14	-	-	-	14	-	-	-	-	-	-	-	-	-		
16	-	-	-	16	0,075	686	2288	0,075	686	2288	0,075	746	2487		
18	-	-	-	18	-	-	-	-	-	-	-	-	-		
20	-	-	-	20	0,082	600	1830	0,082	600	1830	0,090	716	1989		
Steel <1300 N/mm²	m/min	Vc = 90			m/min	α = 12° Vc = 85		Vc = 85			Vc = 95				
	D mm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	
	2	0,002	115	14324	2	-	-	-	-	-	-	-	-	-	
	3	0,004	153	9549	3	-	-	-	-	-	-	-	-	-	
	4	0,007	201	7162	4	0,015	406	6764	0,015	406	6764	0,015	454	7560	
	5	0,012	275	5730	5	0,020	433	5411	0,020	433	5411	0,020	484	6048	
	6	0,016	306	4775	6	0,030	541	4509	0,030	541	4509	0,030	605	5040	
	8	0,020	286	3581	8	0,045	609	3382	0,045	609	3382	0,045	680	3780	
	10	0,025	286	2865	10	0,060	649	2706	0,060	649	2706	0,060	726	3024	
	12	-	-	-	12	0,070	631	2255	0,070	631	2255	0,070	706	2520	
14	-	-	-	14	-	-	-	-	-	-	-	-	-		
16	-	-	-	16	0,075	507	1691	0,075	507	1691	0,075	567	1890		
18	-	-	-	18	-	-	-	-	-	-	-	-	-		
20	-	-	-	20	0,082	444	1353	0,082	444	1353	0,090	544	1512		
High strength steel	m/min	Vc = 40			m/min	α = 10° Vc = 45		Vc = 45			Vc = 50				
	D mm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	
	2	0,002	51	6366	2	-	-	-	-	-	-	-	-	-	
	3	0,004	68	4244	3	-	-	-	-	-	-	-	-	-	
	4	0,007	89	3183	4	0,015	215	3581	0,015	215	3581	0,015	239	3979	
	5	0,012	122	2546	5	0,020	229	2865	0,020	229	2865	0,020	255	3183	
	6	0,016	136	2122	6	0,030	286	2387	0,030	286	2387	0,030	318	2653	
	8	0,020	127	1592	8	0,045	322	1790	0,045	322	1790	0,045	358	1989	
	10	0,025	127	1273	10	0,060	344	1432	0,060	344	1432	0,060	382	1592	
	12	-	-	-	12	0,070	334	1194	0,070	334	1194	0,070	371	1326	
14	-	-	-	14	-	-	-	-	-	-	-	-	-		
16	-	-	-	16	0,075	269	895	0,075	269	895	0,075	298	995		
18	-	-	-	18	-	-	-	-	-	-	-	-	-		
20	-	-	-	20	0,082	235	716	0,082	235	716	0,090	286	796		
Stainless steel	m/min	Vc = 45			m/min	α = 8° Vc = 45		Vc = 35			Vc = 45				
	D mm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	
	2	0,002	57	7162	2	-	-	-	-	-	-	-	-	-	
	3	0,004	76	4775	3	-	-	-	-	-	-	-	-	-	
	4	0,007	100	3581	4	0,015	167	2785	0,015	167	2785	0,015	215	3581	
	5	0,012	138	2865	5	0,020	178	2228	0,020	178	2228	0,020	229	2865	
	6	0,016	153	2387	6	0,030	223	1857	0,030	223	1857	0,030	286	2387	
	8	0,020	143	1790	8	0,045	251	1393	0,045	251	1393	0,045	322	1790	
	10	0,025	143	1432	10	0,060	267	1114	0,060	267	1114	0,060	344	1432	
	12	-	-	-	12	0,070	260	928	0,070	260	928	0,070	334	1194	
14	-	-	-	14	-	-	-	-	-	-	-	-	-		
16	-	-	-	16	0,075	209	696	0,075	209	696	0,075	269	895		
18	-	-	-	18	-	-	-	-	-	-	-	-	-		
20	-	-	-	20	0,082	183	557	0,082	183	557	0,090	258	716		

FH750								FH760E										
MATERIAL	DIAMETER	 1 x D				 0,5 x D				DIAMETER	 1 x D				 0,5 x D			
Steel <800 N/mm²	m/min	Vc = 140				Vc = 160				m/min	Vc = 120				Vc = 130			
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm				
	2	-	-	-	-	-	-	2	0,002	115	19099	0,002	124	20690				
	3	-	-	-	-	-	-	3	0,004	153	12732	0,004	166	13793				
	4	0,025	1114	11141	0,025	1273	12732	4	0,009	258	9549	0,009	279	10345				
	5	0,030	1070	8913	0,030	1222	10186	5	0,014	321	7639	0,014	348	8276				
	6	0,040	1188	7427	0,040	1358	8488	6	0,018	344	6366	0,018	372	6897				
	7	-	-	-	-	-	-	7	-	-	-	-	-	-				
	8	0,060	1337	5570	0,060	1528	6366	8	0,023	329	4775	0,023	357	5173				
	9	-	-	-	-	-	-	9	-	-	-	-	-	-				
	10	0,070	1248	4456	0,070	1426	5093	10	0,028	321	3820	0,028	348	4138				
	12	0,080	1188	3714	0,080	1358	4244	12	0,032	306	3183	0,032	331	3448				
	14	-	-	-	-	-	-	14	-	-	-	-	-	-				
16	0,085	947	2785	0,085	1082	3183	16	0,038	272	2387	0,038	295	2586					
20	-	-	-	-	-	-	20	0,042	241	1910	0,042	261	2069					
Steel <1000 N/mm² - Cast iron	m/min	Vc = 115				Vc = 125				m/min	Vc = 100				Vc = 110			
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm				
	2	-	-	-	-	-	-	2	0,002	95	15915	0,002	105	17507				
	3	-	-	-	-	-	-	3	0,004	127	10610	0,004	140	11671				
	4	0,025	915	9151	0,025	995	9947	4	0,009	215	7958	0,009	236	8754				
	5	0,030	879	7321	0,030	955	7958	5	0,014	267	6366	0,014	294	7003				
	6	0,040	976	6101	0,040	1061	6631	6	0,018	286	5305	0,018	315	5836				
	7	-	-	-	-	-	-	7	-	-	-	-	-	-				
	8	0,060	1098	4576	0,060	1194	4974	8	0,023	275	3979	0,023	302	4377				
	9	-	-	-	-	-	-	9	-	-	-	-	-	-				
	10	0,070	1025	3661	0,070	1114	3979	10	0,028	267	3183	0,028	294	3501				
	12	0,080	976	3050	0,080	1061	3316	12	0,032	255	2653	0,032	280	2918				
	14	-	-	-	-	-	-	14	-	-	-	-	-	-				
16	0,085	778	2288	0,085	846	2487	16	0,038	227	1989	0,038	249	2188					
20	-	-	-	-	-	-	20	0,042	201	1592	0,042	221	1751					
Steel <1300 N/mm²	m/min	Vc = 85				Vc = 95				m/min	Vc = 75				Vc = 80			
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm				
	2	-	-	-	-	-	-	2	0,002	72	11937	0,002	76	12732				
	3	-	-	-	-	-	-	3	0,004	95	7958	0,004	102	8488				
	4	0,025	676	6764	0,025	756	7560	4	0,009	161	5968	0,009	172	6366				
	5	0,030	649	5411	0,030	726	6048	5	0,014	201	4775	0,014	214	5093				
	6	0,040	722	4509	0,040	806	5040	6	0,018	215	3979	0,018	229	4244				
	7	-	-	-	-	-	-	7	-	-	-	-	-	-				
	8	0,060	812	3382	0,060	907	3780	8	0,023	206	2984	0,023	220	3183				
	9	-	-	-	-	-	-	9	-	-	-	-	-	-				
	10	0,070	758	2706	0,070	847	3024	10	0,028	201	2387	0,028	214	2546				
	12	0,080	722	2255	0,080	806	2520	12	0,032	191	1989	0,032	204	2122				
	14	-	-	-	-	-	-	14	-	-	-	-	-	-				
16	0,085	575	1691	0,085	643	1890	16	0,038	170	1492	0,038	181	1592					
20	-	-	-	-	-	-	20	0,042	150	1194	0,042	160	1273					
High strength steel	m/min	Vc = 45				Vc = 50				m/min	Vc = 40				Vc = 40			
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm				
	2	-	-	-	-	-	-	2	0,002	38	6366	0,002	38	6366				
	3	-	-	-	-	-	-	3	0,004	51	4244	0,004	51	4244				
	4	0,025	358	3581	0,025	398	3979	4	0,009	86	3183	0,009	86	3183				
	5	0,030	344	2865	0,030	382	3183	5	0,014	107	2546	0,014	107	2546				
	6	0,040	382	2387	0,040	424	2653	6	0,018	115	2122	0,018	115	2122				
	7	-	-	-	-	-	-	7	-	-	-	-	-	-				
	8	0,060	430	1790	0,060	477	1989	8	0,023	110	1592	0,023	110	1592				
	9	-	-	-	-	-	-	9	-	-	-	-	-	-				
	10	0,070	401	1432	0,070	446	1592	10	0,028	107	1273	0,028	107	1273				
	12	0,080	382	1194	0,080	424	1326	12	0,032	102	1061	0,032	102	1061				
	14	-	-	-	-	-	-	14	-	-	-	-	-	-				
16	0,085	304	895	0,085	338	995	16	0,038	91	796	0,038	91	796					
20	-	-	-	-	-	-	20	0,042	80	637	0,042	80	637					
Stainless steel	m/min	Vc = 35				Vc = 45				m/min	Vc = 40				Vc = 40			
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm				
	2	-	-	-	-	-	-	2	0,002	38	6366	0,002	38	6366				
	3	-	-	-	-	-	-	3	0,004	51	4244	0,004	51	4244				
	4	0,025	279	2785	0,025	358	3581	4	0,009	86	3183	0,009	86	3183				
	5	0,030	267	2228	0,030	344	2865	5	0,014	107	2546	0,014	107	2546				
	6	0,040	297	1857	0,040	382	2387	6	0,018	115	2122	0,018	115	2122				
	7	-	-	-	-	-	-	7	-	-	-	-	-	-				
	8	0,060	334	1393	0,060	430	1790	8	0,023	110	1592	0,023	110	1592				
	9	-	-	-	-	-	-	9	-	-	-	-	-	-				
	10	0,070	312	1114	0,070	401	1432	10	0,028	107	1273	0,028	107	1273				
	12	0,080	297	928	0,080	382	1194	12	0,032	102	1061	0,032	102	1061				
	14	-	-	-	-	-	-	14	-	-	-	-	-	-				
16	0,085	237	696	0,085	304	895	16	0,038	91	796	0,038	91	796					
20	-	-	-	-	-	-	20	0,042	80	637	0,042	80	637					

Per l'operazione di foratura utilizzare un avanzamento fz ridotto del 60%
For drilling operations the feed rate fz should be reduced by 60%
Beim Bohren den Vorschub fz um 60% reduzieren



FH790XE								FH800R				FH960W / FH990W			
MATERIAL	DIAMETER	 1 x D 0,5 x D			 0,5 x D 1 x D			DIAMETER	 0,06 x D 0,02 x D			DIAMETER	 0,05 x D 0,05 x D		
Steel <800 N/mm ²	m/min	Vc = 120			Vc = 130			m/min	Vc = 360			m/min	Vc = 90		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm
	2	0,002	115	19099	0,002	124	20690	2	0,022	2521	57296	2	-	-	-
	3	0,004	153	12732	0,004	166	13793	3	0,081	6188	38197	3	0,020	764	9549
	4	0,009	258	9549	0,009	279	10345	4	0,139	7964	28648	4	0,030	859	7162
	5	0,014	321	7639	0,014	348	8276	5	0,184	8434	22918	5	-	-	-
	6	0,018	344	6366	0,018	372	6897	6	0,220	8403	19099	6	0,040	1146	4775
	7	0,021	336	5457	0,021	364	5911	7	-	-	-	7	-	-	-
	8	0,023	329	4775	0,023	357	5173	8	0,278	7964	14324	8	0,050	1074	3581
	9	0,026	325	4244	0,026	352	4598	9	-	-	-	9	-	-	-
	10	0,028	321	3820	0,028	348	4138	10	0,322	7380	11459	10	0,060	1031	2865
	12	-	-	-	-	-	-	12	0,359	6856	9549	12	0,070	1003	2387
Steel <1000 N/mm ² - Cast iron	m/min	Vc = 100			Vc = 110			m/min	Vc = 295			m/min	Vc = 70		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm
	2	0,002	95	15915	0,002	105	17507	2	0,022	2066	46951	2	-	-	-
	3	0,004	127	10610	0,004	140	11671	3	0,081	5071	31300	3	0,020	594	7427
	4	0,009	215	7958	0,009	236	8754	4	0,139	6526	23475	4	0,030	668	5570
	5	0,014	267	6366	0,014	294	7003	5	0,184	6911	18780	5	-	-	-
	6	0,018	286	5305	0,018	315	5836	6	0,220	6886	15650	6	0,040	891	3714
	7	0,021	280	4547	0,021	308	5002	7	-	-	-	7	-	-	-
	8	0,023	275	3979	0,023	302	4377	8	0,278	6526	11738	8	0,050	836	2785
	9	0,026	271	3537	0,026	298	3890	9	-	-	-	9	-	-	-
	10	0,028	267	3183	0,028	294	3501	10	0,322	6047	9390	10	0,060	802	2228
	12	-	-	-	-	-	-	12	0,359	5618	7825	12	0,070	780	1857
Steel <1300 N/mm ²	m/min	Vc = 75			Vc = 80			m/min	Vc = 225			m/min	Vc = 60		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm
	2	0,002	72	11937	0,002	76	12732	2	0,022	1576	35810	2	-	-	-
	3	0,004	95	7958	0,004	102	8488	3	0,081	3867	23873	3	0,020	509	6366
	4	0,009	161	5968	0,009	172	6366	4	0,139	4978	17905	4	0,030	573	4775
	5	0,014	201	4775	0,014	214	5093	5	0,184	5271	14324	5	-	-	-
	6	0,018	215	3979	0,018	229	4244	6	0,220	5252	11937	6	0,040	764	3183
	7	0,021	210	3410	0,021	224	3638	7	-	-	-	7	-	-	-
	8	0,023	206	2984	0,023	220	3183	8	0,278	4978	8952	8	0,050	716	2387
	9	0,026	203	2653	0,026	216	2829	9	-	-	-	9	-	-	-
	10	0,028	201	2387	0,028	214	2546	10	0,322	4612	7162	10	0,060	688	1910
	12	-	-	-	-	-	-	12	0,359	4285	5968	12	0,070	668	1592
High strength steel	m/min	Vc = 40			Vc = 40			m/min	Vc = 115			m/min	Vc = 40		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm
	2	0,002	38	6366	0,002	38	6366	2	0,022	805	18303	2	-	-	-
	3	0,004	51	4244	0,004	51	4244	3	0,081	1977	12202	3	0,020	340	4244
	4	0,009	86	3183	0,009	86	3183	4	0,139	2544	9151	4	0,030	382	3183
	5	0,014	107	2546	0,014	107	2546	5	0,184	2694	7321	5	-	-	-
	6	0,018	115	2122	0,018	115	2122	6	0,220	2684	6101	6	0,040	509	2122
	7	0,021	112	1819	0,021	112	1819	7	-	-	-	7	-	-	-
	8	0,023	110	1592	0,023	110	1592	8	0,278	2544	4576	8	0,050	477	1592
	9	0,026	108	1415	0,026	108	1415	9	-	-	-	9	-	-	-
	10	0,028	107	1273	0,028	107	1273	10	0,322	2357	3661	10	0,060	458	1273
	12	-	-	-	-	-	-	12	0,359	2190	3050	12	0,070	446	1061
Stainless steel	m/min	Vc = 40			Vc = 40			m/min	Vc = 75			m/min	Vc = 80		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm
	2	0,002	38	6366	0,002	38	6366	2	0,022	525	11937	2	-	-	-
	3	0,004	51	4244	0,004	51	4244	3	0,081	1289	7958	3	0,020	679	8488
	4	0,009	86	3183	0,009	86	3183	4	0,139	1659	5968	4	0,030	764	6366
	5	0,014	107	2546	0,014	107	2546	5	0,184	1757	4775	5	-	-	-
	6	0,018	115	2122	0,018	115	2122	6	0,220	1751	3979	6	0,040	1019	4244
	7	0,021	112	1819	0,021	112	1819	7	-	-	-	7	-	-	-
	8	0,023	110	1592	0,023	110	1592	8	0,278	1659	2984	8	0,050	955	3183
	9	0,026	108	1415	0,026	108	1415	9	-	-	-	9	-	-	-
	10	0,028	107	1273	0,028	107	1273	10	0,322	1537	2387	10	0,060	917	2546
	12	-	-	-	-	-	-	12	0,359	1428	1989	12	0,070	891	2122
	m/min	Vc = 40			Vc = 40			m/min	Vc = 75			m/min	Vc = 80		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm
	2	0,002	38	6366	0,002	38	6366	2	0,022	525	11937	2	-	-	-
	3	0,004	51	4244	0,004	51	4244	3	0,081	1289	7958	3	0,020	679	8488
	4	0,009	86	3183	0,009	86	3183	4	0,139	1659	5968	4	0,030	764	6366
	5	0,014	107	2546	0,014	107	2546	5	0,184	1757	4775	5	-	-	-
	6	0,018	115	2122	0,018	115	2122	6	0,220	1751	3979	6	0,040	1019	4244
	7	0,021	112	1819	0,021	112	1819	7	-	-	-	7	-	-	-
	8	0,023	110	1592	0,023	110	1592	8	0,278	1659	2984	8	0,050	955	3183
	9	0,026	108	1415	0,026	108	1415	9	-	-	-	9	-	-	-
	10	0,028	107	1273	0,028	107	1273	10	0,322	1537	2387	10	0,060	917	2546
	12	-	-	-	-	-	-	12	0,359	1428	1989	12	0,070	891	2122

N.B.: Per i diametri intermedi si consigliano i valori di avanzamento fz del diametro inferiore
For intermediate diameters use feed rate fz values for closest smaller diameter
Für Zwischendurchmesser Schubwerte fz für nächstkleinere Fräserdurchmesser benutzen

Per l'operazione di foratura utilizzare un avanzamento fz ridotto del 60%
For drilling operations the feed rate fz should be reduced by 60%
Beim Bohren den Vorschub fz um 60% reduzieren



FH710								FH710L													
MATERIAL	DIAMETER	 1 x D				 0,25 x D			DIAMETER	 1 x D				 0,25 x D				 FULL 0,1 x D			
Ferritic stainless steel	m/min	Vc = 130				Vc = 140			m/min	Vc = 110				Vc = 130				Vc = 180			
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm				
	3	0,013	717	13793	0,013	772	14854	3	-	-	-	-	-	-	-	-	-				
	4	0,020	828	10345	0,020	891	11141	4	-	-	-	-	-	-	-	-	-				
	5	0,025	828	8276	0,025	891	8913	5	0,015	420	7003	0,015	497	8276	0,040	1833	11459				
	6	0,030	828	6897	0,030	891	7427	6	0,018	420	5836	0,018	497	6897	0,060	2292	9549				
	7	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	-				
	8	0,040	828	5173	0,040	891	5570	8	0,024	420	4377	0,024	497	5173	0,080	2292	7162				
	9	-	-	-	-	-	-	9	-	-	-	-	-	-	-	-	-				
	10	0,050	828	4138	0,050	891	4456	10	0,030	420	3501	0,030	497	4138	0,100	2292	5730				
	12	0,060	828	3448	0,060	891	3714	12	0,039	449	2918	0,039	531	3448	0,120	2292	4775				
Austenitic stainless steel	m/min	Vc = 110				Vc = 120			m/min	Vc = 100				Vc = 120				Vc = 160			
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm				
	3	0,013	607	11671	0,013	662	12732	3	-	-	-	-	-	-	-	-	-				
	4	0,020	700	8754	0,020	764	9549	4	-	-	-	-	-	-	-	-	-				
	5	0,025	700	7003	0,025	764	7639	5	0,015	382	6366	0,015	458	7639	0,040	1630	10186				
	6	0,030	700	5836	0,030	764	6366	6	0,018	382	5305	0,018	458	6366	0,060	2037	8488				
	7	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	-				
	8	0,040	700	4377	0,040	764	4775	8	0,024	382	3979	0,024	458	4775	0,080	2037	6366				
	9	-	-	-	-	-	-	9	-	-	-	-	-	-	-	-	-				
	10	0,050	700	3501	0,050	764	3820	10	0,030	382	3183	0,030	458	3820	0,100	2037	5093				
	12	0,060	700	2918	0,060	764	3183	12	0,039	408	2653	0,039	490	3183	0,120	2037	4244				
Titanium alloys	m/min	Vc = 60				Vc = 70			m/min	Vc = 60				Vc = 70				Vc = 110			
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm				
	3	0,005	127	6366	0,010	297	7427	3	-	-	-	-	-	-	-	-	-				
	4	0,007	134	4775	0,016	357	5570	4	-	-	-	-	-	-	-	-	-				
	5	0,009	138	3820	0,020	357	4456	5	0,015	229	3820	0,015	267	4456	0,040	1120	7003				
	6	0,010	127	3183	0,030	446	3714	6	0,018	229	3183	0,018	267	3714	0,060	1401	5836				
	7	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	-				
	8	0,013	124	2387	0,040	446	2785	8	0,024	229	2387	0,024	267	2785	0,080	1401	4377				
	9	-	-	-	-	-	-	9	-	-	-	-	-	-	-	-	-				
	10	0,018	138	1910	0,050	446	2228	10	0,030	229	1910	0,030	267	2228	0,100	1401	3501				
	12	0,022	140	1592	0,060	446	1857	12	0,039	245	1592	0,039	286	1857	0,120	1401	2918				
Steel <800 N/mm²	m/min	Vc = 130				Vc = 140			m/min	Vc = 120				Vc = 130				Vc = 190			
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm				
	3	0,013	717	13793	0,013	772	14854	3	-	-	-	-	-	-	-	-	-				
	4	0,020	828	10345	0,020	891	11141	4	-	-	-	-	-	-	-	-	-				
	5	0,025	828	8276	0,025	891	8913	5	0,015	458	7639	0,015	497	8276	0,040	1935	12096				
	6	0,030	828	6897	0,030	891	7427	6	0,018	458	6366	0,018	497	6897	0,060	2419	10080				
	7	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	-				
	8	0,040	828	5173	0,040	891	5570	8	0,024	458	4775	0,024	497	5173	0,080	2419	7560				
	9	-	-	-	-	-	-	9	-	-	-	-	-	-	-	-	-				
	10	0,050	828	4138	0,050	891	4456	10	0,030	458	3820	0,030	497	4138	0,100	2419	6048				
	12	0,060	828	3448	0,060	891	3714	12	0,039	490	3183	0,039	531	3448	0,120	2419	5040				

FH770E								FH780										
MATERIAL	DIAMETER	 1 x D 0,5 x D				 0,1 x D 1,5 x D				DIAMETER	 1 x D 1 x D				 0,25 x D 1,5 x D			
Al and Al alloys <6% Si	m/min Vc = 600				Vc = 795				m/min Vc = 600				Vc = 800					
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm				
	3	-	-	-	-	-	-	3	0,012	2292	63662	0,012	3056	84883				
	4	0,021	3008	47746	0,021	3986	63264	4	0,020	2865	47746	0,020	3820	63662				
	5	0,035	4011	38197	0,035	5314	50611	5	0,035	4011	38197	0,035	5348	50930				
	6	0,050	4775	31831	0,050	6326	42176	6	0,050	4775	31831	0,050	6366	42441				
	7	0,062	5034	27284	0,062	6670	36151	7	-	-	-	-	-	-				
	8	0,073	5228	23873	0,073	6927	31632	8	0,070	5013	23873	0,070	6685	31831				
	9	0,082	5220	21221	0,082	6917	28117	9	-	-	-	-	-	-				
	10	0,091	5214	19099	0,091	6908	25306	10	0,090	5157	19099	0,090	6875	25465				
	12	0,105	5013	15915	0,105	6643	21088	12	0,105	5013	15915	0,105	6685	21221				
	14	0,118	4829	13642	0,118	6399	18075	14	-	-	-	-	-	-				
	16	0,128	4584	11937	0,128	6073	15816	16	0,130	4655	11937	0,130	6207	15915				
18	-	-	-	-	-	-	18	-	-	-	-	-	-					
20	0,140	5348	9549	0,140	7086	12653	20	0,160	4584	9549	0,160	6112	12732					
Al and Al alloys >6% Si	m/min Vc = 225				Vc = 300				m/min Vc = 600				Vc = 800					
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm				
	3	-	-	-	-	-	-	3	0,012	2292	63662	0,012	3056	84883				
	4	0,021	1128	17905	0,021	1504	23873	4	0,020	2865	47746	0,020	3820	63662				
	5	0,035	1504	14324	0,035	2005	19099	5	0,035	4011	38197	0,035	5348	50930				
	6	0,050	1790	11937	0,050	2387	15915	6	0,050	4775	31831	0,050	6366	42441				
	7	0,062	1888	10231	0,062	2517	13642	7	-	-	-	-	-	-				
	8	0,073	1961	8952	0,073	2614	11937	8	0,070	5013	23873	0,070	6685	31831				
	9	0,082	1958	7958	0,082	2610	10610	9	-	-	-	-	-	-				
	10	0,091	1955	7162	0,091	2607	9549	10	0,090	5157	19099	0,090	6875	25465				
	12	0,105	1880	5968	0,105	2507	7958	12	0,105	5013	15915	0,105	6685	21221				
	14	0,118	1811	5116	0,118	2415	6821	14	-	-	-	-	-	-				
	16	0,128	1719	4476	0,128	2292	5968	16	0,130	4655	11937	0,130	6207	15915				
18	-	-	-	-	-	-	18	-	-	-	-	-	-					
20	0,140	2005	3581	0,140	2674	4775	20	0,160	4584	9549	0,160	6112	12732					
Copper and Copper alloys	m/min Vc = 375				Vc = 495				m/min Vc = 350				Vc = 500					
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm				
	3	-	-	-	-	-	-	3	0,012	1337	37136	0,012	1910	53052				
	4	0,021	1880	29842	0,021	2482	39391	4	0,020	1671	27852	0,020	2387	39789				
	5	0,035	2507	23873	0,035	3309	31513	5	0,035	2340	22282	0,035	3342	31831				
	6	0,050	2984	19894	0,050	3939	26261	6	0,050	2785	18568	0,050	3979	26526				
	7	0,062	3146	17052	0,062	4153	22509	7	-	-	-	-	-	-				
	8	0,073	3268	14921	0,073	4313	19695	8	0,070	2924	13926	0,070	4178	19894				
	9	0,082	3263	13263	0,082	4307	17507	9	-	-	-	-	-	-				
	10	0,091	3259	11937	0,091	4301	15756	10	0,090	3008	11141	0,090	4297	15915				
	12	0,105	3133	9947	0,105	4136	13130	12	0,105	2924	9284	0,105	4178	13263				
	14	0,118	3018	8526	0,118	3984	11255	14	-	-	-	-	-	-				
	16	0,128	2865	7460	0,128	3782	9848	16	0,130	2716	6963	0,130	3879	9947				
18	-	-	-	-	-	-	18	-	-	-	-	-	-					
20	0,140	3342	5968	0,140	4412	7878	20	0,160	2674	5570	0,160	3820	7958					
Thermoplastics	m/min Vc = 450				Vc = 595				m/min Vc = 450				Vc = 600					
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm				
	3	-	-	-	-	-	-	3	0,012	1719	47746	0,012	2292	63662				
	4	0,021	2256	35810	0,021	2983	47349	4	0,020	2149	35810	0,020	2865	47746				
	5	0,035	3008	28648	0,035	3977	37879	5	0,035	3008	28648	0,035	4011	38197				
	6	0,050	3581	23873	0,050	4735	31566	6	0,050	3581	23873	0,050	4775	31831				
	7	0,062	3775	20463	0,062	4992	27056	7	-	-	-	-	-	-				
	8	0,073	3921	17905	0,073	5185	23674	8	0,070	3760	17905	0,070	5013	23873				
	9	0,082	3915	15915	0,082	5177	21044	9	-	-	-	-	-	-				
	10	0,091	3910	14324	0,091	5170	18939	10	0,090	3867	14324	0,090	5157	19099				
	12	0,105	3760	11937	0,105	4972	15783	12	0,105	3760	11937	0,105	5013	15915				
	14	0,118	3622	10231	0,118	4789	13528	14	-	-	-	-	-	-				
	16	0,128	3438	8952	0,128	4545	11837	16	0,130	3491	8952	0,130	4655	11937				
18	-	-	-	-	-	-	18	-	-	-	-	-	-					
20	0,140	4011	7162	0,140	5303	9470	20	0,160	3438	7162	0,160	4584	9549					

Parametri di lavoro frese in metallo duro ad alte prestazioni
Working parameters for high performance solid carbide end mills
Schnittparameter für Hochleistungs-VHM-Schaftfräser

FP710 / FP710E										
MATERIAL	DIAMETER	 1 x D 1 x D			 0,4 x D 1,5 x D 0,4 x D			 FULL 0,1 x D		
Ferritic stainless steel	m/min	Vc = 140			Vc = 130			Vc = 170		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	3	0,013	772	14854	0,013	717	13793	0,020	1443	18038
	4	0,020	891	11141	0,020	828	10345	0,060	3247	13528
	5	0,025	891	8913	0,025	828	8276	0,095	4113	10823
	6	0,030	891	7427	0,030	828	6897	0,130	4690	9019
	8	0,040	891	5570	0,040	828	5173	0,160	4329	6764
	10	0,050	891	4456	0,050	828	4138	0,190	4113	5411
	12	0,060	891	3714	0,060	828	3448	0,220	3968	4509
	16	0,070	780	2785	0,070	724	2586	0,250	3382	3382
	20	0,080	713	2228	0,080	662	2069	0,300	3247	2706
	25	0,090	642	1783	0,090	596	1655	0,350	3030	2165
Austenitic stainless steel	m/min	Vc = 120			Vc = 110			Vc = 150		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	3	0,013	662	12732	0,013	607	11671	0,020	1273	15915
	4	0,020	764	9549	0,020	700	8754	0,060	2865	11937
	5	0,025	764	7639	0,025	700	7003	0,095	3629	9549
	6	0,030	764	6366	0,030	700	5836	0,130	4138	7958
	8	0,040	764	4775	0,040	700	4377	0,160	3820	5968
	10	0,050	764	3820	0,050	700	3501	0,190	3629	4775
	12	0,060	764	3183	0,060	700	2918	0,220	3501	3979
	16	0,070	668	2387	0,070	613	2188	0,250	2984	2984
	20	0,080	611	1910	0,080	560	1751	0,300	2865	2387
	25	0,090	550	1528	0,090	504	1401	0,350	2674	1910
Titanium alloys	m/min	Vc = 80			Vc = 80			Vc = 100		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	3	0,004	136	8488	0,011	373	8488	0,020	849	10610
	4	0,006	153	6366	0,015	382	6366	0,060	1910	7958
	5	0,008	153	5093	0,019	387	5093	0,095	2419	6366
	6	0,009	153	4244	0,023	390	4244	0,130	2759	5305
	8	0,012	153	3183	0,030	382	3183	0,160	2546	3979
	10	0,015	153	2546	0,040	407	2546	0,190	2419	3183
	12	0,020	170	2122	0,050	424	2122	0,220	2334	2653
	16	0,030	191	1592	0,060	382	1592	0,250	1989	1989
	20	0,040	204	1273	0,075	382	1273	0,300	1910	1592
	25	0,050	204	1019	0,090	367	1019	0,350	1783	1273
Steel <800 N/mm²	m/min	Vc = 195			Vc = 210			Vc = 220		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	3	0,008	662	20690	0,008	713	22282	0,020	1867	23343
	4	0,012	745	15518	0,012	802	16711	0,060	4202	17507
	5	0,016	795	12414	0,016	856	13369	0,095	5322	14006
	6	0,020	828	10345	0,020	891	11141	0,130	6069	11671
	8	0,030	931	7759	0,030	1003	8356	0,160	5602	8754
	10	0,040	993	6207	0,040	1070	6685	0,190	5322	7003
	12	0,050	1035	5173	0,050	1114	5570	0,220	5135	5836
	16	0,060	931	3879	0,060	1003	4178	0,250	4377	4377
	20	0,070	869	3104	0,070	936	3342	0,300	4202	3501
	25	0,080	795	2483	0,080	856	2674	0,350	3922	2801
Steel <1000 N/mm²	m/min	Vc = 140			Vc = 150			Vc = 180		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	3	0,008	475	14854	0,008	509	15915	0,020	1528	19099
	4	0,012	535	11141	0,012	573	11937	0,060	3438	14324
	5	0,016	570	8913	0,016	611	9549	0,095	4354	11459
	6	0,020	594	7427	0,020	637	7958	0,130	4966	9549
	8	0,030	668	5570	0,030	716	5968	0,160	4584	7162
	10	0,040	713	4456	0,040	764	4775	0,190	4354	5730
	12	0,050	743	3714	0,050	796	3979	0,220	4202	4775
	16	0,060	668	2785	0,060	716	2984	0,250	3581	3581
	20	0,070	624	2228	0,070	668	2387	0,300	3438	2865
	25	0,080	570	1783	0,080	611	1910	0,350	3209	2292

FP765 / FP765E									
MATERIAL	DIAMETER	 1 x D			 0,4 x D			 STEP 0,5 x D	
Ferritic stainless steel	m/min	Vc = 130			Vc = 130			Vc = 130	
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min
	2	0,010	621	20690	0,015	931	20690	0,004	248
	3	0,015	621	13793	0,020	828	13793	0,006	248
	4	0,020	621	10345	0,025	776	10345	0,008	248
	5	0,024	596	8276	0,029	720	8276	0,011	261
	6	0,028	579	6897	0,033	683	6897	0,013	269
	7	0,032	559	5911	0,037	647	5911	0,016	275
	8	0,035	543	5173	0,040	621	5173	0,018	279
	9	0,040	545	4598	0,045	614	4598	0,021	283
	10	0,044	546	4138	0,049	608	4138	0,023	286
Austenitic stainless steel	m/min	Vc = 110			Vc = 110			Vc = 110	
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min
	2	0,010	525	17507	0,015	788	17507	0,004	210
	3	0,015	525	11671	0,020	700	11671	0,006	210
	4	0,020	525	8754	0,025	657	8754	0,008	210
	5	0,024	504	7003	0,029	609	7003	0,011	221
	6	0,028	490	5836	0,033	578	5836	0,013	228
	7	0,032	473	5002	0,037	548	5002	0,016	233
	8	0,035	460	4377	0,040	525	4377	0,018	236
	9	0,040	461	3890	0,045	519	3890	0,021	239
	10	0,044	462	3501	0,049	515	3501	0,023	242
Titanium alloys	m/min	Vc = 90			Vc = 80			Vc = 90	
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min
	2	0,003	129	14324	0,005	191	12732	0,004	172
	3	0,006	158	9549	0,009	229	8488	0,006	172
	4	0,008	172	7162	0,013	248	6366	0,008	172
	5	0,012	206	5730	0,017	260	5093	0,011	180
	6	0,016	229	4775	0,021	267	4244	0,013	186
	7	0,020	239	4093	0,025	267	3638	0,016	190
	8	0,023	247	3581	0,028	267	3183	0,018	193
	9	0,028	263	3183	0,033	276	2829	0,021	196
	10	0,032	275	2865	0,037	283	2546	0,023	198
Steel <800 N/mm²	m/min	Vc = 170			Vc = 180			Vc = 170	
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min
	2	0,007	568	27056	0,007	602	28648	0,003	244
	3	0,012	622	18038	0,013	716	19099	0,005	271
	4	0,016	649	13528	0,018	773	14324	0,007	284
	5	0,020	649	10823	0,023	773	11459	0,009	292
	6	0,024	649	9019	0,027	773	9549	0,011	298
	7	0,028	649	7730	0,032	773	8185	0,013	301
	8	0,032	649	6764	0,036	773	7162	0,015	304
	9	0,036	649	6013	0,041	773	6366	0,017	307
	10	0,040	649	5411	0,045	773	5730	0,019	308
Steel <1000 N/mm²	m/min	Vc = 130			Vc = 150			Vc = 130	
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min
	2	0,007	434	20690	0,007	501	23873	0,003	186
	3	0,012	476	13793	0,013	597	15915	0,005	207
	4	0,016	497	10345	0,018	645	11937	0,007	217
	5	0,020	497	8276	0,023	645	9549	0,009	223
	6	0,024	497	6897	0,027	645	7958	0,011	228
	7	0,028	497	5911	0,032	645	6821	0,013	231
	8	0,032	497	5173	0,036	645	5968	0,015	233
	9	0,036	497	4598	0,041	645	5305	0,017	234
	10	0,040	497	4138	0,045	645	4775	0,019	236

N.B.: Per i diametri intermedi si consigliano i valori di avanzamento fz del diametro inferiore
For intermediate diameters use feed rate fz values for closest smaller diameter
Für Zwischendurchmesser Schubwerte fz für nächstkleinere Fräsedurchmesser benutzen

FP720

MATERIAL	DIAMETER	 1 x D 1,5 x D					 0,5 x D 2 x D					MATERIAL	DIAMETER	 1 x D 1,5 x D					 0,5 x D 2 x D				
Steel <800 N/mm²	m/min	Vc = 150				Vc = 170				Ferritic stainless steel	m/min	Vc = 60				Vc = 70							
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z		F mm/min	N rpm	fz mm/z	F mm/min	N rpm								
	3	0,010	637	15915	0,012	866	18038	3	0,010		255	6366	0,012	357	7427								
	4	0,015	716	11937	0,020	1082	13528	4	0,015		286	4775	0,020	446	5570								
	5	0,020	764	9549	0,030	1299	10823	5	0,019		290	3820	0,030	535	4456								
	6	0,030	955	7958	0,044	1587	9019	6	0,026		331	3183	0,040	594	3714								
	7	0,035	955	6821	0,051	1577	7730	7	0,031		338	2728	0,045	573	3183								
	8	0,040	955	5968	0,058	1569	6764	8	0,035		334	2387	0,050	557	2785								
	9	0,043	912	5305	0,064	1539	6013	9	0,039		331	2122	0,054	535	2476								
	10	0,047	898	4775	0,071	1537	5411	10	0,042		321	1910	0,060	535	2228								
	12	0,052	828	3979	0,076	1371	4509	12	0,047		299	1592	0,067	498	1857								
	14	0,058	791	3410	0,081	1252	3865	14	0,050		273	1364	0,071	452	1592								
16	0,061	728	2984	0,085	1150	3382	16	0,054	258	1194	0,078	434	1393										
20	0,065	621	2387	0,090	974	2706	20	0,058	222	955	0,085	379	1114										
Steel <1000 N/mm² - Cast iron	m/min	Vc = 115				Vc = 140				Austenitic stainless steel	m/min	Vc = 50				Vc = 55							
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z		F mm/min	N rpm	fz mm/z	F mm/min	N rpm								
	3	0,010	488	12202	0,012	713	14854	3	0,010		212	5305	0,012	280	5836								
	4	0,015	549	9151	0,020	891	11141	4	0,012		191	3979	0,020	350	4377								
	5	0,019	556	7321	0,030	1070	8913	5	0,017		216	3183	0,030	420	3501								
	6	0,026	634	6101	0,040	1188	7427	6	0,022		233	2653	0,040	467	2918								
	7	0,031	648	5229	0,045	1146	6366	7	0,027		246	2274	0,045	450	2501								
	8	0,035	641	4576	0,050	1114	5570	8	0,031		247	1989	0,050	438	2188								
	9	0,039	634	4067	0,054	1070	4951	9	0,035		248	1768	0,054	420	1945								
	10	0,042	615	3661	0,060	1070	4456	10	0,037		236	1592	0,060	420	1751								
	12	0,047	573	3050	0,067	995	3714	12	0,041		218	1326	0,067	391	1459								
	14	0,050	523	2615	0,071	904	3183	14	0,046		209	1137	0,071	355	1251								
16	0,054	494	2288	0,078	869	2785	16	0,050	199	995	0,078	341	1094										
20	0,058	425	1830	0,085	758	2228	20	0,052	166	796	0,085	298	875										
Steel <1300 N/mm²	m/min	Vc = 95				Vc = 100				DUPLEX	m/min	Vc = 40				Vc = 45							
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z		F mm/min	N rpm	fz mm/z	F mm/min	N rpm								
	3	0,010	403	10080	0,012	509	10610	3	0,010		170	4244	0,012	229	4775								
	4	0,012	363	7560	0,020	637	7958	4	0,012		153	3183	0,020	286	3581								
	5	0,017	411	6048	0,030	764	6366	5	0,017		173	2546	0,030	344	2865								
	6	0,022	444	5040	0,040	849	5305	6	0,022		187	2122	0,040	382	2387								
	7	0,027	467	4320	0,045	819	4547	7	0,027		196	1819	0,045	368	2046								
	8	0,031	469	3780	0,050	796	3979	8	0,031		197	1592	0,050	358	1790								
	9	0,035	470	3360	0,054	764	3537	9	0,035		198	1415	0,054	344	1592								
	10	0,037	448	3024	0,060	764	3183	10	0,037		188	1273	0,060	344	1432								
	12	0,041	413	2520	0,067	711	2653	12	0,041		174	1061	0,067	320	1194								
	14	0,046	397	2160	0,071	646	2274	14	0,046		167	909	0,071	291	1023								
16	0,050	378	1890	0,078	621	1989	16	0,050	159	796	0,078	279	895										
20	0,052	314	1512	0,085	541	1592	20	0,052	132	637	0,085	244	716										
High strength steel	m/min	Vc = 45				Vc = 65				Titanium alloys	m/min	Vc = 40				Vc = 45							
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z		F mm/min	N rpm	fz mm/z	F mm/min	N rpm								
	3	0,010	191	4775	0,012	331	6897	3	0,010		170	4244	0,012	229	4775								
	4	0,012	172	3581	0,020	414	5173	4	0,015		191	3183	0,012	172	3581								
	5	0,017	195	2865	0,030	497	4138	5	0,019		194	2546	0,014	160	2865								
	6	0,022	210	2387	0,040	552	3448	6	0,026		221	2122	0,017	162	2387								
	7	0,027	221	2046	0,045	532	2956	7	0,031		226	1819	0,020	164	2046								
	8	0,031	222	1790	0,050	517	2586	8	0,035		223	1592	0,022	158	1790								
	9	0,035	223	1592	0,054	497	2299	9	0,039		221	1415	0,024	153	1592								
	10	0,037	212	1432	0,060	497	2069	10	0,042		214	1273	0,026	149	1432								
	12	0,041	196	1194	0,067	462	1724	12	0,047		199	1061	0,031	148	1194								
	14	0,046	188	1023	0,071	420	1478	14	0,050		182	909	0,035	143	1023								
16	0,050	179	895	0,078	403	1293	16	0,054	172	796	0,040	143	895										
20	0,052	149	716	0,085	352	1035	20	0,058	148	637	0,045	129	716										

FP750

MATERIAL	DIAMETER	 1 x D 1,5 x D	 0,5 x D 2 x D	MATERIAL	DIAMETER	 1 x D 1,5 x D	 0,5 x D 2 x D
Steel <800 N/mm²	m/min	Vc = 140		Ferritic stainless steel	m/min	Vc = 60	
	D mm	fz mm/z	F mm/min		D mm	fz mm/z	F mm/min
	3	0,012	535		3	0,009	172
	4	0,018	602		4	0,012	172
	5	0,024	642		5	0,017	195
	6	0,032	951		6	0,022	280
	7	-	-		7	-	-
	8	0,042	936		8	0,038	363
	9	-	-		9	-	-
	10	0,049	873		10	0,041	313
	12	0,054	802		12	0,045	286
	14	0,060	764		14	0,048	262
Steel <1000 N/mm² - Cast iron	m/min	Vc = 110		Austenitic stainless steel	m/min	Vc = 50	
	D mm	fz mm/z	F mm/min		D mm	fz mm/z	F mm/min
	3	0,012	420		3	0,009	143
	4	0,018	473		4	0,012	143
	5	0,024	504		5	0,017	162
	6	0,032	747		6	0,022	233
	7	-	-		7	-	-
	8	0,042	735		8	0,038	302
	9	-	-		9	-	-
	10	0,049	686		10	0,041	261
	12	0,054	630		12	0,045	239
	14	0,060	600		14	0,048	218
Steel <1300 N/mm²	m/min	Vc = 95		DUPLEX	m/min	Vc = 40	
	D mm	fz mm/z	F mm/min		D mm	fz mm/z	F mm/min
	3	0,012	363		3	0,009	115
	4	0,018	408		4	0,012	115
	5	0,024	435		5	0,017	130
	6	0,032	645		6	0,022	187
	7	-	-		7	-	-
	8	0,042	635		8	0,038	242
	9	-	-		9	-	-
	10	0,049	593		10	0,041	209
	12	0,054	544		12	0,045	191
	14	0,060	518		14	0,048	175
High strength steel	m/min	Vc = 45		Titanium alloys	m/min	Vc = 40	
	D mm	fz mm/z	F mm/min		D mm	fz mm/z	F mm/min
	3	0,012	172		3	0,012	153
	4	0,018	193		4	0,018	172
	5	0,024	206		5	0,024	183
	6	0,032	306		6	0,032	272
	7	-	-		7	-	-
	8	0,042	301		8	0,042	267
	9	-	-		9	-	-
	10	0,049	281		10	0,049	250
	12	0,054	258		12	0,054	229
	14	0,060	246		14	0,060	218

FP795E							
MATERIAL	DIAMETER	 1 x D 0,5 x D			 0,5 x D 1,5 x D		
Al and Al alloys <6% Si	m/min	Vc = 600			Vc = 800		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	2	0,010	1910	95493	0,010	2546	127324
	3	0,016	2037	63662	0,016	2716	84883
	4	0,025	2387	47746	0,025	3183	63662
	5	0,040	3056	38197	0,040	4074	50930
	6	0,060	3820	31831	0,060	5093	42441
	8	0,075	3581	23873	0,075	4775	31831
	10	0,100	3820	19099	0,100	5093	25465
	12	0,120	3820	15915	0,120	5093	21221
	14	0,135	3683	13642	0,135	4911	18189
	16	0,150	3581	11937	0,150	4775	15915
	20	0,175	3342	9549	0,175	4456	12732
	25	0,200	3056	7639	0,200	4074	10186
Al and Al alloys >6% Si	m/min	Vc = 600			Vc = 800		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	2	0,010	1910	95493	0,010	2546	127324
	3	0,016	2037	63662	0,016	2716	84883
	4	0,025	2387	47746	0,025	3183	63662
	5	0,040	3056	38197	0,040	4074	50930
	6	0,060	3820	31831	0,060	5093	42441
	8	0,075	3581	23873	0,075	4775	31831
	10	0,100	3820	19099	0,100	5093	25465
	12	0,120	3820	15915	0,120	5093	21221
	14	0,135	3683	13642	0,135	4911	18189
	16	0,150	3581	11937	0,150	4775	15915
	20	0,175	3342	9549	0,175	4456	12732
	25	0,200	3056	7639	0,200	4074	10186
Copper and Copper alloys	m/min	Vc = 370			Vc = 500		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	2	0,010	1178	58887	0,010	1592	79577
	3	0,016	1256	39258	0,016	1698	53052
	4	0,025	1472	29444	0,025	1989	39789
	5	0,040	1884	23555	0,040	2546	31831
	6	0,060	2355	19629	0,060	3183	26526
	8	0,075	2208	14722	0,075	2984	19894
	10	0,100	2355	11777	0,100	3183	15915
	12	0,120	2355	9815	0,120	3183	13263
	14	0,135	2271	8412	0,135	3069	11368
	16	0,150	2208	7361	0,150	2984	9947
	20	0,175	2061	5889	0,175	2785	7958
	25	0,200	1884	4711	0,200	2546	6366
Thermoplastics	m/min	Vc = 450			Vc = 600		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	2	0,010	1432	71620	0,010	1910	95493
	3	0,016	1528	47746	0,016	2037	63662
	4	0,025	1790	35810	0,025	2387	47746
	5	0,040	2292	28648	0,040	3056	38197
	6	0,060	2865	23873	0,060	3820	31831
	8	0,075	2686	17905	0,075	3581	23873
	10	0,100	2865	14324	0,100	3820	19099
	12	0,120	2865	11937	0,120	3820	15915
	14	0,135	2762	10231	0,135	3683	13642
	16	0,150	2686	8952	0,150	3581	11937
	20	0,175	2507	7162	0,175	3342	9549
	25	0,200	2292	5730	0,200	3056	7639



STEP
0,5 x D

Per l'operazione di foratura utilizzare un avanzamento fz ridotto del 60%
For drilling operations the feed rate fz should be reduced by 60%
Beim Bohren den Vorschub fz um 60% reduzieren

Parametri di lavoro frese in acciaio per impiego generico
Working parameters for high speed steel end mills for generic applications
Schnittparameter für HSS-Schaftfräser für den allgemeinen Einsatz

FA300SE																					
MATERIAL	DIAMETER	 1 x D 0,5 x D	 0,25 x D 1,5 x D	MATERIAL	DIAMETER	 1 x D 0,5 x D	 0,25 x D 1,5 x D														
Steel <800 N/mm²	m/min	Vc = 40				Vc = 50				High strength steel	m/min	Vc = 20				Vc = 25					
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z		F mm/min	N rpm	fz mm/z	F mm/min	N rpm						
	2	0,006	76	6366	0,006	95	7958	2	0,003		19	3183	0,003	24	3979						
	3	0,011	89	4244	0,011	111	5305	3	0,006		25	2122	0,006	32	2653						
	4	0,017	105	3183	0,017	131	3979	4	0,009		29	1592	0,009	36	1989						
	5	0,024	122	2546	0,024	153	3183	5	0,015		38	1273	0,015	48	1592						
	6	0,030	127	2122	0,030	159	2653	6	0,023		48	1061	0,023	60	1326						
	7	0,039	142	1819	0,039	177	2274	7	0,026		48	909	0,026	60	1137						
	8	0,048	153	1592	0,048	191	1989	8	0,030		48	796	0,030	60	995						
	9	0,054	153	1415	0,054	191	1768	9	0,030		42	707	0,030	53	884						
	10	0,060	153	1273	0,060	191	1592	10	0,045		57	637	0,045	72	796						
	11	0,068	156	1157	0,068	195	1447	11	0,053		61	579	0,053	76	723						
	12	0,075	159	1061	0,075	199	1326	12	0,060		64	531	0,060	80	663						
	13	0,083	162	979	0,083	202	1224	13	0,068		66	490	0,068	83	612						
	14	0,090	164	909	0,090	205	1137	14	0,075		68	455	0,075	85	568						
	15	0,098	166	849	0,098	207	1061	15	0,083		70	424	0,083	88	531						
	16	0,105	167	796	0,105	209	995	16	0,090		72	398	0,090	90	497						
	17	0,113	169	749	0,113	211	936	17	0,098		73	374	0,098	91	468						
	18	0,120	170	707	0,120	212	884	18	0,105		74	354	0,105	93	442						
	19	0,124	166	670	0,124	207	838	19	0,105		70	335	0,105	88	419						
	20	0,128	162	637	0,128	203	796	20	0,105		67	318	0,105	84	398						
	22	0,135	156	579	0,135	195	723	22	0,105		61	289	0,105	76	362						
	25	0,135	138	509	0,135	172	637	25	0,117		60	255	0,117	74	318						
	Steel <1000 N/mm² - Cast iron	m/min	Vc = 30				Vc = 35				Stainless steel	m/min	Vc = 25				Vc = 30				
		D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm			fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm				
2		0,006	57	4775	0,006	67	5570	2	0,005	36		3979	0,005	43	4775						
3		0,011	67	3183	0,011	78	3714	3	0,008	40		2653	0,008	48	3183						
4		0,017	79	2387	0,017	92	2785	4	0,012	48		1989	0,012	57	2387						
5		0,024	92	1910	0,024	107	2228	5	0,021	67		1592	0,021	80	1910						
6		0,030	95	1592	0,030	111	1857	6	0,030	80		1326	0,030	95	1592						
7		0,039	106	1364	0,039	124	1592	7	0,039	89		1137	0,039	106	1364						
8		0,048	115	1194	0,048	134	1393	8	0,048	95		995	0,048	115	1194						
9		0,054	115	1061	0,054	134	1238	9	0,054	95		884	0,054	115	1061						
10		0,060	115	955	0,060	134	1114	10	0,060	95		796	0,060	115	955						
11		0,068	117	868	0,068	137	1013	11	0,068	98		723	0,068	117	868						
12		0,075	119	796	0,075	139	928	12	0,075	99		663	0,075	119	796						
13		0,083	121	735	0,083	141	857	13	0,083	101		612	0,083	121	735						
14		0,090	123	682	0,090	143	796	14	0,090	102		568	0,090	123	682						
15		0,098	124	637	0,098	145	743	15	0,098	103		531	0,098	124	637						
16		0,105	125	597	0,105	146	696	16	0,105	104		497	0,105	125	597						
17		0,113	126	562	0,113	147	655	17	0,113	105		468	0,113	126	562						
18		0,120	127	531	0,120	149	619	18	0,120	106		442	0,120	127	531						
19		0,124	124	503	0,124	145	586	19	0,120	101		419	0,120	121	503						
20		0,128	122	477	0,128	142	557	20	0,120	95		398	0,120	115	477						
22		0,135	117	434	0,135	137	506	22	0,120	87		362	0,120	104	434						
25		0,135	103	382	0,135	120	446	25	0,128	81		318	0,128	97	382						
Steel <1300 N/mm²		m/min	Vc = 25				Vc = 30					 STEP 0,5 x D									
		D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm													
	2	0,005	36	3979	0,005	43	4775														
	3	0,008	40	2653	0,008	48	3183														
	4	0,012	48	1989	0,012	57	2387														
	5	0,021	67	1592	0,021	80	1910														
	6	0,030	80	1326	0,030	95	1592														
	7	0,039	89	1137	0,039	106	1364														
	8	0,048	95	995	0,048	115	1194														
	9	0,054	95	884	0,054	115	1061														
	10	0,060	95	796	0,060	115	955														
	11	0,068	98	723	0,068	117	868														
	12	0,075	99	663	0,075	119	796														
	13	0,083	101	612	0,083	121	735														
	14	0,090	102	568	0,090	123	682														
	15	0,098	103	531	0,098	124	637														
	16	0,105	104	497	0,105	125	597														
	17	0,113	105	468	0,113	126	562														
	18	0,120	106	442	0,120	127	531														
	19	0,120	101	419	0,120	121	503														
	20	0,120	95	398	0,120	115	477														
	22	0,120	87	362	0,120	104	434														
	25	0,128	81	318	0,128	97	382														

Per l'operazione di foratura utilizzare un avanzamento fz ridotto di 60%
For drilling operations the feed rate fz should be reduced by 60%
Beim Bohren den Vorschub fz um 60% reduzieren

N.B.: Per i diametri intermedi si consigliano i valori di avanzamento per il diametro inferiore
For intermediate diameters use feed rate fz values for closest diameter
Für Zwischendurchmesser Schubwerte fz für nächstkleinere Eräserdurchmesser benutzen



Per l'operazione di foratura utilizzare un avanzamento fz ridotto del 60%
For drilling operations the feed rate fz should be reduced by 60%
Beim Bohren den Vorschub fz um 60% reduzieren

N.B.: Per i diametri intermedi si consigliano i valori di avanzamento fz del diametro inferiore
For intermediate diameters use feed rate fz values for closest smaller diameter
Für Zwischendurchmesser Schubwerte fz für nächstkleinere Fräserdurchmesser benutzen

FA405E

MATERIAL	DIAMETER	 0,1 x D 1,5 x D				MATERIAL	DIAMETER	 0,1 x D 1,5 x D				MATERIAL	DIAMETER	 0,1 x D 1,5 x D			
Steel <800 N/mm ²	m/min Vc = 40					Steel <1300 N/mm ²	m/min Vc = 25					Stainless steel	m/min Vc = 25				
	D mm	fz mm/z	F mm/min	N rpm	D mm		fz mm/z	F mm/min	N rpm	D mm	fz mm/z		F mm/min	N rpm			
	3	0,006	102	4244	3		0,005	53	2653	3	0,005		53	2653			
	4	0,010	127	3183	4		0,009	72	1989	4	0,009		72	1989			
	5	0,015	153	2546	5		0,013	83	1592	5	0,013		83	1592			
	6	0,020	170	2122	6		0,018	95	1326	6	0,018		95	1326			
	7	0,028	200	1819	7		0,024	109	1137	7	0,024		109	1137			
	8	0,035	223	1592	8		0,030	119	995	8	0,030		119	995			
	9	0,043	241	1415	9		0,038	133	884	9	0,038		133	884			
	10	0,050	255	1273	10		0,045	143	796	10	0,045		143	796			
	11	0,056	259	1157	11		0,053	152	723	11	0,053		152	723			
	12	0,062	263	1061	12		0,060	159	663	12	0,060		159	663			
	13	0,069	268	979	13		0,065	159	612	13	0,065		159	612			
	14	0,075	273	909	14		0,070	159	568	14	0,070		159	568			
	15	0,083	280	849	15		0,075	159	531	15	0,075		159	531			
	16	0,090	286	796	16		0,080	159	497	16	0,080		159	497			
	17	0,098	292	749	17		0,085	159	468	17	0,085		159	468			
	18	0,105	297	707	18		0,090	159	442	18	0,090		159	442			
	19	0,113	302	670	19		0,095	159	419	19	0,095		159	419			
	20	0,120	306	637	20		0,100	159	398	20	0,100		159	398			
	22	0,135	313	579	22		0,115	166	362	22	0,115		166	362			
	25	0,150	458	509	25		0,120	229	318	25	0,120		229	318			
	28	0,160	437	455	28		0,130	222	284	28	0,130		222	284			
	30	0,160	407	424	30		0,140	223	265	30	0,140		223	265			
	32	0,160	382	398	32		0,150	224	249	32	0,150		224	249			
Steel <1000 N/mm ² - Cast iron	m/min Vc = 30					High strength steel	m/min Vc = 20										
	D mm	fz mm/z	F mm/min	N rpm	D mm		fz mm/z	F mm/min	N rpm								
	3	0,006	76	3183	3		0,005	42	2122								
	4	0,010	95	2387	4		0,008	51	1592								
	5	0,015	115	1910	5		0,012	61	1273								
	6	0,020	127	1592	6		0,018	76	1061								
	7	0,028	150	1364	7		0,022	78	909								
	8	0,035	167	1194	8		0,025	80	796								
	9	0,043	180	1061	9		0,033	92	707								
	10	0,050	191	955	10		0,040	102	637								
	11	0,056	194	868	11		0,045	104	579								
	12	0,062	197	796	12		0,050	106	531								
	13	0,069	201	735	13		0,055	108	490								
	14	0,075	205	682	14		0,060	109	455								
	15	0,083	210	637	15		0,065	110	424								
	16	0,090	215	597	16		0,070	111	398								
	17	0,098	219	562	17		0,074	111	374								
	18	0,105	223	531	18		0,078	110	354								
	19	0,113	226	503	19		0,082	109	335								
	20	0,120	229	477	20		0,085	108	318								
	22	0,135	234	434	22		0,095	110	289								
	25	0,150	344	382	25		0,110	168	255								
	28	0,160	327	341	28		0,120	164	227								
	30	0,160	306	318	30		0,120	153	212								
	32	0,160	286	298	32		0,120	143	199								

FA425E					FA465E								
MATERIAL	DIAMETER	 0,1 x D 1,5 x D			DIAMETER	 1 x D 0,5 x D			 0,1 x D 1,5 x D				
Steel <800 N/mm²	m/min	Vc = 40			m/min	Vc = 40			Vc = 50				
	D mm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm		
	6	0,014	119	2122	6	0,015	95	2122	0,030	239	2653		
	8	0,025	156	1592	8	0,026	122	1592	0,053	313	1989		
	10	0,035	178	1273	10	0,033	126	1273	0,075	358	1592		
	12	0,043	184	1061	12	0,042	134	1061	0,093	370	1326		
	14	0,053	191	909	14	0,053	143	909	0,113	384	1137		
	16	0,063	201	796	16	0,063	150	796	0,135	403	995		
	18	0,074	208	707	18	0,072	153	707	0,158	418	884		
	20	0,084	214	637	20	0,075	191	637	0,180	573	796		
	22	0,095	219	579	22	0,083	191	579	0,203	586	723		
	25	0,105	321	509	25	0,090	183	509	0,233	592	637		
	28	0,112	306	455	28	-	-	-	-	-	-		
	30	0,112	285	424	30	-	-	-	-	-	-		
Steel <1000 N/mm² - Cast iron	m/min	Vc = 30			m/min	Vc = 30			Vc = 35				
	D mm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm		
	6	0,014	89	1592	6	0,015	72	1592	0,030	167	1857		
	8	0,025	117	1194	8	0,026	91	1194	0,053	219	1393		
	10	0,035	134	955	10	0,033	95	955	0,075	251	1114		
	12	0,043	138	796	12	0,042	100	796	0,093	259	928		
	14	0,053	143	682	14	0,053	107	682	0,113	269	796		
	16	0,063	150	597	16	0,063	113	597	0,135	282	696		
	18	0,074	156	531	18	0,072	115	531	0,158	292	619		
	20	0,084	160	477	20	0,075	143	477	0,180	401	557		
	22	0,095	164	434	22	0,083	143	434	0,203	410	506		
	25	0,105	241	382	25	0,090	138	382	0,233	414	446		
	28	0,112	229	341	28	-	-	-	-	-	-		
	30	0,112	214	318	30	-	-	-	-	-	-		
Steel <1300 N/mm²	m/min	Vc = 25			m/min	Vc = 25			Vc = 30				
	D mm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm		
	6	0,013	67	1326	6	0,015	60	1326	0,030	143	1592		
	8	0,021	84	995	8	0,023	67	995	0,053	188	1194		
	10	0,032	100	796	10	0,030	72	796	0,075	215	955		
	12	0,042	111	663	12	0,038	75	663	0,093	222	796		
	14	0,049	111	568	14	0,048	82	568	0,113	230	682		
	16	0,056	111	497	16	0,057	85	497	0,135	242	597		
	18	0,063	111	442	18	0,066	88	442	0,158	251	531		
	20	0,070	111	398	20	0,075	119	398	0,165	315	477		
	22	0,081	116	362	22	0,081	117	362	0,180	313	434		
	25	0,084	160	318	25	0,090	115	318	0,203	309	382		
	28	0,091	155	284	28	-	-	-	-	-	-		
	30	0,098	156	265	30	-	-	-	-	-	-		
High strength steel	m/min	Vc = 20			m/min	Vc = 20			Vc = 25				
	D mm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm		
	6	0,013	53	1061	6	0,014	43	1061	0,030	119	1326		
	8	0,018	56	796	8	0,023	54	796	0,042	125	995		
	10	0,028	71	637	10	0,030	57	637	0,065	154	796		
	12	0,035	74	531	12	0,038	60	531	0,083	164	663		
	14	0,042	76	455	14	0,048	65	455	0,098	166	568		
	16	0,049	78	398	16	0,057	68	398	0,113	168	497		
	18	0,055	77	354	18	0,066	70	354	0,128	169	442		
	20	0,056	71	318	20	0,075	95	318	0,128	203	398		
	22	0,067	77	289	22	0,081	94	289	0,143	206	362		
	25	0,077	118	255	25	0,090	92	255	0,165	210	318		
	28	0,084	115	227	28	-	-	-	-	-	-		
	30	0,084	107	212	30	-	-	-	-	-	-		
Stainless steel	m/min	Vc = 25			m/min	Vc = 25			Vc = 30				
	D mm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm		
	6	0,013	67	1326	6	0,015	60	1326	0,030	143	1592		
	8	0,021	84	995	8	0,023	67	995	0,053	188	1194		
	10	0,032	100	796	10	0,030	72	796	0,075	215	955		
	12	0,042	111	663	12	0,038	75	663	0,093	222	796		
	14	0,049	111	568	14	0,048	82	568	0,113	230	682		
	16	0,056	111	497	16	0,057	85	497	0,135	242	597		
	18	0,063	111	442	18	0,066	88	442	0,158	251	531		
	20	0,070	111	398	20	0,075	119	398	0,165	315	477		
	22	0,081	116	362	22	0,081	117	362	0,180	313	434		
	25	0,084	160	318	25	0,090	115	318	0,203	309	382		
	28	0,091	155	284	28	-	-	-	-	-	-		
	30	0,098	156	265	30	-	-	-	-	-	-		

FA505S							
MATERIAL	DIAMETER	 1 x D			 0,5 x D		
Steel <800 N/mm ²	m/min	Vc = 40			Vc = 50		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	6	0,020	127	2122	0,030	239	2653
	8	0,034	216	1592	0,044	350	1989
	10	0,044	224	1273	0,060	382	1592
	12	0,056	238	1061	0,080	424	1326
	14	0,070	255	909	0,110	500	1137
	16	0,084	267	796	0,126	501	995
	18	0,096	272	707	0,140	495	884
	20	0,110	280	637	0,160	509	796
	25	0,140	285	509	0,180	458	637
	32	0,140	334	398	0,190	567	497
Steel <1000 N/mm ² - Cast iron	m/min	Vc = 30			Vc = 35		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	6	0,020	95	1592	0,030	167	1857
	8	0,034	162	1194	0,044	245	1393
	10	0,044	168	955	0,060	267	1114
	12	0,056	178	796	0,080	297	928
	14	0,070	191	682	0,110	350	796
	16	0,084	201	597	0,126	351	696
	18	0,096	204	531	0,140	347	619
	20	0,110	210	477	0,160	357	557
	25	0,140	214	382	0,180	321	446
	32	0,140	251	298	0,190	397	348
Steel <1300 N/mm ²	m/min	Vc = 25			Vc = 30		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	6	0,018	72	1326	0,024	115	1592
	8	0,020	80	995	0,040	191	1194
	10	0,040	127	796	0,056	214	955
	12	0,050	133	663	0,070	223	796
	14	0,064	146	568	0,100	273	682
	16	0,076	151	497	0,114	272	597
	18	0,086	152	442	0,130	276	531
	20	0,100	159	398	0,146	279	477
	25	0,130	166	318	0,170	260	382
	32	0,130	194	249	0,180	322	298
High strength steel	m/min	Vc = 20			Vc = 25		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	6	0,018	57	1061	0,024	95	1326
	8	0,030	95	796	0,040	159	995
	10	0,040	102	637	0,056	178	796
	12	0,050	106	531	0,070	186	663
	14	0,064	116	455	0,100	227	568
	16	0,076	121	398	0,114	227	497
	18	0,086	122	354	0,130	230	442
	20	0,100	127	318	0,146	232	398
	25	0,130	132	255	0,170	216	318
	32	0,130	155	199	0,180	269	249
Stainless steel	m/min	Vc = 25			Vc = 30		
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	6	0,018	72	1326	0,024	115	1592
	8	0,030	119	995	0,040	191	1194
	10	0,040	127	796	0,056	214	955
	12	0,050	133	663	0,070	223	796
	14	0,064	146	568	0,100	273	682
	16	0,076	151	497	0,114	272	597
	18	0,086	152	442	0,130	276	531
	20	0,100	159	398	0,146	279	477
	25	0,130	166	318	0,170	260	382
	32	0,130	194	249	0,180	322	298

FA545S

MATERIAL	DIAMETER	 1 x D	 0,5 x D	MATERIAL	DIAMETER	 1 x D	 0,5 x D							
Steel <800 N/mm²	m/min	Vc = 45		Vc = 55		m/min	Vc = 20		Vc = 25					
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm				
	5	0,016	138	2865	0,020	210	3501	5	0,012	46	1273	0,016	76	1592
	6	0,020	143	2387	0,030	263	2918	6	0,018	57	1061	0,024	95	1326
	7	0,027	221	2046	0,037	370	2501	7	0,024	87	909	0,032	146	1137
	8	0,034	244	1790	0,044	385	2188	8	0,030	95	796	0,040	159	995
	9	0,039	248	1592	0,052	405	1945	9	0,035	99	707	0,048	170	884
	10	0,044	252	1432	0,060	420	1751	10	0,040	102	637	0,056	178	796
	11	0,050	260	1302	0,070	446	1592	11	0,045	104	579	0,063	182	723
	12	0,056	267	1194	0,080	467	1459	12	0,050	106	531	0,070	186	663
	13	0,063	278	1102	0,095	512	1347	13	0,057	112	490	0,085	208	612
	14	0,070	286	1023	0,110	550	1251	14	0,064	116	455	0,100	227	568
	15	0,077	294	955	0,118	551	1167	15	0,070	119	424	0,107	227	531
	16	0,084	301	895	0,126	551	1094	16	0,076	121	398	0,114	227	497
	17	0,090	303	843	0,133	548	1030	17	0,081	121	374	0,122	228	468
	18	0,096	306	796	0,140	545	973	18	0,086	122	354	0,130	230	442
	19	0,103	311	754	0,150	553	921	19	0,093	125	335	0,138	231	419
	20	0,110	315	716	0,160	560	875	20	0,100	127	318	0,146	232	398
	22	0,120	313	651	0,180	573	796	22	0,110	127	289	0,160	231	362
	25	0,140	321	573	0,180	504	700	25	0,130	132	255	0,170	216	318
	28	0,130	399	512	0,190	713	625	28	0,120	164	227	0,180	307	284
	30	0,136	390	477	0,190	665	584	30	0,126	160	212	0,180	286	265
	32	0,140	376	448	0,190	624	547	32	0,130	155	199	0,180	269	249
Steel <1000 N/mm² - Cast iron	m/min	Vc = 35		Vc = 40		m/min	Vc = 28		Vc = 35					
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	5	0,016	107	2228	0,020	153	2546	5	0,012	64	1783	0,016	107	2228
	6	0,020	111	1857	0,030	191	2122	6	0,018	80	1485	0,024	134	1857
	7	0,027	172	1592	0,037	269	1819	7	0,024	122	1273	0,032	204	1592
	8	0,034	189	1393	0,044	280	1592	8	0,030	134	1114	0,040	223	1393
	9	0,039	193	1238	0,052	294	1415	9	0,035	139	990	0,048	238	1238
	10	0,044	196	1114	0,060	306	1273	10	0,040	143	891	0,056	250	1114
	11	0,050	203	1013	0,070	324	1157	11	0,045	146	810	0,063	255	1013
	12	0,056	208	928	0,080	340	1061	12	0,050	149	743	0,070	260	928
	13	0,063	216	857	0,095	372	979	13	0,057	156	686	0,085	291	857
	14	0,070	223	796	0,110	400	909	14	0,064	163	637	0,100	318	796
	15	0,077	229	743	0,118	401	849	15	0,070	166	594	0,107	318	743
	16	0,084	234	696	0,126	401	796	16	0,076	169	557	0,114	318	696
	17	0,090	236	655	0,133	398	749	17	0,081	170	524	0,122	320	655
	18	0,096	238	619	0,140	396	707	18	0,086	170	495	0,130	322	619
	19	0,103	242	586	0,150	402	670	19	0,093	175	469	0,138	324	586
	20	0,110	245	557	0,160	407	637	20	0,100	178	446	0,146	325	557
	22	0,120	243	506	0,180	417	579	22	0,110	178	405	0,160	324	506
	25	0,140	250	446	0,180	367	509	25	0,130	185	357	0,170	303	446
	28	0,130	310	398	0,190	518	455	28	0,120	229	318	0,180	430	398
	30	0,136	303	371	0,190	484	424	30	0,126	225	297	0,180	401	371
	32	0,140	292	348	0,190	454	398	32	0,130	217	279	0,180	376	348
Steel <1300 N/mm²	m/min	Vc = 28		Vc = 35		m/min	Vc = 28		Vc = 35					
	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm	D mm	fz mm/z	F mm/min	N rpm	fz mm/z	F mm/min	N rpm
	5	0,012	64	1783	0,016	107	2228	5	0,012	64	1783	0,016	107	2228
	6	0,018	80	1485	0,024	134	1857	6	0,018	80	1485	0,024	134	1857
	7	0,024	122	1273	0,032	204	1592	7	0,024	122	1273	0,032	204	1592
	8	0,030	134	1114	0,040	223	1393	8	0,030	134	1114	0,040	223	1393
	9	0,035	139	990	0,048	238	1238	9	0,035	139	990	0,048	238	1238
	10	0,040	143	891	0,056	250	1114	10	0,040	143	891	0,056	250	1114
	11	0,045	146	810	0,063	255	1013	11	0,045	146	810	0,063	255	1013
	12	0,050	149	743	0,070	260	928	12	0,050	149	743	0,070	260	928
	13	0,057	156	686	0,085	291	857	13	0,057	156	686	0,085	291	857
	14	0,064	163	637	0,100	318	796	14	0,064	163	637	0,100	318	796
	15	0,070	166	594	0,107	318	743	15	0,070	166	594	0,107	318	743
	16	0,076	169	557	0,114	318	696	16	0,076	169	557	0,114	318	696
	17	0,081	170	524	0,122	320	655	17	0,081	170	524	0,122	320	655
	18	0,086	170	495	0,130	322	619	18	0,086	170	495	0,130	322	619
	19	0,093	175	469	0,138	324	586	19	0,093	175	469	0,138	324	586
	20	0,100	178	446	0,146	325	557	20	0,100	178	446	0,146	325	557
	22	0,110	178	405	0,160	324	506	22	0,110	178	405	0,160	324	506
	25	0,130	185	357	0,170	303	446	25	0,130	185	357	0,170	303	446
	28	0,120	229	318	0,180	430	398	28	0,120	229	318	0,180	430	398
	30	0,126	225	297	0,180	401	371	30	0,126	225	297	0,180	401	371
	32	0,130	217	279	0,180	376	348	32	0,130	217	279	0,180	376	348

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