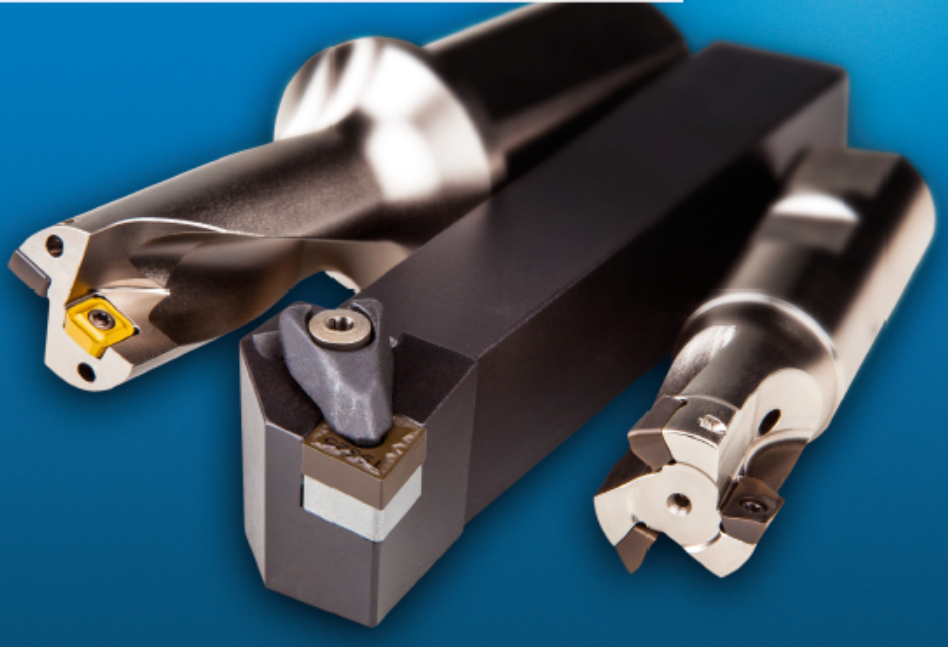
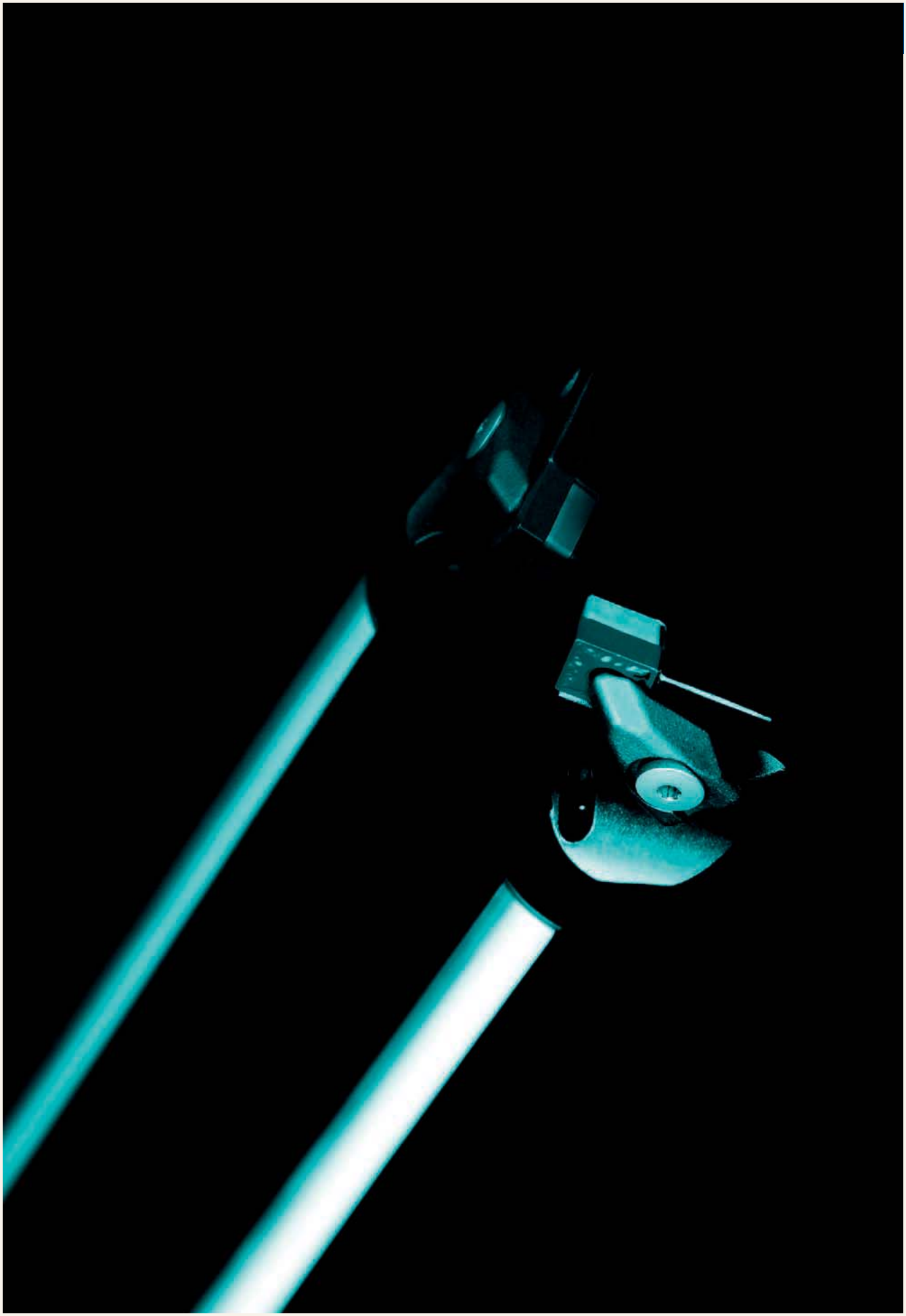
PRAMET

Catalog 2015



2015

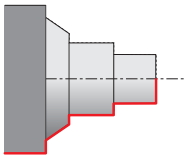
TURNING



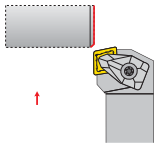
ALPHANUMERIC INDEX - TOOLHOLDERS

ALPHANUMERIC INDEX - INSERTS

TURNING - EXTERNAL
SHORT AND STABLE COMPONENTS (negatively clamped inserts)



DCKNR/L
75°

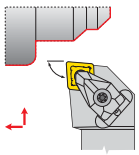


CN..
4

■ 1.000 x 1.000

T16 | T91 – T94

DCLNR/L
95°

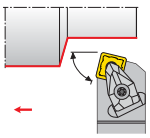


CN..
3
4
5
6
8

■ .625 x .625 / 1.500 x 1.500

T17 | T91 – T94

DCRNR/L
75°

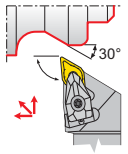


CN..
4
5
6

■ .750 x .750 / 1.500 x 1.500

T18 | T91 – T94

DDJNR/L
93°

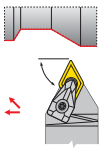


DN..
3
4

■ .750 x .750 / 1.250 x 1.250

T19 | T97 – T100

DDPNR/L
62°30´

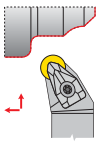


DN..
3
4

■ .750 x .750 / 1.000 x 1.000

T20 | T97 – T100

DRSNR/L

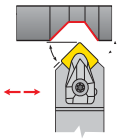


RN..
4

■ 1.000 x 1.000

T21 | T105

DSDNR/L
45°

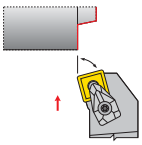


SN..
4
5
6
8

■ .750 x .750 / 1.500 x 1.500

T22 | T108 – T110

DSKNR/L
75°

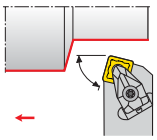


SN..
4
5

■ 1.000 x 1.000 / 1.250 x 1.250

T23 | T108 – T110

DSRNR/L
75°

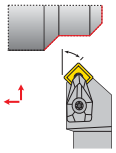


SN..
4
5
6
8

■ .750 x .750 / 1.500 x 1.500

T24 | T184 – T188

DSSNR/L
45°

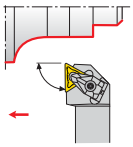


SN..
4
5
6

■ .750 x .750 / 1.500 x 1.500

T25 | T184 – T188

DTGNR/L
90°

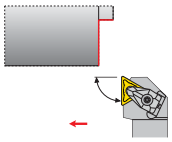


TN..
3
4
5

■ .750 x .750 / 1.500 x 1.500

T26 | T115 – T118

DTJNR/L
93°

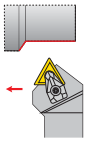


TN..
3
4

■ .750 x .750 / 1.250 x 1.250

T27 | T115 – T118

DTTNR/L
60°

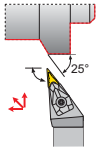


TN..
3
4

■ .750 x .750 / 1.000 x 1.000

T28 | T115 – T118

DVJNR/L
93°

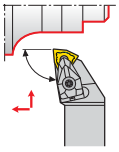


VN..
3

■ .750 x .750 / 1.250 x 1.250

T29 | T123

DWLNR/L
95°

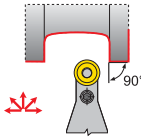


WN..
3
4

■ .625 x .625 / 1.250 x 1.250

T24 | T127 – T129

PRDCN



RC..
.630
.787
.984

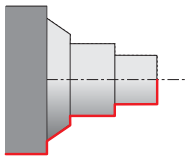
■ 1.260 x .984 / 1.575 x 1.575

35 | 101 - 104

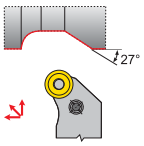
PRAMET

TURNING - EXTERNAL

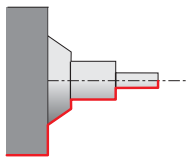
SHORT AND STABLE COMPONENTS (negatively clamped inserts)



PRSCR/L

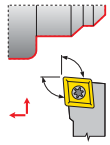
	RC..
	.630 .787 .984
1.260 x .984 1.575 x 1.575	
T36	T101 - T104

TURNING - EXTERNAL
LONG AND UNSTABLE (Positively clamped inserts)



SCLCR/L
95°

CC..
2
3
4

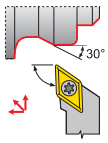


.375 x .375
1.000 x 1.000

T37 | T88 – T90

SDJCR/L
93°

DC..
2
3

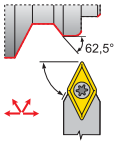


.375 x .375
1.000 x 1.000

T38 | T95 – T97

SDPCN
62°30´

DC..
2
3

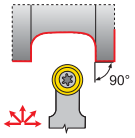


.375 x .375
1.000 x 1.000

T39 | T95 – T97

SRDCN

RC..
.236
.315
.394
.472
.630

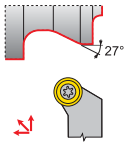


.472 x .472
1.260 x 984

T40 | T101 - T104

SRSCR/L

RC..
.236
.315
.394
.472
.630

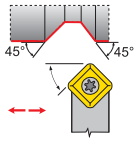


.630 x .630
1.260 x .984

T41 | T101 - T104

SSDCN
45°

SC..
3

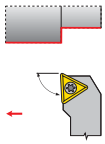


.500 x .500
.625 x .625

T42 | T105 – T107

STGCR/L
93°

TC..
2
3

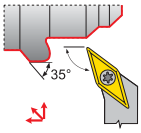


.500 x .500
1.000 x 1.000

T43 | T112 – T114

SVHBR/L
107°30´

VB, VC..
3

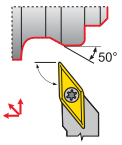


.750 x .750
1.000 x 1.000

T44 | T119 – T122

SVJBR/L
93°

VB, VC..
2
3

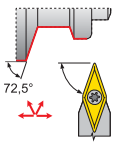


.625 x .625
1.250 x .1.250

T45 | T119 – T122

SVVBN
72°30´

VB, VC..
2
3

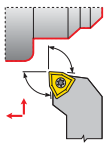


.500 x .500
1.250 x 1.250

T46 | T119 – T122

SWLCR/L
95°

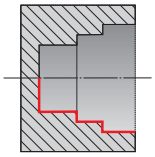
WC..
3
4



.750 x .750
1.000 x 1.000

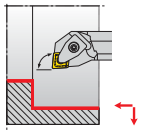
T47 | T124 – T125

TURNING - INTERNAL
SHORT AND STABLE COMPONENTS (negatively clamped inserts)



DCLNR/L

95°



CN..

3
4
5

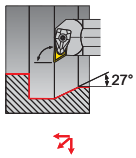
.750 – 1.500

T31

T91 – T94

DDUNR/L

93°



DN..

3
4

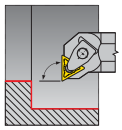
1.000 – 1.500

T32

T97 – T100

DTFNR/L

90°



TN..

3
4

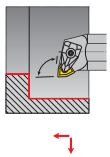
1.000 – 1.500

T33

T115 – T118

DWLNR/L

95°



WN..

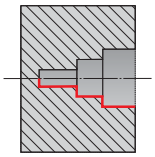
4

1.000 – 1.500

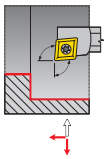
T34

T126 – T129

TURNING - INTERNAL
LONG AND UNSTABLE (positively clamped inserts)



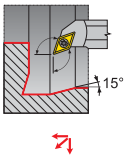
SCLCR/L
95°



ØDmin	CC..
.375 – 1.250	2 3 4

T48 | T88 – T90

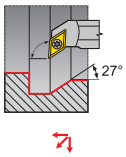
SDQCR/L
107°30´



ØDmin	DC..
.375 – 1.000	2 3

T49 | T95 –T97

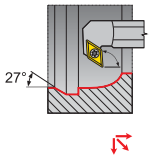
SDUCR/L(-E)
93°



ØDmin	DC..
.375 – 1.250	2 3

T50 | T95 – T97

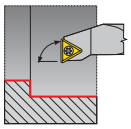
SDZCR/L
93°



ØDmin	DC..
.375 – 1.250	3

T52 | T95 – T97

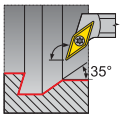
STFCR/L(-E)
90°



ØDmin	DC..
.500 – 1.000	2 3

T53 | T95 – T97

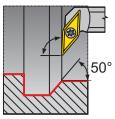
SVQBR/L
107°30´



ØDmin	VB, VC..
1.000 – 1.500	3

T54 | T119 – T122

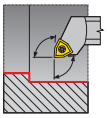
SVUBR/L
93°



ØDmin	VB, VC..
.625 – 1.500	2 3

T55 | T119 – T122

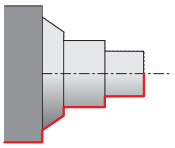
SWLCR/L
95°



ØDmin	WC..
.750	3

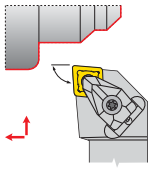
T56 | T124 – T125

TURNING - HEAVY ROUGHING - EXTERNAL
FIXED TOOL HOLDERS



DCLNR/L

95°



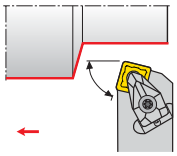
CN..
8

1.500x1.500

T17 | T91 – T94

DSRNR/L

75°

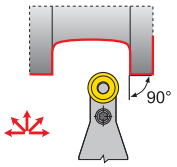


SN..
8

1.500x1.500

T21 | T108 – T110

PRDCN



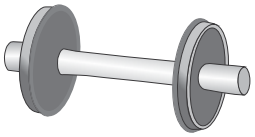
RC..
.787 .984

1.260 x 1.260 1.575 x 1.575

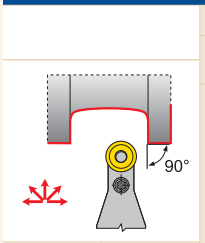
T35 | T101 - T104

TURNING - HEAVY ROUGHING - EXTERNAL

RAILWAY WHEEL MACHINING



PRDCN

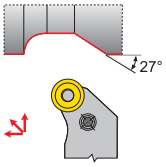


RC..
.787
.984

1.260 x 1.260
1.575 x 1.575

T35 | T101 - T104

PRSCR/L

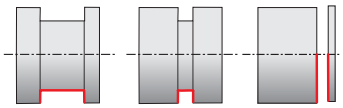


RC..
.787
.984

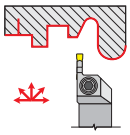
1.260 x 1.260
1.575 x 1.575

T36 | T101 - T104

PARTING OFF AND GROOVING - EXTERNAL



GFKR/L

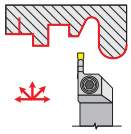


LCMF
.079

■ .625 x .625 – 1.000 x 1.000

T60 | T140

GFIR/L

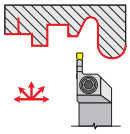


LCMF, LCMR
.118
.157
.197
.236
.315

■ .625 x .625 – 1.250 x 1.000

T61 | T137 – T142

GFMR/L

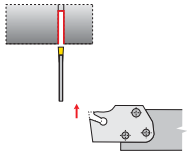


LCMF, LCMR
.118
.157
.197
.236
.315

■ .750 x .750 – 1.250 x 1.000

T62 | T137 – T142

XLCCN + MS-EN

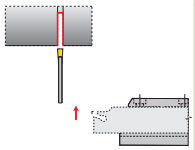


LCMF, LCMR
.118
.157
.197
.236

■ .500 x .500 – 1.250 x 1.000

T73, T72 | T137 – T142

XLCCN + DU

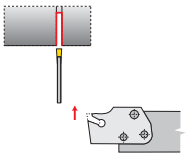


LCMF, LCMR
.118
.157
.197
.236
.315

■ .750 x .750 – 1.500 x 1.500

T73, T78 | T137 – T142

XLCFN/R/L + MS-EN

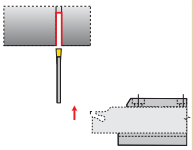


LFMX
.059
.063
.079
.087
.122
.161
.201
.250

■ .500 x .500 – 1.250 x 1.000

T75, T78 | T143

XLCFN + DU

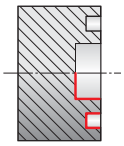


LFMX
.059
.063
.079
.087
.122
.161
.201
.250

■ .750 x .750 – 1.500 x 1.500

T75, T78 | T143

FACE GROOVING

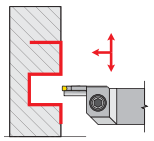


GFIL-L

90°

LCMF, LCMR

.118



min Ø / max Ø

.670 x 1.180
4.330 x 6.690

T68

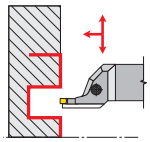
T137 – T142

GFIR-L

90°

LCMF, LCMR

.118
.157



min Ø / max Ø

.670 x 1.180
5.510 x 9.060

T63

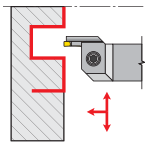
T137 – T142

GFIL-R

90°

LCMF, LCMR

.118
.157



min Ø / max Ø

.670 x 1.180
5.510 x 9.060

T65

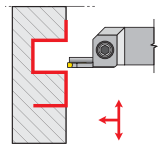
T137 – T142

GFIR-R

90°

LCMF, LCMR

.118



min Ø / max Ø

.670 x 1.180
4.330 x 6.690

T67

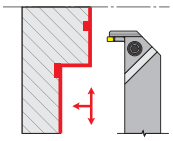
T137 – T142

GGIR/L

90°

LCMF, LCMR

.118



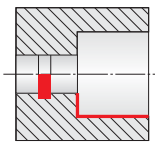
min Ø / max Ø

.670 x 1.180
4.330 x 6.690

T69

T137 – T142

GROOVING - INTERNAL

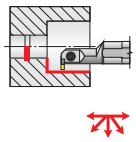


GG.R/L

0°

LCMF, LCMR

.118
.157



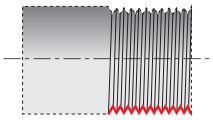
ØDmin

.630
1.260

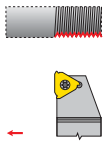
T71

T137 – T142

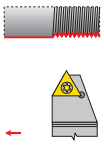
THREAD TURNING - EXTERNAL



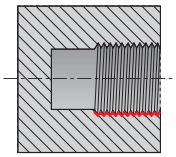
SER/L

	TN..
	3/8 1/2
.750 x .750 1.250 x 1.000	
T80	T144 – T147

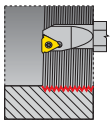
SER/L-S

	TN..
	1/2
1.000 x 1.000 1.250 x 1.000	
T81	T144 – T147

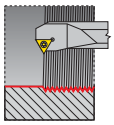
THREAD TURNING - INTERNAL



SIR/L

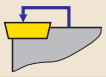
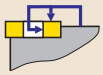
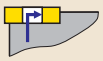
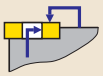
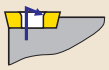
	TN..
	1/4 3/8 1/2
ØDmin .500 1.750	
T82	T144 – T147

SIR/L-S

	TN..
	1/2
ØDmin 1.550 1.800	
T83	T144 – T147

CODE DESIGNATION - EXTERNAL TURNING TOOLS

1 Clamping Designation

C	
D	
P	
M	
S	
X	
G	

2 Insert shape

S	C 80°
T	D 55°
R	K 55°
W 80°	V 35°
L	X Special

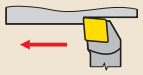
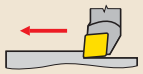
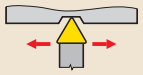
3 Tool style - cutting edge angle

A 90°	B 75°	C 90°	D 45°	D
E 60°	F 90°	G 90°	H 107°30´	J 93°
K 75°	L 95°	M 50°	N 62°30´	P 62°30´
Q 107°30´	R 75°	S 45°	S	T 60°
U 93°	V 72°30´	W 60°	X Special	Y 85°
Z κ				

4 Clearance angle

N	C	P
α_n=0°	α_n=7°	α_n=11°

5 Direction of cut

R	
L	
N	

ISO CODE

1	2	3	4	5		6	7	8	9		10
P	C	L	N	R	-	32	25	L	12	-	S

ANSI CODE

1	2	3	4	5		6 & 7	9	8
D	C	L	N	R	-	16	4	D

6 Shank height [mm]

08	10	12	16	20	25
32	38	40	45	50	60

7 Shank width [mm]

08	10	12	16	20	25
32	38	40	45	50	60

6&7

	b [in]	h [in]		b [in]	h [in]		b [in]	h [in]
05	5/16	5/16	12	3/4	3/4	20	1 1/4	1 1/4
06	3/8	3/8	16	1	1	24	1 1/2	1 1/2
08	1/2	1/2	85	1	1 1/4	32	2	2
10	5/8	5/8	86	1	1 1/2			

For square shanks, this is the number of 16ths of an inch of width and height. For rectangular shanks, the first digit is the number of 8ths of an inch of width, and the second digit is the number of 4ths of an inch of height.

10 Manufacturer's Designation [mm]

M	Clamping system "S" with shim
S	With adjusting screws

8 Total length

	l_1 [in]
A	4.000
B	4.500
C	5.000
D	6.000
E	7.000
F	8.000
M	4.000
N	4.500
R	6.000
S	7.000
T	8.000

	l_1 [mm]
D	60
E	70
F	80
H	100
J	110
K	125
L	140
M	150
N	160
P	170
Q	180
R	200
S	250
T	300
U	350
V	400
W	450
X	Spec.
Y	500

9 Cutting edge length

d = I.C. [mm]	d = I.C. [in]	Symbol	S	C	E	D	V	K	W	T	R
3,97	5/32	1.2					07				
6,00											06
6,35	1/4	2		06		07	11			11	
7,94	5/16	2.5		08	08		13				
8,00										08	
9,525	3/8	3	09	09		11	16	19	06	16	
10,00											10
12,00											12
12,70	1/2	4	12	12		15			08	22	12
15,875	5/8	5	15	16						27	15
16,00											16
19,05	3/4	6	19	19							19
20,00											20
25,00											25
25,40	1	8	25	25							25
38,10	1 1/4	10	38								

PRAMET

CODE DESIGNATION - INTERNAL TURNING TOOLS

1

Shank	
S	Steel shank
A	Steel shank with coolant hole
E	Tungsten carbide shank with steel head and internal coolant supply

2

	d [mm]		d [mm]
08	8	25	25
10	10	32	32
12	12	40	40
16	16	50	50
20	20	60	60

2

	d [in]		d [in]		d [in]
03	.1875	10	.625	28	1.750
04	.250	12	.750	32	2.000
05	.3125	16	1.000	36	2.250
06	.375	20	1.250	40	2.500
08	.500	24	1.500		

	1	2	3		4	5	6	7	8	9		10
ISO CODE	A	25	T	-	P	C	L	N	L	12	-	X

	1	2	3		4	5	6	7	8	9
ANSI CODE	A	16	T	-	D	C	L	N	L	4

3

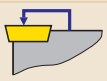
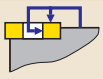
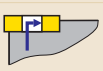
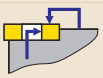
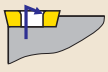
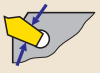
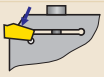
Total length

	l_1 [in]
F	3.250
H	4.000
K	5.000
M	6.000
P	6.250
Q	7.250
R	8.000
S	10.000
T	12.000
U	14.000
V	15.750
W	17.750
Y	20.000
X	Spec.

	l_1 [mm]
D	60
E	70
F	80
H	100
J	110
K	125
L	140
M	150
N	160
P	170
Q	180
R	200
S	250
T	300
U	350
V	400
W	450
X	Spec.
Y	500

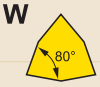
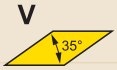
4

Clamping Designation

C	
D	
P	
M	
S	
X	
G	

5

Insert shape

S	C 
T	D 
R	K 
W	 V 
L	X

6

Tool style - cutting edge angle

A 90°	B 75°	C 90°	D 45°	D
E 60°	F 90°	G 90°	H 107°30´	J 93°
K 75°	L 95°	M 50°	N 62°30´	P 117°30´
Q 107°30´	R 75°	S 45°	S	T 60°
U 93°	V 72°30´	W 60°	X Special	Y 85°
Z κ				

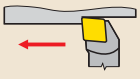
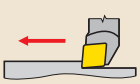
7

Clearance angle

N	C	P
α_n=0°	α_n=7°	α_n=11°

8

Direction of cut

R	
L	

9

Cutting edge length

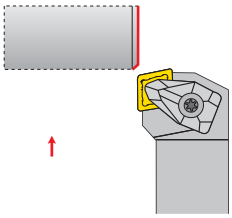
d = I.C. [mm]	d = I.C. [in]	Symbol	S	C	E	D	V	K	W	T	R
3,97	5/32	1.2					07		02	06	
5,56					05					09	
6,00											06
6,35	1/4	2		06	06	07	11			11	
7,94	5/16	2.5		08	08		13				
8,00											08
9,525	3/8	3	09	09		11	16	19	06	16	
10,00											10
12,00											12
12,70	1/2	4	12	12		15			08	22	12
15,875	5/8	5	15	16						27	15
16,00											16
19,05	3/4	6	19	19							19
20,00											20
25,00	1	8									25
25,40	1 1/4	10	25	25							25

10

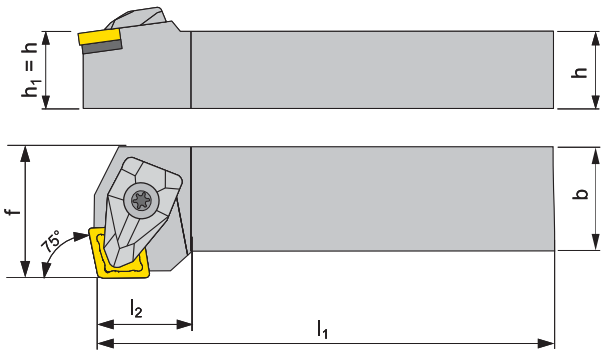
Manufacturer's Designation

X	Special shank style
.	
.	
87	
90	Z - style tool setting angle
93	
.	
.	

DCKNR/L



T91 - T94, T131



γ_o° - Rake Angle
λ_s° - Angle of Inclination

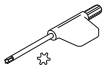
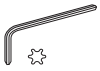
TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λ_s°	γ_o°			
DCKNR/L 16 4D	● / ●	1.000	1.000	1.250	6.000	1.300				-6	-6	1.54	DC12	CN.. 43.

All dimensions [in]

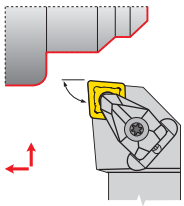
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

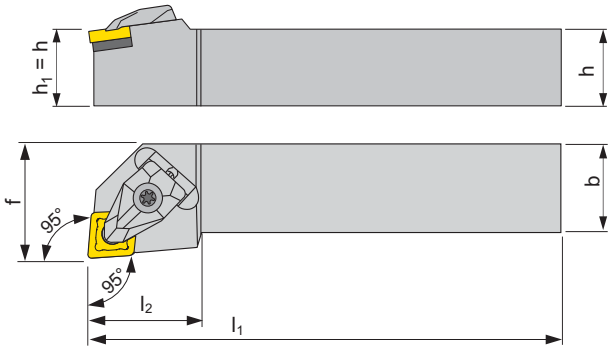
Type	Complete clamp set*	Shim	Shim screw	Key	Key	
						
DC12	DCS 12	DCS 234-01	US 2002-T15P	FLAG T15P/3,5	-	

● stocked as standard /○ not stocked as standard
See price list for current availability.

DCLNR/L



T91 - T94, T131



γ_o° - Rake Angle
λ_s° - Angle of Inclination

TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λs°	γo°			
DCLNR/L 10 3A	● / ●	.625	.625	.875	4.000	.980				-6	-6	.45	DC09	CN.. 32.
DCLNR/L 12 3C	● / ●	.750	.750	1.000	5.000	.980				-6	-6	1.05	DC09	CN.. 32.
DCLNR/L 12 4B	● / ●	.750	.750	1.000	4.500	1.260				-6	-6	.88	DC12	CN.. 43.
DCLNR/L 16 4D	● / ●	1.000	1.000	1.250	6.000	1.260				-6	-6	1.54	DC12	CN.. 43.
DCLNR/L 85 4D	● / ●	1.250	1.000	1.500	6.000	1.260				-6	-6	4.70	DC12	CN.. 43.
DCLNR/L 85 5D	● / ●	1.250	1.000	1.500	6.000	1.540				-6	-6	4.70	DC16	CN.. 54.
DCLNR/L 20 6D	● / ●	1.250	1.250	1.500	6.000	1.700				-6	-6	2.76	DC19	CN.. 64.
DCLNR/L 24 6D	● / ●	1.500	1.500	2.000	6.000	1.700				-6	-6	4.95	DC19	CN.. 64.
DCLNR/L 24 8E	● / ●	1.500	1.500	2.000	7.000	2.090				-6	-6	6.18	DC25	CN.. 86.

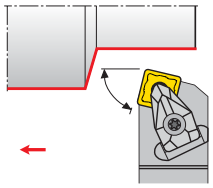
All dimensions [in]

SPARE PARTS

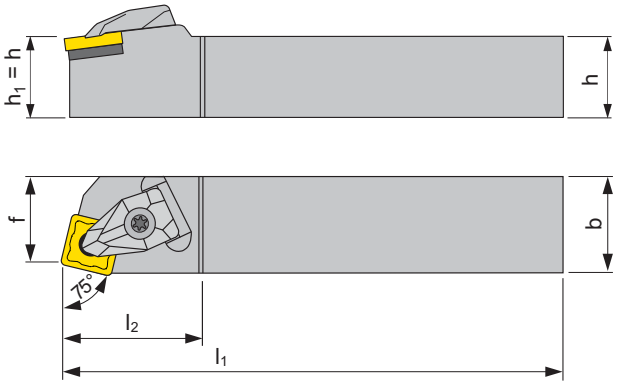
*) See pages T254-T255 for recommended screw torques

Type	Complete clamp set*	Shim	Shim screw	Key	Key	
DC09	DCS 09	DCS 236-04	US 2004-T09P	FLAG T09P	-	
DC12	DCS 12	DCS 234-01	US 2002-T15P	FLAG T15P/3,5	-	
DC16	DCS 16	DCS 234-03	US 2007-T20P	-	LK T20P	
DC19	DCS 19	DCS 236-01	US 2007-T20P	-	LK T20P	
DC25	DCS 25	DCS 234-05	US 2008-T25P	-	LK T25P	

DCRNR/L



T91 - T94, T131



γ_o° - Rake Angle
λ_s° - Angle of Inclination

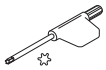
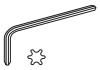
TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λs°	γo°			
DCRNR/L 12 4B	● / ●	.750	.750	.855	4.500	1.350				-6	-6	.88	DC12	CN.. 43.
DCRNR/L 16 4D	● / ●	1.000	1.000	1.048	6.000	1.350				-6	-6	1.54	DC12	CN.. 43.
DCRNR/L 20 4D	● / ●	1.250	1.250	1.292	6.000	1.350				-6	-6	2.76	DC12	CN.. 43.
DCRNR/L 20 5D	● / ●	1.250	1.250	1.291	6.000	1.640				-6	-6	2.76	DC16	CN.. 54.
DCRNR/L 20 6D	● / ●	1.250	1.250	1.291	6.000	1.820				-6	-6	2.76	DC19	CN.. 64.
DCRNR/L 24 6D	● / ●	1.500	1.500	1.697	6.000	1.820				-6	-6	4.95	DC19	CN.. 64.

All dimensions [in]

SPARE PARTS

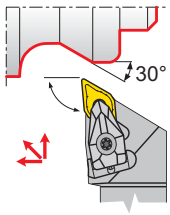
*) See pages T254-T255 for recommended screw torques

Type	Complete clamp set*	Shim	Shim screw	Key	Key	
						
DC12	DCS 12	DCS 234-01	SS 2002-T15P	FLAG T15P/3,5	-	
DC16	DCS 16	DCS 234-03	SS 2007-T20P	FLAG T20P	-	
DC19	DCS 19	DCS 236-01	SS 2007-T20P	-	LK T20P	

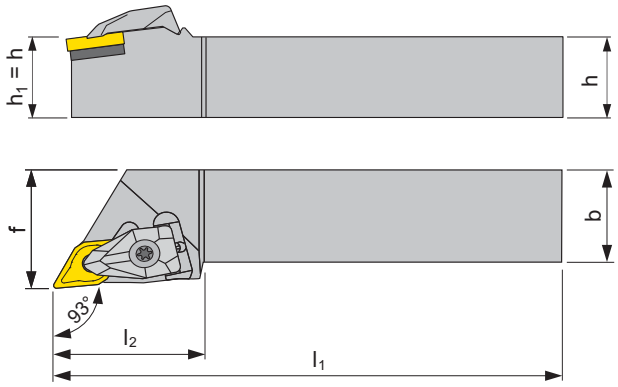
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

DDJNR/L



T97 -T100



γ_o° - Rake Angle
λ_s° - Angle of Inclination

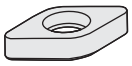
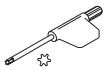
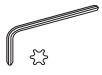
TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λs°	γo°			
DDJNR/L 12 3C	● / ●	.750	.750	1.000	5.000	1.190				-6	-6	1.05	DD11	DN.. 33.
DDJNR/L 16 3D	● / ●	1.000	1.000	1.250	6.000	1.190				-6	-6	1.54	DD11	DN.. 33.
DDJNR/L 12 4B	● / ●	.750	.750	1.000	4.500	1.450				-6	-6	.88	DD1506	DN.. 43.
DDJNR/L 16 4D	● / ●	1.000	1.000	1.250	6.000	1.550				-6	-6	1.54	DD1506	DN.. 43.
DDJNR/L 20 4D	● / ●	1.250	1.250	1.500	6.000	1.550				-6	-6	2.76	DD1506	DN.. 43.

All dimensions [in]

SPARE PARTS

*) See pages T254-T255 for recommended screw torques

Type	Complete clamp set*	Shim	Shim screw	Key	Key	
						
DD11	DCS 09	DDS 267-01	US 2004-T09P	FLAG T09P	-	
DD1506	DCS 12	DDS 266-01	US 2002-T15P	FLAG T15P/3,5	-	

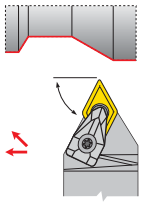
OPTIONALE SPARE PARTS

Insert	Shim
DN.. 44.	DDS 266-02

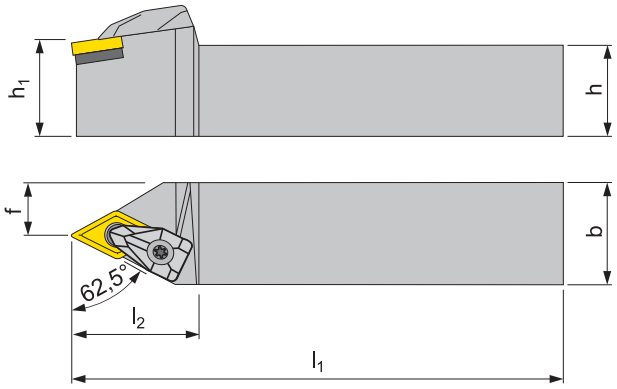
PRAMET

● stocked as standard / ○ not stocked as standard
See price list for current availability.

DDPNR/L



T97 -T100



γ_o° - Rake Angle
λ_s° - Angle of Inclination

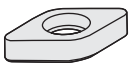
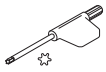
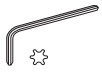
TOOLS FOR EXTERNAL TURNING

Designation	Assortment	Dimensions										[lbs]	Spare parts	Inserts
		h=h_1	b	f	l_1	l_2				λ_s°	γ_o°			
DDPNN 12 3B	●	.750	.750	.375	4.500	1.230				-9	-5	.88	DD11	DN.. 33.
DDPNN 16 4D	●	1.000	1.000	.500	6.000	1.610				-9	-5	1.54	DD1506	DN.. 43.

All dimensions [in]

SPARE PARTS

*) See pages T254-T255 for recommended screw torques

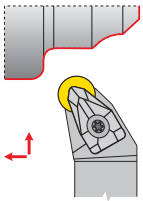
Type	Complete clamp set*	Shim	Shim screw	Key	Key	
						
DD11	DCS 09	DDS 267-01	US 2004-T09P	FLAG T09P	-	
DD1506	DCS 12	DDS 266-01	US 2002-T15P	FLAG T15P/3,5	-	

OPTIONALE SPARE PARTS

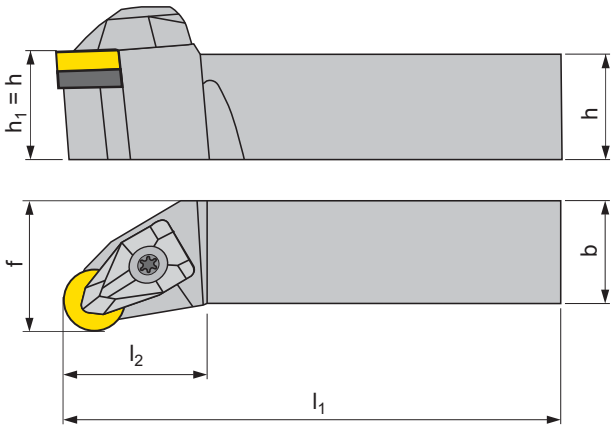
Insert	Shim
DN.. 44.	DDS 266-02

● stocked as standard /○ not stocked as standard
See price list for current availability.

DRSNR/L



T105



γ_o° - Rake Angle
λ_s° - Angle of Inclination

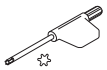
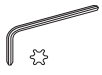
TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λ_s°	γ_o°			
DRSNR/L 16 4D	● / ●	1.000	1.000	1.250	6.000	1.244				-6	-6	1.54	DR12	RN.. 43

All dimensions [in]

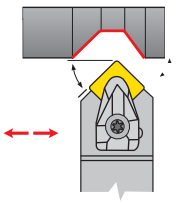
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

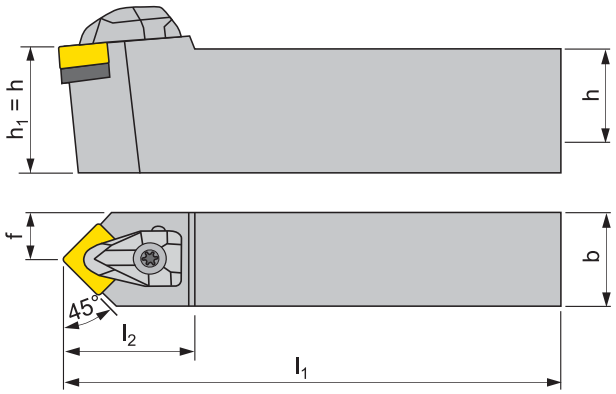
Type	Complete clamp set*	Shim	Shim screw	Key	Key	
						
DR12	DCS 12	DRS 155-02	US 2002-T15P	FLAG T15P/3,5	-	

● stocked as standard / ○ not stocked as standard
See price list for current availability.

DSDNR/L



T108 -T110



γ_o° - Rake Angle
λ_s° - Angle of Inclination

TOOLS FOR EXTERNAL TURNING

Designation	Assortment	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λs°	γo°			
DSDNN 12 4B	●	.750	.750	.386	4.500	1.450				-6	-6	.88	DS12	SN.. 43.
DSDNN 16 4D	●	1.000	1.000	.512	6.000	1.450				-6	-6	1.54	DS12	SN.. 43.
DSDNN 20 5D	●	1.250	1.250	.646	6.000	1.760				-6	-6	2.76	DS15	SN.. 54.
DSDNN 20 6D	●	1.250	1.250	.646	6.000	1.970				-6	-6	2.76	DS19	SN.. 64.
DSDNN 24 8D	●	1.500	1.500	.791	6.000	2.260				-6	-6	4.95	DS25	SN.. 85.

All dimensions [in]

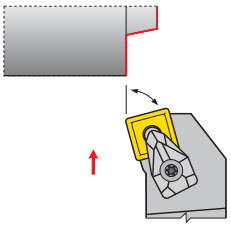
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

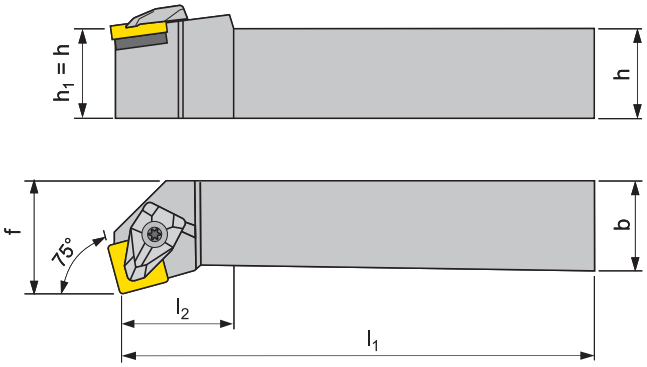
Type	Complete clamp set*	Shim	Shim screw	Key	Key	
DS12	DCS 12	DSS 425-01	US 2002-T15P	FLAG T15P/3,5	-	
DS15	DCS 16	DSS 425-03	US 2007-T20P	-	LK T20P	
DS19	DCS 19	DSS 425-04	US 2007-T20P	-	LK T20P	
DS25	DCS 25	DSS 425-07	US 2008-T25P	-	LK T25P	

● stocked as standard /○ not stocked as standard
See price list for current availability.

DSKNR/L



T108 -T110



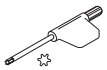
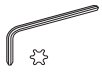
γ_o° - Rake Angle
λ_s° - Angle of Inclination

Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λ_s°	γ_o°			
DSKNR/L 16 4D	● / ●	1.000	1.000	1.250	6.000	.930				-6	-6	1.54	DS12	SN.. 43.
DSKNR/L 20 5D	● / ●	1.250	1.250	1.500	6.000	1.140				-6	-6	2.76	DS16	SN.. 54.

All dimensions [in]

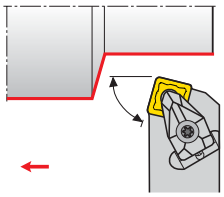
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

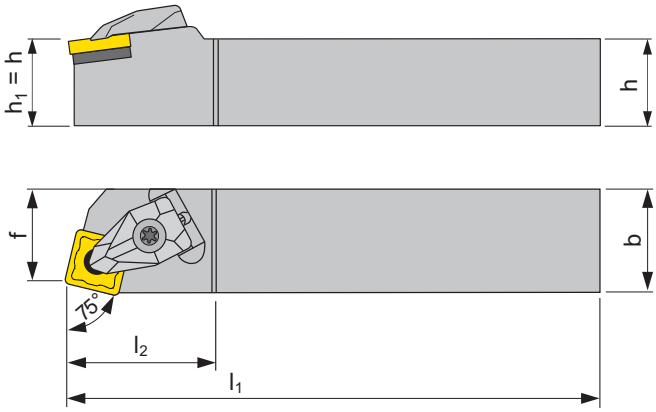
Type	Complete clamp set*	Shim	Shim screw	Key	Key	
						
DS12	DCS 12	DSS 425-01	US 2002-T15P	FLAG T15P/3,5	-	
DS16	DCS 16	DSS 425-03	US 2007-T20P	-	LK T20P	

● stocked as standard / ○ not stocked as standard
See price list for current availability.

DSRNR/L



T108 -110



γ_o° - Rake Angle
λ_s° - Angle of Inclination

TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λs°	γo°			
DSRNR/L 12 4B	● / ●	.750	.750	.855	4.500	1.350				-6	-6	.88	DS12	SN.. 43.
DSRNR/L 16 4D	● / ●	1.000	1.000	1.048	6.000	1.350				-6	-6	1.54	DS12	SN.. 43.
DSRNR/L 20 5D	● / ●	1.250	1.250	1.291	6.000	1.640				-6	-6	2.76	DS15	SN.. 54.
DSRNR/L 20 6D	● / ●	1.250	1.250	1.292	6.000	1.830				-6	-6	2.76	DS19	SN.. 64.
DSRNR/L 24 6D	● / ●	1.500	1.500	1.697	6.000	1.830				-6	-6	4.95	DS19	SN.. 64.
DSRNR/L 24 8E	● / ●	1.500	1.500	1.697	7.000	2.220				-6	-6	6.18	DS25	SN.. 85.

All dimensions [in]

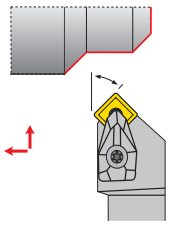
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

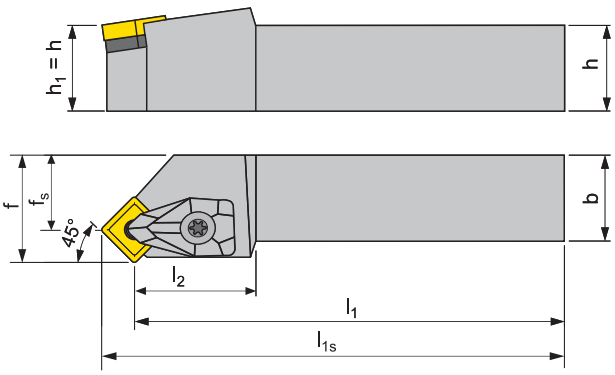
Type	Complete clamp set*	Shim	Shim screw	Key	Key	
DS12	DCS 12	DSS 425-01	US 2002-T15P	FLAG T15P/3,5	-	
DS15	DCS 16	DSS 425-03	US 2007-T20P	-	LK T20P	
DS19	DCS 19	DSS 425-04	US 2007-T20P	-	LK T20P	
DS25	DCS 25	DSS 425-07	US 2008-T25P	-	LK T25P	

● stocked as standard /○ not stocked as standard
See price list for current availability.

DSSNR/L



T108 -110



γ_o° - Rake Angle
λ_s° - Angle of Inclination

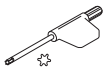
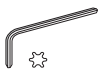
TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	fs	l1	l1s	l2		λs°	γo°			
DSSNR/L 12 4B	● / ●	.750	.750	1.000	.740	4.500	4.880	1.130		0	-8	.88	DS12	SN.. 43.
DSSNR/L 16 4D	● / ●	1.000	1.000	1.250	.925	6.000	6.327	1.172		0	-8	1.54	DS12	SN.. 43.
DSSNR/L 20 5D	● / ●	1.250	1.250	1.500	1.098	6.000	6.413	1.303		0	-8	2.76	DS15	SN.. 54.
DSSNR/L 20 6D	● / ●	1.250	1.250	1.500	1.008	6.000	6.492	1.413		0	-8	2.76	DS19	SN.. 64.
DSSNR/L 24 6E	● / ●	1.500	1.500	2.000	1.508	7.000	7.492	1.484		0	-8	6.18	DS19	SN.. 64.

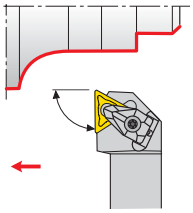
All dimensions [in]

SPARE PARTS

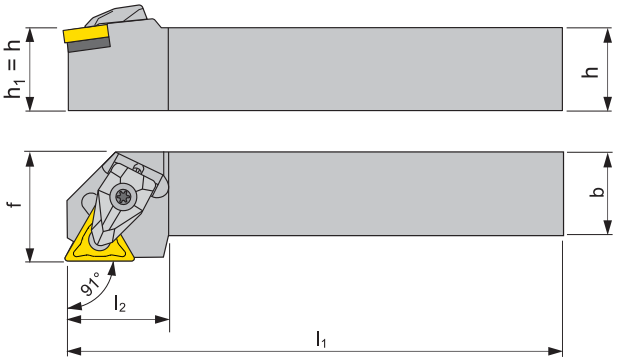
*) See pages T254-T255 for recommended screw torques

Type	Complete clamp set*	Shim	Shim screw	Key	Key	
						
DS12	DCS 12	DSS 425-01	US 2002-T15P	FLAG T15P/3,5	-	
DS15	DCS 16	DSS 425-03	US 2007-T20P	-	LK T20P	
DS19	DCS 19	DSS 425-04	US 2007-T20P	-	LK T20P	

DTGNR/L



T115 - T118, T133



γ_o° - Rake Angle
λ_s° - Angle of Inclination

TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λ_s°	γ_o°			
DTGNR/L 12 3B	● / ●	.750	.750	1.000	4.500	.970				-6	-6	.88	DT16	TN.. 33.
DTGNR/L 16 3D	● / ●	1.000	1.000	1.250	6.000	.970				-6	-6	1.54	DT16	TN.. 33.
DTGNR/L 16 4D	● / ●	1.000	1.000	1.250	6.000	1.260				-6	-6	1.54	DT22	TN.. 43.
DTGNR/L 20 4D	● / ●	1.250	1.250	1.500	6.000	1.310				-6	-6	2.76	DT22	TN.. 43.
DTGNR/L 24 5D	● / ●	1.500	1.500	2.000	6.000	1.550				-6	-6	4.95	DT27	TN.. 54.

All dimensions [in]

SPARE PARTS

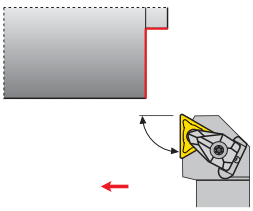
*) See pages T254-T255 for recommended screw torques

Type	Complete clamp set*	Shim	Shim screw	Key	Key	
DT16	DCS 09	DTS 315-02	US 2004-T09P	FLAG T09P	-	
DT22	DCS 12	DTS 315-04	US 2002-T15P	FLAG T15P/3,5	-	
DT27	DCS 16	DTS 315-05	US 2007-T20P	-	LK T20P	

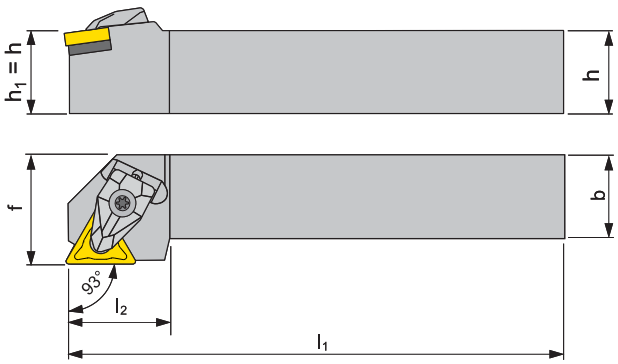
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

DTJNR/L



T115 - T118, T133



γ_o° - Rake Angle
λ_s° - Angle of Inclination

TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λ_s°	γ_o°			
DTJNR/L 12 3B	● / ●	.750	.750	1.000	4.500	.953				-6	-6	.88	DT16	TN.. 33.
DTJNR/L 16 3D	● / ●	1.000	1.000	1.250	6.000	.980				-6	-6	1.54	DT16	TN.. 33.
DTJNR/L 20 4D	● / ●	1.250	1.250	1.500	6.000	1.283				-6	-6	2.76	DT22	TN.. 43.

All dimensions [in]

SPARE PARTS

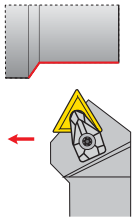
*) See pages T254-T255 for recommended screw torques

Type	Complete clamp set*	Shim	Shim screw	Key	Key	
DT16	DCS 09	DTS 315-02	US 2004-T09P	FLAG T09P	-	
DT22	DCS 12	DTS 315-04	US 2002-T15P	FLAG T15P/3,5	-	

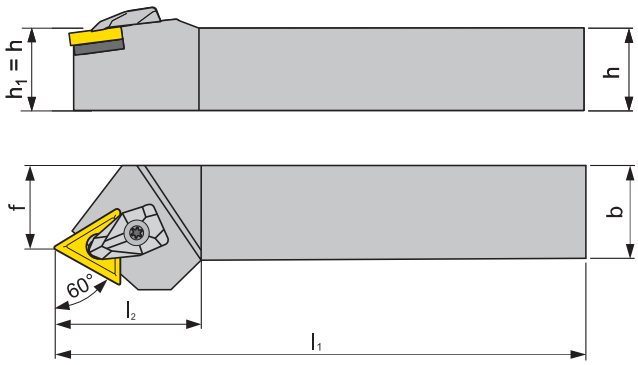
PRAMET

● stocked as standard / ○ not stocked as standard
See price list for current availability.

DTTNR/L



T115 - T118, T133



γ_o° - Rake Angle
λ_s° - Angle of Inclination

TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions h=h1	b	f	l1	l2				λs°	γo°	[lbs]	Spare parts	Inserts
DTTNR/L 12 3B	● / ●	.750	.750	.598	4.500	1.190				-6	-6	.88	DT16	TN.. 33.
DTTNR/L 16 4D	● / ●	1.000	1.000	.791	6.000	1.560				-6	-6	1.54	DT22	TN.. 43.

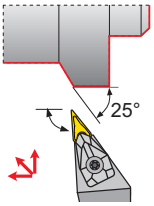
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

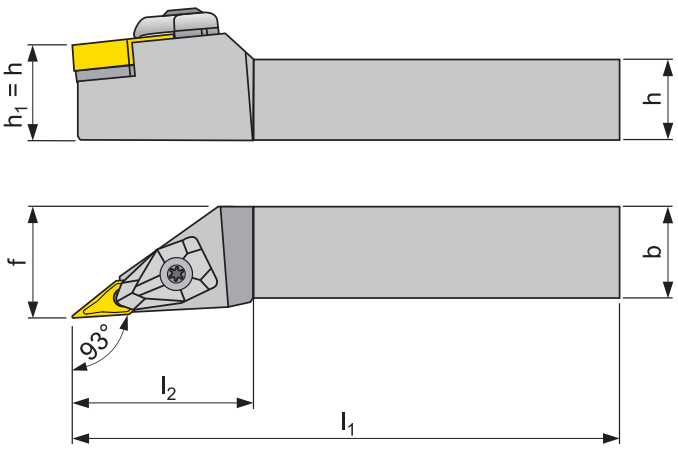
Type	Complete clamp set*	Shim	Shim screw	Key	Key	
DT16	DCS 09	DTS 315-02	US 2004-T09P	FLAG T09P	-	
DT22	DCS 12	DTS 315-04	US 2002-T15P	FLAG T15P/3,5	-	

● stocked as standard /○ not stocked as standard
See price list for current availability.

DVJNR/L



T123, T134



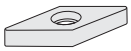
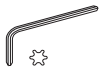
γ_o° - Rake Angle
λ_s° - Angle of Inclination

TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λs°	γo°			
DVJNR/L 12 3B	● / ●	.750	.750	1.000	4.500	1.830				-13	-4	.88	DV16	VN.. 33.
DVJNR/L 16 3D	● / ●	1.000	1.000	1.250	6.000	1.830				-13	-4	1.54	DV16	VN.. 33.
DVJNR/L 20 3D	● / ●	1.250	1.250	1.500	6.000	1.830				-13	-4	2.76	DV16	VN.. 33.

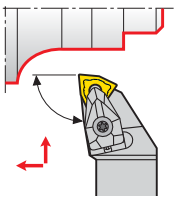
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

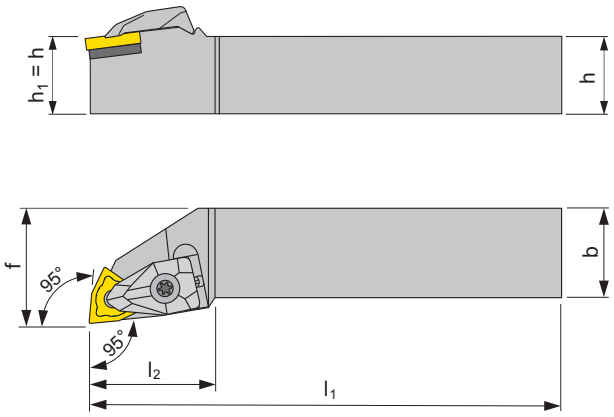
Type	Complete clamp set*	Shim	Shim screw	Key	Key	
						
DV16	DCS 16V	DVS 269-01	US 2009-T15P	FLAG T15P/3,5	-	

● stocked as standard / ○ not stocked as standard
See price list for current availability.

DWLNR/L



T126 - T129, T135



γ_o° - Rake Angle
λ_s° - Angle of Inclination

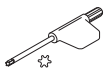
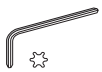
TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λ_s°	γ_o°			
DWLNR/L 10 3B	● / ●	.625	.625	.875	4.500	1.070				-6	-6	.60	DW06	WN.. 33.
DWLNR/L 12 3C	● / ●	.750	.750	1.000	5.000	1.950				-6	-6	1.05	DW06	WN.. 33.
DWLNR/L 16 3D	● / ●	1.000	1.000	1.250	6.000	1.950				-6	-6	1.54	DW06	WN.. 33.
DWLNR/L 12 4C	● / ●	.750	.750	1.000	5.000	1.378				-6	-6	1.05	DW08	WN.. 43.
DWLNR/L 16 4D	● / ●	1.000	1.000	1.250	6.000	1.350				-6	-6	1.54	DW08	WN.. 43.
DWLNR/L 20 4D	● / ●	1.250	1.250	1.500	6.000	1.378				-6	-6	2.76	DW08	WN.. 43.

All dimensions [in]

SPARE PARTS

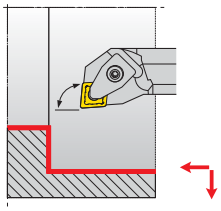
*) See pages T254-T255 for recommended screw torques

Type	Complete clamp set*	Shim	Shim screw	Key	Key	
						
DW06	DCS 09	DWS 328-01	US 2004-T09P	FLAG T09P	-	
DW08	DCS 12	DWS 331-12	US 2002-T15P	FLAG T15P/3,5	-	

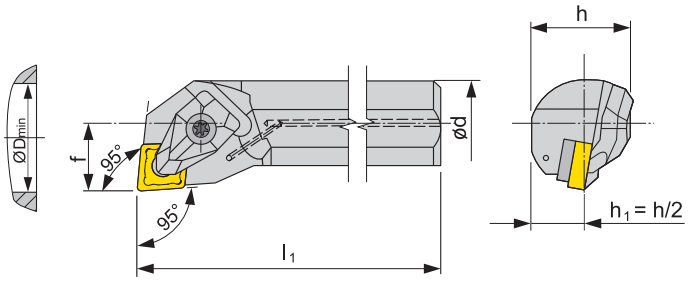
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

DCLNR/L



T91 - T94, T131



γ_o° - Rake Angle
λ_s° - Angle of Inclination

TOOLS FOR INTERNAL TURNING

Designation	R/L	Dimensions									[lbs]	Spare parts	Inserts
		d	D_{min}	f	h	l_1	l_2		λ_s°	γ_o°			
A12S-DCLNR/L 3	● / ●	.750	1.000	.500	.709	10.000	1.024		-14	-6	1.21	DC09	CN.. 32.
A16T-DCLNR/L 4	● / ●	1.000	1.280	.640	.906	12.000	1.339		-12	-6	1.54	DCI12	CN.. 43.
A20T-DCLNR/L 4	● / ●	1.250	1.468	.765	1.181	12.000	1.299		-11	-6	3.08	DCI12	CN.. 43.
A24T-DCLNR/L 4	● / ●	1.500	1.760	.890	1.374	12.000	1.575		-16	-6	8.25	DCI12	CN.. 43.
A24T-DCLNR/L 5	● / ●	1.500	1.760	.890	1.374	12.000	1.575		-18	-6	8.25	DC16	CN.. 54.

All dimensions [in]

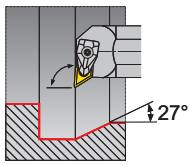
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

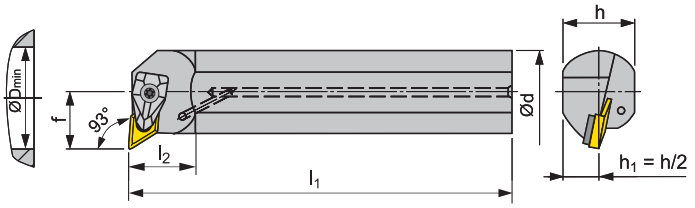
Type	Complete clamp set*	Shim	Shim screw	Key	Key	
DC09	DCS 09	DCS 236-04	US 2004-T09P	FLAG T09P	-	
DCI12	DCS 12	DCS 236-03	US 2002-T15P	FLAG T15P/3,5	-	
DC16	DCS 16	DCS 234-03	US 2007-T20P	-	LK T20P	

● stocked as standard / ○ not stocked as standard
See price list for current availability.

DDUNR/L



T97 -T100



γ_o° - Rake Angle
λ_s° - Angle of Inclination

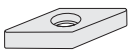
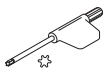
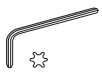
TOOLS FOR INTERNAL TURNING

Designation	R/L	Dimensions									[lbs]	Spare parts	Inserts
		d	D_{min}	f	h	l_1	l_2		λ_s°	γ_o°			
A16T-DDUNR/L 3	● / ●	1.000	1.299	.750	.906	12.000	1.142		-12	-6	1.54	DD11	DN.. 33.
A20T-DDUNR/L 3	● / ●	1.250	1.705	1.000	1.181	12.000	1.181		-9	-6	3.08	DD11	DN.. 33.
A20T-DDUNR/L 4	● / ●	1.250	1.705	1.000	1.181	12.000	1.181		-13	-6	3.08	DD1504	DN.. 44.
A24T-DDUNR/L 4	● / ●	1.500	2.000	1.125	1.374	12.000	1.299		-11	-6	8.25	DD1504	DN.. 44.

All dimensions [in]

SPARE PARTS

*) See pages T254-T255 for recommended screw torques

Type	Complete clamp set*	Shim	Shim screw	Key	Key	
						
DD11	DCS 09	DDS 267-01	US 2004-T09P	FLAG T09P	-	
DD1504	DCS 12	DDS 266-02	US 2002-T15P	FLAG T15P/3,5	-	

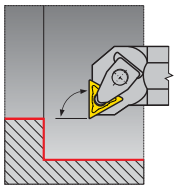
OPTIONALE SPARE PARTS

Insert	Shim
DN.. 43.	DDS 266-01

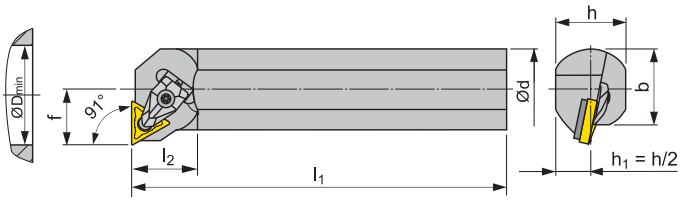
● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

DTFNR/L



T115 - T118, T133



γ_o° - Rake Angle
λ_s° - Angle of Inclination

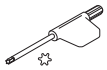
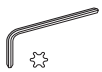
TOOLS FOR INTERNAL TURNING

Designation	R/L	Dimensions									[lbs]	Spare parts	Inserts
		d	D_{min}	f	h	l_1	l_2		λ_s°	γ_o°			
A16T-DTFNR/L 3	● / ●	1.000	1.201	.640	.906	12.000	1.339		-12	-6	1.54	DT16	TN.. 33.
A20T-DTFNR/L 3	● / ●	1.250	1.468	.765	1.181	12.000	1.417		-11	-6	3.08	DT16	TN.. 33.
A24T-DTFNR/L 4	● / ●	1.500	1.760	.890	1.374	12.000	1.417		-15	-6	8.25	DT22	TN.. 43.

All dimensions [in]

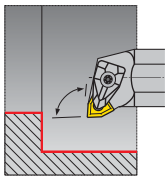
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

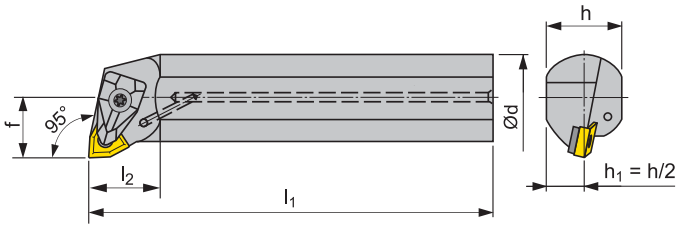
Type	Complete clamp set*	Shim	Shim screw	Key	Key	
						
DT16	DCS 09	DTS 316-01	US 2004-T09P	FLAG T09P	-	
DT22	DCS 12	DTS 315-04	US 2002-T15P	FLAG T15P/3,5	-	

● stocked as standard / ○ not stocked as standard
See price list for current availability.

DWLNR/L



T126 - T129, T135



γ_o° - Rake Angle
λ_s° - Angle of Inclination

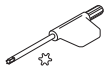
TOOLS FOR INTERNAL TURNING

Designation	R/L	Dimensions									[lbs]	Spare parts	Inserts
		d	D_{min}	f	h	l_1	l_2		λ_s°	γ_o°			
A16T-DWLNR/L 4	● / ●	1.000	1.299	.750	.906	12.000	1.339		-12	-6	1.54	DWI08	WN.. 43.
A20T-DWLNR/L 4	● / ●	1.250	1.705	1.000	1.181	12.000	1.339		-15	-6	3.08	DWI08	WN.. 43.
A24T-DWLNR/L 4	● / ●	1.500	2.000	1.000	1.374	12.000	1.339		-13	-6	8.25	DW08	WN.. 43.

All dimensions [in]

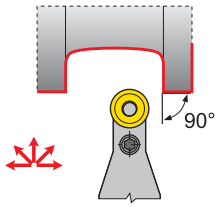
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

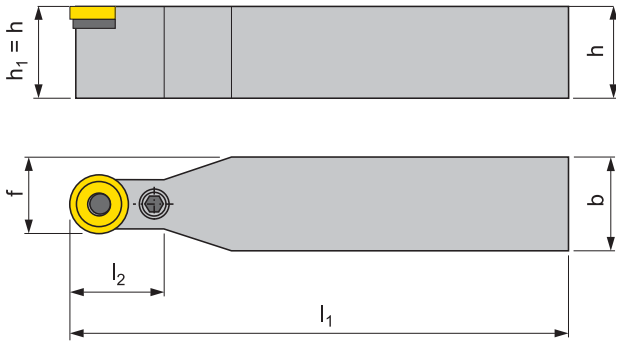
Type	Complete clamp set*	Shim	Shim screw	Key	Key	
						
DWI08	DCS 12	DWS 328-02	US 2002-T15P	FLAG T15P/3,5	-	
DW08	DCS 12	DWS 331-12	US 2002-T15P	FLAG T15P/3,5	-	

● stocked as standard /○ not stocked as standard
See price list for current availability.

PRDCN



T104



γ_o° - Rake Angle
λ_s° - Angle of Inclination

TOOLS FOR EXTERNAL TURNING

Designation	Assortment	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λ_s°	γ_o°			
PRDCN 3225 P 16	●	1.260	.984	0.807	6.693	1.260				0	0	1.76	PRP70	RCMX 1606 M0
PRDCN 3232 P 20	●	1.260	1.260	1.024	6.693	1.260				0	0	2.87	PRP90	RCMX 2006 M0
PRDCN 4040 S 20	●	1.575	1.575	1.181	9.843	1.575				0	0	6.84	PRP90	RCMX 2006 M0
PRDCN 4040 S 25	●	1.575	1.575	1.280	9.843	1.575				0	0	7.06	PRP80	RCMX 2507 M0

All dimensions [in]

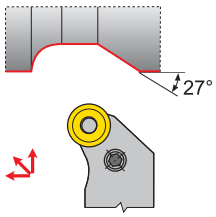
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

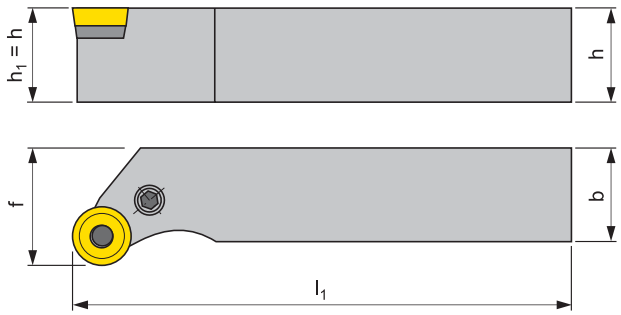
Type	Shim	Clamping lever	Clamp. screw*	Tubular rivet	Mount. taper plug	Key
PRP70	RCU 160300	PU 07	US 36 (M8x26,0)	NT 05	MT 05	HXK 4
PRP80	RCU 250600	PU 08	US 38 (M10x29,0)	NT 06	MT 06	HXK 5
PRP90	RCU 200400	PU 09	US 36 (M8x26,0)	NT 07	MT 07	HXK 4

● stocked as standard / ○ not stocked as standard
See price list for current availability.

PRSCR/L



T104



γ_o° - Rake Angle
λ_s° - Angle of Inclination

TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions h=h1	b	f	l1					λs°	γo°	[lbs]	Spare parts	Inserts
PRSCR/L 3225 P 16	● / ●	1.260	.984	0.807	6.693					0	0	1.98	PRP70	RCMX 1606 M0
PRSCR/L 3232 P 20	● / ●	1.260	1.260	1.024	6.693					0	0	3.09	PRP90	RCMX 2006 M0
PRSCR/L 4040 S 25	● / ●	1.575	1.575	1.280	9.843					0	0	7.50	PRP80	RCMX 2507 M0

All dimensions [in]

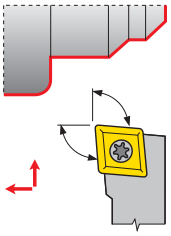
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

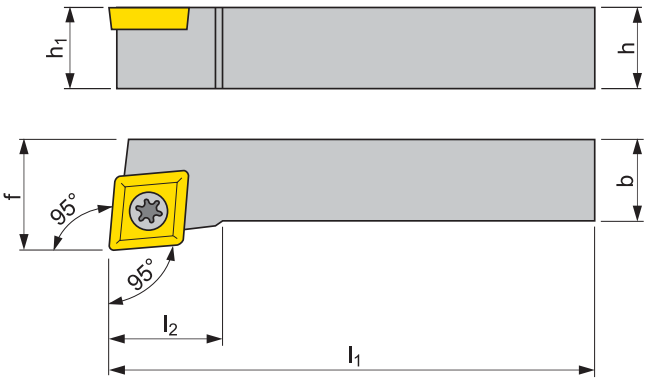
Type	Shim	Clamping lever	Clamp. screw*	Tubular rivet	Mount. taper plug	Key
PRP70	RCU 160300	PU 07	US 36 (M8x26,0)	NT 05	MT 05	HXK 4
PRP80	RCU 250600	PU 08	US 38 (M10x29,0)	NT 06	MT 06	HXK 5
PRP90	RCU 200400	PU 09	US 36 (M8x26,0)	NT 07	MT 07	HXK 4

● stocked as standard /○ not stocked as standard
See price list for current availability.

SCLCR/L



T88 - T90, T131



γ_o° - Rake Angle
λ_s° - Angle of Inclination

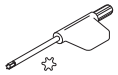
TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λ_s°	γ_o°			
SCLCR/L 06 2	● / ●	.375	.375	.500	2.500	.390				0	0	.24	SC06	CC.. 21.5.
SCLCR/L 08 3	● / ●	.500	.500	.625	3.500	.390				0	0	.33	SC09	CC.. 32.5.
SCLCR/L 10 3	● / ●	.625	.625	.750	4.000	.630				0	0	.62	SC09S	CC.. 32.5.
SCLCR/L 12 4B	● / ●	.750	.750	1.000	4.500	.830				0	0	.88	SC12	CC.. 43.
SCLCR/L 16 4D	● / ●	1.000	1.000	1.250	6.000	.830				0	0	1.54	SC12	CC.. 43.

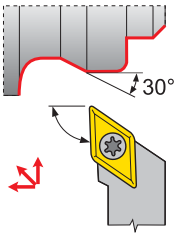
All dimensions [in]

SPARE PARTS

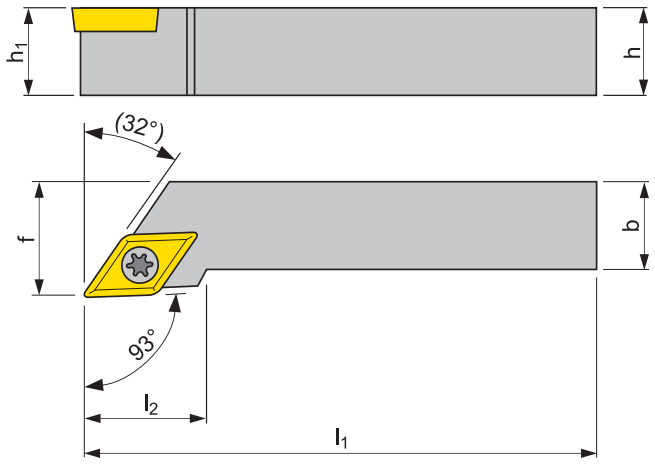
*) See pages T254-T255 for recommended screw torques

Type	Clamp. screw*	Shim	Shim screw	Screwdriver		
						
SC06	US 2003-T07P	-	-	FLAG T07P		
SC09	US 2010-T15P	-	-	FLAG T15P/3,5		
SC09S	US 2001-T15P	SCS 232-01	MS 9001	FLAG T15P/3,5		
SC12	US 2018-T15P	SCS 232-02	MS 9003	FLAG T15P/4		

SDJCR/L



T95 - T97, T132



γ_o° - Rake Angle
λ_s° - Angle of Inclination

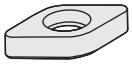
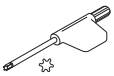
TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λ_s°	γ_o°			
SDJCR/L 06 2	● / ●	.375	.375	.500	2.500	.590				0	0	.24	SD07	DC.. 21.5.
SDJCR/L 08 2	● / ●	.500	.500	.625	3.500	.670				0	0	.33	SD07	DC.. 21.5.
SDJCR/L 12 3B	● / ●	.750	.750	1.000	4.500	.940				0	0	.88	SD11	DC.. 32.5.
SDJCR/L 16 3D	● / ●	1.000	1.000	1.250	6.000	1.100				0	0	1.54	SD11	DC.. 32.5.

All dimensions [in]

SPARE PARTS

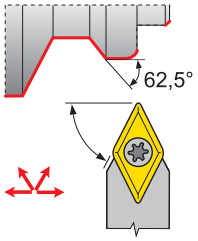
*) See pages T254-T255 for recommended screw torques

Type	Clamp. screw*	Shim	Shim screw	Screwdriver		
						
SD07	US 2003-T07P	-	-	FLAG T07P		
SD11	US 2001-T15P	SDS 263-01	MS 9001	FLAG T15P/3,5		

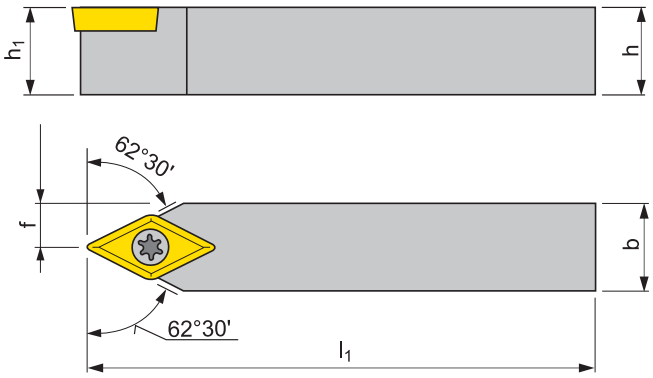
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

SDPCN



T95 - T97, T132



γ_o° - Rake Angle
λ_s° - Angle of Inclination

TOOLS FOR EXTERNAL TURNING

Designation	Assortment	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λ_s°	γ_o°			
SDPCN 06 2	●	.375	.375	.216	2.500	.571				0	0	.24	SD07	DC.. 21.5.
SDPCN 08 2	●	.500	.500	.279	3.482	.571				0	0	.33	SD07	DC.. 21.5.
SDPCN 10 3	●	.625	.625	.341	4.000	.862				0	0	.62	SD11	DC.. 32.5.
SDPCN 12 3B	●	.750	.750	.404	4.500	.862				0	0	.88	SD11	DC.. 32.5.
SDPCN 16 3C	●	1.000	1.000	.529	5.000	.890				0	0	1.54	SD11	DC.. 32.5.

All dimensions [in]

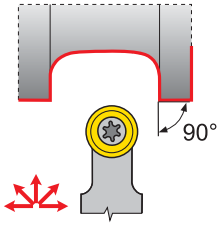
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

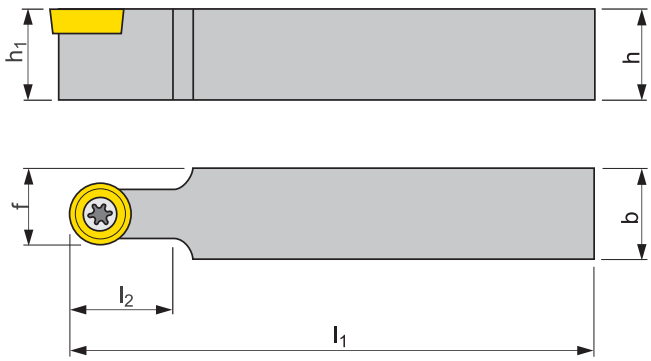
Type	Clamp. screw*	Shim	Shim screw	Screwdriver	Key		
SD07	US 2003-T07P	-	-	FLAG T07P			
SD11	US 2001-T15P	SDS 263-01	MS 9001	FLAG T15P/3,5			

● stocked as standard / ○ not stocked as standard
See price list for current availability.

SRDCN



T101 - T104



γ_o° - Rake Angle
λ_s° - Angle of Inclination

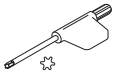
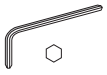
TOOLS FOR EXTERNAL TURNING

Designation	Assortment	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λ_s°	γ_o°			
SRDCN 1212 F 06	●	.472	.472	.354	3.150	.472				0	0	.22	S01	RC.. 0602M0
SRDCN 1616 H 06	●	.630	.630	.433	3.937	.472				0	0	.44	S01	RC.. 0602M0
SRDCN 2020 K 08	●	.787	.787	.551	4.921	.787				0	0	.88	S03	RC.. 0803M0
SRDCN 2020 K 1003-M-A	●	.787	.787	.591	4.921	.984				0	0	.88	SR10	RC.. 1003M0
SRDCN 2020 K 10-M-A	●	.787	.787	.591	4.921	.984				0	0	.88	SR10	RC.. 10T3M0
SRDCN 2525 M 10-M-A	●	.984	.984	.689	5.906	.984				0	0	19725	SR10	RC.. 10T3M0
SRDCN 2525 M 12-M-A	●	.984	.984	.728	5.906	1.181				0	0	19725	SR12	RC.. 1204M0
SRDCN 3225 P 10-M	●	1.260	.984	.689	6.693	.984				0	0	35796	SR10	RC.. 10T3M0
SRDCN 3225 P 12-M	●	1.260	.984	.728	6.693	1.181				0	0	35796	SR12	RC.. 1204M0
SRDCN 3225 P 16-M	●	1.260	.984	.807	6.693	1.260				0	0	44228	SR16	RC.. 1606M0

All dimensions [in]

SPARE PARTS

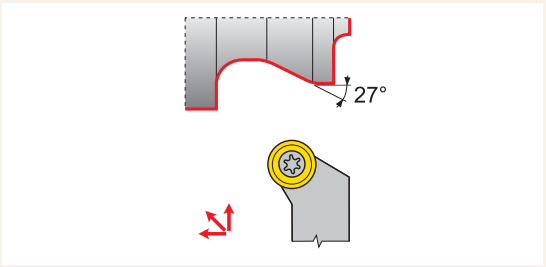
*) See pages T254-T255 for recommended screw torques

Type	Clamp. screw*	Shim	Shim screw	Screwdriver	Key		
							
S01	US 2506-T07P	-	-	FLAG T07P	-		
S03	US 3007-T09P	-	-	FLAG T09P	-		
SR10	US 3510-T15P	SRN 100300	MS 3510	FLAG T15P	HXK 3,5		
SR12	US 3510-T15P	SRN 120300	MS 3510	FLAG T15P	HXK 3,5		
SR16	US 5018-T20P	SRN 16T3M0	MS 5015	FLAG T20P	HXK 5		

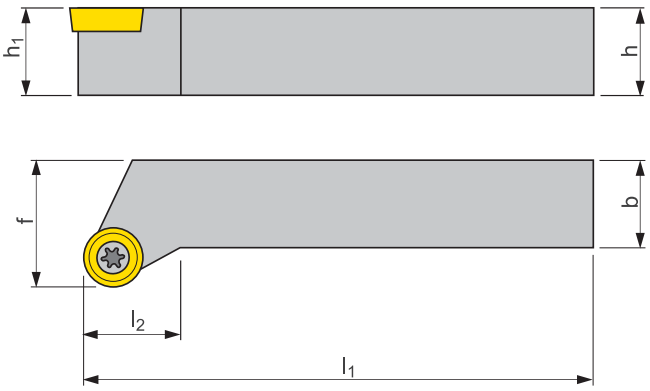
● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

SRSCR/L



T101 - T104



γ_o° - Rake Angle
λ_s° - Angle of Inclination

TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λ_s°	γ_o°			
SRSCR/L 1616 H 06	● / ●	.630	.630	.787	3.937	.472				0	0	.485	S01	RC.. 0602M0
SRSCR/L 2020 K 08	● / ●	.787	.787	.984	4.921	.787				0	0	.992	S03	RC.. 0803M0
SRSCR/L 2020 K 10-M-A	● / ●	.787	.787	.984	4.921	.787				0	0	.992	SR10	RC.. 10T3M0
SRSCR/L 2525 M 10-M-A	● / ●	.984	.984	1.260	5.906	.787				0	0	1.654	SR10	RC.. 10T3M0
SRSCR/L 2525 M 12-M-A	● / ●	.984	.984	1.260	5.906	.787				0	0	1.654	SR12	RC.. 1204M0
SRSCR/L 3225 P 16-M	● / ●	1.260	.984	1.260	6.693	.787				0	0	2.430	SR16	RC.. 1606M0

All dimensions [in]

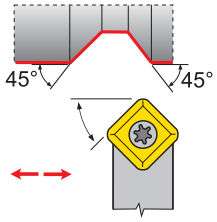
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

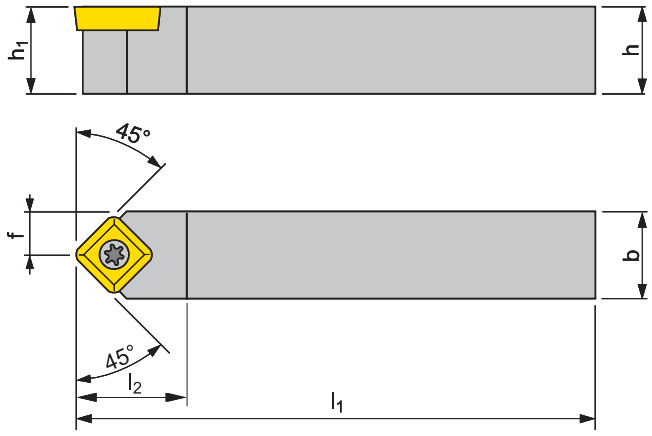
Type	Clamp. screw*	Shim	Shim screw	Screwdriver	Key		
S01	US 2506-T07P	-	-	FLAG T07P	-		
S03	US 3007-T09P	-	-	FLAG T09P	-		
SR10	US 3510-T15P	SRN 100300	MS 3510	FLAG T15P	HXK 3,5		
SR12	US 3510-T15P	SRN 120300	MS 3510	FLAG T15P	HXK 3,5		
SR16	US 5018-T20P	SRN 16T3M0	MS 5015	FLAG T20P	HXK 5		

● stocked as standard / ○ not stocked as standard
See price list for current availability.

SSDCN



T106 - T107



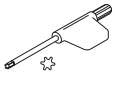
γ_o° - Rake Angle
λ_s° - Angle of Inclination

Designation	Assortment	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λs°	γo°			
SSDCN 08 3	●	.500	.500	.261	3.500	.594				0	0	.33	SS09	SC.. 32.5.
SSDCN 10 3	●	.625	.625	.323	4.000	.594				0	0	.62	SS09S	SC.. 32.5.

All dimensions [in]

SPARE PARTS

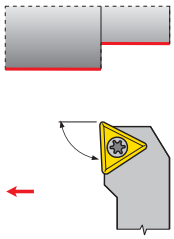
*) See pages T254-T255 for recommended screw torques

Type	Clamp. screw*	Shim	Shim screw	Screwdriver			
							
SS09	US 2010-T15P	-	-	FLAG T15P/3,5			
SS09S	US 2001-T15P	SSS 420-01	MS 9001	FLAG T15P/3,5			

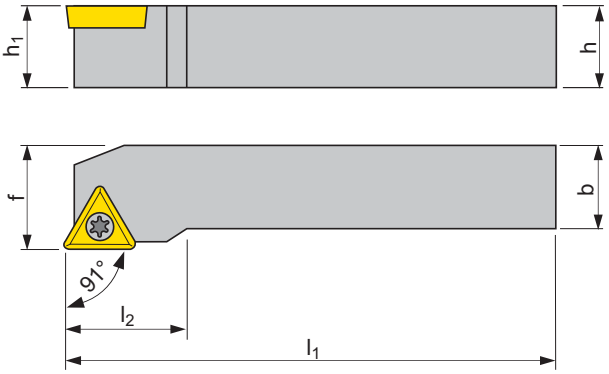
● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

STGCR/L



T112 - T114, T133



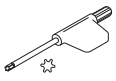
γ_o° - Rake Angle
λ_s° - Angle of Inclination

TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λs°	γo°			
STGCR/L 08 2	● / ●	.500	.500	.625	3.500	.543				0	0	.33	ST11	TC.. 21.5.
STGCR/L 12 3B	● / ●	.750	.750	1.000	4.500	.815				0	0	.88	ST16	TC.. 32.5.
STGCR/L 16 3D	● / ●	1.000	1.000	1.250	6.000	.815				0	0	1.54	ST16	TC.. 32.5.

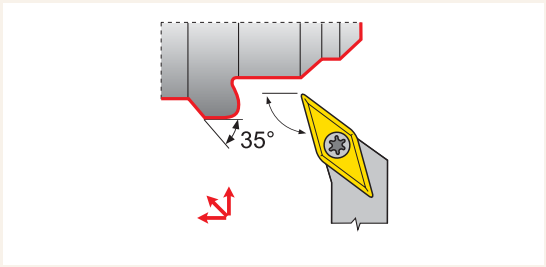
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

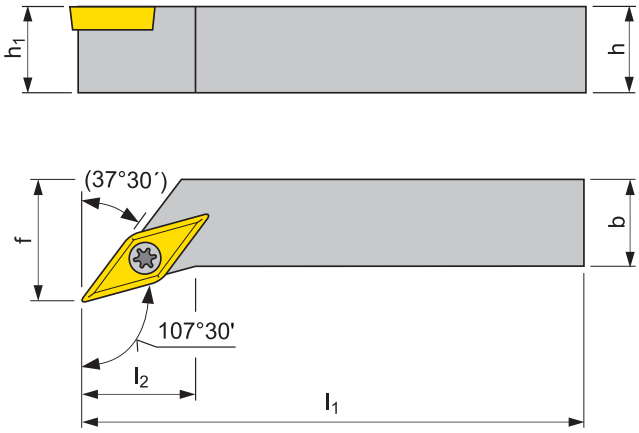
Type	Clamp. screw*	Shim	Shim screw	Screwdriver		
						
ST11	US 2003-T07P	-	-	FLAG T07P		
ST16	US 2001-T15P	STS 320-01	MS 9001	FLAG T15P/3,5		

● stocked as standard / ○ not stocked as standard
See price list for current availability.

SVHBR/L



T119, T120-T122



γ_o° - Rake Angle
λ_s° - Angle of Inclination

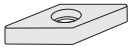
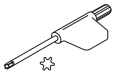
TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λ_s°	γ_o°			
SVHBR/L 12 3B	● / ●	.750	.750	1.000	4.500	1.087				0	0	.88	SV16S	VB.. 33.;VC.. 33.
SVHBR/L 16 3D	● / ●	1.000	1.000	1.250	6.000	1.087				0	0	1.54	SV16S	VB.. 33.;VC.. 33.

All dimensions [in]

SPARE PARTS

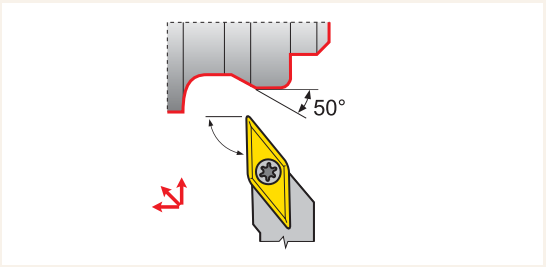
*) See pages T254-T255 for recommended screw torques

Type	Clamp. screw*	Shim	Shim screw	Screwdriver			
							
SV16S	US 2001-T15P	SVS 270-01	MS 9001	FLAG T15P/3,5			

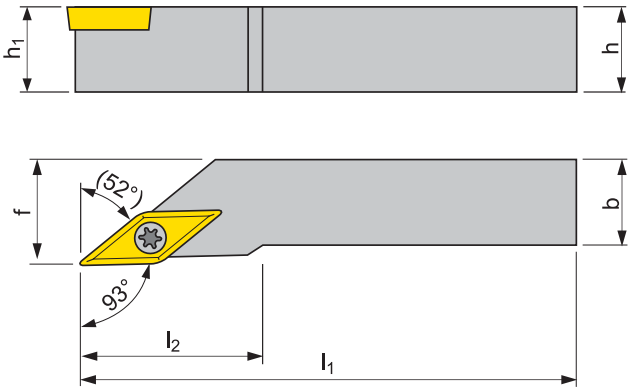
● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

SVJBR/L



T119, T120-T122



γ_o° - Rake Angle
λ_s° - Angle of Inclination

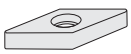
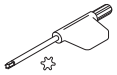
TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λ_s°	γ_o°			
SVJBR/L 10 2	● / ●	.625	.625	.750	4.000	.835				0	0	.22	SV11	VB.. 22.;VC.. 22.
SVJBR/L 12 2B	● / ●	.750	.750	1.000	4.500	.835				0	0	.88	SV11	VB.. 22.;VC.. 22.
SVJBR/L 12 3B	● / ●	.750	.750	1.000	4.500	1.228				0	0	.88	SV16S	VB.. 33.;VC.. 33.
SVJBR/L 16 3D	● / ●	1.000	1.000	1.250	6.000	1.240				0	0	1.54	SV16S	VB.. 33.;VC.. 33.
SVJBR/L 20 3D	● / ●	1.250	1.250	1.500	6.000	1.240				0	0	2.76	SV16S	VB.. 33.;VC.. 33.

All dimensions [in]

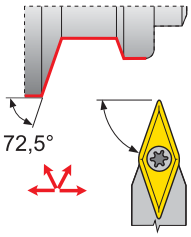
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

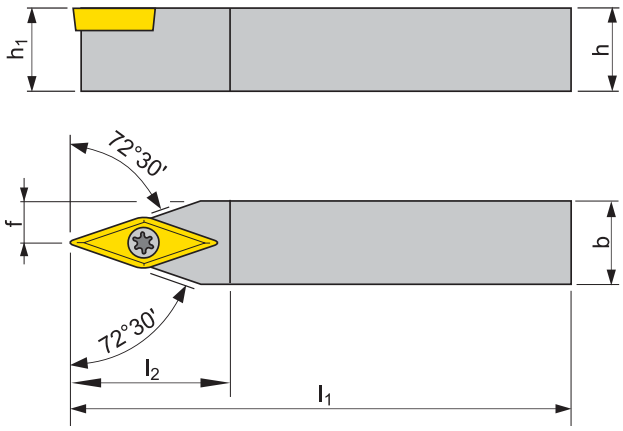
Type	Clamp. screw*	Shim	Shim screw	Screwdriver		
						
SV11	US 2003-T07P	-	-	FLAG T07P		
SV16S	US 2001-T15P	SVS 270-01	MS 9001	FLAG T15P/3,5		

● stocked as standard / ○ not stocked as standard
See price list for current availability.

SVVBN



T119, T120-T122



γ_o° - Rake Angle
λ_s° - Angle of Inclination

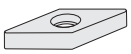
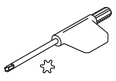
TOOLS FOR EXTERNAL TURNING

Designation	Assortment	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λ_s°	γ_o°			
SVVBN 08 2	●	.500	.500	.260	3.500	.831				0	0	.22	SV11	VB.. 22.;VC.. 22.
SVVBN 12 2B	●	.750	.750	.384	4.500	.831				0	0	.88	SV11	VB.. 22.;VC.. 22.
SVVBN 12 3B	●	.750	.750	.395	4.500	1.240				0	0	.88	SV16	VB.. 33.;VC.. 33.
SVVBN 16 3D	●	1.000	1.000	.520	6.000	1.240				0	0	1.54	SV16	VB.. 33.;VC.. 33.
SVVBN 20 3D	●	1.250	1.250	.645	6.000	1.240				0	0	2.76	SV16	VB.. 33.;VC.. 33.

All dimensions [in]

SPARE PARTS

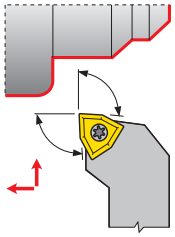
*) See pages T254-T255 for recommended screw torques

Type	Clamp. screw*	Shim	Shim screw	Screwdriver		
						
SV11	US 2003-T07P	-	-	FLAG T07P		
SV16	US 2001-T15P	SVS 270-01	MS 9001	FLAG T15P/3,5		

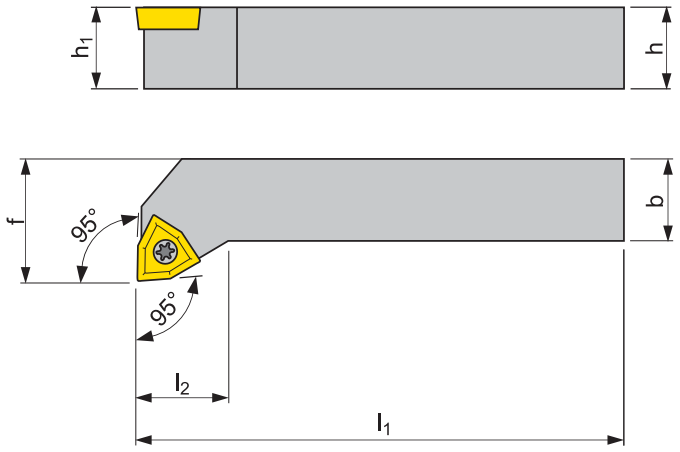
● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

SWLCR/L



T124 - T125



γ_o° - Rake Angle
λ_s° - Angle of Inclination

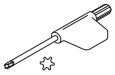
TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	f	l1	l2				λs°	γo°			
SWLCR/L 12 3B	● / ●	.750	.750	1.000	4.500	.630				0	0	.88	S08	WC.. 32.5.
SWLCR/L 16 4D	● / ●	1.000	1.000	1.250	6.000	.830				0	0	1.54	S09	WC.. 43.

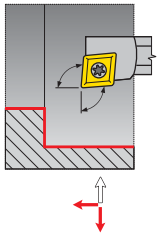
All dimensions [in]

SPARE PARTS

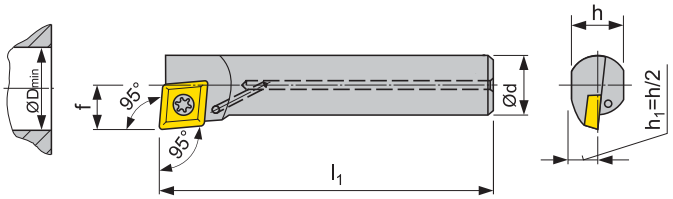
*) See pages T254-T255 for recommended screw torques

Type	Clamp. screw*	Shim	Shim screw	Screwdriver		
						
S08	US 3510-T15P	-	-	FLAG T15P		
S09	US 4512-T15P	-	-	FLAG T15P		

SCLCR/L



T88 - T90, T131



γ_o° - Rake Angle
λ_s° - Angle of Inclination

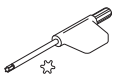
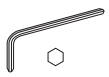
TOOLS FOR INTERNAL TURNING

Designation	R/L	Dimensions									[lbs]	Spare parts	Inserts
		d	D_{min}	f	h	l_1			λ_s°	γ_o°			
A06M-SCLCR/L 2	● / ●	.375	.480	.250	.336	6.000			-11	0	.13	C06M	CC.. 21.5.
A08M-SCLCR/L 2	● / ●	.500	.598	.312	.460	6.000			-8	0	.33	C06	CC.. 21.5.
A10R-SCLCR/L 3	● / ●	.625	.772	.406	.562	8.000			-9	0	.66	C09M	CC.. 32.5.
A12S-SCLCR/L 3	● / ●	.750	.929	.500	.709	10.000			-6	0	1.21	C09	CC.. 32.5.
A16T-SCLCR/L 3	● / ●	1.000	1.201	.640	.906	12.000			-4	0	1.54	C09	CC.. 43.
A20T-SCLCR/L 4	● / ●	1.250	1.468	.765	1.181	12.000			-11	0	3.08	C12	CC.. 43.

All dimensions [in]

SPARE PARTS

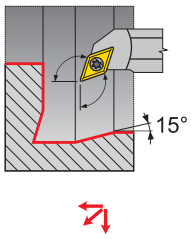
*) See pages T254-T255 for recommended screw torques

Type	Clamp. screw*	Shim	Shim screw	Screwdriver		
						
C06M	US 2046-T07P	-	-	FLAG T07P		
C06	US 2003-T07P	-	-	FLAG T07P		
C09M	US 2009-T15P	-	-	FLAG T15P/3,5		
C09	US 2010-T15P	-	-	FLAG T15P/3,5		
C12	US 2018-T15P	SCS 232-02	MS 9003	FLAG T15P/4		

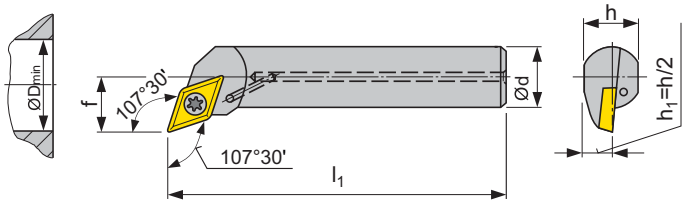
● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

SDQCR/L



T95 - T97, T132



γ_o° - Rake Angle
λ_s° - Angle of Inclination

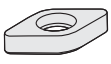
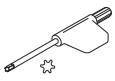
TOOLS FOR INTERNAL TURNING

Designation	R/L	Dimensions								[lbs]	Spare parts	Inserts
		d	D_{min}	f	h	l_1		λ_s°	γ_o°			
A06M-SDQCR/L 2	● / ●	.375	.598	.375	.336	6.000		-8	0	.13	SD07	DC.. 21.5.
A08M-SDQCR/L 2	● / ●	.500	.728	.437	.460	6.000		-6	0	.33	SD07	DC.. 21.5.
A10R-SDQCR/L 2	● / ●	.625	.850	.500	.562	8.000		-4	0	.66	SD07	DC.. 21.5.
A12S-SDQCR/L 3	● / ●	.750	.980	.562	.709	10.000		-6	0	1.21	SD11M	DC.. 32.5.
A16T-SDQCR/L 3	● / ●	1.000	1.299	.750	.906	12.000		-3	0	1.54	SD11	DC.. 32.5.

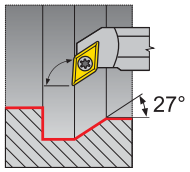
All dimensions [in]

SPARE PARTS

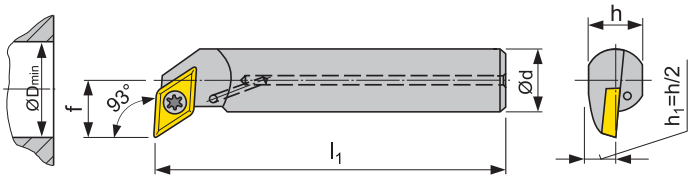
*) See pages T254-T255 for recommended screw torques

Type	Clamp. screw*	Shim	Shim screw	Screwdriver		
						
SD07	US 2003-T07P	-	-	FLAG T07P		
SD11M	US 2009-T15P	-	-	FLAG T15P/3,5		
SD11	US 2010-T15P	-	-	FLAG T15P/3,5		

SDUCR/L



T95 - T97, T132



γ_o° - Rake Angle
λ_s° - Angle of Inclination

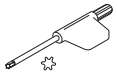
TOOLS FOR INTERNAL TURNING

Designation	R/L	Dimensions								[lbs]	Spare parts	Inserts
		d	D_{min}	f	h	l_1		λ_s°	γ_o°			
A06M-SDUCR/L 2	● / ●	.375	.598	.375	.336	6.000		-7	0	.13	SD07	DC.. 21.5.
A08M-SDUCR/L 2	● / ●	.500	.728	.438	.460	6.000		-5	0	.33	SD07	DC.. 21.5.
A10R-SDUCR/L 2	● / ●	.625	.850	.500	.562	8.000		-4	0	.66	SD07	DC.. 21.5.
A12S-SDUCR/L 3	● / ●	.750	1.051	.625	.709	10.000		-5	0	1.21	SD11M	DC.. 32.5.
A16T-SDUCR/L 3	● / ●	1.000	1.299	.750	.906	12.000		-3	0	1.54	SD11	DC.. 32.5.
A20T-SDUCR/L 3	● / ●	1.250	1.579	.875	1.181	12.000		-8	0	3.08	SD11V	DC.. 32.5.

All dimensions [in]

SPARE PARTS

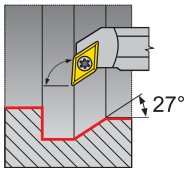
*) See pages T254-T255 for recommended screw torques

Type	Clamp. screw*	Shim	Shim screw	Screwdriver		
						
SD07	US 2003-T07P	-	-	FLAG T07P		
SD11M	US 2009-T15P	-	-	FLAG T15P/3,5		
SD11	US 2010-T15P	-	-	FLAG T15P/3,5		
SD11V	US 2001-T15P	SDS 263-01	MS 9001	FLAG T15P/3,5		

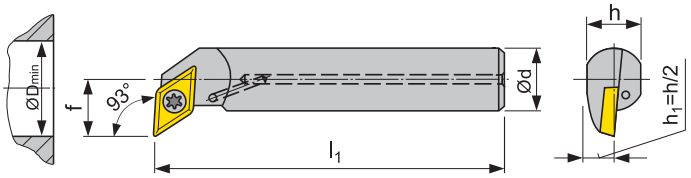
● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

SDUCR/L-E



T95 -T 97



γ_o° - Rake Angle
λ_s° - Angle of Inclination

TOOLS FOR INTERNAL TURNING

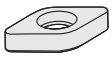
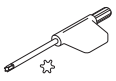
Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		d	D_{min}	f	h	l_1				λ_s°	γ_o°			
E06M-SDUCR/L 2	● / ●	.375	.598	.375	.336	6.000				-7	0	1.20	SD07	DC.. 21.5.
E08R-SDUCR/L 2	● / ●	.500	.716	.438	.460	8.000				-5	0	1.65	SD07	DC.. 21.5.
E10R-SDUCR/L 2	● / ●	.625	.850	.500	.562	8.000				-4	0	2.35	SD07	DC.. 21.5.

All dimensions [in]

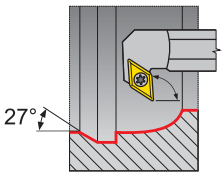
Tungsten carbide shank with steel head and internal coolant supply

SPARE PARTS

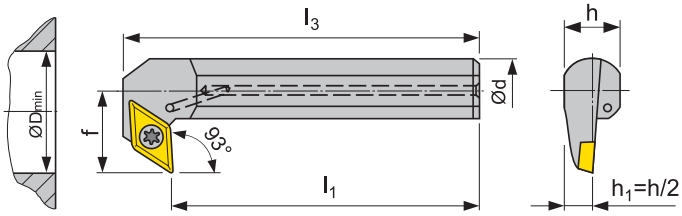
*) See pages T254-T255 for recommended screw torques

Type	Clamp. screw*	Shim	Shim screw	Screwdriver		
						
SD07	US 2003-T07P	-	-	FLAG T07P		

SDZCR/L



T 95 - T97, T132



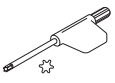
γ_o° - Rake Angle
λ_s° - Angle of Inclination

TOOLS FOR INTERNAL TURNING

Designation	R/L	Dimensions								[lbs]	Spare parts	Inserts
		d	D_{min}	f	h	l_1	l_3	λ_s°	γ_o°			
A20T-SDZCR/L 3-93	● / ●	1.250	1.579	.875	1.181	12.000	12.658	-7	0	3.08	SD11V	DC.. 32.5.

SPARE PARTS

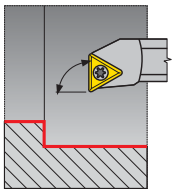
*) See pages T254-T255 for recommended screw torques

Type	Clamp. screw*	Shim	Shim screw	Screwdriver		
						
SD11V	US 2001-T15P	SDS 263-01	MS 9001	FLAG T15P/3,5		

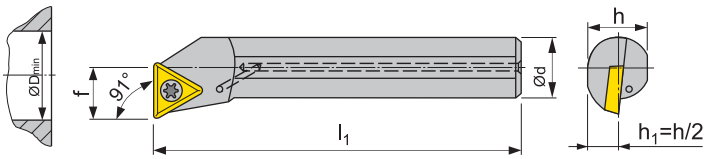
● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

STFCR/L



T 112 - T114, T133



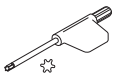
γ_o° - Rake Angle
λ_s° - Angle of Inclination

TOOLS FOR INTERNAL TURNING

Designation	R/L	Dimensions								[lbs]	Spare parts	Inserts
		d	D_{min}	f	h	l_1		λ_s°	γ_o°			
A08M-STFCR/L 2	● / ●	.500	.598	.312	.460	6.000		-7	0	.33	ST11	TC.. 21.5.
A10R-STFCR/L 2	● / ●	.625	.772	.406	.562	8.000		-5	0	.66	ST11	TC.. 21.5.
A12S-STFCR/L 2	● / ●	.750	.929	.500	.709	10.000		-3	0	1.21	ST11	TC.. 21.5.
A16T-STFCR/L 3	● / ●	1.000	1.201	.640	.906	12.000		-4	0	1.54	ST16	TC.. 32.5.

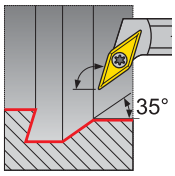
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

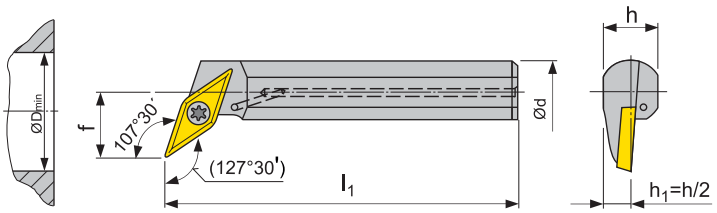
Type	Clamp. screw*	Shim	Shim screw	Screwdriver		
						
ST11	US 2003-T07P	-	-	FLAG T07P		
ST16	US 2010-T15P	-	-	FLAG T15P/3,5		

● stocked as standard / ○ not stocked as standard
See price list for current availability.

SVQBR/L



T119, T120 - T122



γ_o° - Rake Angle
λ_s° - Angle of Inclination

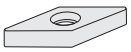
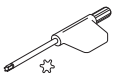
TOOLS FOR INTERNAL TURNING

Designation	R/L	Dimensions									[lbs]	Spare parts	Inserts
		d	D_{min}	f	h	l_1			λ_s°	γ_o°			
A16T-SVQBR/L 3	● / ●	1.000	1.299	.750	.906	12.000			-7	0	1.54	SV16	VB.. 33.; VC.. 33.
A20T-SVQBR/L 3	● / ●	1.250	1.579	.875	1.181	12.000			-7	0	4.51	SV16S	VB.. 33.; VC.. 33.
A24T-SVQBR/L 3	● / ●	1.500	1.841	1.063	1.374	12.000			-5	0	8.25	SV16S	VB.. 33.; VC.. 33.

All dimensions [in]

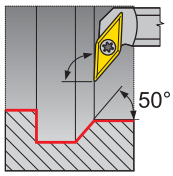
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

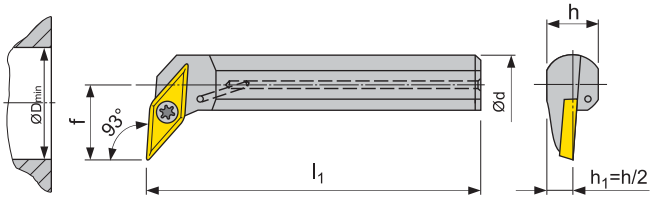
Type	Clamp. screw*	Shim	Shim screw	Screwdriver		
						
SV16	US 2010-T15P	-	-	FLAG T15P/3,5		
SV16S	US 2001-T15P	SVS 270-01	MS 9001	FLAG T15P/3,5		

● stocked as standard /○ not stocked as standard
See price list for current availability.

SVUBR/L



T119, T120 - T122



γ_o° - Rake Angle
λ_s° - Angle of Inclination

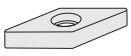
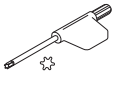
TOOLS FOR INTERNAL TURNING

Designation	R/L	Dimensions									[lbs]	Spare parts	Inserts
		d	D_{min}	f	h	l_1			λ_s°	γ_o°			
A10R-SVUBR/L 2	● / ●	.625	.850	.486	.560	8.000			-7	0	.66	SV11	VB.. 22.; VC.. 22.
A12S-SVUBR/L 2	● / ●	.750	1.012	.580	.710	10.000			-5	0	1.21	SV11	VB.. 22.; VC.. 22.
A20T-SVUBR/L 3	● / ●	1.250	1.705	1.000	1.181	12.000			-5	0	4.51	SV16S	VB.. 33.; VC.. 33.
A24T-SVUBR/L 3	● / ●	1.500	2.126	1.125	1.374	12.000			-3	0	8.25	SV16S	VB.. 33.; VC.. 33.

All dimensions [in]

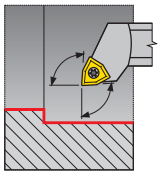
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

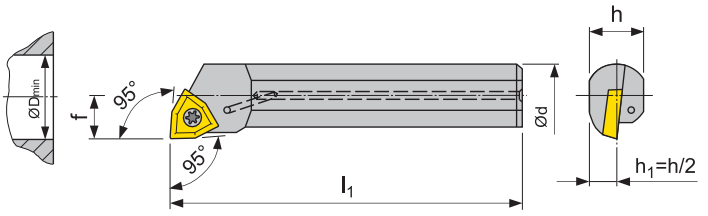
Type	Clamp. screw*	Shim	Shim screw	Screwdriver		
						
SV11	US 2020-T07P	-	-	FLAG T07		
SV16S	US 2001-T15P	SVS 270-01	MS 9001	FLAG T15P/3,5		

● stocked as standard / ○ not stocked as standard
See price list for current availability.

SWLCR/L



T124 - T125



γ_o° - Rake Angle
λ_s° - Angle of Inclination

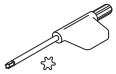
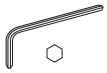
TOOLS FOR INTERNAL TURNING

Designation	R/L	Dimensions									[lbs]	Spare parts	Inserts
		d	D_{min}	f	h	l_1			λ_s°	γ_o°			
A12S-SWLCR/L 3	● / ●	.750	.929	.500	.709	10.000			-6	0	1.32	S08	WC.. 32.5.

All dimensions [in]

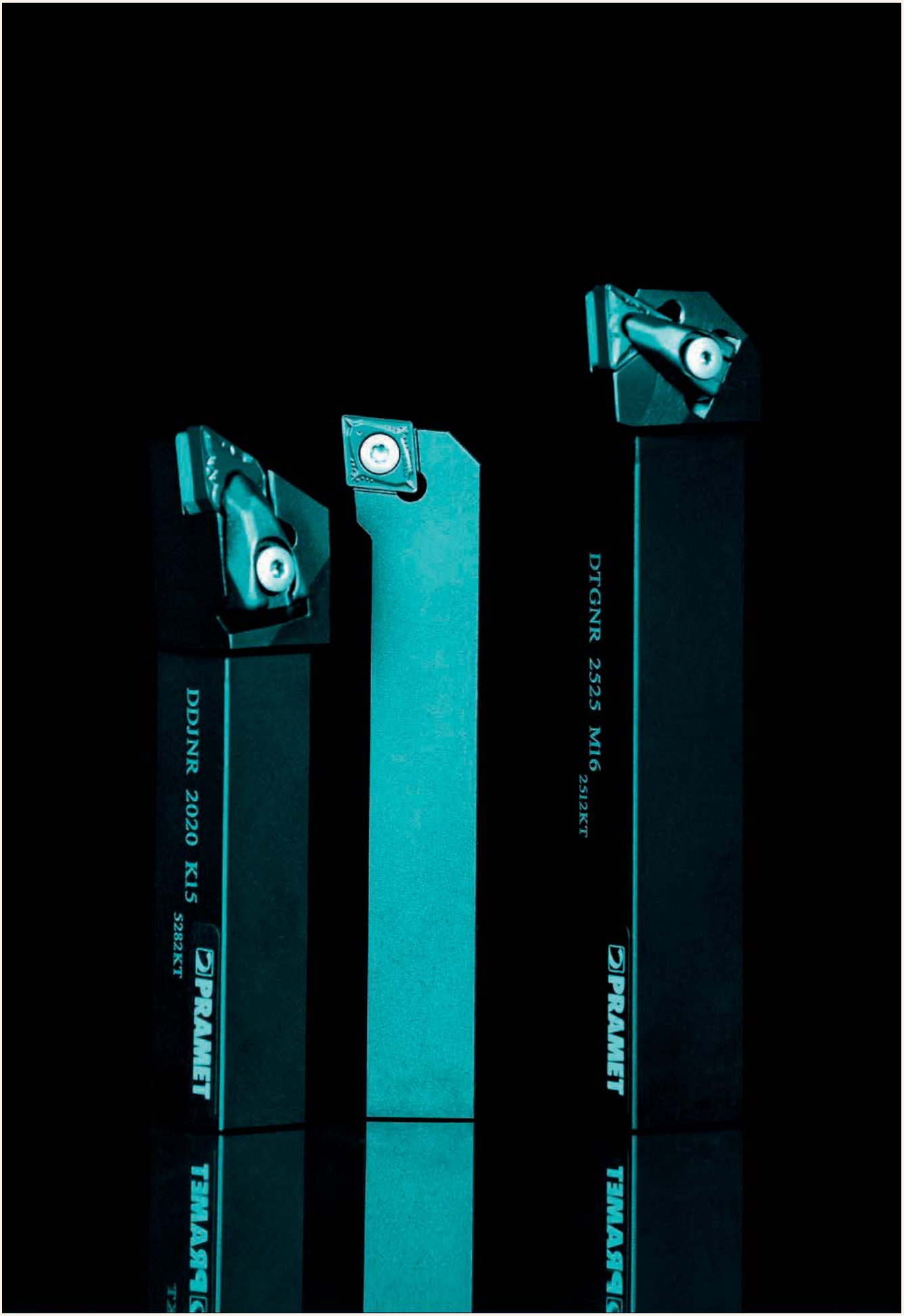
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

Type	Clamp. screw*	Shim	Shim screw*	Screwdriver	Key	
						
S08	US 3510-T15P	-	-	FLAG T15P	-	

● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET


DDJNR 2020 K15
5282KT
PRAMET
DTGNR 2525 M16
2512KT
PRAMET

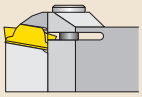
CODE DESIGNATION - PARTING AND GROOVING TOOLS - EXTERNAL TURNING

	1	2	3	4	5	6	7	8	9	10	11
ISO CODE	G	F	I	L	25	25	M	0316	R	030	017
	1	2	3	4	5 & 6		7	8	9	10	11
ANSI CODE	G	F	I	L	16		D	0316	R	1.18	.670

1

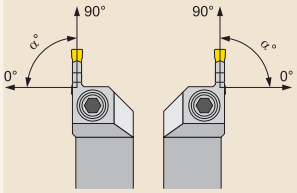
Clamping Designation

G



2

Tool style - cutting edge angle



α	
G = 0°	K = 75°
R = 15°	F = 90°
T = 30°	B = 105°
S = 45°	E = 120°
W = 60°	D = 135°

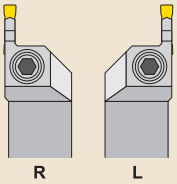
3

Maximum grooving/turning depth

G = 2,0 × a	N = 5,5 × a
H = 2,5 × a	O = 6,0 × a
I = 3,0 × a	P = 6,5 × a
J = 3,5 × a	Q = 7,0 × a
K = 4,0 × a	R = 7,5 × a
L = 4,5 × a	S = 8,0 × a
M = 5,0 × a	T = 8,5 × a

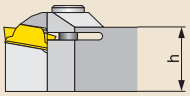
4

Version (right/left)



5

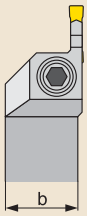
Shank height [mm]



12 = 12 mm
16 = 16 mm
20 = 20 mm
25 = 25 mm
32 = 32 mm

6

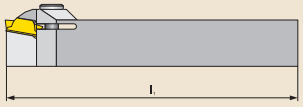
Shank width [mm]



12 = 12 mm
16 = 16 mm
20 = 20 mm
25 = 25 mm
32 = 32 mm

7

Total length

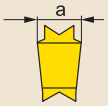


	l_1 [mm]
H	100
J	110
K	125
L	140
E	150
N	160
P	170
Q	180
R	200

	l_1 [in]
A	4.000
B	4.500
C	5.000
D	6.000
E	7.000
F	8.000

8

Insert width



	a [mm]	a [in]
02	2,0	.079
03, 0313 0316	3,0	.118
04, 0413 0416	4,0	.157
05, 0516	5,0	.197
06, 0616	6,0	.236
08, 0830	8,0	.315

5&6

	b [in]	h [in]
05	5/16	5/16
06	3/8	3/8
08	1/2	1/2
10	5/8	5/8

	b [in]	h [in]
12	3/4	3/4
16	1	1
85	1	1 1/4
86	1	1 1/2

	b [in]	h [in]
20	1 1/4	1 1/4
24	1 1/2	1 1/2
32	2	2

For square shanks, this is the number of 16ths of an inch of width and height. For rectangular shanks, the first digit is the number of 8ths of an inch of width, and the second digit is the number of 4ths of an inch of height.

9

Blade curvature direction

Additional information for axial turning.

10

Maximum diameter

Additional information for axial turning.

11

Minimum diameter

Additional information for axial turning.

PRAMET

	1	2	3		4	5	6	7	8
ISO CODE	A	25	S	-	G	G	H	L	0313
ANSI CODE	A	16	S	-	G	G	H	L	0313

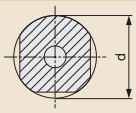
1

Type of tool

Steel with coolant hole

2

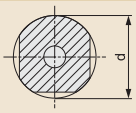
Diameter of shank



	d [mm]
12	12
16	16
20	20
25	25
32	32
40	40

2

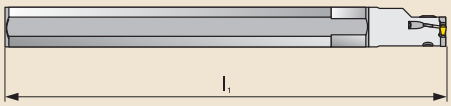
Diameter of shank



	d [in]
08	.500
10	.625
12	.750
16	1.000
20	1.250
24	1.500

3

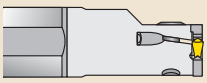
Length of shank



	l_1 [mm]	l_1 [in]
M	150	6.000
P	170	6.250
Q	180	7.250
R	200	8.000
S	250	10.000
T	300	12.000
U	350	14.000
V	400	15.750

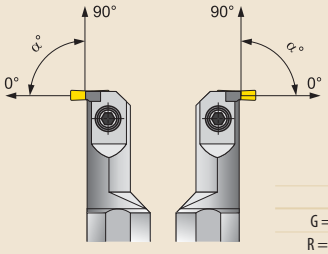
4

Clamping Designation



5

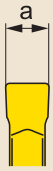
Tool style - cutting edge angle



α	
G = 0°	K = 75°
R = 15°	F = 90°
T = 30°	B = 105°
S = 45°	E = 120°
W = 60°	D = 135°

6

Maximum grooving/turning depth

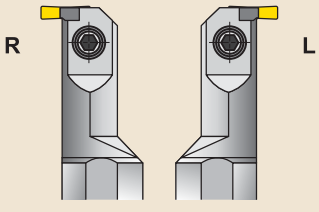


E = 1,0 × a	J = 3,5 × a
F = 1,5 × a	K = 4,0 × a
G = 2,0 × a	L = 4,5 × a
H = 2,5 × a	M = 5,0 × a
I = 3,0 × a	N = 5,5 × a

X = Spezial

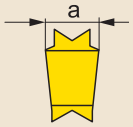
7

Version (right / left)



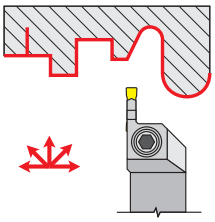
8

Cutting edge length

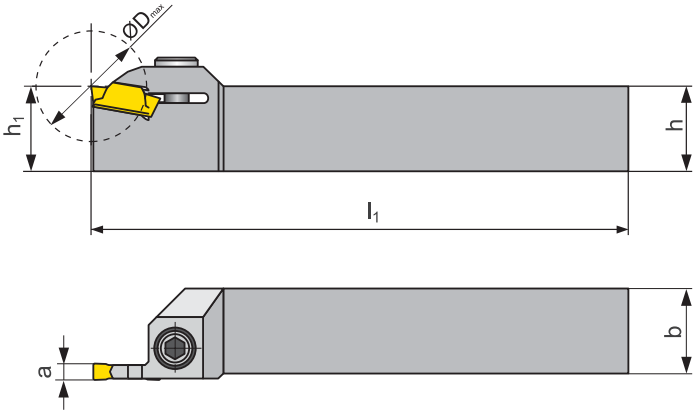


	a [mm]	a [in]
0313	3,0	.118
0413	4,0	.157

GFIR/L, GFKR/L



T137 - T142



TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	l1	a	Dmax								
GFKR/L 10A 02	● / ●	.625	.625	4.000	.078	1.259						.40	GL03	LCMF 0220..
GFKR/L 12C 02	● / ●	.750	.750	5.000	.078	1.259						.71	GL03	LCMF 0220..
GFKR/L 16D 02	● / ●	1.000	1.000	6.000	.078	1.259						1.50	GL05	LCMF 0220..
GFIR/L 10A 03	● / ●	.625	.625	4.000	.118	.708						.40	GL03	LCM. 0316..
GFIR/L 12C 03	● / ●	.750	.750	5.000	.118	.708						.73	GL03	LCM. 0316..
GFIR/L 16D 03	● / ●	1.000	1.000	6.000	.118	.708						1.57	GL05	LCM. 0316..
GFIR/L 10A 04	● / ●	.625	.625	4.000	.157	.944						.40	GL03	LCM. 0416..
GFIR/L 12C 04	● / ●	.750	.750	5.000	.157	.944						.73	GL03	LCM. 0416..
GFIR/L 16D 04	● / ●	1.000	1.000	6.000	.157	.944						1.54	GL05	LCM. 0416..
GFIR/L 12C 05	● / ●	.750	.750	5.000	.196	1.102						.73	GL03	LCM. 0516..
GFIR/L 16D 05	● / ●	1.000	1.000	6.000	.196	1.102						1.52	GL05	LCM. 0516..
GFIR/L 12C 06	● / ●	.750	.750	5.000	.236	1.102						.73	GL03	LCM. 0616..
GFIR/L 16D 06	● / ●	1.000	1.000	6.000	.236	1.102						1.50	GL05	LCM. 0616..
GFIR/L 16D 08	● / ●	1.000	1.000	7.000	.315	1.890						1.54	GL09	LCM. 0830..
GFIR/L 85E 08	● / ●	1.250	1.000	7.000	.315	1.890						2.20	GL09	LCM. 0830..

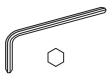
All Dimensions [in]

● stocked as standard /○ not stocked as standard
See price list for current availability.

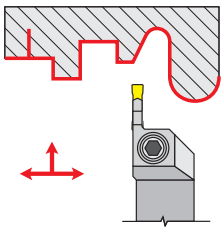
PRAMET

SPARE PARTS

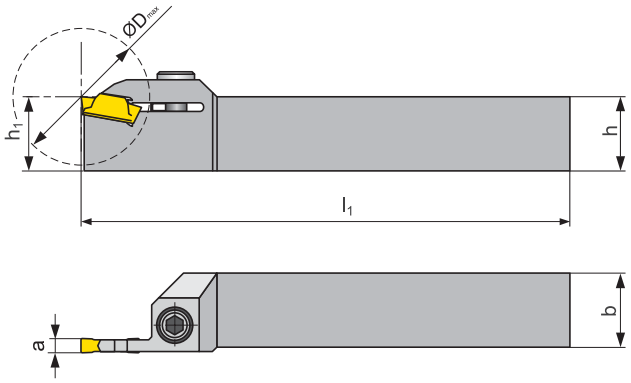
*) See pages T254-T255 for recommended screw torques

Type	Screw* 	Key 				
GL03	HS 0616C	HXK 5				
GL05	HS 0625C	HXK 5				
GL09	HSI 1020	HXK 6				

GFMR/L



T137 - T142



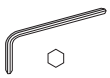
TOOLS FOR EXTERNAL TURNING

Designation	R/L	Dimensions								[lbs]	Spare parts	Inserts
		h=h1	b	l1	a	Dmax						
GFMR/L 12C 0316	● / ●	.750	.750	5.000	.118	1.181				.71	GL04	LCM. 0316..
GFMR/L 16D 0316	● / ●	1.000	1.000	6.000	.118	1.181				1.50	GL04	LCM. 0316..
GFMR/L 12C 0416	● / ●	.750	.750	5.000	.158	1.575				.68	GL04	LCM. 0416..
GFMR/L 16D 0416	● / ●	1.000	1.000	6.000	.158	1.575				1.45	GL04	LCM. 0416..
GFMR/L 16D 0516	● / ●	1.000	1.000	6.000	.197	1.969				1.43	GL04	LCM. 0516..
GFMR/L 85E 0516	● / ●	1.250	1.000	7.000	.197	1.969				2.14	GL04	LCM. 0516..
GFMR/L 16D 0616	● / ●	1.000	1.000	6.000	.236	2.362				1.41	GL04	LCM. 0616..
GFMR/L 85E 0616	● / ●	1.250	1.000	7.000	.236	2.362				2.12	GL04	LCM. 0616..
GFMR/L 85E 0830	● / ●	1.250	1.000	7.000	.315	3.150				2.03	GL09	LCM. 0830..

All dimensions [in]

SPARE PARTS

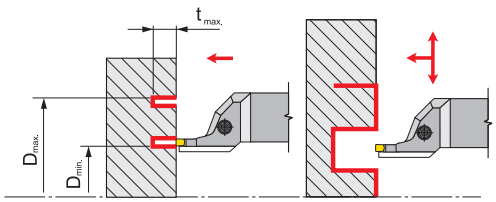
*) See pages T254-T255 for recommended screw torques

Type	Screw*	Key
		
GL04	HS 0620C	HXK 5
GL09	HSI 1020	HXK 6

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

GFIR-L



T137 - T142

TOOLS FOR AXIAL GROOVING & TURNING

Designation	Assortment	Dimensions								[lbs]	Spare parts	Inserts
		h=h1	b	l1	a	tmax	Dmin	Dmax				
GFIR 16D 03L 1.18-.670	●	1.000	1.000	6.000	.118	.374	.670	1.180		1.52	GL07	LCM. 0313..
GFIR 16D 03L 1.54-.940	●	1.000	1.000	6.000	.118	.374	.940	1.540		1.52	GL07	LCM. 0313..
GFIR 16D 03L 1.97-1.30	●	1.000	1.000	6.000	.118	.433	1.300	1.970		1.50	GL07	LCM. 0313..
GFIR 16D 03L 2.36-1.69	●	1.000	1.000	6.000	.118	.433	1.690	2.360		1.50	GL07	LCM. 0313..
GFIR 16D 03L 2.99-2.09	●	1.000	1.000	6.000	.118	.433	2.090	2.990		1.50	GL07	LCM. 0313..
GFIR 16D 03L 3.94-2.76	●	1.000	1.000	6.000	.118	.354	2.760	3.940		1.50	GL08	LCM. 0316..
GFIR 16D 03L 5.12-3.54	●	1.000	1.000	6.000	.118	.354	3.540	5.120		1.52	GL08	LCM. 0316..
GFIR 16D 03L 6.69-4.33	●	1.000	1.000	6.000	.118	.354	4.330	6.690		1.50	GL08	LCM. 0316..
GFIR 16D 04L 1.18-.670	●	1.000	1.000	6.000	.158	.374	.670	1.180		1.52	GL07	LCM. 0413..
GFIR 16D 04L 1.34-.826	●	1.000	1.000	6.000	.158	.374	.826	1.340		1.54	GL07	LCM. 0413..
GFIR 16D 04L 1.57-1.02	●	1.000	1.000	6.000	.158	.433	1.020	1.570		1.52	GL07	LCM. 0413..
GFIR 16D 04L 1.97-1.26	●	1.000	1.000	6.000	.158	.433	1.260	1.970		1.52	GL07	LCM. 0413..
GFIR 16D 04L 2.36-1.65	●	1.000	1.000	6.000	.158	.433	1.650	2.360		1.52	GL07	LCM. 0413..
GFIR 16D 04L 2.95-2.05	●	1.000	1.000	6.000	.158	.433	2.050	2.950		1.52	GL07	LCM. 0413..
GFIR 16D 04L 3.94-2.76	●	1.000	1.000	6.000	.158	.472	2.760	3.940		1.50	GL08	LCM. 0416..
GFIR 16D 04L 5.12-3.54	●	1.000	1.000	6.000	.158	.472	3.540	5.120		1.50	GL08	LCM. 0416..
GFIR 16D 04L 6.69-4.33	●	1.000	1.000	6.000	.158	.472	4.330	6.690		1.50	GL08	LCM. 0416..
GFIR 16D 04L 9.06-5.51	●	1.000	1.000	6.000	.158	.472	5.510	9.060		1.50	GL08	LCM. 0416..

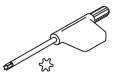
All Dimensions [in]

● stocked as standard / ○ not stocked as standard
See price list for current availability.

GFIR-L

SPARE PARTS

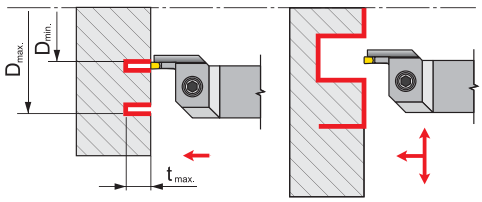
*) See pages T254-T255 for recommended screw torques

Type	Screw* 	Key 				
GL07	US 5018-T20P	FLAG T20P				
GL08	US 6020-T25P	SDR T25P				

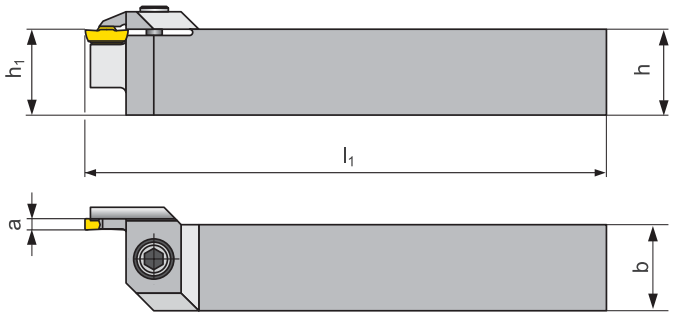
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

GFIL-R



T137 - T142



TOOLS FOR AXIAL GROOVING & TURNING

Designation	Assortment	Dimensions								[lbs]	Spare parts	Inserts
		h=h1	b	l1	a	tmax	Dmin	Dmax				
GFIL 16D 03R 1.18-.670	●	1.000	1.000	6.000	.118	.374	.670	1.180		1.52	GL07	LCM. 0313..
GFIL 16D 03R 1.54-.940	●	1.000	1.000	6.000	.118	.374	.940	1.540		1.52	GL07	LCM. 0313..
GFIL 16D 03R 1.97-1.30	●	1.000	1.000	6.000	.118	.433	1.300	1.970		1.50	GL07	LCM. 0313..
GFIL 16D 03R 2.36-1.69	●	1.000	1.000	6.000	.118	.433	1.690	2.360		1.50	GL07	LCM. 0313..
GFIL 16D 03R 2.99-2.09	●	1.000	1.000	6.000	.118	.433	2.090	2.990		1.50	GL07	LCM. 0313..
GFIL 16D 03R 3.94-2.76	●	1.000	1.000	6.000	.118	.354	2.760	3.940		1.50	GL08	LCM. 0316..
GFIL 16D 03R 5.12-3.54	●	1.000	1.000	6.000	.118	.354	3.540	5.120		1.52	GL08	LCM. 0316..
GFIL 16D 03R 6.69-4.33	●	1.000	1.000	6.000	.118	.354	4.330	6.690		1.50	GL08	LCM. 0316..
GFIL 16D 04R 1.18-.670	●	1.000	1.000	6.000	.158	.374	.670	1.180		1.52	GL07	LCM. 0413..
GFIL 16D 04R 1.34-.826	●	1.000	1.000	6.000	.158	.374	.826	1.340		1.54	GL07	LCM. 0413..
GFIL 16D 04R 1.57-1.02	●	1.000	1.000	6.000	.158	.433	1.020	1.570		1.52	GL07	LCM. 0413..
GFIL 16D 04R 1.97-1.26	●	1.000	1.000	6.000	.158	.433	1.260	1.970		1.52	GL07	LCM. 0413..
GFIL 16D 04R 2.36-1.65	●	1.000	1.000	6.000	.158	.433	1.650	2.360		1.52	GL07	LCM. 0413..
GFIL 16D 04R 2.95-2.05	●	1.000	1.000	6.000	.158	.433	2.050	2.950		1.52	GL07	LCM. 0413..
GFIL 16D 04R 3.94-2.76	●	1.000	1.000	6.000	.158	.472	2.760	3.940		1.50	GL08	LCM. 0416..
GFIL 16D 04R 5.12-3.54	●	1.000	1.000	6.000	.158	.472	3.540	5.120		1.50	GL08	LCM. 0416..
GFIL 16D 04R 6.69-4.33	●	1.000	1.000	6.000	.158	.472	4.330	6.690		1.50	GL08	LCM. 0416..
GFIL 16D 04R 9.06-5.51	●	1.000	1.000	6.000	.158	.472	5.510	9.060		1.50	GL08	LCM. 0416..

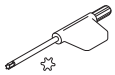
All Dimensions [in]

● stocked as standard / ○ not stocked as standard
See price list for current availability.

GFIL-R

SPARE PARTS

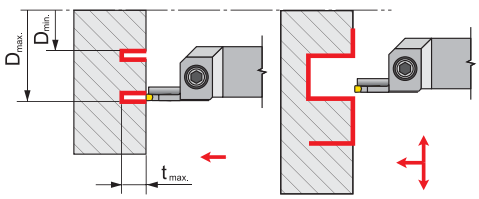
*) See pages T254-T255 for recommended screw torques

Type	Screw* 	Key 				
GL07	US 5018-T20P	FLAG T20P				
GL08	US 6020-T25P	SDR T25P				

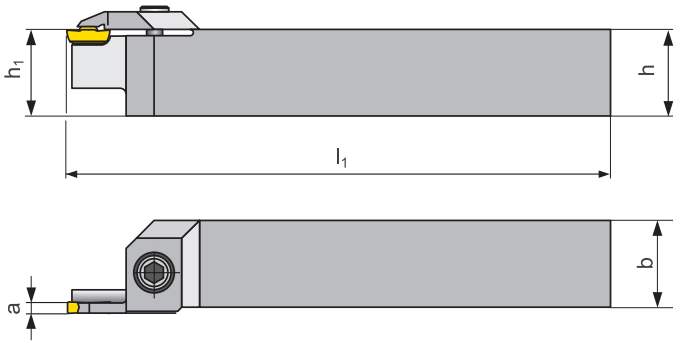
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

GFIR-R



T137 - T142



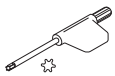
TOOLS FOR AXIAL GROOVING & TURNING

Designation	Assortment	Dimensions h=h1	b	l1	a	tmax	Dmin	Dmax		[lbs]	Spare parts	Inserts
GFIR 16D 0313R 1.18-.670	●	1.000	1.000	6.000	.118	.354	.670	1.180		1.45	GL07	LCM. 0313..
GFIR 16D 0313R 1.54-.940	●	1.000	1.000	6.000	.118	.354	.940	1.540		1.48	GL07	LCM. 0313..
GFIR 16D 0313R 1.97-1.30	●	1.000	1.000	6.000	.118	.354	1.300	1.970		1.50	GL07	LCM. 0313..
GFIR 16D 0313R 2.36-1.69	●	1.000	1.000	6.000	.118	.354	1.690	2.360		1.52	GL07	LCM. 0313..
GFIR 16D 0313R 2.99-2.09	●	1.000	1.000	6.000	.118	.354	2.090	2.990		1.52	GL07	LCM. 0313..
GFIR 16D 0316R 3.94-2.76	●	1.000	1.000	6.000	.118	.354	2.760	3.940		1.54	GL07	LCM. 0316..
GFIR 16D 0316R 5.12-3.54	●	1.000	1.000	6.000	.118	.354	3.540	5.120		1.56	GL07	LCM. 0316..
GFIR 16D 0316R 6.69-4.33	●	1.000	1.000	6.000	.118	.354	4.330	6.690		1.56	GL07	LCM. 0316..

All dimensions [in]

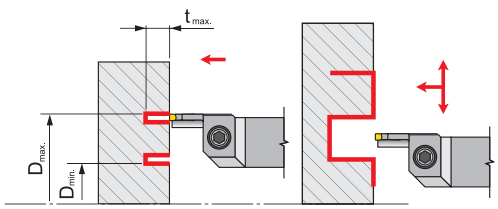
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

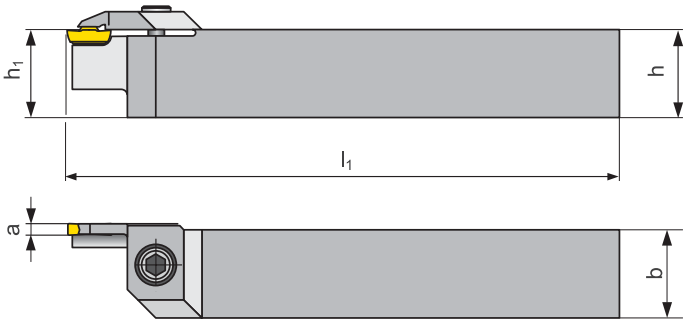
Type	Screw*	Key				
						
GL07	US 5018-T20P	FLAG T20P				

● stocked as standard / ○ not stocked as standard
See price list for current availability.

GFIL-L



T137 - T142



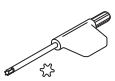
TOOLS FOR AXIAL GROOVING & TURNING

Designation	Assortment	Dimensions								[lbs]	Spare parts	Inserts
		h=h1	b	l1	a	tmax	Dmin	Dmax				
GFIL 16D 0313L 1.18-.670	●	1.000	1.000	6.000	.118	.354	.670	1.180		1.45	GL07	LCM. 0313..
GFIL 16D 0313L 1.54-.940	●	1.000	1.000	6.000	.118	.354	.940	1.540		1.48	GL07	LCM. 0313..
GFIL 16D 0313L 1.97-1.30	●	1.000	1.000	6.000	.118	.354	1.300	1.970		1.50	GL07	LCM. 0313..
GFIL 16D 0313L 2.36-1.69	●	1.000	1.000	6.000	.118	.354	1.690	2.360		1.52	GL07	LCM. 0313..
GFIL 16D 0313L 2.99-2.09	●	1.000	1.000	6.000	.118	.354	2.090	2.990		1.52	GL07	LCM. 0313..
GFIL 16D 0316L 3.94-2.76	●	1.000	1.000	6.000	.118	.354	2.760	3.940		1.54	GL07	LCM. 0316..
GFIL 16D 0316L 5.12-3.54	●	1.000	1.000	6.000	.118	.354	3.540	5.120		1.56	GL07	LCM. 0316..
GFIL 16D 0316L 6.69-4.33	●	1.000	1.000	6.000	.118	.354	4.330	6.690		1.56	GL07	LCM. 0316..

All dimensions [in]

SPARE PARTS

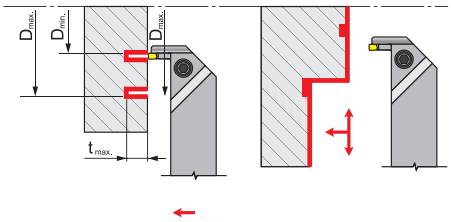
*) See pages T254-T255 for recommended screw torques

Type	Screw*	Key				
						
GL07	US 5018-T20P	FLAG T20P				

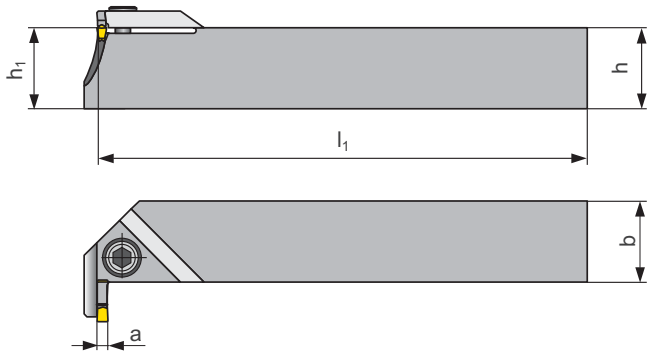
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

GGIR/L - 90°



T137 - T142



TOOLS FOR AXIAL GROOVING & TURNING - 90°

Designation	Assortment	Dimensions								[lbs]	Spare parts	Inserts
		h=h1	b	l1	a	tmax	Dmin	Dmax				
GGIR 16D 03R 1.18-.670	●	1.000	1.000	6.000	.118	.374	.670	1.180		1.70	GL01	LCM. 0313..
GGIR 16D 03R 1.54-.940	●	1.000	1.000	6.000	.118	.374	.940	1.540		1.70	GL01	LCM. 0313..
GGIR 16D 03R 1.97-1.30	●	1.000	1.000	6.000	.118	.433	1.300	1.970		1.70	GL01	LCM. 0313..
GGIR 16D 03R 2.36-1.69	●	1.000	1.000	6.000	.118	.433	1.690	2.360		1.70	GL01	LCM. 0313..
GGIR 16D 03R 2.99-2.09	●	1.000	1.000	6.000	.118	.433	2.090	2.990		1.70	GL01	LCM. 0313..
GGIR 16D 03R 3.94-2.76	●	1.000	1.000	6.000	.118	.354	2.760	3.940		1.70	GL04	LCM. 0316..
GGIR 16D 03R 5.12-3.54	●	1.000	1.000	6.000	.118	.354	3.540	5.120		1.70	GL04	LCM. 0316..
GGIR 16D 03R 6.69-4.33	●	1.000	1.000	6.000	.118	.354	4.330	6.690		1.70	GL04	LCM. 0316..
GGIL 16D 03L 1.18-.670	●	1.000	1.000	6.000	.118	.374	.670	1.180		1.70	GL01	LCM. 0313..
GGIL 16D 03L 1.54-.940	●	1.000	1.000	6.000	.118	.374	.940	1.540		1.70	GL01	LCM. 0313..
GGIL 16D 03L 1.97-1.30	●	1.000	1.000	6.000	.118	.433	1.300	1.970		1.70	GL01	LCM. 0313..
GGIL 16D 03L 2.36-1.69	●	1.000	1.000	6.000	.118	.433	1.690	2.360		1.70	GL01	LCM. 0313..
GGIL 16D 03L 2.99-2.09	●	1.000	1.000	6.000	.118	.433	2.090	2.990		1.70	GL01	LCM. 0313..
GGIL 16D 03L 3.94-2.76	●	1.000	1.000	6.000	.118	.354	2.760	3.940		1.70	GL04	LCM. 0316..
GGIL 16D 03L 5.12-3.54	●	1.000	1.000	6.000	.118	.354	3.540	5.120		1.70	GL04	LCM. 0316..
GGIL 16D 03L 6.69-4.33	●	1.000	1.000	6.000	.118	.354	4.330	6.690		1.70	GL04	LCM. 0316..

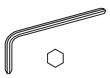
All Dimensions [in]

● stocked as standard / ○ not stocked as standard
See price list for current availability.

GGIR/L - 90°

SPARE PARTS

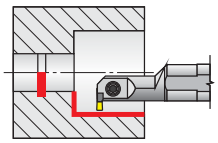
*) See pages T254-T255 for recommended screw torques

Type	Screw* 	Key 				
GL01	HS 0520C	HXK 4				
GL04	HS 0620C	HXK 5				

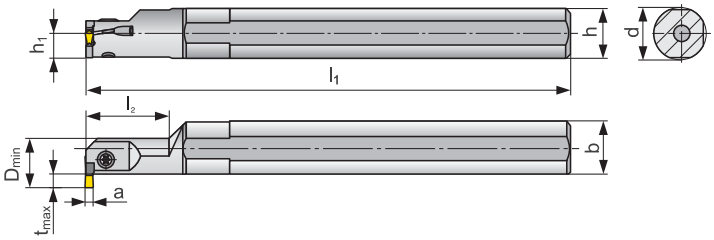
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

GG.R/L



T137 - T142



TOOLS FOR INTERNAL GROOVING & TURNING

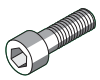
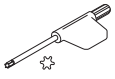
Designation	R/L	Dimensions									[lbs]	Spare parts	Inserts
		d	h	h_1	b	l_1	l_2	a	t_{max}	D_{min}			
A10Q-GGER/L 0313-04	● / ●	.625	.591	.296	.608	7.000	.984	.118	.118	.630	.51	GL06	LCMF 0313….-04
A12R-GGFR/L 0313-04	● / ●	.750	.709	.355	.729	8.000	1.181	.118	.217	.787	.73	GL06	LCMF 0313….-04
A16S-GGHR/L 0313	● / ●	1.000	.906	.453	.953	10.000	1.575	.118	.295	.984	1.70	GL06	LCM. 0313..
A16S-GGFR/L 0413	● / ●	1.000	.906	.453	.953	10.000	1.575	.158	.295	.984	1.70	GL06	LCM. 0413..
A20T-GGHR/L 0413	● / ●	1.250	1.181	.591	1.216	12.000	1.969	.158	.413	1.260	3.41	GL06	LCM. 0413..

All dimensions [in]

**) For inserts with a thickness 4mm

SPARE PARTS

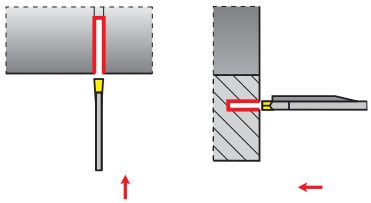
*) See pages T254-T255 for recommended screw torques

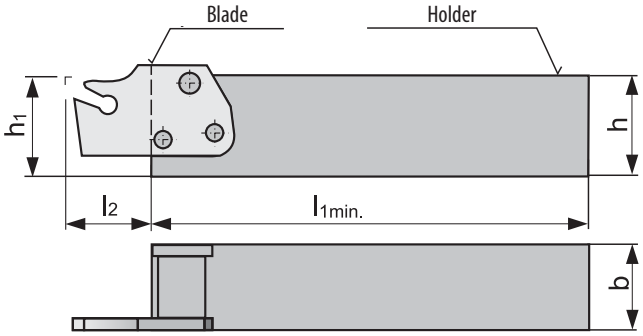
Type	Screw*	Key				
						
GL06	SR 85011-T15P	FLAG T15P				

● stocked as standard / ○ not stocked as standard
See price list for current availability.

MS-EN

MODULAR SYSTEM FOR PARTING AND GROOVING





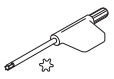
TOOLS FOR PARTING & GROOVING

Designation	Assortment	Dimensions										[lbs]	Spare parts	Inserts
		h=h1	b	l1	l2									
MS-EN-08 A	●	.500	.500	4.000	.591							.29	ND4	XLCF. 16..15...
					.788									XLCF. 16..20...
MS-EN-10 A	●	.625	.625	4.000	.591							.43	ND4	XLCF. 16..15...
					.788									XLCF. 16..20...
MS-EN-12 C	●	.750	.750	5.000	.591							.82	ND5	XLC.. 25..15...
					.984									XLC.. 25..25...
MS-EN-16 D	●	1.000	1.000	6.000	.591							1.65	ND5	XLC.. 25..15...
					.984									XLC.. 25..25...
MS-EN-85 E	●	1.250	1.000	7.000	.591							2.40	ND5	XLC.. 25..15...
					.984									XLC.. 25..25...

All dimensions [in]

SPARE PARTS

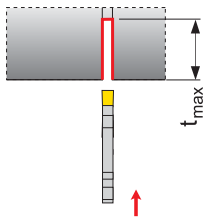
*) See pages T254-T255 for recommended screw torques

Type	Clamping screw*	Clamping screw*	Screwdriver			
						
ND4	3x US 4011-T15P	-	FLAG T15P			
ND5	2x US 45013-T20P	US 46017-T20P	FLAG T20P			

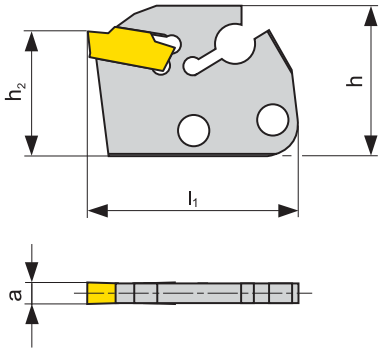
● stocked as standard /○ not stocked as standard
See price list for current availability.

XLCCN

MODULAR SYSTEM FOR PARTING AND GROOVING



T137 - T142



BLADES FOR PARTING & GROOVING

Designation	Assortment	Dimensions										[lbs]	Spare parts	Inserts
		h	h_2	l_1	a	t_{max}								
XLCCN 250215-0316	●	1.142	.945	1.575	.118	.591						.02	-	LCM. 0316..
XLCCN 250225-0316	●	1.142	.945	1.969	.118	.984						.04	-	LCM. 0316..
XLCCN 250315-0416	●	1.142	.945	1.575	.157	.591						.04	-	LCM. 0416..
XLCCN 250325-0416	●	1.142	.945	1.969	.157	.984						.07	-	LCM. 0416..
XLCCN 250425-0516	●	1.142	.945	1.969	.197	.984						.07	-	LCM. 0516..
XLCCN 250525-0616	●	1.142	.945	1.969	.236	.984						.09	-	LCM. 0616..

All dimensions [in]

SPARE PARTS

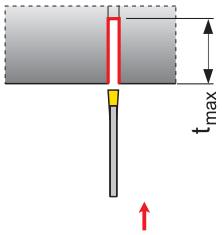
*) See pages T254-T255 for recommended screw torques

Type	Extractor					
-	-					

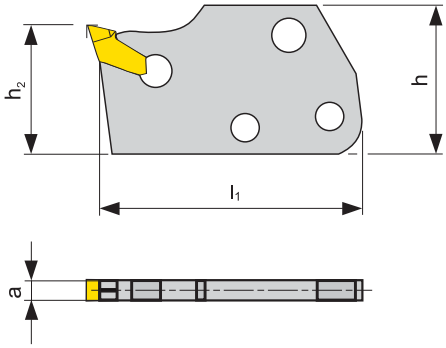
● stocked as standard / ○ not stocked as standard
See price list for current availability.

XLCFN

MODULAR SYSTEM FOR PARTING AND GROOVING



T143



BLADES FOR PARTING & GROOVING

Designation	Assortment	Dimensions										[lbs]	Spare parts	Inserts
		h	h_2	l_1	a	t_{max}								
XLCFN 160215-3.00	●	.984	.472	1.378	.122	.591						.02	KV	LFMX 3.10.....
XLCFN 160220-3.00	●	.984	.472	1.575	.122	.787						.04	KV	LFMX 3.10.....
XLCFN 250215-3.00	●	1.142	.945	1.575	.122	.591						.04	KV	LFMX 3.10.....
XLCFN 250225-3.00	●	1.142	.945	1.969	.122	.984						.04	KV	LFMX 3.10.....
XLCFN 250315-4.00	●	1.142	.945	1.575	.161	.591						.04	KV	LFMX 4.10.....
XLCFN 250325-4.00	●	1.142	.945	1.969	.161	.984						.07	KV	LFMX 4.10.....
XLCFN 250425-5.00	●	1.142	.945	1.969	.201	.984						.09	KV	LFMX 5.10.....
XLCFN 250525-6.35	●	1.142	.945	1.969	.250	.984						.09	KV	LFMX 6.35.....

All dimensions [in]

SPARE PARTS

*) See pages T254-T255 for recommended screw torques

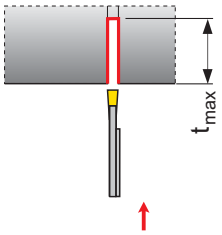
Type	Extractor					
KV	KV 5x70					

PRAMET

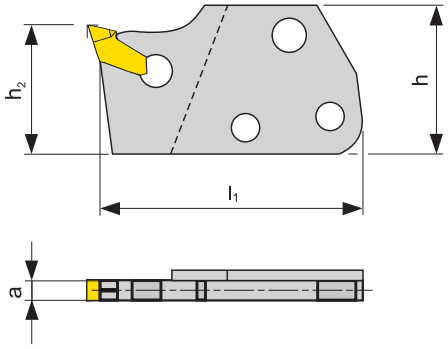
● stocked as standard /○ not stocked as standard
See price list for current availability.

XLCFN/R/L

MODULAR SYSTEM FOR PARTING AND GROOVING



T143



BLADES FOR PARTING & GROOVING

Designation	R/L	Dimensions h	h_2	l_1	a	t_{max}	[lbs]	Spare parts	Inserts
XLCFR/L 160115-1.60	● / ●	.984	.472	1.378	.059 - .063	.591	.02	KV	LFMX 1.50…, LFMX 1.60…
XLCFR/L 160115-2.00	● / ●	.984	.472	1.378	.079-.087	.591	.02	KV	LFMX 2.00..., LFMX 2.20...
XLCFR/L 250115-1.60	● / ●	1.142	.945	1.575	.059 - .063	.591	.02	KV	LFMX 1.50…, LFMX 1.60…
XLCFR/L 250115-2.00	● / ●	1.142	.945	1.575	.079-.087	.591	.02	KV	LFMX 2.00..., LFMX 2.20...

All dimensions [in]

SPARE PARTS

*) See pages T254-T255 for recommended screw torques

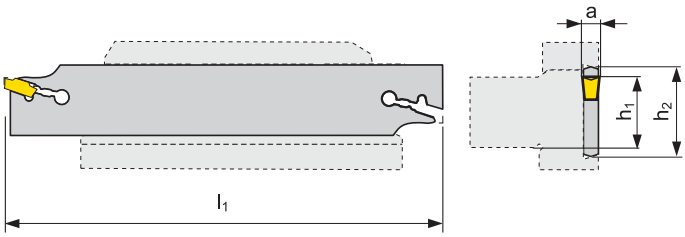
Type	Extractor 
KV	KV 5x70

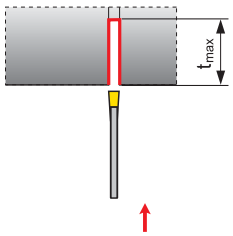
● stocked as standard / ○ not stocked as standard
See price list for current availability.

XLCCN

MODULAR SYSTEM FOR PARTING AND GROOVING

T137 - T142





BLADES FOR PARTING & GROOVING

Designation	Assortment	Dimensions										[lbs]	Spare parts	Inserts
		h_1	h_2	l_1	a	t_{max}								
XLCCN 2602 J 0316	●	.787	1.024	4.331	.118	1.378						.11	KV1	LCM. 0316..
XLCCN 3202 M 0316	●	.984	1.260	5.906	.118	1.969						.18	KV1	LCM. 0316..
XLCCN 3203 M 0416	●	.984	1.260	5.906	.157	1.969						.24	KV1	LCM. 0416..
XLCCN 3204 M 0516	●	.984	1.260	5.906	.197	2.362						.31	KV1	LCM. 0516..
XLCCN 3205 M 0616	●	.984	1.260	5.906	.236	2.362						.37	KV1	LCM. 0616..

All dimensions [in]

SPARE PARTS

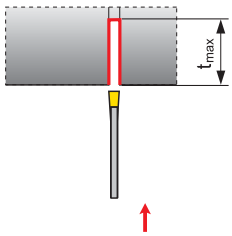
*) See pages T254-T255 for recommended screw torques

Type	Extractor					
KV1	KV 5x100					

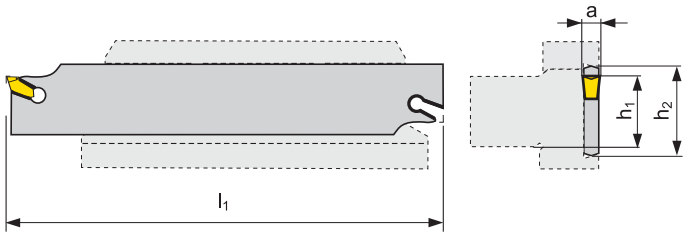
● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

XLCFN



T143



BLADES FOR PARTING & GROOVING

Designation	Assortment	Dimensions					Holder	[lbs]	Spare parts	Inserts
		h_1	h_2	l_1	a	t_{max}				
XLCFN 2601 J 1.60	●	.787	1.024	4.331	.059 - .063	.591	26-D.	.07	KV	LFMX 1.50..., LFMX 1.60...
XLCFN 2601 J 2.00	●	.787	1.024	4.331	.079-.087	.984	26-D.	.09	KV	LFMX 2.00..., LFMX 2.20...
XLCFN 2602 J 3.00	●	.787	1.024	4.331	.122	1.476	26-D.	.11	KV	LFMX 3.10...
XLCFN 2603 J 4.00	●	.787	1.024	4.331	.161	1.575	26-D.	.13	KV	LFMX 4.10...
XLCFN 3201 M 1.60	●	.984	1.260	5.906	.059 - .063	.591	32-D.	.13	KV	LFMX 1.50..., LFMX 1.60...
XLCFN 3201 M 2.00	●	.984	1.260	5.906	.079-.087	.984	32-D.	.15	KV	LFMX 2.00..., LFMX 2.20...
XLCFN 3202 M 3.00	●	.984	1.260	5.906	.122	1.969	32-D.	.18	KV	LFMX 3.10...
XLCFN 3203 M 4.00	●	.984	1.260	5.906	.161	1.969	32-D.	.24	KV	LFMX 4.10...
XLCFN 3204 M 5.00	●	.984	1.260	5.906	.201	2.362	32-D.	.31	KV	LFMX 5.10...
XLCFN 3205 M 6.35	●	.984	1.260	5.906	.250	2.362	32-D.	.37	KV	LFMX 6.35...
XLCFN 4502 S 3.00	●	1.260	1.772	9.843	.122	3.150	45-D.	.26	KV	LFMX 3.10...
XLCFN 4503 S 4.00	●	1.260	1.772	9.843	.161	3.150	45-D.	.42	KV	LFMX 4.10...
XLCFN 4504 S 5.00	●	1.260	1.772	9.843	.201	3.150	45-D.	.62	KV	LFMX 5.10...
XLCFN 4505 S 6.35	●	1.260	1.772	9.843	.250	3.150	45-D.	.88	KV	LFMX 6.35...

All Dimensions

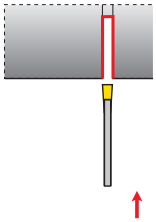
SPARE PARTS

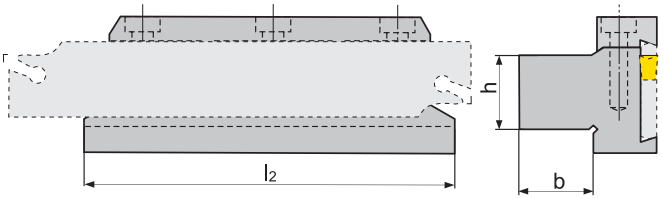
*) See pages T254-T255 for recommended screw torques

Type	Extractor
KV	KV 5x70

● stocked as standard / ○ not stocked as standard
See price list for current availability.

DU





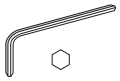
HOLDER FOR EXTERNAL TURNING

Designation	Assortment	Dimensions h	b	l_2						[lbs]	Spare parts	Inserts
26-DU 12	●	.750	.750	3.540						1.15	ND2	XLC.N 26..
32-DU 74	●	1.000	.875	4.330						1.88	ND2	XLC.N 32..
32-DU 104	●	1.000	1.250	4.330						2.32	ND2	XLC.N 32..
32-DU 95	●	1.250	1.125	4.330						2.32	ND2	XLC.N 32..
45-DU 95	●	1.250	1.125	4.330						2.98	ND7	XLC.N 45..
45-DU 24	●	1.500	1.500	4.330						3.90	ND7	XLC.N 45..

All dimensions [in]

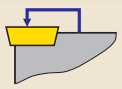
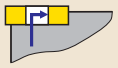
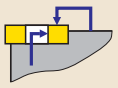
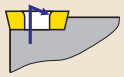
SPARE PARTS

*) See pages T254-T255 for recommended screw torques

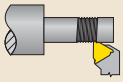
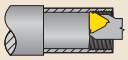
Type	Clamping screw*	Key
		
ND2	HS 0625	HXK 5
ND7	HS 0630	HXK 5

● stocked as standard /○ not stocked as standard
See price list for current availability.

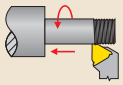
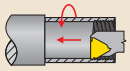
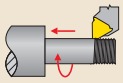
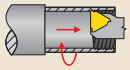
1 Clamping Designation

C	
P	
M	
S	

2 External/Internal

E	external	
I	internal	

3 Direction of cut

R - Right	external	
	internal	
L - Left	external	
	internal	

4 Type of construction

-	normal
S	special

ISO CODE

1	2	3		4	5	6	7		8
S	E	R	-	S	2525	M	16	-	

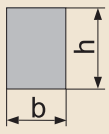
ANSI CODE

1	2	3		4	5	6	7		8
S	E	R	-	S	16	D	16	-	

5 Tool dimensions [mm]

External turning	2525	25 x 25 mm
Internal turning	1416	shank width - 16 mm

5

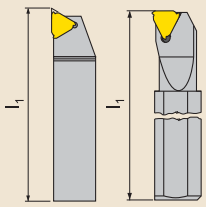


	b [in]	h [in]		b [in]	h [in]
10	5/8	5/8	85	1	1 1/4
12	3/4	3/4	86	1	1 1/2
16	1	1	20	1 1/4	1 1/4

For square shanks, this is the number of 16ths of an inch of width and height. For rectangular shanks, the first digit is the number of 8ths of an inch of width, and the second digit is the number of 4ths of an inch of height.

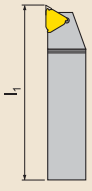
	d [in]		d [in]
08	.500	16	1.000
10	.625	20	1.250
12	.750	24	1.500

6 Total Length

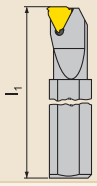


	l_1 [mm]
K	125
L	140
M	150
N	160
P	170
Q	180
R	200
S	250
T	300

6



	l_1 [in]
C	5.000
D	6.000
E	7.000
F	8.000



	l_1 [in]
K	5.000
M	6.000
P	6.250
Q	7.250
R	8.000
S	10.000
T	12.000
U	14.000

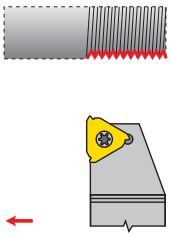
7 Insert dimensions [mm]

d = I.C.		T
[mm]	[in]	
6,350	1/4	11
9,525	3/8	16
12,700	1/2	22

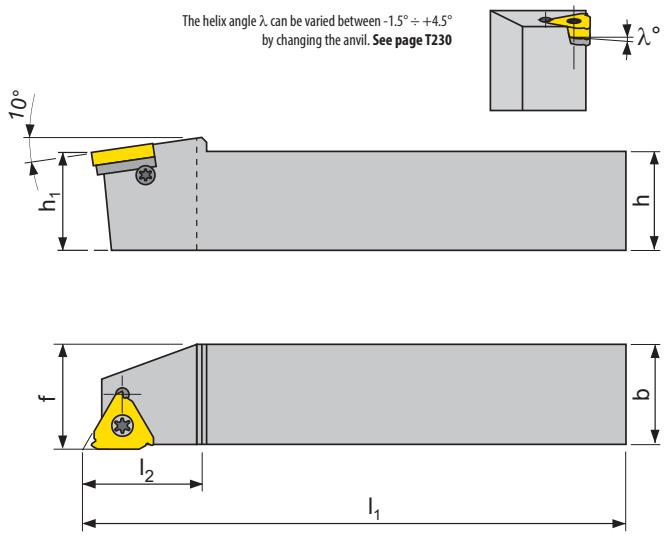
8

	Helix angle λ
0	Helix angle λ = 0°
1	Helix angle λ = 1°
2	Helix angle λ = 2°

SER/L



T144-T147



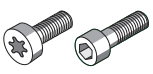
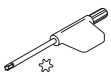
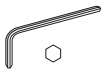
TOOLS FOR EXTERNAL THREADING

Designation	R/L	Dimensions								[lbs]	Spare parts	Inserts
		h=h1	b	l1	l2	f						
SER/L 12 C16	● / ●	.750	.750	5.000	.900	.750				.77	Z12	TN 16ER/L..
SER/L 16 D16	● / ●	1.000	1.000	6.000	.950	1.000				1.54	Z12	TN 16ER/L..
SER/L 85 D16	● / ●	1.250	1.000	6.000	1.000	1.000				1.98	Z12	TN 16ER/L..
SER/L 16 D22	● / ●	1.000	1.000	6.000	1.000	1.000				1.54	Z13	TN 22ER/L..
SER/L 85 D22	● / ●	1.250	1.000	6.000	1.000	1.000				1.98	Z13	TN 22ER/L..

All dimensions [in]

SPARE PARTS

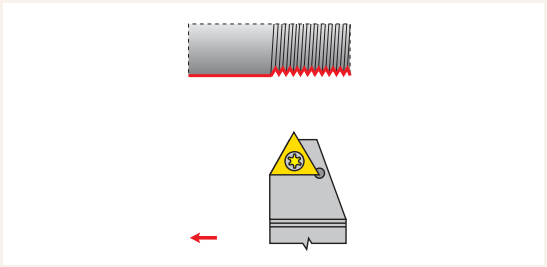
*) See pages T254-T255 for recommended screw torques

Type	Clamp. screw*	Shim screw	Screwdriver	Key	Shim	
						
Z12	US 3512A-T15P	HS 0304	FLAG T15P	HXK 2,5	str. T230	
Z13	US 4514A-T20	SP 0405	FLAG T20	-	str. T230	

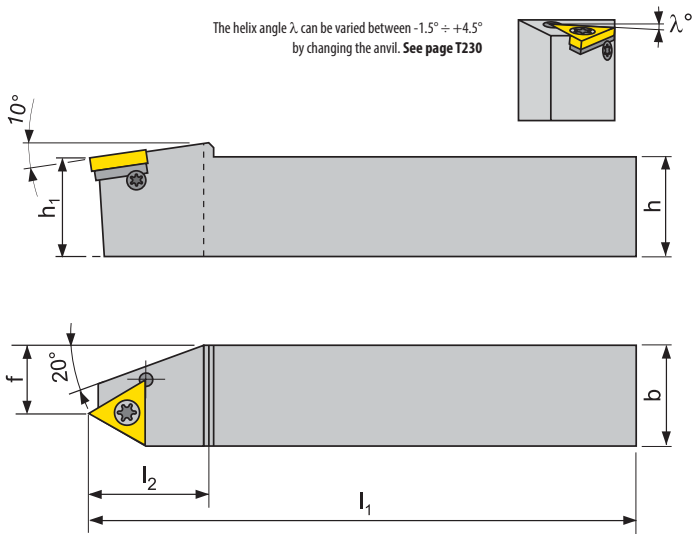
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

SER/L-S



T144-T147



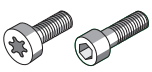
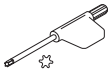
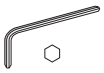
TOOLS FOR EXTERNAL THREADING

Designation	R/L	Dimensions								[lbs]	Spare parts	Inserts
		h=h1	b	l1	l2	f						
SER/L-S 16 D22	● / ●	1.000	1.000	6.000	1.200	.575				.77	Z13	TN 22EN..
SER/L-S 85 D22	● / ●	1.250	1.000	6.000	1.200	.575				1.54	Z13	TN 22EN..

All dimensions [in]

SPARE PARTS

*) See pages T254-T255 for recommended screw torques

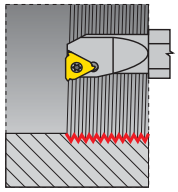
Type	Clamp. screw*	Shim screw	Screwdriver	Key	Shim	
						
Z13	US 4514A-T20	SP 0405	FLAG T20	-	str. T230	

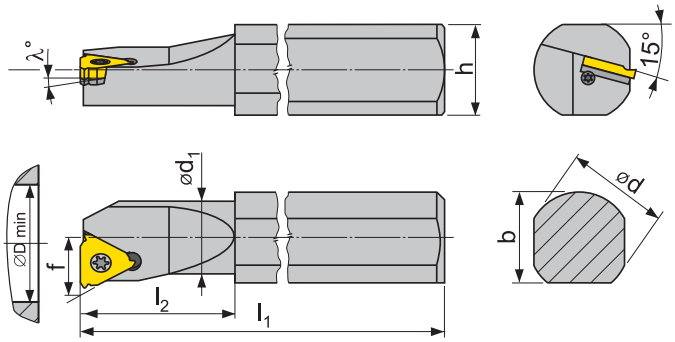
● stocked as standard / ○ not stocked as standard
See price list for current availability.

SIR/L

T 144-T147

The helix angle λ can be varied between -1.5° ÷ +4.5° by changing the anvil. **See page T230**





TOOLS FOR INTERNAL THREADING

Designation	R/L	Dimensions b	d	D_{min}	h	l_1	l_2	d_1	f	[lbs]	Spare parts	Inserts
SIR/L 10 K11-0	● / ●	.570	.625	.500	.550	5.000	1.000	.380	.295	.33	Z11	TN 11NR/L.
SIR/L 10 K11-1	● / ●	.570	.625	.500	.550	5.000	1.000	.380	.295	.33	Z11	TN 11NR/L.
SIR/L 10 M11-0	● / ●	.570	.625	.630	.550	6.000	1.250	.500	.350	.44	Z11	TN 11NR/L..
SIR/L 10 M11-1	● / ●	.570	.625	.630	.550	6.000	1.250	.500	.350	.44	Z11	TN 11NR/L..
SIR/L 10 M16-0	● / ●	.550	.625	.850	.550	6.000	-		.450	.44	Z9	TN 16NR/L..
SIR/L 10 M16-1	● / ●	.550	.625	.850	.550	6.000	-		.450	.44	Z9	TN 16NR/L..
SIR/L 10 M16-2**	● / ●	.550	.625	.650	.550	6.000	1.500	.600	.430	.44	Z10	TN 16NR/L..
SIR/L 12 P16	● / ●	.700	.750	.850	.700	6.250	-		.500	.66	Z12	TN 16NR/L..
SIR/L 16 Q16	● / ●	.900	1.000	1.150	.900	7.250	-		.650	1.37	Z12	TN 16NR/L..
SIR/L 20 S16	● / ●	1.200	1.250	1.400	1.000	10.000	-		.760	2.98	Z12	TN 16NR/L..
SIR/L 20 S22	● / ●	1.200	1.250	1.450	1.000	10.000	-		.850	2.98	Z13	TN 22NR/L..
SIR/L 20 S22-2**	● / ●	1.200	1.250	1.000	1.000	10.000	3.000	.950	.650	2.43	Z14	TN 22NR/L..
SIR/L 24 T22	● / ●	1.250	1.500	1.750	1.450	12.000	-		.950	5.18	Z13	TN 22NR/L..

***) With internal cooling*

All Dimensions

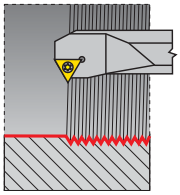
SPARE PARTS

**) See pages T254-T255 for recommended screw torques*

Type	Clamp. screw*	Shim screw	Screwdriver	Key	Shim	
Z9	US 3510A-T15P	-	FLAG T15P	-	P-16	
Z10	US 3510A-T15P	-	FLAG T15P	-	-	
Z11	US 2506-T07P	-	FLAG T07P	-	-	
Z12	US 3512A-T15P	HS 0304	FLAG T15P	HXK 2,5	str. T230	
Z13	US 4514A-T20	SP 0405	FLAG T20	-	str. T230	
Z14	US 4514A-T20	-	FLAG T20	-	-	

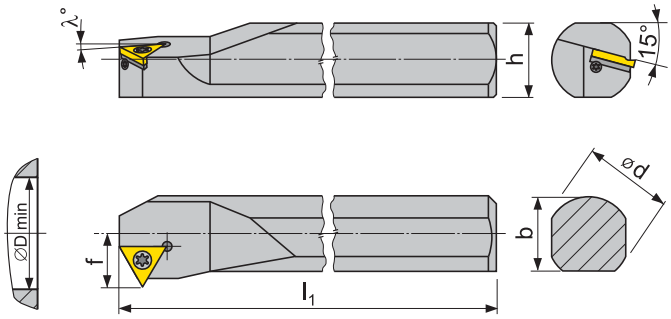
● stocked as standard /○ not stocked as standard
See price list for current availability.

SIR/L-S



T144-T147

The helix angle λ can be varied between -1.5° ÷ +4.5° by changing the anvil. **See page T230**



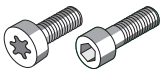
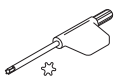
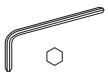
TOOLS FOR INTERNAL THREADING

Designation	R/L	Dimensions								[lbs]	Spare parts	Inserts
		b	d	D_{min}	h	l_1	l_2	d_1	f			
SIR/L-S 20 S22	● / ●	1.200	1.250	1.550	1.000	10.000	-	-	.880	2.86	Z13	TN 22NN..
SIR/L-S 24 T22	● / ●	1.250	1.500	1.800	1.450	12.000	-	-	1.020	5.07	Z13	TN 22NN..

All Dimensions

SPARE PARTS

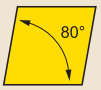
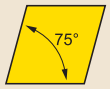
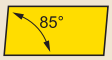
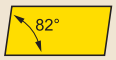
*) See pages T254-T255 for recommended screw torques

Type	Clamp. screw*	Shim screw	Screwdriver	Key	Shim	
						
Z13	US 4514A-T20	SP 0405	FLAG T20	-	str. T230	

● stocked as standard / ○ not stocked as standard
See price list for current availability.

DESIGNATION CODE - INSERTS

1 – Insert shape

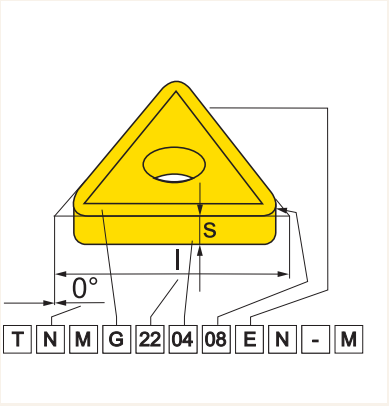
 H	 O	 P	 R
 S	 T	 C	 D
 E	 M	 V	 W
 L	 A	 B	 K

2 – Clearance angle

 A	 B
 C	 D
 E	 F
 G	 N
 P	Special O

4 – Insert type

 N	 R
 F	 A
 M	 G
 W	 T
 Q	Special X



CODE

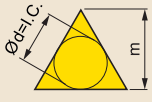
1	2	3	4
T	N	U	N
T	N	M	G

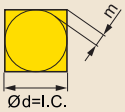
ANSI CODE

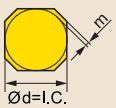
1	2	3	4
T	N	U	N
T	N	M	G

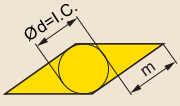
3 – Tolerances

Symbol	Tolerances [mm]			Tolerances [In]		
	m (±)	s (±)	d = I.C. (±)	m (±)	s (±)	d = I.C. (±)
A	0,005	0,025	0,025	0,0002	0,001	0,0010
F	0,005	0,025	0,013	0,0002	0,001	0,0005
C	0,013	0,025	0,025	0,0005	0,001	0,0010
H	0,013	0,025	0,013	0,0005	0,001	0,0005
E	0,025	0,025	0,025	0,0010	0,001	0,0010
G	0,025	0,130	0,025	0,0010	0,005	0,0010
J	0,005	0,025	0,05 ÷ 0,13	0,0002	0,001	0,002 ÷ 0,005
K	0,013	0,025	0,05 ÷ 0,13	0,0005	0,001	0,002 ÷ 0,005
L	0,025	0,025	0,05 ÷ 0,13	0,0010	0,001	0,002 ÷ 0,005
M	0,08 ÷ 0,18	0,130	0,05 ÷ 0,13	0,003 ÷ 0,007	0,005	0,002 ÷ 0,005
N	0,08 ÷ 0,18	0,025	0,05 ÷ 0,13	0,003 ÷ 0,007	0,001	0,002 ÷ 0,005
U	0,05 ÷ 0,38	0,130	0,08 ÷ 0,25	0,005 ÷ 0,015	0,005	0,003 ÷ 0,010









PRAMET

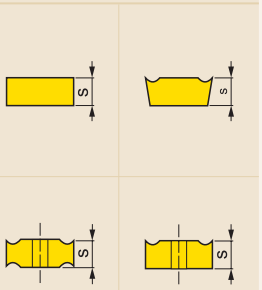
5

Cutting edge length

d=I.C.		R	S	T	C	D	E	V	W
mm									
3,97	5/32"			06				07	02
5,00		05							
5,56	7/32"			09			05		03
6,00		06							
6,35	1/4"			11	06	07			04
7,94	5/16"				08		08	13	
8,00		08							
9,525	3/8"	09	09	16	09	11		16	06
10,0		10							
12,0		12							
12,7	1/2"	12	12	22	12	15			08
15,875	5/8"	15	15	27	16				
16,0		16							
19,05	3/4"	19	19	33	19				
20,0		20							
25,0		25							
25,4	1"	25	25		25				
31,75	1 1/4"	31							
32,0		32							
38,1	1 1/2"		38						

6

Thickness



Symb.	s	
	mm	In
01	1,59	1/16"
T1	1,98	5/64"
02	2,38	3/32"
03	3,18	1/8"
T3	3,97	5/32"
04	4,76	3/16"
05	5,56	7/32"
06	6,35	1/4"
07	7,94	5/16"
09	9,52	3/8"

7

Nose radius

Symb.	r_ε mm	In
00	0	0"
02	0,2	1/128"
04	0,4	1/64"
08	08	1/32"
12	1,2	3/64"
16	1,6	1/16"
24	2,4	3/32"
32	3,2	1/8"

Round inserts

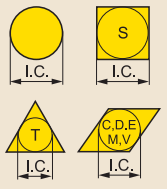
d=I.C.	Symb.
In	00
mm	M0

5	6	7	8	9		10
22	04	08				
22	04	08	E	N	-	M

5A	6A	7A	8	9		10
4	3	2				
4	3	2	E	N	-	M

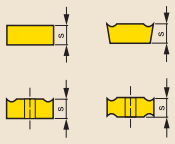
ANSI CODE

Inscribed circle



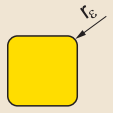
Symb.	d = I.C.	
	mm	In
1	3,175	1/8"
1.2	3,969	5/32"
1.5	4,763	3/16"
1.8	5,556	7/32"
2	6,350	1/4"
2.5	7,938	5/16"
3	9,525	3/8"
4	12,700	1/2"
5	15,875	5/8"
6	19,050	3/4"
7	22,225	7/8"
8	25,400	1"
10	31,750	1-1/4"

Thickness



Symb.	s	
	mm	In
1	1,588	1/16"
1.2	1,984	5/64"
1.5	2,381	3/32"
2	3,175	1/8"
2.5	3,969	5/32"
3	4,763	3/16"
3.5	5,556	7/32"
4	6,350	1/4"
5	7,938	5/16"
6	9,525	3/8"
7	11,113	7/16"
8	12,700	1/2"
9	14,288	9/16"
10	15,875	5/8"

Nose radius



Symb.	r_ε mm	In
0	0,050	1/512"
0.2	0,099	1/256"
0.5	0,198	1/128"
1	0,397	1/64"
2	0,794	1/32"
3	1,191	3/64"
4	1,588	1/16"
5	1,984	5/64"
6	2,381	3/32"
7	2,778	7/64"
8	3,175	1/8"
10	3,969	5/32"
12	4,763	3/16"
14	5,556	7/32"
16	6,350	1/4"
x	Other	Other

8

Cutting edge design

F	Sharp edges	E	Rounded edges
T	Edges with facet	S	Rounded edges with facet
K	Edges with double facet	P	Rounded edges with double facet

9

Feed direction

R	Feed	N	
L	Feed		Feed Feed

10

Chip breaker designation

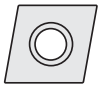
CCGT

T88

CCMT

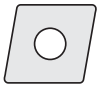
T89

CCMW



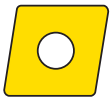
T90

CNMA



T91

CNMG

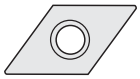


T92 - T93

CNMM

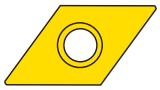
T94 - T95

DCGT



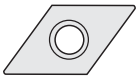
T95

DCMT



T96

DCMW



T97

DNMA

T97

DNMG

T98 -T99

DNMM

T100

RCGT

T101

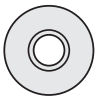
RCMH

T101

RCMT

T102

RCMW



T103

RCMX

T104

RNMG

T105

SCGT

T105

SCMT

T106

SCMW

T107

SNMA

T108

SNMG

T109

SNMM

T110 - T111

TCGT

T112

TCMT

T113

TCMW

T114

TNMA

T115

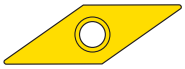
TNMG

T116 - T117

TNMM

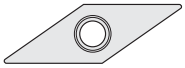
T118

VBMT



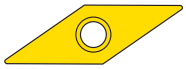
T119

VCGT



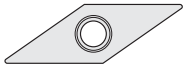
T120

VCMT



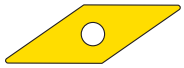
T121

VCMW



T122

VNMG



T123

WCGT

T124

WCMT

T125

WNMA

T126

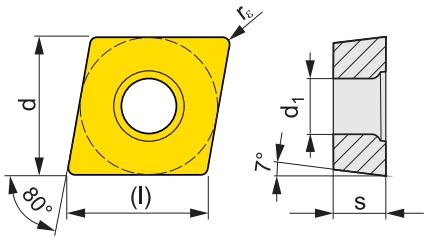
WNMG

T127 - T128

WNMM

T129

CCGT



Dimensions	(l)	d	d_1	s		
21.5	.252	1/4	.110	3/32		
32.5	.382	3/8	.173	5/32		
43	.508	1/2	.217	3/16		

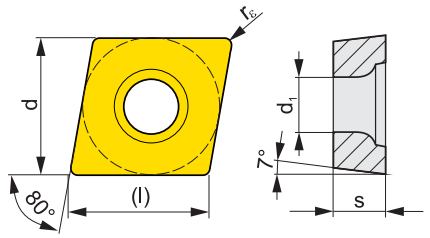
All dimensions [in]

For tools see pages: T37, T48

Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		T8330	HF7														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	CCGT 21.50.5F-AL		●														1/128	.002	.006	.012	.118
	CCGT 21.51F-AL		●														1/64	.004	.012	.016	.138
	CCGT 32.50.5F-AL		●														1/128	.004	.006	.012	.157
	CCGT 32.51F-AL		●														1/64	.004	.012	.016	.177
	CCGT 32.52F-AL		●														1/32	.006	.024	.031	.197
	CCGT 431F-AL		●														1/64	.004	.012	.016	.276
	CCGT 432F-AL		●														1/32	.006	.024	.031	.276
	CCGT 21.50.5R-SI	●															1/128	.003	.006	.016	.063
	CCGT 21.51R-SI	●															1/64	.003	.010	.020	.059
	CCGT 32.51R-SI	●															1/64	.006	.012	.031	.079
	CCGT 432R-SI	●															1/32	.009	.017	.039	.157
	CCGT 21.50.5L-SI	●															1/128	.003	.006	.016	.063
	CCGT 21.51L-SI	●															1/64	.003	.010	.020	.059
	CCGT 32.51L-SI	●															1/64	.006	.012	.031	.079
	CCGT 432L-SI	●															1/32	.009	.017	.039	.157

● stocked as standard /○ not stocked as standard
See price list for current availability.

CCMT



Dimensions	(l)	d	d_1	s		
21.5	.252	1/4	.114	3/32		
32.5	.382	3/8	.177	5/32		
43	.508	1/2	.220	3/16		

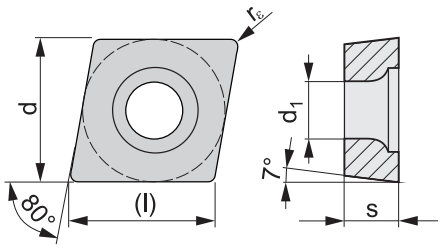
All dimensions [in]

For tools see pages: T37, T48

Chip breaker	Designation	Grades														Radius	Feed/rev.		Depth of cut	
		T5305	T5315	T7335	T9310	T9315	T9325	T8315	T8330	TT310						r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**CCMT 21.50.5-FF**							●	●							1/128	.002	.006	.008	.079
	CCMT 21.51-FF							●	●							1/64	.002	.009	.016	.079
	CCMT 32.51-FF							●	●							1/64	.002	.009	.016	.079
	**CCMT 21.50.5-FM**			●			●	●	●							1/128	.003	.006	.008	.039
	CCMT 21.51-FM			●		●	●	●	●							1/64	.003	.008	.016	.059
	CCMT 21.52-FM					●	●		●							1/32	.005	.012	.031	.079
	CCMT 32.50.5-FM			●			●	●	●							1/128	.002	.006	.008	.118
	CCMT 32.51-FM			●		●	●	●	●							1/64	.004	.012	.016	.118
	CCMT 32.52-FM			●		●	●	●	●							1/32	.006	.014	.031	.118
	CCMT 431-FM			●		●	●	●	●							1/64	.004	.012	.016	.157
	CCMT 432-FM			●		●	●	●	●							1/32	.006	.014	.031	.157
	CCMT 433-FM					●	●		●							3/64	.006	.018	.047	.157
	**CCMT 32.51-RM**	●	●	●		●	●		●							1/64	.006	.012	.039	.157
	CCMT 32.52-RM	●	●	●		●	●		●							1/32	.008	.016	.059	.157
	CCMT 432-RM	●	●	●		●	●		●							1/32	.008	.016	.059	.177
	CCMT 433-RM					●	●		●							3/64	.008	.020	.059	.177
	**CCMT 21.50.5-UR**			●			●	●	●	●						1/128	.003	.006	.008	.079
	CCMT 21.51-UR		●	●		●	●	●	●	●						1/64	.003	.012	.016	.079
	CCMT 21.51W-UR									●						1/64	.003	.012	.016	.079
	CCMT 21.52-UR		●			●	●		●							1/32	.003	.020	.031	.079
	CCMT 32.50.5-UR									●						1/128	.003	.006	.008	.118
	CCMT 32.51-UR		●	●	●	●	●	●	●	●						1/64	.003	.012	.016	.118
	CCMT 32.52-UR		●	●	●	●	●	●	●	●						1/32	.003	.020	.031	.118
	CCMT 32.52W-UR									●						1/32	.003	.020	.031	.118
	CCMT 431-UR		●			●	●		●							1/64	.003	.012	.016	.118
	CCMT 432-UR		●	●		●	●		●							1/32	.003	.020	.031	.157
	CCMT 433-UR		●			●	●		●							3/64	.003	.020	.047	.157

● stocked as standard / ○ not stocked as standard
See price list for current availability.

CCMW



Dimensions	(l)	d	d_1	s		
21.5	.252	1/4	.110	3/32		
32.5	.382	3/8	.173	5/32		
43	.508	1/2	.217	3/16		

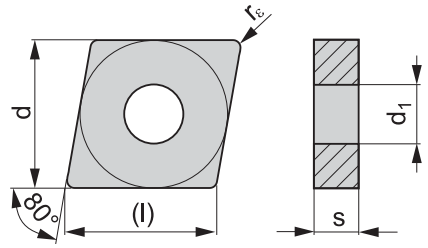
All dimensions [in]

For tools see pages: T37, T48

Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		T5305															r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**CCMW 21.50.5**	●															1/128	.004	.006	.008	.165
	CCMW 21.51	●															1/64	.004	.012	.016	.165
	CCMW 32.51	●															1/64	.004	.012	.016	.248
	CCMW 32.52	●															1/32	.004	.014	.031	.248
	CCMW 431	●															1/64	.004	.012	.016	.331
	CCMW 432	●															1/32	.004	.016	.031	.331

● stocked as standard /○ not stocked as standard
See price list for current availability.

CNMA



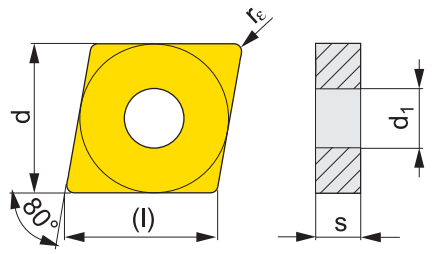
Dimensions	(l)	d	d_1	s		
43	.508	1/2	.203	3/16		
54	.634	5/8	.250	1/4		
64	.760	3/4	.313	1/4		

All dimensions [in]

For tools see pages: T16-T18, T31

Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		T5305	T5315														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	CNMA 431	●															1/64	.004	.012	.016	.331
	CNMA 432	●	●														1/32	.004	.024	.031	.331
	CNMA 433	●	●														3/64	.004	.024	.047	.331
	CNMA 434	●															1/16	.004	.024	.063	.331
	CNMA 543	●															3/64	.004	.024	.047	.335
	CNMA 643	●															3/64	.004	.035	.047	.500
	CNMA 644	●															1/16	.004	.035	.063	.500
	CNMA 432S	●															1/32	.004	.024	.031	.331
	CNMA 433S	●															3/64	.004	.024	.063	.331
	CNMA 543S	●															3/64	.004	.024	.047	.335
	CNMA 644S	●															1/16	.004	.035	.063	.500

CNMG



Dimensions	(l)	d	d_1	s		
32	.382	3/8	.150	1/8		
43	.508	1/2	.203	3/16		
54	.634	5/8	.250	1/4		
64	.760	3/4	.313	1/4		
86	1.016	1	.359	3/8		

All dimensions [in]

For tools see pages: T16-T18, T31

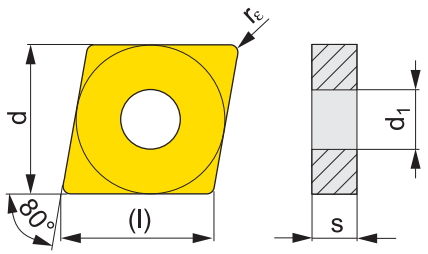
Chip breaker	Designation	Grades														Radius	Feed/rev.		Depth of cut	
		T5305	T5315	T7335	T9310	T9315	T9325	T9335	T8315	T8330	TT310					r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**CNMG 431-FF**								●							1/64	.002	.006	.016	.059
	CNMG 432-FF								●							1/32	.003	.008	.031	.059
	**CNMG 321-FM**					●	●			●						1/64	.004	.012	.020	.248
	CNMG 322-FM					●	●			●						1/32	.004	.018	.031	.118
	CNMG 431-FM			●	●	●	●		●	●	●					1/64	.004	.012	.020	.118
	CNMG 432-FM			●	●	●	●		●	●	●					1/32	.006	.018	.031	.118
	CNMG 433-FM					●	●									3/64	.006	.018	.047	.157
	**CNMG 433-KR**	●	●													3/64	.010	.028	.047	.276
	**CNMG 322-M**					●	●	●								1/32	.006	.024	.031	.157
	CNMG 431-M		●		●	●	●	●								1/64	.007	.012	.031	.236
	CNMG 432-M	●	●		●	●	●	●		●						1/32	.007	.024	.031	.236
	CNMG 433-M	●	●		●	●	●	●								3/64	.007	.031	.047	.236
	CNMG 434-M	●					●	●								1/16	.007	.031	.063	.236
	CNMG 542-M				●	●	●	●								1/32	.007	.024	.031	.276
	CNMG 543-M					●	●	●								3/64	.007	.024	.047	.276
	CNMG 544-M						●	●								1/16	.007	.024	.063	.276
	CNMG 642-M					●	●	●								1/32	.007	.024	.031	.315
	CNMG 643-M				●	●	●	●								3/64	.007	.031	.047	.315
	CNMG 644-M				●	●	●	●								1/16	.007	.031	.063	.315
	**CNMG 432-R**	●				●	●	●								1/32	.010	.024	.079	.236
	CNMG 433-R	●				●	●	●								3/64	.010	.028	.079	.236
	CNMG 543-R	●				●	●									3/64	.010	.028	.118	.276
	CNMG 544-R	●														1/16	.010	.028	.118	.276
	CNMG 643-R	●					●	●								3/64	.010	.028	.118	.315
	CNMG 644-R	●				●	●	●								1/16	.010	.028	.079	.354

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		T5305	T5315	T7335	T9310	T9315	T9325	T9335	T8315	T8330	TT310						r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**CNMG 432-RM**	●	●		●	●	●	●	●	●							1/32	.008	.020	.039	.276
	CNMG 433-RM	●	●		●	●	●	●	●	●							3/64	.010	.028	.059	.276
	CNMG 434-RM	●	●		●	●	●	●		●							1/16	.012	.030	.079	.276
	CNMG 542-RM	●	●			●	●	●		●							1/32	.008	.020	.039	.315
	CNMG 543-RM	●	●		●	●	●	●		●							3/64	.010	.028	.059	.315
	CNMG 544-RM	●	●		●	●	●	●									1/16	.012	.031	.079	.315
	CNMG 642-RM	●	●			●	●	●									1/32	.008	.020	.039	.394
	CNMG 643-RM	●	●		●	●	●	●		●							3/64	.010	.028	.059	.394
	CNMG 644-RM	●	●		●	●	●	●									1/16	.012	.031	.079	.394
	CNMG 866-RM					●	●	●									3/32	.016	.039	.098	.591
	**CNMG 432W-F**		●			●	●										1/32	.004	.024	.031	.173
	**CNMG 432W-M**		●			●	●										1/32	.006	.024	.031	.157
	CNMG 433W-M		●			●	●										3/64	.008	.035	.047	.157
	**CNMG 431-NM**			●			●			●							1/64	.006	.012	.020	.118
	CNMG 432-NM			●			●			●							1/32	.008	.016	.031	.118
	CNMG 433-NM			●			●			●							3/64	.008	.016	.047	.138
	CNMG 542-NM			●			●			●							1/32	.010	.020	.031	.197
	CNMG 543-NM			●			●										3/64	.010	.020	.047	.197
	CNMG 643-NM			●			●			●							3/64	.012	.020	.047	.315
	**CNMG 431R-SI**			●			●			●							1/64	.008	.012	.031	.197
	CNMG 432R-SI			●			●			●							1/32	.008	.020	.031	.197
	**CNMG 431L-SI**			●			●			●							1/64	.008	.012	.031	.197
	CNMG 432L-SI			●			●			●							1/32	.008	.020	.031	.197

CNMM



Dimensions	(l)	d	d_1	s		
43	.508	1/2	.203	3/16		
54	.634	5/8	.250	1/4		
64	.760	3/4	.313	1/4		
86	1.016	1	.359	3/8		

All dimensions [in]

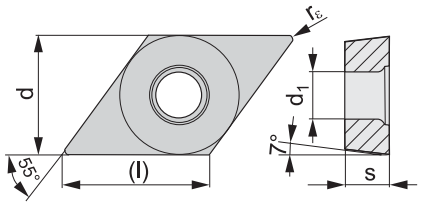
For tools see pages: T16-T18, T31

Chip breaker	Designation	Grades						Radius	Feed/rev.		Depth of cut	
		T7335	T9315	T9325	T9335	T8330	T8345	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	CNMM 543-DR			●	●			3/64	.012	.033	.098	.354
	CNMM 642-DR			●	●			1/32	.012	.024	.098	.354
	CNMM 643-DR			●	●			3/64	.012	.033	.098	.354
	CNMM 644-DR			●	●			1/16	.012	.033	.098	.354
	CNMM 644-HR			●	●		●	1/16	.020	.047	.197	.524
	CNMM 646-HR			●	●		●	3/32	.020	.055	.197	.524
	CNMM 866-HR			●	●		●	3/32	.020	.055	.197	.551
	CNMM 432-NR	●		●		●		1/32	.010	.024	.039	.331
	CNMM 433-NR	●		●		●		3/64	.010	.031	.047	.331
	CNMM 432-NR2	●		●		●		1/32	.010	.022	.031	.295
	CNMM 433-NR2	●		●		●		3/64	.011	.028	.047	.295
	CNMM 542-NR2	●		●		●		1/32	.012	.024	.039	.374
	CNMM 543-NR2	●		●		●		3/64	.014	.026	.059	.374
	CNMM 544-NR2	●		●				1/16	.014	.031	.079	.374
	CNMM 643-NR2	●		●		●		3/64	.014	.035	.059	.472
	CNMM 644-NR2	●		●		●		1/16	.016	.039	.079	.472
	CNMM 646-NR2	●		●				3/32	.016	.047	.098	.472
	CNMM 866-NR2	●		●		●		3/32	.020	.063	.118	.630
	CNMM 432-0R		●	●	●	●		1/32	.010	.024	.079	.315
	CNMM 433-0R		●	●	●			3/64	.012	.028	.098	.315
	CNMM 434-0R		●	●	●			1/16	.014	.031	.098	.315
	CNMM 542-0R		●	●	●			1/32	.012	.024	.118	.315
	CNMM 543-0R		●	●		●		3/64	.014	.035	.118	.394
	CNMM 544-0R		●	●				1/16	.014	.039	.118	.394
	CNMM 643-0R		●	●	●	●		3/64	.014	.035	.118	.394
	CNMM 644-0R		●	●	●	●	●	1/16	.015	.047	.118	.394
	CNMM 646-0R		●	●				3/32	.015	.049	.118	.472
	CNMM 866-0R		●	●	●	●	●	3/32	.018	.067	.157	.630

● stocked as standard /○ not stocked as standard
See price list for current availability.

Chip breaker	Designation	Grades						Radius	Feed/rev.		Depth of cut	
		T7335	T9315	T9325	T9335	T8330	T8345	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**CNMM 644-OR1**			●	●			1/16	.012	.039	.118	.433
	**CNMM 866-923**				●	●	●	3/32	.018	.059	.118	.512

DCGT



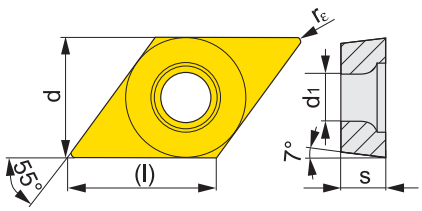
Dimensions	(l)	d	d_1	s		
21.5	.307	1/4	.114	3/32		
32.5	.457	3/8	.177	5/32		

All dimensions [in]

For tools see pages: T38-T39, T49-T52

Chip breaker	Designation	Grades						Radius	Feed/rev.		Depth of cut	
		HF7						r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**DCGT 21.50.5F-AL**	●						1/128	.002	.005	.012	.083
	DCGT 21.51F-AL	●						1/64	.004	.009	.016	.083
	DCGT 32.50.5F-AL	●						1/128	.002	.005	.012	.130
	DCGT 32.51F-AL	●						1/64	.004	.009	.016	.130
	DCGT 32.52F-AL	●						1/32	.006	.019	.031	.130

DCMT



Dimensions	(l)	d	d_1	s		
21.5	.307	1/4	.114	3/32		
32.5	.457	3/8	.177	5/32		

All dimensions [in]

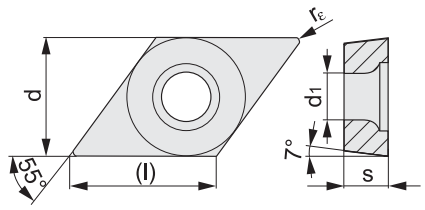
For tools see pages: T38-T39, T49-T52

Chip breaker	Designation	Grades								Radius	Feed/rev.		Depth of cut	
		T5305	T5315	T7335	T9315	T9325	T8315	T8330	TT310	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	DCMT 32.50.5-FF						●	●		1/128	.002	.005	.008	.079
	DCMT 32.51-FF						●	●		1/64	.002	.009	.016	.079
	DCMT 32.52-FF						●	●		1/32	.002	.009	.031	.079
	DCMT 21.50.5-FM					●	●	●		1/128	.002	.005	.008	.039
	DCMT 21.51-FM			●	●	●	●	●		1/64	.003	.009	.016	.079
	DCMT 32.50.5-FM					●	●	●		1/128	.003	.005	.008	.079
	DCMT 32.51-FM			●	●	●	●	●		1/64	.004	.009	.016	.118
	DCMT 32.52-FM			●	●	●	●	●		1/32	.004	.012	.031	.118
	DCMT 32.53-FM				●	●		●		3/64	.008	.016	.047	.130
	DCMT 32.51-RM	●	●	●	●	●		●		1/64	.006	.009	.039	.130
	DCMT 32.52-RM	●	●	●	●	●		●		1/32	.006	.016	.039	.130
	DCMT 32.53-RM			●	●	●		●		3/64	.006	.018	.059	.130
	DCMT 21.50.5-UR					●	●	●		1/128	.002	.005	.008	.039
	DCMT 21.51-UR				●	●	●	●	●	1/64	.002	.009	.016	.079
	DCMT 32.50.5-UR					●		●	●	1/128	.002	.005	.008	.079
	DCMT 32.51-UR		●	●	●	●	●	●	●	1/64	.003	.009	.016	.098
	DCMT 32.52-UR		●	●	●	●	●	●	●	1/32	.003	.019	.031	.098
	DCMT 32.53-UR				●	●				3/64	.006	.012	.047	.079

● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

DCMW



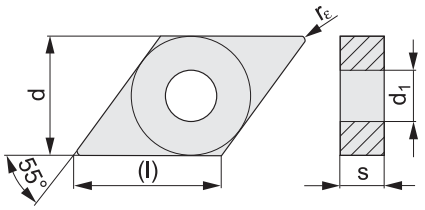
Dimensions	(l)	d	d_1	s		
21.5	.307	1/4	.110	3/32		
32.5	.457	3/8	.173	5/32		

All dimensions [in]

For tools see pages: T38-T39, T49-T52

Chip breaker	Designation	Grades														Radius	Feed/rev.		Depth of cut	
		T5305														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	DCMW 21.50.5	●														1/128	.002	.004	.008	.079
	DCMW 21.51	●														1/64	.004	.008	.016	.079
	DCMW 32.51	●														1/64	.004	.009	.016	.114
	DCMW 32.52	●														1/32	.004	.014	.031	.114

DNMA



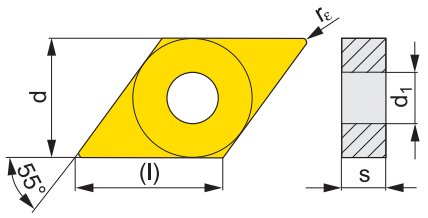
Dimensions	(l)	d	d_1	s		
43	.610	1/2	.203	3/16		
44	.610	1/2	.203	1/4		

All dimensions [in]

For tools see pages: T19-T20, T32

Chip breaker	Designation	Grades														Radius	Feed/rev.		Depth of cut	
		T5305														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	DNMA 431	●														1/64	.004	.009	.016	.154
	DNMA 432	●														1/32	.004	.019	.031	.154
	DNMA 441	●														1/64	.004	.009	.016	.154
	DNMA 442	●														1/32	.004	.019	.031	.154
	DNMA 443	●														3/64	.004	.028	.047	.154

DNMG



Dimensions	(l)	d	d_1	s		
33	.457	3/8	.150	3/16		
43	.610	1/2	.203	3/16		
44	.610	1/2	.203	1/4		

All dimensions [in]

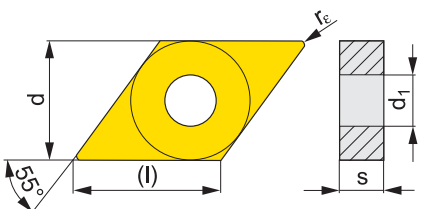
For tools see pages: T19-T20, T32

Chip breaker	Designation	Grades														Radius	Feed/rev.		Depth of cut	
		T5305	T5315	T7335	T9310	T9315	T9325	T9335	T8315	T8330	TT310					r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**DNMG 330.5-FF**								●							1/128	.002	.005	.008	.059
	DNMG 331-FF								●							1/64	.002	.008	.016	.059
	DNMG 332-FF								●							1/32	.003	.010	.031	.059
	DNMG 431-FF								●							1/64	.002	.008	.016	.059
	DNMG 441-FF								●							1/64	.002	.008	.016	.059
	DNMG 442-FF								●							1/32	.003	.010	.031	.059
	**DNMG 331-FM**				●	●	●		●	●						1/64	.004	.009	.016	.118
	DNMG 332-FM				●	●	●		●	●						1/32	.004	.014	.031	.118
	DNMG 431-FM					●	●			●						1/64	.004	.009	.020	.118
	DNMG 432-FM					●	●			●						1/32	.006	.018	.031	.118
	DNMG 441-FM			●	●	●	●		●	●	●					1/64	.004	.009	.020	.118
	DNMG 442-FM			●	●	●	●		●	●	●					1/32	.006	.018	.031	.118
	DNMG 443-FM					●	●			●						3/64	.006	.018	.047	.118
	**DNMG 331-M**		●			●	●	●								1/64	.005	.009	.031	.118
	DNMG 332-M		●			●	●	●								1/32	.006	.019	.031	.118
	DNMG 333-M					●	●	●								3/64	.007	.028	.047	.130
	DNMG 431-M					●	●	●								1/64	.007	.009	.031	.118
	DNMG 432-M					●	●	●								1/32	.006	.019	.031	.177
	DNMG 433-M						●	●								3/64	.007	.028	.047	.177
	DNMG 441-M		●			●	●	●								1/64	.007	.009	.031	.118
	DNMG 442-M		●		●	●	●	●								1/32	.006	.019	.031	.177
	DNMG 443-M		●		●	●	●	●								3/64	.007	.028	.047	.177
	**DNMG 331-NM**			●			●			●						1/64	.006	.009	.020	.118
	DNMG 332-NM			●			●			●						1/32	.008	.016	.031	.118
	DNMG 441-NM			●			●			●						1/64	.006	.009	.020	.118
	DNMG 442-NM			●			●			●						1/32	.008	.016	.031	.118
	DNMG 443-NM			●			●									3/64	.008	.016	.047	.138

● stocked as standard /○ not stocked as standard
See price list for current availability.

Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		T5305	T5315	T7335	T9310	T9315	T9325	T9335	T8315	T8330	TT310						r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**DNMG 442-R**	●					●										1/32	.010	.019	.079	.177
	DNMG 443-R	●				●	●										3/64	.010	.028	.079	.177
	**DNMG 332-RM**					●	●	●									1/32	.008	.019	.039	.130
	DNMG 333-RM					●	●	●									3/64	.010	.024	.059	.130
	DNMG 433-RM					●	●	●									3/64	.010	.028	.059	.177
	DNMG 442-RM	●	●		●	●	●	●	●	●							1/32	.008	.019	.039	.177
	DNMG 443-RM	●	●		●	●	●	●		●							3/64	.010	.028	.059	.177
	DNMG 444-RM		●			●	●	●									1/16	.012	.030	.079	.177
	**DNMG 331R-SI**			●			●			●							1/64	.008	.009	.031	.130
	DNMG 332R-SI			●			●			●							1/32	.008	.019	.031	.130
	DNMG 432R-SI			●			●			●							1/32	.008	.019	.031	.177
	DNMG 441R-SI			●			●			●							1/64	.008	.009	.031	.177
	DNMG 442R-SI			●			●			●							1/32	.008	.019	.031	.177
	**DNMG 331L-SI**			●			●			●							1/64	.008	.009	.031	.130
	DNMG 332L-SI			●			●			●							1/32	.008	.019	.031	.130
	DNMG 432L-SI			●			●			●							1/32	.008	.019	.031	.177
	DNMG 441L-SI			●			●			●							1/64	.008	.009	.031	.177
	DNMG 442L-SI			●			●			●							1/32	.008	.019	.031	.177

DNMM



Dimensions	(l)	d	d_1	s		
43	.610	1/2	.203	3/16		
44	.610	1/2	.203	1/4		

All dimensions [in]

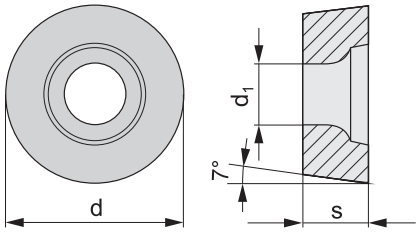
For tools see pages: T19-T20, T32

Chip breaker	Designation	Grades					Radius	Feed/rev.		Depth of cut	
		T7335	T9315	T9325	T9335	T8330	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	DNMM 432-NR	●		●			1/32	.010	.019	.039	.177
	DNMM 442-NR	●		●		●	1/32	.010	.019	.039	.177
	DNMM 442-NR2	●		●			1/32	.011	.019	.031	.177
	DNMM 442-OR			●	●		1/32	.010	.019	.079	.177
	DNMM 443-OR		●	●	●		3/64	.012	.028	.079	.177
	DNMM 444-OR			●	●		1/16	.014	.031	.079	.177

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

RCGT



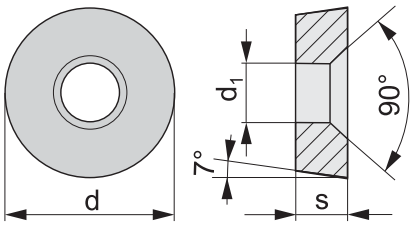
Dimensions	d	d_1	s
0803	.315	.134	1/8
1003	.394	.173	1/8

All dimensions [in]

For tools see pages: T40-T41

Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		HF7															r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**RCGT 0803M0F-AL**	●																.008	.059	.031	.118
	RCGT 1003M0F-AL	●																.008	.079	.039	.157

RCMH



Dimensions	d	d_1	s
3209	1.260	.413	3/8

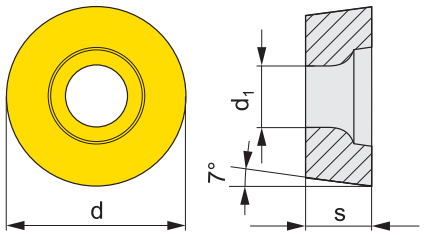
All dimensions [in]

For tools see pages: T40-T41

Chip breaker	ISO	Grades															Radius	Feed/rev.		Depth of cut	
		T9310	T9315	T9325													r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**RCMH 3209M0-RM2**	●	●	●														.031	.051	.079	.315
	**RCMH 3209M0-RR2**	●	●	●														.031	.059	.098	.315

● stocked as standard / ○ not stocked as standard
See price list for current availability.

RCMT



Dimensions	d	d_1	s
0602	.236	.110	3/32
0803	.315	.134	1/8
10T3	.394	.173	5/32
1204	.472	.173	3/16
1606	.630	.217	1/4
2006	.787	.256	1/4
2507	.984	.339	5/16

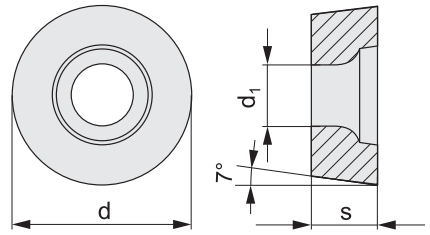
All dimensions [in]

For tools see pages: T40-T41

Chip breaker	Designation	Grades			Radius	Feed/rev.		Depth of cut	
		T9315	T9325	T8330	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**RCMT 1606M0S-37**	●	●			.008	.035	.039	.157
	**RCMT 2006M0S-371**		●			.008	.047	.039	.197
	**RCMT 2507M0S-372**		●			.008	.047	.039	.236
	**RCMT 0602M0E-FM**	●	●	●		.004	.024	.012	.094
	RCMT 0803M0E-FM	●	●	●		.006	.031	.020	.118
	RCMT 10T3M0E-FM	●	●	●		.012	.039	.028	.157
	RCMT 1204M0E-FM	●	●	●		.012	.039	.028	.189
	**RCMT 0602M0E-UR**		●	●		.004	.016	.009	.059
	RCMT 0803M0E-UR	●	●	●		.005	.020	.013	.118
	RCMT 10T3M0E-UR	●	●	●		.006	.024	.016	.157
	RCMT 1204M0E-UR		●	●		.007	.039	.019	.189

● stocked as standard /○ not stocked as standard
See price list for current availability.

RCMW



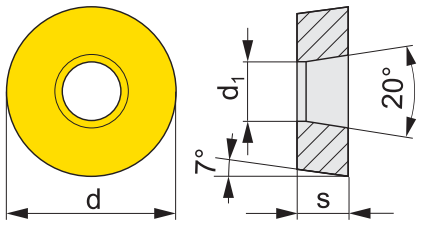
Dimensions	d	d_1	s			
0602	.236	.110	3/32			
0803	.315	.134	1/8			
10T3	.394	.173	5/32			
1204	.472	.173	3/16			

All dimensions [in]

For tools see pages: T40-T41

Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		T5305																			
																	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**RCMW 0602M0**	●																.004	.008	.020	.059
	RCMW 0803M0	●																.004	.012	.020	.079
	RCMW 10T3M0	●																.004	.014	.020	.098
	RCMW 1204M0	●																.004	.016	.020	.118

RCMX



Dimensions	d	d_1	s
1003	.394	.142	1/8
1204	.472	.165	3/16
1606	.630	.205	1/4
2006	.787	.256	1/4
2507	.984	.283	5/16
3209	1.260	.374	3/8

All dimensions [in]

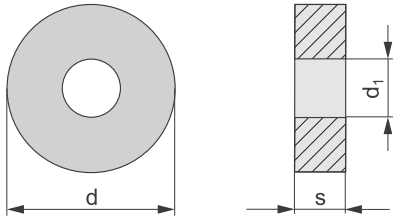
For tools see pages: T35-T36, T40-T41

Chip breaker	Designation	Grades						Radius	Feed/rev.		Depth of cut	
		T5305	T9310	T9315	T9325	T9335	T8345	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	RCMX 1003M0S-31				●	●			.016	.039	.059	.098
	RCMX 1204M0S-321				●	●			.016	.039	.039	.118
	RCMX 1606M0S-331			●	●	●			.016	.047	.039	.157
	RCMX 1606M0S-37			●	●				.008	.035	.039	.157
	RCMX 2006M0-RF1	●	●	●	●	●			.018	.047	.039	.197
	RCMX 2507M0-RF1		●	●	●	●	●		.024	.047	.059	.276
	RCMX 2006M0-RM1		●	●	●	●			.008	.051	.059	.197
	RCMX 2507M0-RM1		●	●	●	●			.024	.047	.079	.276
	RCMX 2507M0-RM2		●	●	●				.031	.059	.079	.276
	RCMX 3209M0-RM2		●	●	●	●			.031	.059	.079	.315
	RCMX 3209M0-RR2		●	●	●				.031	.059	.098	.315

● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

RNMG



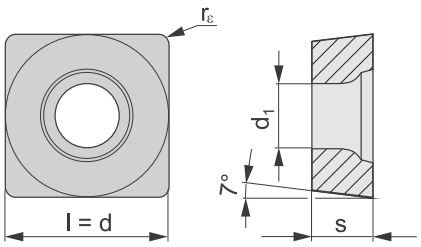
Dimensions	d	d_1	s			
43	.500	.203	3/16			
54	.625	.250	1/4			
64	.750	.250	1/4			

All dimensions [in]

For tools see pages: T21

Chip breaker	Designation	Grades			Radius	Feed/rev.		Depth of cut	
		T5305	T9315	T9325	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	RNMG 43-08	●	●	●	0	.012	.031	.039	.189
	RNMG 54-08	●	●	●	0	.012	.031	.039	.236
	RNMG 64-08		●	●	0	.012	.031	.039	.236

SCGT



Dimensions	l	d	d_1	s		
43	.500	1/2	.217	3/16		

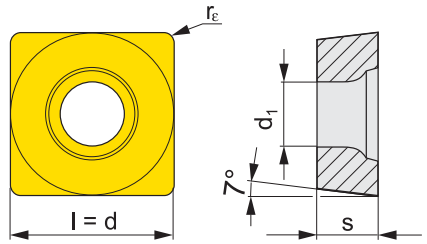
All dimensions [in]

For tools see pages: T42

Chip breaker	Designation	Grades	Radius	Feed/rev.		Depth of cut	
		HF7	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	SCGT 432F-AL	●	1/32	.006	.024	.031	.276

● stocked as standard / ○ not stocked as standard
See price list for current availability.

SCMT



Dimensions	l	d	d_1	s		
32.5	.375	3/8	.177	5/32		
43	.500	1/2	.220	3/16		

All dimensions [in]

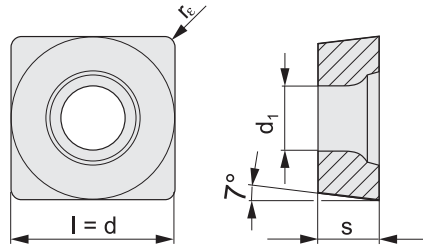
For tools see pages: T42

Chip breaker	Designation	Grades								Radius	Feed/rev.		Depth of cut	
		T5305	T5315	T7335	T9315	T9325	T8315	T8330	TT310	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	SCMT 32.51-FM			●	●	●	●	●		1/64	.004	.012	.016	.118
	SCMT 32.52-FM			●	●	●	●	●		1/32	.006	.014	.031	.118
	**SCMT 431-FM**				●	●	●	●		1/64	.004	.012	.016	.157
	SCMT 432-FM			●	●	●	●	●		1/32	.006	.014	.031	.157
	SCMT 433-FM				●	●		●		3/64	.006	.018	.047	.157
	**SCMT 32.52-RM**	●	●	●	●	●		●		1/32	.008	.016	.059	.157
	SCMT 432-RM	●	●	●	●	●		●		1/32	.008	.016	.059	.177
	**SCMT 32.51-UR**				●	●		●		1/64	.003	.012	.016	.118
	SCMT 32.52-UR		●		●	●		●	●	1/32	.003	.020	.031	.118
	SCMT 432-UR		●		●	●		●		1/32	.003	.020	.031	.157
	SCMT 433-UR					●		●		3/64	.003	.020	.047	.157

● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

SCMW



Dimensions	l	d	d_1	s		
32.5	.375	3/8	.173	5/32		
43	.500	1/2	.217	3/16		

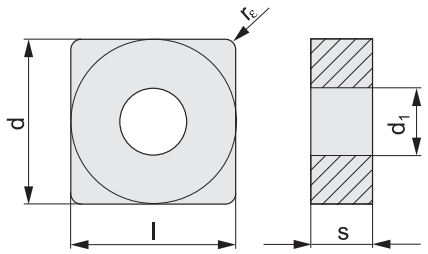
All dimensions [in]

For tools see pages: T42

Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		T5305															r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	SCMW 32.51	●															1/64	.004	.013	.016	.177
	SCMW 32.52	●															1/32	.004	.014	.031	.177
	SCMW 432	●															1/32	.004	.016	.031	.236

● stocked as standard / ○ not stocked as standard
See price list for current availability.

SNMA



Dimensions	(l)	d	d_1	s		
43	.500	1/2	.203	3/16		
54	.625	5/8	.250	1/4		
64	.750	3/4	.313	1/4		
85	1,000	1	.359	5/16		

All dimensions [in]

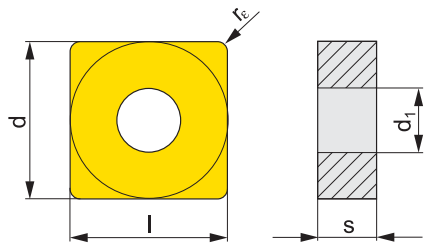
For tools see pages: T22-T25

Chip breaker	Designation	Grades														Radius	Feed/rev.		Depth of cut	
		T5305	T5315													r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	SNMA 432	●	●													1/32	.004	.024	.031	.236
	SNMA 433	●	●													3/64	.004	.024	.047	.236
○	**SNMA 543**	●														3/64	.004	.035	.047	.280
	SNMA 643	●														3/64	.004	.035	.047	.350
	SNMA 644	●														1/16	.004	.035	.063	.350
	SNMA 856	●														3/32	.004	.043	.094	.472
	SNMA 433S	●														3/64	.004	.024	.047	.236
○	**SNMA 644S**	●														1/16	.004	.035	.047	.350
	SNMA 856S	●														3/32	.004	.043	.094	.472

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

SNMG



Dimensions	l	d	d_1	s		
43	.500	1/2	.203	3/16		
54	.625	5/8	.250	1/4		
64	.750	3/4	.313	1/4		

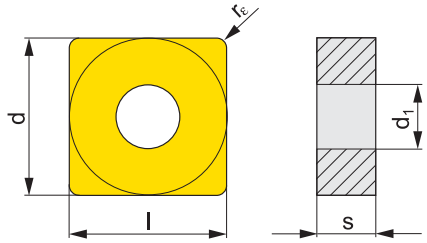
All dimensions [in]

For tools see pages: T22-T25

Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		T5305	T5315	T7335	T9310	T9315	T9325	T9335	T8315	T8330	TT310						r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	SNMG 431-FM					●	●		●	●							1/64	.004	.012	.020	.118
	SNMG 432-FM				●	●	●		●	●	●						1/32	.006	.018	.031	.118
	SNMG 433-FM					●	●			●							3/64	.006	.018	.047	.118
	SNMG 434-FM					●	●			●							1/16	.006	.018	.063	.331
	SNMG 432-KR	●	●														1/32	.008	.020	.031	.276
	SNMG 433-KR	●	●														3/64	.010	.028	.047	.276
	SNMG 432-M	●	●		●	●	●	●									1/32	.006	.024	.031	.236
	SNMG 433-M					●	●	●									3/64	.007	.031	.047	.236
	SNMG 434-M					●	●	●									1/16	.007	.031	.063	.236
	SNMG 543-M					●	●	●									3/64	.007	.031	.047	.315
	SNMG 643-M					●	●	●									3/64	.007	.031	.047	.315
	SNMG 644-M					●	●	●									1/16	.007	.031	.063	.315
	SNMG 432-R	●					●	●									1/32	.010	.024	.079	.236
	SNMG 433-R	●					●	●									3/64	.010	.028	.079	.236
	SNMG 434-R						●										1/16	.012	.031	.079	.236
	SNMG 543-R	●					●										3/64	.010	.028	.079	.276
	SNMG 544-R						●										1/16	.010	.028	.079	.276
	SNMG 643-R						●										3/64	.010	.028	.079	.354
	SNMG 644-R						●										1/16	.012	.031	.079	.354
	SNMG 432-RM	●	●		●	●	●	●	●	●							1/32	.008	.020	.039	.276
	SNMG 433-RM	●	●		●	●	●	●									3/64	.010	.028	.059	.276
	SNMG 434-RM	●	●		●	●	●	●		●							1/16	.012	.030	.079	.276
	SNMG 543-RM	●	●		●	●	●	●									3/64	.010	.028	.059	.315
	SNMG 544-RM	●	●			●	●	●									1/16	.012	.031	.079	.315
	SNMG 643-RM	●	●		●	●	●	●									3/64	.010	.028	.059	.394
	SNMG 644-RM	●	●		●	●	●	●									1/16	.012	.031	.079	.394
	SNMG 432-NM			●			●			●							1/32	.008	.020	.031	.118
	SNMG 433-NM			●			●										3/64	.008	.020	.047	.138

● stocked as standard / ○ not stocked as standard
See price list for current availability.

SNMM



Dimensions	l	d	d_1	s		
43	.500	1/2	.203	3/16		
54	.625	5/8	.250	1/4		
64	.750	3/4	.313	1/4		
85	1,000	1	.359	5/16		

All dimensions [in]

For tools see pages: T22-T25

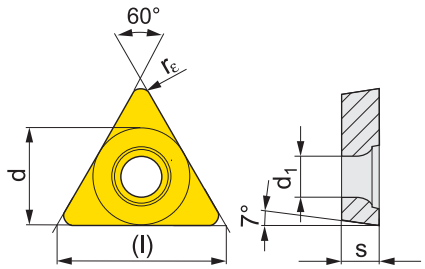
Chip breaker	Designation	Grades						Radius	Feed/rev.		Depth of cut	
		T7335	T9315	T9325	T9335	T8330	T8345	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**SNMM 433-DR**			●	●			3/64	.012	.033	.098	.331
	SNMM 543-DR			●	●			3/64	.012	.033	.098	.354
	SNMM 643-DR			●	●			3/64	.012	.033	.098	.354
	SNMM 644-DR			●	●			1/16	.012	.033	.098	.354
	**SNMM 644-HR**			●	●		●	1/16	.020	.054	.197	.524
	SNMM 646-HR			●	●		●	3/32	.020	.055	.197	.524
	SNMM 854-HR			●	●		●	1/16	.020	.054	.197	.551
	SNMM 856-HR			●	●		●	3/32	.020	.055	.197	.551
	SNMM 858-HR			●	●			1/8	.024	.055	.197	.551
	**SNMM 432-NR**	●		●		●		1/32	.010	.027	.039	.331
	**SNMM 432-NR2**	●		●		●		1/32	.012	.022	.031	.276
	SNMM 433-NR2	●		●		●		3/64	.013	.028	.047	.295
	SNMM 543-NR2	●		●		●		3/64	.012	.028	.047	.354
	SNMM 544-NR2	●		●				1/16	.014	.035	.063	.354
	SNMM 643-NR2	●		●				3/64	.013	.028	.059	.472
	SNMM 644-NR2	●		●		●		1/16	.014	.035	.063	.472
	SNMM 646-NR2	●		●				3/32	.016	.047	.098	.472
	SNMM 856-NR2	●		●		●		3/32	.020	.055	.118	.630
	**SNMM 432-0R**		●	●	●			1/32	.012	.027	.059	.236
	SNMM 433-0R		●	●				3/64	.013	.028	.079	.236
	SNMM 434-0R		●	●				1/16	.014	.031	.079	.315
	SNMM 542-0R		●	●	●			1/32	.014	.024	.079	.315
	SNMM 543-0R		●	●	●			3/64	.014	.039	.079	.354
	SNMM 544-0R		●	●				1/16	.016	.039	.079	.394
	SNMM 643-0R		●	●	●	●		3/64	.014	.039	.118	.394
	SNMM 644-0R		●	●	●	●	●	1/16	.015	.047	.079	.394
	SNMM 646-0R		●	●				3/32	.018	.047	.138	.472
	SNMM 854-0R		●	●	●			1/16	.018	.054	.157	.630

● stocked as standard /○ not stocked as standard
See price list for current availability.

Chip breaker	Designation	Grades						Radius	Feed/rev.		Depth of cut	
		T7335	T9315	T9325	T9335	T8330	T8345	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**SNMM 856-0R**		●	●	●	●	●	3/32	.018	.067	.157	.630
	**SNMM 644-0R1**			●	●			1/16	.012	.039	.118	.433
	**SNMM 856-SR**			●	●			3/32	.028	.063	.197	.630
	**SNMM 644-923**				●	●	●	1/16	.018	.054	.118	.512
	SNMM 854-923				●			1/16	.018	.054	.118	.512
	SNMM 856-923				●	●	●	3/32	.018	.059	.118	.512

● stocked as standard / ○ not stocked as standard
See price list for current availability.

TCGT



Dimensions	(l)	d	d_1	s		
21.5	.433	1/4	.110	3/32		
32.5	.650	3/8	.173	5/32		

All dimensions [in]

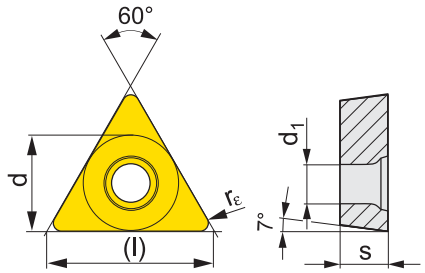
For tools see pages: T43, T53

Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		T8330	HF7														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**TCGT 21.50.5F-AL**		●														1/128	.002	.005	.012	.143
	TCGT 21.51F-AL		●														1/64	.004	.009	.016	.143
	TCGT 21.52F-AL		●														1/32	.006	.019	.031	.143
	TCGT 32.51F-AL		●														1/64	.004	.009	.016	.208
	TCGT 32.52F-AL		●														1/32	.006	.019	.031	.208
	**TCGT 21.50.5R-SI**	●															1/128	.003	.005	.016	.063
	TCGT 21.51R-SI	●															1/64	.003	.009	.016	.063
	**TCGT 21.50.5L-SI**	●															1/128	.003	.005	.016	.063
	TCGT 21.51L-SI	●															1/64	.003	.009	.016	.063

● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

TCMT



Dimensions	(l)	d	d_1	s		
21.5	.433	1/4	.114	3/32		
32.5	.650	3/8	.177	5/32		

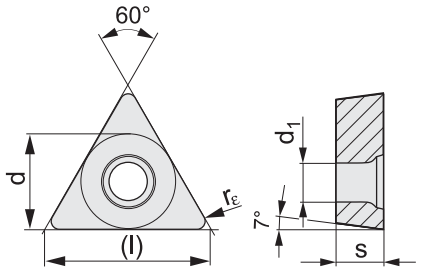
All dimensions [in]

For tools see pages: T43, T53

Chip breaker	Designation	Grades								Radius	Feed/rev.		Depth of cut	
		T5305	T5315	T7335	T9315	T9325	T8315	T8330	TT310	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**TCMT 21.50.5-FM**			●		●	●	●		1/128	.003	.005	.008	.079
	TCMT 21.51-FM			●	●	●	●	●		1/64	.003	.009	.016	.079
	TCMT 21.52-FM					●		●		1/32	.006	.012	.031	.098
	TCMT 32.51-FM			●	●	●	●	●		1/64	.004	.009	.016	.118
	TCMT 32.52-FM			●	●	●	●	●		1/32	.004	.010	.031	.118
	**TCMT 32.52-RM**	●	●	●	●	●		●		1/32	.006	.016	.039	.157
	TCMT 32.53-RM	●	●		●	●		●		3/64	.006	.018	.059	.157
	**TCMT 21.51-UR**				●	●		●		1/64	.003	.009	.016	.079
	TCMT 32.51-UR				●	●		●	●	1/64	.003	.009	.016	.118
	TCMT 32.52-UR		●		●	●		●		1/32	.003	.012	.031	.118

● stocked as standard / ○ not stocked as standard
See price list for current availability.

TCMW



Dimensions	(l)	d	d_1	s		
21.5	.433	1/4	.110	3/32		
32.5	.650	3/8	.173	5/32		

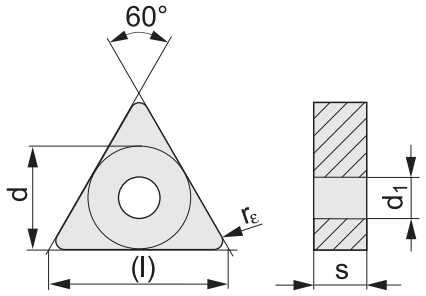
All dimensions [in]

For tools see pages: T43, T53

Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		T5305															r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TCMW 21.51	●															1/64	.004	.008	.016	.142
	TCMW 32.51	●															1/64	.004	.009	.016	.189
	TCMW 32.52	●															1/32	.004	.014	.031	.189

● stocked as standard /○ not stocked as standard
See price list for current availability.

TNMA



Dimensions	(l)	d	d_1	s		
33	.650	3/8	.150	3/16		
43	.866	1/2	.203	3/16		

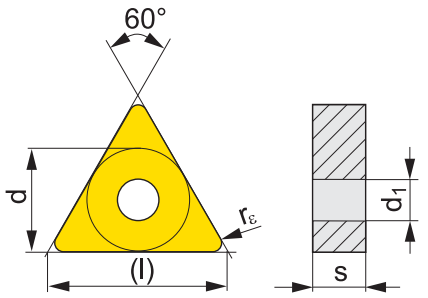
All dimensions [in]

For tools see pages: T26-T28, T33

Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		T5305	T5315														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TNMA 331	●															1/64	.004	.009	.016	.189
	TNMA 332	●	●														1/32	.004	.016	.031	.189
	TNMA 333	●															3/64	.004	.016	.047	.189
	TNMA 432	●															1/32	.004	.016	.031	.252
	TNMA 433	●															3/64	.004	.016	.047	.252
	TNMA 332S	●															1/32	.004	.016	.031	.189
	TNMA 433S	●															3/64	.004	.016	.047	.252

● stocked as standard / ○ not stocked as standard
See price list for current availability.

TNMG



Dimensions	(l)	d	d_1	s		
33	.650	3/8	.150	3/16		
43	.866	1/2	.203	3/16		
54	1.083	5/8	.250	1/4		

All dimensions [in]

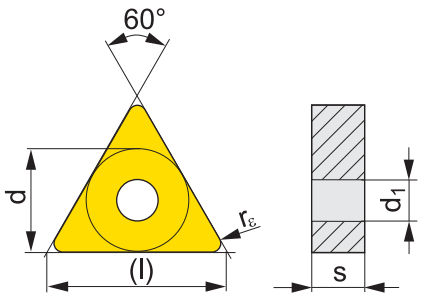
For tools see pages: T26-T28, T33

Chip breaker	Designation	Grades														Radius	Feed/rev.		Depth of cut	
		T5305	T5315	T7335	T9310	T9315	T9325	T9335	T8315	T8330	TT310					r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TNMG 331-FF								●							1/64	.002	.008	.016	.059
	TNMG 332-FF								●							1/32	.003	.010	.031	.059
	TNMG 331-FM			●	●	●	●		●	●	●					1/64	.004	.009	.020	.118
	TNMG 332-FM			●	●	●	●		●	●	●					1/32	.006	.018	.031	.118
	TNMG 333-FM					●	●			●						3/64	.006	.018	.047	.118
	TNMG 332-KR	●	●													1/32	.008	.016	.031	.156
	TNMG 331-M		●			●	●	●								1/64	.007	.009	.031	.118
	TNMG 332-M	●	●		●	●	●	●								1/32	.006	.019	.031	.197
	TNMG 333-M		●			●	●	●								3/64	.007	.028	.047	.208
	TNMG 432-M	●	●		●	●	●	●								1/32	.007	.019	.039	.236
	TNMG 433-M	●	●			●	●	●								3/64	.007	.028	.047	.236
	TNMG 332-R					●	●	●								1/32	.010	.019	.079	.197
	TNMG 333-R						●	●								3/64	.010	.028	.079	.197
	TNMG 432-R						●									1/32	.010	.019	.079	.236
	TNMG 433-R						●									3/64	.010	.028	.079	.236
	TNMG 434-R						●									1/16	.010	.031	.079	.236
	TNMG 332-RM	●	●		●	●	●	●								1/32	.008	.019	.039	.208
	TNMG 333-RM	●	●			●	●	●		●						3/64	.010	.026	.059	.208
	TNMG 432-RM	●	●		●	●	●	●								1/32	.008	.019	.039	.276
	TNMG 433-RM	●	●		●	●	●	●								3/64	.010	.026	.059	.276
	TNMG 434-RM	●	●			●	●	●								1/16	.012	.030	.079	.276
	TNMG 544-RM					●	●	●								1/16	.014	.030	.079	.351
	TNMG 546-RM						●	●								3/32	.014	.031	.118	.351
	TNMG 331-NM			●			●			●						1/64	.006	.009	.020	.118
	TNMG 332-NM			●			●			●						1/32	.008	.016	.039	.118
	TNMG 432-NM			●			●			●						1/32	.008	.016	.039	.138

● stocked as standard /○ not stocked as standard
See price list for current availability.

Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		T5305	T5315	T7335	T9310	T9315	T9325	T9335	T8315	T8330	TT310						r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**TNMG 433-NM**			●			●										3/64	.008	.016	.047	.138
	**TNMG 331R-SI**			●			●			●							1/64	.008	.009	.031	.197
	TNMG 332R-SI			●			●			●							1/32	.008	.019	.031	.197
	**TNMG 331L-SI**			●			●			●							1/64	.008	.009	.031	.197
	TNMG 332L-SI			●			●			●							1/32	.008	.019	.031	.197

TNMM



Dimensions	(l)	d	d_1	s		
33	.650	3/8	.150	3/16		
43	.866	1/2	.203	3/16		
54	1.083	5/8	.250	1/4		

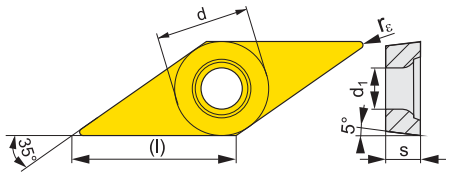
All dimensions [in]

For tools see pages: T26-T28, T33

Chip breaker	Designation	Grades				Radius	Feed/rev.		Depth of cut	
		T9315	T9325	T9335	T8330	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TNMM 332-DR		●			1/32	.012	.019	.098	.208
	TNMM 432-DR		●	●		1/32	.012	.019	.098	.286
	TNMM 433-DR		●	●		3/64	.012	.028	.098	.286
	TNMM 434-DR		●			1/16	.012	.033	.098	.286
	TNMM 544-DR		●	●		1/16	.012	.033	.098	.351
	TNMM 544-HR		●	●		1/16	.020	.038	.197	.351
	TNMM 546-HR		●			3/32	.020	.055	.197	.351
	TNMM 332-NR2		●			1/32	.008	.019	.031	.208
	TNMM 432-NR2		●			1/32	.010	.019	.031	.286
	TNMM 433-NR2		●		●	3/64	.012	.028	.047	.286
	TNMM 332-OR	●	●			1/32	.010	.018	.079	.197
	TNMM 333-OR	●	●			3/64	.012	.024	.079	.208
	TNMM 432-OR	●	●	●		1/32	.012	.019	.079	.236
	TNMM 433-OR	●	●	●		3/64	.013	.028	.079	.276
	TNMM 434-OR	●	●			1/16	.016	.031	.118	.286
	TNMM 433R			●		3/64	.008	.020	.047	.197
	TNMM 433L			●		3/64	.008	.020	.047	.197

● stocked as standard /○ not stocked as standard
See price list for current availability.

VBMT



Dimensions	(l)	d	d_1	s		
22	.437	1/4	.114	1/8		
33	.654	3/8	.177	3/16		

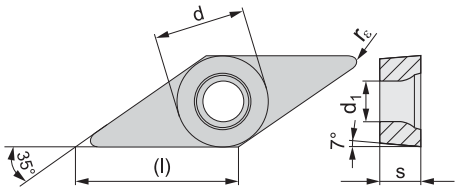
All dimensions [in]

For tools see pages: T44-T46, T54-T55

Chip breaker	Designation	Grades														Radius	Feed/rev.		Depth of cut	
		T5305	T5315	T7335	T9310	T9315	T9325	T8315	T8330	TT310						r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**VBMT 220.5-FM**						●	●	●							1/128	.003	.004	.008	.079
	VBMT 221-FM			●		●	●	●	●							1/64	.003	.008	.016	.079
	VBMT 222-FM					●	●		●							1/32	.004	.010	.031	.098
	VBMT 330.5-FM						●		●							1/128	.003	.004	.008	.079
	VBMT 331-FM		●	●		●	●	●	●							1/64	.004	.008	.016	.079
	VBMT 332-FM		●	●		●	●	●	●							1/32	.006	.012	.031	.098
	VBMT 333-FM					●	●		●							3/64	.008	.016	.047	.118
	**VBMT 331-RM**	●	●	●		●	●		●							1/64	.004	.008	.031	.142
	VBMT 332-RM	●	●	●		●	●		●							1/32	.004	.014	.039	.142
	VBMT 333-RM			●		●	●		●							3/64	.006	.016	.047	.142
	**VBMT 330.5-UR**								●							1/128	.002	.004	.008	.079
	VBMT 331-UR		●		●	●	●		●	●						1/64	.003	.008	.016	.079
	VBMT 332-UR		●		●	●	●		●	●						1/32	.003	.012	.031	.118
	VBMT 333-UR				●	●	●		●							3/64	.003	.012	.047	.118

● stocked as standard / ○ not stocked as standard
See price list for current availability.

VCGT



Dimensions	(l)	d	d_1	s		
22	.437	1/4	.110	1/8		
33	.654	3/8	.173	3/16		

All dimensions [in]

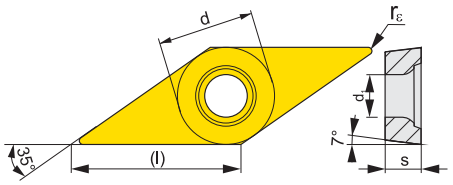
For tools see pages: T44-T46, T54-T55

Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		HF7															r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**VCGT 220.5F-AL**	●															1/128	.002	.004	.012	.108
	VCGT 221F-AL	●															1/64	.004	.008	.016	.108
	VCGT 330.5F-AL	●															1/128	.002	.004	.012	.157
	VCGT 331F-AL	●															1/64	.004	.008	.016	.157
	VCGT 332F-AL	●															1/32	.006	.016	.031	.157
	VCGT 333F-AL	●															3/64	.006	.024	.047	.157

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

VCMT



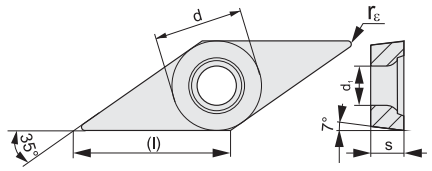
Dimensions	(l)	d	d_1	s		
32.5	.256	3/8	.177	5/32		
43	.343	1/2	.220	3/16		

All dimensions [in]

For tools see pages: T44-T46, T54-T55

Chip breaker	Designation	Grades		Radius	Feed/rev.		Depth of cut	
		T9325	T8330	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**VCMT 331-FM**	●	●	1/64	.004	.008	.016	.079
	VCMT 332-FM	●	●	1/32	.006	.012	.031	.098
	**VCMT 221-UR**	●	●	1/64	.003	.008	.016	.079
	VCMT 222-UR	●	●	1/32	.003	.012	.031	.079
	VCMT 331-UR	●	●	1/64	.003	.008	.016	.079
	VCMT 332-UR	●	●	1/32	.003	.012	.031	.118

VCMW



Dimensions	(l)	d	d_1	s		
22	.437	1/4	.110	1/8		
33	.650	3/8	.173	3/16		

All dimensions [in]

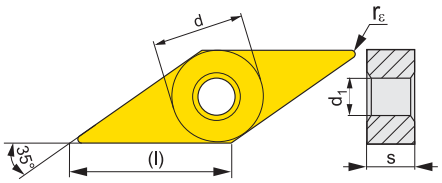
For tools see pages: T44-T46, T54-T55

Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		T5305															r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**VCMW 220.5**	●															1/128	.003	.004	.008	.094
	VCMW 221	●															1/64	.004	.008	.016	.094
	VCMW 331	●															1/64	.004	.008	.016	.146
	VCMW 332	●															1/32	.004	.016	.031	.146

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

VNMG



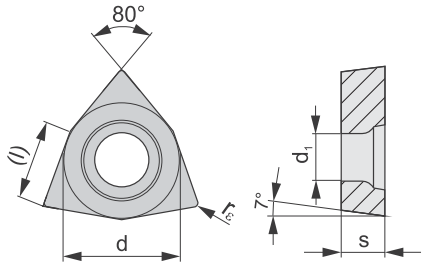
Dimensions	(l)	d	d_1	s		
33	.375	3/8	.150	3/16		

All dimensions [in]

For tools see pages: T29

Chip breaker	Designation	Grades								Radius	Feed/rev.		Depth of cut	
		T5305	T5315	T7335	T9310	T9315	T9325	T9335	T8315	T8330	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**VNMG 331-FF**								●		1/64	.002	.008	.016	.059
	**VNMG 331-FM**				●	●	●			●	1/64	.004	.008	.020	.118
	VNMG 332-FM				●	●	●			●	1/32	.006	.014	.031	.118
	VNMG 333-FM					●	●			●	3/64	.006	.018	.047	.118
	**VNMG 331-M**		●			●	●	●			1/64	.005	.008	.031	.118
	VNMG 332-M	●	●		●	●	●	●			1/32	.006	.016	.031	.118
	VNMG 333-M						●	●			3/64	.007	.024	.047	.157
	**VNMG 331-NM**			●			●			●	1/64	.006	.008	.020	.118
	VNMG 332-NM			●			●			●	1/32	.008	.016	.031	.118

WCGT



Dimensions	(l)	d	d_1	s		
32.5	.256	3/8	.173	5/32		
43	.343	1/2	.217	3/16		

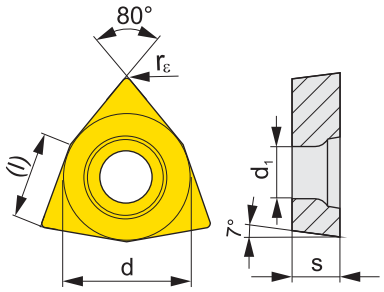
All dimensions [in]

For tools see pages: T47, T56

Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		HF7															r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**WCGT 32.50.5F-AL**	●															1/128	.002	.006	.012	.118
	WCGT 32.51F-AL	●															1/64	.003	.012	.016	.138
	WCGT 32.52F-AL	●															1/32	.003	.024	.031	.165
	WCGT 433F-AL	●															3/64	.006	.024	.047	.220

● stocked as standard /○ not stocked as standard
See price list for current availability.

WCMT



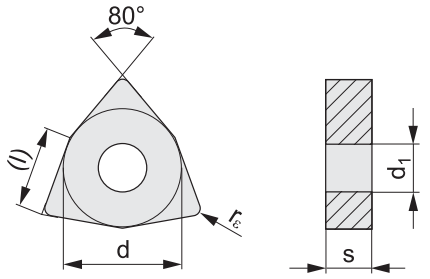
Dimensions	(l)	d	d_1	s		
32.5	.256	3/8	.177	5/32		
43	.343	1/2	.220	3/16		

All dimensions [in]

For tools see pages: T47, T56

Chip breaker	Designation	Grades					Radius	Feed/rev.		Depth of cut	
		T7335	T9315	T9325	T8315	T8330	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**WCMT 32.51-FM**	●	●	●	●	●	1/64	.004	.012	.016	.118
	WCMT 32.52-FM	●	●	●	●	●	1/32	.006	.014	.031	.118
	WCMT 431-FM	●	●	●	●	●	1/64	.004	.012	.016	.157
	WCMT 432-FM	●	●	●	●	●	1/32	.006	.014	.031	.157
	WCMT 433-FM		●	●		●	3/64	.006	.018	.047	.157
	**WCMT 32.52-UR**		●	●			1/32	.006	.012	.031	.118

WNMA



Dimensions	(l)	d	d_1	s		
43	.342	1/2	.203	3/16		

All dimensions [in]

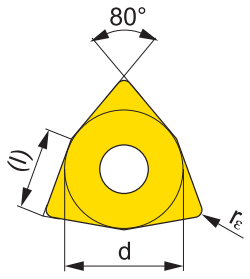
For tools see pages: T30, T34

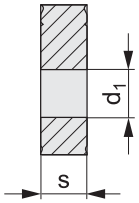
Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		T5305	T5315														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**WNMA 431**	●															1/64	.004	.012	.016	.173
	WNMA 432	●	●														1/32	.004	.024	.031	.173
	WNMA 433	●	●														3/64	.004	.024	.047	.173
	**WNMA 432S**	●															1/32	.004	.024	.031	.173

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

WNMG





Dimensions	(l)	d	d_1	s		
33	.256	3/8	.150	3/16		
43	.343	1/2	.203	3/16		

All dimensions [in]

For tools see pages: T30, T34

Chip breaker	Designation	Grades														Radius	Feed/rev.		Depth of cut	
		T5305	T5315	T7335	T9310	T9315	T9325	T9335	T8315	T8330	TT310					r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**WNMG 330.5-FF**								●							1/128	.002	.006	.008	.059
	WNMG 331-FF								●							1/64	.002	.008	.016	.059
	WNMG 431-FF								●							1/64	.002	.008	.016	.059
	WNMG 432-FF								●							1/32	.003	.010	.031	.059
	**WNMG 331-FM**					●	●		●	●	●					1/64	.004	.012	.020	.118
	WNMG 332-FM					●	●			●	●					1/32	.004	.014	.031	.118
	WNMG 333-FM					●										3/64	.006	.018	.047	.118
	WNMG 431-FM			●	●	●	●		●	●						1/64	.004	.012	.020	.118
	WNMG 432-FM			●	●	●	●		●	●						1/32	.006	.018	.031	.118
	WNMG 433-FM			●	●	●	●			●						3/64	.006	.018	.047	.157
	**WNMG 433-KR**	●	●													3/64	.010	.024	.047	.217
	**WNMG 331-M**		●			●	●	●								1/64	.007	.012	.031	.118
	WNMG 332-M		●		●	●	●	●								1/32	.006	.024	.031	.157
	WNMG 431-M		●			●	●	●								1/64	.007	.012	.031	.118
	WNMG 432-M	●	●		●	●	●	●		●						1/32	.006	.024	.031	.220
	WNMG 433-M	●	●		●	●	●	●								3/64	.007	.031	.047	.220
	**WNMG 432-R**	●				●	●	●								1/32	.010	.024	.079	.220
	WNMG 433-R	●				●	●									3/64	.010	.028	.079	.220
	**WNMG 333-RM**					●	●	●								3/64	.010	.024	.051	.157
	WNMG 432-RM	●	●		●	●	●	●	●	●						1/32	.008	.022	.039	.197
	WNMG 433-RM	●	●		●	●	●	●	●							3/64	.010	.028	.059	.197
	WNMG 434-RM	●	●		●	●	●	●		●						1/16	.012	.030	.079	.197
	**WNMG 332W-F**					●	●									1/32	.006	.024	.031	.165
	WNMG 431W-F					●	●									1/64	.006	.012	.016	.173

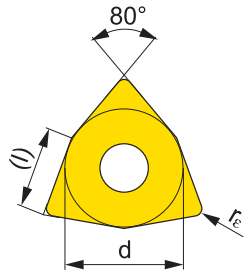
● stocked as standard / ○ not stocked as standard
See price list for current availability.

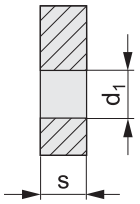
Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		T5305	T5315	T7335	T9310	T9315	T9325	T9335	T8315	T8330	TT310						r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**WNMG 332W-M**				●	●	●										1/32	.006	.024	.031	.118
	WNMG 333W-M		●			●	●										3/64	.008	.035	.047	.118
	WNMG 432W-M					●	●										1/32	.006	.024	.031	.157
	WNMG 433W-M		●			●	●										3/64	.008	.035	.047	.157
	**WNMG 331-NM**			●			●			●							1/64	.006	.012	.020	.118
	WNMG 332-NM			●			●			●							1/32	.008	.016	.031	.118
	WNMG 333-NM			●			●										3/64	.008	.020	.047	.138
	WNMG 431-NM			●			●			●							1/64	.006	.012	.020	.118
	WNMG 432-NM			●			●			●							1/32	.008	.020	.031	.118
	WNMG 433-NM			●			●										3/64	.008	.020	.047	.138
	**WNMG 331R-SI**						●			●							1/64	.008	.012	.031	.165
	WNMG 431R-SI						●			●							1/64	.008	.012	.031	.197
	WNMG 432R-SI						●			●							1/32	.008	.020	.031	.197
	**WNMG 331L-SI**						●			●							1/64	.008	.012	.031	.165
	WNMG 431L-SI						●			●							1/64	.008	.012	.031	.197
	WNMG 432L-SI						●			●							1/32	.008	.020	.031	.197

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

WNMM





Dimensions	(l)	d	d_1	s		
43	.343	1/2	.203	3/16		

All dimensions [in]

For tools see pages: T30, T34

Chip breaker	Designation	Grades					Radius	Feed/rev.		Depth of cut	
		T7335	T9315	T9325	T9335	T8330	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**WNMM 432-NR**	●		●		●	1/32	.010	.024	.039	.220
	**WNMM 432-NR2**	●		●			1/32	.010	.024	.039	.197
	WNMM 433-NR2	●		●			3/64	.011	.028	.059	.197
	**WNMM 432-OR**		●	●	●	●	1/32	.010	.024	.079	.197
	WNMM 433-OR		●	●	●		3/64	.013	.028	.079	.220
	WNMM 434-OR			●			1/16	.014	.039	.118	.220

● stocked as standard / ○ not stocked as standard
See price list for current availability.

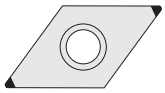
CCGW

T131

CNGA

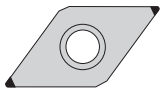
T131

DCGW



T132

DNGA



T132

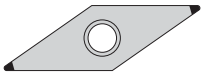
TCGW

T133

TNGA

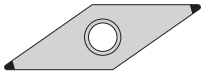
T133

VBGW



T134

VNGA

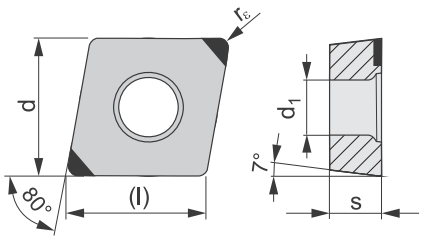


T134

WNGA

T135

CCGW



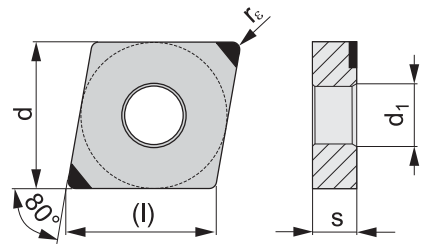
Dimensions	(l)	d	d_1	s		
21.5	.256	1/4	.114	3/32		
32.5	.382	3/8	.177	5/32		

All dimensions [in]

For tools see pages: T37, T48

Chip breaker	Designation	Grades														Radius	Feed/rev.		Depth of cut	
		TB310														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	CCGW 21.51E	●														1/64	.001	.008	.002	.106
	CCGW 21.51S00420	●														1/64	.001	.008	.002	.106
	CCGW 32.51E	●														1/64	.001	.008	.002	.106
	CCGW 32.51S00420	●														1/64	.001	.008	.002	.106
	CCGW 32.51S00420W	●														1/64	.001	.008	.002	.106

CNGA



Dimensions	(l)	d	d_1	s		
43	.508	1/2	.203	3/16		

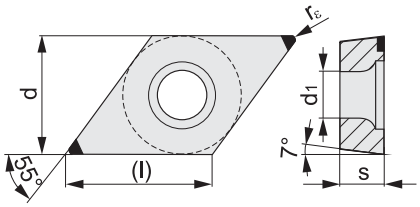
All dimensions [in]

For tools see pages: T17, T31

Chip breaker	Designation	Grades														Radius	Feed/rev.		Depth of cut	
		TB310														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	CNGA 431S00420	●														1/64	.001	.008	.002	.106
	CNGA 432S00420	●														1/32	.001	.008	.002	.106

● stocked as standard / ○ not stocked as standard
See price list for current availability.

DCGW



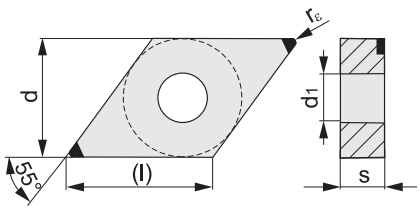
Dimensions	(l)	d	d_1	s		
32.5	.457	3/8	.177	5/32		

All dimensions [in]

For tools see pages: T38-T39, T49 - T52

Chip breaker	Designation	Grades		Radius	Feed/rev.		Depth of cut	
		TB310		r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**DCGW 32.51S00420**	●		1/64	.001	.008	.002	.118
	DCGW 32.52S00420	●		1/32	.001	.008	.002	.118

DNGA



Dimensions	(l)	d	d_1	s		
44	.610	1/2	.203	3/16		

All dimensions [in]

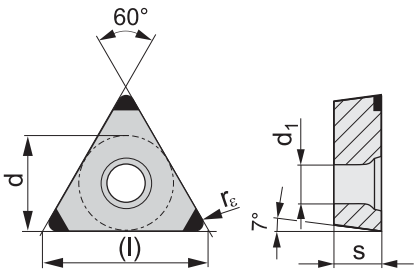
For tools see pages: T19-T20, T32

Chip breaker	Designation	Grades		Radius	Feed/rev.		Depth of cut	
		TB310		r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**DNGA 442S00420**	●		1/32	.001	.008	.002	.118

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

TCGW



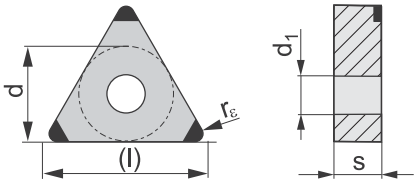
Dimensions	(l)	d	d_1	s		
21.5	.433	1/4	.110	3/32		
32.5	.650	3/8	.173	5/32		

All dimensions [in]

For tools see pages: T43, T53

Chip breaker	Designation	Grades														Radius	Feed/rev.		Depth of cut	
		TB310														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TCGW 21.51E	●														1/64	.001	.008	.002	.098
	TCGW 21.51S00420	●														1/64	.001	.008	.002	.098
	TCGW 21.52S00420	●														1/32	.001	.008	.002	.098

TNGA



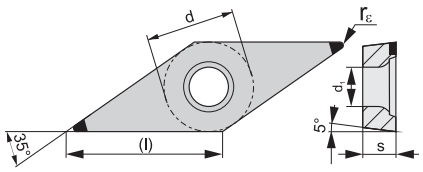
Dimensions	(l)	d	d_1	s		
33	.650	3/8	.150	3/16		

All dimensions [in]

For tools see pages: T26-T28, T33

Chip breaker	Designation	Grades														Radius	Feed/rev.		Depth of cut	
		TB310														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TNGA 332S00420	●														1/32	.001	.008	.002	.098

VBGW



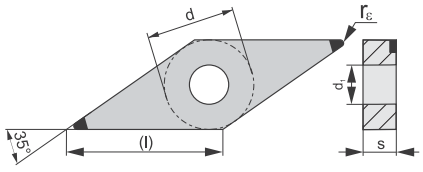
Dimensions	(l)	d	d_1	s		
33	.630	3/8	.177	3/16		

All dimensions [in]

For tools see pages: T44-T46, T54 - T55

Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		TB310															r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	VBGW 331S00420	●															1/64	.001	.006	.002	.142
	VBGW 332S00420	●															1/32	.001	.008	.002	.142

VNGA



Dimensions	(l)	d	d_1	s		
43	.342	1/2	.203	3/16		

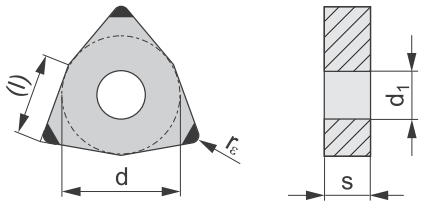
All dimensions [in]

For tools see pages: T29

Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		TB310															r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	VNGA 331S00420	●															1/64	.001	.006	.002	.142
	VNGA 332S00420	●															1/32	.001	.008	.002	.142

● stocked as standard /○ not stocked as standard
See price list for current availability.

WNGA



Dimensions	(l)	d	d_1	s		
43	.342	1/2	.203	3/16		

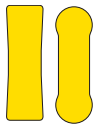
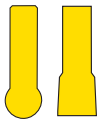
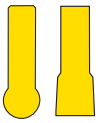
All dimensions [in]

For tools see pages: T30, T34

Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		TB310															r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**WNGA 432S00420**	●															1/32	.001	.008	.002	.106
	WNGA 432S00420W	●															1/32	.001	.008	.002	.106

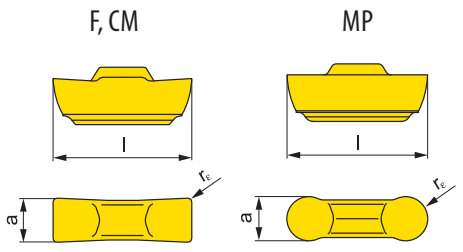
● stocked as standard / ○ not stocked as standard
See price list for current availability.

LINE - INSERTS FOR PARTING AND GROOVING

LCMF 13	LCMF 16	LCMF 20	LCMR 13	LCMR 16
				
T241	T242 - T243	T244	T245	T246

LFMX	TN ..ER/L ...ZZ	TN ..NR/L ...ZZ	TN ..ER/L-R	TN..NR/L-R
				
T247	T249	T250	T251	T252

LCMF 13



Dimensions	a	tol. a	l			
0313	.118	±.002	.496			
0413	.157	±.002	.496			

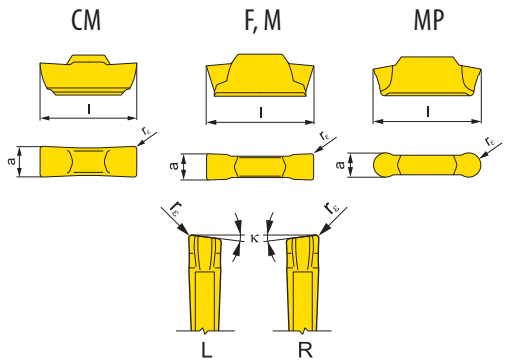
All dimensions [in]

For tools see pages: T60-T71, T73, T76

Chip breaker	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		T9325	T8330														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**LCMF 031304-CM**		●														1/64	.002	.012	-	-
	LCMF 031304-CM-04*		●														1/64	.002	.012	-	-
	LCMF 041304-CM		●														1/64	.002	.012	-	-
	**LCMF 031302-F**		●														1/128	.002	.008	.012	.118
	LCMF 031304-F		●														1/64	.002	.010	.012	.118
	LCMF 031304-F-04*		●														1/64	.002	.008	.012	.079
	LCMF 041304-F	●	●														1/64	.004	.010	.020	.118
	**LCMF 0313M0-MP**		●														0.059	.002	.012	.020	.059
	LCMF 0413M0-MP		●														0.079	.002	.014	.020	.079

* For internal holder A... - GG.R/L 0313-04

LCMF 16



Dimensions	a	tol. a	l
0316	.118	±.002	.646
0416	.157	±.002	.646
0516	.197	±.002	.646
0616	.236	±.002	.646
0830	.315	±.002	1.181

All dimensions [in]

For tools see pages: T60-T71, T73, T76

Chip breaker	Designation	Grades T9325	Grades T8330	χ°	Radius r_ε	Feed/rev. f_{min}	Feed/rev. f_{max}	Depth of cut $a_{p\,min}$	Depth of cut $a_{p\,max}$
	LCMF 031602-CM		●	-	1/128	.002	.012	-	-
	LCMF 031604-CM		●	-	1/64	.002	.012	-	-
	LCMF 041602-CM		●	-	1/128	.002	.012	-	-
	LCMF 041604-CM		●	-	1/64	.002	.012	-	-
	LCMF 051604-CM		●	-	1/64	.004	.016	-	-
	LCMF 061604-CM		●	-	1/64	.004	.016	-	-
	LCMF 031602R6-CM		●	6	1/128	.002	.012	-	-
	LCMF 031602R15-CM*		●	15	1/128	.002	.012	-	-
	LCMF 041602R6-CM		●	6	1/128	.002	.012	-	-
	LCMF 041602R15-CM*		●	15	1/128	.002	.012	-	-
	LCMF 031602L6-CM		●	6	1/128	.002	.012	-	-
	LCMF 031602L15-CM*		●	15	1/128	.002	.012	-	-
	LCMF 041602L6-CM		●	6	1/128	.002	.012	-	-
	LCMF 041602L15-CM*		●	15	1/128	.002	.012	-	-
	LCMF 031602-F		●	-	1/128	.002	.007	.012	.118
	LCMF 031604-F		●	-	1/64	.002	.007	.012	.118
	LCMF 041604-F	●	●	-	1/64	.003	.010	.020	.118
	LCMF 041608-F	●	●	-	1/32	.003	.010	.020	.118
	LCMF 051608-F	●	●	-	1/32	.004	.012	.020	.118
	LCMF 061608-F	●	●	-	1/32	.004	.014	.020	.118
	LCMF 083008-F		●	-	1/32	.004	.020	.031	.236
	LCMF 083012-F		●	-	3/64	.010	.020	.047	.236
	LCMF 031602-M		●	-	1/128	.004	.010	.012	.118
	LCMF 031604-M		●	-	1/64	.004	.010	.012	.118
	LCMF 041604-M	●	●	-	1/64	.006	.014	.020	.118
	LCMF 041608-M	●	●	-	1/32	.006	.014	.020	.118
	LCMF 051608-M	●	●	-	1/32	.007	.017	.020	.118
	LCMF 061608-M	●	●	-	1/32	.008	.020	.020	.118

* Toolholders have to be modified.

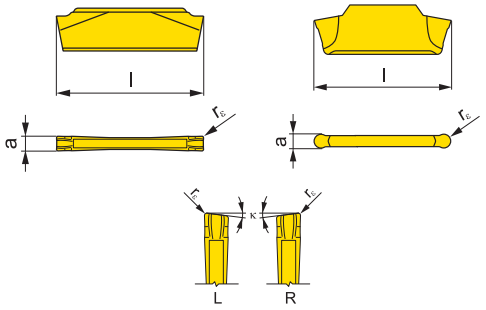
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

Chip breaker	Designation	Grades															χ°	Radius	Feed/rev.		Depth of cut	
		T9325	T8330															r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**LCMF 0316M0-MP**		●														-	0.059	.002	.016	.020	.059
	LCMF 0416M0-MP	●	●														-	0.079	.003	.024	.031	.079
	LCMF 0516M0-MP	●	●														-	0.098	.003	.028	.031	.098
	LCMF 0616M0-MP	●	●														-	1.118	.003	.031	.039	.118
	LCMF 0830M0-MP		●														-	0.158	.004	.039	.039	.157

LCMF 20

F1, M2 MP



Dimensions	a	tol. a	l			
0220	.079	±.0012	.768			

All dimensions [in]

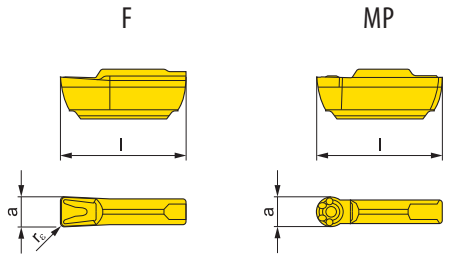
For tools see pages: T60-T71, T73, T76

Chip breaker	Designation	Grades															χ°	Radius	Feed/rev.		Depth of cut	
		T8330																r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	LCMF 022002-F1	●															-	1/128	.003	.008	.008	.079
	LCMF 022002-M2	●															-	1/128	.004	.009	.008	.079
	LCMF 022002L6-M2	●															6	1/128	.002	.008	-	-
	LCMF 022002R6-M2	●															6	1/128	.002	.008	-	-
	LCMF 0220M0-MP	●															-	0.039	.003	.016	.008	.039

● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

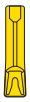
LCMR 13



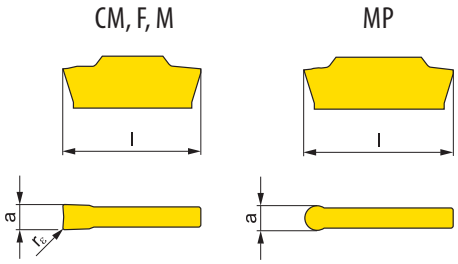
Dimensions	a	tol. a	l			
0313	.118	±.002	.496			
0413	.157	±.002	.496			

All dimensions [in]

For tools see pages: T60-T71, T73, T76

Chip breaker	Designation	Grades													χ°	Radius	Feed/rev.		Depth of cut	
		T8330														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**LCMR 031304-F**	●													-	1/64	.002	.010	.012	.118
	LCMR 041304-F	●													-	1/64	.004	.010	.020	.118
	**LCMR 0313M0-MP**	●													-	0.059	.002	.012	.020	.059
	LCMR 0413M0-MP	●													-	0.079	.002	.014	.020	.079

LCMR 16



Dimensions	a	tol. a	l
0316	.118	±.002	.646
0416	.157	±.002	.646
0516	.197	±.002	.646
0616	.236	±.002	.646
0830	.315	±.002	1.181

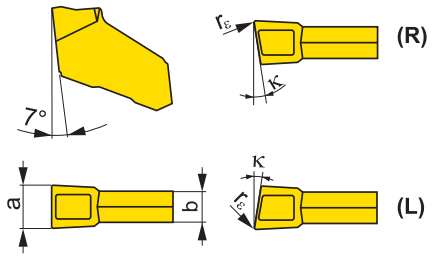
All dimensions [in]

For tools see pages: T60-T71, T73, T76

Chip breaker	Designation	Grades														χ°	Radius	Feed/rev.		Depth of cut	
		T8330															r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	LCMR 031602-CM	●														-	1/128	.002	.012	-	-
	LCMR 041604-CM	●														-	1/64	.002	.012	-	-
	LCMR 031604-F	●														-	1/64	.002	.007	.012	.118
	LCMR 041604-F	●														-	1/64	.003	.010	.020	.118
	LCMR 051604-F	●														-	1/64	.004	.012	.020	.118
	LCMR 061608-F	●														-	1/32	.004	.014	.020	.118
	LCMR 083008-F	●														-	1/32	.004	.020	.031	.236
	LCMR 031604-M	●														-	1/64	.004	.010	.012	.118
	LCMR 041604-M	●														-	1/64	.006	.014	.020	.118
	LCMR 051604-M	●														-	1/64	.007	.017	.020	.118
	LCMR 061608-M	●														-	1/32	.008	.020	.020	.118
	LCMR 0316M0-MP	●														-	0.059	.002	.016	.020	.059
	LCMR 0416M0-MP	●														-	0.079	.003	.024	.031	.079
	LCMR 0516M0-MP	●														-	0.098	.003	.028	.031	.098
	LCMR 0616M0-MP	●														-	1.118	.004	.031	.039	.118

● stocked as standard /○ not stocked as standard
See price list for current availability.

LFMX



Dimensions	a	tol. a	b	r_e		
1.5	.059	±.0012	.051	0.006		
1.6	.063	±.0012	.051	0.006		
2.0	.079	±.0012	.063	0.006		
2.2	.087	±.0012	.063	0.006		
3.1	.122	±.0015	.102	0.008		
4.1	.161	±.0015	.142	0.008		
5.1	.201	±.0015	.181	0.008		
6.3	.250	±.0015	.228	0.008		

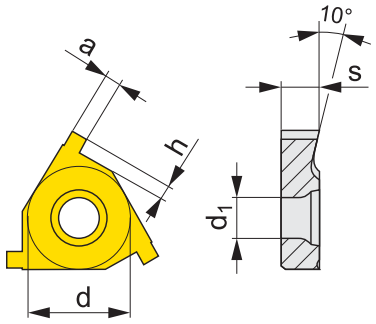
All dimensions [in]

For tools see pages: T74-T75, T77

Chip breaker	Designation	Grades														χ°	Radius	Feed/rev.		Depth of cut	
		6640	T8330														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	LFMX 1.5-.16ENF1		●													-	0.006	.002	.004	-	-
	LFMX 1.6-.16ENF1		●													-	0.006	.002	.004	-	-
	LFMX 2.0-.16ENF1		●													-	0.006	.002	.005	-	-
	LFMX 3.1-.20ENF1		●													-	0.008	.002	.006	-	-
	LFMX 4.1-.20ENF1		●													-	0.008	.002	.007	-	-
	LFMX 2.0-.16SNF2	●	●													-	0.006	.002	.006	-	-
	LFMX 3.1-.20SNF2	●	●													-	0.008	.003	.007	-	-
	LFMX 3.1-.20TNF2	●	●													-	0.008	.002	.007	-	-
	LFMX 4.1-.20SNF2		●													-	0.008	.003	.009	-	-
	LFMX 4.1-.20TNF2		●													-	0.008	.002	.009	-	-
	LFMX 5.1-.20SNF2		●													-	0.008	.003	.010	-	-
	LFMX 6.35-.20SNF2		●													-	0.008	.003	.012	-	-
	LFMX 2.0-.16SNM2	●	●													-	0.006	.003	.007	-	-
	LFMX 2.2-.16SNM2	●	●													-	0.006	.003	.007	-	-
	LFMX 3.1-.20SNM2	●	●													-	0.008	.003	.008	-	-
	LFMX 3.1-.20TNM2	●	●													-	0.008	.002	.008	-	-
	LFMX 4.1-.20SNM2	●	●													-	0.008	.003	.010	-	-
	LFMX 4.1-.20TNM2	●	●													-	0.008	.002	.010	-	-
	LFMX 5.1-.20SNM2	●	●													-	0.008	.003	.012	-	-
	LFMX 6.35-.20SNM2	●	●													-	0.008	.003	.014	-	-
	LFMX 2.0-.16SR6M2		●													6	0.006	.002	.006	-	-
	LFMX 2.0-.16SR12M2		●													12	0.006	.002	.005	-	-
	LFMX 3.1-.20SR8M2		●													8	0.008	.003	.006	-	-
	LFMX 4.1-.20SR8M2		●													8	0.008	.003	.008	-	-
	LFMX 2.0-.16SL6M2		●													6	0.006	.002	.006	-	-
	LFMX 2.0-.16SL12M2		●													12	0.006	.002	.005	-	-
	LFMX 3.1-.20SL8M2		●													8	0.008	.003	.006	-	-
	LFMX 4.1-.20SL8M2		●													8	0.008	.003	.008	-	-

● stocked as standard / ○ not stocked as standard
See price list for current availability.

TN ..ER/L ...ZZ DIN 471
EXTERNAL



Dimensions	d	d_1	s			
16	3/8	.154	.138			
22	1/2	.193	.185			

All dimensions [in]

For tools see pages: T80-T83

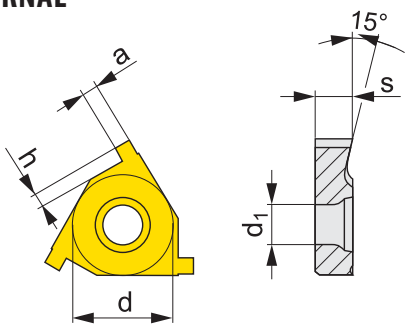
Chip breaker	Designation	Grades								a	Tolerance		h	Feed/rev.		Depth of cut	
		T8330									min	max		f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TN 16ER090ZZ	●								.035	.002	.004	.035	-	-	-	-
	TN 16ER110ZZ	●								.043	.002	.004	.051	-	-	-	-
	TN 16ER130ZZ	●								.051	.002	.004	.063	-	-	-	-
	TN 16ER160ZZ	●								.063	.002	.004	.073	-	-	-	-
	**TN 16ER185ZZ**	●								.073	.002	.004	.073	-	-	-	-
	TN 16ER215ZZ	●								.085	.002	.004	.073	-	-	-	-
	TN 16ER265ZZ	●								.104	.002	.004	.081	-	-	-	-
	TN 22ER265ZZ	●								.104	.003	.005	.087	-	-	-	-
	TN 22ER315ZZ	●								.124	.003	.005	.087	-	-	-	-
	TN 22ER415ZZ	●								.163	.003	.005	.102	-	-	-	-
	TN 16EL090ZZ	●								.035	.002	.004	.035	-	-	-	-
	TN 16EL110ZZ	●								.043	.002	.004	.051	-	-	-	-
	TN 16EL130ZZ	●								.051	.002	.004	.063	-	-	-	-
	TN 16EL160ZZ	●								.063	.002	.004	.073	-	-	-	-
	**TN 16EL185ZZ**	●								.073	.002	.004	.073	-	-	-	-
	TN 16EL215ZZ	●								.085	.002	.004	.073	-	-	-	-
	TN 16EL265ZZ	●								.104	.002	.004	.081	-	-	-	-
	TN 22EL265ZZ	●								.104	.003	.005	.087	-	-	-	-
	TN 22EL315ZZ	●								.124	.003	.005	.087	-	-	-	-
	TN 22EL415ZZ	●								.163	.003	.005	.102	-	-	-	-

Recommended shim PE ZZ (page 230)

● stocked as standard /○ not stocked as standard
See price list for current availability.

TN ..ER/L ...ZZ DIN 472

INTERNAL



Dimensions	d	d_1	s			
11	1/4	.110	.118			
16	3/8	.154	.138			
22	1/2	.193	.185			

All dimensions [in]

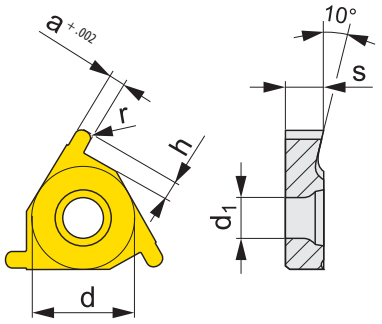
For tools see pages: T80-T83

Chip breaker	Designation	Grades								a	Tolerance		h	Feed/rev.		Depth of cut	
		T8330									min	max		f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TN 11NR090ZZ	●								.035	.002	.004	.035	-	-	-	-
	TN 11NR110ZZ	●								.043	.002	.004	.051	-	-	-	-
	TN 16NR090ZZ	●								.035	.002	.004	.035	-	-	-	-
	TN 16NR110ZZ	●								.043	.002	.004	.051	-	-	-	-
	TN 16NR130ZZ	●								.051	.002	.004	.063	-	-	-	-
	TN 16NR160ZZ	●								.063	.002	.004	.073	-	-	-	-
	TN 16NR185ZZ	●								.073	.002	.004	.073	-	-	-	-
	TN 16NR215ZZ	●								.085	.002	.004	.073	-	-	-	-
	TN 16NR265ZZ	●								.104	.002	.004	.081	-	-	-	-
	TN 22NR265ZZ	●								.104	.003	.005	.087	-	-	-	-
	TN 22NR315ZZ	●								.124	.003	.005	.087	-	-	-	-
	TN 22NR415ZZ	●								.163	.003	.005	.102	-	-	-	-
	TN 11NL090ZZ	●								.035	.002	.004	.035	-	-	-	-
	TN 11NL110ZZ	●								.043	.002	.004	.051	-	-	-	-
	TN 16NL090ZZ	●								.035	.002	.004	.035	-	-	-	-
	TN 16NL110ZZ	●								.043	.002	.004	.051	-	-	-	-
	TN 16NL130ZZ	●								.051	.002	.004	.063	-	-	-	-
	TN 16NL160ZZ	●								.063	.002	.004	.073	-	-	-	-
	TN 16NL185ZZ	●								.073	.002	.004	.073	-	-	-	-
	TN 16NL215ZZ	●								.085	.002	.004	.073	-	-	-	-
	TN 16NL265ZZ	●								.104	.002	.004	.081	-	-	-	-
	TN 22NL265ZZ	●								.104	.003	.005	.087	-	-	-	-
	TN 22NL315ZZ	●								.124	.003	.005	.087	-	-	-	-
	TN 22NL415ZZ	●								.163	.003	.005	.102	-	-	-	-

Recommended shim PE ZZ (page 230)

● stocked as standard / ○ not stocked as standard
See price list for current availability.

TN ..ER/L-R
EXTERNAL



Dimensions	d	d_1	s			
16	3/8	.154	.138			
22	1/2	.193	.185			

All dimensions [in]

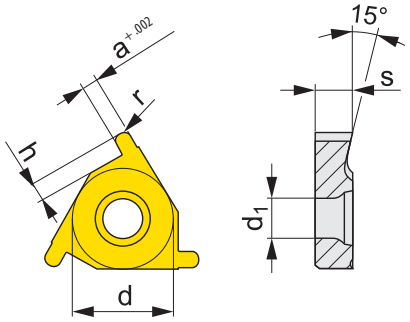
For tools see pages: T80-T83

Chip breaker	Designation	Grades								r	a	h	Feed/rev.		Depth of cut	
		T8330											f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**TN 16ER-R050**	●								.020	.039	.051	-	-	-	-
	TN 16ER-R100	●								.039	.079	.073	-	-	-	-
	TN 22ER-R150	●								.059	.118	.087	-	-	-	-
	**TN 16EL-R050**	●								.020	.039	.051	-	-	-	-
	TN 16EL-R100	●								.039	.079	.073	-	-	-	-
	TN 22EL-R150	●								.059	.118	.087	-	-	-	-

Recommended shim PE ZZ (page 230)

● stocked as standard /○ not stocked as standard
See price list for current availability.

TN ..NR/L-R
INTERNAL



Dimensions	d	d_1	s			
11	1/4	.110	.150			
16	3/8	.154	.138			
22	1/2	.193	.185			

All dimensions [in]

For tools see pages: T80-T83

Chip breaker	Designation	Grades								r	a	h	Feed/rev.		Depth of cut	
		T8330											f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TN 11NR-R050	●								.020	.039	.051	-	-	-	-
	TN 16NR-R100	●								.039	.079	.073	-	-	-	-
	TN 22NR-R150	●								.059	.118	.087	-	-	-	-
	TN 11NL-R050	●								.020	.039	.051	-	-	-	-
	TN 16NL-R100	●								.039	.079	.073	-	-	-	-
	TN 22NL-R150	●								.059	.118	.087	-	-	-	-

Recommended shim PE ZZ (page 230)

● stocked as standard / ○ not stocked as standard
See price list for current availability.

CODE DESIGNATION - INDEXABLE CUTTING INSERTS FOR THREADING

1

Insert shape

T

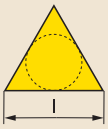
2

Clearance angle

N

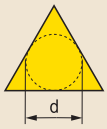
3

Cutting edge length



l

[mm]	[in]
11	.433
16	.650
22	.866



d = I.C.

[mm]	[in]
6,350	1/4
9,525	3/8
12,700	1/2

4

Internal

External

E

Internal

N

ISO CODE

1	2	3	4	5	6	7		8
T	N	16	E	R	175	M	-	P1

ANSI CODE

1	2	3	4	5	6	7		8
T	N	16	E	R	120	W	-	P1

5

Direction of cut

Right

R

Left

L

Neutral

N

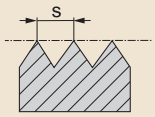
8

Chip breaker

P1	Pressed

6

Thread pitch



s x 100

Thread Pitch, mm x100

6

Thread pitch

Thread pitch

N°. of threads per inch x 10

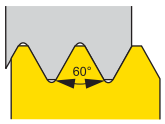
7

Thread profile

M	Metric 60° ISO 965/1-1980	**TR**	TR 30° ISO 2901/3-1977
W	Whitworth 55° ISO 228-1982	**UN**	American UN 60° ISO 5864-1978
RD	Round 30° DIN 405-1981	**ACME**	ACME 29° ANSI B1.5-1988
BSPT	ISO 228/1 35 21 1959 ISO 7/1	**API**	API
NPT	ANSI B1.1-1983		

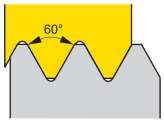
M
Full profile

TN ..ER/EL...M



T152

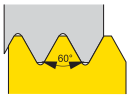
TN ..NR/NL...M



T153 - 154

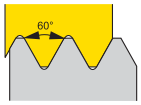
M
Partial profile

TN ..ER/EL...60°



T155

TN ..NR/NL...60°



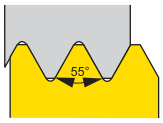
T156

TN ..EN/NN....60°

T157

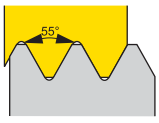
W
Full profile

TN ..ER/EL...W



T158

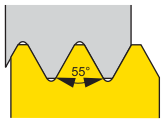
TN ..NR/NL...W



T159

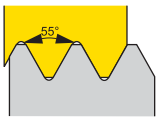
W
Partial profile

TN ..ER/EL...W



T160

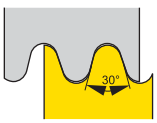
TN ..NR/NL...W



T161

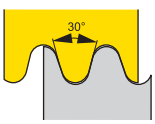
RD
Full profile

TN ..ER/EL...RD



T162

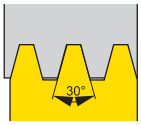
TN ..NR/NL...RD



T163

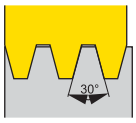
TR
Full profile

TN ..ER/EL...TR



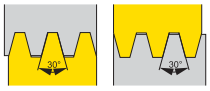
T164

TN ..NR/NL...TR



T165

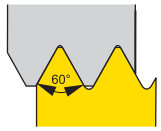
TN ..EN/NN...TR



T166

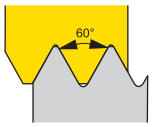
UN
Full profile

TN ..ER/EL...UN



T167

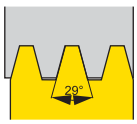
TN ..NR/NL...UN



T168

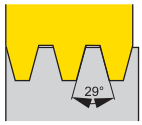
ACME
Full profile

TN ..ER/EL...ACME



T169

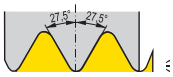
TN ..NR/NL...ACME



T170

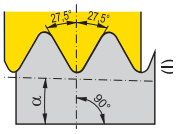
BSPT
Full profile

TN ..ER/EL..BSPT



T171

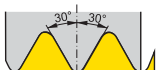
TN ..NR/NL..BSPT



T171

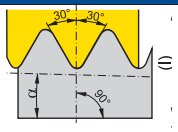
NPT
Full profile

TN ..ER/EL...NPT



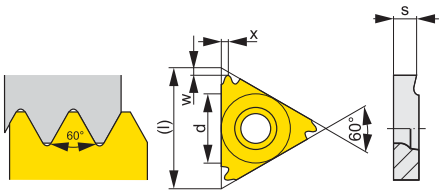
T172

TN ..NR/NL...NPT



T172

METRIC 60°
ISO 965/1-1980
FULL PROFILE
EXTERNAL



Dimensions	(l)	d	s			
16	.650	3/8	.137			
22	.866	1/2	.185			

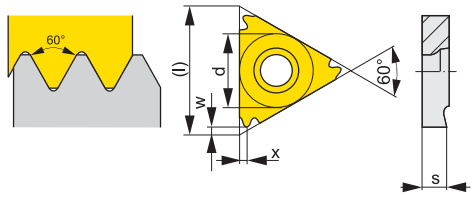
All dimensions [in]

For tools see pages: T80

Chip breaker	Designation	Pitch [mm]	Grades								x	w	Feed/rev.		Depth of cut	
			T8030										f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TN 16ER050M	0,50	●								.020	.051	-	-	-	-
	TN 16ER075M	0,75	●								.020	.051	-	-	-	-
	TN 16ER080M	0,80	●								.020	.051	-	-	-	-
	TN 16ER100M	1,00	●								.028	.051	-	-	-	-
	TN 16ER125M	1,25	●								.031	.051	-	-	-	-
	TN 16ER150M	1,50	●								.039	.051	-	-	-	-
	**TN 16ER175M**	1,75	●								.055	.051	-	-	-	-
	TN 16ER200M	2,00	●								.055	.051	-	-	-	-
	TN 16ER250M	2,50	●								.055	.051	-	-	-	-
	TN 16ER300M	3,00	●								.059	.063	-	-	-	-
	TN 22ER350M	3,50	●								.091	.063	-	-	-	-
	TN 22ER400M	4,00	●								.091	.063	-	-	-	-
	TN 22ER450M	4,50	●								.094	.063	-	-	-	-
	TN 22ER500M	5,00	●								.098	.071	-	-	-	-
	TN 16EL050M	0,50	●								.020	.051	-	-	-	-
	TN 16EL075M	0,75	●								.020	.051	-	-	-	-
	TN 16EL080M	0,80	●								.020	.051	-	-	-	-
	TN 16EL100M	1,00	●								.028	.051	-	-	-	-
	TN 16EL125M	1,25	●								.031	.051	-	-	-	-
	TN 16EL150M	1,50	●								.039	.051	-	-	-	-
	**TN 16EL175M**	1,75	●								.055	.051	-	-	-	-
	TN 16EL200M	2,00	●								.055	.051	-	-	-	-
	TN 16EL250M	2,50	●								.055	.051	-	-	-	-
	TN 16EL300M	3,00	●								.059	.063	-	-	-	-
	TN 22EL350M	3,50	●								.091	.063	-	-	-	-
	TN 22EL400M	4,00	●								.091	.063	-	-	-	-
	TN 22EL450M	4,50	●								.094	.063	-	-	-	-
	TN 22EL500M	5,00	●								.098	.071	-	-	-	-

● stocked as standard /○ not stocked as standard
See price list for current availability.

METRIC 60°
ISO 965/1-1980
FULL PROFILE
INTERNAL



Dimensions	(l)	d	s
11	.433	1/4	.118
16	.650	3/8	.137
22	.866	1/2	.185

All dimensions [in]

For tools see pages: T82

Chip breaker	Designation	Pitch [mm]	Grades	x	w	Feed/rev.		Depth of cut	
			T8030			f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**TN 11NR050M**	0,50	●	.020	.051	-	-	-	-
	TN 11NR075M	0,75	●	.020	.051	-	-	-	-
	TN 11NR100M	1,00	●	.028	.051	-	-	-	-
	TN 11NR125M	1,25	●	.031	.051	-	-	-	-
	TN 11NR150M	1,50	●	.039	.051	-	-	-	-
	TN 11NR200M	2,00	●	.039	.051	-	-	-	-
	TN 16NR050M	0,50	●	.020	.051	-	-	-	-
	TN 16NR075M	0,75	●	.020	.051	-	-	-	-
	TN 16NR100M	1,00	●	.028	.051	-	-	-	-
	TN 16NR125M	1,25	●	.031	.051	-	-	-	-
	TN 16NR150M	1,50	●	.039	.051	-	-	-	-
	TN 16NR175M	1,75	●	.055	.051	-	-	-	-
	TN 16NR200M	2,00	●	.055	.051	-	-	-	-
	TN 16NR250M	2,50	●	.055	.051	-	-	-	-
	TN 16NR300M	3,00	●	.059	.051	-	-	-	-
	TN 22NR350M	3,50	●	.091	.063	-	-	-	-
	TN 22NR400M	4,00	●	.091	.063	-	-	-	-
	TN 22NR450M	4,50	●	.094	.063	-	-	-	-
	TN 22NR500M	5,00	●	.098	.071	-	-	-	-
	TN 11NL050M	0,50	●	.020	.051	-	-	-	-
	TN 11NL075M	0,75	●	.020	.051	-	-	-	-
	TN 11NL100M	1,00	●	.028	.051	-	-	-	-
	TN 11NL125M	1,25	●	.031	.051	-	-	-	-
	TN 11NL150M	1,50	●	.039	.051	-	-	-	-
	TN 11NL200M	2,00	●	.039	.051	-	-	-	-
	**TN 16NL050M**	0,50	●	.020	.051	-	-	-	-
	TN 16NL075M	0,75	●	.020	.051	-	-	-	-
	TN 16NL100M	1,00	●	.028	.051	-	-	-	-
	TN 16NL125M	1,25	●	.031	.051	-	-	-	-
	TN 16NL150M	1,50	●	.039	.051	-	-	-	-
	TN 16NL175M	1,75	●	.055	.051	-	-	-	-
	TN 16NL200M	2,00	●	.055	.051	-	-	-	-

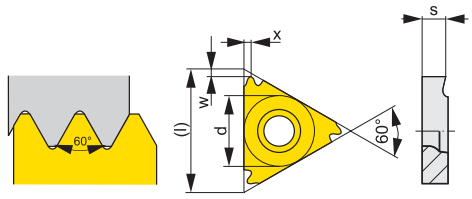
Chip breaker	Designation	Pitch [mm]	Grades								x	w	Feed/rev.		Depth of cut	
			T8030										f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**TN 16NL250M**	2,50	●								.055	.051	-	-	-	-
	TN 16NL300M	3,00	●								.059	.051	-	-	-	-
	TN 22NL350M	3,50	●								.091	.063	-	-	-	-
	TN 22NL400M	4,00	●								.091	.063	-	-	-	-
	TN 22NL500M	5,00	●								.098	.071	-	-	-	-

● stocked as standard /○ not stocked as standard
See price list for current availability.

METRIC 60°

PARTIAL PROFILE

EXTERNAL



Dimensions	(l)	d	s			
16	.650	3/8	.137			
22	.866	1/2	.185			

All dimensions [in]

For tools see pages: 80

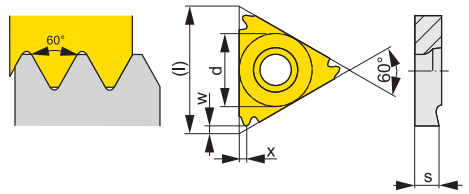
Chip breaker	Designation	Pitch [mm]	Grades								x	w	Feed/rev.		Depth of cut	
			T8030										f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TN 16ERA60	0,50 - 1,50	●								.031	.024	-	-	-	-
	TN 16ERAG60	0,50 - 3,00	●								.059	.043	-	-	-	-
	TN 16ERG60	1,75 - 3,00	●								.059	.043	-	-	-	-
	TN 22ERN60	3,50 - 5,00	●								.098	.071	-	-	-	-
	TN 16ELA60	0,50 - 1,50	●								.031	.024	-	-	-	-
	TN 16ELAG60	0,50 - 3,00	●								.059	.043	-	-	-	-
	TN 16ELG60	1,75 - 3,00	●								.059	.043	-	-	-	-
	TN 22ELN60	3,50 - 5,00	●								.098	.071	-	-	-	-

● stocked as standard / ○ not stocked as standard
See price list for current availability.

METRIC 60°

PARTIAL PROFILE

INTERNAL



Dimensions	(l)	d	s			
11	.433	1/4	.118			
16	.650	3/8	.137			
22	.866	1/2	.181			

All dimensions [in]

For tools see pages: T82

Chip breaker	Designation	Pitch [mm]	Grades								x	w	Feed/rev.		Depth of cut	
			T8030										f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TN 11NRA60	0,50 - 1,50	●								.031	.024	-	-	-	-
	TN 16NRA60	0,50 - 1,50	●								.031	.024	-	-	-	-
	**TN 16NRAG60**	0,50 - 3,00	●								.059	.043	-	-	-	-
	TN 16NRG60	1,75 - 3,00	●								.059	.043	-	-	-	-
	TN 22NRN60	3,50 - 5,00	●								.098	.071	-	-	-	-
	TN 11NLA60	0,50 - 1,50	●								.031	.024	-	-	-	-
	TN 16NLA60	0,50 - 1,50	●								.031	.024	-	-	-	-
	**TN 16NLAG60**	0,50 - 3,00	●								.059	.043	-	-	-	-
	TN 16NLG60	1,75 - 3,00	●								.059	.043	-	-	-	-
	TN 22NLN60	3,50 - 5,00	●								.098	.071	-	-	-	-

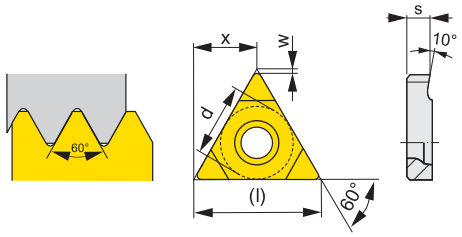
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

METRIC 60° - S

PARTIAL PROFILE

EXTERNAL



Dimensions	(l)	d	s			
22	.866	1/2	.181			

All dimensions [in]

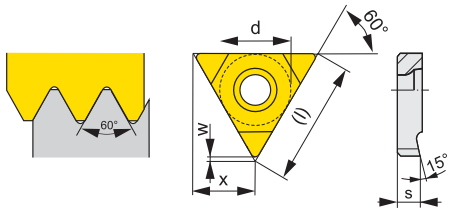
For tools see pages: T81

Chip breaker	Designation	Pitch [mm]	Grades								x	w	Feed/rev.		Depth of cut	
			T8030										f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TN 22EN350-500M	3,50 - 5,00	●								.433	.030	-	-	-	-
	TN 22EN550-800M	5,50 - 8,00	●								.433	.049	-	-	-	-

METRIC 60° - S

PARTIAL PROFILE

INTERNAL



Dimensions	(l)	d	s			
22	.866	1/2	.181			

All dimensions [in]

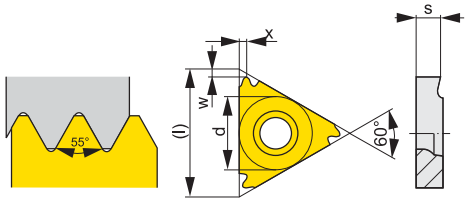
For tools see pages: T83

Chip breaker	Designation	Pitch [mm]	Grades								x	w	Feed/rev.		Depth of cut	
			T8030										f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TN 22NN350-500M	3,50 - 5,00	●								.433	.026	-	-	-	-
	TN 22NN550-800M	5,50 - 8,00	●								.433	.037	-	-	-	-

WHITWORTH 55° ISO 228-1982

FULL PROFILE

EXTERNAL



Dimensions	(l)	d	s			
16	.650	3/8	.137			
22	.866	1/2	.185			

All dimensions [in]

For tools see pages: T80

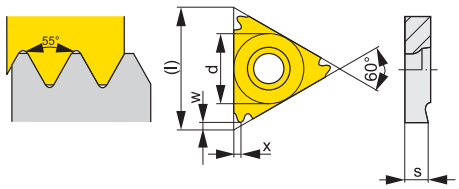
Chip breaker	Designation	Threads per in	Grades								x	w	Feed/rev.		Depth of cut	
			T8030										f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TN 16ER280W	28.0	●								.028	.024	-	-	-	-
	TN 16ER200W	20.0	●								.035	.031	-	-	-	-
	TN 16ER190W	19.0	●								.039	.031	-	-	-	-
	TN 16ER180W	18.0	●								.039	.031	-	-	-	-
	TN 16ER160W	16.0	●								.043	.035	-	-	-	-
	TN 16ER140W	14.0	●								.047	.039	-	-	-	-
	TN 16ER120W	12.0	●								.055	.043	-	-	-	-
	**TN 16ER110W**	11.0	●								.059	.043	-	-	-	-
	TN 16ER100W	10.0	●								.059	.047	-	-	-	-
	TN 16ER090W	9.0	●								.067	.047	-	-	-	-
	TN 16ER080W	8.0	●								.059	.047	-	-	-	-
	TN 22ER070W	7.0	●								.091	.063	-	-	-	-
	TN 22ER060W	6.0	●								.091	.063	-	-	-	-
	TN 22ER050W	5.0	●								.094	.067	-	-	-	-
	TN 16EL280W	28.0	●								.028	.024	-	-	-	-
	TN 16EL200W	20.0	●								.035	.031	-	-	-	-
	TN 16EL190W	19.0	●								.039	.031	-	-	-	-
	TN 16EL160W	16.0	●								.043	.035	-	-	-	-
	TN 16EL140W	14.0	●								.047	.039	-	-	-	-
	TN 16EL120W	12.0	●								.055	.043	-	-	-	-
	**TN 16EL110W**	11.0	●								.059	.043	-	-	-	-
	TN 16EL100W	10.0	●								.059	.043	-	-	-	-
	TN 16EL090W	9.0	●								.067	.047	-	-	-	-
	TN 16EL080W	8.0	●								.059	.047	-	-	-	-
	TN 22EL070W	7.0	●								.091	.063	-	-	-	-
	TN 22EL060W	6.0	●								.091	.063	-	-	-	-
	TN 22EL050W	5.0	●								.094	.067	-	-	-	-

● stocked as standard /○ not stocked as standard
See price list for current availability.

WHITWORTH 55° ISO 228-1982

FULL PROFILE

INTERNAL



Dimensions	(l)	d	s			
11	.433	1/4	.118			
16	.650	3/8	.137			
22	.866	1/2	.185			

All dimensions [in]

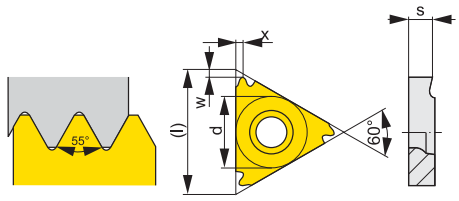
For tools see pages: T82

Chip breaker	Designation	Threads per in	Grades								x	w	Feed/rev.		Depth of cut	
			T8030										f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TN 11NR190W	19.0	●								.039	.031	-	-	-	-
	TN 11NR140W	14.0	●								.047	.031	-	-	-	-
	TN 16NR280W	28.0	●								.028	.024	-	-	-	-
	TN 16NR200W	20.0	●								.035	.031	-	-	-	-
	TN 16NR190W	19.0	●								.039	.031	-	-	-	-
	TN 16NR160W	16.0	●								.043	.035	-	-	-	-
	TN 16NR140W	14.0	●								.047	.039	-	-	-	-
	**TN 16NR120W**	12.0	●								.055	.043	-	-	-	-
	TN 16NR110W	11.0	●								.059	.043	-	-	-	-
	TN 16NR100W	10.0	●								.059	.047	-	-	-	-
	TN 16NR090W	9.0	●								.067	.047	-	-	-	-
	TN 16NR080W	8.0	●								.059	.047	-	-	-	-
	TN 22NR070W	7.0	●								.091	.063	-	-	-	-
	TN 22NR060W	6.0	●								.091	.063	-	-	-	-
	TN 22NR050W	5.0	●								.094	.067	-	-	-	-
	TN 11NL190W	19.0	●								.039	.031	-	-	-	-
	TN 11NL140W	14.0	●								.047	.031	-	-	-	-
	TN 16NL280W	28.0	●								.028	.024	-	-	-	-
	TN 16NL200W	20.0	●								.035	.031	-	-	-	-
	TN 16NL190W	19.0	●								.039	.031	-	-	-	-
	TN 16NL160W	16.0	●								.043	.035	-	-	-	-
	TN 16NL140W	14.0	●								.047	.039	-	-	-	-
	**TN 16NL120W**	12.0	●								.055	.043	-	-	-	-
	TN 16NL110W	11.0	●								.059	.043	-	-	-	-
	TN 16NL100W	10.0	●								.059	.043	-	-	-	-
	TN 16NL090W	9.0	●								.067	.047	-	-	-	-
	TN 16NL080W	8.0	●								.059	.047	-	-	-	-
	TN 22NL070W	7.0	●								.091	.063	-	-	-	-
	TN 22NL060W	6.0	●								.091	.063	-	-	-	-
	TN 22NL050W	5.0	●								.094	.067	-	-	-	-

WHITWORTH 55° ISO 228-1982

PARTIAL PROFILE

EXTERNAL



Dimensions	(l)	d	s			
16	.650	3/8	.137			
22	.866	1/2	.185			

All dimensions [in]

For tools see pages: T80

Chip breaker	Designation	Threads per in	Grades								x	w	Feed/rev.		Depth of cut	
			T8030										f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TN 16ERA55	48 - 16	●								.031	.024	-	-	-	-
	TN 16ERAG55	48 - 8	●								.059	.043	-	-	-	-
	TN 16ERG55	14 - 8	●								.059	.043	-	-	-	-
	TN 22ERN55	7 - 5	●								.098	.071	-	-	-	-
	TN 16ELA55	48 - 16	●								.031	.024	-	-	-	-
	TN 16ELAG55	48 - 8	●								.059	.043	-	-	-	-
	TN 16ELG55	14 - 8	●								.059	.043	-	-	-	-
	TN 22ELN55	7 - 5	●								.098	.071	-	-	-	-

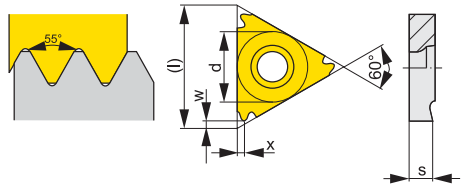
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

WHITWORTH 55° ISO 228-1982

PARTIAL PROFILE

INTERNAL



Dimensions	(l)	d	s			
11	.433	1/4	.118			
16	.650	3/8	.137			
22	.866	1/2	.185			

All dimensions [in]

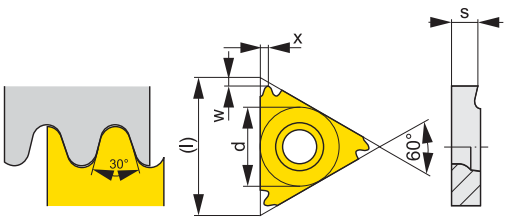
For tools see pages: T82

Chip breaker	Designation	Threads per in	Grades								x	w	Feed/rev.		Depth of cut	
			T8030										f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TN 11NRA55	48 - 16	●								.031	.024	-	-	-	-
	TN 16NRA55	48 - 16	●								.031	.024	-	-	-	-
	**TN 16NRAG55**	48 - 8	●								.059	.043	-	-	-	-
	TN 16NRG55	14 - 8	●								.059	.043	-	-	-	-
	TN 22NRN55	7 - 5	●								.098	.071	-	-	-	-
	TN 11NLA55	48 - 16	●								.031	.024	-	-	-	-
	TN 16NLA55	48 - 16	●								.031	.024	-	-	-	-
	**TN 16NLAG55**	48 - 8	●								.059	.043	-	-	-	-
	TN 16NLG55	14 - 8	●								.059	.043	-	-	-	-
	TN 22NLN55	7 - 5	●								.098	.071	-	-	-	-

RD 30° DIN 405-1981

FULL PROFILE

EXTERNAL



Dimensions	(l)	d	s			
16	.650	3/8	.137			
22	.866	1/2	.185			

All dimensions [in]

For tools see pages: T80

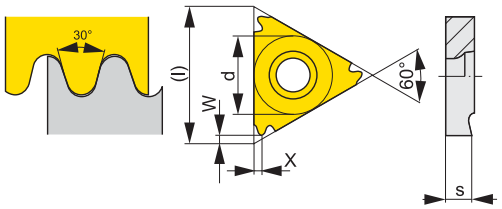
Chip breaker	Designation	Threads per in	Grades								x	w	Feed/rev.		Depth of cut	
			T8030										f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TN 16ER100RD	10.0	●								.047	.043	-	-	-	-
	TN 16ER080RD	8.0	●								.051	.055	-	-	-	-
	TN 16ER060RD	6.0	●								.067	.059	-	-	-	-
	TN 22ER060RD	6.0	●								.098	.079	-	-	-	-
	TN 22EL060RD	6.0	●								.098	.079	-	-	-	-

● stocked as standard /○ not stocked as standard
See price list for current availability.

RD 30° DIN 405-1981

FULL PROFILE

INTERNAL



Dimensions	(l)	d	s			
16	.650	3/8	.137			
22	.866	1/2	.185			

All dimensions [in]

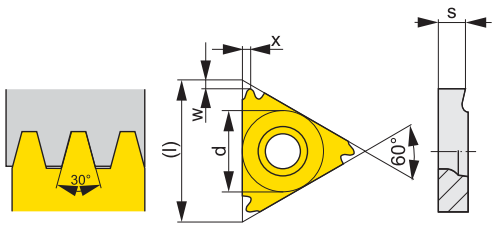
For tools see pages: T82

Chip breaker	Designation	Threads per in	Grades								x	w	Feed/rev.		Depth of cut	
			T8030										f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TN 16NR100RD		●								.047	.043	-	-	-	-
	TN 16NR080RD		●								.051	.055	-	-	-	-
	TN 16NR060RD		●								.067	.055	-	-	-	-
	TN 22NR060RD		●								.098	.079	-	-	-	-
	TN 22NL060RD		●								.098	.079	-	-	-	-

TR 30° DIN 103-1977, ISO 2901/3-1977

FULL PROFILE

EXTERNAL



Dimensions	(l)	d	s			
16	.650	3/8	.137			
22	.866	1/2	.185			

All dimensions [in]

For tools see pages: T80

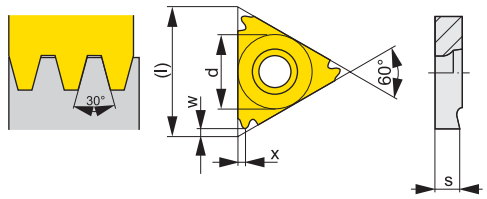
Chip breaker	Designation	Pitch [mm]	Grades								x	w	Feed/rev.		Depth of cut	
			T8030										f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**TN 16ER150TR**	1,50	●								.039	.039	-	-	-	-
	TN 16ER200TR	2,00	●								.055	.051	-	-	-	-
	TN 16ER300TR	3,00	●								.059	.051	-	-	-	-
	TN 22ER400TR	4,00	●								.091	.065	-	-	-	-
	TN 22ER500TR	5,00	●								.098	.083	-	-	-	-
	**TN 16EL150TR**	1,50	●								.039	.039	-	-	-	-
	TN 16EL200TR	2,00	●								.055	.051	-	-	-	-
	TN 16EL300TR	3,00	●								.059	.051	-	-	-	-
	TN 22EL400TR	4,00	●								.091	.065	-	-	-	-
	TN 22EL500TR	5,00	●								.098	.083	-	-	-	-

● stocked as standard /○ not stocked as standard
See price list for current availability.

TR 30° DIN 103-1977, ISO 2901/3-1977

FULL PROFILE

INTERNAL



Dimensions	(l)	d	s			
16	.650	3/8	.137			
22	.866	1/2	.185			

All dimensions [in]

For tools see pages: T82

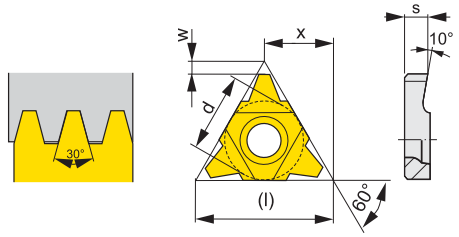
Chip breaker	Designation	Pitch [mm]	Grades								x	w	Feed/rev.		Depth of cut	
			T8030										f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TN 16NR150TR	1,50	●								.039	.039	-	-	-	-
	TN 16NR200TR	2,00	●								.055	.051	-	-	-	-
	TN 16NR300TR	3,00	●								.059	.051	-	-	-	-
	TN 22NR400TR	4,00	●								.091	.065	-	-	-	-
	TN 22NR500TR	5,00	●								.098	.083	-	-	-	-
		0,00														
	TN 16NL150TR	1,50	●								.039	.039	-	-	-	-
	TN 16NL200TR	2,00	●								.055	.051	-	-	-	-
	TN 16NL300TR	3,00	●								.059	.051	-	-	-	-
	TN 22NL400TR	4,00	●								.091	.065	-	-	-	-
	TN 22NL500TR	5,00	●								.098	.083	-	-	-	-

● stocked as standard /○ not stocked as standard
See price list for current availability.

TR 30° S

FULL PROFILE

EXTERNAL



Dimensions	(l)	d	s
22	.866	1/2	.181

All dimensions [in]

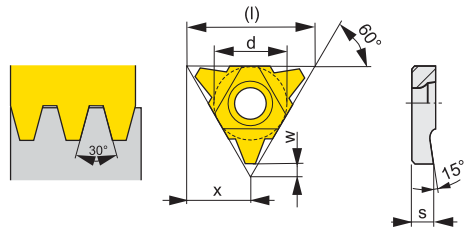
For tools see pages: T81

Chip breaker	Designation	Pitch [mm]	Grades T8030	x	w	Feed/rev. f_{min}	Feed/rev. f_{max}	Depth of cut $a_{p\,min}$	Depth of cut $a_{p\,max}$
	TN 22EN600TR	6,00	●	.433	.061	-	-	-	-
	TN 22EN700TR	7,00	●	.433	.073	-	-	-	-

TR 30° S

FULL PROFILE

INTERNAL



Dimensions	(l)	d	s
22	.866	1/2	.181

All dimensions [in]

For tools see pages: T83

	Designation	Pitch [mm]	Grades T8030	x	w	Feed/rev. f_{min}	Feed/rev. f_{max}	Depth of cut $a_{p\,min}$	Depth of cut $a_{p\,max}$
	TN 22NN600TR	6,00	●	.433	.061	-	-	-	-
	TN 22NN700TR	7,00	●	.433	.073	-	-	-	-

PRAMET

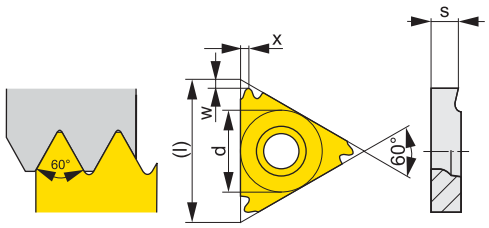
● stocked as standard /○ not stocked as standard
See price list for current availability.

UN 60°

SO 5864-1978, ANSI B1.1-1983

FULL PROFILE

EXTERNAL



Dimensions	(l)	d	s			
16	.650	3/8	.137			
22	.866	1/2	.185			

All dimensions [in]

For tools see pages: T80

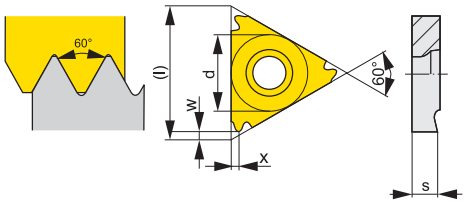
Chip breaker	Designation	Threads per in	Grades	x	w	Feed/rev.		Depth of cut	
			T8030			f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TN 16ER320UN	32.0	●	.024	.024	-	-	-	-
	TN 16ER280UN	28.0	●	.028	.024	-	-	-	-
	TN 16ER240UN	24.0	●	.031	.028	-	-	-	-
	TN 16ER200UN	20.0	●	.035	.031	-	-	-	-
	TN 16ER180UN	18.0	●	.039	.031	-	-	-	-
	TN 16ER160UN	16.0	●	.043	.035	-	-	-	-
	TN 16ER140UN	14.0	●	.047	.039	-	-	-	-
	TN 16ER130UN	13.0	●	.051	.039	-	-	-	-
	**TN 16ER120UN**	12.0	●	.055	.043	-	-	-	-
	TN 16ER115UN	11.5	●	.055	.043	-	-	-	-
	TN 16ER110UN	11.0	●	.059	.043	-	-	-	-
	TN 16ER100UN	10.0	●	.059	.043	-	-	-	-
	TN 16ER090UN	9.0	●	.067	.047	-	-	-	-
	TN 16ER080UN	8.0	●	.063	.047	-	-	-	-
	TN 22ER070UN	7.0	●	.091	.063	-	-	-	-
	TN 22ER060UN	6.0	●	.091	.063	-	-	-	-
	TN 22ER050UN	5.0	●	.098	.067	-	-	-	-
	TN 16EL320UN	32.0	●	.024	.024	-	-	-	-
	TN 16EL280UN	28.0	●	.028	.024	-	-	-	-
	TN 16EL240UN	24.0	●	.031	.028	-	-	-	-
	TN 16EL200UN	20.0	●	.035	.031	-	-	-	-
	TN 16EL180UN	18.0	●	.039	.031	-	-	-	-
	TN 16EL160UN	16.0	●	.043	.035	-	-	-	-
	TN 16EL140UN	14.0	●	.047	.039	-	-	-	-
	**TN 16EL120UN**	12.0	●	.051	.043	-	-	-	-
	TN 16EL110UN	11.0	●	.055	.043	-	-	-	-
	TN 16EL100UN	10.0	●	.059	.043	-	-	-	-
	TN 16EL090UN	9.0	●	.067	.047	-	-	-	-
	TN 16EL080UN	8.0	●	.063	.047	-	-	-	-
	TN 22EL070UN	7.0	●	.091	.063	-	-	-	-
	TN 22EL060UN	6.0	●	.091	.063	-	-	-	-
	TN 22EL050UN	5.0	●	.098	.067	-	-	-	-

UN 60°

ISO 5864-1978, ANSI B1.1-1983

FULL PROFILE

INTERNAL



Dimensions	(l)	d	s			
16	.650	3/8	.137			
22	.866	1/2	.185			

All dimensions [in]

For tools see pages: T82

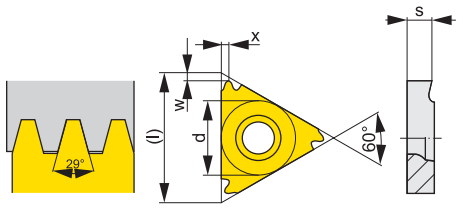
Chip breaker	Designation	Threads per in	Grades T8030	x	w	Feed/rev. f_{min}	Feed/rev. f_{max}	Depth of cut $a_{p\,min}$	Depth of cut $a_{p\,max}$
	TN 16NR320UN	32.0	●	.024	.024	-	-	-	-
	TN 16NR280UN	28.0	●	.028	.024	-	-	-	-
	TN 16NR240UN	24.0	●	.031	.028	-	-	-	-
	TN 16NR200UN	20.0	●	.035	.031	-	-	-	-
	TN 16NR180UN	18.0	●	.039	.031	-	-	-	-
	TN 16NR160UN	16.0	●	.043	.035	-	-	-	-
	TN 16NR140UN	14.0	●	.047	.039	-	-	-	-
	**TN 16NR130UN**	13.0	●	.051	.039	-	-	-	-
	TN 16NR120UN	12.0	●	.055	.043	-	-	-	-
	TN 16NR115UN	11.5	●	.055	.043	-	-	-	-
	TN 16NR110UN	11.0	●	.059	.043	-	-	-	-
	TN 16NR100UN	10.0	●	.059	.043	-	-	-	-
	TN 16NR080UN	8.0	●	.059	.047	-	-	-	-
	TN 22NR070UN	7.0	●	.091	.063	-	-	-	-
	TN 22NR060UN	6.0	●	.091	.063	-	-	-	-
	TN 22NR050UN	5.0	●	.098	.067	-	-	-	-
	TN 16NL320UN	32.0	●	.024	.024	-	-	-	-
	TN 16NL280UN	28.0	●	.028	.024	-	-	-	-
	TN 16NL240UN	24.0	●	.031	.028	-	-	-	-
	TN 16NL200UN	20.0	●	.035	.031	-	-	-	-
	TN 16NL180UN	18.0	●	.039	.031	-	-	-	-
	**TN 16NL160UN**	16.0	●	.043	.035	-	-	-	-
	TN 16NL140UN	14.0	●	.047	.039	-	-	-	-
	TN 16NL120UN	12.0	●	.051	.039	-	-	-	-
	TN 16NL110UN	11.0	●	.055	.043	-	-	-	-
	TN 16NL100UN	10.0	●	.059	.043	-	-	-	-
	TN 16NL080UN	8.0	●	.063	.047	-	-	-	-
	TN 22NL070UN	7.0	●	.091	.063	-	-	-	-
	TN 22NL060UN	6.0	●	.091	.063	-	-	-	-

● stocked as standard /○ not stocked as standard
See price list for current availability.

ACME 29° ANSI B1,5-1988

FULL PROFILE

EXTERNAL



Dimensions	(l)	d	s			
16	.650	3/8	.137			
22	.866	1/2	.185			

All dimensions [in]

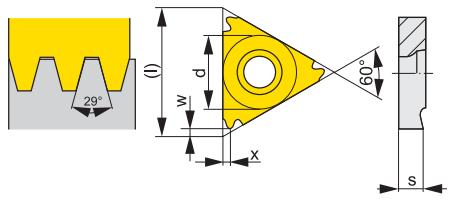
For tools see pages: T80

Chip breaker	Designation	Threads per in	Grades								x	w	Feed/rev.		Depth of cut	
			T8030										f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TN 16ER120ACME	12.0	●								.055	.047	-	-	-	-
	TN 16ER100ACME	10.0	●								.055	.051	-	-	-	-
	**TN 16ER080ACME**	8.0	●								.059	.055	-	-	-	-
	TN 22ER060ACME	6.0	●								.094	.083	-	-	-	-
	TN 22ER050ACME	5.0	●								.094	.075	-	-	-	-
	**TN 22EL060ACME**	6.0	●								.094	.083	-	-	-	-
	TN 22EL050ACME	5.0	●								.094	.075	-	-	-	-

ACME 29° ANSI B1,5-1988

FULL PROFILE

IINTERNAL



Dimensions	(l)	d	s			
16	.650	3/8	.137			
22	.866	1/2	.185			

For tools see pages: T82

Chip breaker	Designation	Threads per in	Grades								x	w	Feed/rev.		Depth of cut	
			T8030										f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TN 16NR080ACME	8.0	●								.059	.059	-	-	-	-
	TN 22NR060ACME	6.0	●								.094	.083	-	-	-	-
	TN 22NR050ACME	5.0	●								.094	.075	-	-	-	-
	TN 22NL050ACME	5.0	●								.094	.075	-	-	-	-

PRAMET

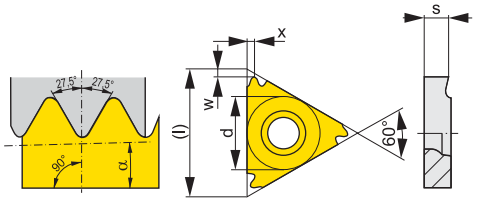
● stocked as standard /○ not stocked as standard
See price list for current availability.

BSPT

ISO 228/1 35 21 1959, ISO 7/1

FULL PROFILE

EXTERNAL



Dimensions	(l)	d	s	α		
16	.650	3/8	.137	1°47´		

All dimensions [in]

For tools see pages: T80

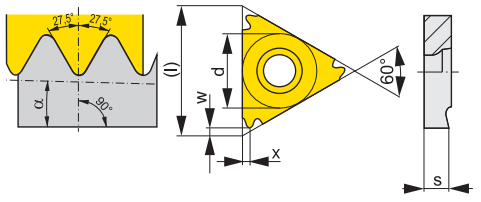
Chip breaker	Designation	Threads per in	Grades								x	w	Feed/rev.		Depth of cut	
			T8030										f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**TN 16ER140BSPT**	14.0	●								.059	.047	-	-	-	-
	TN 16ER110BSPT	11.0	●								.059	.047	-	-	-	-

BSPT

ISO 228/1 35 21 1959, ISO 7/1

FULL PROFILE

INTERNAL



Dimensions	(l)	d	s	α		
16	.650	3/8	.137	1°47´		

All dimensions [in]

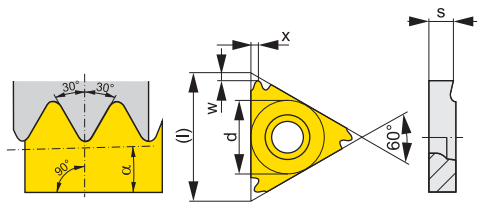
For tools see pages: T82

Chip breaker	Designation	Threads per in	Grades								x	w	Feed/rev.		Depth of cut	
			T8030										f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**TN 16NR140BSPT**	14.0	●								.059	.047	-	-	-	-
	TN 16NR110BSPT	11.0	●								.059	.047	-	-	-	-

NPT ANSI B1.1-1983

FULL PROFILE

EXTERNAL



Dimensions	(l)	d	s	α		
16	.650	3/8	.137	1°47´		

All dimensions [in]

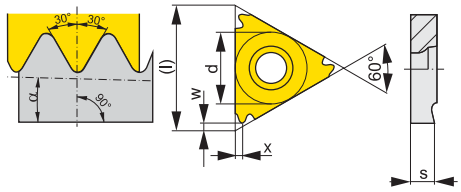
For tools see pages: T80

Chip breaker	Designation	Threads per in	Grades T8030	x	w	Feed/rev. f_{min}	Feed/rev. f_{max}	Depth of cut $a_{p\,min}$	Depth of cut $a_{p\,max}$
	TN 16ER270NPT	27.0	●	.031	.028	-	-	-	-
	TN 16ER180NPT	18.0	●	.031	.028	-	-	-	-
	TN 16ER140NPT	14.0	●	.059	.028	-	-	-	-
	TN 16ER115NPT	11.5	●	.059	.043	-	-	-	-
	TN 16ER080NPT	8.0	●	.063	.043	-	-	-	-

NPT ANSI B1.1-1983

FULL PROFILE

INTERNAL



Dimensions	(l)	d	s	α		
11	.433	1/4	.118	1°47´		
16	.650	3/8	.137	1°47´		

All dimensions [in]

For tools see pages: T82

Designation	Threads per in	Grades T8030	x	w	Feed/rev. f_{min}	Feed/rev. f_{max}	Depth of cut $a_{p\,min}$	Depth of cut $a_{p\,max}$
TN 11NR180NPT	18.0	●	.031	.028	-	-	-	-
TN 11NR140NPT	14.0	●	.031	.028	-	-	-	-
TN 16NR140NPT	14.0	●	.059	.028	-	-	-	-
TN 16NR115NPT	11.5	●	.059	.043	-	-	-	-
TN 16NR080NPT	8.0	●	.063	.043	-	-	-	-

● stocked as standard /○ not stocked as standard
See price list for current availability.

TECHNICAL INFORMATION

Correctly identifying the machined material is one of the most important factors when choosing the tool and the initial machining conditions. To facilitate this, the machined materials are divided into six basic groups, or into twenty-four subgroups, combining materials that qualitatively cause the same type of loading (straining) on the cutting edge and therefore a similar type of wear.

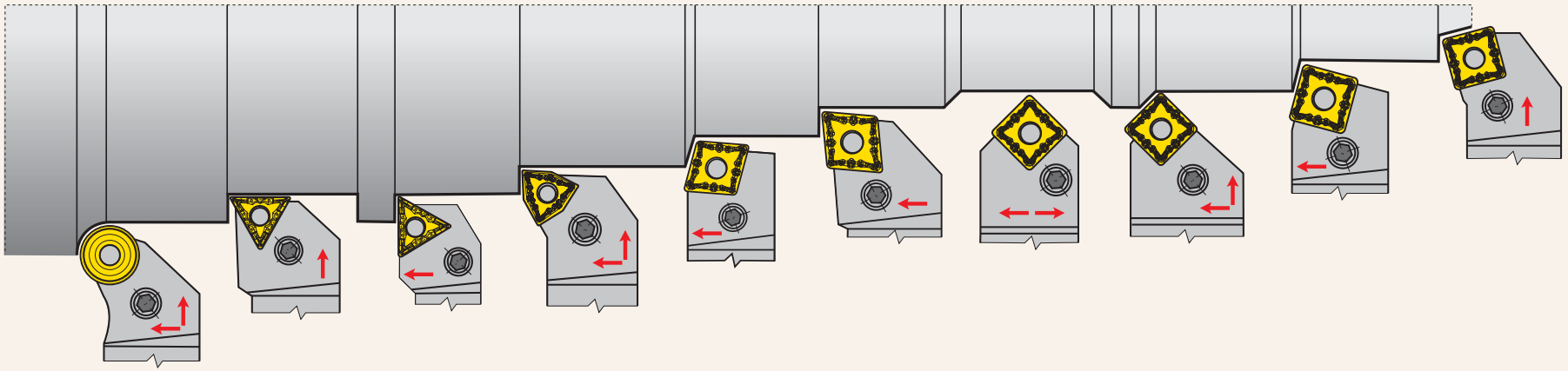
Thus the first step is to assign the workpiece material to one of the (sub)groups - see table 1. below.

Table 1

Group	Subgroup	Subgroup definition	Example ANSII/SAE	Correction to standard	DORMER AMG	VDI 3323
P	P1	Steel and cast steel with very good (enhanced) machinability; automatic steel and low-carbon steel	1213	1.33	1.1, 1.2	1
	P2	Non-alloy and low-alloy cast steel and steel with a medium carbon content (0.25<C<0.55); rigidity of up to 900 MPa and hardness of 160-255 HB	Gr.1043	1.00	1.3	2, 3, 6
	P3	Less machinable non-alloy and low-alloy cast steel and steel with a medium carbon content; rigidity of up to 1000 MPa and hardness of up to 300 HB	Cl. A	.80	1.4	4, 5, 7, 8, (10)
	P4	Medium- to high-alloy cast steel and steel (usually with a carbon content of 0.55 <C); rigidity of up to 1270 MPa and hardness of up to 375HB (resp. 40 HRC)	D3	.60	1.5	9, (10), 11
M	M1	Ferritic corrosion-resistant steel	Type 430	1.09	2.1	12
	M2	Martensitic corrosion-resistant steel	440 C	1.06	(2.1,2.4)	13.1, 13.2
	M3	Austenitic corrosion-resistant steel	Type 321	1.00	2.2	14.1
	M4	Ferritic-austenitic (duplex) and super-austenitic corrosion-resistant steel	EV 12	.93	2.3, 2.4	14.2, 14.3, 14.4
K	K1	Grey cast iron	C1.35B	1.00	3.1, 3.2	15, 16
	K2	Tempered cast iron	Gr.45006	.95	3.1, 3.2	-
	K3	Ductile cast iron ferritic and ferrite-pearlite	Gr.60-40-18	.,90	3.3	17, 19
	K4	Ductile cast iron pearlite-ferritic, pearlite-sorbitic and pearlite	Gr.100-70-03	.85	3.4	18, 20
N	N1	Aluminium and its soft alloys (with a low Si content), particularly formed and cast (non-hardened); hardness of up to 100 HB	A96061	1.00	7.1	21, 22
	N2	Hard Al alloys, particularly cast and hardened (with a high Si content)	A04130	.65	7.2, 7.3, 7.4	23, 24, 25
	N3	Soft Cu alloys, automatic brass and other types of soft brass and bronze	C83600	.60	6.1,6.2, 6.3	26, (27)
	N4	Less machinable and hard Cu alloys	C95200	.40	6.4	(27), 28
S	S1	Technically pure Ti, alloys a , a+b and b, refined and aged alloys	TiAl6V4, AMS R56400	1.75	4.1, 4.2, 4.3	36, 37
	S2	Fe-based alloys	INCOLOY 800, B 163	1.20	(9.1)	31, 32
	S3	Ni-based alloys	INCONEL 718, AMS 5589	1.00	5.1, 5.2, 5.3	33, 34, 35
	S4	Co-based alloys	Haynes 25, AMS 5759	.75	(9.1)	33, 34, 35
H	H1	Highly rigid and hard tool steel and hardened and refined steel with a hardness of 40-50 HRC	T 4	1.15	1.6	38.1
	H2	Hardened and white cast iron 350-600 HV	Gr.1	1.10	-	40.1, 40.2 41.1, 41.2
	H3	Hardened and refined steel with hardness in the 50-55 HRC range	H11	1.00	1.7	38.2
	H4	Hardened and refined (mostly tool) steel with hardness of more than 55 HRC	D3	.95	1.8	39.1, 39.2

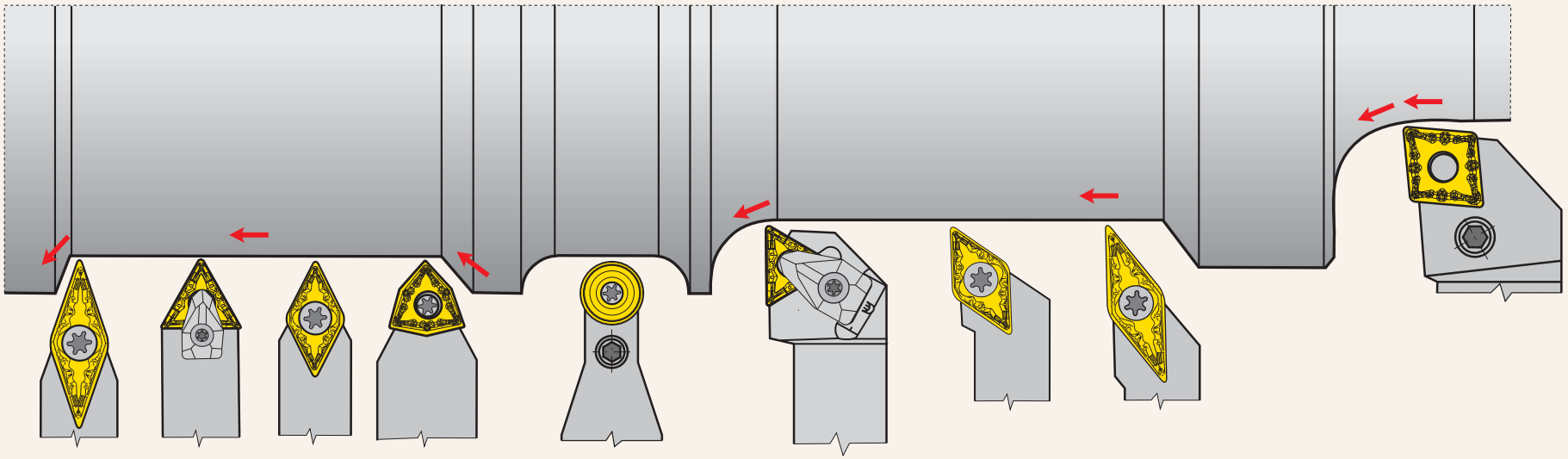
The first step in choosing a turning tool is selecting the type of holder according to technological requirements, possibilities and limitations.
In other words, what surfaces and under what conditions you want to use this tool for turning. For the initial selection of the tool bit type, you can use the navigator at the beginning of the catalogue Turning or one of the following five images.

LONGITUDINAL AND FACE TURNING - EXTERNAL



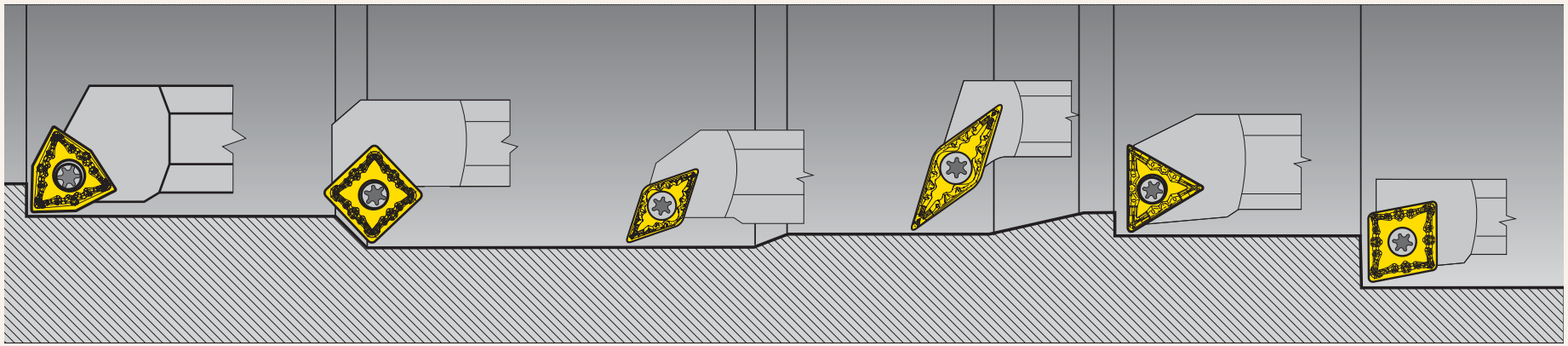
RNMG RCMX RCMT RCMW	TNMG TNMM TNMA TCMT TCMW	WNMG WNMM WNMA WCMT WCMW	CNMG CNMM CNMA CCMT CCMW	SNMG SNMM SNMA SCMT SCMW

COPY TURNING - EXTERNAL



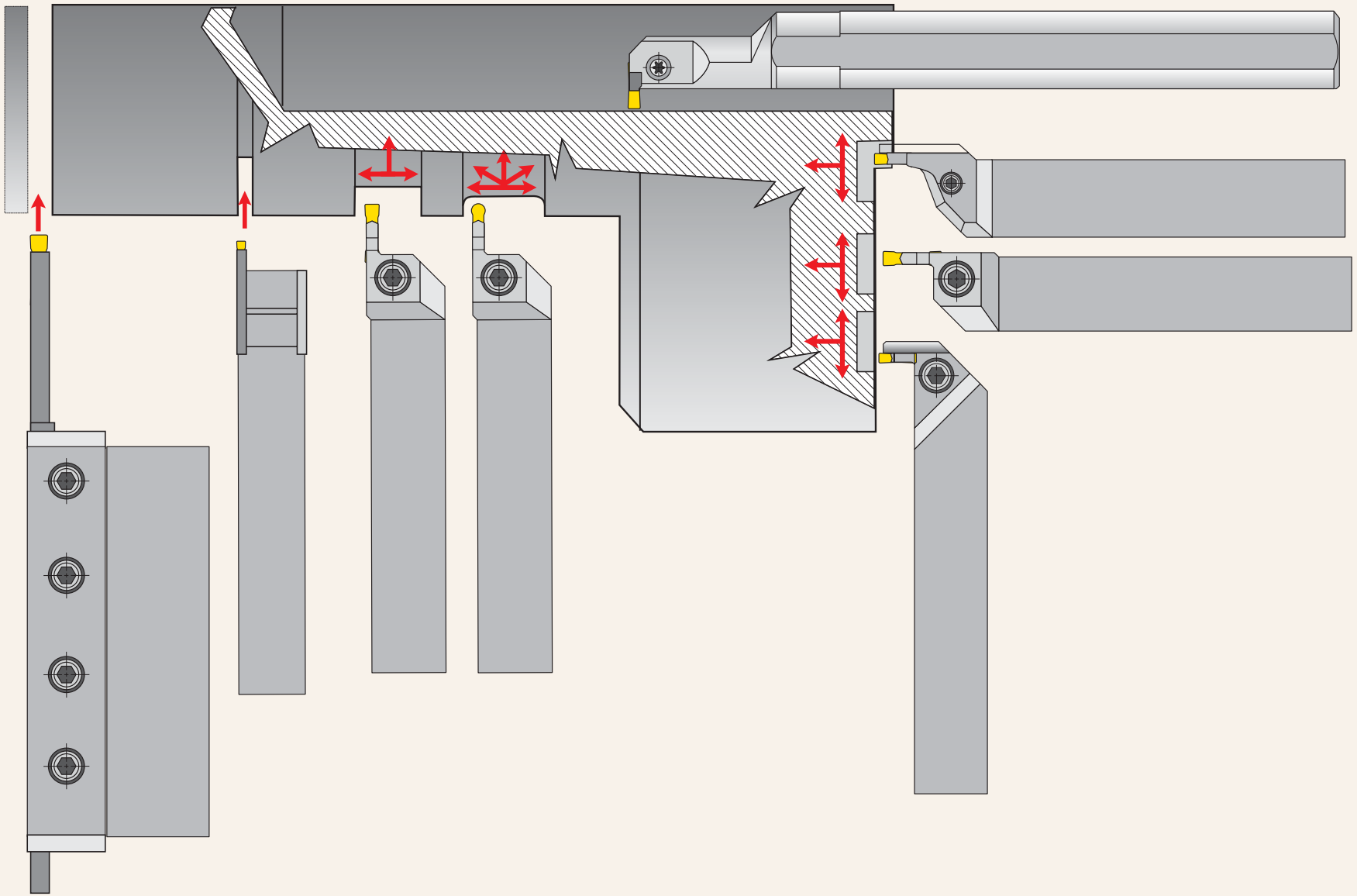
VBMT VCMT VCMW	TNMG TNMM TNMA TCMT TCMW	DNMG DNMM DNMA DCMT DCMW	WNMG WNMM WNMA WCMT WCMW	RNMG RPGA RCMX RCMT RCMW	TNMG TNMM TNMA TCMT TCMW	DNMG DNMM DNMA DCMT DCMW	VBMT VCMT VCMW	CNMG CNMM CNMA CCMT CCMW

BORING COPY TURNING - INTERNAL

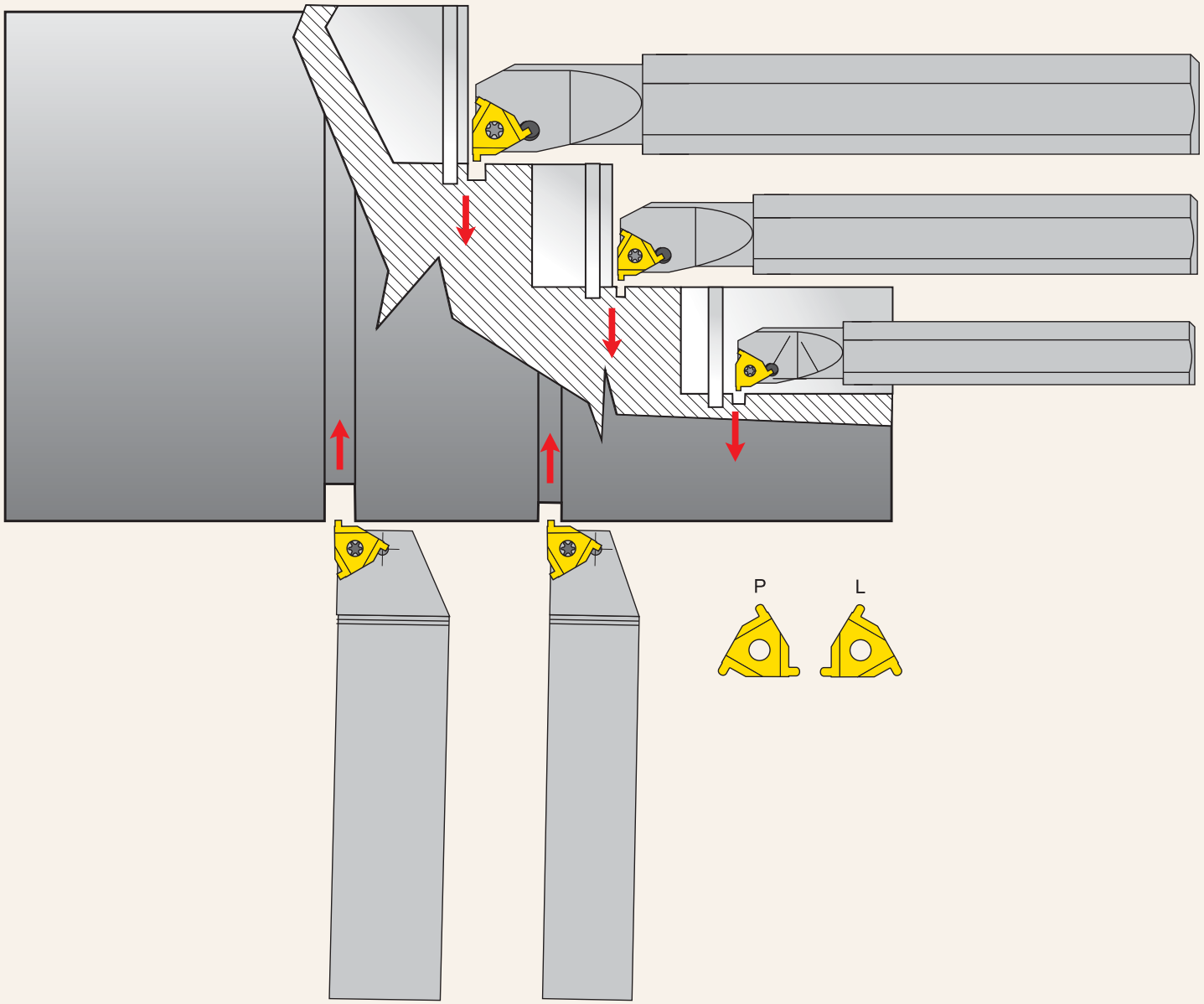


WNMG WNMM WNMA WCMT WCMW	SNMG SNMM SNMA SCMT SCMW	DNMG DNMM DNMA DCMT DCMW	VBMT VCMT VCMW	TNMG TNMM TNMA TCMT TCMW	CNMG CNMM CNMA CCMT CCMW

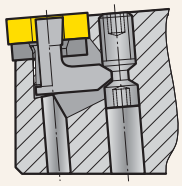
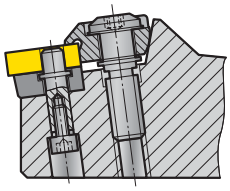
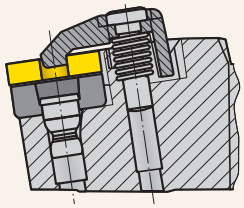
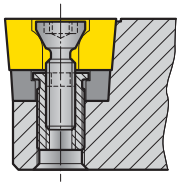
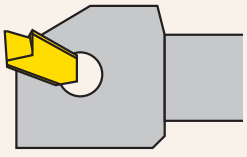
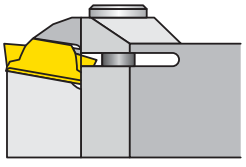
PARTING AND GROOVING - MULTIDIRECTIONAL TURNING



PRECISION AND SHAPE GROOVING



In the second step, which is very closely connected with the first one, choose the clamping system to clamp the insert. Typical characteristics of the different ways of clamping are described in the following text.

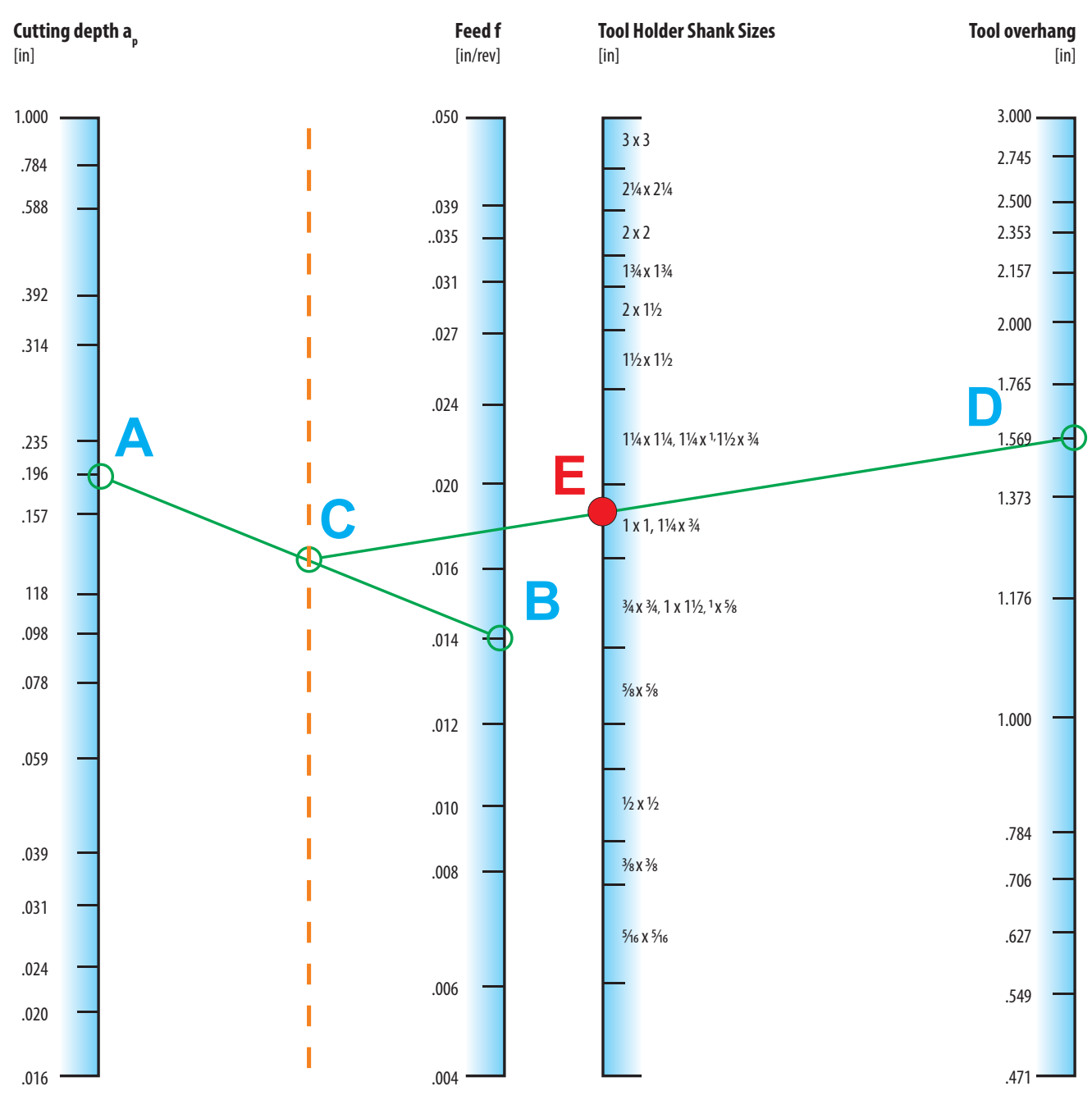
P TYPE		This system is used to clamp negative inserts with cylindrical bore, both with and without a chip breaker. Clamping of the insert is provided by an angle lever which, after tightening the screw, pushes the insert into a seat in the holder. Holders with this system of clamping provide reliable and accurate clamping of inserts. Their best and most common use is for external turning operations, both in finishing and roughing. Alternatively, this method is also used for clamping holders for internal turning of bores of larger diameter.
M TYPE		This way is used to clamp inserts of the same type as in the ISO P system. In this case the insert is mounted on a fixed pin to which it is pushed by a clamp which also fixes the cutting insert from the above. This type of clamping is particularly suitable for holders where increased dynamic stress is expected. These holders are used almost exclusively for external turning.
D TYPE		This way is used to clamp inserts of the same type as in the ISO P system. In this case, the insert is clamped by a special clamp which simultaneously fixes the cutting insert by tightening it in the seat from the above. This type of clamping is particularly suitable for holders where increased dynamic stress is expected. These holders are used almost exclusively for external turning.
S TYPE		This clamping system is encountered especially with turning tools with smaller sections of the body designed for external and internal turning (boring). Clamping in this case is provided by a special screw passing through a conical hole of the insert. By tightening this screw, the insert is fixed in the seat of the tool holder. The benefit of this solution is mainly the fact that there is no obstacle for chip flow.
X TYPE		This designation is used for tools with a special clamping system (i.e. it differs between different manufacturers and equipment suppliers). In our case, the designation identifies tool holders providing the clamping force of the insert by cutting power to the self-locking bed. This type of clamping is used for tools designed for parting and grooving.
G TYPE		This clamping system is used for groove turning and copy turning tools. The insert is pushed into the holder bed by a clamp from the above. The contact surface in the holder, the clamp and the insert is profiled so as to prevent dislodging of the insert by the feed component of the cutting force.

Next task is to perform a selection of, or rather to check, the section of the holder. In selecting the cross-section of the holder, we recommend using the largest possible cross-section of the tool to be clamped in the machine in order to eliminate the risk of vibration. The following nomogram is used to select external steel holders.

Choosing the cross-section of the tool holder

The tool holder shank sizes are normally limited by the turning machine being used. However, when it is possible to make a choice, the nomogram below displays the optimum shank sizes with regard to the cutting conditions (feed and depth of cut) and tool overhang.

Picture 1.



Example of using the nonogram:

First of all, draw a line from the chosen (or maximum) depth of cut a_p (point **A**) to the chosen feed f (point **B**). From the point of intersection of the straight line running down the middle and the line connecting points **A** and **B** (point **C**), draw another line to the point of tool overhang (point **D**). The point on the second axis on the right (point **E**) indicates the optimum tool holder shank sizes.

Choosing the shape and size of the insert

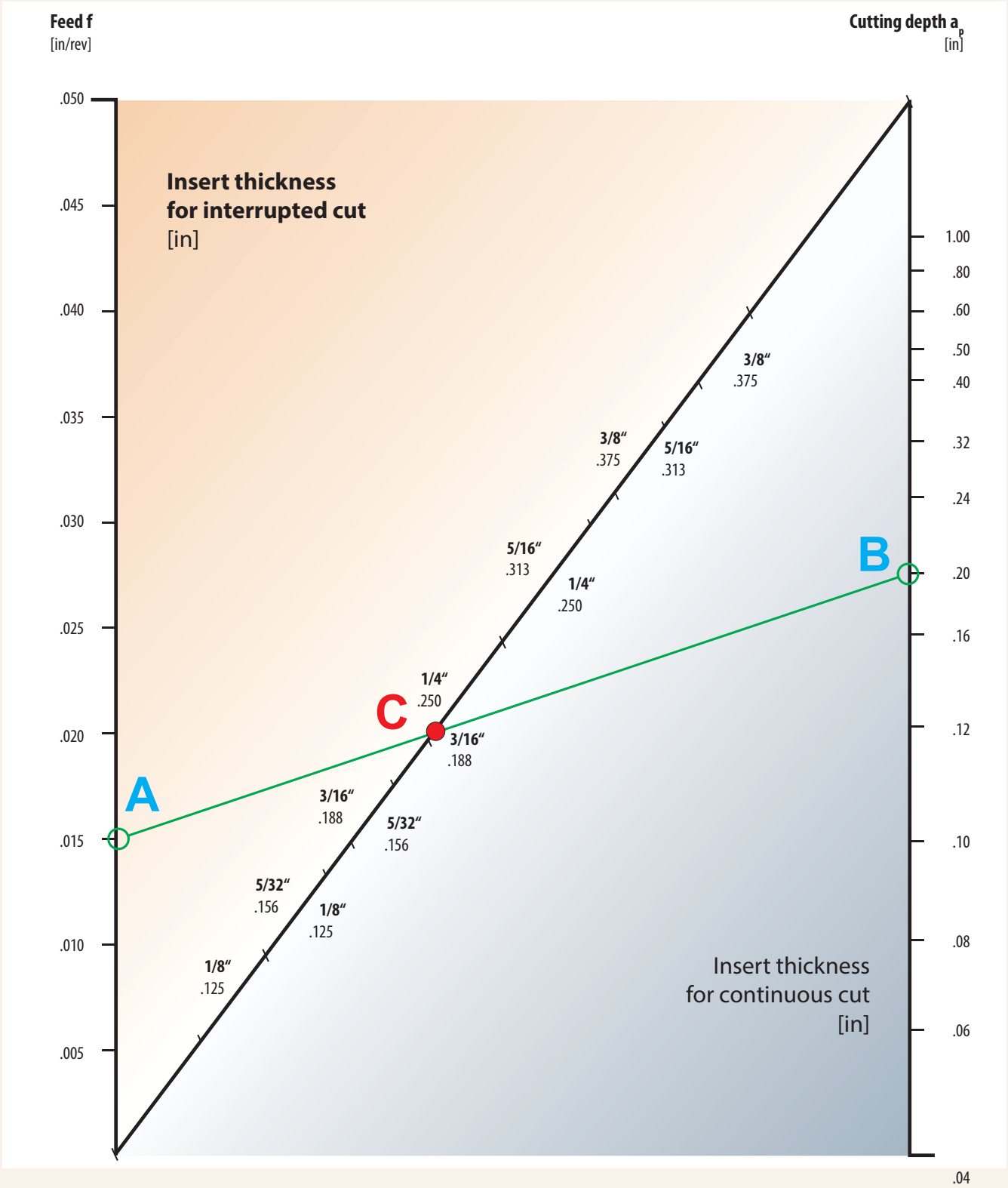
Selecting the insert shape is very closely linked to the insert size and maximum cutting length of that insert. Sometimes there is only one option, but in some cases there are multiple solutions. For example, if we choose a insert cutting edge angle close to 90°, we can choose between insert shapes; V, D, T, W and C. In these cases we recommend following the table below in regards to the percentage of insert cutting engagement as it relates to the shape and size of the insert. It is also important to consider the usable number of cutting edges as an important part of the selection criteria.

Table 2.

Priority of choice	Insert shape		Insert size Code	Insert I. C. size	Maximum length of cutting edge L_{max} [in]		a_{pmax} [in]			
							$\kappa_r = 90°$	$\kappa_r = 75°$ = 105°	$\kappa_r = 60°$ = 120°	$\kappa_r = 45°$ = 135°
Increasing the accessibility of the cutting edge for profiling and fewer vibrations.		**V**	2	1/4"	**0,25L**	.110	.110	.106	.094	-
			3	3/8"		.165	.165	.157	.145	-
		**D**	2	1/4"	**0,25L**	.078	.078	.075	.067	-
			3	3/8"		.114	.114	.110	.098	-
			4	1/2"		.153	.153	.149	.133	-
		**T**	2	1/4"	**0,33L**	.141	.141	-	-	-
			3	3/8"		.216	.216	-	.188	-
			4	1/2"		.286	.286	-	.251	-
			5	5/8"		.357	.357	-	.310	-
		**W**	3	3/8"	**0,50L**	.129	.129	-	-	-
			4	1/2"		.173	.173	-	-	-
		**C**	2	1/4"	**0,66L**	.165	.165	.161	-	-
			3	3/8"		.251	.251	.243	-	-
			4	1/2"		.333	.333	.322	-	-
			5	5/8"		.416	.416	.412	-	-
			6	3/4"		.498	.498	.482	-	-
			8	1"		.647	.647	.627	-	-
		**S**	3	3/8"	**0,66L**	.247	-	.239	-	.176
			4	1/2"		.329	-	.318	-	.235
			5	5/8"		.408	-	.392	-	.278
			6	3/4"		.494	-	.478	-	.349
			8	1"		.659	-	.639	-	.471
		**R**	06	6 mm	**0,40D**	.094	-	-	-	-
			08	8 mm		.125	-	-	-	-
			10	10 mm		.157	-	-	-	-
			12	12 mm		.188	-	-	-	-
			15	15 mm		.235	-	-	-	-
			16	16 mm		.251	-	-	-	-
			19	19 mm		.298	-	-	-	-
			20	20 mm		.314	-	-	-	-
			25	25 mm		.392	-	-	-	-
Increasing the strength of the cutting edge and suitability for interrupted cut.			32	32 mm		.502	-	-	-	-

Choosing the optimum thickness of the insert

To select the insert thickness we can use a simple nomogram as shown below (Picture 2). From the chosen Feed Rate and Cutting Depth we can determine the optimum insert thickness for both continuous and interrupted cutting. The insert thickness is the point of intersection (on the central axis) between the chosen feed rate and the depth of cut. Choose the insert thickness at this point of intersection that is closest to this value (rounded up to the next thickest insert).

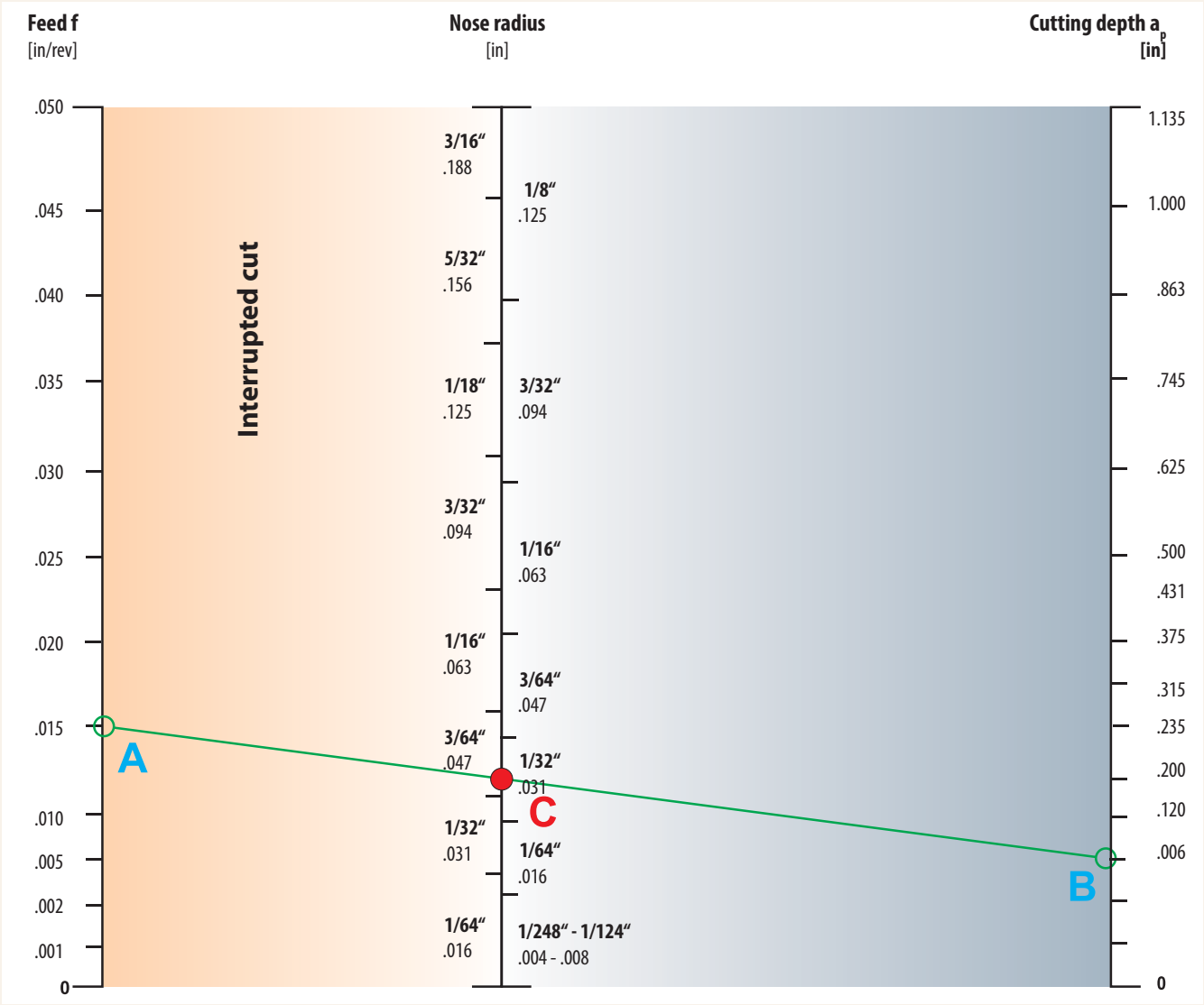


PRAMET

Choosing the nose radius of the insert

The nose radius r_ε (the last two digits in the ISO code and third digit in the ANSI code of the indexable cutting insert) should be as large as possible. The nose radius of the insert, together with the insert shape is what determines the resistance of the cutting edge to plastic deformation. The larger the nose radius r_ε the better the resistance to plastic deformation (damage to the cutting edge due to exceeding the thermal stability limit of the insert grade). A larger r_ε also allows greater feed rates – however, this requires a stable machine-tool workpiece setup. If the conditions are unstable when using a larger nose radius r_ε there is an increased risk of vibrations.

Use the following nomogram to choose the nose radius.



Example of using the nomogram:

The size of the nose radius with respect to interrupted or continuous cutting can be found on the middle axis at the intersection (point **C**) between the selected feed rate to be used (point **A**) and the selected maximum depth of cut a_p (point **B**).

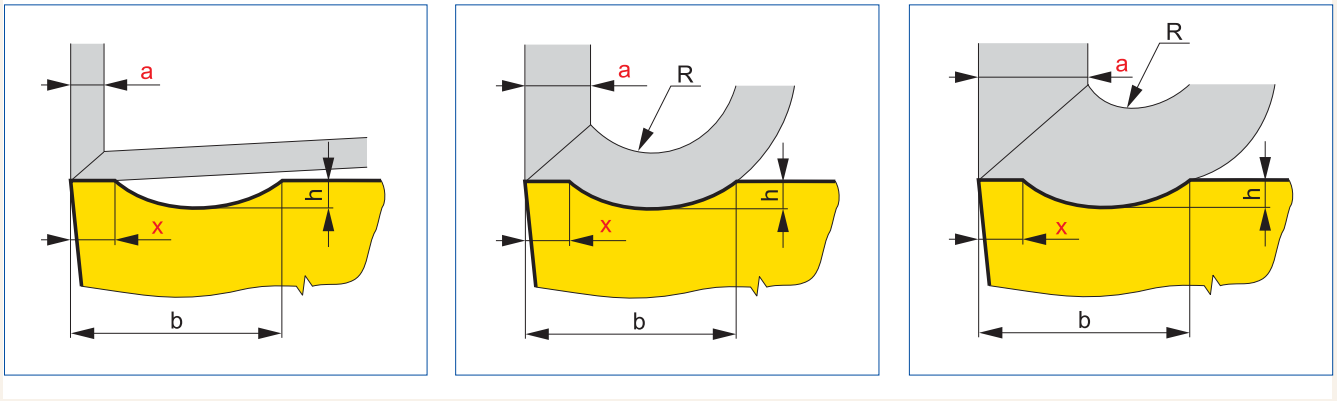
Choosing the chip breaker

The shape of the chip depends on several factors; the properties of the material being machined (the material's strength, toughness and microstructure), the static & dynamic properties of the machine, the properties of the insert grade (frictional properties on the rake face), the coolant used, the geometry of the cutting edge, the cutting conditions and the type of chipbreaker.

All of these factors in the cutting process work in combination to determine the shape of the chip (shearing action, flowing chip or curled chip) which can build up and obstruct the work space in the machining area.

The minimum feed at which the chip breaker functions depends on the width of Top Land „x" and it's angle γ_x. The maximum feed depends on the distance of the outer edge from the cutting edge b and the depth of groove h at the groove chip breaker.

When selecting chipbreaker geometries each chipbreaker only breaks the chip in a defined range of feed and depth of cut. The minimum feed at which the chipbreaker works depends upon the width of the Top Land (x) and it's angle (γ_x). The maximum feed at which the chipbreaker works depends upon the distance from the external edge to the cutting edge (b) and the depth of groove (h) on the chipbreaker.

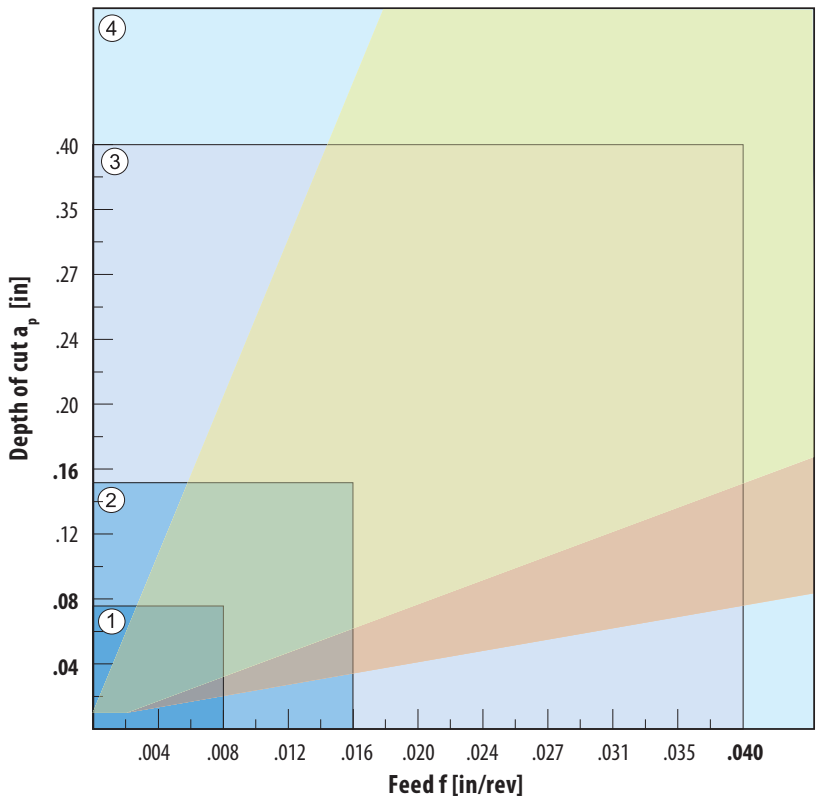


If the chip thickness being cut (at setting angle $\kappa_r = 90°$, equal to the feed) is significantly smaller than the T-land x, the chip is only in contact with the chamfer. It cannot enter the chip breaker and therefore it cannot be broken (see picture).

If the feed f is greater (thickness greater than the depth of a) and $x < a$ (f), the chip enters the chip breaker and is curved at specific values of radius R (see picture).

If the feed f is much greater ($x << a$ (f) - see picture) the chip is excessively deformed (chip is crushed). If the chip misses the chip breaker it will not be broken.

All chip breakers work in a defined range of cutting conditions. This is why the chip breaking area is shown as a continuous range in order to define the most commonly used depth of cut and feed combinations (see following picture). The chip breaker application ranges also overlap.

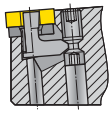
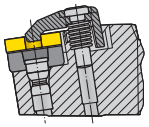
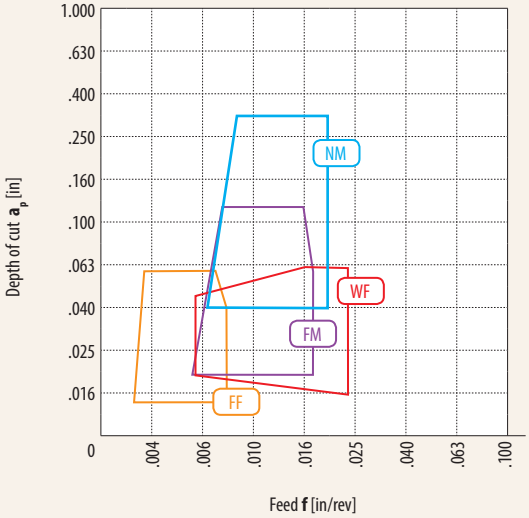
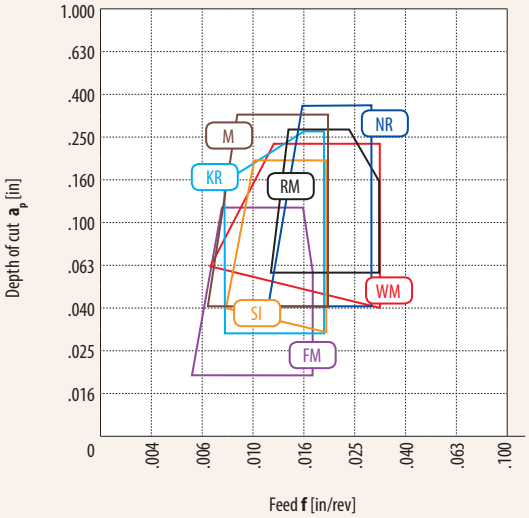
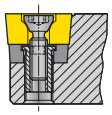
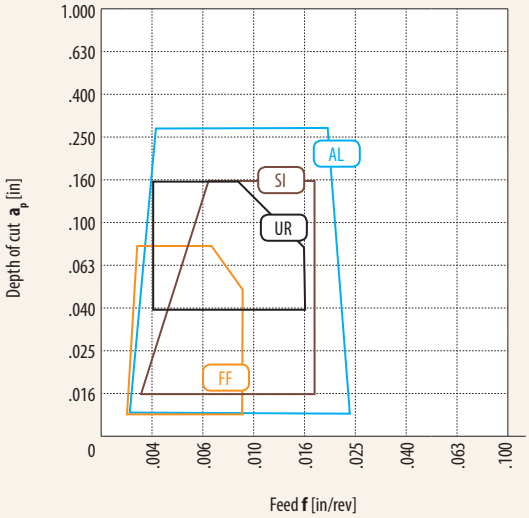
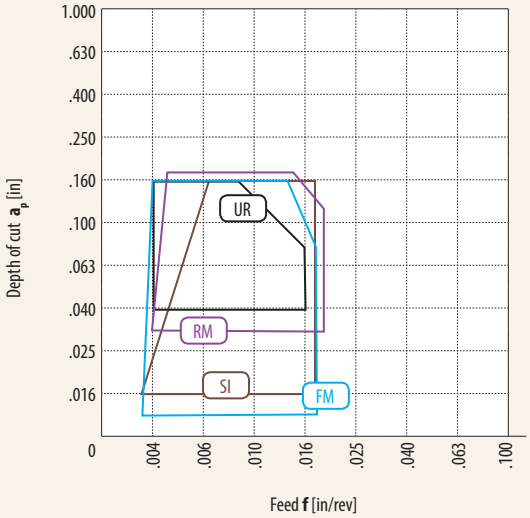


1 Fine turning and finishing
Feed
$f = .002 \div .008$ [in/rev]
Depth of cut
$a_p = .002 \div .08$ [in]

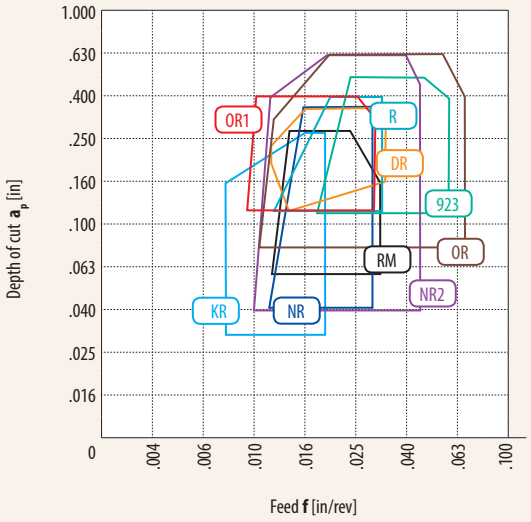
2 Semi-roughing
Feed
$f = .008 \div .016$ [in/rev]
Depth of cut
$a_p = .08 \div .16$ [in]

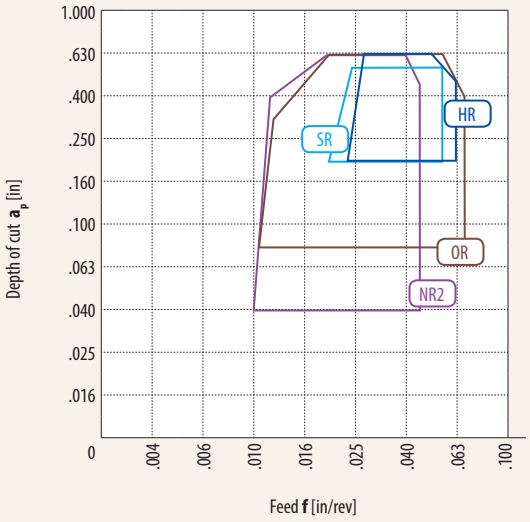
3 Roughing
Feed
$f = .016 \div .04$ [in/rev]
Depth of cut
$a_p = .16 \div .40$ [in]

4 Heavy roughing
Feed
$f = > .04$ [in/rev]
Depth of cut
$a_p = > .40$ [in]

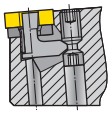
CLAMPING DESIGNATION	FINE TURNING AND FINISHING	SEMI-ROUGHING
P  **D** 		
S 		

ROUGHING	HEAVY ROUGHING	CLAMPING DESIGNATION

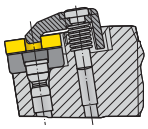


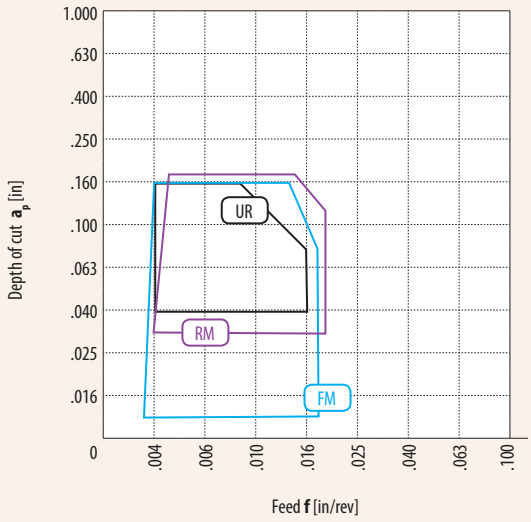


P

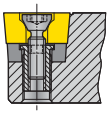


D





S



Overview of turning inserts' geometries

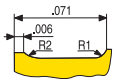
Geometry: **08 (RNMG)**

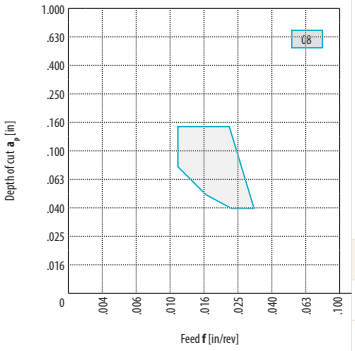
Clamping designation: **P**

Workpiece material group — Turning: P M K N S H

F ■ M ■ □ ■ R ■ □ ■

Profile of cutting edge





Application range

Description

Applied to inserts: RNMG

- Semi-roughing to heavy roughing
- Main application - machined materials in groups P and K
- Supplementary application - machined materials in group M
- Continuous and interrupted cut

Range of cutting conditions:

f	.012 - .032 [in/rev]
a_p	.039 - .158 [in]

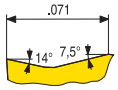
Geometry: **31 (RCMX)**

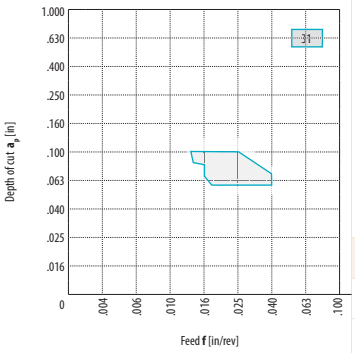
Clamping designation: **P**

Workpiece material group — Turning: P M K N S H

M ■ ◥ ■ R ■ ◥ ■ SR ■ □ ■

Profile of cutting edge





Application range

Description

Applied to inserts: RCMX

- Finishing and semi-roughing
- Main application - machined materials in groups P and K
- Supplementary application - machined materials in group M
- Continuous and interrupted cut

Range of cutting conditions:

f	.016 - .039 [in/rev]
a_p	.059 - .098 [in]

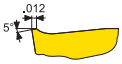
Geometry: **37 (RCMX)**

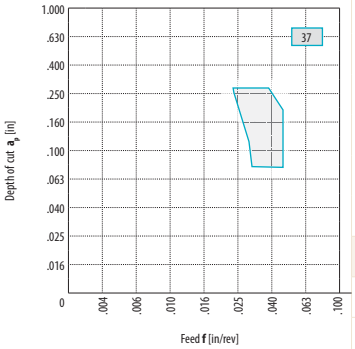
Clamping designation: **P**

Workpiece material group — Turning: P M K N S H

M ■ R ■ □ ■ SR ■ □ ■

Profile of cutting edge





Application range

Description

Applied to inserts: RCMX

- Roughing to heavy roughing
- Main application - machined materials in groups P and K
- Supplementary application - machined materials in group M
- Continuous and interrupted cut

Range of cutting conditions:

f	.024 - .047 [in/rev]
a_p	.079 - .276 [in]

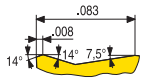
Geometry: **321 (RCMX)**

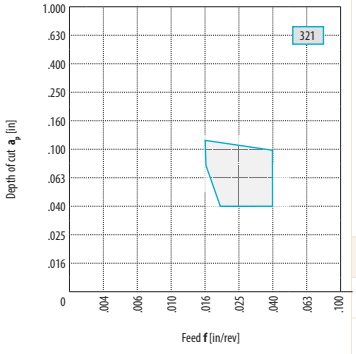
Clamping designation: **P**

Workpiece material group — Turning: P M K N S H

M ■ R ■ □ ■ SR ■ □ ■

Profile of cutting edge





Application range

Description

Applied to inserts: RCMX

- Semi-roughing to heavy roughing
- Main application - machined materials in groups P and K
- Supplementary application - machined materials in group M
- Continuous and interrupted cut

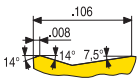
Range of cutting conditions:

f	.016 - .0400 [in/rev]
a_p	.040 - .118 [in]

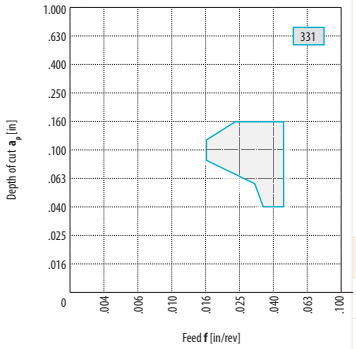
Geometry | Clamping designation: **P** | Workpiece material group: Turning P M K N S H | Application range | Description | Applied to inserts: RCMX

331 (RCMX)

Profile of cutting edge



M	■
R	■ □ ■
SR	■ □ ■



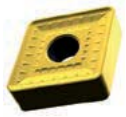
- Semi-roughing to heavy roughing
- Main application - machined materials in groups P and K
- Supplementary application - machined materials in group M
- Continuous and interrupted cut

Range of cutting conditions:

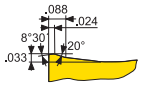
f	.016 - .047 [in/rev]
a_p	.040 - .158 [in]

Geometry | Clamping designation: **P, D** | Workpiece material group: Turning P M K N S H | Application range | Description | Applied to inserts: CNMM, SNMM

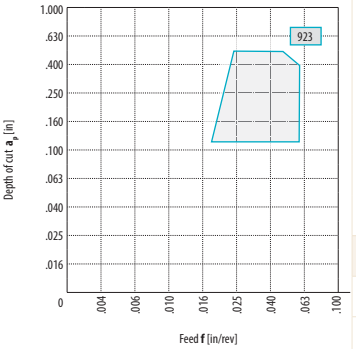
923



Profile of cutting edge



M	■ ◪ ◪
R	■ ◪ ◪
SR	■ ◪ ◪



- Wide-ranging geometry suited to super-roughing and semi-roughing
- Main application - machined materials in group P
- Secondary application - machined materials in groups M and K
- Continuous to heavily interrupted cut

Range of cutting conditions:

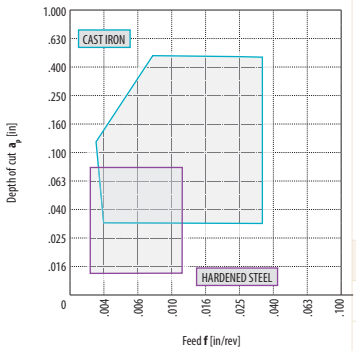
f	.018 - .059 [in/rev]
a_p	.118 - .512 [in]

Geometry | Clamping designation: **P, D** | Workpiece material group: Turning P M K N S H | Application range | Description | Applied to inserts: CNMA, DNMA, SNMA, TNMA, WNMA

...A

Profile of cutting edge

F	■ ■
M	■ ■
R	◪ ◪



- Negative geometry with zero rake suitable for fine finishing, finishing and semi-roughing
- Main application - machined materials in groups K and H
- Continuous and slightly interrupted cut

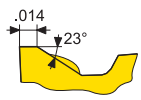
Range of cutting conditions:

f	.004 - .035 [in/rev]
a_p	.032 - .472 [in]

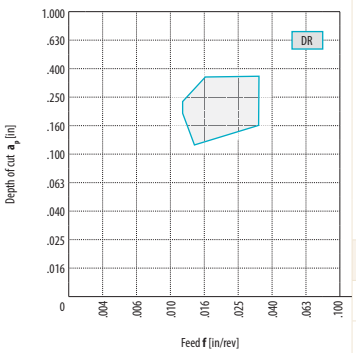
Geometry | Clamping designation: **P (M, D)** | Workpiece material group: Turning P M K N S H | Application range | Description | Applied to inserts: CNMM, DNMM, SNMM, TNMM, WNMM

DR

Profile of cutting edge



F	
M	■ ■ ◪ □
R	■ ■ ◪ □



- Semi-roughing and roughing
- Main application - machined materials in groups P and M
- Secondary application - machined materials in group K
- Supplementary application - machined materials in group S
- Continuous and interrupted cut

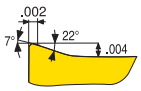
Range of cutting conditions:

f	.012 - .033 [in/rev]
a_p	.098 - .354 [in]

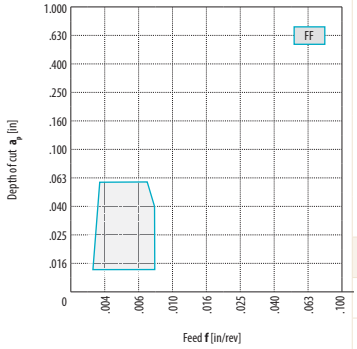
FF

Geometry	Clamping designation	Workpiece material group	Application range	Description	Applied to inserts:
FF	P, D	Turning P M K N S H			CNMG, DNMG, TNMG, VNMG, WNMG

Profile of cutting edge



F ■ ■ ◪ □ □
M
R



- Fine turning and finishing
- Main application - machined materials in group P
- Supplementary application - machined materials in group M
- Continuous cut

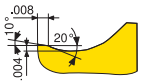
Range of cutting conditions:

f	.002 - .008 [in/rev]
a_p	.012 - .059 [in]

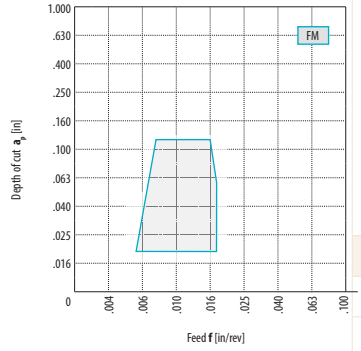
FM

Geometry	Clamping designation	Workpiece material group	Application range	Description	Applied to inserts:
FM	P, D	Turning P M K N S H			CNMG, DNMG, SNMG, TNMG, VNMG, WNMG

Profile of cutting edge



F ■ ■ ◪ □
M ■ ■ ◪ □
R



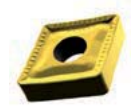
- Finishing to semi-roughing
- Main application - machined materials in groups P and M
- Secondary application - machined materials in group K
- Supplementary application - machined materials in group S
- Continuous and moderately interrupted cut

Range of cutting conditions:

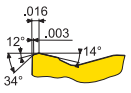
f	.006 - .018 [in/rev]
a_p	.020 - .118 [in]

HR

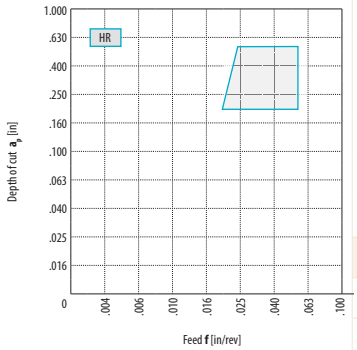
Geometry	Clamping designation	Workpiece material group	Application range	Description	Applied to inserts:
HR	P, M	Turning P M K N S H			CNMM, SNMM, TNMM



Profile of cutting edge



M ■ ◪ ■ □
R ■ ◪ ■ □
SR ■ ◪ ■ □



- Roughing to heavy roughing
- Main application - machined materials in groups P and K
- Secondary application - machined materials in group M
- Supplementary application - machined materials in group S
- Continuous and interrupted cut

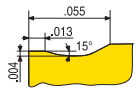
Range of cutting conditions:

f	.020 - .006 [in/rev]
a_p	.197 - .551 [in]

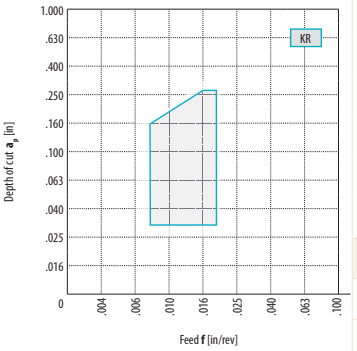
KR

Geometry	Clamping designation	Workpiece material group	Application range	Description	Applied to inserts:
KR	P, D	Turning P M K N S H			CNMG, SNMG, TNMG, WNMG

Profile of cutting edge



F ◪ ◪
M □ ■ ■
R ◪ ■ ◪

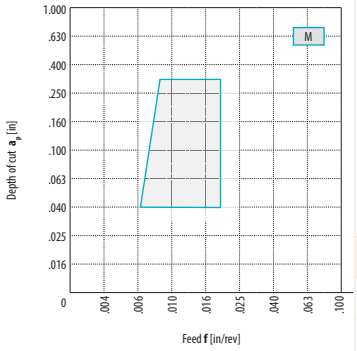


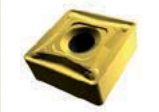
- Semi-roughing and roughing
- Main application - machined materials in groups K and H
- Supplementary application - machined materials in group P
- Continuous and interrupted cut

Range of cutting conditions:

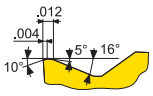
f	.008 - .028 [in/rev]
a_p	.032 - .276 [in]

M

Geometry	Clamping designation	Workpiece material group							Application range	Description	Applied to inserts:
		Turning	P	M	K	N	S	H			
M	P, M,D	F	■	◪	■			□			CNMG, DNMG, SNMG, TNMG, WNMG, VNMG
		M	■	◪	■			□			
		R	■	□	■						



Profile of cutting edge

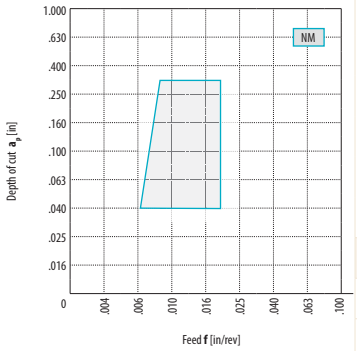


- Finishing and semi-roughing
- Main application - machined materials in groups P and K
- Secondary application - machined materials in group M
- Supplementary application - machined materials in group H
- Continuous cut

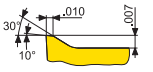
Range of cutting conditions:

f	.007 - .032 [in/rev]
a_p	.039 - .315 [in]

NM

Geometry	Clamping designation	Workpiece material group							Application range	Description	Applied to inserts:
		Turning	P	M	K	N	S	H			
NM	P, D	F	■	■	□	□	■				CNMG, DNMG, TNMG, VNMG, WNMG
		M	■	■	□	□	■				
		R	■	■	□	□	■				

Profile of cutting edge

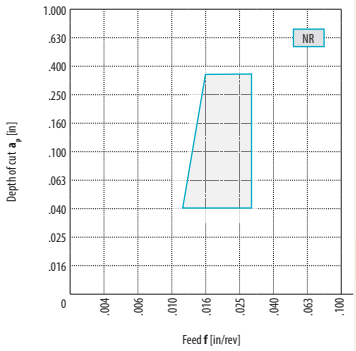


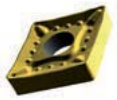
- Double-sided chip breaker not only for fine finishing but also for medium machining and roughing
- Used for machining corrosion-resistant materials and turning common materials such as carbon steels, alloyed steels and super alloys based on Fe, Ni and Co
- Potentially suitable for machining cast iron and non-iron materials

Range of cutting conditions:

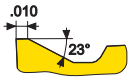
f	.006 - .020 [in/rev]
a_p	.020 - .315 [in]

NR

Geometry	Clamping designation	Workpiece material group							Application range	Description	Applied to inserts:
		Turning	P	M	K	N	S	H			
NR	P, (M, D)	F									CNMM, DNMM, SNMM, TNMM, WNMM
		M	■	■	□	□	■				
		R	◪	■		□	◪				



Profile of cutting edge

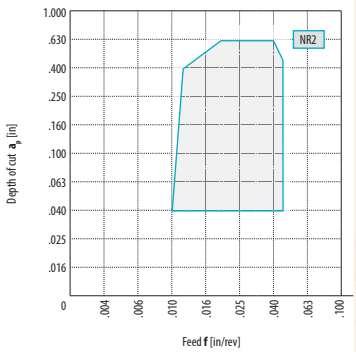


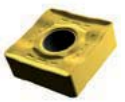
- Semi-roughing and roughing
- Main application - machined materials in groups P and M
- Secondary application - machined materials in group K
- Supplementary application - machined materials in group S
- Continuous and interrupted cut

Range of cutting conditions:

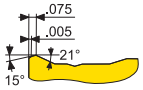
f	.010 - .032 [in/rev]
a_p	.039 - .354 [in]

NR2

Geometry	Clamping designation	Workpiece material group							Application range	Description	Applied to inserts:
		Turning	P	M	K	N	S	H			
NR2	P, (M, D)	M	■	■	◪		□				CNMM, DNMM, SNMM, TNMM, WNMM
		R	■	■	◪		□				
		SR	■	■	◪		□				



Profile of cutting edge



- Versatile turning geometry suitable for heavy roughing and finishing
- Main application - machined materials in groups P and M
- Secondary application - machined materials in group K
- Supplementary application - machined materials in group S
- Continuous and interrupted cut

Range of cutting conditions:

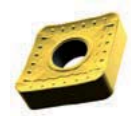
f	.010 - .047 [in/rev]
a_p	.039 - .630 [in]

OR

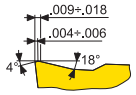
Geometry: Clamping designation **P, (M, D)**

Workpiece material group — Turning: P M K N S H

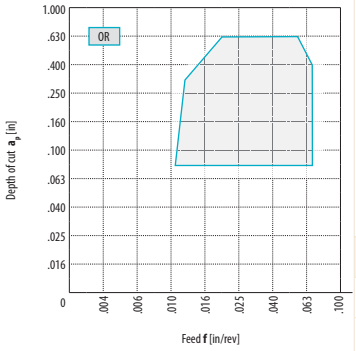
	P	M	K	N	S	H
M	■	■	◪		□	
R	■	■	◪		□	
SR	■	■	◪		□	



Profile of cutting edge



Application range



Description

Applied to inserts: CNMM, DNMM, SNMM, TNMM, WNMM, SCMT

- Versatile turning geometry suitable for heavy roughing and finishing
- Main application - machined materials in groups P and M
- Secondary application - machined materials in group K
- Supplementary application - machined materials in group S
- Continuous and interrupted cut

Range of cutting conditions:

f	.010 - .067[in/rev]
a_p	.079 - .630 [in]

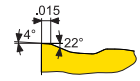
OR1

Geometry: Clamping designation **P, D**

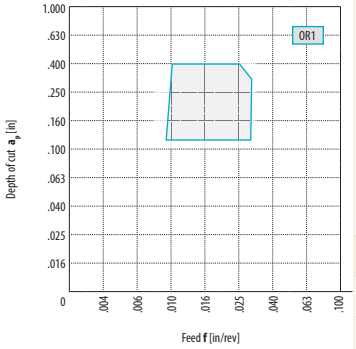
Workpiece material group — Turning: P M K N S H

	P	M	K	N	S	H
M	■	■	◪		□	
R	■	■	◪		□	
SR	■	■	◪		□	

Profile of cutting edge



Application range



Description

Applied to inserts: CNMM, SNMM

- Suitable for semi-roughing, roughing and heavy roughing
- Main application - machined materials in groups P and M
- Secondary application - machined materials in group K
- Supplementary application - machined materials in group S
- Continuous and interrupted cut

Range of cutting conditions:

f	.015 - .047 [in/rev]
a_p	.118 - .394 [in]

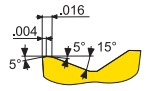
R

Geometry: Clamping designation **P, D**

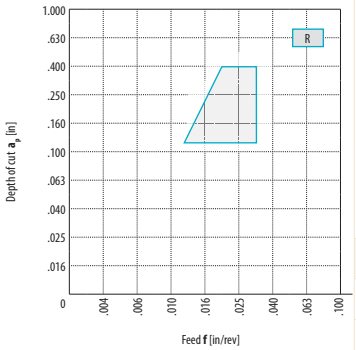
Workpiece material group — Turning: P M K N S H

	P	M	K	N	S	H
F						□
M	■	◪	■			□
R	■	◪	■			

Profile of cutting edge



Application range



Description

Applied to inserts: CNMG, DNMG, SNMG, TNMG, WNMG

- Semi-roughing and roughing
- Main application - machined materials in groups P and K
- Secondary application - machined materials in group M
- Supplementary application - machined materials in group H
- Continuous and interrupted cut

Range of cutting conditions:

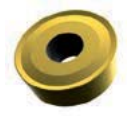
f	.012 - .032 [in/rev]
a_p	.118 - .394 [in]

RF1 (RCMX)

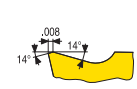
Geometry: Clamping designation **P**

Workpiece material group — Turning: P M K N S H

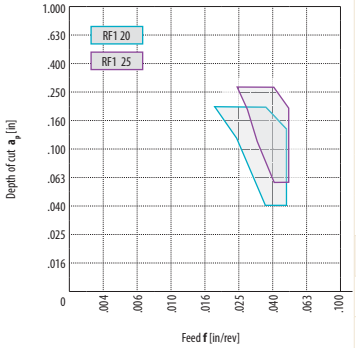
	P	M	K	N	S	H
F	■	□	■			
M	■	□	■			
R						



Profile of cutting edge



Application range



Description

Applied to inserts: RCMX 20, RCMX 25

- Chip breaker designed for machining new railway wheels
- Positive cutting geometry with a narrow negative peripheral chamfered edge
- Finishing to semi-roughing turning
- Main application - machined materials in groups P and K
- Supplementary application - machined materials in group M
- Continuous and interrupted cut

Range of cutting conditions:

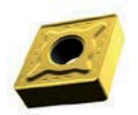
f	.018 (.0236) - .047 (.049) [in/rev]
a_p	.039 (.059) - .197 (.276) [in]

RM

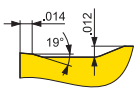
Geometry: Clamping designation **P, D**

Workpiece material group — Turning: P M K N S H

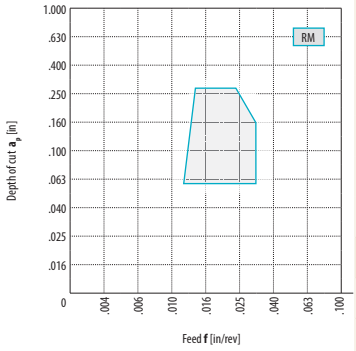
	P	M	K	N	S	H
M		■	■		◪	□
R	■	■	■		◪	□
SR	■	■	■		◪	□



Profile of cutting edge



Application range



Description

Applied to inserts: CNMG. DNMG, SNMG, TNMG, WNMG

- Semi-roughing and roughing
- Main application - machined materials in groups P, M, and K
- Secondary application - machined materials in group S
- Supplementary application - machined materials in group H
- Continuous and interrupted cut

Range of cutting conditions:

f	.012 - .032 [in/rev]
a_p	.059 - .276 [in]

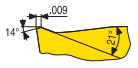
RM1 (RCMX)

Geometry: Clamping designation **P**

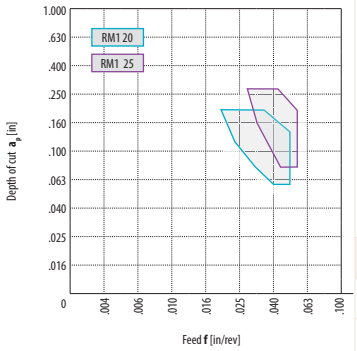
Workpiece material group — Turning: P M K N S H

	P	M	K	N	S	H
F	■	□	■			
M	■	□	■			
R						

Profile of cutting edge



Application range



Description

Applied to inserts: RCMX 20, RCMX 25

- Chip breaker designed for machining new railway wheels
- Positive cutting geometry with a narrow negative peripheral chamfered edge
- Specific chip breaker ensures reduced contact between the chip and the face
- Finishing to semi-roughing turning
- Main application - machined materials in groups P and K; supplementary application
- Machined materials in group M - continuous and interrupted cut

Range of cutting conditions:

f	.020 (.028) - .051 (.006) [in/rev]
a_p	.059 (.079) - .197 (.276) [in]

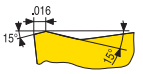
RM2 (RCM.)

Geometry: Clamping designation **P**

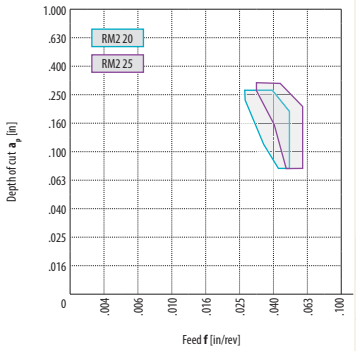
Workpiece material group — Turning: P M K N S H

	P	M	K	N	S	H
F						
M	■	□	■			
R	■	□	■			

Profile of cutting edge



Application range



Description

Applied to inserts: RCMX 25, RCMX 32, RCMH 32

- The first choice for machining new railway wheels
- Positive cutting geometry with a medium negative peripheral chamfered edge
- Semi-roughing to roughing
- Main application - machined materials in groups P and K
- Supplementary application - machined materials in group M
- Continuous and interrupted cut

Range of cutting conditions:

f	.028 (.032) - .051 (.059) [in/rev]
a_p	.079 - .276 (.315) [in]

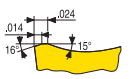
RR2 (RCM.)

Geometry: Clamping designation **P**

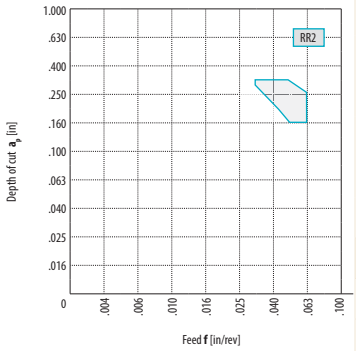
Workpiece material group — Turning: P M K N S H

	P	M	K	N	S	H
M						
R	■	□	■			
SR	■	□	■			

Profile of cutting edge



Application range



Description

Applied to inserts: RCMX 32, RCMH 32

- Chip breaker designed for machining new railway wheels
- Positive cutting geometry with a wide negative peripheral chamfered edge
- Roughing chip breaker for heavy cuts with casting and forging skin
- Main application - machined materials in groups P and K
- Supplementary application - machined materials in group M
- Continuous and interrupted cut

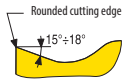
Range of cutting conditions:

f	.032 - .063 [in/rev]
a_p	.158 - .315 [in]

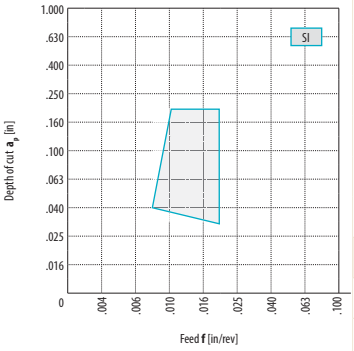
SI

Geometry	Clamping designation	Workpiece material group	Application range	Description	Applied to inserts:
SI	P, D	Turning: P M K N S H	SI	- (fine) finishing and semi-roughing - Main application - machined materials in groups P, M and K - Supplementary application - machined materials in groups K and N - Continuous cut	CNMG, DNMG, TNMG, WNMG

Profile of cutting edge



Turning	P	M	K	N	S	H
F	■	■	□	□	■	
M	■	■	□	□	■	
R						

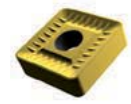


Range of cutting conditions:

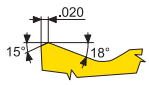
f	.008 - .020 [in/rev]
a_p	.032 - .197 [in]

SR

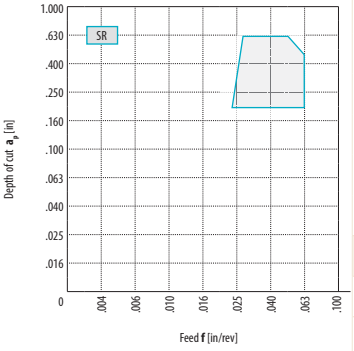
Geometry	Clamping designation	Workpiece material group	Application range	Description	Applied to inserts:
SR	P	Turning: P M K N S H	SR	- Heavy roughing - Main application - machined materials in groups P, M, and K - Stable negative peripheral top land - Continuous and interrupted cut	SNMM



Profile of cutting edge



Turning	P	M	K	N	S	H
M						
R	■	■	■			
SR	■	■	■			

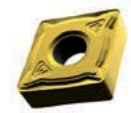


Range of cutting conditions:

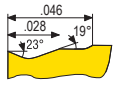
f	.028 - .063 [in/rev]
a_p	.197 - .630 [in]

WF

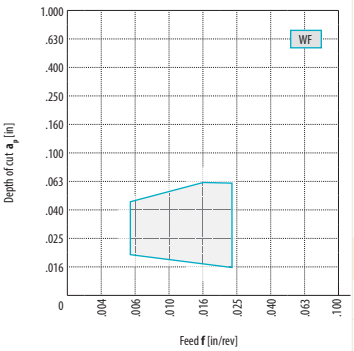
Geometry	Clamping designation	Workpiece material group	Application range	Description	Applied to inserts:
WF	P, D	Turning: P M K N S H	WF	- Fine turning and finishing - Wiper geometry for highly productive turning - Main application - machined materials in groups P and K - Continuous cut	CNMG, WNMG



Profile of cutting edge



Turning	P	M	K	N	S	H
F	■		■			
M	■		■			
R						



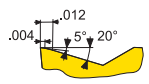
Range of cutting conditions:

f	.006 - .024 [in/rev]
a_p	.016 - .063 [in]

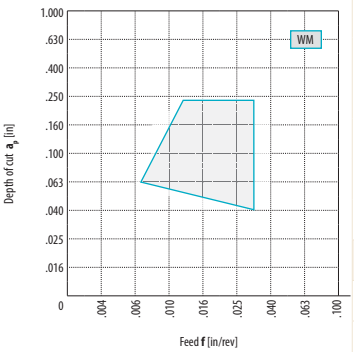
WM

Geometry	Clamping designation	Workpiece material group	Application range	Description	Applied to inserts:
WM	P, D	Turning: P M K N S H	WM	- Semi-roughing and roughing - Wiper geometry for highly productive turning - Main application - machined materials in groups P and K - Continuous and moderately interrupted cut	CNMG, WNMG

Profile of cutting edge



Turning	P	M	K	N	S	H
F	■		■			
M	■		■			
R	■		■			



Range of cutting conditions:

f	.007 - .032 [in/rev]
a_p	.039 - .236 [in]

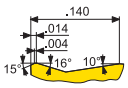
371 (RCMT)

Geometry: S — Clamping designation: S

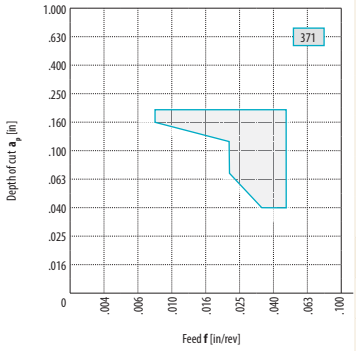
Workpiece material group — Turning: P M K N S H

	P	M	K	N	S	H
M						
R	■	□	■			
SR	■	□	■			

Profile of cutting edge



Application range



Description

Applied to inserts: RCMT

- Semi-roughing and heavy roughing
- Main application - machined materials in groups P and K
- Supplementary application - machined materials in group M
- Continuous and interrupted cut

Range of cutting conditions:

f	.008 - .047 [in/rev]
a_p	.039 - .197 [in]

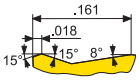
372 (RCMT)

Geometry: S — Clamping designation: S

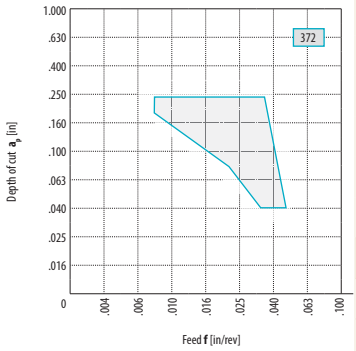
Workpiece material group — Turning: P M K N S H

	P	M	K	N	S	H
M						
R	■	□	■			
SR	■	□	■			

Profile of cutting edge



Application range



Description

Applied to inserts: RCMT

- Semi-roughing and heavy roughing
- Main application - machined materials in groups P and K
- Supplementary application - machined materials in group M
- Continuous and interrupted cut

Range of cutting conditions:

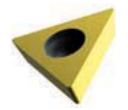
f	.008 - .047 [in/rev]
a_p	.039 - .236 [in]

...W

Geometry: S — Clamping designation: S

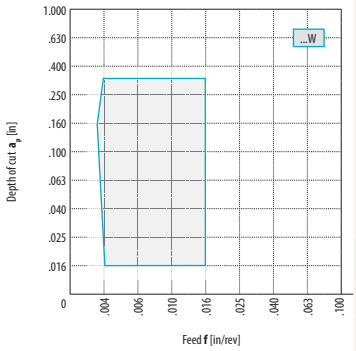
Workpiece material group — Turning: P M K N S H

	P	M	K	N	S	H
F			■			■
M			■			■
R			◪			◪



Profile of cutting edge

Application range



Description

Applied to inserts: CCMW, DCMW, SCMW, RCMW, TCMW, VCMW

- Negative geometry with zero rake suitable for fine finishing and semi-roughing
- Main application - machined materials in groups K and H
- Continuous and moderately interrupted cut

Range of cutting conditions:

f	.004 - .016 [in/rev]
a_p	.016 - .331 [in]

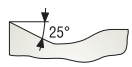
AL

Geometry: S — Clamping designation: S

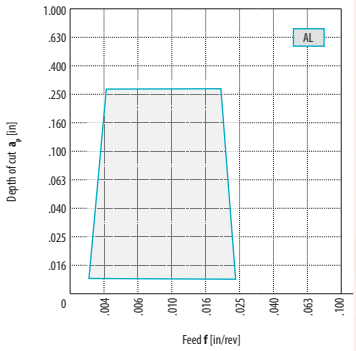
Workpiece material group — Turning: P M K N S H

	P	M	K	N	S	H
F				■		
M				■		
R				■		

Profile of cutting edge



Application range



Description

Applied to inserts: CCGT, DCGT, SCGT, RCGT, TCGT, VCGT, WCGT

- High positive turning geometry with sharp cutting edge
- Fine turning to roughing of AL and AL alloys
- Main application - machined materials in group N
- Continuous cut

Range of cutting conditions:

f	.002 - .024 [in/rev]
a_p	.008 - .276 [in]

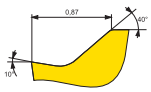
FF

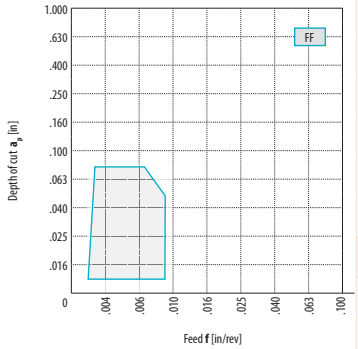
Geometry: **S** | Clamping designation: **S**

Workpiece material group — Turning: P M K N S H

F: ■ ■ ◪ □ □
M:
R:

Profile of cutting edge





Application range

Description

Applied to inserts: CCMT, DCMT

- Fine and finishing turning
- Main application - P and M
- Secondary application - K
- Supplementary application - N and S
- Continuous cut

Range of cutting conditions:

f	.002 - .009 [in/rev]
a_p	.008 - .079 [in]

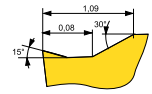
FM

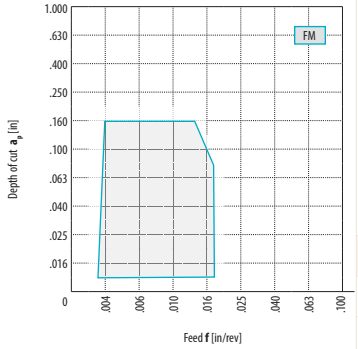
Geometry: **S** | Clamping designation: **S**

Workpiece material group — Turning: P M K N S H

F: ■ ■ ◪ □
M: ■ ■ ◪ □
R:

Profile of cutting edge





Application range

Description

Applied to inserts: CCMT, DCMT, SCMT, TCMT, VBMT, WCMT

- Finishing and semi-roughing, drilling
- Main application - P and M
- Secondary application - K
- Potential application - S
- Continuous and slightly interrupted cut

Range of cutting conditions:

f	.003 - .018 [in/rev]
a_p	.008 - .158 [in]

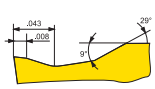
FM (RCMT)

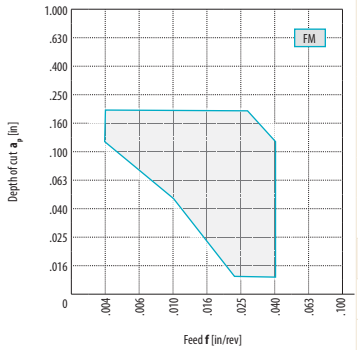
Geometry: **S** | Clamping designation: **S**

Workpiece material group — Turning: P M K N S H

F: ■ ■ ◪ □
M: ■ ■ ◪ □
R:

Profile of cutting edge





Application range

Description

Applied to inserts: RCMT

- Finishing and semi-roughing, drilling
- Main application - P and M
- Secondary application - K
- Supplementary application - S
- Continuous and interrupted cut

Range of cutting conditions:

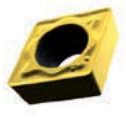
f	.004 - .039 [in/rev]
a_p	.012 - .189 [in]

RM

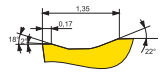
Geometry: **S** | Clamping designation: **S**

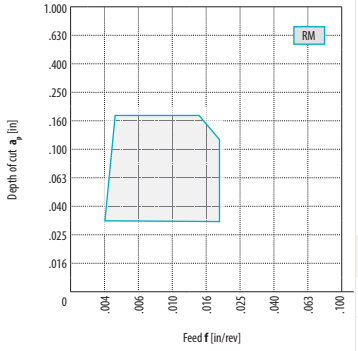
Workpiece material group — Turning: P M K N S H

F:
M: ■ ■ ■ ◪ □
R: ■ ■ ■ ◪ □



Profile of cutting edge





Application range

Description

Applied to inserts: CCMT, DCMT, SCMT, TCMT, VBMT

- Semi-roughing, drilling
- Main application - P, M, and K
- Secondary application - S
- Supplementary application - H
- Continuous and interrupted cut

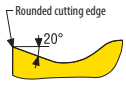
Range of cutting conditions:

f	.004 - .020 [in/rev]
a_p	.032 - .177 [in]

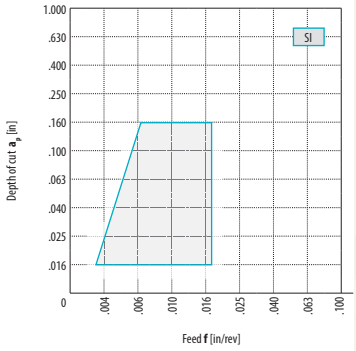
Geometry	Clamping designation	Workpiece material group	Application range	Description	Applied to inserts:
	S	Turning: P M K N S H			CCGT, TCGT

SI

Profile of cutting edge



	P	M	K	N	S	H
F	■	■	◪	□	■	
M	■	■	◪	□	■	
R						



- Universal turning geometry characterized by a low cutting force
- Finishing and semi-roughing, drilling
- Main application - machined materials in groups P, M, and S
- Secondary application - machined materials in group K
- Supplementary application - machined materials in group N
- Continuous cut

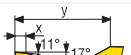
Range of cutting conditions:

f	.003 - .018 [in/rev]
a_p	.016 - .158 [in]

Geometry	Clamping designation	Workpiece material group	Application range	Description	Applied to inserts:
	S	Turning: P M K N S H			RCMT

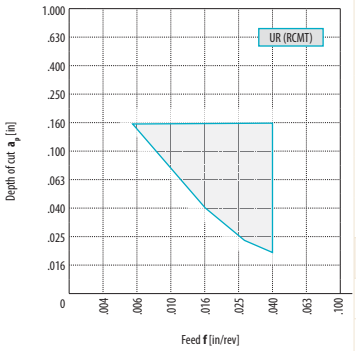
UR (RCMT)

Profile of cutting edge



	x	y
06	0,00	.0354
08	.0031	.03946
10	0,18	.0512
12	0,11	.05915

	P	M	K	N	S	H
M	■	□	■			
R	■	□	■			
SR						



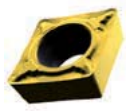
- Fine turning and finishing, drilling
- Main application - machined materials in groups P and K
- Supplementary application - machined materials in group M
- Continuous and interrupted cut

Range of cutting conditions:

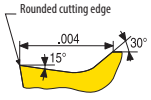
f	.006 - .039 [in/rev]
a_p	.020 - .197 [in]

Geometry	Clamping designation	Workpiece material group	Application range	Description	Applied to inserts:
	S	Turning: P M K N S H			CCMT, DCMT, RCMT, SCMT, TCMT, VBMT, WCMT

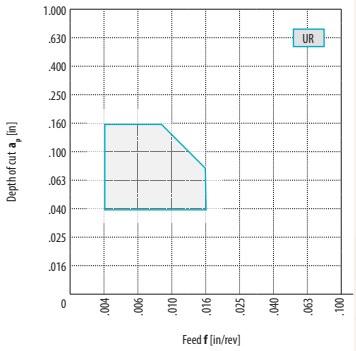
UR



Profile of cutting edge



	P	M	K	N	S	H
F	■	■	■	□		
M	■	■	■	□		
R						



- Fine turning and finishing, drilling
- Main application - machined materials in groups P, M, and K
- Supplementary application - machined materials in group N
- Continuous and interrupted cut

Range of cutting conditions:

f	.004 - .016 [in/rev]
a_p	.039 - .158 [in]

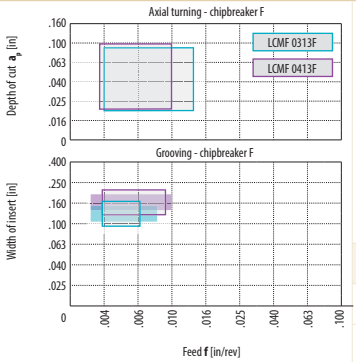
13 F (LCM.)

Geometry: Clamping designation **G**

Workpiece material group — Turning: P M K N S H

F: ■ ◪ ■ | M: ■ ◪ ■ | R:

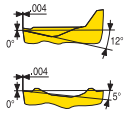
Application range



Description

Applied to inserts: LCMF, LCMR

Profile of cutting edge



- Cutting geometry suitable for grooving and axial turning
- Geometry suitable for machined material groups P, K, and M
- For fine turning and finishing

Range of cutting conditions:

f	See diagram
a_p	See diagram

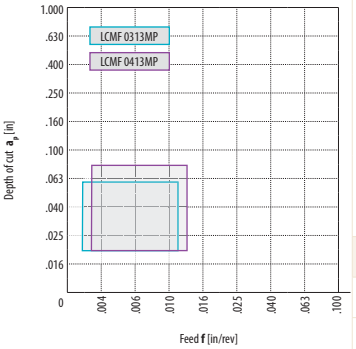
13 MP (LCM.)

Geometry: Clamping designation **G**

Workpiece material group — Turning: P M K N S H

F: ■ ◪ ■ | M: ■ ◪ ■ | R:

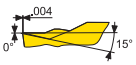
Application range



Description

Applied to inserts: LCMF, LCMR

Profile of cutting edge



- Cutting geometry suitable for copy turning
- Geometry suitable for machined material groups P, K, and M
- For fine turning and finishing

Range of cutting conditions:

f	See diagram
a_p	See diagram

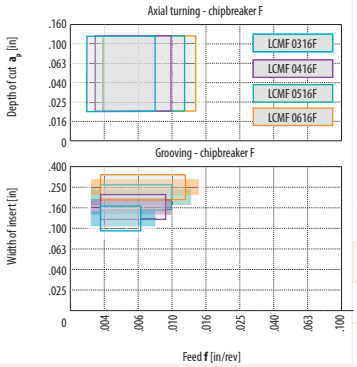
16 F (LCM.)

Geometry: Clamping designation **G**

Workpiece material group — Turning: P M K N S H

F: ■ ◪ ■ | M: ■ ◪ ■ | R:

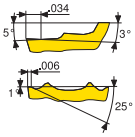
Application range



Description

Applied to inserts: LCMF, LCMR

Profile of cutting edge



- Cutting geometry suitable for grooving and axial turning
- Geometry suitable for machined material groups P, K, and M
- For fine turning and finishing

Range of cutting conditions:

f	See diagram
a_p	See diagram

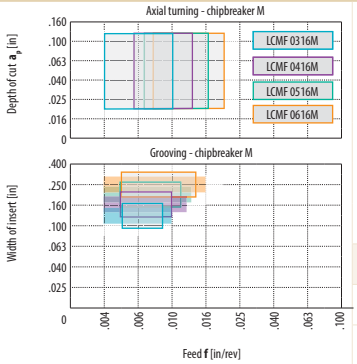
16 M (LCM.)

Geometry: Clamping designation **G**

Workpiece material group — Turning: P M K N S H

F: ■ ◪ ■ | M: ■ ◪ ■ | R:

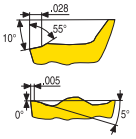
Application range



Description

Applied to inserts: LCMF, LCMR

Profile of cutting edge



- Cutting geometry suitable for axial turning and grooving
- Geometry suitable for machined material groups P, K, and M
- For fine turning and finishing

Range of cutting conditions:

f	See diagram
a_p	See diagram

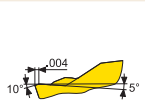
16 MP (LCM.)

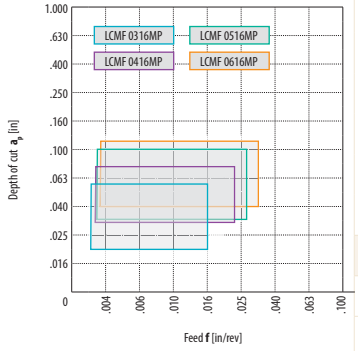
Geometry: G

Clamping designation: G

Workpiece material group — Turning: P M K N S H

Profile of cutting edge





Application range

Description

Applied to inserts: LCMF, LCMR

- Geometry suitable for copy turning
- Geometry suitable for machined material groups P, K, and M
- For fine turning and finishing

Range of cutting conditions:

f	See diagram
a_p	See diagram

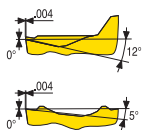
20 F1 (LCMF)

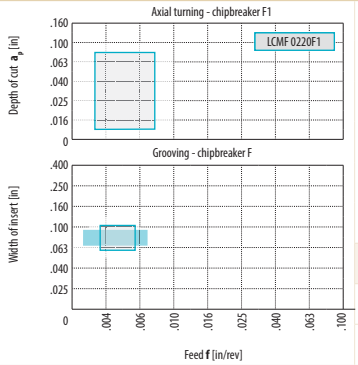
Geometry: G

Clamping designation: G

Workpiece material group — Turning: P M K N S H

Profile of cutting edge





Application range

Description

Applied to inserts: LCMF

- Cutting geometry suitable for grooving and axial turning
- Geometry suitable for machined material groups P, K, and M
- For fine turning and finishing

Range of cutting conditions:

f	See diagram
a_p	See diagram

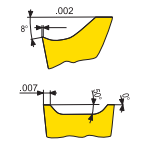
20 M2 (LCMF)

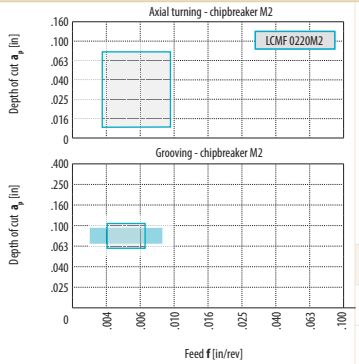
Geometry: G

Clamping designation: G

Workpiece material group — Turning: P M K N S H

Profile of cutting edge





Application range

Description

Applied to inserts: LCMF

- Extremely universal cutting geometry, generates a very low cutting force and has good stability
- Parting and grooving
- Main application - machined material groups P and M
- Secondary application area - machined material groups K and S
- Supplementary application - machined material groups N and H
- Suitable for slightly interrupted cut

Range of cutting conditions:

f	.004 - .009 [in/rev]
a_p	.012 - .059 [in]

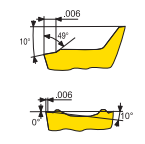
30 F (LCM.)

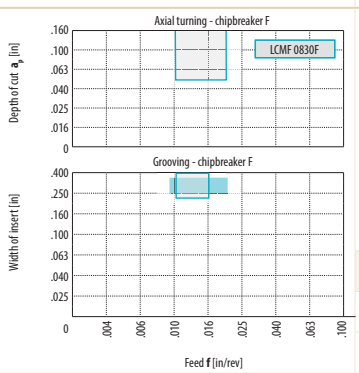
Geometry: G

Clamping designation: G

Workpiece material group — Turning: P M K N S H

Profile of cutting edge





Application range

Description

Applied to inserts: LCMF, LCMR

- Extremely universal cutting geometry, generates a very low cutting force and has good stability
- Parting and grooving
- Main application - machined material groups P and M
- Secondary application area - machined material groups K and S
- Supplementary application - machined material groups N and H
- Suitable for slightly interrupted cut

Range of cutting conditions:

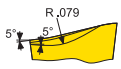
f	.010 - .020 [in/rev]
a_p	.051 - .236 [in]

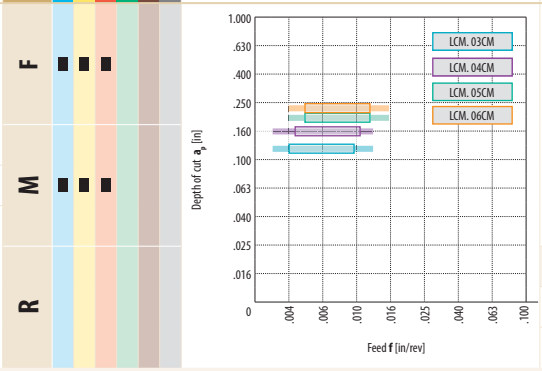
CM (LCM.)

Geometry: Clamping designation **G**

Workpiece material group — Turning: P M K N S H

Profile of cutting edge





Application range

Description

Applied to inserts:
LCMF 13 CM, LCMF 16 CM, LCMR 16 CM

- Cutting geometry particularly suited to parting and grooving
- Geometry suitable for machined materials in groups P, K, and M

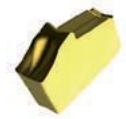
Range of cutting conditions:

f	See diagram
a_p	See diagram

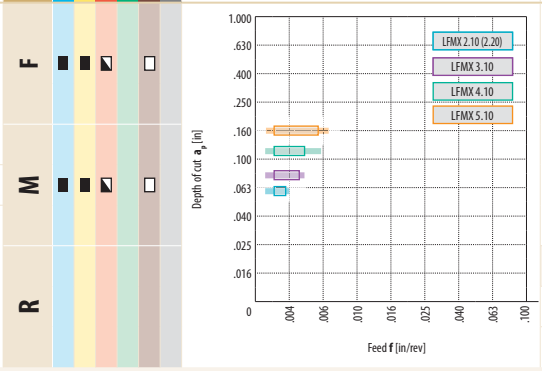
F1 (LFMX)

Geometry: Clamping designation **X**

Workpiece material group — Turning: P M K N S H



Profile of cutting edge



Application range

Description

Applied to inserts:
LFMX

- Universal cutting geometry characterized by a low cutting resistance
- Parting and grooving
- Main application - machined material groups P and M
- Secondary application area - machined materials in group K
- Supplementary application - machined materials in group S

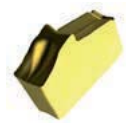
Range of cutting conditions:

f	See diagram
a_p	See diagram

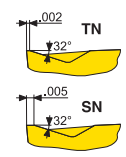
F2 (LFMX)

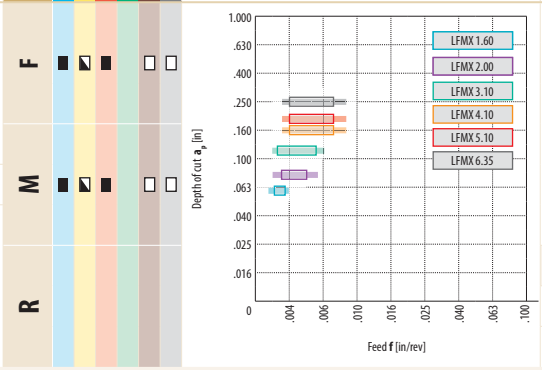
Geometry: Clamping designation **X**

Workpiece material group — Turning: P M K N S H



Profile of cutting edge





Application range

Description

Applied to inserts:
LFMX

- Universal cutting geometry characterized by a low cutting resistance
- Parting and grooving
- Main application - machined material groups P and K
- Secondary application area - machined materials in group M
- Supplementary application - machined materials groups S and H
- Recommended for continuous cut

Range of cutting conditions:

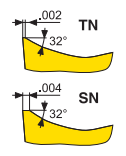
f	See diagram
a_p	See diagram

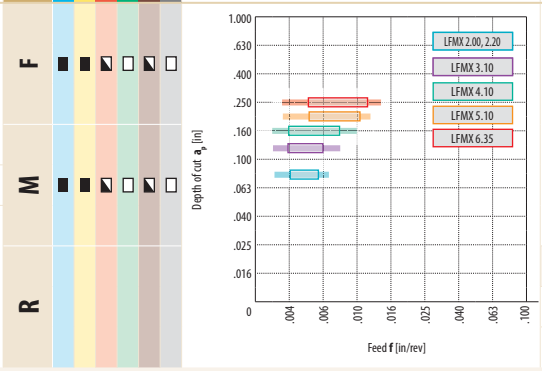
M2 (LFMX)

Geometry: Clamping designation **X**

Workpiece material group — Turning: P M K N S H

Profile of cutting edge





Application range

Description

Applied to inserts:
LFMX

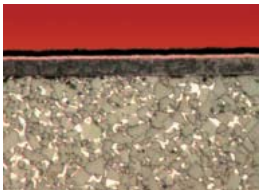
- Universal cutting geometry characterized by a low cutting resistance
- Parting and grooving
- Main application - machined material groups P and M
- Secondary application area - machined materials groups K and S
- Supplementary application - machined materials groups N and H
- For moderately interrupted cut

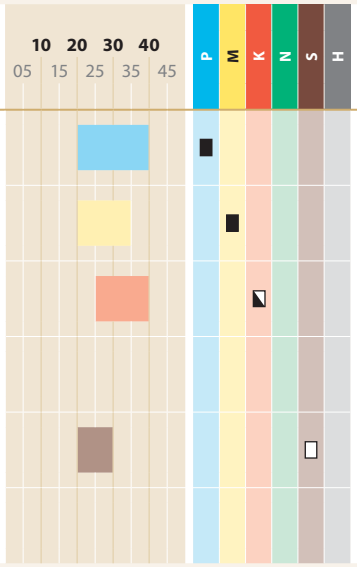
Range of cutting conditions:

f	See diagram
a_p	See diagram

Designation and microstructure	Application areas	Workpiece Material Group	Grade description and recommended application

6640

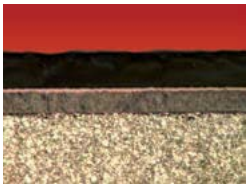


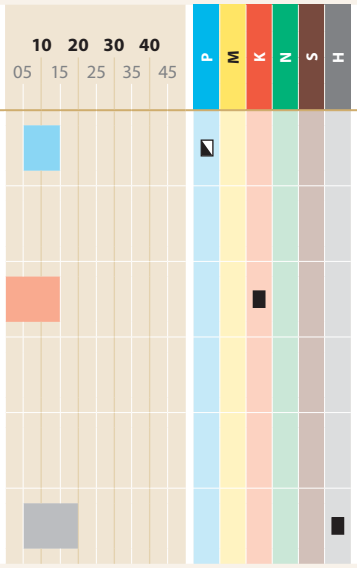


- substrate without cubic carbides (type H)
- thin coating with TiCN supporting layer, applied with the MT-CVD method
- especially for semi-roughing and roughing
- especially for material groups P, M, and K; potentially also group S
- lower to medium cutting speeds
- interrupted cut and suited to unfavourable machining conditions

T5305

UP!GRADE®

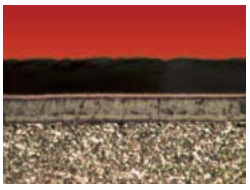


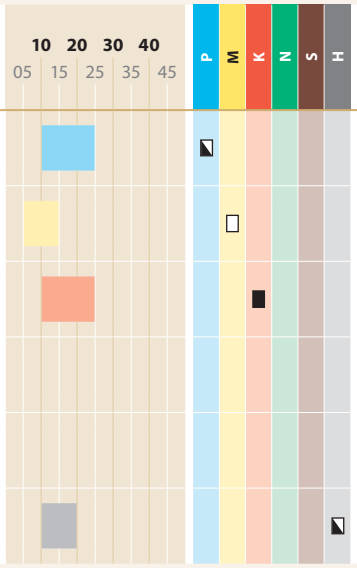


- fine-grained substrate with a low cobalt content
- thick layer of MT-CVD coating with a layer of Al_2O_3 on the surface
- special finish for coating
- designed for machining materials in groups K, P, and H
- top performance for machining grey cast iron
- material with the highest abrasion resistance of the 5300 series
- high cutting speeds
- continuous and slightly interrupted cut

T5315

UP!GRADE®

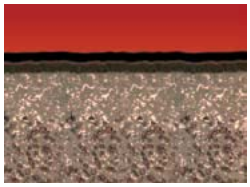


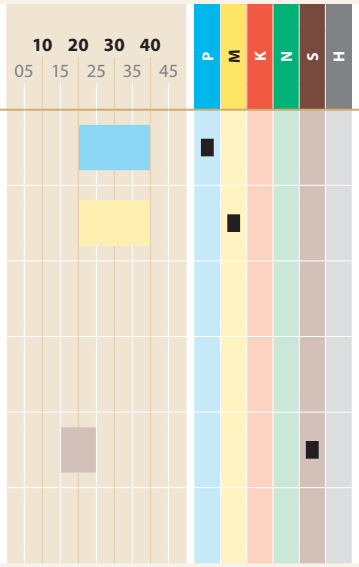


- fine-grained substrate with a modified cobalt content to increase strength
- thick MT-CVD coating combining the advantages of TiCN and Al_2O_3 layers
- special finish for coating
- versatile material designed primarily for turning grey and ductile cast iron
- can also be used for machining material groups P and H
- supplementary for also machining group M
- suitable for finishing and roughing
- medium to high cutting speeds
- suitable for continuous and interrupted cut

Designation and microstructure	Application areas	Workpiece Material Group	Grade description and recommended application

T7335

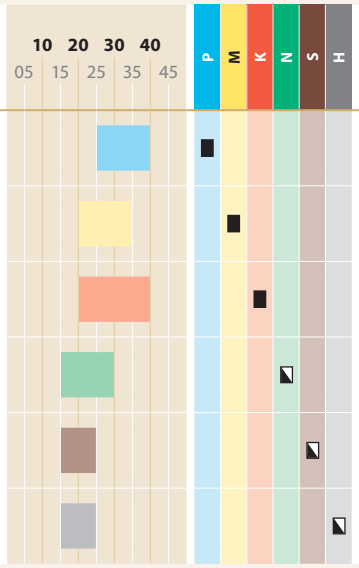




UP! GRADE®

- functionally gradient substrate with medium grain size
- relatively high cobalt content
- relatively thin coating applied with the MT-CVD method
- material shows very high strength
- special surface finish for coating
- designed for machining material groups M, S, and P
- medium cutting speeds
- continuous and heavily interrupted cut
- also withstands very unfavourable machining conditions

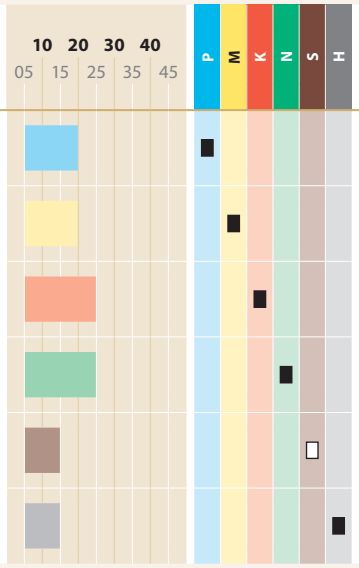
T8030



UP! GRADE®

- sub-micron substrate with a relatively high cobalt content
- mono-layer PVD coating
- lower internal coating tension with high hardness
- highly versatile, wide-ranging material
- especially for inserts for thread turning
- medium cutting speeds
- suitable for machining material groups M, P, and K; potentially also N, S, and H
- good operative reliability
- impaired machining conditions

T8315

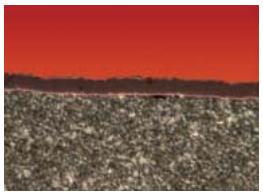


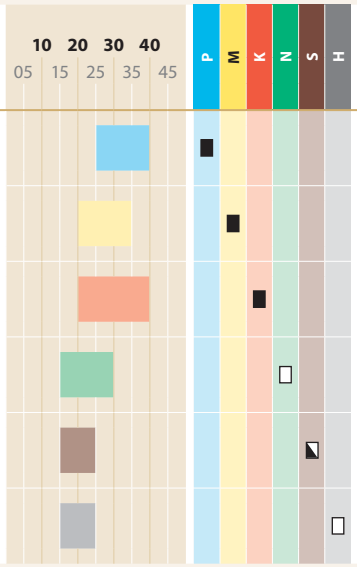
UP! GRADE®

- highly abrasion resistant material of the T8300 series with guaranteed strength
- sub-micron substrate with a relatively low cobalt content
- nano-layered PVD coating with gradient transitions
- lower internal coating tension with higher hardness
- lower notch wear on the main cutting edge
- higher cutting speeds
- medium chip cross-sections
- suitable for machining material groups M, P, K, N and H; potentially also S
- stable machining conditions

Designation and microstructure	Application areas	Workpiece Material Group	Grade description and recommended application

T8330

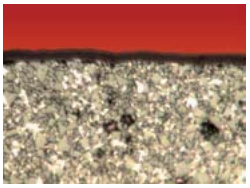


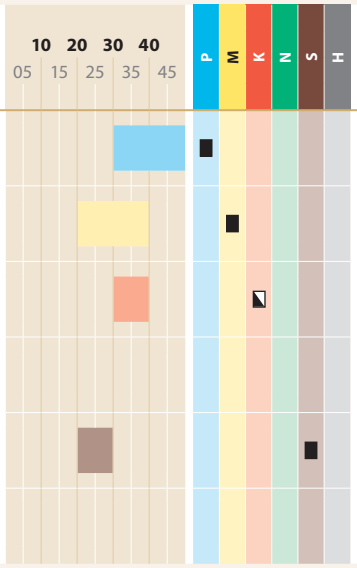


UP!GRADE®

- the most versatile member of the T8300 series
- sub-micron substrate with a relatively high cobalt content
- nano-layered PVD coating with gradient transitions
- lower internal coating tension with higher hardness
- lower notch wear on the main cutting edge
- medium cutting speeds
- suitable for machining material groups M, P, and K; potentially also N, S, and H
- good operative reliability
- impaired machining conditions

T8345

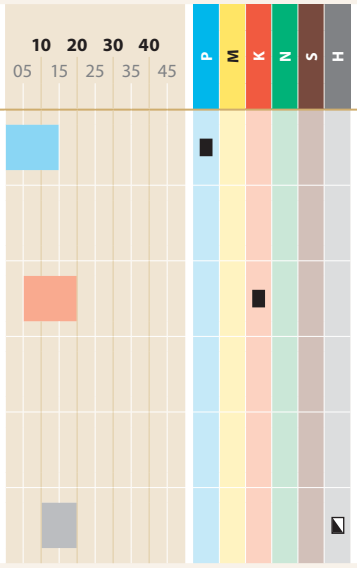




UP!GRADE®

- the toughest member of the T8300 series
- sub-micron substrate with a high cobalt content
- nano-layered PVD coating with gradient transitions
- lower internal coating tension with higher hardness
- lower notch wear on the main cutting edge
- lower to medium cutting speeds and bigger chip cross-sections
- suitable for machining material groups M, P and S; potentially also K
- good operative reliability
- interrupted cut, unstable machining conditions

T9310

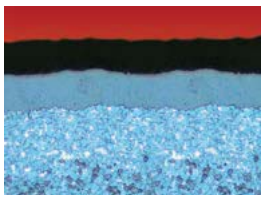


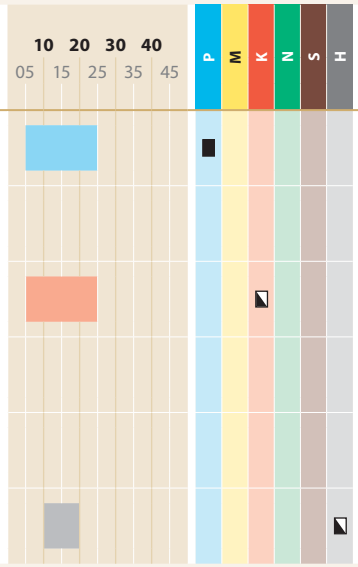
UP!GRADE®

- fine-grained, functionally gradient substrate
- low cobalt content
- thick MT-CVD coating with a special Al_2O_3 layer
- exceptional thermal and chemical stability ensures excellent protection of the bearing material
- special surface finish for coating
- primarily designed for machining material groups P, K, and H
- high cutting speeds
- continuous to slightly interrupted cut

Designation and microstructure	Application areas	Workpiece Material Group	Grade description and recommended application

T9315

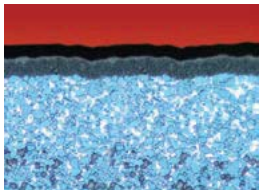


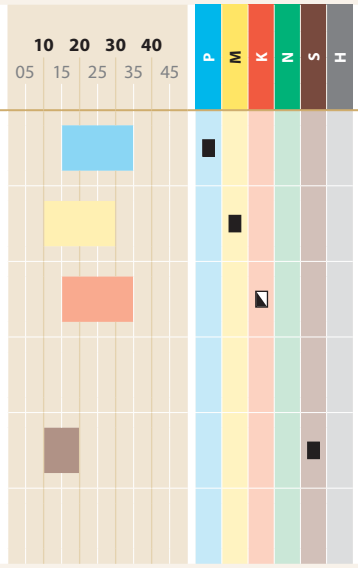


UP! GRADE®

- functionally gradient substrate with fine structure
- relatively low cobalt content
- thick MT-CVD coating with a dominant Al_2O_3 layer
- highly versatile material with a balanced ratio of abrasion resistance and operative reliability
- special surface finish for coating
- primarily designed for machining material groups P, K, and H
- high cutting speeds
- continuous to slightly interrupted cut

T9325

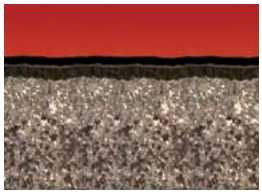


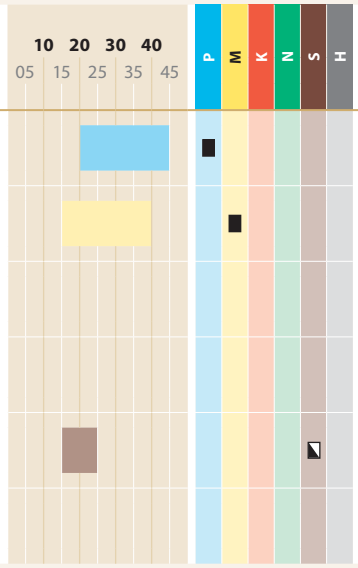


UP! GRADE®

- functionally gradient substrate
- relatively low content of cobalt binder phase
- thick MT-CVD coating
- highly versatile material with very good operational reliability
- special surface finish for coating
- primarily designed for machining material groups P, M, K and S
- medium and higher cutting speed
- continuous and interrupted cut
- unfavourable cutting conditions, continuous and/or interrupted cuts

T9335





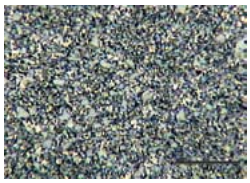
UP! GRADE®

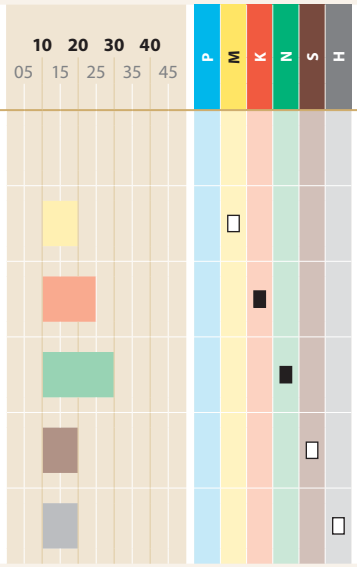
- functionally gradient substrate with medium grain size
- relatively high cobalt content
- MT-CVD coating of medium thickness
- material shows very high strength
- special surface finish for coating
- designed for machining material groups P, M, and S
- medium cutting speeds
- continuous and heavily interrupted cut
- also withstands very unfavourable machining conditions

■ Main application ◥ Secondary application □ Supplementary application

Designation and microstructure	Application areas	Workpiece Material Group	Grade description and recommended application

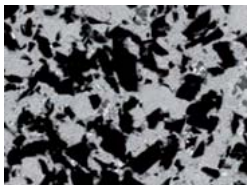
HF7

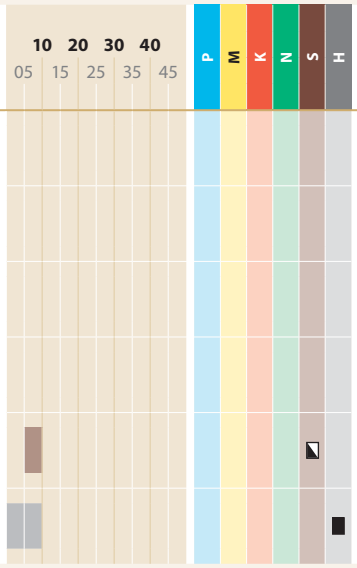




- sub-micron material without cubic carbides (type H) with a low cobalt content
- very versatile in terms of machined materials (recommended for all groups with the exception of P)
- small to medium chip cross-sections
- stable machining conditions

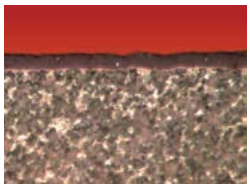
TB310

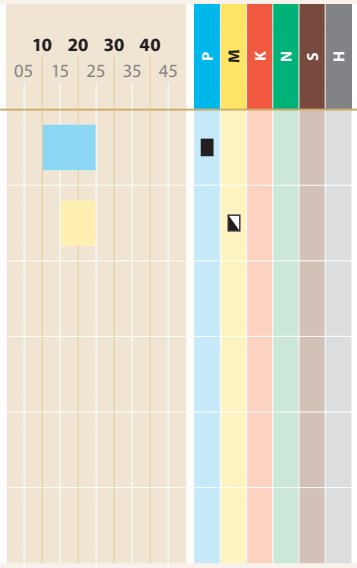




- polycristalline cubic boron nitride
- material suitable for machining hardened steel
- excellent wear resistance
- for machining material group s and H
- finishing work with high-strength steel, also suitable for slightly interrupted cut
- stable machining conditions

TT310





- special material designed especially for finishing work
- cermet-based substrate with high abrasion resistance and good thermal and chemical stability
- TiAlN-based nano-layered PVD coating equipped with an end gold layer of TiN for abrasion indication.
- for machining material group P, potentially also group M
- suitable for finishing applications with low feeds
- stable machining condition
- medium to high cutting speeds

■ Main application ◪ Secondary application □ Supplementary application

The first and most important step is to classify the material to be machined into one of the six groups, see Table No. 1 on page T175. According to this material group, find the appropriate table in the following section.

For a specific workpiece material group and with regard to the nature of the operation (fine, finishing, semi-roughing, roughing, heavy roughing in turning, parting and threading) select a combination of cutting material and the insert's chip breaker - use tables 2a - 7a on pages T210 - T220. These tables specify several alternatives numbered from I to III for each group of workpiece material.

Use tables 2b – 7b on pages T211 - T221to select the starting cutting speed according to the insert's cutting material, shape, feed and swarf depth. The starting cutting speeds are set for a standard material and a durability of 15 min (45 min for heavy roughing) without coolant. Coolant is used for threading, parting and grooving operations.

The tables mentioned in the previous step are supplemented with correction coefficients for the conversion of cutting speeds when turning with regard to the insert's shape, machine condition, required tool life, workpiece material and hardness. Therefore, where necessary, use these correction coefficients to calculate the final starting speed:

$$v_c = v_{15} . k_{vbd} k_{vx} . k_{vT} . k_{vHB} . (k_{vN})$$

Please note that cutting speed determined in this way is the initial value (default) defining the basic level of cutting speed for a given operation. Above all, the range of machinability values of the workpiece material, which may be as much as two grades of machinability for high-grade steels, is often the reason for modifying a certain cutting speed if you require to achieve relatively accurate economical tool life.

CUTTING CONDITIONS FOR TURNING

Machined material, the main ISO group		CUTTING INSERTS TYPE according to ISO		Fine turning		Finishing		Semi-roughing		Roughing		Heavy roughing		Parting, grooving		Threading
				f = .002 - .004 [in/rev]		f = .002 - .004 [in/rev]		f = .008 - .016 [in/rev]		f = .016 - .040 [in/rev]		f > .040 [in/rev]		f = .002 - .012		
				a_p = .020 - .040 [in]		a_p = .040 - .080 [in]		a_p = .080 - .160 [in]		a_p = .160 - .400 [in]		a_p > .400 [in]				
				Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Peripheral grooving and parting	Front grooving and parting	-
P	..A ..M ..G ..U ..N	CNMA, CNMM, CNMG, DNMM, DNMG, DNMG, SNMA, SNMM, SNMG, SNMX, TNMA, TNMM, TNMG, RNMA, RNMG, WNMA, WNMM, WNMG	I	T8315	T8315	TT310	T8315	T9315	T9325	T9315	T9315	T9325	T9325	-	-	-
				FF	FF	FM	FM	FM	FM	RM (W-M)	R (W-M)	OR	SR	-	-	-
			II	-	-	T9315	T8330	T9325	T8330	T9325	T9325	T9335	T9335	-	-	-
				-	-	FM	FM	NM	NM	RM (W-M)	R (W-M)	OR	SR	-	-	-
			III	-	-	T9315	T9315	T8330	T9325	T9325	T8330	T8330	T8345	-	-	-
				-	-	W-F	W-F	NM	M (W-M)	OR (NR2)	NR2 (OR)	OR	SR	-	-	-
	..X	LNUX, LNMX	I	-	-	-	-	-	-	-	-	T9310	T9315	-	-	-
				-	-	-	-	-	-	-	-			-	-	-
			II	-	-	-	-	-	-	-	-	T9315	T9325 (T9335)	-	-	-
				-	-	-	-	-	-	-	-			-	-	-
	..W ..T	CCMW, CCMT, SCMW, SCMT, DCMW, DCMT, TCMW, TCMT, VCMW, VCMT, WCMW, WCMT, RCMW, RCMT, RCMX	I	TT310	T8315	TT310	T8315	T5315	T9315	-	-	T9325	T9335	-	-	-
				UR	FF	UR	FF	RM	RM	-	-	OR	OR	-	-	-
			II	T8315	T8330	T9315	T9325	T9315	T9325	-	-	T9325	T9335	-	-	-
				FF	FF	FM	FM	RM	RM	-	-	SR	SR	-	-	-
			III	8016	-	T8315	T8330	T9325	T8330	-	-	-	-	-	-	-
				Al	-	UR	FM	RM	RM	-	-	-	-	-	-	-
	..X	LFMX, TN11.., TN16.., TN22..	I	T8330	T8330	T8330	T8330	-	-	-	-	-	-	T8330	T8330	-
				-	-	-	-	-	-	-	-	-	-			-
			II	-	-	-	-	-	-	-	-	-	-	T9325	T9325 (6640)	-
				-	-	-	-	-	-	-	-	-	-			-
		TN11.., TN16.., TN 22	I											-	-	T8030

Turning operation	Priority of choice	Range of feeds and depth of cut: Feed f [in/rev]	Depth of cut a_p [in]	P: 6640	T5305	T5315	T7335	T9310	T9315	T9325	T9335	T8030	T8315	T8330	T8345	TT310	Durability
				S..	S..	S..	S..	S..	S..	S..	S..	S..	S..	S..	S..	S..	
				C..	C..	C..	C..	C..	C..	C..	C..	C..	C..	C..	C..	C..	
				W..	W..	W..	W..	W..	W..	W..	W..	W..	W..	W..	W..	W..	
Fine turning	I	.002	.020	-	2065	-	-	-	-	-	-	-	1345	1015	1000	1690	V_{15} [min]
	II	.003	.020	-	1770	-	-	-	-	-	-	-	1165	900	855	1460	
	III	.004	.020	-	1640	-	-	-	-	-	-	-	1085	855	785	1360	
Finishing	I	.004	.060	-	1475	1200	1065	1215	1115	1085	920	-	970	755	705	1215	
	II	.006	.060	-	1280	1100	900	1085	1035	985	835	-	855	675	605	1065	
	III	.008	.060	-	1165	1035	805	1000	970	920	770	-	785	625	540	970	
Semi-roughing	I	.008	.100	-	1115	985	770	950	920	885	740	-	740	605	525	-	
	II	.012	.100	-	970	900	655	855	855	805	675	-	655	540	445	-	
	III	.016	.100	-	885	835	575	785	805	755	625	-	605	490	410	-	
Roughing	I	.016	.200	-	820	785	540	740	755	690	575	-	560	460	375	-	
	II	.024	.200	-	720	720	460	655	690	640	525	-	490	410	330	-	
	III	.031	.200	-	655	675	410	605	655	590	490	-	445	395	295	-	
Heavy roughing	I	.031	.500	-	360	460	310	-	475	425	345	-	-	280	195	-	V_{15} [min]
	II	.040	.500	-	345	445	280	-	445	410	330	-	-	260	180	-	
	III	.050	.500	-	310	425	260	-	425	395	295	-	-	245	165	-	
Parting, grooving and copying		.004	-	625	-	-	-	-	-	720	-	-	-	490	-	-	V_{15} [min] with cooling
		.006	-	560	-	-	-	-	-	690	-	-	-	475	-	-	
		.008	-	490	-	-	-	-	-	655	-	-	-	445	-	-	
		.012	-	410	-	-	-	-	-	590	-	-	-	395	-	-	
Front and internal grooving		.004	-	-	-	-	-	-	-	575	-	-	-	395	-	-	
		.006	-	-	-	-	-	-	-	540	-	-	-	375	-	-	
		.008	-	-	-	-	-	-	-	525	-	-	-	345	-	-	
		.012	-	-	-	-	-	-	-	460	-	-	-	310	-	-	
Threading				-	-	-	-	-	-	-	-	360	-	425	-	-	
				-	-	-	-	-	-	-	-	330	-	395	-	-	
				-	-	-	-	-	-	-	-	310	-	375	-	-	

CORRECTION v_c

Subgroup	P1	P2	P3	P4
Work piece hardness factor				
Hardness	kv_{HBP1}	kv_{HBP2}	kv_{HBP3}	kv_{HBP4}
120	**1.53**	1.18	.94	.71
140	**1.46**	1.12	.90	.67
160	**1.37**	1.05	.84	.63
180	**1.30**	**1.00**	.80	.60
200	**1.24**	**.95**	.76	.57
220	**1.17**	**.90**	**.72**	.54
240	**0.12**	**.86**	**.69**	.52
260	**1.07**	**.82**	**.66**	**.49**
280	1.04	**.80**	**.64**	**.48**
300	1.00	**.77**	**.62**	**.46**
320	.96	.74	**.59**	**.44**
340	.92	.71	**.57**	**.43**
360	.88	.68	.54	**.41**
375	.85	.65	.52	**.39**

Correction for durability (general machining)

Durability [min]	k_{vT}	Durability [min]	k_{vT}
10	1.10	30	.84
15	1.00	45	.76
20	.93	60	.71

Correction for durability (heavy roughing)

Durability [min]	k_{vT}	Durability [min]	k_{vT}
30	1.10	60	.93
45	1.00		

Correction factor k_{vx}

Skin of forging and casting	.70 - .80
Internal turning	.75 - .85
Interrupted cut	.80 - .90
Good machine conditions	1.05 - 1.20
Bad machine conditions	.85 - .95

Correction for insert shape

Insert shape	k
S..., C..., W...	1.00
T..., D..., K...	.95
V..., L... (Parting and grooving)	.88
R..., L... (Heavy roughing)	1.10

PRAMET

Table 3a

CUTTING CONDITIONS FOR TURNING

Machined material, the main ISO group	CUTTING INSERTS TYPE according to ISO			Fine turning		Finishing		Semi-roughing		Roughing		Heavy roughing		Parting, grooving		Threading
				f = .002 - .004 [in/rev]		f = .002 - .004 [in/rev]		f = .008 - .016 [in/rev]		f = .016 - .040 [in/rev]		f > .040 [in/rev]		f = .002 - .012		
				a_p = .020 - .040 [in]		a_p = .040 - .080 [in]		a_p = .080 - .160 [in]		a_p = .160 - .400 [in]		a_p > .400 [in]				
				Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Peripheral grooving and parting	Front grooving and parting	-
M	..A ..M ..G ..U ..N	CNMA, CNMM, CNMG, DNMM, DNMG, DNMG, SNMA, SNMM, SNMG, SNMX, TNMA, TNMM, TNMG, RNMA, RNMG, WNMA, WNMM, WNMG	I	T8315	T8315	TT310	T8315	T9325	T9325	T9325	T8315	T9325	T9335	-	-	-
				FF	FF	FM	FM	NM (SI)	FM	RM	RM	NR2 (OR)	NR2 (OR)	-	-	-
			II	-	-	T9315	T8330	T7335	T7335	T7335	T7335	T7335	T9335	-	-	-
				-	-	FM	FM	NM (SI)	FM	NR	R	NR2 (OR)	SR	-	-	-
			III	-	-	-	-	T8330	T8330	T7335	T8330	-	-	-	-	-
				-	-	-	-	NM (SI)	FM	RM	NR2 (OR)	-	-	-	-	-
	..X	LNUX, LNMX	I	-	-	-	-	-	-	-	-	**T9310**	**T9315**	-	-	-
				-	-	-	-	-	-	-	-			-	-	-
			II	-	-	-	-	-	-	-	-	T9315	T9325 (T9335)	-	-	-
				-	-	-	-	-	-	-	-			-	-	-
	..W ..T	CCMW, CCMT, SCMW, SCMT, DCMW, DCMT, TCMW, TCMT, VCMW, VCMT, WCMW, WCMT, RCMW, RCMT, RCMX	I	**TT310**	**T8315**	**TT310**	**T8315**	**T5315**	**T9315**	-	-	**T9325**	**T9335**	-	-	-
				UR	FF	UR	FF	RM	RM	-	-	OR	OR	-	-	-
			II	T8315	T8330	T9315	T7335	T9315	T7335	-	-	T9325	T9335	-	-	-
				FF	FF	FM	FM	RM	RM	-	-	SR	SR	-	-	-
			III	-	-	T8315	T8330	T7335	T8330	-	-	-	-	-	-	-
				-	-	UR	FM	RM	RM	-	-	-	-	-	-	-
	..X	LFMX, TN11.., TN16.., TN22..	I	**T8330**	**T8330**	**T8330**	**T8330**	-	-	-	-	-	-	**T8330**	**T8330**	-
				-	-	-	-	-	-	-	-	-	-			-
			II	-	-	-	-	-	-	-	-	-	-	T9325	T9325 (6640)	-
				-	-	-	-	-	-	-	-	-	-			-
		TN11.., TN16.., TN 22	I	-	-	-	-	-	-	-	-	-	-	-	-	T8030

CHOICE OF INITIAL CUTTING CONDITIONS

Turning operation	Priority of choice	Range of feeds and depth of cut		M														
				6640	T5315	T7335	T93.25	T9335		T8030	T8315	T8330	T8345		HF7	TT310		Durability
		Feed f [in/rev]	Depth of cut, ap [in]	S.	S.	S.	S.	S.		S.	S.	S.	S.		S.	S.		
				C.	C.	C.	C.	C.		C.	C.	C.	C.		C.	C.		
				W.	W.	W.	W.	W.		W.	W.	W.	W.		W.	W.		
Fine turning	I	.00.2	.0.20	-	-	-	-	-		-	805	605	590		655	1015		V_{15} [min]
	II	.003	.0.20	-	-	-	-	-		-	705	540	510		540	870		
	III	.004	.0.20	-	-	-	-	-		-	655	510	460		490	805		
Finishing	I	.004	.060	-	705	640	655	540		-	575	445	410		445	720		
	II	.006	.060	-	655	540	590	490		-	510	410	360		375	640		
	III	.008	.060	-	605	475	560	460		-	475	375	330		330	575		
Semi-roughing	I	.008	.100	-	590	460	252	445		-	445	360	310		310	-		
	II	.0.1.2	.100	-	540	395	475	395		-	395	310	260		280	-		
	III	.0.16	.100	-	510	345	445	375		-	360	295	245		245	-		
Roughing	I	.0.16	.200	-	475	330	410	345		-	330	280	230		-	-		
	II	.0.24	.200	-	425	280	375	310		-	295	245	195		-	-		
	III	.03.1	.200	-	410	245	345	295		-	260	230	180		-	-		
Heavy roughing	I	.03.1	.500	-	280	180	260	195		-	-	165	115		-	-		V_{fc} [min]
	II	.040	.500	-	260	165	245	195		-	-	150	100		-	-		
	III	.050	.500	-	245	150	230	180		-	-	150	100		-	-		
Parting, grooving and copying		.004	-	.360	-	-	425	-		-	-	295	-		-	-		V_{15} [min] with cooling
		.006	-	.330	-	-	410	-		-	-	280	-		-	-		
		.008	-	.295	-	-	395	-		-	-	260	-		-	-		
		.0.1.2	-	.245	-	-	360	-		-	-	230	-		-	-		
Front and internal grooving		.004	-	-	-	-	330	-		-	-	230	-		-	-		
		.006	-	-	-	-	330	-		-	-	215	-		-	-		
		.008	-	-	-	-	310	-		-	-	195	-		-	-		
		.0.1.2	-	-	-	-	280	-		-	-	180	-		-	-		
Threading				-	-	-	-	-		215	-	260	-		-	-		
				-	-	-	-	-		195	-	230	-		-	-		
				-	-	-	-	-		180	-	215	-		-	-		

CORRECTION v_c

Subgroup	M1	M2	M3	M3
Work piece hardness factor				
Hardness	kv_{HBM1}	kv_{HBM2}	kv_{HBM3}	kv_{HBM4}
120	**1.35**	1.31	1.24	1.15
140	**1.28**	**1.24**	1.18	1.10
160	**1.22**	**1.18**	**1.12**	1.04
180	**1.14**	**1.11**	**1.05**	.98
200	**1.09**	**1.06**	**1.00**	.93
220	**1.03**	**1.00**	**.95**	.88
240	.98	**.95**	**.90**	**.84**
260	.93	**.91**	**.86**	**.80**
280	.89	**.87**	**.82**	**.76**
300	.87	**.84**	**.80**	**.74**
320	.84	**.81**	.77	**.72**
340	.80	.78	.74	**.69**
360	.77	.75	.71	**.66**
375	.74	.72	.68	**.63**

Correction for durability (general machining)

Durability [min]	k_{vT}	Durability [min]	k_{vT}
10	1.10	30	.84
15	1.00	45	.76
20	0.93	60	.71

Correction for durability (heavy roughing)

Durability [min]	k_{vT}	Durability [min]	k_{vT}
30	1.10	60	.93
45	1.0		

Correction factor k_{vx}

Skin of forging and casting	.70 - .80
Internal turning	.75 - .85
Interrupted cut	.80 - .90
Good machine conditions	1.05 - 1.20
Bad machine conditions	.85 - .95

Correction for insert shape

Insert shape	k
S..., C..., W...	1.00
T..., D..., K...	.95
V..., L... (Parting and grooving)	.88
R..., L... (Heavy roughing)	1.10

PRAMET

Table 4a

CUTTING CONDITIONS FOR TURNING

Machined material, the main ISO group	CUTTING INSERTS TYPE according to ISO		Fine turning		Finishing		Semi-roughing		Roughing		Heavy roughing		Parting, grooving		Threading
			f = .002 - .004 [in/rev]		f = .002 - .004 [in/rev]		f = .008 - .016 [in/rev]		f = .016 - .040 [in/rev]		f > .040 [in/rev]		f = .002 - .012		
			a_p = .020 - .040 [in]		a_p = .040 - .080 [in]		a_p = .080 - .160 [in]		a_p = .160 - .400 [in]		a_p > .400 [in]				
			Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Peripheral grooving and parting	Front grooving and parting	-
K	..A ..M ..G ..U ..N	CNMA, CNMM, CNMG, DNMM, DNMG, DNMG, SNMA, SNMM, SNMG, SNMX, TNMA, TNMM, TNMG, RNMA, RNMG, WNMA, WNMM, WNMG	I T5305	I T5305	I T5305	I T5305	I T5305	I T5305	I T5305	I T5315	I T9325	I T9325	I -	I -	I -
				M		M		R	RM	RM	OR	SR	-	-	-
			II T5305	II T5315	II T5305	II T5315	II T5305	II T5315	II T5305	II T5315	II T9335	II T9335	II -	II -	II -
			M	M	M	M	M	M (W-M)	R (RM)	R (RM)	OR	SR	-	-	-
			III -	III T8315	III -	III T8315	III T5305	III T9325	III T9325	III T9325	III T8330	III T8345	III -	III -	III -
				FF		FF	-	R (W-M)	RM	R (W-M)	OR	SR	-	-	-
	..X	LNMX	I -	I -	I -	I -	I -	I -	I -	I -	I T9310	I T9315	I -	I -	I -
			-	-	-	-	-	-	-	-			-	-	-
			II -	II -	II -	II -	II -	II -	II -	II -	II T9315	II T9325 (T9335)	II -	II -	II -
			-	-	-	-	-	-	-	-			-	-	-
	..W ..T	CCMW, CCMT, SCMW, SCMT, DCMW, DCMT, TCMW, TCMT, VCMW, VCMT, WCMW, WCMT, RCMW, RCMT, RCMX	I T5305	I T5305	I T5305	I T5305	I T5305	I T9315	I -	I -	I T9325	I T9335	I -	I -	I -
			UR	-	UR	-	RM	RM	-	-	OR	OR	-	-	-
			II T5305	II T5315	II T5305	II T5315	II T5315	II T9325	II -	II -	II T9325	II T9335	II -	II -	II -
			_	-	_	-	RM	RM	-	-	SR	SR	-	-	-
			III T5315	III T8315	III T5315	III T8315	III T9315	III T8330	III -	III -	III -	III -	III -	III -	III -
			UR	FF	UR	FF(FM)	RM	RM	-	-	-	-	-	-	-
	..X	LFMX, TN11.., TN16.., TN22..	I T8330	I T8330	I T8330	I T8330	I -	I -	I -	I -	I -	I -	I T8330	I T8330	I -
			-	-	-	-	-	-	-	-	-	-			-
			II -	II -	II -	II -	II -	II -	II -	II -	II -	II -	II T9325 (6630)	II T9325 (6640)	II -
		TN11.., TN16.., TN 22	I -	I -	I -	I -	I -	I -	I -	I -	I -	I -	I -	I -	I T8030

CHOICE OF INITIAL CUTTING CONDITIONS

Table 4b

CHOICE OF INITIAL CUTTING CONDITIONS

Turning operation	Priority of choice	Range of feeds and depth of cut: Feed f [in/rev]	Depth of cut, a_p [in]	K: 6640 S..	6640 C..	6640 W..	T5305 S..	T5305 C..	T5305 W..	T5315 S..	T5315 C..	T5315 W..	T9310 S..	T9310 C..	T9310 W..	T9315 S..	T9315 C..	T9315 W..	T9325 S..	T9325 C..	T9325 W..	T8030 S..	T8030 C..	T8030 W..	T8315 S..	T8315 C..	T8315 W..	T8330 S..	T8330 C..	T8330 W..	T8345 S..	T8345 C..	T8345 W..	TB310 S..	TB310 C..	TB310 W..	Durability
Fine turning	I	.002	.020	-	-	-	1970	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1280	970	950	-	-	-	-	-	820	-	-	V_{15} [min]
	II	.003	.020	-	-	-	1675	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1115	855	805	-	-	-	-	-	820	-	-	
	III	.004	.020	-	-	-	1560	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1035	805	740	-	-	-	-	-	820	-	-	
Finishing	I	.004	.060	-	-	-	1395	1130	1150	1065	1035	-	-	-	-	-	-	-	-	-	-	-	-	-	920	720	675	-	-	-	-	-	820	-	-	
	II	.006	.060	-	-	-	1215	1035	1035	985	935	-	-	-	-	-	-	-	-	-	-	-	-	-	820	640	575	-	-	-	-	-	820	-	-	
	III	.008	.060	-	-	-	1115	985	950	920	885	-	-	-	-	-	-	-	-	-	-	-	-	-	740	605	252	-	-	-	-	-	820	-	-	
Semi-roughing	I	.008	.100	-	-	-	1050	935	900	885	835	-	-	-	-	-	-	-	-	-	-	-	-	-	705	575	490	-	-	-	-	-	-	-	-	
	II	.012	.100	-	-	-	920	855	805	805	755	-	-	-	-	-	-	-	-	-	-	-	-	-	625	510	425	-	-	-	-	-	-	-	-	
	III	.016	.100	-	-	-	835	805	755	770	705	-	-	-	-	-	-	-	-	-	-	-	-	-	575	475	395	-	-	-	-	-	-	-	-	
Roughing	I	.016	.200	-	-	-	770	755	705	705	655	-	-	-	-	-	-	-	-	-	-	-	-	-	525	445	360	-	-	-	-	-	-	-	-	
	II	.024	.200	-	-	-	375	690	625	655	605	-	-	-	-	-	-	-	-	-	-	-	-	-	460	395	310	-	-	-	-	-	-	-	-	
	III	.031	.200	-	-	-	625	640	575	625	560	-	-	-	-	-	-	-	-	-	-	-	-	-	425	360	280	-	-	-	-	-	-	-	-	
Heavy roughing	I	.031	.500	-	-	-	345	445	-	445	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	260	180	-	-	-	-	-	-	-	V_{15} [min]
	II	.040	.500	-	-	-	330	425	-	425	395	-	-	-	-	-	-	-	-	-	-	-	-	-	-	245	165	-	-	-	-	-	-	-	
	III	.050	.500	-	-	-	295	410	-	410	360	-	-	-	-	-	-	-	-	-	-	-	-	-	-	230	150	-	-	-	-	-	-	-	
Parting, grooving and copying		.004	-	590	-	-	-	-	-	-	-	-	-	-	-	-	-	-	675	-	-	-	-	-	475	-	-	-	-	-	-	-	-	V_{15} [min] with cooling
		.006	-	525	-	-	-	-	-	-	-	-	-	-	-	-	-	-	655	-	-	-	-	-	460	-	-	-	-	-	-	-	-	
		.008	-	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	625	-	-	-	-	-	425	-	-	-	-	-	-	-	-	
		.012	-	395	-	-	-	-	-	-	-	-	-	-	-	-	-	-	560	-	-	-	-	-	375	-	-	-	-	-	-	-	-	
Front and internal grooving		.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	525	-	-	-	-	-	375	-	-	-	-	-	-	-	-	
		.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	525	-	-	-	-	-	360	-	-	-	-	-	-	-	-	
		.008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	490	-	-	-	-	-	330	-	-	-	-	-	-	-	-	
		.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	445	-	-	-	-	-	295	-	-	-	-	-	-	-	-	
Threading				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	105	-	-	410	-	-	-	-	-	-	-	-	
				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	95	-	-	375	-	-	-	-	-	-	-	-	
				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90	-	-	360	-	-	-	-	-	-	-	-	

CORRECTION v_c

Subgroup	K1	K2	K3	K4
Work piece hardness factor				
Hardness	kv_{HBK1}	kv_{HBK2}	kv_{HBK3}	kv_{HBK4}
120	1.60	.,52	1.44	1.36
140	1.45	1.38	1.31	1.23
160	1.35	**1.28**	1.22	1.15
180	1.25	**1.19**	**1.13**	1.06
200	**1.10**	**1.05**	**.99**	.94
220	**1.00**	**.95**	**.90**	.85
240	**.90**	**.86**	**.81**	.77
260	**.80**	.76	.72	.68
280	**.70**	.67	.63	**.60**
300	.65	.62	.59	**.55**
320	.60	.57	.54	**.51**
340	.55	.52	.50	**.47**
360	.50	.48	.45	.43
375	.40	.38	.36	.34

Correction for durability (general machining)

Durability [min]	k_{vT}	Durability [min]	k_{vT}
10	1.10	30	.84
15	1.0	45	.76
20	.93	60	.71

Correction for durability (heavy roughing)

Durability [min]	k_{vT}	Durability [min]	k_{vT}
30	1.10	60	.93
45	1.0		

Correction factor k_{vx}

Skin of forging and casting	.70 - .80
Internal turning	.75 - .85
Interrupted cut	.80 - .90
Good machine conditions	1.05 - 1.20
Bad machine conditions	.85 - .95

Correction for insert shape

Insert shape	k
S..., C..., W...	1.00
T..., D..., K...	.95
V..., L... (Parting and grooving)	.88
R..., L... (Heavy roughing)	1.10

PRAMET

Table 5a

CUTTING CONDITIONS FOR TURNING

Machined material, the main ISO group	CUTTING INSERTS TYPE according to ISO		Fine turning		Finishing		Semi-roughing		Roughing		Heavy roughing		Parting, grooving		Threading
			f = .002 - .004 [in/rev]		f = .002 - .004 [in/rev]		f = .008 - .016 [in/rev]		f = .016 - .040 [in/rev]		f > .040 [in/rev]		f = .002 - .012		
			a_p = .020 - .040 [in]		a_p = .040 - .080 [in]		a_p = .080 - .160 [in]		a_p = .160 - .400 [in]		a_p > .400 [in]				
			Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Peripheral grooving and parting	Front grooving and parting	-
N	..A ..M ..G ..U ..N	CNMA, CNMM, CNMG, DNMM, DNMG, DNMG, SNMA, SNMM, SNMG, SNMX, TNMA, TNMM, TNMG, RNMA, RNMG, WNMA, WNMM, WNMG	I -	I -	I -	I -	I -	I -	I -	I -	I -	I -	I -	I -	I -
			-	-	-	-	-	-	-	-	-	-	-	-	-
			II -	II -	II -	II -	II -	II -	II -	II -	II -	II -	II -	II -	II -
			-	-	-	-	-	-	-	-	-	-	-	-	-
			III T8315	III T8315	III T8330	III T8330	III T8330	III T8330	III T8330	III T8330	III -	III -	III -	III -	III -
			FF	FF	SI	SI	NM	NM	NM	NR	-	-	-	-	-
	..X	LNUX, LNMX	I -	I -	I -	I -	I -	I -	I -	I -	I -	I -	I -	I -	I -
			-	-	-	-	-	-	-	-	-	-	-	-	-
			II -	II -	II -	II -	II -	II -	II -	II -	II -	II -	II -	II -	II -
			-	-	-	-	-	-	-	-	-	-	-	-	-
	..W ..T	CCMW, CCMT, SCMW, SCMT, DCMW, DCMT, TCMW, TCMT, VCMW, VCMT, WCMW, WCMT, RCMW, RCMT, RCMX	I -	I -	I -	I -	I -	I -	I -	I -	I -	I -	I -	I -	I -
			-	-	-	-	-	-	-	-	-	-	-	-	-
			II HF7	II HF7	II HF7	II HF7	II HF7	II HF7	II -	II -	II -	II -	II -	II -	II -
			AL	AL	AL	AL	AL	AL	-	-	-	-	-	-	-
			III -	III -	III -	III -	III -	III -	III -	III -	III -	III -	III -	III -	III -
			-	-	-	-	-	-	-	-	-	-	-	-	-
	..X	LFMX, TN11.., TN16.., TN22..	I -	I -	I -	I -	I -	I -	I -	I -	I -	I -	I T8330	I T8330	I -
			-	-	-	-	-	-	-	-	-	-			-
			II -	II -	II -	II -	II -	II -	II -	II -	II -	II -	II T9325	II T9325	II -
			-	-	-	-	-	-	-	-	-	-			-
		TN11.., TN16.., TN22	I -	I -	I -	I -	I -	I -	I -	I -	I -	I -	I -	I -	I T8030

CHOICE OF INITIAL CUTTING CONDITIONS

Turning operation	Priority of choice	Range of feeds and depth of cut		N										Durability
				T8030	T8315	T8330			HF7					
		Feed f [in/rev]	Depth of cut, ap [in]	S..	S..	S..			S..					
				C..	C..	C..			C..					
				W..	W..	W..			W..					
Fine turning	I	.002	.020	-	-	-			2740					V_{15} [min]
	II	.003	.020	-	-	-			2280					
	III	.004	.020	-	-	-			2085					
Finishing	I	.004	.060	-	2445	1905			1870					
	II	.006	.060	-	2165	1705			1590					
	III	.008	.060	-	1970	1590			1425					
Semi-roughing	I	.008	.100	-	1870	1510			1360					
	II	.012	.100	-	1655	1360			1150					
	III	.016	.100	-	1510	1265			1035					
Roughing	I	.016	.200	-	-	-			-					
	II	.024	.200	-	-	-			-					
	III	.031	.200	-	-	-			-					
Heavy roughing	I	.031	.500	-	-	-			-					V_{45} [min]
	II	.040	.500	-	-	-			-					
	III	.050	.500	-	-	-			-					
Parting, grooving and copying		.004	-	-	-	1245			-					V_{15} [min] with cooling
		.006	-	-	-	1200			-					
		.008	-	-	-	1115			-					
		.012	-	-	-	1015			-					
Front and internal grooving		.004	-	-	-	985			-					
		.006	-	-	-	950			-					
		.008	-	-	-	885			-					
		.012	-	-	-	805			-					
Threading				280	-	1100			-					
				255	-	1015			-					
				235	-	950			-					

CORRECTION v_c

Subgroup	N1	N2	N3	N4

Workpiece hardness factor

Legierungsarten / Alloy type	k_{vx}	Subgroup
Legierungsarten	2.00	N1
Al alloys formed, unhardened HB 60	1.50	
Al alloys formed, hardened HB100	**1.00**	
Al alloys cast, unhardened HB75	.90	N2
Al alloys cast, hardened HB90	.65	
Al alloys cast, unhardened HB 130 >12% Si	.20	
Highly machinable alloys (>1%Pb)	.90	N3
Brass and lead bronze (<1%Pb)	.75	
Other brass HB <90	.60	
Other brass HB >90	.54	N4
Bronze electrolytic Cu	.40	
Hard and very hard bronze	.20	

Correction for durability (general machining)

Durability [min]	k_{vT}	Durability [min]	k_{vT}
10	1.10	30	.84
15	1.0	45	.76
20	.93	60	.71

Correction factor k_{vx}

Skin of forging and casting	.70 - .80
Internal turning	.75 - .85
Interrupted cut	.80 - .90
Good machine conditions	1.05 - 1.20
Bad machine conditions	.85 - .95

Correction for insert shape

Insert shape	k
S..., C..., W...	1.00
T..., D..., K...	.95
V..., L... (Parting and grooving)	.88
R..., L... (Heavy roughing)	1.10

PRAMET

Table 6a

CUTTING CONDITIONS FOR TURNING

Machined material, the main ISO group	CUTTING INSERTS TYPE according to ISO			Fine turning		Finishing		Semi-roughing		Roughing		Heavy roughing		Parting, grooving		Threading
				f = .002 - .004 [in/rev]		f = .002 - .004 [in/rev]		f = .008 - .016 [in/rev]		f = .016 - .040 [in/rev]		f > .040 [in/rev]		f = .002 - .012		
				a_p = .020 - .040 [in]		a_p = .040 - .080 [in]		a_p = .080 - .160 [in]		a_p = .160 - .400 [in]		a_p > .400 [in]				
				Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Peripheral grooving and parting	Front grooving and parting	-
S	..A ..M ..G ..U ..N	CNMA, CNMM, CNMG, DNMM, DNMG, DNMG, SNMA, SNMM, SNMG, SNMX, TNMA, TNMM, TNMG, RNMA, RNMG, WNMA, WNMM, WNMG	I	T8315	T8315	TT310	T8315	T9325	T9325	T9325	T8315	-	-	-	-	-
				FF	FF	FM	FM	NM (SI)	FM	RM	RM	-	-	-	-	-
			II	TB310	-	T9315	T8330	T7335	T7335	T7335	T7335	-	-	-	-	-
				-	-	FM	FM	NM (SI)	FM	NR	R	-	-	-	-	-
			III	-	-	-	-	T8330	T8330	T7335	T8330	-	-	-	-	-
				-	-	-	-	NM (SI)	FM	RM	NR2 (OR)	-	-	-	-	-
	..X	LNUX, LNMX	I	-	-	-	-	-	-	-	-	-	-	-	-	-
				-	-	-	-	-	73 (78)	-	-	-	-	-	-	-
			II	-	-			-	-	-	-	-	-	-	-	-
				-	-			-	-	-	-	-	-	-	-	-
	..W ..T	CCMW, CCMT, SCMW, SCMT, DCMW, DCMT, TCMW, TCMT, VCMW, VCMT, WCMW, WCMT, RCMW, RCMT, RCMX	I	TT310	T8315	TT310	T8315	T5315	T9315	-	-	-	-	-	-	-
				UR	FF	UR	FF	RM	RM	-	-	-	-	-	-	-
			II	T8315	T8330	T9315	T7335	T9315	T7335	-	-	-	-	-	-	-
				FF	FF	FM	FM	RM	RM	-	-	-	-	-	-	-
			III	8310	-	T8315	T8330	T7335	T8330	-	-	-	-	-	-	-
				AI	-	UR	FM	RM	RM	-	-	-	-	-	-	-
	..X	LFMX, TN11.., TN16.., TN22..	I	T8330	T8330	T8330	T8330	-	-	-	-	-	-	T8330	T8330	-
				-	-	-	-	-	-	-	-	-	-			-
			II	-	-	-	-	-	-	-	-	-	-	T9325 (6630)	T9325 (6640)	-
				-	-	-	-	-	-	-	-	-	-			-
		TN11.., TN16.., TN22	I	-	-	-	-	-	-	-	-	-	-	-	-	T8030

Table 6a CHOICE OF INITIAL CUTTING CONDITIONS

Turning operation	Priority of choice	Range of feeds and depth of cut		S															Durability
				6640	T7335	T9325	T9335		T8030	T8315	T8330	T8345		HF7			TB310		
		Feed f [in/rev]	Depth of cut, ap [in]	S..	S..	S..	S..		S..	S..	S..	S..		S..			S..		
				C..	C..	C..	C..		C..	C..	C..	C..		C..			C..		
				W..	W..	W..	W..		W..	W..	W..	W..		W..			W..		
Fine turning	I	.002	.020	-	-	-	-		-	-	-	-		-			1310		V_{15} [min]
	II	.003	.020	-	-	-	-		-	-	-	-		-			1245		
	III	.004	.020	-	-	-	-		-	330	-	-		-			1150		
Finishing	I	.004	.060	-	.310	.330	.80		-	280	215	-		215			1085		
	II	.006	.060	-	.260	.295	.75		-	245	195	180		180			1050		
	III	.008	.060	-	.230	.280	.70		-	230	180	165		165			1015		
Semi-roughing	I	.008	.100	-	.230	.260	.65		-	215	180	150		150			-		
	II	.012	.100	-	.195	.230	.60		-	195	150	130		130			-		
	III	.016	.100	-	.165	.215	.55		-	180	150	115		115			-		
Roughing	I	.016	.200	-	.165	.195	.50		-	-	130	115		-			-		
	II	.024	.200	-	.130	.180	.45		-	-	-	-		-			-		
	III	.031	.200	-	.115	.165	.45		-	-	-	-		-			-		
Heavy roughing	I	.031	.500	-	-	-	-		-	-	-	-		-			-		V_{45} [min]
	II	.040	.500	-	-	-	-		-	-	-	-		-			-		
	III	.050	.500	-	-	-	-		-	-	-	-		-			-		
Parting, grooving and copying		.004	-	.180	-	.215	-		-	-	150	-		-			-		V_{15} [min] with cooling
		.006	-	.165	-	.195	-		-	-	130	-		-			-		
		.008	-	.150	-	.195	-		-	-	130	-		-			-		
		.012	-	.115	-	.180	-		-	-	115	-		-			-		
Front and internal grooving		.004	-	-	-	.165	-		-	-	115	-		-			-		
		.006	-	-	-	.150	-		-	-	100	-		-			-		
		.008	-	-	-	.150	-		-	-	100	-		-			-		
		.012	-	-	-	.130	-		-	-	80	-		-			-		
Threading				-	-	-	-		100	-	130	-		-			-		
				-	-	-	-		100	-	115	-		-			-		
				-	-	-	-		80	-	100	-		-			-		

CORRECTION v_c

Subgroup	S1	S2	S3	S4

Work piece hardness factor

Hardness	kv_{HBS1}	kv_{HBS2}	kv_{HBS3}	kv_{HBS4}
120	**2.14**	**1.46**	1.22	.92
140	**2.01**	**1.38**	1.15	**.86**
160	**1.93**	**1.32**	1.10	**.83**
180	**1.89**	**1.30**	1.08	**.81**
200	**1.84**	**1.26**	**.05**	**.79**
220	**1.80**	**1.24**	**.03**	**.77**
240	**1.75**	**1.20**	**.00**	**.75**
260	**1.70**	**1.16**	**.97**	**.73**
280	**1.61**	**1.10**	**.92**	**.69**
300	**1.54**	1.06	**.88**	**.66**
320	**1.47**	1.01	**.84**	**.63**
340	**1.40**	.96	**.80**	.60
360	**1.37**	.94	**.78**	.59
375	**1.30**	.89	.74	.56

Correction for durability (general machining)

Durability [min]	k_{vT}	Durability [min]	k_{vT}
10	1.10	30	.84
15	1.0	45	.76
20	.93	60	.71

Correction factor k_{vx}

Skin of forging and casting	.70 - .80
Internal turning	.75 - .85
Interrupted cut	.80 - .90
Good machine conditions	1.05 - 1.20
Bad machine conditions	.85 - .95

Correction for insert shape

Insert shape	k
S..., C..., W...	1.00
T..., D..., K...	.95
V..., L... (Parting and grooving)	.88
R..., L... (Heavy roughing)	1.10

PRAMET

Table 7a

CUTTING CONDITIONS FOR TURNING

Machined material, the main ISO group		CUTTING INSERTS TYPE according to ISO		Fine turning		Finishing		Semi-roughing		Roughing		Heavy roughing		Parting, grooving		Threading
				f = .002 - .004 [in/rev]		f = .002 - .004 [in/rev]		f = .008 - .016 [in/rev]		f = .016 - .040 [in/rev]		f > .040 [in/rev]		f = .002 - .012		
				a_p = .020 - .040 [in]		a_p = .040 - .080 [in]		a_p = .080 - .160 [in]		a_p = .160 - .400 [in]		a_p > .400 [in]				
				Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Pre-machined surface non-interrupted cut	Casting, forging interrupted cut	Peripheral grooving and parting	Front grooving and parting	-
H	..A ..M ..G ..U ..N	CNMA, CNMM, CNMG, DNMM, DNMG, DNMG, SNMA, SNMM, SNMG, SNMX, TNMA, TNMM, TNMG, RNMA, RNMG, WNMA, WNMM, WNMG	I	T5305	T5305	T5305	T5305	T5305	T5305	-	-	-	-	-	-	-
					M		M	R	R	-	-	-	-	-	-	-
			II	T5305	T5315	T5305	T5315	T5305	T5315	-	-	-	-	-	-	-
				M	M	M	M	M	M (W-M)	-	-	-	-	-	-	-
			III	-	T8315	-	T8315	T5305	T5315	-	-	-	-	-	-	-
				-	FF	-	FF	-	R (W-M)	-	-	-	-	-	-	-
	..X	LNUX, LNMX	I	-	-	-	-	-	-	-	-	-	-	-	-	-
				-	-	-	-	-	-	-	-	-	-	-	-	-
			II	-	-	-	-	-	-	-	-	-	-	-	-	-
				-	-	-	-	-	-	-	-	-	-	-	-	-
	..W ..T	CCMW, CCMT, SCMW, SCMT, DCMW, DCMT, TCMW, TCMT, VCMW, VCMT, WCMW, WCMT, RCMW, RCMT, RCMX	I	T5305	T5305	T5305	T5305	T5305	T9315	-	-	-	-	-	-	-
				RM	-	RM	-	RM	RM	-	-	-	-	-	-	-
			II	T5305	T5315	T5305	T5315	T5315	T8330	-	-	-	-	-	-	-
				_	RM	_	RM	RM	RM	-	-	-	-	-	-	-
			III	T5315	T8330	T5315	T8330	T9315		-	-	-	-	-	-	-
				RM	RM	RM	RM	RM		-	-	-	-	-	-	-
	..X	LFMX, TN11.., TN16.., TN22..	I	T8330	T8330	T8330	T8330	-	-	-	-	-	-	T8330	T8330	-
				-	-	-	-	-	-	-	-	-	-			-
			II	-	-	-	-	-	-	-	-	-	-	-	-	-
				-	-	-	-	-	-	-	-	-	-	-	-	-
		TN11.., TN16.., TN22	I	-	-	-	-	-	-	-	-	-	-	-	-	T8030

Table 7a CHOICE OF INITIAL CUTTING CONDITIONS

Turning operation	Priority of choice	Range of feeds and depth of cut		H								
				T5305	T5315	T9310	T9315	T8030	T8315	T8330		T8310
				S..	S..	S..	S..	S..	S..	S..		S..
				C..	C..	C..	C..	C..	C..	C..		C..
				W..	W..	W..	W..	W..	W..	W..		W..
		Feed f [in/rev]	Depth of cut, ap [in]									Durability
Fine turning	I	.002	.020	-	-	-	-	-	-	-		655
	II	.003	.020	-	-	-	-	-	-	-		590
	III	.004	.020	.330	-	-	-	-	215	-		525
Finishing	I	.004	.060	295	230	230	230	-	180	150		475
	II	.006	.060	245	215	215	215	-	165	130		425
	III	.008	.060	230	195	195	195	-	150	115		375
Semi-roughing	I	.008	.100	215	195	180	180	-	150	115		-
	II	.012	.100	180	180	165	165	-	130	100		-
	III	.016	.100	165	165	150	150	-	-	100		-
Roughing	I	.016	.200	-	-	-	-	-	-	-		-
	II	.024	.200	-	-	-	-	-	-	-		-
	III	.031	.200	-	-	-	-	-	-	-		-
Heavy roughing	I	.031	.500	-	-	-	-	-	-	-		-
	II	.040	.500	-	-	-	-	-	-	-		-
	III	.050	.500	-	-	-	-	-	-	-		-
Parting, grooving and copying		.004	-	-	-	-	-	-	-	100		-
		.006	-	-	-	-	-	-	-	80		-
		.008	-	-	-	-	-	-	-	80		-
		.012	-	-	-	-	-	-	-	65		-
Front and internal grooving		.004	-	-	-	-	-	-	-	115		-
		.006	-	-	-	-	-	-	-	100		-
		.008	-	-	-	-	-	-	-	100		-
		.012	-	-	-	-	-	-	-	80		-
Threading				-	-	-	-	65	-	80		-
				-	-	-	-	65	-	65		-
				-	-	-	-	80	-	100		-

V_{15} [min]

V_{45} [min]

V_{15} [min] with cooling

CORRECTION v_c

Subgroup	H1	H2	H3	H4
Work piece hardness factor				
Hardness	kv_{HBH1}	kv_{HBH2}	kv_{HBH3}	kv_{HBH4}
380 / 40,8	**1.84**	**1.76**	1.60	1.52
400 / 42,7	**1.73**	**1.65**	1.50	1.43
420 / 44,6	**1.61**	**1.54**	1.40	1.33
440 / 46,5	**1.50**	**1.43**	1.30	1.24
460 / 48,1	**1.38**	**1.32**	**1.20**	1.14
500 / 50,8	**1.15**	**1.10**	**1.00**	0.95
520 / 52,0	1.09	1.05	**0.95**	0.90
540 / 53,5	1.04	.99	**0.90**	0.86
560 / 54,7	0.98	.94	**0.85**	0.81
580 / 55,7	0.92	.88	**0.80**	**0.76**
600 / 56,8	0.86	.83	0.75	**0.71**
620 / 57,9	0.81	.77	0.70	**0.67**
640 / 59,0	0.75	.72	0.65	**0.62**
>640 / >59	0.69	.66	0.60	**0.57**

Correction for durability (general machining)

Durability [min]	k_{vT}	Durability [min]	k_{vT}
10	1.10	30	0.84
15	1.0	45	0.76
20	.93	60	0.71

Correction factor k_{vx}

Skin of forging and casting	.70 - .80
Internal turning	.75 - .85
Interrupted cut	.80 - .90
Good machine conditions	1.05 - 1.20
Bad machine conditions	.85 - .95

Correction for insert shape

Insert shape	k
S.... C.... W...	1.00
T.... D.... K...	.95
V.... L... (Parting and grooving)	.88
R.... L... (Heavy roughing)	1.10

Surface quality in turning

The quality of the machined surface in turning depends on the feed rate f and the radius of the insert r_e. The values of surface roughness R_{max} and R_a are given in following tables 8a and 8b.

There are other factors that can influence surface roughness, please take the given values as a guide.

$$R_a = 33337 \cdot \frac{f_z^{1,88}}{r_\varepsilon^{0,97}} \quad [\mu in]$$

Table 8a

Feed f [in/rev]	r_ε Radius [in]																
	.004	.008	.016	.031	.039	.047	.063	.071	.078	.094	.118	.125	.137	.157	.196	.235	.314
	Surface R_a [µin]																
.002	58.5	29.9	15.2	7.8	6.3	5.3	4.0	3.5	3.2	2.7	2.2	2.0	1.9	1.6	1.3	1.1	0.8
.003	110.1	56.2	28.7	14.6	11.8	9.9	7.5	6.7	6.0	5.0	4.1	3.8	3.5	3.1	2.5	2.1	1.6
.003	141.5	72.2	36.9	18.8	15.2	12.7	9.6	8.6	7.7	6.5	5.2	4.9	4.5	4.0	3.2	2.7	2.0
.004	-	109.9	56.1	28.6	23.1	19.3	14.6	13.0	11.8	9.9	7.9	7.5	6.8	6.0	4.8	4.1	3.1
.005	-	154.8	79.0	40.3	32.5	27.2	20.6	18.4	16.6	13.9	11.2	10.5	9.6	8.5	6.8	5.7	4.3
.006	-	235.5	120.2	61.4	49.4	41.4	31.3	28.0	25.2	21.1	17.0	16.0	14.7	12.9	10.4	8.7	6.6
.006	-	265.9	135.7	69.3	55.8	46.8	35.4	31.6	28.5	23.9	19.2	18.1	16.6	14.5	11.7	9.8	7.4
.007	-	331.8	169.4	86.5	69.6	58.4	44.1	39.4	35.6	29.8	24.0	22.5	20.7	18.2	14.6	12.2	9.3
.008	-	-	206.5	105.4	84.9	71.1	53.8	48.0	43.3	36.3	29.2	27.5	25.2	22.1	17.8	14.9	11.3
.009	-	-	247.0	126.1	101.6	85.1	64.4	57.4	51.8	43.4	35.0	32.9	30.1	26.5	21.3	17.9	13.5
.010	-	-	314.1	160.4	129.2	108.2	81.9	73.0	65.9	55.2	44.5	41.8	38.3	33.7	27.1	22.7	17.2
.011	-	-	363.0	185.3	149.3	125.1	94.6	84.4	76.2	63.8	51.4	48.3	44.3	38.9	31.3	26.3	19.9
.012	-	-	442.6	225.9	182.0	152.5	115.3	102.9	92.9	77.8	62.7	58.9	54.0	47.4	38.2	32.0	24.2
.013	-	-	499.6	255.1	205.4	172.1	130.2	116.2	104.9	87.9	70.8	66.5	60.9	53.5	43.1	36.1	27.3
.014	-	-	591.3	301.9	243.1	203.7	154.1	137.5	124.1	104.0	83.8	78.7	72.1	63.4	51.0	42.8	32.3
.015	-	-	656.4	335.1	269.9	226.1	171.1	152.6	137.8	115.4	93.0	87.3	80.1	70.3	56.6	47.5	35.9
.016	-	-	-	388.0	312.5	261.8	198.1	176.7	159.5	133.7	107.7	101.1	92.7	81.4	65.6	55.0	41.6
.018	-	-	-	484.2	390.0	326.7	247.2	220.5	199.1	166.8	134.3	126.2	115.7	101.6	81.8	68.6	51.9
.020	-	-	-	590.3	475.4	398.3	301.3	268.8	242.7	203.3	163.8	153.8	141.0	123.9	99.8	83.6	63.2
.022	-	-	-	706.1	568.7	476.5	360.5	321.5	290.3	243.2	195.9	184.0	168.7	148.2	119.4	100.0	75.7
.024	-	-	-	831.6	669.7	561.2	424.5	378.7	341.9	286.5	230.7	216.7	198.7	174.5	140.6	117.8	89.1
.025	-	-	-	966.6	778.5	652.3	493.5	440.2	397.4	333.0	268.2	251.9	230.9	202.9	163.4	136.9	103.6
.027	-	-	-	1111.1	894.9	749.8	567.2	506.0	456.8	382.8	308.3	289.6	265.5	233.2	187.8	157.4	119.1
.029	-	-	-	1265.0	1018.8	853.7	645.8	576.1	520.1	435.8	351.0	329.7	302.2	265.5	213.8	179.2	135.5
.031	-	-	-	-	1150.2	963.8	729.1	650.4	587.2	492.0	396.3	372.2	341.2	299.8	241.4	202.3	153.0
.033	-	-	-	-	1289.1	1080.1	817.1	728.9	658.1	551.4	444.1	417.1	382.4	336.0	270.6	226.7	171.5
.035	-	-	-	-	1435.3	1202.7	909.8	811.6	732.7	614.0	494.5	464.5	425.8	374.1	301.3	252.4	191.0
.037	-	-	-	-	1588.9	1331.3	1007.2	898.4	811.1	679.7	547.4	514.2	471.4	414.1	333.5	279.4	211.4
.039	-	-	-	-	-	1466.1	1109.1	989.4	893.3	748.5	602.8	566.2	519.1	456.0	367.3	307.7	232.8
.047	-	-	-	-	-	-	1562.6	1393.9	1258.5	1054.5	849.2	797.7	731.3	642.4	517.4	433.5	328.0

SURFACE ROUGHNESS CONVERSION CHART

R_a (micrometers)	R_a (microinches)	RMS	CLA (N)	R_{max}	R_a (micrometers)	R_a (microinches)	RMS	CLA (N)	R_{max}
0.025	1	1. 1	1	0.3	1.6	63	64.3	63	8.0
0.05	2	2.2	2	0.5	3.2	125	137.5	125	13
0.1	4	4.4	4	0.8	6.3	250	275	250	25
0.2	8	8.8	8	1.2	12.5	500	550	500	50
0.4	16	17.6	16	2.0	25.0	1000	11 00	1000	100
0.8	32	32.5	32	4.0	50.0	2000	2200	2000	200

R_a = Roughness Average in micrometers or microinches.
RMS = Root Mean Square in microinches.
CLA = Center Line Average in microinches.
R_{max} = Roughness T otal in microns

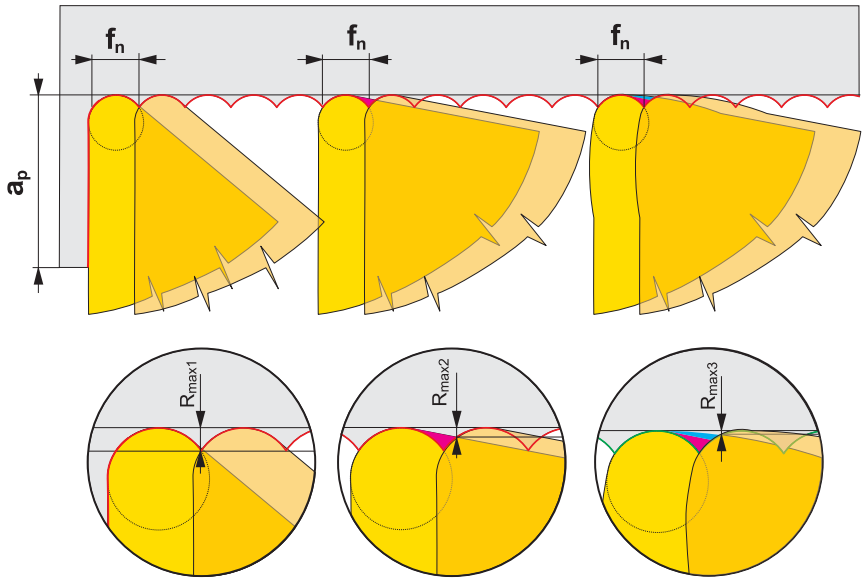
PRAMET

$$R_z = 127000 \cdot \frac{f^2}{r_\varepsilon} \quad [\mu in]$$

Table 8b

Feed f [in/rev]	r_ε Radius [in]																
	.004	.008	.016	.031	.039	.047	.063	.071	.078	.094	.118	.125	.137	.157	.196	.235	.314
	Surface R_z [µin]																
.002	124.5	62.3	31.1	15.6	12.5	10.4	7.8	6.9	6.2	5.2	4.2	3.9	3.6	3.1	2.5	2.1	1.6
.003	244.0	122.0	61.0	30.5	24.4	20.3	15.3	13.6	12.2	10.2	8.1	7.6	7.0	6.1	4.9	4.1	3.1
.003	318.7	159.4	79.7	39.8	31.9	26.6	19.9	17.7	15.9	13.3	10.6	10.0	9.1	8.0	6.4	5.3	4.0
.004	-	249.0	124.5	62.3	49.8	41.5	31.1	27.7	24.9	20.8	16.6	15.6	14.2	12.5	10.0	8.3	6.2
.005	-	358.6	179.3	89.6	71.7	59.8	44.8	39.8	35.9	29.9	23.9	22.4	20.5	17.9	14.3	12.0	9.0
.006	-	560.3	280.1	140.1	112.1	93.4	70.0	62.3	56.0	46.7	37.4	35.0	32.0	28.0	22.4	18.7	14.0
.006	-	637.5	318.7	159.4	127.5	106.2	79.7	70.8	63.7	53.1	42.5	39.8	36.4	31.9	25.5	21.2	15.9
.007	-	806.8	403.4	201.7	161.4	134.5	100.9	89.6	80.7	67.2	53.8	50.4	46.1	40.3	32.3	26.9	20.2
.008	-	-	498.0	249.0	199.2	166.0	124.5	110.7	99.6	83.0	66.4	62.3	56.9	49.8	39.8	33.2	24.9
.009	-	-	602.6	301.3	241.1	200.9	150.7	133.9	120.5	100.4	80.4	75.3	68.9	60.3	48.2	40.2	30.1
.010	-	-	778.2	389.1	311.3	259.4	194.5	172.9	155.6	129.7	103.8	97.3	88.9	77.8	62.3	51.9	38.9
.011	-	-	907.7	453.8	363.1	302.6	226.9	201.7	181.5	151.3	121.0	113.5	103.7	90.8	72.6	60.5	45.4
.012	-	-	1120.6	560.3	448.2	373.5	280.1	249.0	224.1	186.8	149.4	140.1	128.1	112.1	89.6	74.7	56.0
.013	-	-	1275.0	637.5	510.0	425.0	318.7	283.3	255.0	212.5	170.0	159.4	145.7	127.5	102.0	85.0	63.7
.014	-	-	1525.2	762.6	610.1	508.4	381.3	338.9	305.0	254.2	203.4	190.7	174.3	152.5	122.0	101.7	76.3
.015	-	-	1704.5	852.3	681.8	568.2	426.1	378.8	340.9	284.1	227.3	213.1	194.8	170.5	136.4	113.6	85.2
.016	-	-	-	996.1	796.9	664.1	498.0	442.7	398.4	332.0	265.6	249.0	227.7	199.2	159.4	132.8	99.6
.018	-	-	-	1260.7	1008.5	840.4	630.3	560.3	504.3	420.2	336.2	315.2	288.2	252.1	201.7	168.1	126.1
.020	-	-	-	1556.4	1245.1	1037.6	778.2	691.7	622.5	518.8	415.0	389.1	355.7	311.3	249.0	207.5	155.6
.022	-	-	-	1883.2	1506.6	1255.5	941.6	837.0	753.3	627.7	502.2	470.8	430.4	376.6	301.3	251.1	188.3
.024	-	-	-	2241.2	1792.9	1494.1	1120.6	996.1	896.5	747.1	597.6	560.3	512.3	448.2	358.6	298.8	224.1
.025	-	-	-	2630.3	2104.2	1753.5	1315.1	1169.0	1052.1	876.8	701.4	657.6	601.2	526.1	420.8	350.7	263.0
.027	-	-	-	3050.5	2440.4	2033.7	1525.2	1355.8	1220.2	1016.8	813.5	762.6	697.3	610.1	488.1	406.7	305.0
.029	-	-	-	3501.8	2801.5	2334.6	1750.9	1556.4	1400.7	1167.3	933.8	875.5	800.4	700.4	560.3	466.9	350.2
.031	-	-	-	-	3187.5	2656.2	1992.2	1770.8	1593.7	1328.1	1062.5	996.1	910.7	796.9	637.5	531.2	398.4
.033	-	-	-	-	3598.3	2998.6	2249.0	1999.1	1799.2	1499.3	1199.4	1124.5	1028.1	899.6	719.7	599.7	449.8
.035	-	-	-	-	4034.1	3361.8	2521.3	2241.2	2017.1	1680.9	1344.7	1260.7	1152.6	1008.5	806.8	672.4	504.3
.037	-	-	-	-	4494.8	3745.7	2809.3	2497.1	2247.4	1872.8	1498.3	1404.6	1284.2	1123.7	899.0	749.1	561.9
.039	-	-	-	-	-	4150.3	3112.7	2766.9	2490.2	2075.2	1660.1	1556.4	1423.0	1245.1	996.1	830.1	622.5
.047	-	-	-	-	-	-	4482.4	3984.3	3585.9	2988.2	2390.6	2241.2	2049.1	1792.9	1434.4	1195.3	896.5
.059	-	-	-	-	-	-	7003.7	6225.5	5602.9	4669.1	3735.3	3501.8	3201.7	2801.5	2241.2	1867.6	1400.7
.071	-	-	-	-	-	-	-	-	8068.2	6723.5	5378.8	5042.6	4610.4	4034.1	3227.3	2689.4	2017.1
.078	-	-	-	-	-	-	-	-	-	8300.7	6640.5	6225.5	5691.9	4980.4	3984.3	3320.3	2490.2
.086	-	-	-	-	-	-	-	-	-	10043.8	8035.0	7532.8	6887.2	6026.3	4821.0	4017.5	3013.1
.098	-	-	-	-	-	-	-	-	-	-	10375.8	9727.3	8893.6	7781.9	6225.5	5187.9	3890.9

Values of surface finish R_a stated in this table apply for turning by cutting indexable inserts with bigger setting angles of minor cutting edge κ_r' (inserts shapes **T..., S..., D...., K..., V...**). The surface finish Ra is better than values mentioned in table at turning by cutting inserts shapes **C..., W...** and primarily by inserts with WIPER geometry (tools with setting angle $\kappa_r = 90 \div 95°$). The reason is the low value of setting angles of minor cutting edge κ_r'. In this case the value of max. height of profile Rmax is reduced to $R_{max3} < R_{max2} < R_{max1}$ as you can see on following picture.



The position and orientation of the cutting edge in relation to the workpiece and it's geometric shape determine the cutting angle characteristics.

The angles on the cutting edge are determined on two coordinate systems:

a) tool

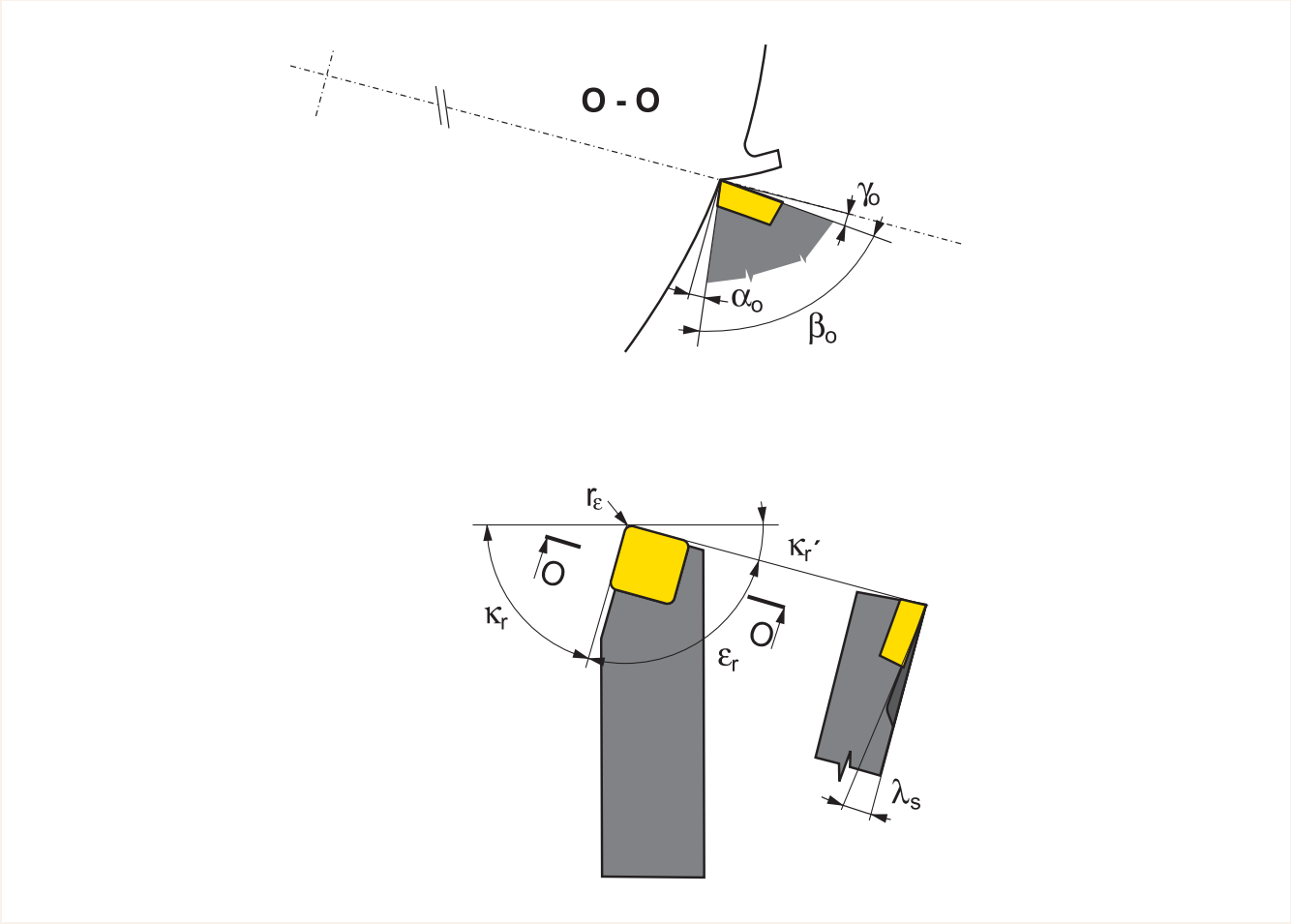
b) working

a) tool coordinate system (stationary), which is used to determine the cutting edge geometry during design, production and checking. All angles defined in this system are called tool cutting angles. All angles defined by ISO standards according to the insert shape belong in this group.

b) working coordinate system, used to determine the cutting edge geometry during the machining process. These angles are called working angles and they depend on the position of the insert clamped into the tool holder.

For example, the cutting insert SNUN ..... has a tool clearance angle $\alpha = 0°$ and a rake angle $\gamma = 0°$, however the insert is clamped in the tool holder to give a working clearance angle $\alpha_o = 6°$ and a working rake angle $\gamma_o = -6°$.

The working angles affect the tool angles with pre-formed chip formers. However the most important are the working angles for the cutting process.



The basic tool angles are indicated in the picture in the basic tool plane (interlaid by the bearing surface of the tool holder) and in the normal tool plane (interlaid across to cutting edge – cut 0-0).

We speak about the following angles:

The rake angle γ_0 – substantially affects the cutting process. Its size determines the progress and the intensity of plastic deformation during chip forming; it also determines the value of the cutting forces and the thermal stress on the cutting edge. The range of rake angles is wide, from $\gamma_0 = +25°$ to -15° for cutting tools with indexable cutting inserts for milling and turning. A positive rake angle improves the chip forming conditions, reduces the cutting forces and reduces the cutting temperature level. A negative rake angle improves the strength of the cutting edge, however it increases plastic deformation during chip forming and thereby also the cutting forces and temperatures.

Clearance angle α_0 affects the value of friction between the flank and the machined surface. Increasing the clearance angle αo reduces this friction and thereby flank wear as well.

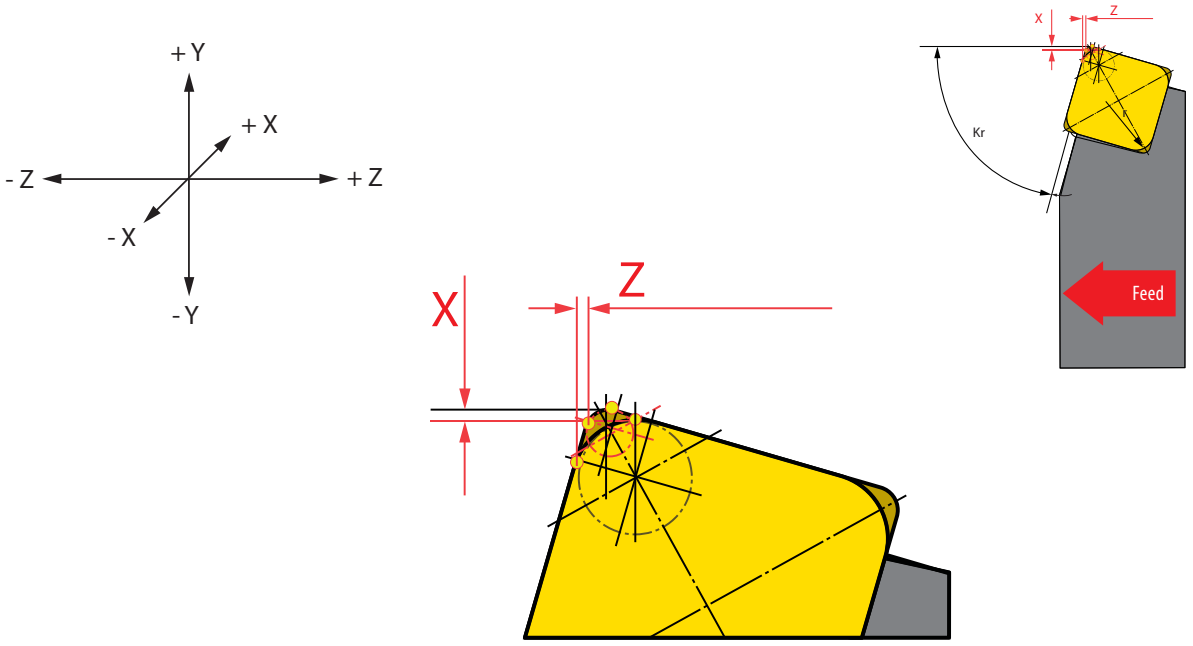
Wedge angle β_0 is the angle of the cutting insert's wedge. Increasing angle β_0 increases the strength of the cutting edge (resistance against shock), however it also increases the cutting resistance.

Inclination angle of main cutting edge λ_s – determines the point of first contact between the cutting edge and the workpiece, which is important for interrupted cut. If λ_s is positive, the point of contact is close to the nose of the cutting insert. The negative angle λ_s moves the point of first contact far from the nose and thereby affects the resistance of the cutting edge against mechanical stress. Furthermore, λ_s affects the direction of chip evacuation. If λ_s is negative, the direction of chip evacuation is towards the machined surface. Whereas if λ_s is positive, the direction of chip evacuation is away from the machined surface.

Setting angle of main cutting edge κ_r affects the shape of the chip cross-section. Reducing angle κr makes the chip thinner at a given feed f and depth of cut a_p . Whereas if $\kappa_r = 90°$ the chip thickness $h = f$ and the chip width $b = a_p$ becomes wider.

Setting angle of minor cutting edge κ_r together with nose radius r_ε define the final surface quality.

Correction of X and Z coordinate by radius and holder:



ATTENTION - the data is valid for the right-hand holders oriented as shown in picture 14. For internal holders, left-hand holders or other orientations it is necessary to correct or mark +/- (to substitute values X/Z)

	holder	coordinates	radius 1/124" .008	radius 1/64" .016	radius 1/32" .031	radius 3/64" .047	radius 1/16" .063	radius 3/32" .094	radius 1/8" .125
External tools	DCLNR/L	X	.00236	.00157	.00000	-.00157	-.00315	-.00630	-.00945
		Z	-.00244	-.00165	.00000	.00165	.00327	.00654	.00980
	DCKNR/L	X	.00673	.00453	.00000	-.00433	-.00878	-.01764	-.02646
		Z	.02697	.01799	.00000	-.01799	-.03598	-.07193	-.10791
	DCRNR/L	X	.00177	.00130	.00000	-.00063	-.00157	-.00346	-.00539
		Z	.00504	.00327	.00000	-.00378	-.00728	-.01433	-.02138
	DDJNR/L	X	.02031	.01366	.00000	-.01295	-.02626	-.05287	-.07949
		Z	-.00220	-.00161	.00000	.00087	.00213	.00461	.00709
	DDPNR/L	X	.02752	.01846	.00000	-.01783	-.03602	-.07232	-.10862
		Z	.02063	.01370	.00000	-.01406	-.02795	-.05571	-.08346
	DSDNN	X	.00992	.00669	.00000	-.00622	-.01268	-.02555	-.03846
		Z	.01661	.01102	.00000	-.01122	-.02236	-.04465	-.06689
	DSKNR/L	X	.00551	.00370	.00000	-.00354	-.00598	-.01441	-.02165
		Z	.02260	.01508	.00000	-.01512	-.03020	-.06035	-.09055
	DSRNR/L	X	.00992	.00669	.00000	-.00622	-.01268	-.02555	-.03846
		Z	.01661	.01102	.00000	-.01122	-.02236	-.04465	-.06693
	DSSNR/L	X	.00969	.00646	.00000	-.00646	-.01291	-.02583	-.03870
		Z	.01669	.01114	.00000	-.01114	-.02228	-.04453	-.06681
	DTGNR/L	X	.01720	.01157	.00000	-.01091	-.02213	-.04461	-.06705
		Z	.00000	.00000	.00000	.00000	.00000	.00000	.00000
	DTTNR/L	X	.02366	.01587	.00000	-.01531	-.03087	-.06201	-.09319
		Z	.02043	.01358	.00000	-.01394	-.02768	-.05516	-.08264

CORRECTION OF X AND Z COORDINATE BY RADIUS AND HOLDER

	holder	coordinates	radius 1/124" .008	radius 1/64" .016	radius 1/32" .031	radius 3/64" .047	radius 1/16" .063	radius 3/32" .094	radius 1/8" .125
External tools	DVJNR/L	X	.04972	.03335	.00000	-.03224	-.06500	-.13059	-.19614
		Z	-.00295	-.00217	.00000	.00098	.00256	.00575	.00890
	DWLNR/L	X	.00240	.00173	.00000	-.00102	-.00240	-.00516	-.00787
		Z	-.00248	-.00177	.00000	.00106	.00244	.00528	.00811
Internal tools	DCLNR/L	X	.00236	.00157	.00000	-.00157	-.00315	-.00630	-.00945
		Z	-.00244	-.00165	.00000	.00165	.00327	.00654	.00980
	DDUNR/L	X	-.01969	-.01335	.00000	.01201	.02469	.05004	.07539
		Z	-.00205	-.00157	.00000	.00024	.00114	.00299	.00480
	DTFNR/L	X	-.01673	-.01138	.00000	.01000	.02071	.04209	.06350
		Z	.00000	.00000	.00000	.00000	.00000	.00000	.00000
	DWLNR/L	X	-.00236	-.00181	.00000	.00047	.00169	.00386	.00614
		Z	-.00256	-.00193	.00000	.00047	.00157	.00413	.00654
External tools	SCLCR/L	X	.00236	.00157	.00000	-.00157	-.00315	-.00630	-.00945
		Z	-.00244	-.00165	.00000	.00165	.00327	.00654	.00980
	SDJCR/L	X	.02047	.01362	.00000	-.01362	-.02728	-.05457	-.08181
		Z	-.00236	-.00157	.00000	.00157	.00315	.00634	.00949
	SDPCN	X	.02752	.01835	.00000	-.01835	-.03673	-.07343	-.11016
		Z	.00000	.00000	.00000	.00000	.00000	.00000	.00000
	SSDCN	X	.00980	.00654	.00000	-.00654	-.01303	-.02610	-.03913
		Z	.00000	.00000	.00000	.00000	.00000	.00000	.00000
	STGCR/L	X	.01598	.01067	.00000	-.01067	-.02134	-.04268	-.06402
		Z	-.00213	-.00142	.00000	.00142	.00280	.00563	-.00843
	SVHBR/L	X	.04071	.02717	.00000	-.02717	-.05429	-.10862	-.16291
		Z	-.02142	-.01429	.00000	.01429	.02858	.05717	.08575
	SVJBR/L	X	.04996	.03331	.00000	-.03331	-.06661	-.13323	-.19984
		Z	-.00390	-.00260	.00000	.00260	.00520	.01035	.01555
	SVVBN	X	.05492	.03661	.00000	-.03661	-.07323	-.14650	-.21972
		Z	.00000	.00000	.00000	.00000	.00000	.00000	.00000
	SWLCR/L	X	.00236	.00157	.00000	-.00157	-.00315	-.00630	-.00945
		Z	-.00236	-.00157	.00000	.00157	.00315	.00630	.00945
Internal tools	SCLCR/L	X	-.00228	-.00154	.00000	.00154	.00307	.00610	.00917
		Z	-.00244	-.00165	.00000	.00165	.00327	.00654	.00980
	SDQCR/L	X	-.01217	-.00764	.00000	.00811	.01622	.03248	.04870
		Z	-.01220	-.00811	.00000	.01055	.01965	.03783	.05602
	SDUCR/L	X	-.01984	-.01323	.00000	.01323	.02646	.05291	.07937
		Z	-.00232	-.00154	.00000	.00161	.00323	.00638	.00953
	SDZCR/L	X	-.02047	-.01362	.00000	.01362	.02728	.00547	.08181
		Z	.00232	.00154	.00000	-.00161	-.00323	-.00638	-.00953
	STFCR/L	X	-.01705	-.01138	.00000	.01138	.02272	.04543	.06815
		Z	.00000	.00000	.00000	.00000	.00000	.00000	.00000
	SVQBR/L	X	-.04043	-.02693	.00000	.02717	.05390	.10780	.16165
		Z	-.02146	-.01429	.00000	.01429	.02858	.05717	.08575
	SVUBR/L	X	-.04957	-.03307	.00000	.03307	.06610	.13220	.19831
		Z	.00390	-.00260	.00000	.00260	.00520	.01035	.01555
	SWLCR/L	X	-.00236	-.00154	.00000	.00154	.00311	.00622	.00933
		Z	-.00236	-.00157	.00000	.00157	.00315	.00630	.00945

ATTENTION - the data is valid for the right-hand holders oriented as shown in picture 14. For internal holders, left-hand holders or other orientations it is necessary to correct or mark +/- (to substitute values X/Z)

The choice of production method is influenced by the workpiece and the machine. Workpiece – external or internal thread, right- or left-hand thread. Machine – right- or left-hand tool. You can use the following tables 9a and 9b.

Table 9a

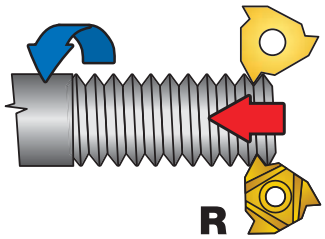
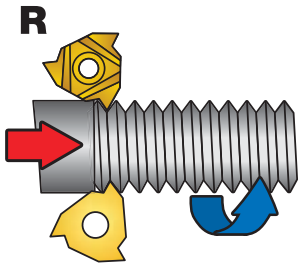
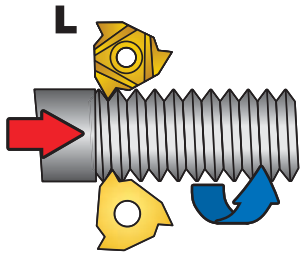
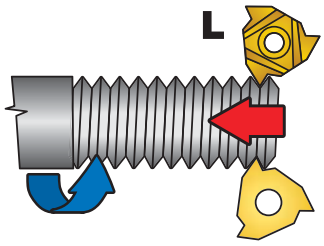
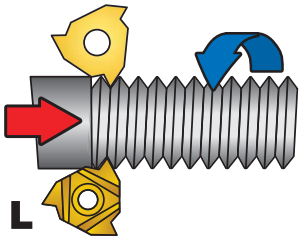
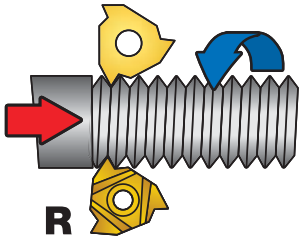
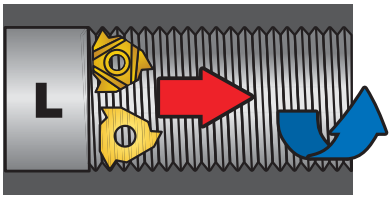
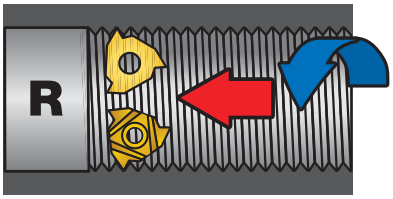
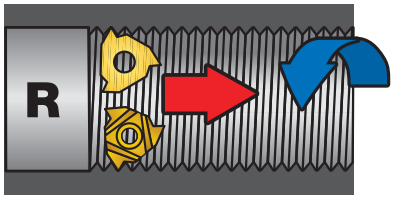
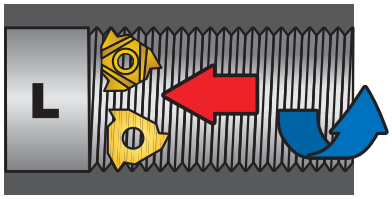
EXTERNAL THREAD, RIGHT-HAND		
		
EXTERNAL THREAD, LEFT-HAND		
		
movement of the workpiece	*tool movement*	**L / R** - *Dinsert design*

Table 9b

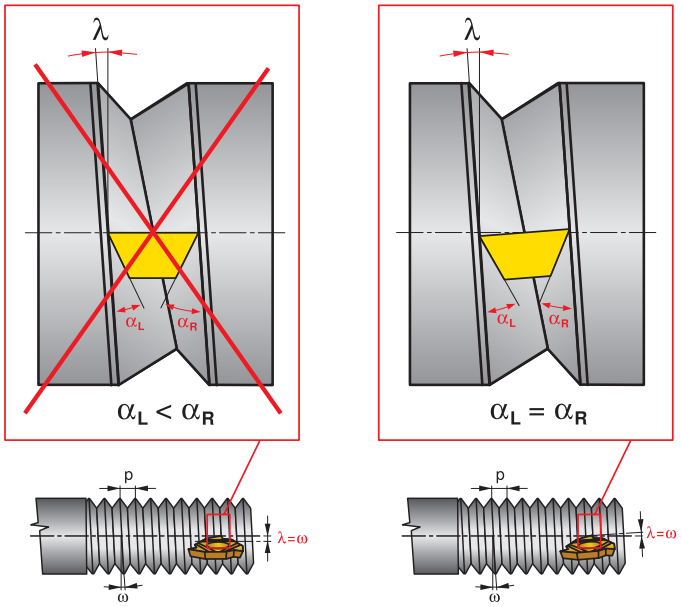
INTERNAL THREAD, RIGHT-HAND	
	
INTERNAL THREAD, LEFT-HAND	
	
movement of the workpiece	*tool movement*

L / R - *Dinsert design*

The following formula can be used to calculate the helix angle:

$$tg\ \omega = \frac{p}{d_s \cdot \pi}$$

ω	*helix angle*	*[°]*
p	*pitch*	*[in]*
d_s	*pitch diameter*	*[in]*



To generate the correct shape on the thread and uniform wear on the insert, the cutting edge helix angle should be equal to the thread lead angle.

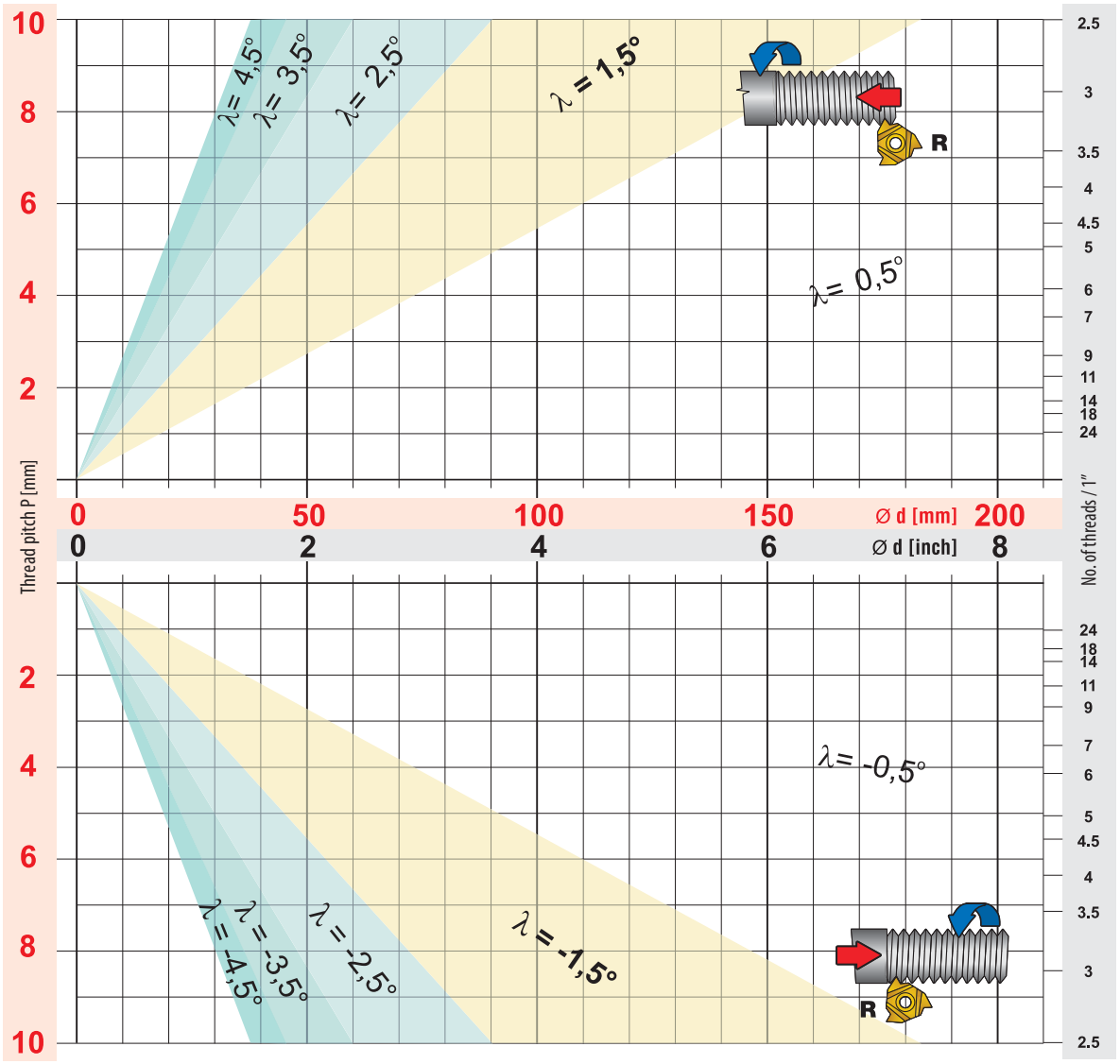
The tool holders are usually supplied with a helix angle λ = 1.5°. A different helix angle can be selected by changing the anvil.

Use the graph or table below to choose the correct anvil.

Helix angle λ	Positive					Negative		for grooving inserts TN16.. ... ZZ, TN 22...ZZ
	4.5°	3.5°	2.5°	**1.5°**	.5°	-.5°	-1.5°	
Tool holder	Anvil specification							
SER .... .16; SIL .... .16	PE16+4.5	PE16+3.5	PE16+2.5	PE16+1.5	PE16+.5	PE16-.5	PE16-1.5	PE16 ZZ
SEL .... .16; SIR .... .16	PI16+4.5	PI16+3.5	PI16+2.5	PI16+1.5	PI16+.5	PI16-.5	PI16-1.5	PI16 ZZ
SER .... .22; SIL .... .22	PE22+4.5	PE22+3.5	PE22+2.5	PE22+1.5	PE22+.5	PE22-.5	PE22-1.5	PE22 ZZ
SEL .... .22; SIR .... .22	PI22+4.5	PI22+3.5	PI22+2.5	PI22+1.5	PI22+.5	PI22-.5	PI22-1.5	PI22 ZZ
SER-S .... .22; SIL-S .... .22	PE22S+4.5	PE22S+3.5	PE22S+2.5	PE22S+1.5	PE22S+.5	PE22S-.5	PE22S-1.5	-
SEL-S .... .22; SIR-S .... .22	PI22S+4.5	PI22S+3.5	PI22S+2.5	PI22S+1.5	PI22S+.5	PI22S-.5	PI22S-1.5	-

The tool holders are usually supplied with a helix angle λ = 1.5°. A different helix angle can be selected by changing the anvil.

Shims for holders SER-S ...., SIR-S .... are marked with „S“



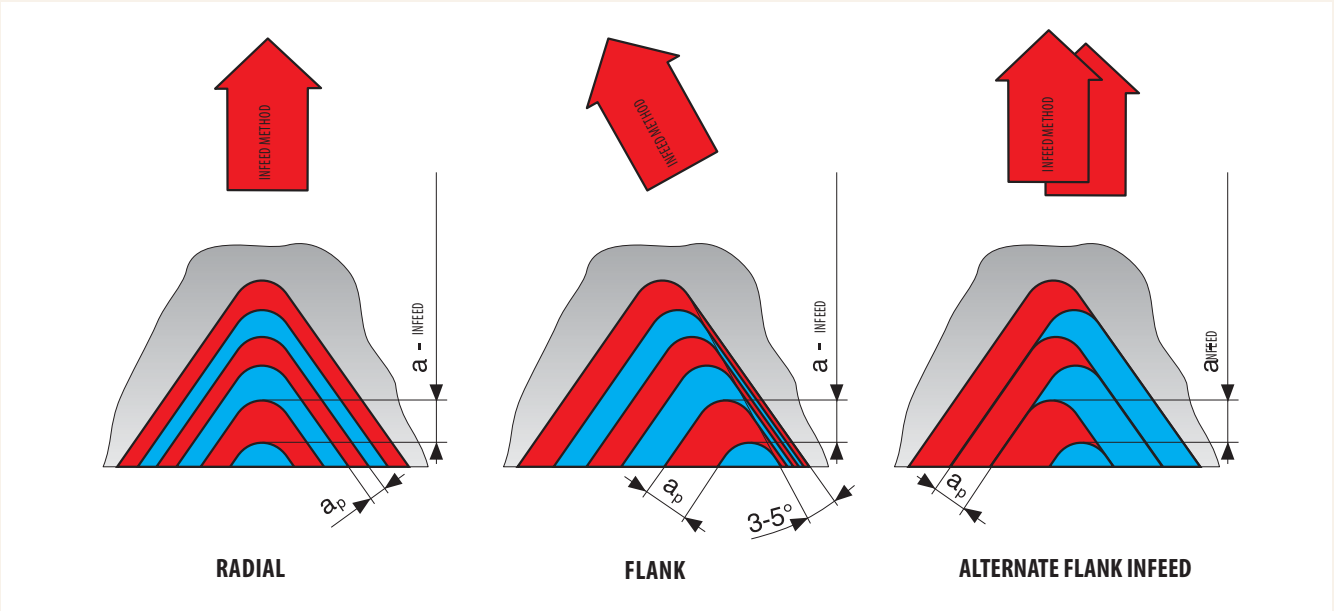
movement of the workpiece

tool movement

L / R - *Dinsert design*

Infeed method and depth

The choice of infeed method is most important for long chipping materials to ensure good chip control.



The choice depends on the machine type, the machined material and the pitch.

Radial infeed – the most simple and the most used. The infeed is perpendicular to the axis of rotation of the workpiece. It contributes to good chip formation and uniform wear on the cutting edge. Suitable for threads with a small pitch (p <1.5 mm). There is a risk of vibration at higher feeds. First choice for working on hard materials (e.g. austenitic stainless steels, steels with low carbon content).

Flank infeed – reduces thermal stress on the cutting edge and thereby wear. Good chip control. Suitable for threads with a pitch of p >1.5 mm for TR threads. Flank infeed with deviation 3-5° eliminates friction on the thread flank.

Alternate flank infeed – recommended for coarse threads and materials with poor chip formation. Long tool life. For CNC machines, higher demand on CNC programming.

Infeed method and Number of passes [in] depend on the thread pitch. The tables give basic recommendations and apply to all geometries. If the insert fractures, the infeed value should be decreased and the Number of passes [in] should be increased. The infeed depth should not be less than .05 mm/pass. On austenitic and soft steels the infeed depth per pass should be greater than .08 mm.

Tubular cylindrical thread profile corresponds with W (WHITWORTH 55°)					
Thread marking	No. of threads /1"	Thread pitch [in]	Nominal diameter of thread [in]	Small diameter of thread [in]	Thread insert marknig
G 1/16″	28	.0357	.304	.258	**TN xxxx280W**
G 1/8″			.383	.337	
G 1/4″	19	.0526	.518	.450	**TN xxxx190W**
G 3/8″			.656	.588	
G 1/2″	14	.0714	.825	.733	**TN xxxx140W**
G 5/8″			.902	.810	
G 3/4″			1.041	.949	
G 7/8″			1.189	1.097	
G 1″	11	.0909	1.309	1.192	**TN xxxx110W**
G1 1/8″			1.492	1.376	
G1 1/4″			1.650	1.534	
G1 1/2″			1.882	1.767	
G1 3/4″			2.216	1.999	
G 2″			2.347	2.231	
G2 1/4″			2.587	2.471	
G2 1/2″			2.960	2.844	
G2 3/4″			3.210	3.094	
G3″			3.460	3.344	
G3 1/2″			3.950	3.834	
G4″			4.450	4.334	
G4 1/2″			4.950	4.834	
G5″			5.450	5.334	
G5 1/2″			5.950	5.834	
G6″			6.450	6.334	

Example: for right external thread on tube 1 1/2" use thread insert TN 16ER110W; 8030

M - Metric 60° - external

Number of passes	REDUCE THE CUTTING SPEED PROPORTIONALLY TO INCREASING THE THREAD PITCH														
	Pitch [mm]														
	6.0	5.5	5.0	4.5	4.0	3.5	3.0	2.5	2.0	1.75	1.5	1.25	1.0	0.75	0.50
1	.018	.017	.016	.015	.003	.013	.011	.011	.009	.008	.008	.008	.008	.006	.005
2	.017	.016	.015	.013	.013	.012	.010	.009	.009	.008	.008	.007	.006	.006	.004
3	.014	.013	.013	.011	.010	.010	.008	.008	.007	.007	.007	.006	.005	.004	.003
4	.012	.011	.011	.009	.009	.008	.007	.007	.006	.006	.006	.004	.004	.003	.002
5	.011	.010	.010	.009	.008	.008	.007	.006	.006	.005	.005	.004	.003		
6	.010	.009	.009	.008	.007	.007	.006	.006	.005	.004	.003	.003			
7	.009	.008	.009	.008	.007	.006	.006	.005	.004	.003					
8	.009	.008	.008	.007	.006	.006	.005	.004	.003	.003					
9	.009	.007	.007	.007	.006	.006	.005	.004							
10	.008	.007	.007	.006	.005	.005	.004	.003							
11	.007	.007	.006	.006	.005	.004	.004								
12	.006	.006	.006	.005	.004	.003	.003								
13	.006	.006	.005	.005	.004										
14	.006	.005	.004	.004	.003										
15	.005	.005													
16	.004	.004													
Total infeed depth [in]	.151	.139	.126	.113	.100	.088	.076	.063	.049	.044	.037	.032	.026	.019	.014

M - Metric 60° - internal

Number of passes	REDUCE THE CUTTING SPEED PROPORTIONALLY TO INCREASING THE THREAD PITCH														
	Pitch [mm]														
	6.0	5.5	5.0	4.5	4.0	3.5	3.0	2.5	2.0	1.75	1.5	1.25	1.0	0.75	0.50
1	.018	.017	.017	.015	.013	.013	.011	.010	.009	.009	.008	.007	.007	.006	.004
2	.017	.016	.016	.013	.012	.012	.010	.010	.008	.007	.007	.007	.006	.005	.003
3	.014	.013	.013	.011	.009	.009	.008	.007	.007	.006	.006	.006	.004	.004	.003
4	.012	.010	.010	.009	.008	.007	.006	.006	.006	.005	.005	.004	.004	.003	.002
5	.010	.009	.009	.008	.007	.007	.006	.005	.005	.004	.004	.003	.003		
6	.009	.008	.008	.007	.007	.006	.005	.005	.004	.004	.003	.003			
7	.008	.007	.007	.006	.006	.006	.005	.004	.003	.003					
8	.007	.006	.006	.006	.005	.005	.004	.004	.003	.003					
9	.007	.006	.006	.006	.005	.005	.004	.004							
10	.006	.006	.006	.005	.005	.004	.004	.003							
11	.006	.006	.005	.005	.004	.004	.004								
12	.006	.006	.005	.005	.004	.003	.003								
13	.005	.005	.005	.004	.004										
14	.005	.005	.004	.004	.003										
15	.005	.004													
16	.004	.004													
Total infeed depth [in]	.139	.128	.117	.104	.092	.081	.070	.058	.045	.041	.033	.030	.024	.018	.012

W - Whitworth 55° - external and internal

Number of passes	REDUCE THE CUTTING SPEED PROPORTIONALLY TO INCREASING THE THREAD PITCH																
	Pitch [TPI]																
	4	4.5	5	6	7	8	9	10	11	12	14	16	18	19	20	26	28
1	.019	.018	.018	.015	.015	.013	.012	.011	.011	.011	.009	.009	.009	.009	.008	.007	.007
2	.018	.017	.017	.014	.014	.011	.011	.010	.010	.010	.009	.009	.009	.008	.008	.007	.006
3	.015	.015	.015	.012	.012	.009	.009	.009	.009	.009	.007	.008	.008	.007	.007	.006	.006
4	.014	.013	.013	.010	.010	.008	.008	.007	.007	.007	.006	.006	.006	.006	.006	.005	.005
5	.013	.011	.011	.009	.009	.007	.007	.007	.006	.006	.005	.005	.005	.005	.004	.003	.003
6	.012	.010	.010	.008	.007	.007	.006	.006	.006	.006	.004	.004	.003	.003	.003		
7	.011	.009	.009	.007	.006	.006	.006	.006	.005	.005	.004	.003					
8	.011	.008	.008	.007	.006	.006	.005	.005	.005	.003	.003						
9	.010	.008	.007	.006	.006	.005	.005	.005	.003								
10	.009	.007	.006	.006	.005	.005	.004	.003									
11	.008	.007	.006	.006	.005	.005	.003										
12	.007	.006	.006	.005	.003	.003											
13	.007	.006	.005	.005													
14	.006	.006	.004	.004													
15	.005	.005															
16	.004	.004															
Total infeed depth [in]	.169	.150	.135	.114	.098	.085	.076	.069	.062	.057	.047	.044	.040	.038	.036	.028	.027

UN - UN 60° - external

Number of passes	REDUCE THE CUTTING SPEED PROPORTIONALLY TO INCREASING THE THREAD PITCH																	
	Pitch [TPI]																	
	4	4.5	5	6	7	8	9	10	11	12	13	14	16	18	20	24	28	32
1	.019	.018	.017	.014	.014	.012	.011	.011	.011	.011	.010	.009	.009	.009	.008	.007	.007	.007
2	.017	.016	.016	.013	.013	.011	.010	.010	.010	.010	.009	.009	.008	.008	.007	.007	.006	.006
3	.016	.015	.014	.011	.010	.010	.008	.008	.008	.008	.007	.007	.006	.006	.006	.006	.004	.005
4	.014	.012	.012	.009	.009	.008	.007	.007	.007	.007	.007	.006	.006	.006	.005	.005	.004	.003
5	.013	.010	.010	.009	.008	.007	.007	.006	.006	.006	.006	.005	.005	.005	.004	.003	.003	
6	.011	.009	.009	.008	.007	.006	.006	.006	.006	.005	.005	.004	.004	.003	.003			
7	.010	.008	.008	.007	.007	.006	.006	.005	.005	.005	.004	.004	.003					
8	.010	.008	.008	.006	.006	.005	.005	.005	.004	.003	.003	.003						
9	.009	.007	.007	.006	.006	.005	.005	.004	.003									
10	.008	.007	.007	.006	.005	.005	.004	.003										
11	.007	.006	.007	.005	.004	.004	.003											
12	.007	.006	.006	.005	.003	.003												
13	.006	.006	.005	.004														
14	.006	.006	.004	.004														
15	.005	.005																
16	.004	.004																
Total infeed depth [in]	.162	.143	.130	.107	.092	.082	.072	.065	.060	.055	.051	.047	.041	.037	.033	.028	.024	.021

UN - UN 60° - internal

Number of passes	REDUCE THE CUTTING SPEED PROPORTIONALLY TO INCREASING THE THREAD PITCH																	
	Pitch [TPI]																	
	4	4.5	5	6	7	8	9	10	11	12	13	14	16	18	20	24	28	32
1	.017	.016	.017	.014	.013	.012	.011	.011	.011	.011	.010	.009	.009	.009	.008	.007	.007	.007
2	.016	.015	.015	.013	.013	.011	.010	.010	.009	.009	.008	.007	.007	.007	.006	.006	.005	.005
3	.015	.013	.013	.010	.009	.009	.007	.007	.007	.007	.006	.006	.006	.006	.005	.005	.004	.004
4	.013	.011	.011	.008	.008	.007	.006	.006	.006	.006	.005	.005	.005	.005	.004	.004	.003	.003
5	.011	.009	.009	.007	.007	.006	.006	.005	.005	.005	.005	.004	.004	.003	.004	.003	.003	
6	.009	.008	.008	.006	.006	.005	.005	.005	.005	.004	.004	.004	.003	.003	.003			
7	.009	.007	.007	.006	.006	.005	.005	.004	.004	.004	.004	.004	.003					
8	.008	.007	.007	.006	.005	.004	.004	.004	.004	.003	.003	.003						
9	.008	.007	.006	.005	.005	.004	.004	.004	.003									
10	.007	.006	.005	.005	.005	.004	.004	.003										
11	.007	.006	.005	.005	.004	.004	.003											
12	.006	.006	.006	.004	.003	.003												
13	.006	.006	.005	.004														
14	.006	.005	.004	.004														
15	.005	.005																
16	.004	.004																
Total infeed depth [in]	.147	.131	.118	.097	.084	.074	.065	.059	.054	.049	.045	.042	.037	.033	.030	.025	.022	.019

NPT - NPT 60° - internal and external

Number of passes	REDUCE THE CUTTING SPEED PROPORTIONALLY TO INCREASING THE THREAD PITCH				
	Pitch [TPI]				
	8	11.5	14	18	27
1	.011	.010	.009	.009	.007
2	.010	.009	.007	.007	.006
3	.009	.007	.007	.006	.005
4	.007	.006	.006	.006	.005
5	.007	.006	.006	.005	.004
6	.007	.005	.005	.004	.003
7	.007	.005	.005	.004	
8	.007	.005	.004	.003	
9	.006	.005	.004		
10	.006	.004	.003		
11	.006	.004			
12	.005	.003			
13	.005				
14	.004				
15	.003				
Total infeed depth [in]	.100	.069	.056	.044	.030

RD - RD 30° - external

Number of passes	REDUCE THE CUTTING SPEED PROPORTIONALLY TO INCREASING THE THREAD PITCH			
	Pitch [TPI]			
	4	6	8	10
1	.017	.013	.011	.010
2	.016	.012	.010	.010
3	.013	.010	.008	.009
4	.013	.009	.007	.008
5	.011	.008	.007	.006
6	.010	.008	.007	.005
7	.009	.008	.007	.004
8	.009	.006	.005	.003
9	.008	.006	.004	
10	.007	.005	.003	
11	.007	.004		
12	.006	.003		
13	.005			
14	.004			
Total infeed depth [in]	.135	.091	.068	.055

RD - RD 30° - internal

Number of passes	REDUCE THE CUTTING SPEED PROPORTIONALLY TO INCREASING THE THREAD PITCH			
	Pitch [TPI]			
	4	6	8	10
1	.018	.015	.010	.011
2	.017	.013	.009	.010
3	.016	.012	.008	.010
4	.014	.010	.007	.009
5	.012	.008	.007	.007
6	.010	.007	.006	.005
7	.009	.007	.006	.004
8	.009	.006	.005	.003
9	.008	.006	.004	
10	.007	.005	.003	
11	.007	.004		
12	.006	.003		
13	.005			
14	.003			
Total infeed depth [in]	.141	.096	.065	.059

INFEED DEPTH

TR - TR 30° - external

Number of passes	REDUCE THE CUTTING SPEED PROPORTIONALLY TO INCREASING THE THREAD PITCH											
	Pitch [mm]											
	14.0	12.0	1.0	9.0	8.0	7.0	6.0	5.0	4.0	3.0	2.0	1.5
1	.40	.38	.38	.38	.37	.37	.37	.34	.31	.27	.25	.23
2	.37	.36	.36	.35	.35	.34	.35	.33	.28	.25	.24	.22
3	.36	.34	.34	.34	.34	.33	.32	.27	.24	.21	.20	.18
4	.36	.34	.34	.33	.33	.31	.29	.25	.20	.17	.17	.14
5	.35	.32	.32	.31	.31	.29	.27	.23	.19	.15	.14	.12
6	.35	.32	.32	.30	.29	.26	.25	.21	.18	.13	.13	.08
7	.34	.30	.31	.29	.28	.26	.23	.20	.16	.13	.11	
8	.34	.30	.29	.28	.27	.26	.22	.20	.15	.12	.09	
9	.34	.30	.28	.26	.25	.24	.22	.18	.15	.12		
10	.33	.29	.27	.25	.24	.23	.20	.16	.15	.10		
11	.33	.29	.25	.24	.23	.22	.18	.15	.14	.10		
12	.32	.29	.24	.23	.21	.22	.17	.14	.13	.08		
13	.32	.28	.23	.22	.20	.20	.17	.13	.10			
14	.31	.27	.22	.21	.19	.19	.16	.10				
15	.31	.25	.22	.21	.19	.17	.14					
16	.30	.25	.20	.19	.18	.16	.12					
17	.30	.24	.19	.18	.17	.12						
18	.29	.22	.18	.16	.15							
19	.28	.20	.17	.15	.13							
20	.27	.20	.16	.15								
21	.23	.19	.15	.13								
22	.23	.18	.15									
23	.21	.17	.13									
24	.19	.16										
25	.17	.15										
26	.16	.13										
27	.16											
28	.15											
29	.13											
Total infeed depth [in]	8.2	6.72	5.7	5.16	4.68	4.17	3.66	2.89	2.38	1.83	1.33	.97

TR - TR 30° - internal

Number of passes	REDUCE THE CUTTING SPEED PROPORTIONALLY TO INCREASING THE THREAD PITCH											
	Pitch [mm]											
	14.0	12.0	1.0	9.0	8.0	7.0	6.0	5.0	4.0	3.0	2.0	1.5
1	.40	.38	.38	.38	.37	.37	.37	.34	.31	.27	.25	.23
2	.37	.36	.36	.35	.35	.34	.34	.33	.28	.25	.24	.22
3	.36	.34	.34	.34	.34	.33	.32	.27	.24	.22	.21	.19
4	.36	.34	.34	.33	.33	.31	.29	.25	.20	.17	.17	.14
5	.35	.32	.32	.31	.31	.29	.27	.23	.19	.15	.14	.12
6	.35	.32	.32	.31	.29	.26	.25	.21	.18	.14	.13	.08
7	.34	.30	.31	.29	.28	.26	.23	.20	.16	.13	.11	
8	.34	.30	.29	.29	.27	.26	.22	.20	.15	.12	.09	
9	.34	.30	.28	.26	.25	.24	.22	.18	.15	.12		
10	.33	.29	.27	.25	.24	.23	.20	.16	.15	.10		
11	.33	.29	.25	.24	.23	.22	.18	.15	.14	.10		
12	.32	.28	.24	.23	.21	.22	.17	.14	.13	.08		
13	.32	.28	.23	.22	.20	.20	.17	.13	.10			
14	.31	.27	.22	.21	.19	.19	.16	.10				
15	.31	.25	.22	.21	.19	.17	.14					
16	.30	.25	.20	.20	.18	.16	.12					
17	.30	.24	.19	.18	.17	.12						
18	.29	.22	.18	.16	.15							
19	.28	.20	.17	.15	.13							
20	.27	.20	.16	.15								
21	.27	.19	.15	.13								
22	.23	.18	.15									
23	.23	.17	.13									
24	.21	.16										
25	.19	.15										
26	.17	.13										
27	.16											
28	.16											
29	.15											
30	.13											
Total infeed depth [in]	8.47	6.71	5.7	5.19	4.68	4.17	3.65	2.89	2.38	1.85	1.34	.98

ACME - ACME 29° - external

Number of passes	REDUCE THE CUTTING SPEED PROPORTIONALLY TO INCREASING THE THREAD PITCH									
	Pitch [TPI]									
	2	3	4	5	6	8	10	12	14	16
1	.028	.019	.013	.012	.011	.010	.010	.009	.008	.009
2	.026	.018	.012	.011	.011	.010	.009	.009	.008	.009
3	.023	.016	.011	.010	.010	.009	.009	.007	.007	.007
4	.022	.015	.011	.010	.009	.007	.007	.007	.006	.006
5	.019	.013	.010	.009	.008	.006	.006	.005	.005	.005
6	.017	.011	.010	.008	.007	.005	.005	.005	.004	.003
7	.015	.011	.009	.007	.006	.005	.005	.004	.003	
8	.013	.009	.008	.007	.006	.005	.004	.004		
9	.013	.009	.008	.007	.006	.005	.004			
10	.011	.009	.007	.006	.006	.004	.004			
11	.011	.008	.007	.006	.006	.004				
12	.010	.007	.006	.006	.005	.004				
13	.009	.007	.006	.005	.004					
14	.009	.007	.006	.004						
15	.008	.006	.006	.004						
16	.007	.005	.004							
17	.007	.005	.004							
18	.006	.005								
19	.006									
20	.005									
Total infeed depth [in]	.265	.180	.138	.112	.095	.074	.063	.050	.041	.039

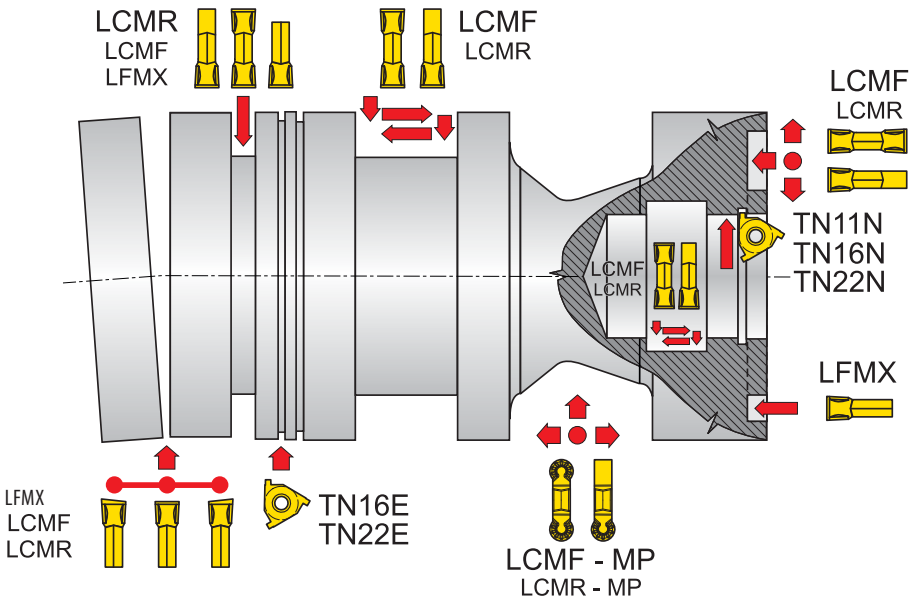
ACME - ACME 29° - internal

Number of passes	REDUCE THE CUTTING SPEED PROPORTIONALLY TO INCREASING THE THREAD PITCH									
	Pitch [TPI]									
	2	3	4	5	6	8	10	12	14	16
1	.028	.020	.013	.012	.012	.011	.010	.009	.009	.009
2	.026	.018	.012	.012	.011	.011	.010	.009	.008	.009
3	.023	.016	.012	.011	.011	.009	.009	.007	.007	.008
4	.022	.015	.011	.010	.009	.007	.007	.006	.006	.006
5	.019	.013	.011	.009	.008	.006	.006	.005	.005	.005
6	.017	.011	.010	.008	.007	.006	.006	.005	.004	.003
7	.015	.011	.009	.007	.007	.005	.005	.004	.003	
8	.013	.009	.008	.007	.006	.005	.004	.004		
9	.013	.009	.008	.007	.006	.005	.004			
10	.011	.009	.007	.006	.006	.005	.004			
11	.011	.008	.007	.006	.006	.004				
12	.010	.007	.006	.006	.005	.004				
13	.009	.007	.006	.005	.004					
14	.009	.007	.006	.004						
15	.008	.006	.006	.004						
16	.007	.006	.005							
17	.007	.005	.005							
18	.006	.005								
19	.006									
20	.005									
Total infeed depth [in]	.265	.182	.142	.114	.098	.078	.065	.049	.042	.040

Recesses, parting and copy turning.

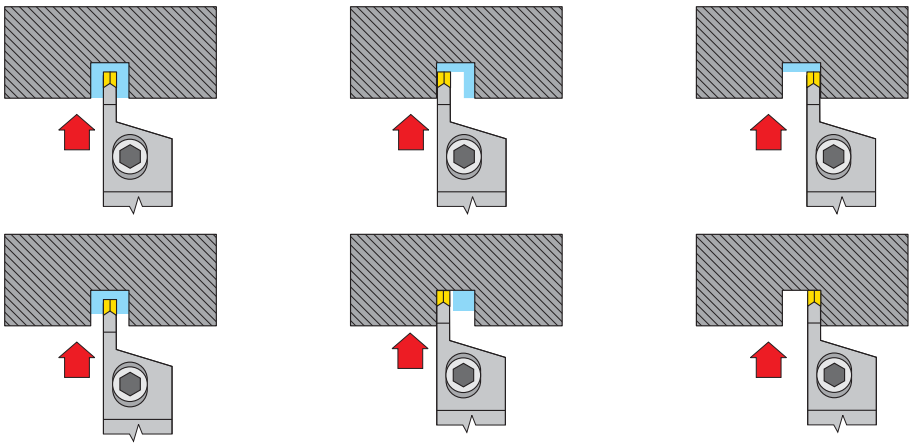
Pramet offers a comprehensive range of turning tools for turning shallow and deep recesses, both radially and axially (face grooving). Circular/copy profile turning can also be performed through side cutting.

The Pramet range of tools for recessing, grooving, profiling and parting are shown in the picture below.



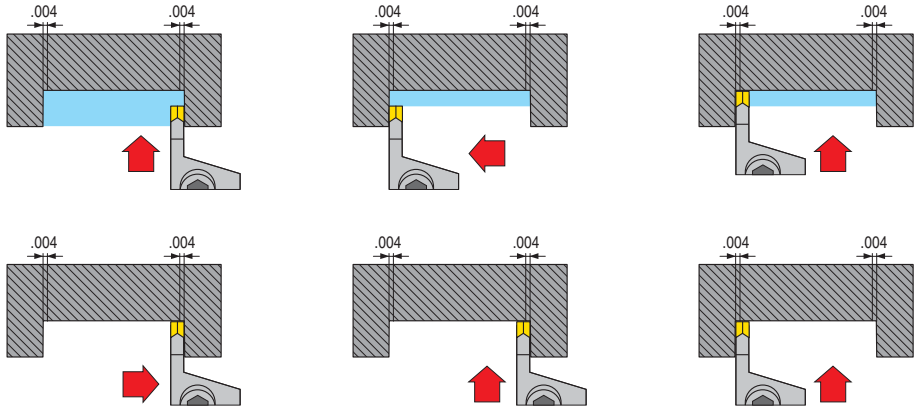
Recommendation for practical usage:

The procedure for turning a recess (deepening and widening) is shown in the next picture.

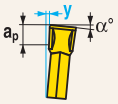


Note: To create a flat seating surface, use insert type LCMF with chip breaker F. The outboard radial grooving passes should overlap the central pass by two times the insert corner radius.

When machining a wide recess, follow the procedure shown in the following pictures.

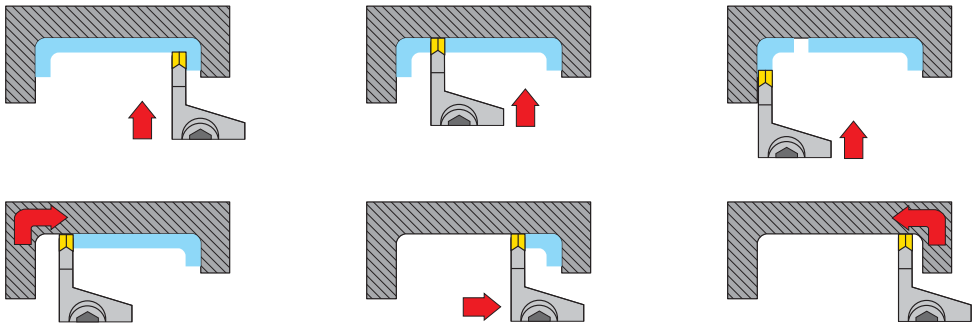


*Note: Use the cutting insert LCMF with chip breaker M. You must consider the tool's deformation "**y**":*

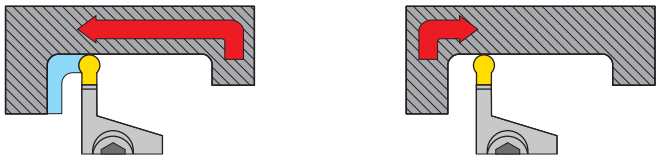


- for f =.006 in.rev^{-1};	*a_p = .118 in*	***y = .0027 in***
- for f =.010 in.rev^{-1};	*a_p = .118 in*	***y = .0031 in***
- for f =.014 in.rev^{-1};	*a_p = .118 in*	***y = .0039 in***

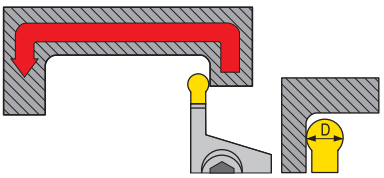
When opening up or deepening a contour using side turning, use the procedure shown in picture 21.



Roughing of contour (insert with round cutting edge)



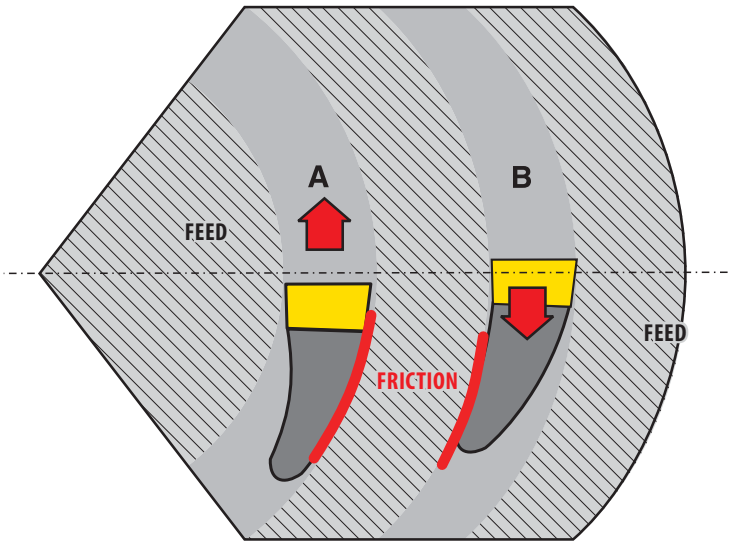
Finishing of contour (insert with round cutting edge)



D [in]	a_p [in]
.120	.006
.160	.008
.200	.009
.240	.010
.310	.016

- **When copy turning using indexable inserts with a round cutting edge, the maximum depth of cut is 40% of the diameter of the insert.**
- **Choose the tool holder with the maximum cross-section and minimum tool overhang to eliminate vibrations.**
- **The longitudinal axis of the cutting insert must be perpendicular to the axis of rotation of the workpiece (at radial recesses).**
- **The cutting edge must be on centerline within a tolerance of ± .004 in**
- **Coolant must be applied directly onto the cutting edge, and onto the support area of the tool holder under the insert cutting edge, in sufficient quantities to guarantee effective cooling of the insert.**
- When face grooving it is necessary to select a tool holder with the correct range of diameters for the groove to be machined. The tool must be set parallel to the axis of rotation of the workpiece (perpendicular to the face of the groove). Otherwise there is a risk of rubbing against the wall(s) of the groove during machining.
- In the event of the tool rubbing against the outer wall of the groove, it may be necessary to raise the cutting edge above centre (see example A in picture 18). In the event of the tool rubbing against the inner wall of the groove, it may be necessary to lower the cutting edge below center (see example A on picture below).

When face grooving, the tool must be set to be perpendicular to the face of the workpiece with high accuracy, otherwise the side of the tool will rub against the groove being created.



Using effective coolant, applied directly to the cutting edge in sufficient quantities, is very important. Cooling reduces the temperature of the cutting edge and also the lower part of the tool holder, in which the cutting insert is seated.

In both cases it is necessary to take into consideration vibrations on the machine/tool/workpiece when selecting cutting speeds, feeds and insert geometries.

Vibrations negatively affect the wear on the cutting edge, the quality of the machined surface and the final precision of the workpiece.

The primary cause of vibrations is a reduction in the rigidity of one of the elements in the system - this is mainly due to the slenderness of the machined shaft in external turning and a lower rigidity of the tool holder (boring bar) in internal turning.

The degree of slenderness of the shaft is defined as the ratio between the length of the shaft L and its diameter.

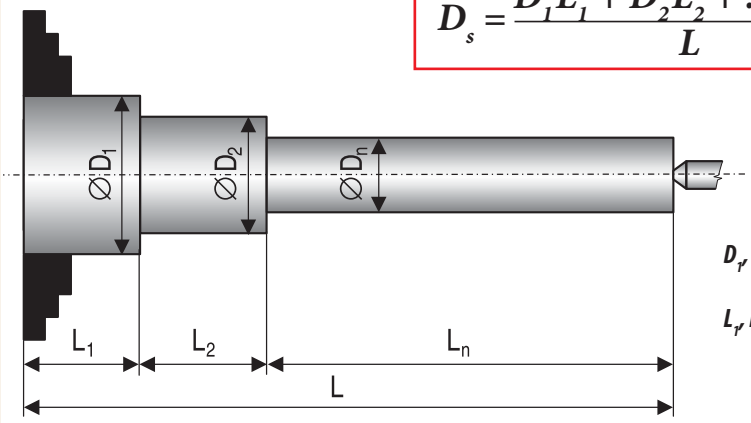
$$\lambda = \frac{L}{D}$$

λ	*degree of slenderness*	
L	*length of shaft*	*[in]*
D	*diameter of shaft*	*[in]*

We often have to machine shafts with different diameters on different stepped lengths, see picture.

In these situations, we determine the the degree of slenderness by calculating from the median diameter of the shaft (see picture below).

$$D_s = \frac{D_1 L_1 + D_2 L_2 + \ldots . D_n L_n}{L}$$



D_1, D_2, D_n ..... *Diameters of stepped parts of shaft [in]*

L_1, L_2, L_n ..... *Length of stepped parts [in]*

Reduced degree of slenderness λ_{red} is defined as the ratio

$$\lambda_{red} = \frac{L}{D_s}$$

For internal turning, the rigidity of the tool holder depends on the length of protrusion.

$$\lambda = \frac{L}{D}$$

In this case, „L" represents the length of protrusion of the tool holder and „D" the diameter.

During turning deflection of the workpiece occurs due to cutting forces , the vibrations originate mainly from the deformation of the workpiece in the radial direction.

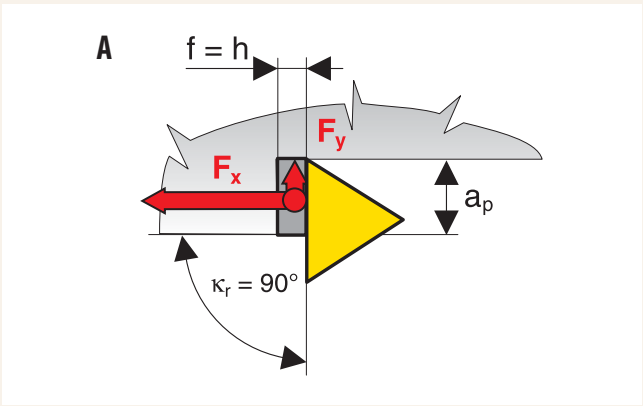
Vibrations increase when the deformation reaches a specific limit. There are many articles on vibration in technical literature, which describe how vibrations increase in a more detailed way.

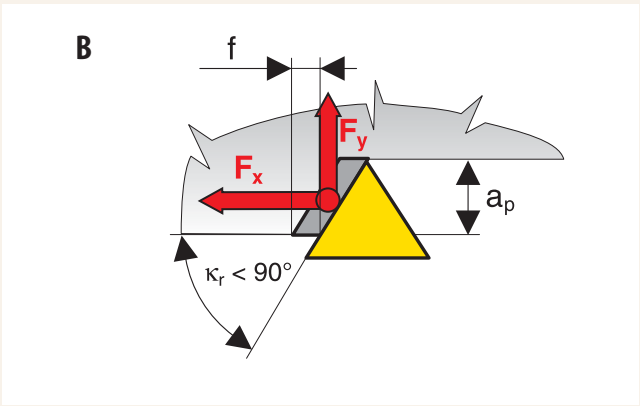
In the next paragraph are some recommendations on how to prevent vibrations from increasing.

The probability of vibration is greater during roughing, where higher cutting forces (radial and tangential) act due to cutting a bigger cross-section of chip.

You should use the tool with the maximum setting angle (near) $\kappa_r \approx 90°$ to reduce the risk of vibration.

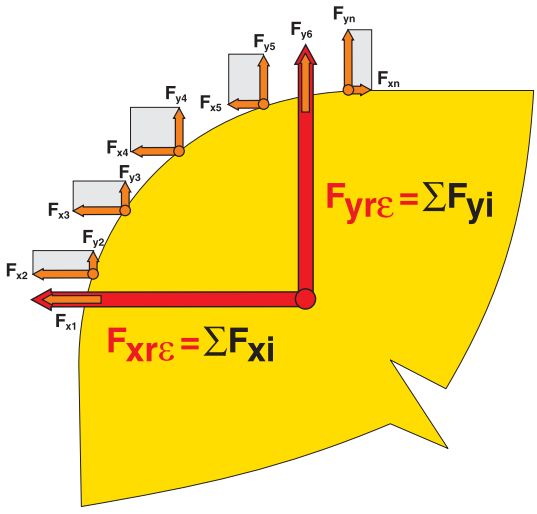
In this case you reach the maximum chip thickness h at cutting depth a_p and feed f, and the specific cutting resistance reaches the minimum value and the radial component of the cutting force F_y as well (which causes the deflection of the workpiece). The feed component of cutting force F_x reaches the maximum value at $\kappa_r \approx 90°$ (acts in the direction of the axis of rotation of the workpiece and has minimum influence on its deflection). See the diagram in following picture a + b. For instance, at setting angle $\kappa_r \approx 75$, the value of F_y increases two times compared with the value $\kappa_r = 90°$.





The forces acting on the corner of the cutting insert (with corner radius r_ε) have the biggest influence on the radial component of the cutting force at setting angle $\kappa_r = 90°$.

This is a passive component of the cutting force, which pushes the workpiece away. Its components are divided into forces F_x and F_y, as you can see in following picture. The greater the radius rε, the greater the share of the cutting forces F_y acting on the corner of the cutting insert and the deflection (pushing away) of the workpiece.



PRAMET

In order to reduce the probability of vibration, choose the smallest corner radius of cutting insert r_ε.

To reduce the risk of vibration it is also necessary to use a chip breaker with the maximum rake face land angle γ (reduction of F_y) and, if possible, with a honed cutting edge (cutting edge design E) – sharp cutting edge (not S – chamfer + honing).

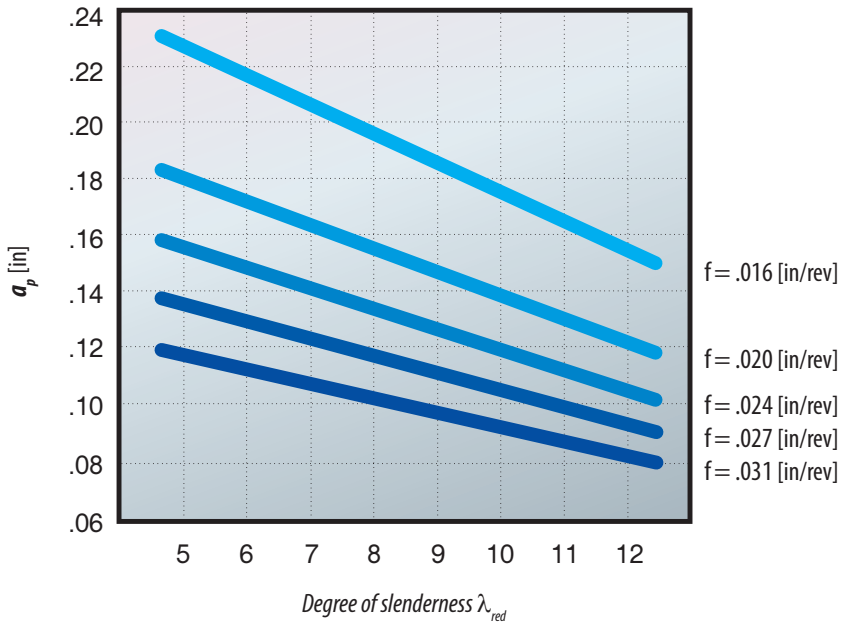
The risk of vibration increases when tools with abnormal flank wear or coated grades are used (the increased thickness of the coating layer increases the radius of honing on the cutting edge). The application of PVD coated grades or grades with thin MT-CVD coating is recommended, for example grade 6640.

Use the largest diameter of boring bar and the shortest overhang during internal turning.

The problem of increasing vibrations can be solved by changing the cutting conditions, especially by reducing the cutting depth a_p.

To choose the right cutting conditions, use values in the following table (experimentally determined values). The values are applicable for the tools with cutting insert $\kappa_r \approx 90°$ and a corner radius $r_\varepsilon = 1/32"$ [0,031 in].

The influence of cutting speed on vibrations is not evident. The frequency of the cutting force can be changed and vibrations almost eliminated by changing the cutting speed. That is why it is necessary both to increase and decrease the cutting speed.

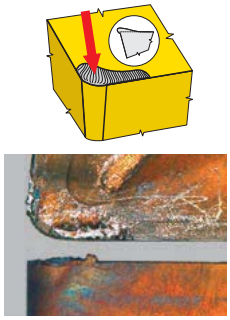


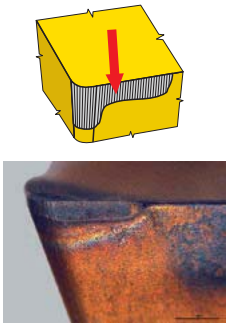
The same is true for the feed, the cutting force is altered and a change in frequency is reached by changing the feed. It is recommended to both increase and decrease the feed.

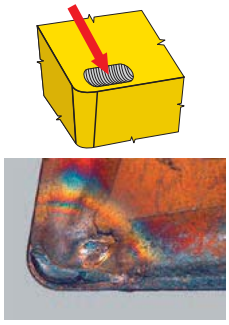
In turning of very slender shafts $\lambda_{red} >> 12$ it is very effective to use a follow rest (travelling stay) to eliminate the vibration. The follow rest follows the movement of the cutting edge and supports the workpiece at the point of cut against the cutting force direction.

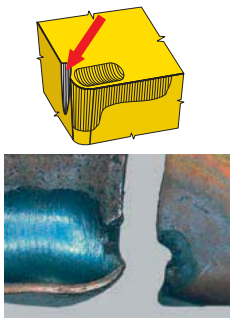
The follow rests are very effective, but attention must be paid to adjusting the pressure between the rest and the workpiece. The rest must not deform the machined shaft. The high pressure may cause vibrations. If the part of the rest is a rotating element (for example an anti-friction bearing), the touch point must have the minimum displacement.

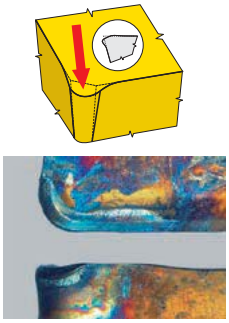
When turning and boring with very slender tools, using special boring bars with shock absorbers to reduce vibrations is very effective.

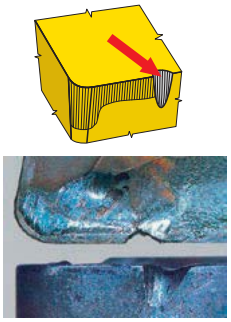
Picture	BUILT-UP EDGE	
	**Description and cause:** The machined material gets stuck to the cutting edge of the insert. When it breaks off, the edge becomes brittle and cracks, which has a negative effect on the quality of the machined surface.	**Corrective measures:** - increase the cutting speed - increase the feed rate - use a coated grade - do not use coolant - choose a more easy-cutting chip breaker

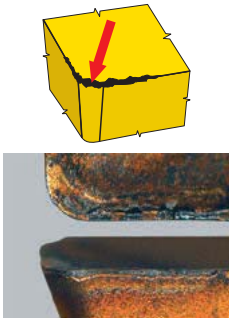
Picture	FLANK WEAR	
	**Description and cause:** Flank wear is one of the main factors that affects the service life of the insert. It is caused by friction between the insert and the machined material. It cannot be fully eliminated, but it can be reduced.	**Corrective measures:** - use a more wear-resistant grade - reduce the cutting speed - increase the feed rate (if it is under .400 in/rev per tooth) - use coolant or increase cooling

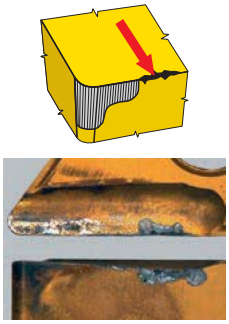
Picture	CRATERING	
	**Description and cause:** Cratering usually appears on inserts with a plain face.	**Corrective measures:** - use a more wear resistant grade - reduce the cutting speed - increase the feed rate (if it is under 0.1 in/rev) - use coolant or increase the intensity of cooling

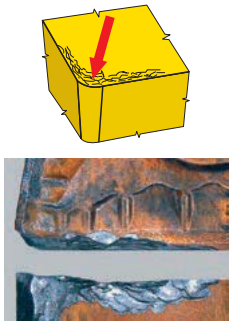
Picture	OXIDATION GROOVE ON THE MINOR EDGE	
	**Description and cause:** The main factor that limits the service life of the tool. It usually occurs during turning, where a combination of oxidation on the groove and cratering roughens the machined surface.	**Corrective measures:** - use a coated or more wear-resistant grade, if possible use Al_2O_3 coated inserts - use coolant or increase the intensity of cooling - reduce the cutting speed

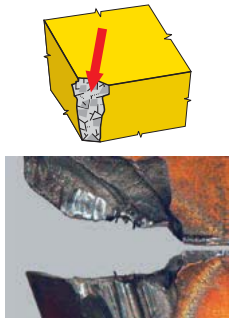
Picture	PLASTIC DEFORMATION	
	**Description and cause:** This is caused by high thermal stress on the cutting edge (high feed rate and cutting speed).	**Corrective measures:** - use a more wear-resistant grade - reduce the cutting speed - reduce the feed rate - use a coolant or increase cooling - use a cutting insert with a larger corner radius - use a cutting insert with a larger corner angle

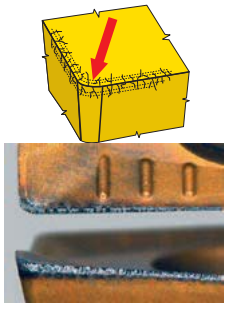
Picture	NOTCH WEAR	
	**Description and cause:** This occurs where the cutting edge of the insert comes into contact with the surface of the machined material. It is caused by the hardening of the surface layer of the material and by burrs. It usually appears on stainless austenitic steels.	**Corrective measures:** - use a coated or more wear-resistant grade, if possible use Al_2O_3 coated inserts - select a tool with a smaller setting angle - reduce the cutting speed - reduce the feed rate

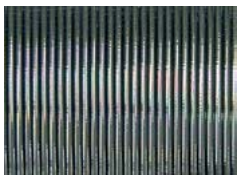
Picture	CHIPPING OF CUTTING EDGE	
	**Description and cause:** This usually appears together with another type of wear. It is caused by low rigidity of machine-tool-workpiece or by hard chip forming.	Corrective measures: - increase the cutting speed - reduce the feed rate - select a stronger chip breaker - minimize the vibrations - select a tougher grade

Picture	CHIPPING OF CUTTING EDGE (OUT OF CUT)	
	**Description and cause:** This is caused by inadequate chip forming, which causes mechanical damage to the cutting edge.	**Corrective measures:** - change the feed rate - select a tool with a different setting angle - use an insert with a different geometry - use a tougher grade

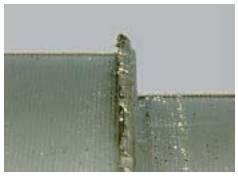
Picture	CRACKS ALONG THE FLANK	
	**Description and cause:** This is caused by high dynamic stress on the area behind the cutting edge.	**Corrective measures:** - use a tougher grade - change the cutting conditions - use an insert with a different geometry or an insert with a different cutting edge condition (...T, ...S, ...K, ...P) - change the feed

Picture	INSERT FRACTURE	
	**Description and cause:** This has numerous causes and depends on the workpiece material, grade and condition, and on the rigidity of the machine-tool-workpiece assembly, as well as the extent of wear and cutting conditions.	**Corrective measures:** - use a tougher grade - reduce the feed and depth of cut - use an insert with a bigger corner radius - use a cutting insert with a bigger corner angle - choose a stronger chip breaker - choose a thicker insert

Picture	COMB CRACKS	
	**Description and cause:** This is caused by high thermal stress on the cutting edge during interrupted cut.	**Corrective measures:** - use plenty of coolant or stop using coolant - reduce the cutting speed - reduce the feed rate - use tougher grade

Picture	POOR SURFACE QUALITY	
	**Description and cause:** Numerous causes depending on the workpiece material, cutting conditions (feed rate and cutting speed), the condition of the cutting edge, the extent and type of wear, and the condition and rigidity of the machine-tool-workpiece assembly. - incorrect tool chosen - incorrect chip thickness - incorrect cutting speed - coolant is needed - high feed rate	**Corrective measures:** - use a wiper insert - use a cutting insert with the right geometry - reduce the feed rate - change (usually increase) the cutting speed - use a coolant - improve the stability of the tool and workpiece - change the chip cross section - select a more easy-cutting chip breaker - increase the nose radius

Picture	VIBRATIONS	
	**Description and cause:** This is a very common problem, which is mainly caused by an unbalanced workpiece or tool, unstable fixing of the workpiece, high cutting forces or tool overhang.	**Corrective measures:** - improve the stability of the tool and workpiece - reduce the depth of cut - minimize tool overhang - reduce the cutting speed - use a tool with smaller setting angle - reduce the chip cross section - use a tool with a low cutting resistance - increase the feed rate - select a more easy-cutting chip breaker - increase the nose radius

Picture	BURRS	
	**Description and cause:** This usually occurs on soft steels and plastic materials.	**Corrective measures:** - use a cutting insert with a sharp cutting edge - use a cutting insert with positive geometry - use a tool with a smaller setting angle

Picture	ERRORS IN DIMENSIONS AND SHAPE OF WORKPIECE	
	Description and cause: Depends on a number of factors.	**Corrective measures:** - use a wear-resistant cutting insert - improve the stability of the cutter and workpiece - minimize tool overhang - use a workpiece with a suitable machining allowance

Picture	INADEQUATE CHIP FORMATION	
	**Description and cause:** Using a chip with a suitable shape is as important as its durability (service life of the tool). The workpiece material, the feed rate, the depth of cut and the cutting geometry all have an effect on chip forming. A chip that is too long is unacceptable for various reasons, while a chip that is too short is undesirable as it overloads the cutting edge and causes vibrations.	**Corrective measures:** - change the feed rate and depth of cut - use a more suitable cutting geometry - change the cutting conditions

GENERAL PRINCIPLES

Check the seat condition of the cutting insert

Before clamping a new cutting insert or changing the edge, it is necessary to clean the seat and check its condition or the condition of the anvil and wedge (especially the damage under the corner of the cutting insert).

Check and service the clamping parts

It is also important to check the clamping parts, including lamping levers, screws, wedges and clamps. Only use original, undamaged parts (found in the catalogue). Regularly lubricate the threads and the binding surface of screws, for example using heat-resistant lubricant (Molykotete G.). For assembly and disassembly, only use screwdrivers and wrenches specified in our catalogue or recommended by the tool manufacturer. Pay attention to the correct tightening (proportional) - it is advisable to use a torque wrench.

Check the tightening

Before tightening, check the fit of the cutting insert on the whole of the binding surface and in the radial and axial directions. Cutting inserts and tools must always be clean and undamaged.

Value	Formula	Unit	Note
Number of revolutions	$n = \frac{v_c \cdot 12}{D \cdot \pi}$	[1.min]	
Cutting speed	$v_c = \frac{\pi \cdot D \cdot n}{12}$	[ft.min]	
Feed per revolution	$f_{ot} = \frac{f_{min}}{n} = f_z \cdot z$	[in.rev]	
Feed per minute (Linear Feedrate)	$f_{min} = v_f = f_{ot} \cdot n$	[in.min]	
Max. height of profile R_{max}	$R_{max} = 127000 \cdot \frac{f^2}{r_\varepsilon}$	[µin]	
Surface finish R_a	$R_a = 33337 \cdot \frac{f_z^{1,88}}{r_\varepsilon^{.97}}$	[µin]	
Chip cross section	$A = f_{ot} \cdot a_p$	[in²]	
Chip thickness (For insert with straight edge)	$h = f \cdot sin\ \kappa_r$	[in]	
Chip thickness (For round cutting insert)	$h = f_z \cdot \sqrt{\frac{a_p}{D}}$	[in]	
Metal removal rate	$Q = 12 \cdot a_p \cdot f_{ot} \cdot v_c$	[in³/min]	

n Number of revolutions [1.min]
D Diameter (of tool or workpiece) [in]
v_c Cutting speed [ft.min]
f_{rev} Feed per revolution [in.rev]
f_{min} Feed per minute (Linear Feedrate) [in.min]

R_{max} max. height of profile [µin]
R_a surface finish [µin]
f_{rev} feed per revolution [in/rev]
r_ε nose radius [in]

A Chip cross section [in]
f_{rev} Feed per revolution [in.rev]
a_p Axial depth of cut [in]
κ_r Primary edge setting angle [°]
h Chip thickness [in]
v_c Cutting speed [in/min]
f_{min} Feed per minute (Linear Feedrate) [in/min]
Q Material removal rate per minute [in³/min]

Material	Steel	Cast iron	Al
Coefficient x	20	25	100

CLAMPING SCREW

Screw designation 	Screwdriver 	Torque [Nm]*
HS 0520C	HXK 4	6
HS 0620C	HXK 5	8
HS 0625	HXK 5	8
HS 0630	HXK 5	8
HSI 1020	HXK6	7.4
SR 85011-T15P	SDR T15P	5
US 2505-T07P	SDR T07P	0.9
US 2506-T07P	SDR T07P	0.9
US 3007-T09P	SDR T09P	2
US 3510-T15P	SDR T15P	3
US 3512A-T15P	SDR T15P	3
US 36	HXK 4	6
US 38	HXK 5	8
US 4011-T15P	SDR T15P	3.5
US 45013-T20P	SDR T20P	5
US 4512-T15P	SDR T15P	5
US 4514A-T20	SDR T20	5
US 46017-T20P	SDR T20P	5
US 5018-T20P	SDR T20P	5
US 6020-T25P	SDR T25P	6
US 2046-T07P	SDR T07P	0.9
US 2003-T07P	SDR T07P	0.9
US 2009-T15P	SDR T15P	3
US 2020-T07P	SDR T07P	0.9
US 2010-T15P	SDR T15P	3
US 2018-T15P	SDR T15P	3
US 2001-T15P	SDR T15P	3
US 2003-T07P	SDR T07P	0.9
CS 8601-T09P	SDR T09P	1.7
CS 8602-T15P	SDR T15P	3.9
CS 8603-T20P	SDR T20P	6.4
CS 8604-T25P	SDR T25P	9.5

TORQUE HANDLE

Replaceable 	Torque [Nm]	Thread of clamping screw
MR-0,8-2,0 vario	0.8 - 2.0	M 2 - M 3
MR-1,0-5,0 vario	1.0 - 5.0	M 2,5 - M 5
MR-0,9 fix	0.9	M 2
MR-2,0 fix	2.0	M 3
MR-3,0 fix	3.0	M 3,5
MR-3,5 fix	3.5	M 4
MR-5,0 fix	5.0	M 5

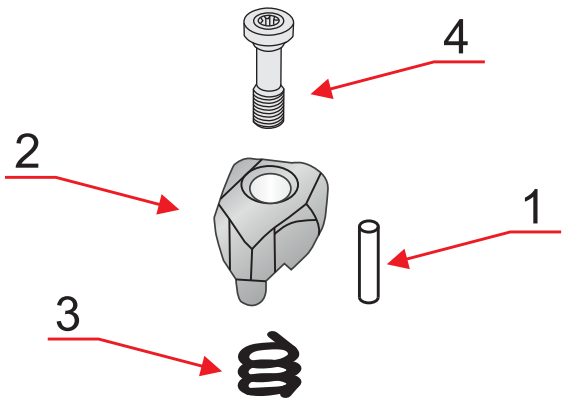
DRIVERS

Exchangeable driver 
D-T6
D-T6P
D-T7
D-T7P
D-T8
D-T8P
D-T9
D-T9P
D-T15
D-T15P
D-T20
D-T20P

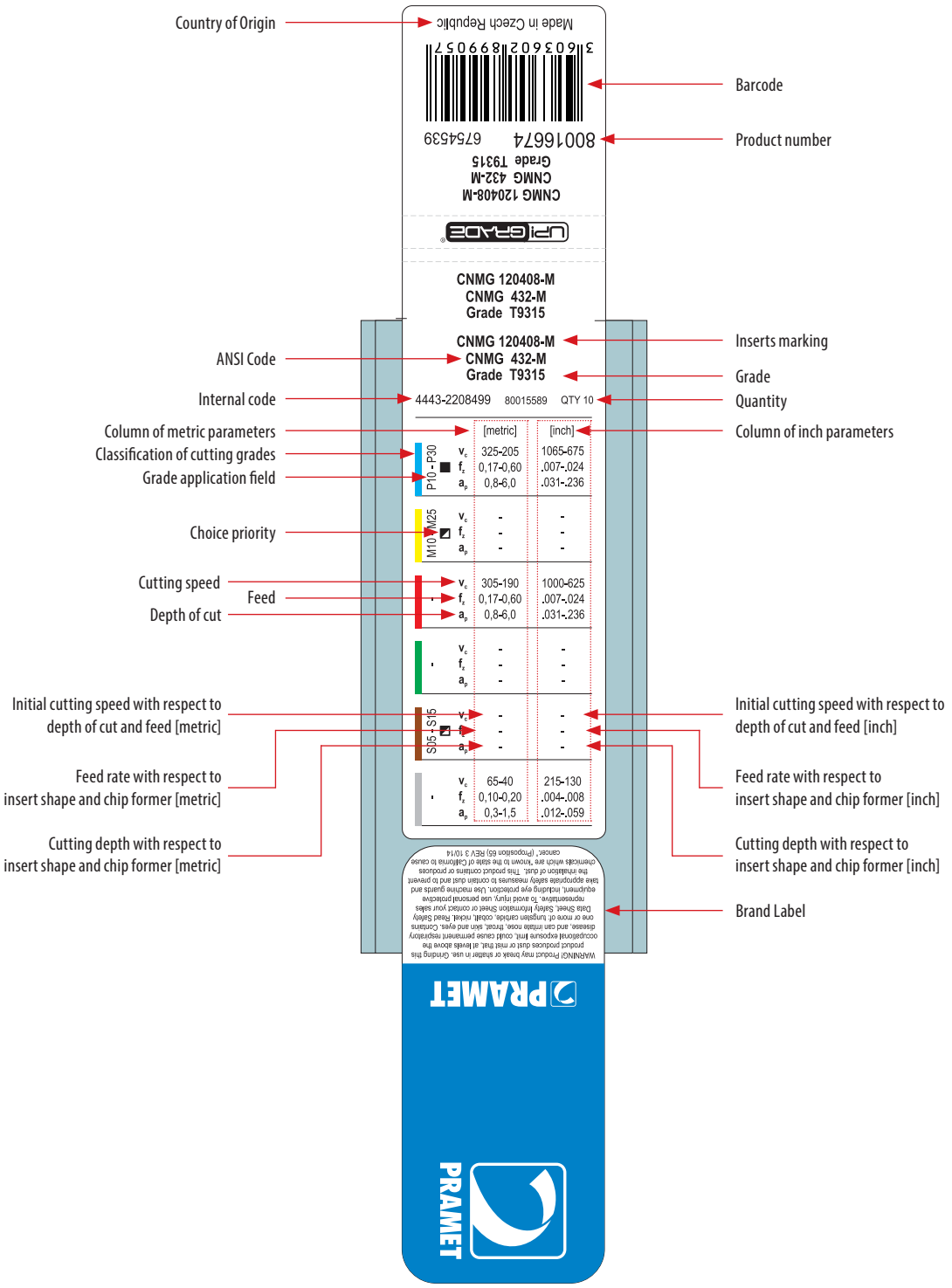
SCREW LUBRICATION

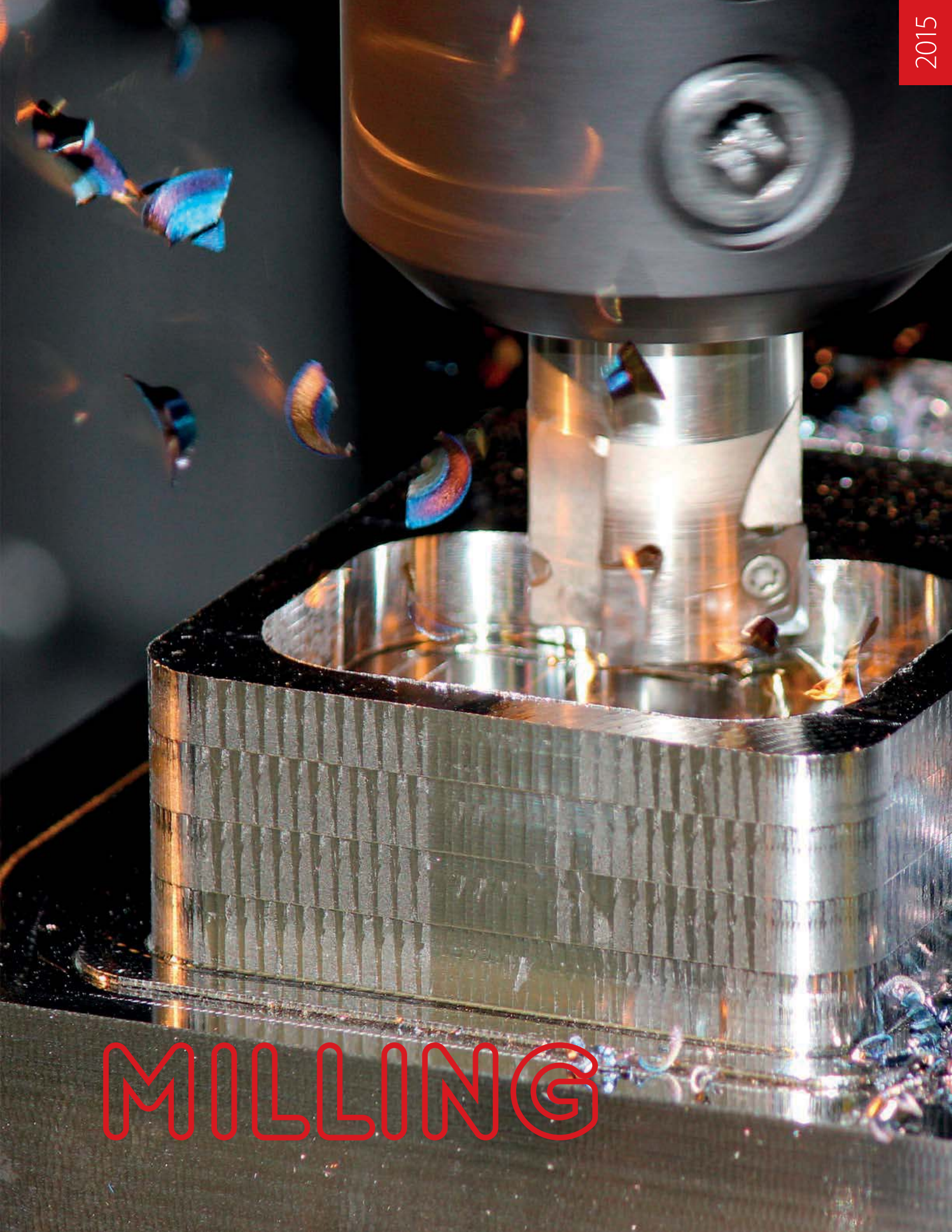
Owing to the high thermal stress on the clamping screws, it is advisable to lubricate them with a high-quality paste such as MOLYKOTE 100.

COMPLETE CLAMP SET



	1	2	3	4
	PIN	CLAMP	SPRING	SCREW
DCS 09	CP 3055	CD 09	PR 0157	CS 8601-T09P
DCS 12	CP 3007	CD 12	PR 0158	CS 8602-T15P
DCS 16	CP 3007	CD 16	PR 0159	CS 8603-T20P
DCS 19	CP 3007	CD 19	PR 0159	CS 8603-T20P
DCS 25	CP 3007	CD 25	PR 0101	CS 8604-T25P
DCS 16V	CP 3007	CD 16V	PR 0158	CS 8602-T15P


Country of Origin
Made in Czech Republic
3 603602 899057
Barcode
8001667 4 6754539
Product number
CNMG 120408-M
CNMG 432-M
Grade T9315
UNIGRADE
CNMG 120408-M
CNMG 432-M
Grade T9315
Inserts marking
ANSI Code
CNMG 120408-M
CNMG 432-M
Grade T9315
Grade
Internal code
4443-2208499 80015589 QTY 10
Quantity
Column of metric parameters
[metric] [inch]
Column of inch parameters
Classification of cutting grades
Grade application field
P10 - P30
vc 325-205 1065-675
fz 0,17-0,60 .007-.024
ap 0,8-6,0 .031-.236
Choice priority
M10 - M25
vc - -
fz - -
ap - -
Cutting speed
Feed
Depth of cut
vc 305-190 1000-625
fz 0,17-0,60 .007-.024
ap 0,8-6,0 .031-.236
vc - -
fz - -
ap - -
Initial cutting speed with respect to depth of cut and feed [metric]
S05 - S15
vc - -
fz - -
ap - -
Initial cutting speed with respect to depth of cut and feed [inch]
Feed rate with respect to insert shape and chip former [metric]
vc 65-40 215-130
fz 0,10-0,20 .004-.008
ap 0,3-1,5 .012-.059
Feed rate with respect to insert shape and chip former [inch]
Cutting depth with respect to insert shape and chip former [metric]
Cutting depth with respect to insert shape and chip former [inch]
WARNING! Product may break or shatter in use. Grinding this product produces dust or mist that, at levels above the occupational exposure limit, could cause permanent respiratory disease, and can irritate nose, throat, skin and eyes. Contains one or more of tungsten carbide, cobalt, nickel. Read Safety Data Sheet. Safety information Sheet or contact your sales representative. To avoid injury, use personal protective equipment, including eye protection. Use machine guards and take appropriate safety measures to contain dust and to prevent the inhalation of dust. This product contains or produces chemicals which are known to the state of California to cause cancer. (Proposition 65) REV 3 10/14
PRAMET
Brand Label



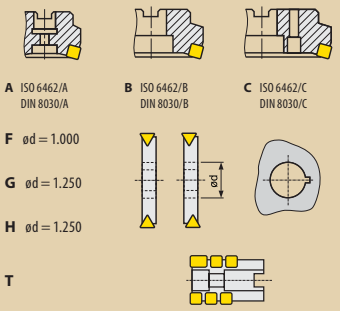
MILLING

ALPHANUMERIC INDEX - TOOLS

ALPHANUMERIC INDEX - INSERTS

SHELL CUTTER BODIES

2 – Cutting type, designation and/or size of clamping

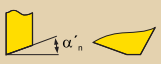


5 – Standard

I	Inch

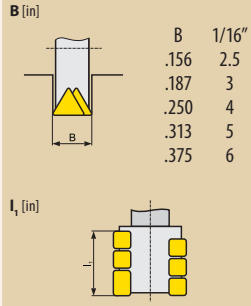
7 – Setting angle

11 – Clearance angle



N	$\alpha'_N = 0°$	E	$\alpha'_N = 20°$
P	$\alpha'_N = 11°$	F	$\alpha'_N = 25°$
D	$\alpha'_N = 15°$		

12 – Cutting edge length (width)



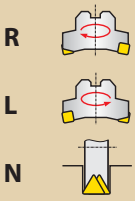
B	1/16"
.156	2.5
.187	3
.250	4
.313	5
.375	6

1	2	3	4		5	6	7	8	9	10	11	12
300	F	04	N		I	S	90	S	N	12	N	4
250	**A**	**06**	**R**	–	**I**	**S**	**90**	**A**	**D**	**16**	**E**	

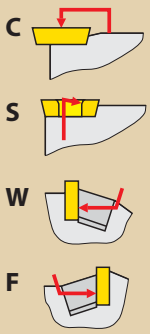
1 – Cutting diameter [in]

3 – No. of working edges

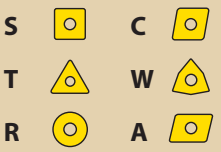
4 – Direction of cut



6 – Clamping designation



8 – Insert shape



9 – Clearance angle

N	$\alpha_N = 0°$	D	$\alpha_N = 15°$
C	$\alpha_N = 7°$	E	$\alpha_N = 20°$
P	$\alpha_N = 11°$	F	$\alpha_N = 25°$

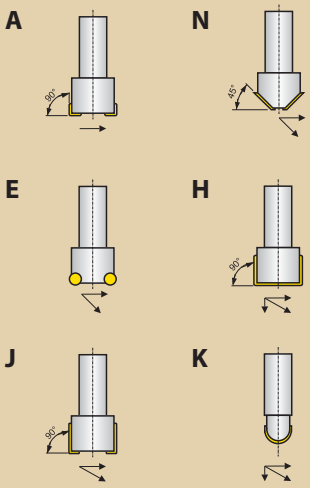
10 – Insert size or cutting edge length

d [mm]	S	C	T	W	R	A
6,35						9/11
7,94				05		
8,00					08	
9,525	09	09	16	06		12
10,00					10	
12,00					12	
12,70	12	12	22	08		15
15,875	15					
16,00					16	
25,00					25	
25,40	25					

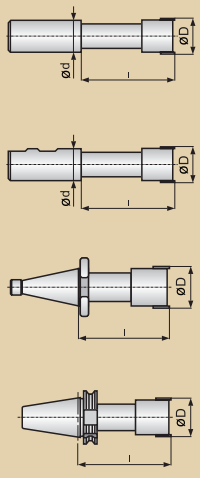
SHOULDER END MILLING CUTTERS

1	1a	3	4	2a	3a	4a		5	6	8	9	10	11	12
125	J	2	R	236	W	125		I	S	A	D	11	E	185
100	**A**	**3**	**R**	**128**	**W**	**100**	–	**I**	**S**	**A**	**D**	**11**	**E**	

1a – Cutter type and setting angle



2a – Overhang [in]



3a – Shank designation

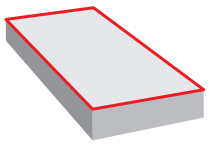
C	DIN 1835-1
W	ISO 3338-2 DIN 1835-2
G	ISO 297 DIN 208-1
H	ISO/DIS 7388-1 DIN 69871-1

4a – Shank size

øD .625 - 1.250	ød .625 - 1.250
øD .625 - 1.500	ød .625 - 1.250
øD 2.000 - 3.000	7:24 No. 40 50
øD 2.000 - 3.000	7:24 No. 40 50

PRAMET

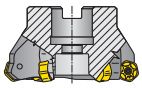
MILLING FLAT SURFACES



IS45HN06C

45° | $a_{p\,max}$ [in] .118 | ø D [in] 1.000 - 5.000

ECON HN



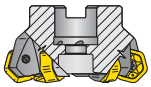
	P	M	K
HN 0604			
XN 0604	N		H

M10 - M15

IS45HN09C

45° | $a_{p\,max}$ [in] .197 | ø D [in] 2.000-12.000

ECON HN

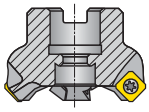


	P	M	K
HN 0906			
XN 0906	N		H

M16 - M17

IS45SE09F

45° | $a_{p\,max}$ [in] .177 | ø D [in] .750-6.000



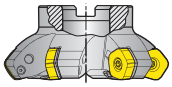
	P	M	K
SE 09T3			
	N	S	H

M18 - M21

IS57PN13

57° | $a_{p\,max}$ [in] .394 | ø D [in] 4.000-12.000

PENTA HD



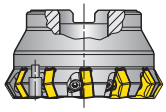
	P	M	K
PN 1308			
	N	S	H

M22 - M23

IC60HN09

60° | $a_{p\,max}$ [in] .236 | ø D [in] 3.000-10.000

ECON HN



	P		K
HN 0905			
			H

M24 - M25

IF60SB22X

60° | $a_{p\,max}$ [in] .590 | ø D [in] 5.000-12.000

ROUGH SB

	P	M	K
SB 2207			
			H

M26-27

ISRD07

- | $a_{p\,max}$ [in] .071 | ø D [in] .625-1.000

	P	M	K
RD.. 0702			
	N		H

M74 - M75

ISRD10

- | $a_{p\,max}$ [in] .100 | ø D [in] .750-1.500

	P	M	K
RD 1003			
	N		H

M72 - M75

IS(C)RD12

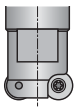
- | $a_{p\,max}$ [in] .118 | ø D [in] 1.000-3.000

	P	M	K
RD 12T3			
	N		H

M74 - M77

ISCMORD16

- | $a_{p\,max}$ [in] .157 | ø D [in] 2.500-4.000



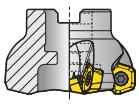
	P	M	K
RD 1604			
	N		H

M76 - M77

IS19PD09

19° | $a_{p\,max}$ [in] .079 | ø D [in] 1.250-4.000

PENTA HF



	P	M	K
PD 0905			
	N	S	H

M78 - M81

ISZD07

- | $a_{p\,max}$ [in] .039 | ø D [in] .625-1.250

FEED ZD

	P	M	K
ZD 0703			
			H

M82 - M85

ISZD09

- | $a_{p\,max}$ [in] .039 | ø D [in] 1.000-1.500

FEED ZD

	P	M	K
ZD 09T3			
			H

M82 - M87

ISZD12

- | $a_{p\,max}$ [in] .063 | ø D [in] 1.500-3.000

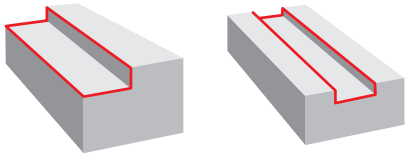
FEED ZD

	P	M	K
ZD 1204			
			H

M82 - M87

PRAMET

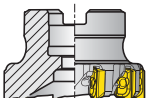
MILLING LOW SHOULDERS AND SLOTS



IC90AD15

90° | $a_{p\,max}$ [in] .394 | ø D [in] 1.000-3.000

MULTISIDE AD

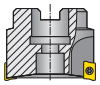


AD 15T3 — P M K / S — M46 - M51

IS90AD11E

90° | $a_{p\,max}$ [in] .354 | ø D [in] .625-5.000

FORCE AD

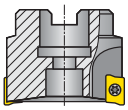


AD 11T3 — P M K / N S H — M28 - M38

IS90AD16E

90° | $a_{p\,max}$ [in] .512 | ø D [in] 1.000-6.000

FORCE AD

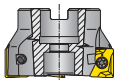


AD 1606 — P M K / N S H — M40 - M45

IS90LN12

90° | $a_{p\,max}$ [in] .354 | ø D [in] 1.000-5.000

ECON LN

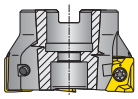


LN 1205 — P M K / N H — M52 - M57

IS90LN16

90° | $a_{p\,max}$ [in] .512 | ø D [in] 2.500-6.000

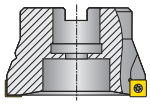
ECON LN



LN 1607 — P M K / N H — M58 - M59

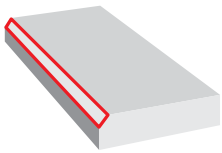
IS90SO09

90° | $a_{p\,max}$ [in] .315 | ø D [in] 1.000-5.000



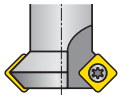
SO 09T3 — P M K / N S H — M60 - M63

CHAMFER MILLING



SSD09

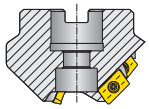
45° | $a_{p\,max}$ [in] .177 | ø D [in] .375-1.000



SD 0903 — P M K / N S H — M88 - M89

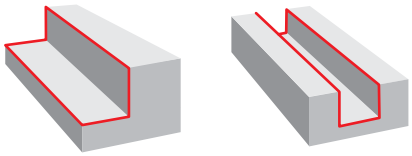
SxxXP

30-60° | $a_{p\,max}$ [in] .551-.984 | ø D [in] 1.500-2.000



XP 1604 — P M K / N S — M90 - M91

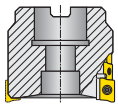
MILLING DEEP SHOULDERS AND SLOTS



J-ISAD11E

90° | $a_{p\,max}$ [in] 1.496 - 2.205 | ø D [in] 1.000-2.000

FORCE AD



	P	M	K
AD 11T3	N	S	H

M64 - M67

IS90SN

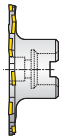
90° | $a_{p\,max}$ [in] .156-.375 | ø D [in] 3.000-6.000

	P	M	K
SN 11 SN 12	N	S	H

M68 - M69

IS90SN-R

90° | $a_{p\,max}$ [in] .156-.375 | ø D [in] 2.500-6.000



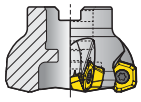
	P	M	K
SN 11 SN 12	N	S	H

M70 - M71

IS19PD09

19° | $a_{p\,max}$ [in] .079 | ø D [in] 1.250-4.000

PENTA HF



	P	M	K
PD 0905	N	S	H

M78 - M81

ISZD07

- | $a_{p\,max}$ [in] .039 | ø D [in] .625-1.250

FEED ZD

	P	M	K
ZD 0703			H

M82 - M85

ISZD09

- | $a_{p\,max}$ [in] .039 | ø D [in] 1.000-1.500

FEED ZD

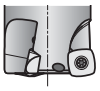
	P	M	K
ZD 09T3			H

M82 - M87

ISZD12

- | $a_{p\,max}$ [in] .063 | ø D [in] 1.500-3.000

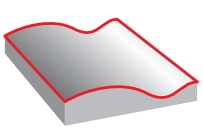
FEED ZD

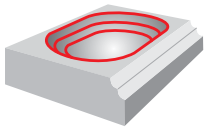


	P	M	K
ZD 1204			H

M82 - M87

MILLING SHAPED SURFACES (COPY MILLING)





ISRD07

-	$a_{p\,max}$ [in]	.071
	ø D [in]	.625-1.000

	RD.. 0702	P	M	K
		N		H

M74 - M75

ISRD10

-	$a_{p\,max}$ [in]	.100
	ø D [in]	.750-1.500

	RD 1003	P	M	K
		N		H

M72 - M75

IS(C)RD12

-	$a_{p\,max}$ [in]	.118
	ø D [in]	1.000-3.000

	RD 12T3	P	M	K
		N		H

M74 - M77

ISCMORD16

-	$a_{p\,max}$ [in]	.157
	ø D [in]	2.500-4.000

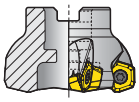
	RD 1604	P	M	K
		N		H

M76 - M77

IS19PD09

19°	$a_{p\,max}$ [in]	.079
	ø D [in]	1.250-4.000

PENTA HF



	PD 0905	P	M	K
		N	S	H

M78 - M81

ISZD07

-	$a_{p\,max}$ [in]	.039
	ø D [in]	.625-1.250

FEED ZD

	ZD 0703	P	M	K
				H

M82 - M85

ISZD09

-	$a_{p\,max}$ [in]	.039
	ø D [in]	1.000-1.500

FEED ZD

	ZD 09T3	P	M	K
				H

M82 - M87

ISZD12

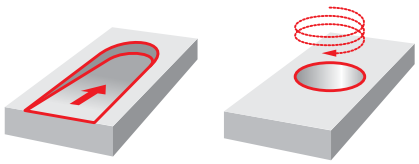
-	$a_{p\,max}$ [in]	.063
	ø D [in]	1.500-3.000

FEED ZD

	ZD 1204	P	M	K
				H

M82 - M87

RAMPING AND HELICAL INTERPOLATION



ISRD07

-	$a_{p\,max}$ [in]	.071
	ø D [in]	.625-1.000

	RD.. 0702	P	M	K
		N		H
		M74 - M75		

ISRD10

-	$a_{p\,max}$ [in]	.100
	ø D [in]	.750-1.500

	RD 1003	P	M	K
		N		H
		M72 - M75		

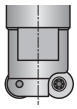
IS(C)RD12

-	$a_{p\,max}$ [in]	.118
	ø D [in]	1.000-3.000

	RD 12T3	P	M	K
		N		H
		M74 - M77		

ISCMORD16

-	$a_{p\,max}$ [in]	.157
	ø D [in]	2.500-4.000

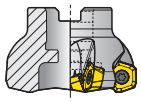


	RD 1604	P	M	K
		N		H
		M76 - M77		

IS19PD09

19°	$a_{p\,max}$ [in]	.079
	ø D [in]	1.250-4.000

PENTA *HF*



	PD 0905	P	M	K
		N	S	H
		M78 - M81		

ISZD07

-	$a_{p\,max}$ [in]	.039
	ø D [in]	.625-1.250

FEED *ZD*

	ZD 0703	P	M	K
				H
		M82 - M85		

ISZD09

-	$a_{p\,max}$ [in]	.039
	ø D [in]	1.000-1.500

FEED *ZD*

	ZD 09T3	P	M	K
				H
		M82 - M87		

ISZD12

-	$a_{p\,max}$ [in]	.063
	ø D [in]	1.500-3.000

FEED *ZD*

	ZD 1204	P	M	K
				H
		M82 - M87		

IS90AD11E

90°	$a_{p\,max}$ [in]	.354
	ø D [in]	.625-5.000

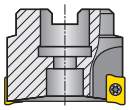
FORCE *AD*

	AD 11T3	P	M	K
		N	S	H
		M28 - M38		

IS90AD16E

90°	$a_{p\,max}$ [in]	.512
	ø D [in]	1.000-6.000

FORCE *AD*

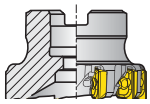


	AD 1606	P	M	K
		N	S	H
		M40 - M45		

IC90AD15

90°	$a_{p\,max}$ [in]	.394
	ø D [in]	1.000-3.000

MULTISIDE *AD*

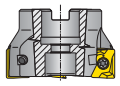


	AD 15T3	P	M	K
			S	
		M46 - M51		

IS90LN12

90°	$a_{p\,max}$ [in]	.354
	ø D [in]	1.000-5.000

ECON *LN*

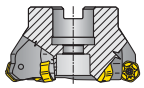


	LN 1205	P	M	K
		N		H
		M52 - M57		

IS45HN06C

45°	$a_{p\,max}$ [in]	.118
	ø D [in]	1.000 - 5.000

ECON *HN*

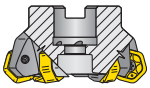


	HN 0604	P	M	K
	XN 0604	N		H
		M10 - M15		

IS45HN09C

45°	$a_{p\,max}$ [in]	.197
	ø D [in]	2.000-12.000

ECON *HN*



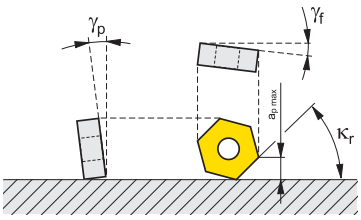
	HN 0906	P	M	K
	XN 0906	N		H
		M16 - M17		

PRAMET

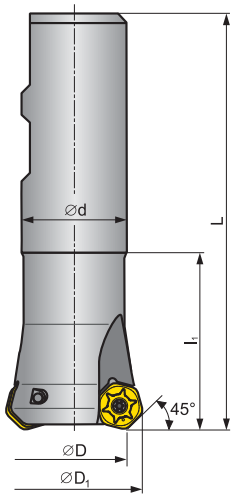
ISHN06

NEGATIVE FACE MILLING CUTTER

γ_p	-7°	κ_r	45°
γ_f	-7°	$a_{p\,max}$	.118 in



ECON HN



Z* - Number of teeth

Dimensions [in].

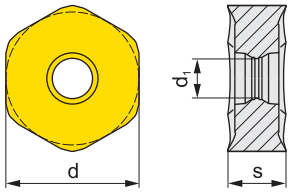
Designation	Assortment	Dimensions											Cooling	[lbs]
		D	D_1	d	L	l_1	Z*							
100N2R128W100-ISHN06C-C	●	1.000	1.283	1.000	3.819	1.280	2						+	.71
125N3R150W125-ISHN06C-C	●	1.250	1.537	1.250	4.039	1.500	3						+	1.23

PRAMET

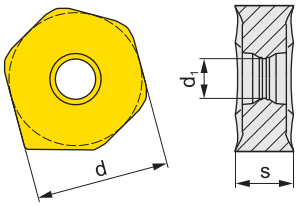
● stocked as standard /○ not stocked as standard
See price list for current availability.

ISHN06

INSERTS FOR NEGATIVE FACE MILLING CUTTER



HNGX 06

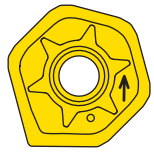


XNGX 06

HNGX 06 -F

HNGX 06 -M

HNGX 06 -R



XNGX 06 ANSN

INDEXABLE CUTTING INSERTS

Designation	Grades							Dimensions		
	M5315	M9315	M9325	M9340	M8340	8215	8230	d	s	d_1
HNGX 0604ANSN-F				●	●	●	●	.413	.207	.146
HNGX 0604ANSN-M	●	●	●	●	●	●	●	.413	.207	.146
HNGX 0604ANSN-R	●	●	●		●	●	●	.413	.207	.146
XNGX 0604ANSN						●		.413	.207	.146

SPARE PARTS

*) For screw torques see pages: M191 – M193.

Diameter of cutter	Clamping screw*	Screwdriver
1.000 – 1.250	US 3007-T09P	FLAG T09P

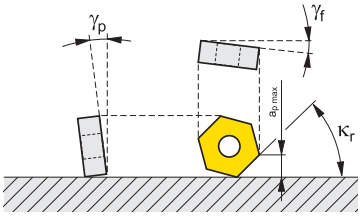
● stocked as standard /○ not stocked as standard
See price list for current availability.

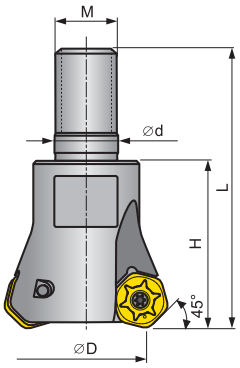
ISHN06

EXCHANGEABLE HEADS FOR NEGATIVE FACE MILL CUTTERS

ECON HN

γ_p	-7°	κ_r	45°
γ_f	-7°	$a_{p\,max}$	.118 in





Z* - Number of teeth

Dimensions [in].

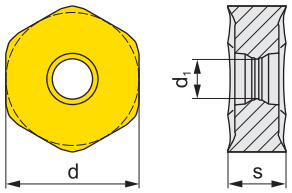
Designation	Assortment	Dimensions											Cooling	[lbs]
		D	D_1	d	M	H	L	Z*						
100N2R138M12-ISHN06C-C	●	1.000	1.283	.492	M12	1.378	2.244	2					+	.22
125N3R169M16-ISHN06C-C	●	1.250	1.537	.669	M16	1.693	2.598	3					+	.49
150N4R169M16-ISHN06C-C	●	1.500	1.787	.669	M16	1.693	2.598	4					+	.60

PRAMET

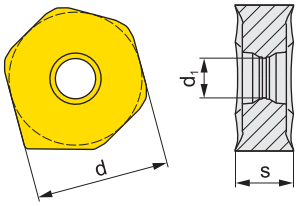
● stocked as standard /○ not stocked as standard
See price list for current availability.

ISHN06

INSERTS FOR NEGATIVE FACE MILL CUTTERS



HNGX 06

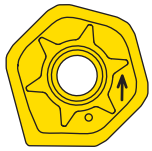


XNGX 06

HNGX 06 -F

HNGX 06 -M

HNGX 06 -R



XNGX 06 ANSN

INDEXABLE CUTTING INSERTS

Designation	Grades							Dimensions					
	M5315	M9315	M9325	M9340	M8340	8215	8230	d	s	d_1			
HNGX 0604ANSN-F				●	●	●	●	.413	.207	.146			
HNGX 0604ANSN-M	●	●	●	●	●	●	●	.413	.207	.146			
HNGX 0604ANSN-R	●	●	●		●	●	●	.413	.207	.146			
XNGX 0604ANSN						●		.413	.207	.146			

SPARE PARTS

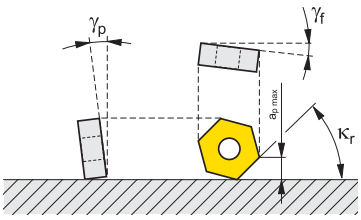
*) For screw torques see pages: M191 – M193.

Diameter of cutter	Clamping screw*	Screwdriver
1.000 – 1.500	US 3007-T09P	FLAG T09P

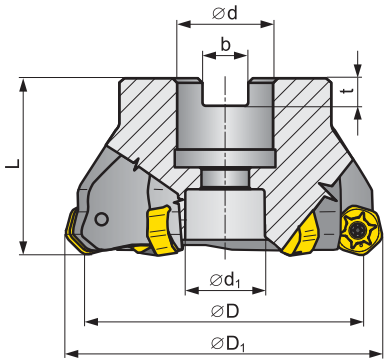
● stocked as standard /○ not stocked as standard
See price list for current availability.

IS45HN06

γ_p	-7°	κ_r	45°
γ_f	-7°	$a_{p\,max}$	.118 in



ECON HN



Z* - Number of teeth

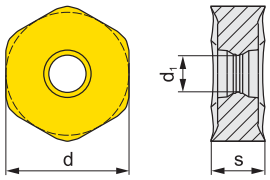
Dimensions [in].

Designation	Assortment	Dimensions											Cooling	[lbs]
		D	D_1	d	d_1	L	b	t	Z*					
150A05R-IS45HN06C-C	●	1.500	1.787	.500	.433	1.575	.258	.165	5				+	.55
200A04R-IS45HN06C-C	●	2.000	2.287	.750	.630	1.575	.321	.193	4				+	.93
200A06R-IS45HN06C-C	●	2.000	2.287	.750	.630	1.575	.321	.193	6				+	.88
250A06R-IS45HN06C-C	●	2.500	2.787	.750	.630	1.575	.321	.193	6				+	1.21
250A08R-IS45HN06C-C	●	2.500	2.787	.750	.630	1.575	.321	.193	8				+	1.21
300A07R-IS45HN06C-C	●	3.000	3.268	1.000	.827	1.969	.382	.224	7				+	2.40
300A10R-IS45HN06C-C	●	3.000	3.268	1.000	.827	1.969	.382	.224	10				+	2.38
400A08R-IS45HN06C-C	●	4.000	4.280	1.500	1.260	1.969	.630	.382	8				+	3.99
400A12R-IS45HN06C-C	●	4.000	4.280	1.500	1.260	1.969	.630	.382	12				+	3.92
500A10R-IS45HN06C-C	●	5.000	5.283	1.500	1.260	2.480	.630	.382	10				+	7.39
500A16R-IS45HN06C-C	●	5.000	5.283	1.500	1.260	2.480	.630	.382	16				+	7.30

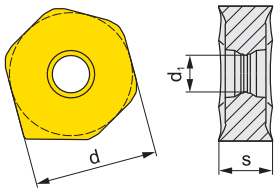
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

IS45HN06



HNGX 06

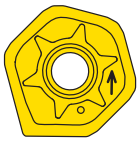


XNGX 06

HNGX 06-F

HNGX 06-M

HNGX 06-R



XNGX 06 ANSN

INDEXABLE CUTTING INSERTS

Designation	Grades							Dimensions		
	M5315	M9315	M9325	M9340	M8340	8215	8230	d	s	d_1
HNGX 0604ANSN-F				●	●	●	●	.413	.207	.146
HNGX 0604ANSN-M	●	●	●	●	●	●	●	.413	.207	.146
HNGX 0604ANSN-R	●	●	●		●	●	●	.413	.207	.146
XNGX 0604ANSN						●		.413	.207	.146

SPARE PARTS

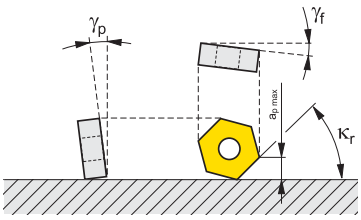
*) For screw torques see pages: M191 – M193.

Diameter of cutter	Clamping screw*	Driver	Driver handle	Screw for taper clamping
1.500	US 3007-T09P	D-T07P/T09P	FG-15	HS 025100
2.000 – 2.500	US 3007-T09P	D-T07P/T09P	FG-15	HS 037100
3.000	US 3007-T09P	D-T07P/T09P	FG-15	HS 050125
4.000	US 3007-T09P	D-T07P/T09P	FG-15	HCS 075200
5.000	US 3007-T09P	D-T07P/T09P	FG-15	HS 075125

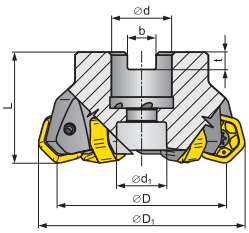
● stocked as standard /○ not stocked as standard
See price list for current availability.

IS45HN09

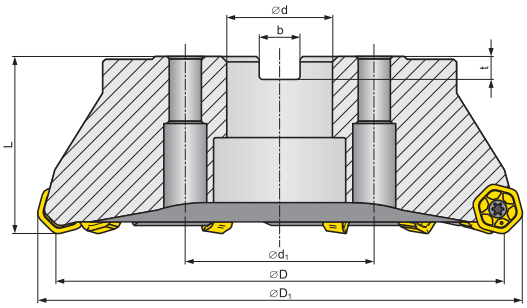
γ_p	-7°	κ_r	45°
γ_f	-7°	$a_{p\,max}$	.197 in



ECON HN



ø 2.000 – 6.000 in



ø 8.000 – 12.000 in

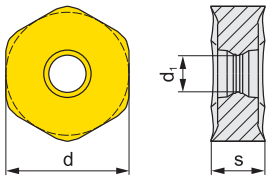
Z* - Number of teeth

Dimensions [in].

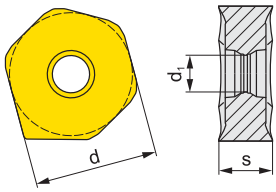
Designation	Assortment	Dimensions D	D_1	d	d_1	L	b	t	Z*				Cooling	[lbs]
200A04R-IS45HN09C-CF	●	2.000	2.461	.750	.630	1.575	.321	.193	4				+	.77
250A06R-IS45HN09C-CF	●	2.500	2.961	.750	.630	1.575	.321	.193	6				+	1.08
300A06R-IS45HN09C-CF	●	3.000	3.461	1.000	.827	1.969	.382	.224	6				+	2.34
300A08R-IS45HN09C-CF	●	3.000	3.461	1.000	.827	1.969	.382	.224	8				+	2.34
400A06R-IS45HN09C-CF	●	4.000	4.461	1.500	1.260	1.969	.630	.382	6				+	3.84
400A08R-IS45HN09C-CF	●	4.000	4.461	1.500	1.260	1.969	.630	.382	8				+	3.84
400A10R-IS45HN09C-CF	●	4.000	4.461	1.500	1.260	1.969	.630	.382	10				+	3.84
500A06R-IS45HN09C-CF	●	5.000	5.461	1.500	1.260	2.480	.630	.382	6				+	7.14
500A10R-IS45HN09C-CF	●	5.000	5.461	1.500	1.260	2.480	.630	.382	10				+	7.14
500A12R-IS45HN09C-CF	●	5.000	5.461	1.500	1.260	2.480	.630	.382	12				+	7.14
600B08R-IS45HN09CF	●	6.000	6.461	2.000	3.465	2.480	.756	.445	8					12.57
600B12R-IS45HN09CF	●	6.000	6.461	2.000	3.465	2.480	.756	.445	12					12.57
800C10R-IS45HN09CF	●	8.000	8.461	2.500	4.000	2.480	1.000	.559	14					19.85
1000C14R-IS45HN09CF	○	10.000	10.461	2.500	4.000	2.480	1.000	.559	10					28.22
1200C16R-IS45HN09CF	○	12.000	12.461	2.500	4.000	3.150	1.000	.559	14					71.00

● stocked as standard /○ not stocked as standard
See price list for current availability.

IS45HN09



HNGX 09



XNGX 09

HNGX 09-FF

HNGX 09-F

HNGX 09-M

HNGX 09-R

XNGX 09 ANSN

INDEXABLE CUTTING INSERTS

Designation	Grades							Dimensions		
	M5315	M9315	M9325	M9340	M8340	8215	8230	d	s	d_1
HNGX 0906ANEN-FF				●		●	●	.650	.250	.193
HNGX 0906ANSN-F				●	●	●	●	.650	.250	.193
HNGX 0906ANSN-M	●	●	●	●	●	●	●	.650	.250	.193
HNGX 0906ANSN-R	●	●	●		●	●	●	.650	.250	.193
XNGX 0906ANSN						●		.650	.250	.193

SPARE PARTS

*) For screw torques see pages: M191 – M193.

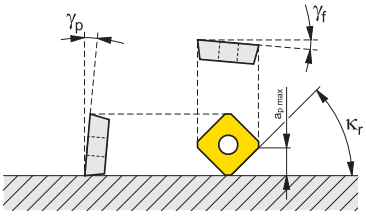
Diameter of cutter	Clamping screw*	Driver	Driver handle	Screw for taper clamping
2.000 – 2.500	US 54511-T15P	D-T08P/T15P	FG-15	HS 037100
3.000	US 54511-T15P	D-T08P/T15P	FG-15	HS 050125
4.000	US 54511-T15P	D-T08P/T15P	FG-15	HCS 075200
5.000	US 54511-T15P	D-T08P/T15P	FG-15	HS 075125
6.000 – 12.000	US 54511-T15P	D-T08P/T15P	FG-15	-

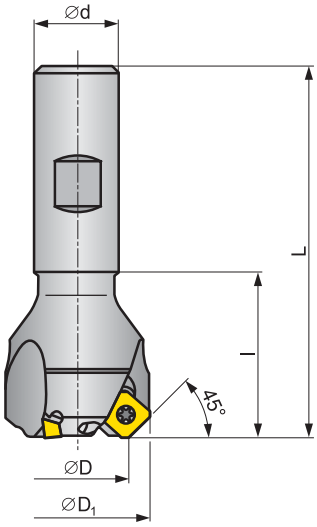
● stocked as standard /○ not stocked as standard
See price list for current availability.

ISSE09

HIGH POSITIVE FACE MILLING CUTTERS

γ_p	+20°	κ_r	45°
γ_f	-5°	$a_{p\,max}$	.177 in





Z* - Number of teeth

Dimensions [in].

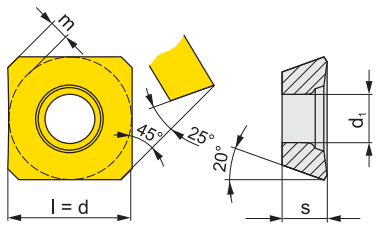
Designation	Assortment	Dimensions											Cooling	[lbs]
		D	D_1	d	L	l	Z*							
075N2R126W075-ISSE09-C	●	.750	1.136	.750	3.331	1.260	2						+	.22
100N3R128W100-ISSE09-C	●	1.000	1.386	1.000	3.819	1.280	3						+	.66
125N4R150W125-ISSE09-C	●	1.250	1.644	1.250	4.039	1.500	4						+	1.32

PRAMET

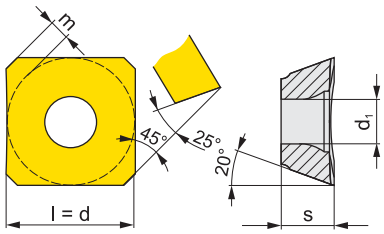
● stocked as standard /○ not stocked as standard
See price list for current availability.

ISSE09

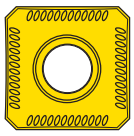
INSERTS FOR HIGH POSITIVE FACE MILLING CUTTERS



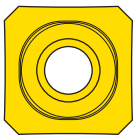
SEMT



SEET



SEMT AFSN



SEET AFEN

INDEXABLE CUTTING INSERTS

Designation	Grades					Dimensions				
	M9325	M9340	M8340	8215	8230	l	d	s	d_1	m
SEMT 09T3AFSN	●	●	●	●	●	.375	.375	.156	.138	.048
SEET 09T3AFEN	●	●	●	●	●	.375	.375	.156	.138	.048

SPARE PARTS

*) For screw torques see pages: M191 – M193.

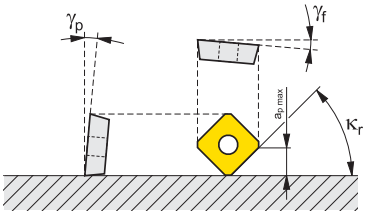
Diameter of cutter	Clamping screw*	Screwdriver
.750 – 1.250	US 3007-T09P	FLAG T09P

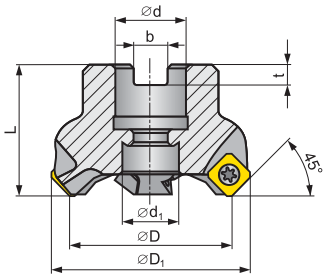
● stocked as standard /○ not stocked as standard
See price list for current availability.

IS45SE09F

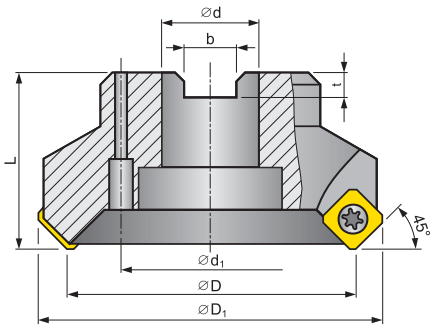
HIGH POSITIVE FACE MILLING CUTTERS

γ_p	+20°	κ_r	45°
γ_f	-5°	$a_{p\,max}$	.177 in





ø 1.500 – 5.000 in



ø 6.000 in

Z* - Number of teeth

Dimensions [in].

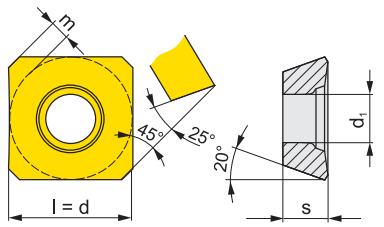
Designation	Assortment	Dimensions											Cooling	[lbs]
		D	D_1	d	d_1	L	b	t	Z*					
150A04R-IS45SE09F-C	●	1.500	1.878	.500	.433	1.575	.258	.165	4				+	.75
200A05R-IS45SE09F-C	●	2.000	2.378	.750	.630	1.575	.321	.193	5				+	.84
250A05R-IS45SE09F-C	●	2.500	2.878	.750	.630	1.575	.321	.193	5				+	1.19
250A06R-IS45SE09F-C	●	2.500	2.878	.750	.630	1.575	.321	.193	6				+	1.23
300A06R-IS45SE09F-C	●	3.000	3.378	1.000	.827	1.969	.382	.224	6				+	2.21
300A08R-IS45SE09F-C	●	3.000	3.378	1.000	.827	1.969	.382	.224	8				+	2.43
400A08R-IS45SE09F-C	●	4.000	4.394	1.500	1.260	1.969	.630	.382	8				+	3.04
400A10R-IS45SE09F-C	●	4.000	4.394	1.500	1.260	1.969	.630	.382	10				+	3.37
500A09R-IS45SE09F-C	●	5.000	5.374	1.500	1.260	2.480	.630	.382	9				+	6.02
500A12R-IS45SE09F-C	●	5.000	5.374	1.500	1.260	2.480	.630	.382	12				+	6.88
600B10R-IS45SE09F	●	6.000	6.378	2.000	3.465	2.480	.756	.445	10					10.43
600B14R-IS45SE09F	●	6.000	6.378	2.000	3.465	2.480	.756	.445	14					11.25

● stocked as standard /○ not stocked as standard
See price list for current availability.

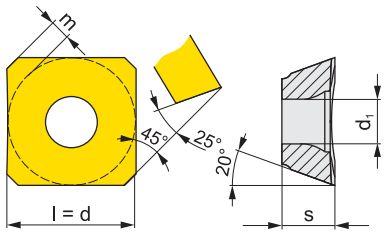
PRAMET

IS45SE09F

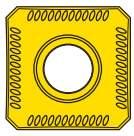
INSERTS FOR HIGH POSITIVE FACE MILLING CUTTERS



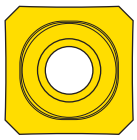
SEMT



SEET



SEMT AFSN



SEET AFEN

INDEXABLE CUTTING INSERTS

Designation	Grades					Dimensions				
	M9325	M9340	M8340	8215	8230	l	d	s	d_1	m
SEMT 09T3AFSN	●	●	●	●	●	.375	.375	.156	.138	.048
SEET 09T3AFEN	●	●	●	●	●	.375	.375	.156	.138	.048

SPARE PARTS

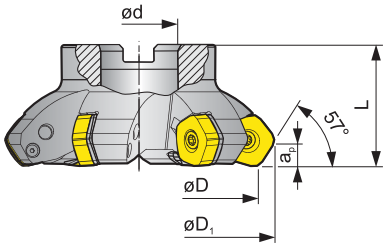
*) For screw torques see pages: M191 – M193.

Diameter of cutter	Clamping screw*	Driver	Driver handle	Screw for taper clamping			
1.500	US 3007-T09P	D-T07P/T09P	FG-15	HS 025100			
2.000 – 2.500	US 3007-T09P	D-T07P/T09P	FG-15	HS 037100			
3.000	US 3007-T09P	D-T07P/T09P	FG-15	HS 050125			
4.000	US 3007-T09P	D-T07P/T09P	FG-15	HCS 075175			
5.000	US 3007-T09P	D-T07P/T09P	FG-15	HS 075125			
6.000	US 3007-T09P	D-T07P/T09P	FG-15	-			

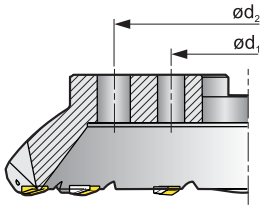
● stocked as standard /○ not stocked as standard
See price list for current availability.

IS57PN13

PENTA HD

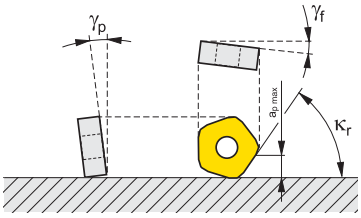


ø 4.000 – 6.000 in



ø 8.000 – 12.000 in

γ_p	-4°	κ_r	57°
γ_f	-8° – -5°	$a_{p\,max}$	.394 in



Z* - Number of teeth

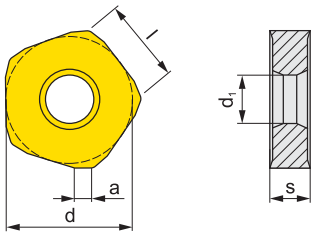
Dimensions [in].

Designation	Assortment	Dimensions											Cooling	[lbs]
		D	D_1	d	d_1	d_2	L	Z*						
400A05R-IS57PN13	●	4.000	4.629	1.500	-	-	1.969	5						2.63
500B06R-IS57PN13	●	5.000	5.629	1.500	2.205	-	2.480	6						5.03
600B08R-IS57PN13	●	6.000	6.628	2.000	3.465	-	2.480	8						7.04
800C10R-IS57PN13	●	8.000	8.627	2.500	4.000	-	2.480	10						14.73
1000C12R-IS57PN13	○	10.000	10.627	2.500	4.000	-	2.480	12						27.54
1200C14R-IS57PN13	○	12.000	12.627	2.500	4.000	7.000	3.150	14						45.52

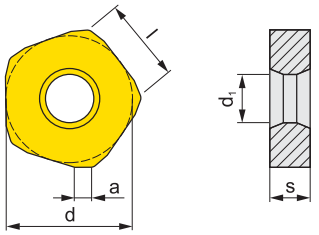
● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

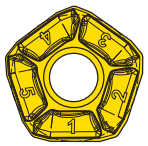
IS57PN13



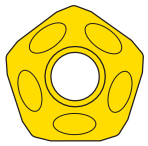
PNMU



PNMQ



PNMU-M



PNMQ

INDEXABLE CUTTING INSERTS

Designation	Grades				Dimensions				
	M9340	M8345	8215	8230	l	d	s	d_1	a
PNMU 1308DNSR-M	●	●	●	●	.512	.961	.313	.394	.118
PNMQ 1308DNSN	●	●		●	.512	.961	.313	.394	.118

SPARE PARTS

*) For screw torques see pages: M191 – M193.

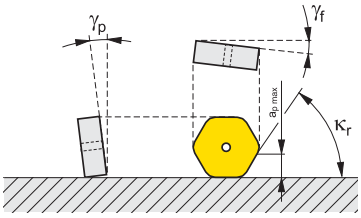
Diameter of cutter	Shim	Shim Clamping screw*	Screwdriver	Insert Clamping Screw*	Screwdriver	Screw for taper clamping
4.000	SPN 13T3DN	US 64010-T15P	SDR T15P	US 68026-T30P	SDR T30P-T	HCS 075200
5.000 – 12.000	SPN 13T3DN	US 64010-T15P	SDR T15P	US 68026-T30P	SDR T30P-T	-

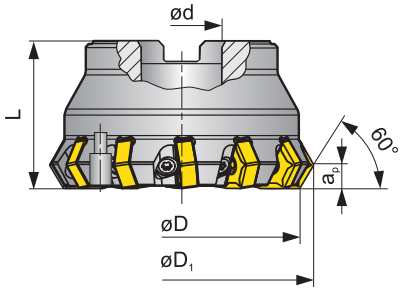
● stocked as standard /○ not stocked as standard
See price list for current availability.

IC60HN09

ECON HN

γ_p	-7°	κ_r	60°
γ_f	-5°	$a_{p\,max}$	.236 in





Z* - Number of teeth

Dimensions [in].

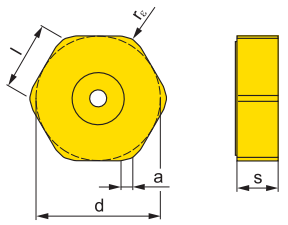
Designation	Assortment	Dimensions											Cooling	[lbs]
		D	D_1	d	d_1	L	b	t	Z*					
300A08R-IC60HN09	●	3.000	3.370	1,000	-	1.969	.382	.224	8					2.89
300A12R-IC60HN09	●	3.000	3.370	1,000	-	1.969	.382	.224	12					2.69
400A10R-IC60HN09	●	4.000	4.370	1.500	-	1.969	.630	.382	10					4.56
400A16R-IC60HN09	●	4.000	4.370	1.500	-	1.969	.630	.382	16					4.33
500B12R-IC60HN09	●	5.000	5.370	1.500	-	2.480	.630	.382	12					8.46
500B20R-IC60HN09	●	5.000	5.370	1.500	-	2.480	.630	.382	20					8.04
600B16R-IC60HN09	●	6.000	6.370	2.000	3.465	2.480	.756	.445	16					12.82
600B24R-IC60HN09	○	6.000	6.370	2.000	3.465	2.480	.756	.445	24					12.47
800C20R-IC60HN09	●	8.000	8.370	2.500	4.000	2.480	1,000	.559	20					20.10
800C32R-IC60HN09	○	8.000	8.370	2.500	4.000	2.480	1,000	.559	32					19.59
1000C24R-IC60HN09	○	10.000	10.370	2.500	4.000	2.480	1,000	.559	24					27.08
1000C40R-IC60HN09	○	10.000	10.370	2.500	4.000	2.480	1,000	.559	40					26.41

PRAMET

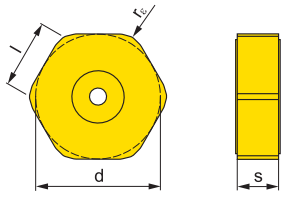
● stocked as standard /○ not stocked as standard
See price list for current availability.

IC60HN09

INSERTS FOR NEGATIVE FACE MILLING CUTTERS



HNEF



HNMF

HNEF-F

HNEF-M

HNEF-W

HNMF-R

INDEXABLE CUTTING INSERTS

Designation	Grades				Dimensions					
	M5315	M9325	M8310	8215	l	d	s	a		r_ε
HNEF 0905DNFN-F	●	○	●	●	.370	.638	.222	.063		.016
HNEF 090508EN-M	●	○		●	.370	.638	.222	-		.031
HNMF 090516SN-R	●	●		●	.370	.638	.222	-		.063
HNEF 0905ZZL-W	○			○	.133	.640	.222	.197		.031
HNEF 0905ZZR-W	●	○	●	●	.133	.640	.222	.197		.031

SPARE PARTS

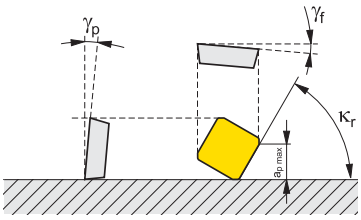
*) For screw torques see pages: M191 – M193.

Diameter of cutter	Clamping screw*	Driver	Driver handle	Screw for taper clamping			
3.000	US 74016-T15P	D-T08P/T15P	FG-15	HS 050125			
4.000	US 74016-T15P	D-T08P/T15P	FG-15	HCS 075200			
5.000 – 10.000	US 74016-T15P	D-T08P/T15P	FG-15	-			

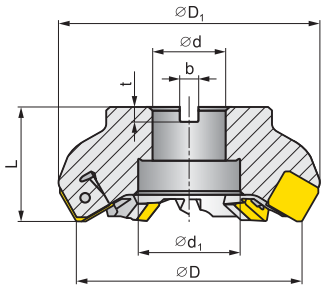
● stocked as standard /○ not stocked as standard
See price list for current availability.

IF60SB22X

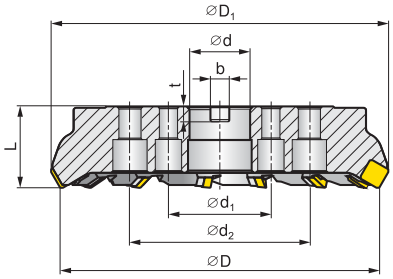
γ_p	+9°	κ_r	60°
γ_f	-9°	$a_{p\,max}$	.590 in



ROUGH SB



ø 5.000 – 6.000 in



ø 8.000 – 12.000 in

Z* - Number of teeth

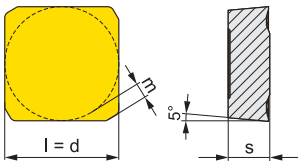
Dimensions [in].

Designation	Assortment	Dimensions											Cooling	[lbs]
		D	D_1	d	d_1	d_2	L	b	t	Z*				
500B07R-IF60SB22X	●	5.000	5.764	1.500	2.205	-	2.480	.630	.382	7				7.06
600B08R-IF60SB22X	●	6.000	6.736	2.000	3.465	-	2.480	.756	.445	8				12.57
800C10R-IF60SB22X	●	8.000	8.705	2.500	4.000	-	2.480	1.000	.559	10				19.40
1000C12R-IF60SB22X	○	10.000	10.685	2.500	4.000	-	2.480	1.000	.559	12				33.52
1200C14R-IF60SB22X	○	12.000	12.661	2.500	4.000	7.000	3.150	1.000	.559	14				73.21

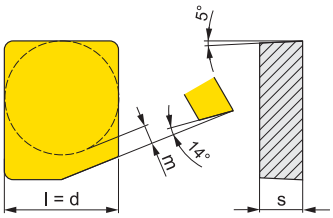
● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

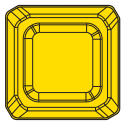
IF60SB22X



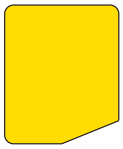
SBMR



SBKX



SBMR DZSR



SBKX DZER

Smothing inserts

INDEXABLE CUTTING INSERTS

Designation	Grades		Dimensions			
	M8326	M8346	l	d	s	m
SBMR 2207DZSR	●	●	.866	.866	.335	.111
SBKX 2207DZER	●		.866	.866	.335	.127

SPARE PARTS

*) For screw torques see pages: M191 – M193.

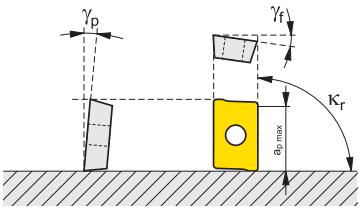
Diameter of cutter	Shim	Shim Clamping screw*	Key	Wedge	Differential screw	Key
5.000 – 12.000	LNX 220616	US 6013-T20P	SDR T20P-T	KU SBMR 2207	DS 01Z	KL 04

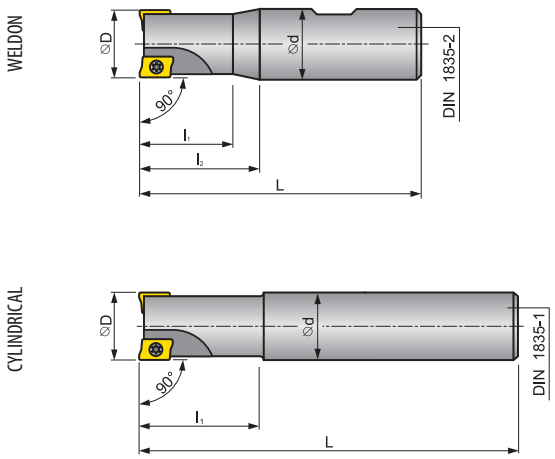
● stocked as standard /○ not stocked as standard
See price list for current availability.

ISAD11E

FORCE AD

γ_p	+4° – +11°	κ_r	90°
γ_f	-5.2° – -8.1°	$a_{p\,max}$	.354 in





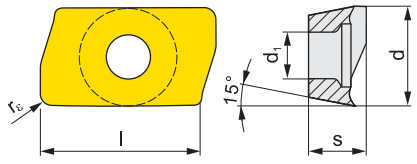
Z* - Number of teeth

Dimensions [in].

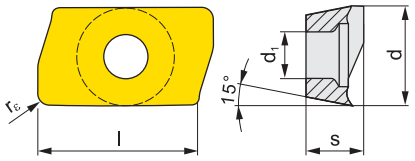
Designation	Assortment	Dimensions D	L	l_1	d	Z_*	Cooling	[lbs]
WELDON								
062A2R106W062-ISAD11E-C	●	.625	2.969	1.063	.625	2	+	.22
075A2R126W075-ISAD11E-C	●	.750	3.291	1.260	.750	2	+	.44
075A3R126W075-ISAD11E-C	●	.750	3.291	1.260	.750	3	+	.44
100A3R128W100-ISAD11E-C	●	1.000	3.780	1.280	1.000	3	+	.66
100A4R128W100-ISAD11E-C	●	1.000	3.780	1.280	1.000	4	+	.66
125A4R150W125-ISAD11E-C	●	1.250	4.000	1.500	1.250	4	+	.88
125A5R150W125-ISAD11E-C	●	1.250	4.000	1.500	1.250	5	+	.88
CYLINDRICAL								
062A2R094C062-ISAD11E-C	●	.625	5.315	.945	.625	2	+	.44
062A2R197C062-ISAD11E-C	●	.625	5.315	1.969	.625	2	+	.44
075A2R114C075-ISAD11E-C	●	.750	5.906	1.142	.750	2	+	.66
075A2R276C075-ISAD11E-C	●	.750	5.906	2.756	.750	2	+	.66
075A3R114C075-ISAD11E-C	●	.750	5.906	1.142	.750	3	+	.66
100A3R134C100-ISAD11E-C	●	1.000	6.693	1.339	1.000	3	+	1.10
100A3R315C100-ISAD11E-C	●	1.000	6.693	3.150	1.000	3	+	1.10
100A4R134C100-ISAD11E-C	●	1.000	6.693	1.339	1.000	4	+	1.10
125A3R354C125-ISAD11E-C	●	1.250	7.677	3.543	1.250	3	+	1.98
125A5R134C125-ISAD11E-C	●	1.250	7.677	1.339	1.250	5	+	1.98

● stocked as standard /○ not stocked as standard
See price list for current availability.

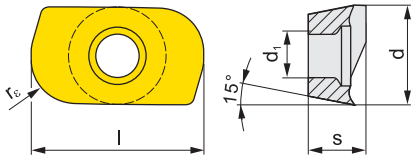
ISAD11E



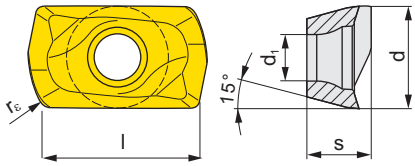
ADMX 11



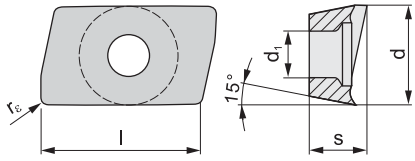
ADMX 11 (16)



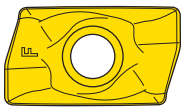
ADMX 11 (30)



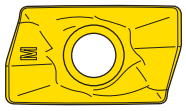
ADEX 11



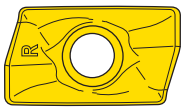
ADEX 11



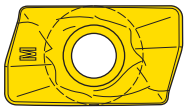
ADMX 11SR-F



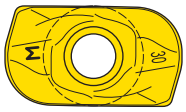
ADMX 11SR-M



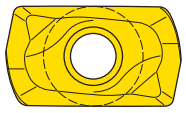
ADMX 11PR-R



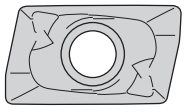
ADMX 11T316SR-M



ADMX 11T330SR-M



ADEX HF



ADEX FR-FA

● stocked as standard /○ not stocked as standard
See price list for current availability.

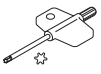
ISAD11E

INDEXABLE CUTTING INSERTS

Designation	Grades															Dimensions				
	M0315	M5315	M9315	M9325	M9340	M8340	8215	8230	HF7							(l)	d	s	d_1	r_ε
ADMX 11T304SR-F					●	●	●	●								.433	.257	.156	.114	.016
ADMX 11T308SR-F					●	●	●	●								.433	.257	.156	.114	.031
ADMX 11T302SR-M						●		●								.433	.257	.156	.114	.008
ADMX 11T304SR-M				●	●	●	●	●								.433	.257	.156	.114	.016
ADMX 11T308SR-M		●	●	●	●	●	●	●								.433	.257	.156	.114	.031
ADMX 11T310SR-M						●		●								.433	.257	.156	.114	.039
ADMX 11T312SR-M						●	●	●								.433	.257	.156	.114	.047
ADMX 11T316SR-M						●	●	●								.433	.257	.156	.114	.063
ADMX 11T320SR-M						●		●								.433	.257	.156	.114	.079
ADMX 11T325SR-M						●		●								.433	.257	.156	.114	.098
ADMX 11T330SR-M						●		●								.433	.257	.156	.114	.118
ADMX 11T308PR-R		●	●	●		●	●	●								.433	.257	.156	.114	.031
ADMX 11T316PR-R				●		●	●	●								.433	.257	.156	.114	.063
ADEX 11T308SR-HF						●	●	●								.433	.257	.156	.114	.031
ADEX 11T304FR-FA	●								●							.433	.257	.156	.114	.016
ADEX 11T308FR-FA	●								●							.433	.257	.156	.114	.031
ADEX 11T316FR-FA									●							.433	.257	.156	.114	.063

SPARE PARTS

*) For screw torques see pages: M191 – M193.

Diameter of cutter	Clamping screw*	Screwdriver
		
.625 – 1.250	US 2505-T08P	FLAG T08P

PRAMET

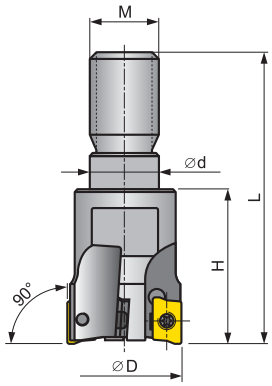
● stocked as standard /○ not stocked as standard
See price list for current availability.

FORCE AD

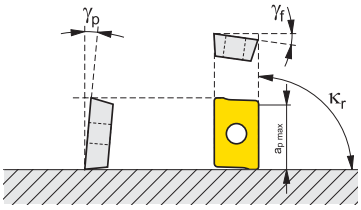
ISAD11E

EXCHANGEABLE HEAD FOR SQUARE SHOULDER AND SLOT MILLING CUTTERS

FORCE *AD*



γ_p	+4° – +11°	κ_r	90°
γ_f	-5.2° – -8.1°	$a_{p\,max}$	.354 in



Z* - Number of teeth

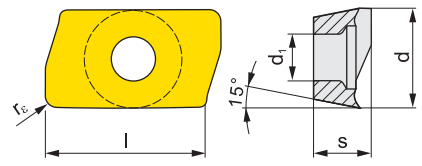
Dimensions [in].

Designation	Assortment	Dimensions											Cooling	[lbs]
		D	L	H	M	d	Z*							
062A2R094M08-ISAD11E-C	●	.625	1.496	.945	M8	.335	2						+	.22
075A2R102M10-ISAD11E-C	●	.750	1.772	1.024	M10	.413	2						+	.22
075A3R102M10-ISAD11E-C	●	.750	1.772	1.024	M10	.413	3						+	.22
100A3R138M12-ISAD11E-C	●	1.000	2.244	1.378	M12	.492	3						+	.22
100A4R138M12-ISAD11E-C	●	1.000	2.244	1.378	M12	.492	4						+	.22
125A4R169M16-ISAD11E-C	●	1.250	2.598	1.693	M16	.669	4						+	.22
125A5R169M16-ISAD11E-C	●	1.250	2.598	1.693	M16	.669	5						+	.22
150A4R169M16-ISAD11E-C	●	1.500	2.598	1.693	M16	.669	4						+	.44
150A6R169M16-ISAD11E-C	●	1.500	2.598	1.693	M16	.669	6						+	.44

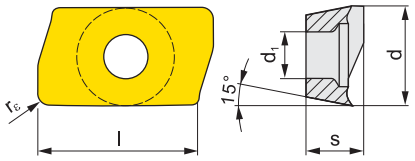
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

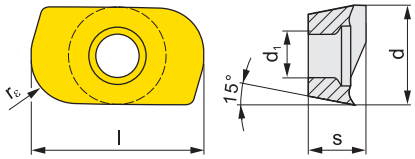
ISAD11E



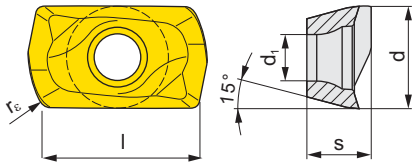
ADMX 11



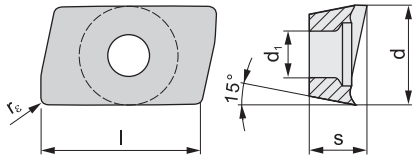
ADMX 11 (16)



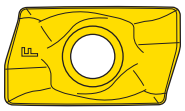
ADMX 11 (30)



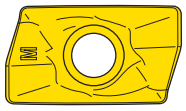
ADEX 11



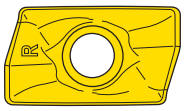
ADEX 11



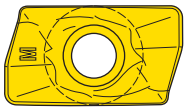
ADMX 11SR-F



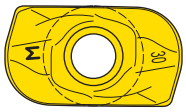
ADMX 11SR-M



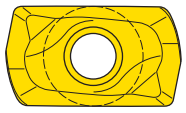
ADMX 11PR-R



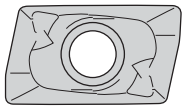
ADMX 11T316SR-M



ADMX 11T330SR-M



ADEX HF



ADEX FR-FA

● stocked as standard /○ not stocked as standard
See price list for current availability.

ISAD11E

EXCHANGEABLE HEAD FOR SQUARE SHOULDER AND SLOT MILLING CUTTERS

INDEXABLE CUTTING INSERTS

Designation	Grades															Dimensions				
	M0315	M5315	M9315	M9325	M9340	M8340	8215	8230	HF7							(l)	d	s	d_1	r_ε
ADMX 11T304SR-F					●	●	●	●								.433	.257	.156	.114	.016
ADMX 11T308SR-F					●	●	●	●								.433	.257	.156	.114	.031
ADMX 11T302SR-M						●		●								.433	.257	.156	.114	.008
ADMX 11T304SR-M				●	●	●	●	●								.433	.257	.156	.114	.016
ADMX 11T308SR-M		●	●	●	●	●	●	●								.433	.257	.156	.114	.031
ADMX 11T310SR-M						●		●								.433	.257	.156	.114	.039
ADMX 11T312SR-M						●	●	●								.433	.257	.156	.114	.047
ADMX 11T316SR-M						●	●	●								.433	.257	.156	.114	.063
ADMX 11T320SR-M						●		●								.433	.257	.156	.114	.079
ADMX 11T325SR-M						●		●								.433	.257	.156	.114	.098
ADMX 11T330SR-M						●		●								.433	.257	.156	.114	.118
ADMX 11T308PR-R		●	●	●		●	●	●								.433	.257	.156	.114	.031
ADMX 11T316PR-R				●		●	●	●								.433	.257	.156	.114	.063
ADEX 11T308SR-HF						●	●	●								.433	.257	.156	.114	.031
ADEX 11T304FR-FA	●								●							.433	.257	.156	.114	.016
ADEX 11T308FR-FA	●								●							.433	.257	.156	.114	.031
ADEX 11T316FR-FA									●							.433	.257	.156	.114	.063

SPARE PARTS

*) For screw torques see pages: M191 – M193.

Diameter of cutter	Clamping screw*	Screwdriver
.625 – 1.500	US 2505-T08P	FLAG T08P

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

ISAD11E

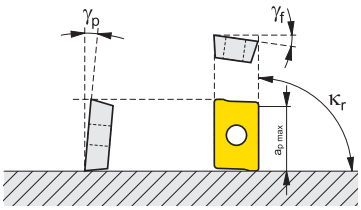
EXCHANGEABLE HEAD FOR SQUARE SHOULDER AND SLOT MILLING CUTTERS

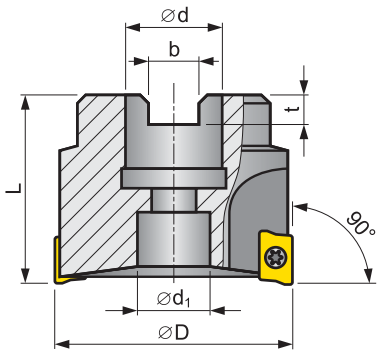
FORCE AD

IS90AD11E

FORCE AD

γ_p	+11° – +12°	κ_r	90°
γ_f	-5.2° – -8.1°	$a_{p\,max}$	.354 in





Z* - Number of teeth

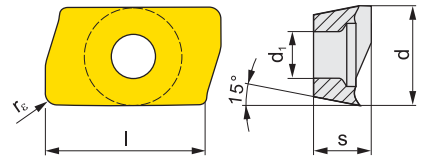
Dimensions [in].

Designation	Assortment	Dimensions											Cooling	[lbs]
		D	d	d_1	L	b	t	Z*						
150A04R-IS90AD11E-C	●	1.500	.500	.433	1.575	.258	.165	4					+	.44
150A06R-IS90AD11E-C	●	1.500	.500	.433	1.575	.258	.165	6					+	.44
200A05R-IS90AD11E-C	●	2.000	.750	.630	1.575	.321	.193	5					+	.66
200A07R-IS90AD11E-C	●	2.000	.750	.630	1.575	.321	.193	7					+	.66
250A06R-IS90AD11E-C	●	2.500	.750	.630	1.575	.321	.193	6					+	1.10
250A09R-IS90AD11E-C	●	2.500	.750	.630	1.575	.321	.193	9					+	1.10
300A10R-IS90AD11E-C	●	3.000	1.000	.827	1.969	.382	.224	10					+	2.21
400A11R-IS90AD11E-C	●	4.000	1.500	1.260	1.969	.630	.382	11					+	3.75
500A12R-IS90AD11E-C	●	5.000	1.500	1.260	2.480	.630	.382	12					+	7.72

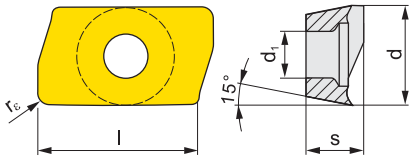
● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

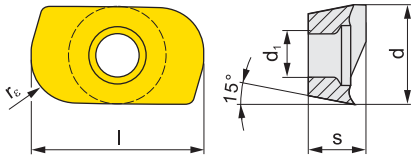
IS90AD11E



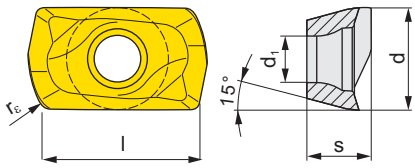
ADMX 11



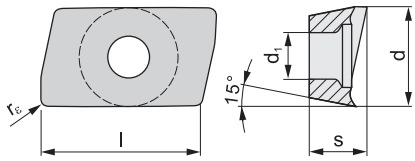
ADMX 11 (16)



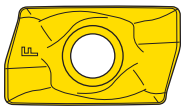
ADMX 11 (30)



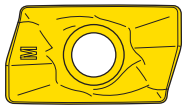
ADEX 11



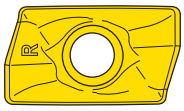
ADEX 11



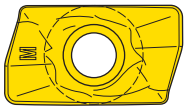
ADMX 11SR-F



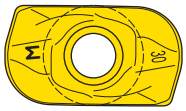
ADMX 11SR-M



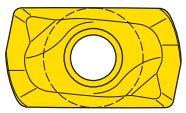
ADMX 11PR-R



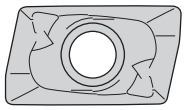
ADMX 11T316SR-M



ADMX 11T330SR-M



ADEX HF



ADEX FR-FA

● stocked as standard /○ not stocked as standard
See price list for current availability.

IS90AD11E

INDEXABLE CUTTING INSERTS

Designation	Grades															Dimensions				
	M0315	M5315	M9315	M9325	M9340	M8340	8215	8230	HF7							(l)	d	s	d_1	r_ε
ADMX 11T304SR-F					●	●	●	●								.433	.257	.156	.114	.016
ADMX 11T308SR-F					●	●	●	●								.433	.257	.156	.114	.031
ADMX 11T302SR-M						●		●								.433	.257	.156	.114	.008
ADMX 11T304SR-M				●	●	●	●	●								.433	.257	.156	.114	.016
ADMX 11T308SR-M		●	●	●	●	●	●	●								.433	.257	.156	.114	.031
ADMX 11T310SR-M						●		●								.433	.257	.156	.114	.039
ADMX 11T312SR-M						●	●	●								.433	.257	.156	.114	.047
ADMX 11T316SR-M						●	●	●								.433	.257	.156	.114	.063
ADMX 11T320SR-M						●		●								.433	.257	.156	.114	.079
ADMX 11T325SR-M						●		●								.433	.257	.156	.114	.098
ADMX 11T330SR-M						●		●								.433	.257	.156	.114	.118
ADMX 11T308PR-R		●	●	●		●	●	●								.433	.257	.156	.114	.031
ADMX 11T316PR-R				●		●	●	●								.433	.257	.156	.114	.063
ADEX 11T308SR-HF						●	●	●								.433	.257	.156	.114	.031
ADEX 11T304FR-FA	●								●							.433	.257	.156	.114	.016
ADEX 11T308FR-FA	●								●							.433	.257	.156	.114	.031
ADEX 11T316FR-FA									●							.433	.257	.156	.114	.063

SPARE PARTS

*) For screw torques see pages: M191 – M193.

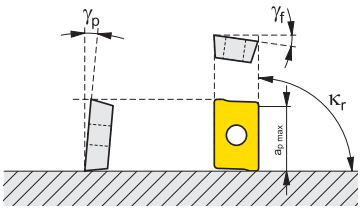
Diameter of cutter	Clamping screw*	Driver	Driver handle	Screw for taper clamping			
							
1.500	US 2505-T08P	D-T08P/T15P	FG-15	HS 025100			
2.000 – 2.500	US 2505-T08P	D-T08P/T15P	FG-15	HS 037100			
3.000	US 2505-T08P	D-T08P/T15P	FG-15	HS 050125			
4.000 – 5.000	US 2505-T08P	D-T08P/T15P	FG-15	HS 075125			

● stocked as standard /○ not stocked as standard
See price list for current availability.

FORCE AD

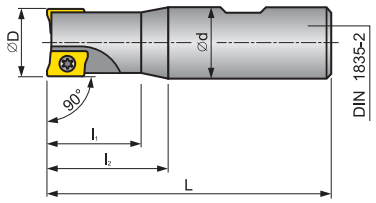
ISAD16E

γ_p	+5° – 10.5°	κ_r	90°
γ_f	-8.2° – -13°	$a_{p\,max}$	.512 in

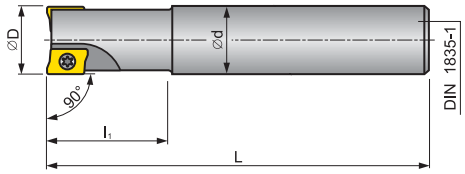


FORCE AD

WELDON



CYLINDRICAL



Z* - Number of teeth

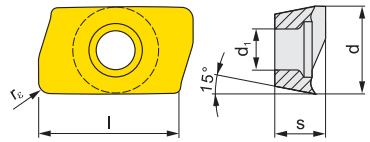
Dimensions [in].

Designation	Assortment	Dimensions D	L	l_1	d	Z*	Cooling	[lbs]
WELDON								
100A2R128W100-ISAD16E-C	●	1.000	3.780	1.280	1.000	2	+	.66
125A3R150W125-ISAD16E-C	●	1.250	4.000	1.500	1.250	3	+	1.10
150A3R160W125-ISAD16E-C	●	1.500	4.350	1.600	1.250	3	+	1.32
150A4R160W125-ISAD16E-C	●	1.500	4.350	1.600	1.250	4	+	1.32
CYLINDRICAL								
100A2R130C100-ISAD16E-C	●	1.000	6.496	1.300	1.000	2	+	1.10
125A3R130C125-ISAD16E-C	●	1.250	7.677	1.300	1.250	3	+	1.98

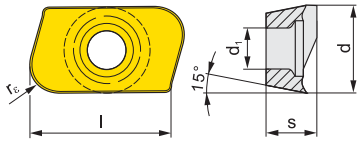
● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

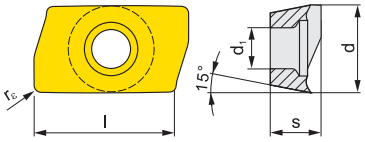
ISAD16E



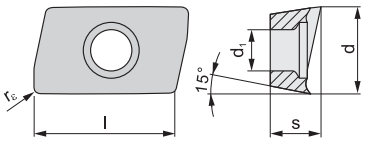
ADMX 16



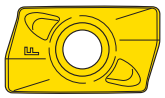
ADMX 16 (16/32)



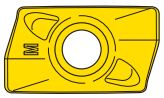
ADEX 16



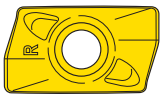
ADEX 16



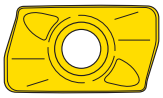
ADMX 16SR-F



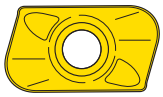
ADMX 16SR-M



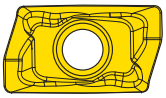
ADMX 16PR-R



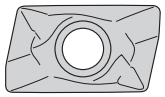
ADMX 160616SR-M



ADMX 160632SR-M



ADEX 16 SR-FM



ADEX 16 FR-FA

INDEXABLE CUTTING INSERTS

Designation	Grades															Dimensions				
	M5315	M9315	M9325	M9340	M8340	8215	8230	HF7								(l)	d	s	d_1	r_ε
ADMX 160608SR-F				●	●	●	●									.630	.392	.246	.177	.031
ADMX 160608SR-M	●	●	●	●	●	●	●									.630	.392	.246	.177	.031
ADMX 160608PR-R	●	●	●		●	●	●									.630	.392	.246	.177	.031
ADMX 160616SR-M			●		●	●	●									.630	.392	.246	.177	.063
ADMX 160632SR-M			●		●	●	●									.630	.392	.246	.177	.126
ADEX 160608SR-FM			●	●	●	●	●									.630	.392	.246	.177	.031
ADEX 160608FR-FA								●								.630	.392	.246	.177	.031

SPARE PARTS

*) For screw torques see pages: M191 – M193.

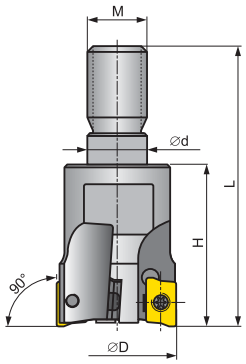
Diameter of cutter	Clamping screw*	Screwdriver
1.000 – 1.500	US 4008-T15P	FLAG T15P

● stocked as standard / ○ not stocked as standard
See price list for current availability.

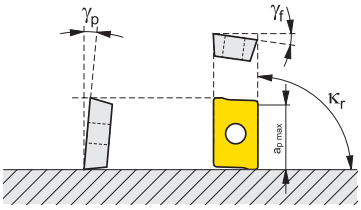
ISAD16E

EXCHANGEABLE HEADS FOR SQUARE SHOULDER AND SLOT MILLING CUTTERS

FORCE AD



γ_p	+7° – +10.5°	κ_r	90°
γ_f	-8.2° – -12°	$a_{p\,max}$	.512 in



Z* - Number of teeth

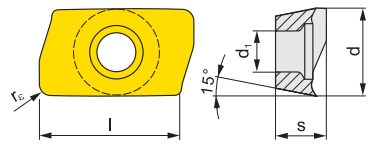
Dimensions [in].

Designation	Assortment	Dimensions											Cooling	[lbs]
		D	L	H	M	d	Z*							
125A3R169M16-ISAD16E-C	●	1.250	2.596	1.690	M16	.669	3						+	.44
150A4R169M16-ISAD16E-C	●	1.500	2.596	1.690	M16	.669	4						+	.44

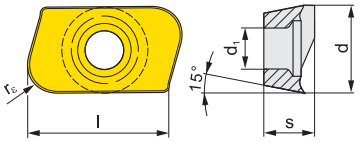
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

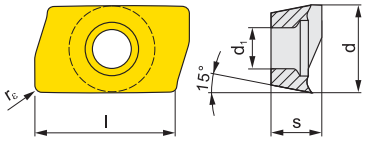
ISAD16E



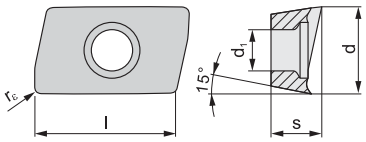
ADMX 16



ADMX 16 (16/32)

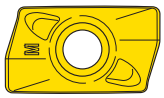


ADEX 16

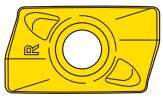


ADEX 16

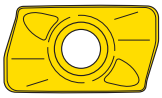
ADMX 16SR-F



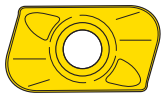
ADMX 16SR-M



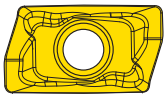
ADMX 16PR-R



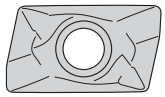
ADMX 160616SR-M



ADMX 160632SR-M



ADEX 16 SR-FM



ADEX 16 FR-FA

INDEXABLE CUTTING INSERTS

Designation	Grades															Dimensions				
	M5315	M9315	M9325	M9340	M8340	8215	8230	HF7								(l)	d	s	d_1	r_ε
ADMX 160608SR-F				●	●	●	●									.630	.392	.246	.177	.031
ADMX 160608SR-M	●	●	●	●	●	●	●									.630	.392	.246	.177	.031
ADMX 160608PR-R	●	●	●		●	●	●									.630	.392	.246	.177	.031
ADMX 160616SR-M			●		●	●	●									.630	.392	.246	.177	.063
ADMX 160632SR-M			●		●	●	●									.630	.392	.246	.177	.126
ADEX 160608SR-FM			●	●	●	●	●									.630	.392	.246	.177	.031
ADEX 160608FR-FA								●								.630	.392	.246	.177	.031

SPARE PARTS

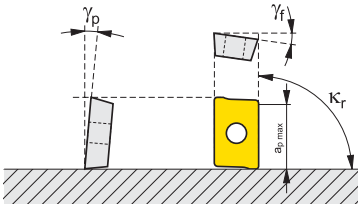
*) For screw torques see pages: M191 – M193.

Diameter of cutter	Clamping screw*	Screwdriver
1.250 – 1.500	US 4008-T15P	FLAG T15P

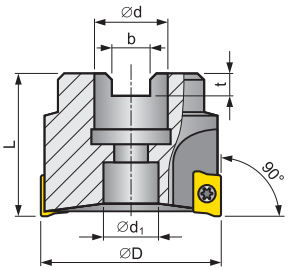
● stocked as standard /○ not stocked as standard
See price list for current availability.

IS90AD16E

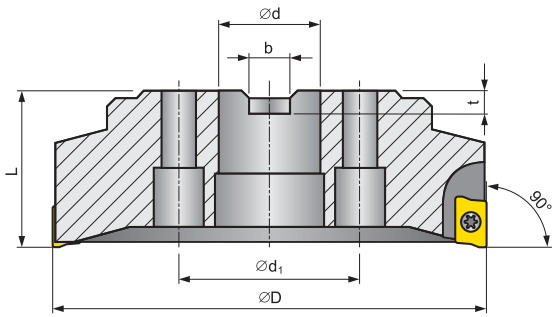
γ_p	+10.5° – 12°	κ_r	90°
γ_f	-3.8° – -8.2°	$a_{p\,max}$	.512 in



FORCE AD



ø 1.500 – 5.000 in



ø 6.000 in

Z* - Number of teeth

Dimensions [in].

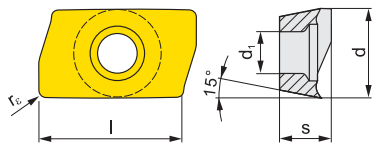
Designation	Assortment	Dimensions D	d	d_1	L	b	t	Z*					Cooling	[lbs]
150A04R-IS90AD16E-C	●	1.500	.500	.433	1.575	.258	.165	4					+	.44
200A03R-IS90AD16E-C	●	2.000	.750	.630	1.575	.321	.193	3					+	.66
200A05R-IS90AD16E-C	●	2.000	.750	.630	1.575	.321	.193	5					+	.66
250A04R-IS90AD16E-C	●	2.500	.750	.630	1.575	.321	.193	4					+	1.10
250A06R-IS90AD16E-C	●	2.500	.750	.630	1.575	.321	.193	6					+	1.10
300A05R-IS90AD16E-C	●	3.000	1.000	.827	1.969	.382	.224	5					+	2.21
300A07R-IS90AD16E-C	●	3.000	1.000	.827	1.969	.382	.224	7					+	2.21
400A06R-IS90AD16E-C	●	4.000	1.500	1.260	1.969	.630	.382	6					+	3.97
400A08R-IS90AD16E-C	●	4.000	1.500	1.260	1.969	.630	.382	8					+	3.75
500A09R-IS90AD16E-C	●	5.000	1.500	1.260	2.480	.630	.382	9					+	7.72
600B10R-IS90AD16E	●	6.000	1.575	3.465	2.480	.756	.445	10						12.57

PRAMET

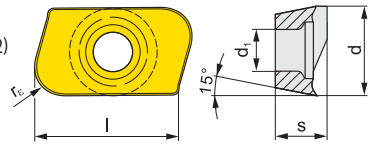
● stocked as standard /○ not stocked as standard
See price list for current availability.

IS90AD16E

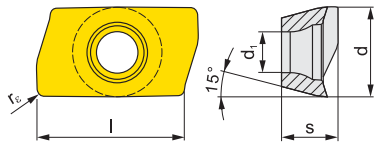
ADMX 16



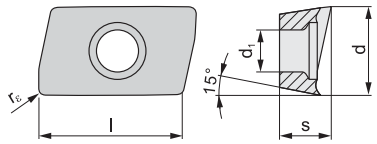
ADMX 16 (16, 32)

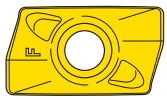


ADEX 16

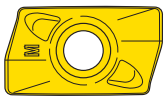


ADEX 16

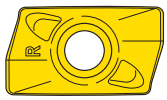




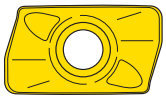
ADMX 16SR-F



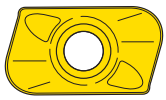
ADMX 16SR-M



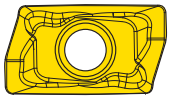
ADMX 16PR-R



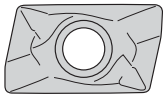
ADMX 160616SR-M



ADMX 160632SR-M



ADEX 16SR-FM



ADEX 16FR-FA

INDEXABLE CUTTING INSERTS

Designation	Grades								Dimensions				
	M5315	M9315	M9325	M9340	M8340	8215	8230	HF7	(l)	d	s	d_1	r_ε
ADMX 160608SR-F				●	●	●	●		.630	.392	.246	.177	.031
ADMX 160608SR-M	●	●	●	●	●	●	●		.630	.392	.246	.177	.031
ADMX 160608PR-R	●	●	●		●	●	●		.630	.392	.246	.177	.031
ADMX 160616SR-M			●		●	●	●		.630	.392	.246	.177	.063
ADMX 160632SR-M			●		●	●	●		.630	.392	.246	.177	.126
ADEX 160608SR-FM			●	●	●	●	●		.630	.392	.246	.177	.031
ADEX 160608FR-FA								●	.630	.392	.246	.177	.031

SPARE PARTS

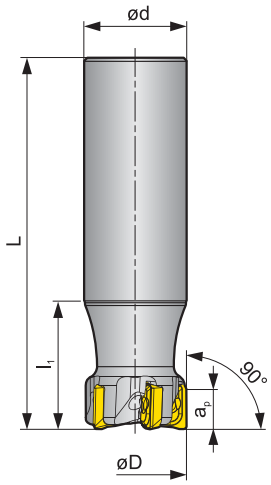
*) For screw torques see pages: M191 – M193.

Diameter of cutter	Clamping screw*	Driver	Driver handle	Screw for taper clamping
1.500	US 4008-T15P	D-T08P/T15P	FG-15	HS 025100
2.000 – 2.500	US 4011-T15P	D-T08P/T15P	FG-15	HS 037100
3.000	US 4011-T15P	D-T08P/T15P	FG-15	HS 050125
4.000 – 5.000	US 4011-T15P	D-T08P/T15P	FG-15	HS 075125
6.000	US 4011-T15P	D-T08P/T15P	FG-15	-

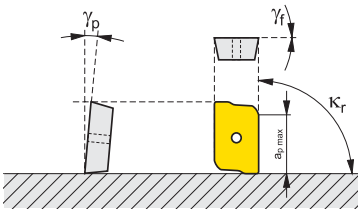
● stocked as standard /○ not stocked as standard
See price list for current availability.

ICAD15

MULTISIDE AD



γ_p	2°	κ_r	90°
γ_f	0°	$a_{p\,max}$	.394 in



Z* - Number of teeth

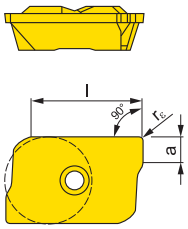
Dimensions [in].

Designation	Assortment	Dimensions											Cooling	[lbs]
		D	L	l_1	d	Z*								
100A3R157C100-ICAD15-C	●	1,000	6.299	1.575	1.000	3							+	1.09
125A5R157C125-ICAD15-C	●	1.250	7.874	1.575	1.250	5							+	2.29

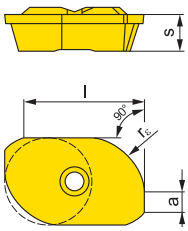
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

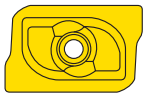
ICAD15



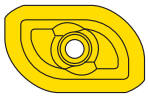
ADKX 15 (04, 08)



ADKX 15 (30, 40, 60)



ADKX 15 (04, 08)



ADKX 15 (30, 40, 60)

INDEXABLE CUTTING INSERTS

Designation	Grades															Dimensions					
	M8345	8230														l	d	s	a		r_ε
ADKX 15T304ER-F	●	●														.480	.375	.156	.102		.016
ADKX 15T308ER-F	●	●														.480	.375	.156	.087		.031
ADKX 15T330ER-F	●	●														.488	.375	.156	.100		.118
ADKX 15T340ER-F	●	●														.492	.375	.156	.100		.157
ADKX 15T360ER-F*	●	●														.496	.375	.156	.079		.236

*) When using inserts with corner radius r_ε = 6.0 mm, the cutter body must be modified!

SPARE PARTS

*) For screw torques see pages: M191 – M193.

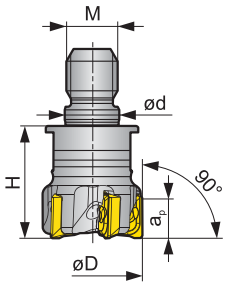
Diameter of cutter	Clamping screw*	Screwdriver
1.000 – 1.250	US 63511D-T15P	FLAG T15P

● stocked as standard /○ not stocked as standard
See price list for current availability.

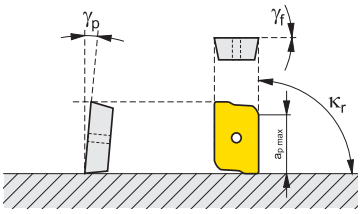
ICAD15

EXCHANGEABLE HEADS FOR SQUARE SHOULDER AND SLOT MILLING CUTTERS

MULTISIDE AD



γ_p	2°	κ_r	90°
γ_f	0°	$a_{p\,max}$	.394 in



Z* - Number of teeth

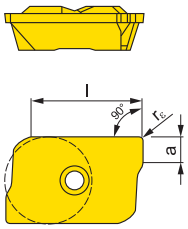
Dimensions [in].

Designation	Assortment	Dimensions											Cooling	[lbs]
		D	d	M	H	Z*								
100A3R118M12-ICAD15-C	●	1.000	.492	M12	1.181	3							+	.15
125A5R138M16-ICAD15-C	●	1.250	.669	M16	1.378	5							+	.33
150A6R138M16-ICAD15-C	●	1.500	.669	M16	1.378	6							+	.40

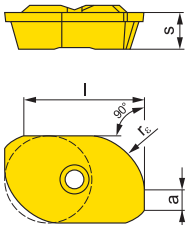
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

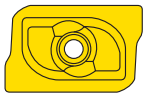
ICAD15



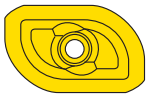
ADKX 15 (04, 08)



ADKX 15 (30, 40, 60)



ADKX 15 (04, 08)



ADKX 15 (30, 40, 60)

INDEXABLE CUTTING INSERTS

Designation	Grades															Dimensions					
	M8345	8230														l	d	s	a		r_ε
ADKX 15T304ER-F	●	●														.480	.375	.156	.102		.016
ADKX 15T308ER-F	●	●														.480	.375	.156	.087		.031
ADKX 15T330ER-F	●	●														.488	.375	.156	.100		.118
ADKX 15T340ER-F	●	●														.492	.375	.156	.100		.157
ADKX 15T360ER-F*	●	●														.496	.375	.156	.079		.236

*) When using inserts with corner radius r_ε = 6.0 mm, the cutter body must be modified!

SPARE PARTS

*) For screw torques see pages: M191 – M193.

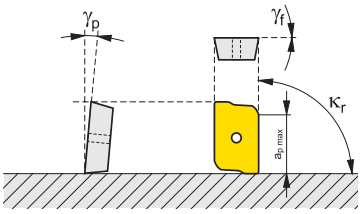
Diameter of cutter	Clamping screw*	Screwdriver
1.000 – 1.500	US 63511D-T15P	FLAG T15P

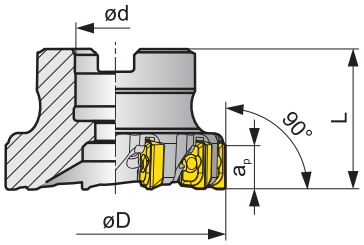
● stocked as standard /○ not stocked as standard
See price list for current availability.

IC90AD15

MULTISIDE AD

γ_p	2°	κ_r	90°
γ_f	0°	$a_{p\,max}$	.394 in





Z* - Number of teeth

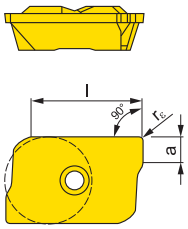
Dimensions [in].

Designation	Assortment	Dimensions											Cooling	[lbs]
		D	d	d_1	L	b	t	Z*						
150A06R-IC90AD15-C	●	1.500	.750	.630	1.575	.321	.193	6					+	.36
200A08R-IC90AD15-C	●	2.000	1,000	.827	1.575	.382	.224	8					+	.57
250A10R-IC90AD15-C	●	2.500	1,000	.827	1.575	.382	.224	10					+	.87
300A10R-IC90AD15-C	●	3.000	1.250	1.063	1.969	.508	.287	10					+	1.57
300A14R-IC90AD15-C	●	3.000	1.250	1.063	1.969	.508	.287	14					+	1.57

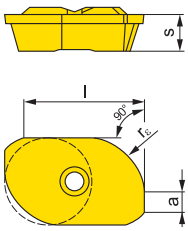
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

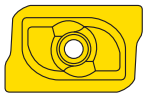
IC90AD15



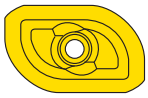
ADKX 15 (04, 08)



ADKX 15 (30, 40, 60)



ADKX 15 (04, 08)



ADKX 15 (30, 40, 60)

INDEXABLE CUTTING INSERTS

Designation	Grades																Dimensions					
	M8345	8230															l	d	s	a		r_ε
ADKX 15T304ER-F	●	●															.480	.375	.156	.102		.016
ADKX 15T308ER-F	●	●															.480	.375	.156	.087		.031
ADKX 15T330ER-F	●	●															.488	.375	.156	.100		.118
ADKX 15T340ER-F	●	●															.492	.375	.156	.100		.157
ADKX 15T360ER-F	●	●															.496	.375	.156	.079		.236

*) When using inserts with corner radius r_ε = 6.0 mm, the cutter body must be modified!

SPARE PARTS

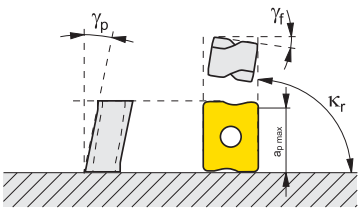
*) For screw torques see pages: M191 – M193.

Diameter of cutter	Clamping screw*	Driver	Driver handle	Screw for taper clamping			
1.500	US 63511D-T15P	D-T08P/T15P	FG-15	HS 037100			
2.000 – 2.500	US 63511D-T15P	D-T08P/T15P	FG-15	HS 050125			
3.000	US 63511D-T15P	D-T08P/T15P	FG-15	HS 062125			

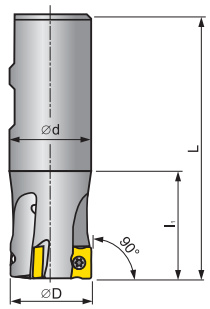
● stocked as standard /○ not stocked as standard
See price list for current availability.

ISLN12

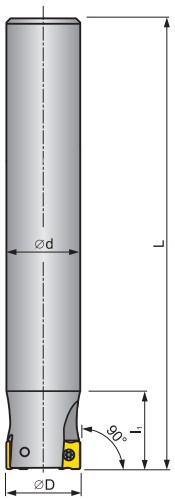
γ_p	-6° – -8°	κ_r	90°
γ_f	-15° – -23°	$a_{p\,max}$	.354 in



ECON LN



WELDON



CYLINDRICAL

Z* - Number of teeth

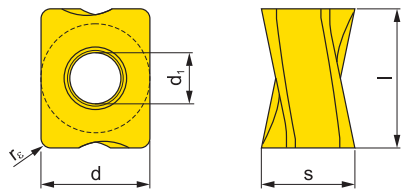
Dimensions [in].

Designation	Assortment	Dimensions D	d	L	l_1	Z*							Cooling	[lbs]
WELDON														
100A2R128W100-ISLN12-C	●	1.000	1.000	3.819	1.280	2							+	.22
125A3R150W125-ISLN12-C	●	1.250	1.250	4.039	1.500	3							+	1.10
150A4R160W125-ISLN12-C	●	1.500	1.250	.452	1.600	4							+	1.32
CYLINDRICAL														
100A2R134C100-ISLN12-C	●	1.000	1.000	6.693	1.340	2							+	1.10
100A2R315C100-ISLN12-C	●	1.000	1.000	6.693	3.150	2							+	1.10
125A2R134C125-ISLN12-C	●	1.250	1.250	7.677	1.340	2							+	1.98
125A2R354C125-ISLN12-C	●	1.250	1.250	7.677	3.543	2							+	1.98

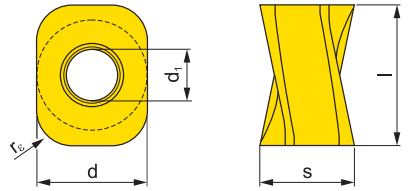
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

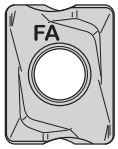
ISLN12



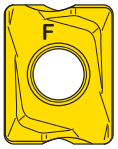
LNGX 12



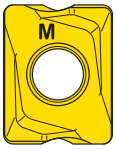
LNGU 12



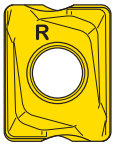
LNGX 12-FA



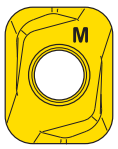
LNGX 12-F



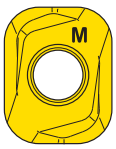
LNGX 12-M



LNGX 12-R



LNGU 120525ER-M



LNGU 120530ER-M

INDEXABLE CUTTING INSERTS

Designation	Grades															Dimensions				
	M0315	M5315	M9315	M9325	M9340	M8340	8215	8230	HF7							(l)	d	s	d_1	r_ε
LNGX 120504ER-F						●	●	●								.472	.374	.280	.177	.016
LNGX 120508ER-F						●	●	●								.472	.374	.280	.177	.031
LNGX 120504ER-M						●		●								.472	.374	.280	.177	.016
LNGX 120508ER-M			●	●	●	●	●	●								.472	.374	.280	.177	.031
LNGX 120512ER-M						●		●								.472	.374	.280	.177	.047
LNGX 120516ER-M						●		●								.472	.374	.280	.177	.063
LNGX 120520ER-M						●		●								.472	.374	.280	.177	.079
LNGU 120525ER-M						●		●								.472	.374	.280	.177	.098
LNGU 120530ER-M						●		●								.472	.374	.280	.177	.118
LNGX 120508SR-R		●	●	●	●	●	●	●								.472	.374	.280	.177	.031
LNGX 120516SR-R				●		●	●	●								.472	.374	.280	.177	.063
LNGX 120504FR-FA									●							.472	.374	.280	.177	.016
LNGX 120508FR-FA	●								●							.472	.374	.280	.177	.031

SPARE PARTS

*) For screw torques see pages: M191 – M193.

Diameter of cutter	Clamping screw*	Screwdriver
1.000 – 1.500	US 44012-T15P	FLAG T15P

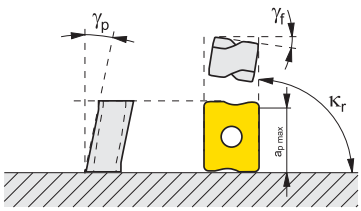
● stocked as standard /○ not stocked as standard
See price list for current availability.

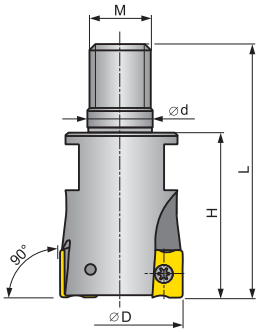
ISLN12

EXCHANGEABLE HEADS FOR SQUARE SHOULDER AND SLOT MILLING CUTTERS

ECON *LN*

γ_p	-6°	κ_r	90°
γ_f	-15°	$a_{p\,max}$	.354 in





Z* - Number of teeth

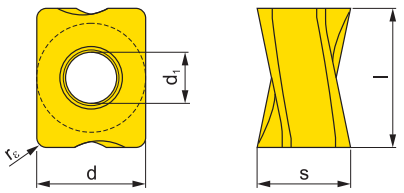
Dimensions [in].

Designation	Assortment	Dimensions											Cooling	[lbs]
		D	d	M	H	L	Z*							
100A2R138M12-ISLN12-C	●	1.000	.492	M12	1.378	2.244	2						+	.22
125A2R169M16-ISLN12-C	●	1.250	.669	M16	1.693	2.598	2						+	.44
125A3R169M16-ISLN12-C	●	1.250	.669	M16	1.693	2.598	3						+	.44
150A3R169M16-ISLN12-C	●	1.500	.669	M16	1.693	2.598	3						+	.44

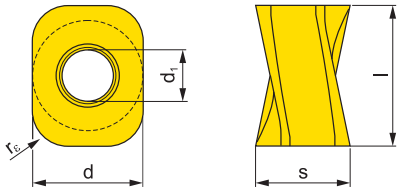
● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

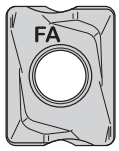
ISLN12



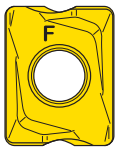
LNGX 12



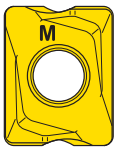
LNGU 12



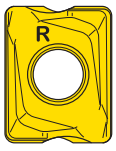
LNGX 12-FA



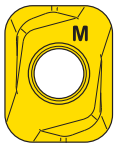
LNGX 12-F



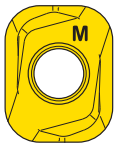
LNGX 12-M



LNGX 12-R



LNGU 120525ER-M



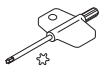
LNGU 120530ER-M

INDEXABLE CUTTING INSERTS

Designation	Grades									Dimensions				
	M0315	M5315	M9315	M9325	M9340	M8340	8215	8230	HF7	(l)	d	s	d_1	r_ε
LNGX 120504ER-F						●	●	●		.472	.374	.280	.177	.016
LNGX 120508ER-F						●	●	●		.472	.374	.280	.177	.031
LNGX 120504ER-M						●		●		.472	.374	.280	.177	.016
LNGX 120508ER-M			●	●	●	●	●	●		.472	.374	.280	.177	.031
LNGX 120512ER-M						●		●		.472	.374	.280	.177	.047
LNGX 120516ER-M						●		●		.472	.374	.280	.177	.063
LNGX 120520ER-M						●		●		.472	.374	.280	.177	.079
LNGU 120525ER-M						●		●		.472	.374	.280	.177	.098
LNGU 120530ER-M						●		●		.472	.374	.280	.177	.118
LNGX 120508SR-R		●	●	●	●	●	●	●		.472	.374	.280	.177	.031
LNGX 120516SR-R				●		●	●	●		.472	.374	.280	.177	.063
LNGX 120504FR-FA									●	.472	.374	.280	.177	.016
LNGX 120508FR-FA	●								●	.472	.374	.280	.177	.031

SPARE PARTS

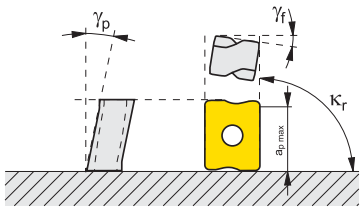
*) For screw torques see pages: M191 – M193.

Diameter of cutter	Clamping screw*	Screwdriver
		
1.000 – 1.500	US 44012-T15P	FLAG T15P

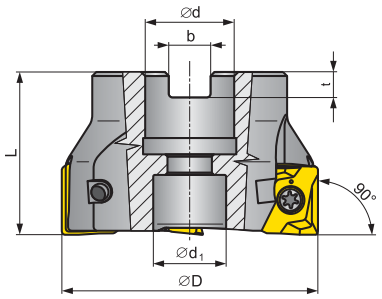
● stocked as standard /○ not stocked as standard
See price list for current availability.

IS90LN12

γ_p	-6°	κ_r	90°
γ_f	-14° – -15°	$a_{p\,max}$	.354 in



ECON LN



Z* - Number of teeth

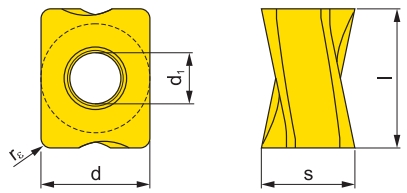
Dimensions [in].

Designation	Assortment	Dimensions											Cooling	[lbs]
		D	d	d_1	L	b	t	Z*						
150A04R-IS90LN12-C	●	1.500	.500	.433	1.575	.258	.165	4					+	.44
200A04R-IS90LN12-C	●	2.000	.750	.630	1.575	.321	.193	4					+	.66
200A05R-IS90LN12-C	●	2.000	.750	.630	1.575	.321	.193	5					+	.66
250A04R-IS90LN12-C	●	2.500	.750	.630	1.575	.321	.193	4					+	1.10
250A06R-IS90LN12-C	●	2.500	.750	.630	1.575	.321	.193	6					+	1.10
300A05R-IS90LN12-C	●	3.000	1.000	.827	1.969	.382	.224	5					+	2.21
300A07R-IS90LN12-C	●	3.000	1.000	.827	1.969	.382	.224	7					+	2.21
400A06R-IS90LN12-C	●	4.000	1.500	1.260	1.969	.630	.382	6					+	3.75
400A08R-IS90LN12-C	●	4.000	1.500	1.260	1.969	.630	.382	8					+	3.75
500A07R-IS90LN12-C	●	5.000	1.500	1.260	2.480	.630	.382	7					+	7.06
500A09R-IS90LN12-C	●	5.000	1.500	1.260	2.480	.630	.382	9					+	7.06

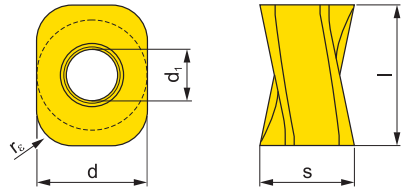
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

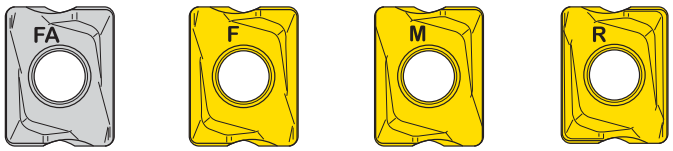
IS90LN12



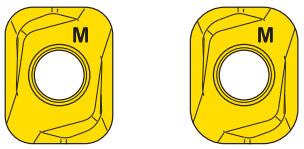
LNGX 12



LNGU 12



LNGX 12-FA | LNGX 12-F | LNGX 12-M | LNGX 12-R



LNGU 120525ER-M | LNGU 120530ER-M

INDEXABLE CUTTING INSERTS

Designation	Grades															Dimensions				
	M0315	M5315	M9315	M9325	M9340	M8340	8215	8230	HF7							(l)	d	s	d_1	r_ε
LNGX 120504ER-F						●	●	●								.472	.374	.280	.177	.016
LNGX 120508ER-F						●	●	●								.472	.374	.280	.177	.031
LNGX 120504ER-M						●		●								.472	.374	.280	.177	.016
LNGX 120508ER-M			●	●	●	●	●	●								.472	.374	.280	.177	.031
LNGX 120512ER-M						●		●								.472	.374	.280	.177	.047
LNGX 120516ER-M						●		●								.472	.374	.280	.177	.063
LNGX 120520ER-M						●		●								.472	.374	.280	.177	.079
LNGU 120525ER-M						●		●								.472	.374	.280	.177	.098
LNGU 120530ER-M						●		●								.472	.374	.280	.177	.118
LNGX 120508SR-R		●	●	●	●	●	●	●								.472	.374	.280	.177	.031
LNGX 120516SR-R				●		●	●	●								.472	.374	.280	.177	.063
LNGX 120504FR-FA									●							.472	.374	.280	.177	.016
LNGX 120508FR-FA	●								●							.472	.374	.280	.177	.031

SPARE PARTS

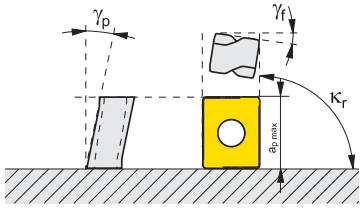
*) For screw torques see pages: M191 – M193.

Diameter of cutter	Clamping screw*	Driver	Driver handle	Screw for taper clamping
1.500	US 2505-T08P	D-T08P/T15P	FG-15	HS 025100
2.000 – 2.500	US 2505-T08P	D-T08P/T15P	FG-15	HS 037100
3.000	US 2505-T08P	D-T08P/T15P	FG-15	HS 050125
4.000	US 2505-T08P	D-T08P/T15P	FG-15	HCS 075200
5.000	US 2505-T08P	D-T08P/T15P	FG-15	HS 075125

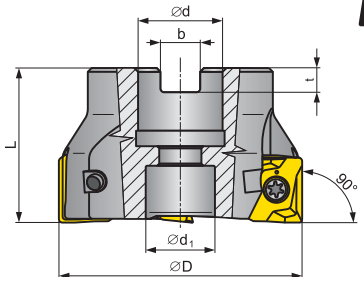
● stocked as standard /○ not stocked as standard
See price list for current availability.

IS90LN16

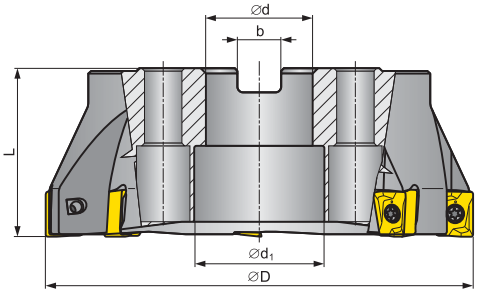
γ_p	-6°	κ_r	90°
γ_f	-10.5°	$a_{p\,max}$	.512 in



ECON *LN*



ø 2.500 – 5.000 in



ø 6.000 in

Z* - Number of teeth

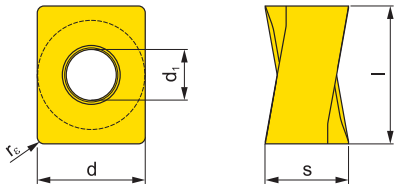
Dimensions [in].

Designation	Assortment	Dimensions											Cooling	[lbs]
		D	d	d_1	L	b	t	Z*						
250A04R-IS90LN16-C	●	2.500	.750	.630	1.575	.321	.193	4					+	1.10
250A05R-IS90LN16-C	●	2.500	.750	.630	1.575	.321	.193	5					+	1.10
300A04R-IS90LN16-C	●	3.000	1.000	.827	1.969	.382	.224	4					+	2.21
300A06R-IS90LN16-C	●	3.000	1.000	.827	1.969	.382	.224	6					+	2.21
400A05R-IS90LN16-C	●	4.000	1.260	1.260	1.969	.630	.382	5					+	3.97
400A07R-IS90LN16-C	●	4.000	1.260	1.260	1.969	.630	.382	7					+	3.75
500A06R-IS90LN16-C	○	5.000	1.575	1.260	2.480	.630	.382	6					+	7.72
500A08R-IS90LN16-C	○	5.000	1.575	1.260	2.480	.630	.382	8					+	7.28
600B08R-IS90LN16	○	6.000	1.575	2.205	2.480	.756	.445	8						12.57

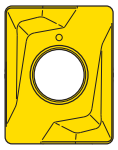
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

IS90LN16



LNGU 16



LNGU 16-M

INDEXABLE CUTTING INSERTS

Designation	Grades						Dimensions				
	M9315	M9325	M8340	M8340	8215	8230	l	d	s	d_1	r_ε
LNGU 160708SR-M	●	●	●	●	●	●	.654	.520	.394	.224	.031

SPARE PARTS

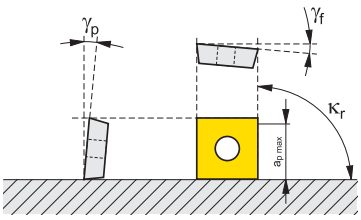
*) For screw torques see pages: M191 – M193.

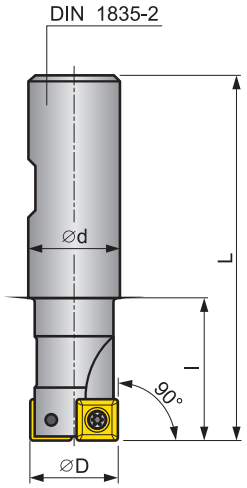
Diameter of cutter	Clamping screw*	Screwdriver	Screw for taper clamping
2.500	US 45012-T20P	SDR T20P-T	HS 037100
3.000	US 45012-T20P	SDR T20P-T	HS 050125
4.000	US 45012-T20P	SDR T20P-T	HCS 075200
5.000	US 45012-T20P	SDR T20P-T	HS 075125
6.000	US 45012-T20P	SDR T20P-T	-

● stocked as standard /○ not stocked as standard
See price list for current availability.

ISSO09

γ_p	+6 – +10°	κ_r	90°
γ_f	-10° – -12°	$a_{p\,max}$	.315 in





Z* - Number of teeth

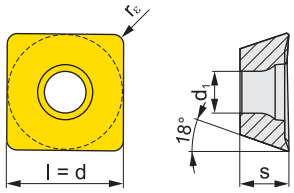
Dimensions [in].

Designation	Assortment	Dimensions											Cooling	[lbs]
		D	L	l_1	d	Z*								
100A3R128W100-ISSO09-C	●	1.000	3.780	1.280	1.000	3							+	.66
125A4R150W125-ISSO09-C	●	1.250	4.000	1.500	1.250	4							+	1.54

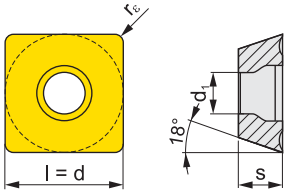
● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

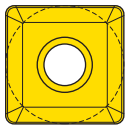
ISSO09



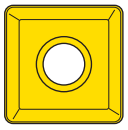
SOMT-P



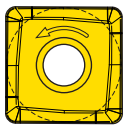
SOMT



SOMT-P



SOMT-MI



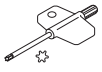
SOMT-M

INDEXABLE CUTTING INSERTS

Designation	Grades								Dimensions				
	M5315	M9315	M9325	M9340	M8310	M8340	8215	8230	(l)	d	s	d_1	r_ε
SOMT 09T304-P			●			●		●	.376	.376	.156	.138	.016
SOMT 09T304-MI		●		●	●	●	●	●	.376	.376	.156	.138	.016
SOMT 09T308-M	●	●				●	●	●	.376	.376	.156	.138	.031

SPARE PARTS

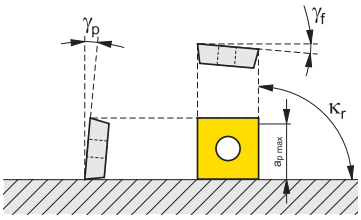
*) For screw torques see pages: M191 – M193.

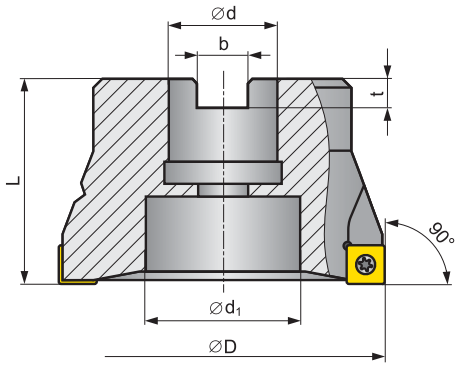
Diameter of cutter	Clamping screw*	Screwdriver
		
1.000 – 1.250	US 3006-T09P	FLAG T09P

● stocked as standard /○ not stocked as standard
See price list for current availability.

IS90SO09

γ_p	+10°	κ_r	90°
γ_f	-8° – -9°	$a_{p\,max}$	.315 in





Z* - Number of teeth

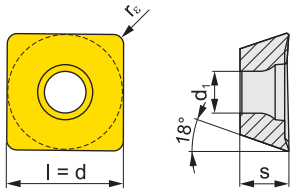
Dimensions [in].

Designation	Assortment	Dimensions											Cooling	[lbs]
		D	d	d_1	L	b	t	Z*						
150A05R-IS90SO09-C	●	1.500	.500	.433	1.575	.258	.165	5					+	.33
200A06R-IS90SO09-C	●	2.000	.750	.630	1.575	.321	.193	6					+	.66
250A07R-IS90SO09-C	●	2.500	.750	.630	1.575	.321	.193	7					+	1.12
300A09R-IS90SO09-C	●	3.000	1.000	.827	1.969	.382	.224	9					+	2.14
400A10R-IS90SO09-C	●	4.000	1.500	1.260	1.969	.630	.382	10					+	3.55
500A12R-IS90SO09-C	●	5.000	1.500	1.260	2.480	.630	.382	12					+	6.55

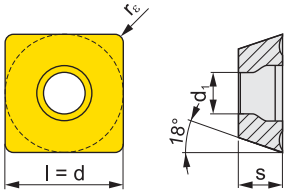
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

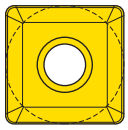
IS90SO09



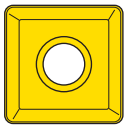
SOMT-P



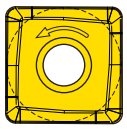
SOMT



SOMT-P



SOMT-MI



SOMT-M

INDEXABLE CUTTING INSERTS

Designation	Grades								Dimensions				
	M5315	M9315	M9325	M9340	M8310	M8340	8215	8230	(l)	d	s	d_1	r_ε
SOMT 09T304-P			●			●		●	.376	.376	.156	.138	.016
SOMT 09T304-MI		●		●	●	●	●	●	.376	.376	.156	.138	.016
SOMT 09T308-M	●	●				●	●	●	.376	.376	.156	.138	.031

SPARE PARTS

*) For screw torques see pages: M191 – M193.

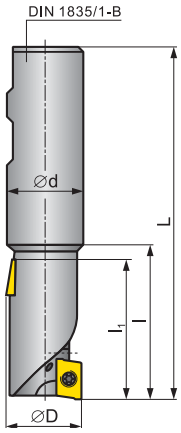
Diameter of cutter	Clamping screw*	Driver	Driver handle	Screw for taper clamping
1.500	US 3006-T09P	D-T07P/T09P	FG-15	HS 025100
2.000 – 2.500	US 3006-T09P	D-T07P/T09P	FG-15	HS 037100
3.000	US 3006-T09P	D-T07P/T09P	FG-15	HS 050125
4.000 – 5.000	US 3006-T09P	D-T07P/T09P	FG-15	HS 075125

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

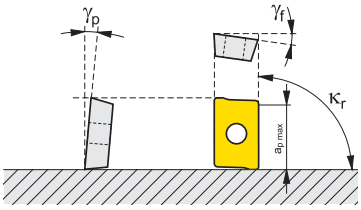
J-ISAD11E

FORCE AD



WELDON

γ_p	+11° – +12°	κ_r	90°
γ_f	-5.2° – -8.1°	$a_{p\,max}$	l_1



Z* - Number of teeth
ZN* - Number of inserts
Note: Inserts with radius r_ε more than .031 in can be used only for face insert seats.

Dimensions [in].

Designation	Assortment	Dimensions											Cooling	[lbs]
		D	d	L	l	l_1	Z*	ZN*						
100J2R197W100-ISAD11E150	●	1.000	1.000	4.508	1.969	1.496	2	8					+	.66
125J2R236W125-ISAD11E185	●	1.250	1.250	4.902	2.362	1.850	2	10					+	1.32
150J3R276W125-ISAD11E220	●	1.500	1.250	5.295	2.756	2.205	3	18					+	2.21

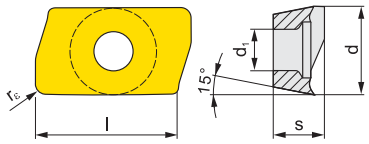
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

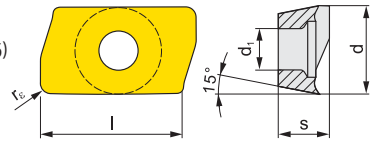
J-ISAD11E

INSERTS FOR HELICAL END MILLING CUTTERS FOR ROUGHING

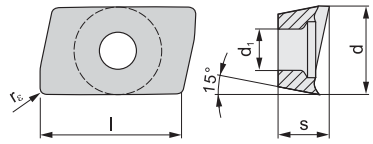
ADMX 11

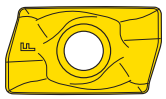


ADMX 11(16)

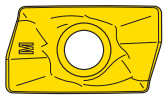


ADEX 11

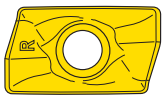




ADMX 11SR-F

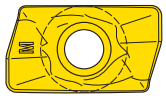


ADMX 11SR-M

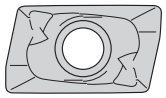


ADMX 11PR-R

ADMX 11T316SR-M



ADEX 11 FR-FA



INDEXABLE CUTTING INSERTS

Designation	Grades															Dimensions				
	M0315	M5315	M9315	M9315	M9340	M8340	8215	8230	HF7							(l)	d	s	d_1	r_ε
ADMX 11T304SR-F					●	●	●	●								.433	.257	.156	.114	.016
ADMX 11T308SR-F					●	●	●	●								.433	.257	.156	.114	.031
ADMX 11T302SR-M						●		●								.433	.257	.156	.114	.008
ADMX 11T304SR-M					●	●	●	●								.433	.257	.156	.114	.016
ADMX 11T308SR-M		●	●	●	●	●	●	●								.433	.257	.156	.114	.031
ADMX 11T310SR-M						●		●								.433	.257	.156	.114	.039
ADMX 11T312SR-M						●	●	●								.433	.257	.156	.114	.047
ADMX 11T316SR-M						●	●	●								.433	.257	.156	.114	.063
ADMX 11T308PR-R		●	●	●		●	●	●								.433	.257	.156	.114	.031
ADMX 11T316PR-R						●	●	●								.433	.257	.156	.114	.063
ADEX 11T304FR-FA	●								●							.433	.257	.156	.114	.016
ADEX 11T308FR-FA	●								●							.433	.257	.156	.114	.031
ADEX 11T316FR-FA									●							.433	.257	.156	.114	.063

SPARE PARTS

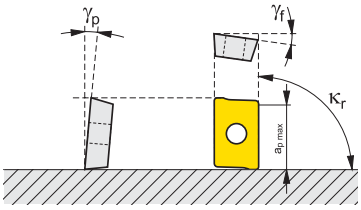
*) For screw torques see pages: M191 - M193.

Diameter of cutter	Clamping screw*	Screwdriver
1.000 – 1.500	US 2506-T08P	FLAG T07P

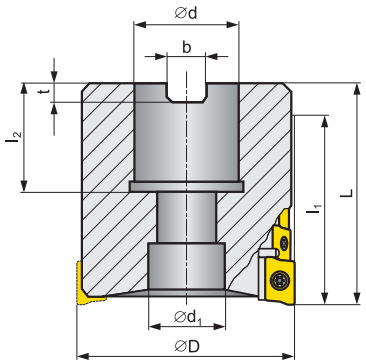
● stocked as standard / ○ not stocked as standard
See price list for current availability.

T-IS90AD11E

γ_p	+11° – +12°	κ_r	90°
γ_f	-5.2° – -8.1°	$a_{p\,max}$	l_1



FORCE AD



Z* - Number of teeth
ZN* - Number of inserts
Note: Inserts with radius r_ε more than .031 in can be used only for face insert seats.

Dimensions [in].

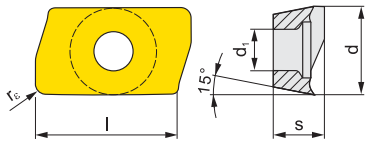
Designation	Assortment	Dimensions											Cooling	[lbs]
		D	d	d_1	L	l_1	l_2	Z*	ZN*					
200T03R-IS90AD11E146-C	●	2.000	.750	.630	2.362	1.457	.827	3	12				+	1.10

PRAMET

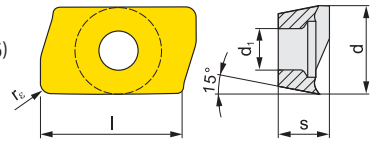
● stocked as standard /○ not stocked as standard
See price list for current availability.

T-IS90AD11E

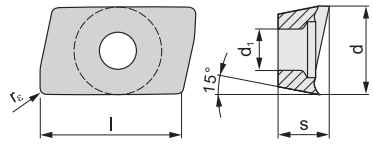
ADMX 11

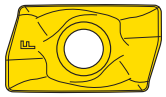


ADMX 11(16)

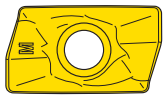


ADEX 11

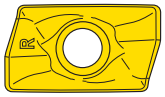




ADMX 11SR-F

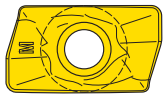


ADMX 11SR-M

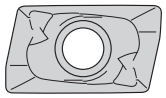


ADMX 11PR-R

ADMX 11T316SR-M



ADEX 11 FR-FA



INDEXABLE CUTTING INSERTS

Designation	Grades									Dimensions				
	M0315	M5315	M9315	M9325	M9340	M8340	8215	8230	HF7	(l)	d	s	d_1	r_ε
ADMX 11T304SR-F					●	●	●	●		.433	.257	.156	.114	.016
ADMX 11T308SR-F					●	●	●	●		.433	.257	.156	.114	.031
ADMX 11T302SR-M						●		●		.433	.257	.156	.114	.008
ADMX 11T304SR-M				●	●	●	●	●		.433	.257	.156	.114	.016
ADMX 11T308SR-M		●	●	●	●	●	●	●		.433	.257	.156	.114	.031
ADMX 11T310SR-M						●		●		.433	.257	.156	.114	.039
ADMX 11T312SR-M						●	●	●		.433	.257	.156	.114	.047
ADMX 11T316SR-M						●	●	●		.433	.257	.156	.114	.063
ADMX 11T308PR-R		●	●	●		●	●	●		.433	.257	.156	.114	.031
ADMX 11T316PR-R				●		●	●	●		.433	.257	.156	.114	.063
ADEX 11T304FR-FA	●								●	.433	.257	.156	.114	.016
ADEX 11T308FR-FA	●								●	.433	.257	.156	.114	.031
ADEX 11T316FR-FA									●	.433	.257	.156	.114	.063

SPARE PARTS

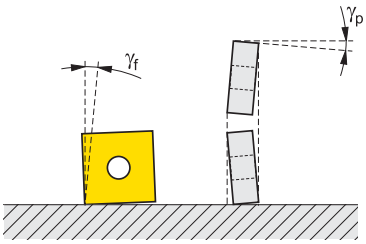
*) For screw torques see pages: M191 - M193.

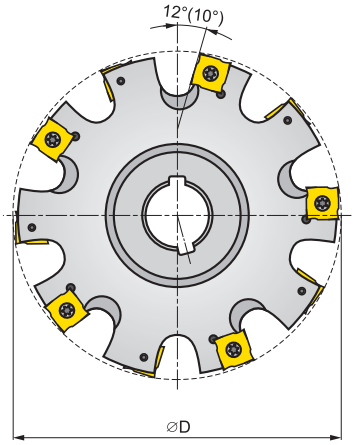
Diameter of cutter	Clamping screw*	Driver	Driver handle	Screw for taper clamping
2.000	US 2506-T07P	D-T07P/T09P	FG-15	HS 037100

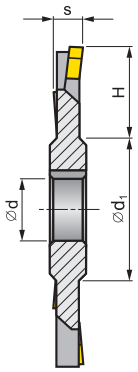
● stocked as standard / ○ not stocked as standard
See price list for current availability.

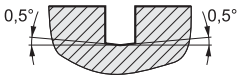
IS90SN

γ_p	-0°30´	κ_r	90°
γ_f	+2°30´	$a_{\varepsilon\,max}$	H









Z* - Number of teeth
ZN* - Number of inserts

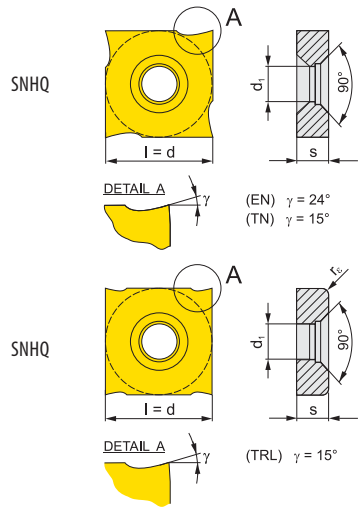
Dimensions [in].

Designation	Assortment	Dimensions											Cooling	[lbs]
		D	d	H	s	d_1	Z*	ZN*						
300F04N-IS90SN11N2.5	●	3.000	1.000	.630	.156	1.480	4	8						.44
300F04N-IS90SN12N4	●	3.000	1.000	.630	.250	1.480	4	8						.44
300F04N-IS90SN12N5	●	3.000	1.000	.630	.313	1.480	4	8						.66
400G05N-IS90SN12N4	●	4.000	1.250	.945	.250	1.750	5	10						.66
400G05N-IS90SN12N5	●	4.000	1.250	.945	.313	1.750	5	10						.88
400G05N-IS90SN12N6	●	4.000	1.250	.945	.375	1.750	5	10						1.10
500H06N-IS90SN12N4	○	5.000	1.250	1.220	.250	2.000	6	12						1.10
500H06N-IS90SN12N5	●	5.000	1.250	1.220	.313	2.000	6	12						1.32
600H08N-IS90SN12N4	●	6.000	1.250	1.693	.250	2.000	8	16						2.21
600H08N-IS90SN12N5	○	6.000	1.250	1.693	.313	2.000	8	16						2.43
600H08N-IS90SN12N6	○	6.000	1.250	1.693	.375	2.000	8	16						2.65

PRAMET

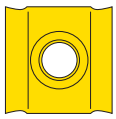
● stocked as standard /○ not stocked as standard
See price list for current availability.

IS90SN



SNHQ AZEN/AZTN

(EN) γ = 24° for machining aluminium
(TN) γ = 15° for machining steel and cast iron



SNHQ TRL

(TN) γ = 15° for machining steel and cast iron

INDEXABLE CUTTING INSERTS

Designation	Grades			Dimensions				
	M8340	8215	8230	l	s	d_1	g	r_ε
s = .156"								
SNHQ 1102AZTN	●		●	.433	.091	.169	15°	-
s = .250"								
SNHQ 12T3AZEN	●			.500	.134	.197	24°	-
SNHQ 12T3AZTN	●		●	.500	.134	.197	15°	-
SNHQ 12T305TRL	●			.500	.134	.197	15°	.020
SNHQ 12T310TRL	●			.500	.134	.197	15°	.039
SNHQ 12T315TRL	●			.500	.134	.197	15°	.059
s = .313"								
SNHQ 1204AZEN	●	●		.500	.177	.197	24°	-
SNHQ 1204AZTN	●		●	.500	.177	.197	15°	-
SNHQ 120405TRL	●			.500	.177	.197	15°	.020
SNHQ 120410TRL	●			.500	.177	.197	15°	.039
SNHQ 120415TRL	●			.500	.177	.197	15°	.059
s = .375"								
SNHQ 1205AZEN	●	●		.500	.213	.197	24°	-
SNHQ 1205AZTN	●		●	.500	.213	.197	15°	-
SNHQ 120505TRL	●			.500	.213	.197	15°	.020
SNHQ 120510TRL	●			.500	.213	.197	15°	.039
SNHQ 120515TRL	●			.500	.213	.197	15°	.059

SPARE PARTS

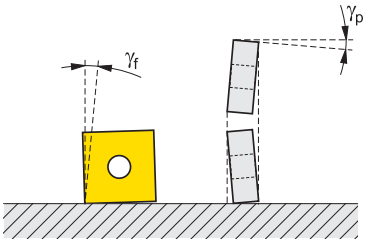
*) For screw torques see pages: M191 - M193.

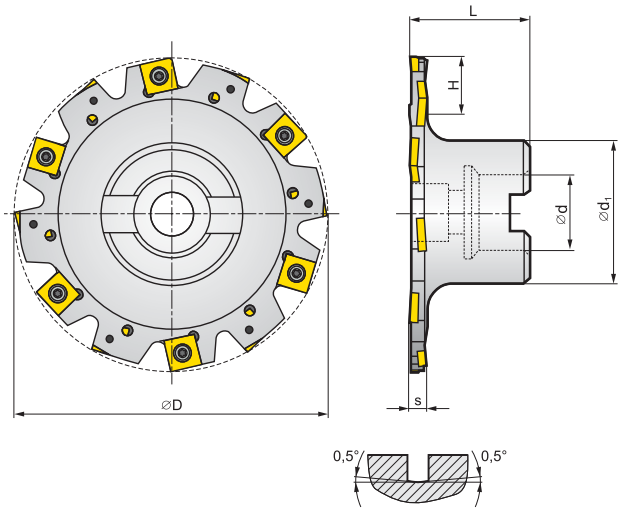
Width of cutter "s"	Clamping screw*	Screwdriver
.156	US 3504-T09P	SDR T09P
.250	US 94006-T15	SDR T15
.313	US 71	SDR T15
.375	US 94008-T15	SDR T15

● stocked as standard / ○ not stocked as standard
See price list for current availability.

IS90SN-R

γ_p	-0°30´	κ_r	90°
γ_f	+2°30´	$a_{\varepsilon\,max}$	H





Z* - Number of teeth
ZN* - Number of inserts
K* - Effective number of teeth

Dimensions [in].

Designation	Assortment	Dimensions										Cooling	[lbs]
		D	d	H	s	d_1	Z*	ZN*	L				
250A03R-IS90SN11N2.5	●	2.500	.750	.413	.156	1.378	3	6	1.575				1.10
250A03R-IS90SN12N4	●	2.500	.750	.413	.250	1.319	3	6	1.575				1.10
300A04R-IS90SN11N3	●	3.000	.750	.610	.187	1.575	4	8	1.575				1.32
300A04R-IS90SN12N4	●	3.000	.750	.610	.250	1.575	4	8	1.575				1.32
400A05R-IS90SN12N4	●	4.000	1.000	.945	.250	1.890	5	10	1.969				1.54
600B08R-IS90SN12N6	●	6.000	1.500	1.457	.375	2.756	8	16	1.969				4.63

SPARE PARTS

*) For screw torques see pages: M191 - M193.

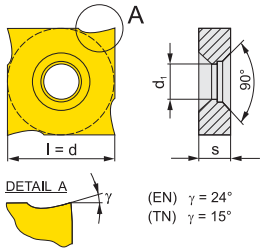
Designation of cutter	Clamping screw*	Screwdriver	Screw for taper clamping			
250A03R-IS90SN11N2.5	US 3504-T09P	SDR T09P	HS 037100			
250A03R-IS90SN12N4	US 94006-T15	SDR T15	HS 037100			
300A04R-IS90SN11N3	US 3505-T09P	SDR T09P	HS 037100			
300A04R-IS90SN12N4	US 94006-T15	SDR T15	HS 037100			
400A05R-IS90SN12N4	US 94006-T15	SDR T15	HS 050125			
600B08R-IS90SN12N6	US 94008-T15	SDR T15	-			

● stocked as standard /○ not stocked as standard
See price list for current availability.

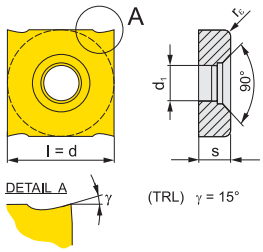
PRAMET

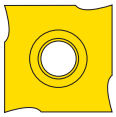
IS90SN-R

SNHQ



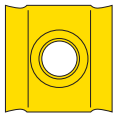
SNHQ





SNHQ AZEN/AZTN

(EN) γ = 24° for machining aluminium
(TN) γ = 15° for machining steel and cast iron



SNHQ TRL

(TN) γ = 15° for machining steel and cast iron

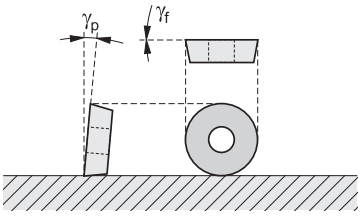
INDEXABLE CUTTING INSERTS

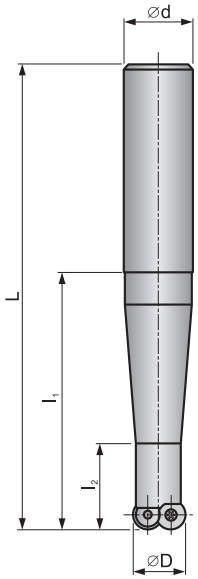
Designation	Grades			Dimensions				
	M8340	8215	8230	l	s	d_1	g	r_ε
s = .156″								
SNHQ 1102AZTN	●		●	.433	.091	.169	15°	-
s = .187″								
SNHQ 1103AZTN	●		●	.433	.106	.169	15°	-
s = .250″								
SNHQ 12T3AZEN	●			.500	.134	.197	24°	-
SNHQ 12T3AZTN	●		●	.500	.134	.197	15°	-
SNHQ 12T305TRL	●			.500	.134	.197	15°	.020
SNHQ 12T310TRL	●			.500	.134	.197	15°	.039
SNHQ 12T315TRL	●			.500	.134	.197	15°	.059
s = .375″								
SNHQ 1205AZEN	●	●		.500	.213	.197	24°	-
SNHQ 1205AZTN	●		●	.500	.213	.197	15°	-
SNHQ 120505TRL	●			.500	.213	.197	15°	.020
SNHQ 120510TRL	●			.500	.213	.197	15°	.039
SNHQ 120515TRL	●			.500	.213	.197	15°	.059

● stocked as standard / ○ not stocked as standard
See price list for current availability.

W-ISRD

γ_p	+3°	κ_r	
γ_f	0°	$a_{p\,max}$	.098 in





Z* - Number of teeth

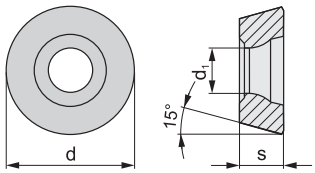
Dimensions [in].

Designation	Assortment	Dimensions										Cooling	[lbs]
		D	L	l_1	d	Z*	Inserts						
075E2R175W075-ISRD10-C	●	.750	3.780	1.750	.750	2	RD.. 1003					+	.44
075E2R250W075-ISRD10-C	●	.750	4.528	2.500	.750	2	RD.. 1003					+	.66
075E2R325W100-ISRD10-C	●	.750	5.315	3.250	.750	2	RD.. 1003					+	1.32
075E2R400W100-ISRD10-C	●	.750	6.024	4.000	.750	2	RD.. 1003					+	1.76
075E2R475W100-ISRD10-C	●	.750	6.772	4.750	.750	2	RD.. 1003					+	2.21

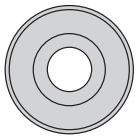
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

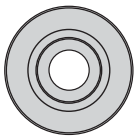
W-ISRD



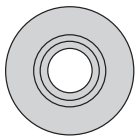
RD..



RDHX MOT



RDGT MOT



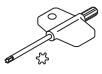
RDHT-FA

INDEXABLE CUTTING INSERTS

Designation	Grades						Dimensions		
	M9340	M8310	M8325	M8345	7205	HF7	d	d_1	s
RDHX 1003M0T		●	●	●	●		.394	.154	.125
RDGT 1003M0T	●	●	●	●			.394	.154	.125
RDHT 1003M0-FA						●	.394	.154	.125

SPARE PARTS

*) For screw torques see pages: M191 - M193.

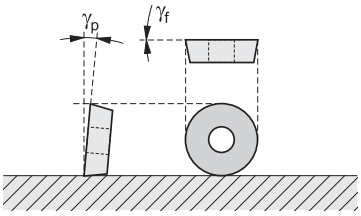
Diameter of cutter	Clamping screw*	Screwdriver
		
.750	US 3507-T15	FLAG T15P

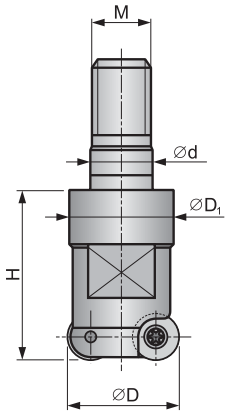
● stocked as standard /○ not stocked as standard
See price list for current availability.

ISCRD

EXCHANGEABLE HEADS FOR COPY MILLING CUTTERS

γ_p	+3°	κ_r	
γ_f	0°	$a_{p\,max}$	.078 – .157 in





Z* - Number of teeth

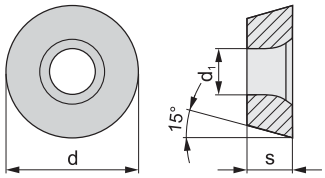
Dimensions [in].

Designation	Assortment	Dimensions [in] D	d	M	H	D_1	Z*	Inserts				Cooling	[lbs]
062E2R110M08-ISRD07-C	●	.625	.335	M8	1.100	.512	2	RD.. 0702				+	.22
075E2R118M10-ISRD07-C	●	.750	.413	M10	1.180	.709	2	RD.. 0702				+	.66
100E3R150M12-ISRD07-C	●	1.000	.492	M12	1.500	.827	3	RD.. 0702				+	.88
075E2R118M10-ISRD10-C	●	.750	.413	M10	1.180	.709	2	RD.. 1003				+	.66
100E2R150M12-ISRD10-C	●	1.000	.492	M12	1.500	.827	2	RD.. 1003				+	.88
100E3R150M12-ISRD10-C	●	1.000	.492	M12	1.500	.827	3	RD.. 1003				+	.77
125E4R175M16-ISRD10-C	●	1.250	.669	M16	1.750	1.142	4	RD.. 1003				+	1.10
150E5R175M16-ISRD10-C	●	1.500	.669	M16	1.750	1.142	5	RD.. 1003				+	1.21
100E2R150M12-ISCRD12-C	●	1.000	.492	M12	1.500	.827	2	RD.. 12T3				+	.77
150E3R175M16-ISCRD12-C	●	1.500	.669	M16	1.750	1.142	3	RD.. 12T3				+	1.21

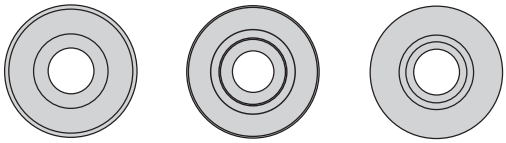
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

ISCRD



RD..



RDHX MOT RDGT MOT RDHT-FA

INDEXABLE CUTTING INSERTS

Designation	Grades																Dimensions						
	M9340	M8310	M8325	M8345	7205	HF7											d	d_1	s				
RDHX 0702M0T		●	●		●												.276	.110	.094				
RDHX 1003M0T		●	●	●	●												.394	.154	.125				
RDHX 12T3M0T		●	●	●	●												.472	.154	.156				
RDGT 0702M0T		○	○	○													.276	.110	.094				
RDGT 1003M0T	●	●	●	●													.394	.154	.125				
RDGT 12T3M0T	●	●	●	●													.472	.154	.156				
RDHT 0702M0-FA						●											.276	.110	.094				
RDHT 1003M0-FA						●											.394	.154	.125				
RDHT 12T3M0-FA						●											.472	.154	.156				

SPARE PARTS

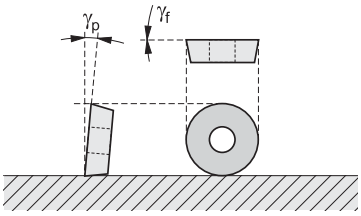
*) For screw torques see pages: M191 - M193.

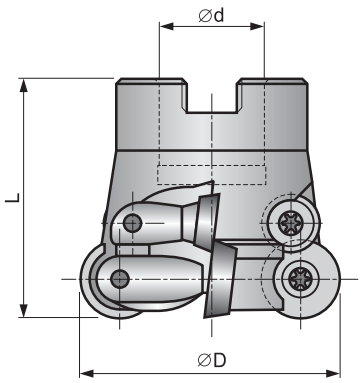
Marking of cutter	Clamping screw*	Clamping screw	Screwdriver
..ISRD07	US 25	-	FLAG T07
..ISRD10	US 3507-T15	-	FLAG T15
..ISCRD12	US 3507-T15	CS12	FLAG T15

● stocked as standard /○ not stocked as standard
See price list for current availability.

ISCMORD

γ_p	+5°	κ_r	
γ_f	0°	$a_{p\,max}$	.118; .157 in





Z* - Number of teeth

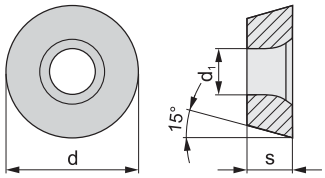
Dimensions [in].

Designation	Assortment	Dimensions [in] D	d	d_1	L	Z*	Inserts					Cooling	[lbs]
200A05R-ISCMORD12-C	●	2.000	.750	.630	1.630	5	RD.. 12T3					+	1.54
250A06R-ISCMORD12-C	●	2.500	1.000	.827	1.750	6	RD.. 12T3					+	1.98
300A07R-ISCMORD12-C	●	3.000	1.000	.827	2.000	7	RD.. 12T3					+	3.09
250A04R-ISCMORD16-C	●	2.500	1.000	.827	1.750	4	RD.. 1604					+	1.98
300A05R-ISCMORD16-C	●	3.000	1.000	.827	2.000	5	RD.. 1604					+	3.09
400A06R-ISCMORD16-C	●	4.000	1.250	1.063	2.000	6	RD.. 1604					+	4.41

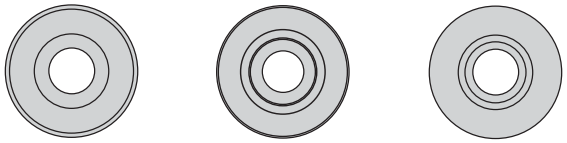
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

ISCMORD



RD..



RDHX MOT | RDGT MOT | RDHT-FA

INDEXABLE CUTTING INSERTS

Designation	Grades						Dimensions [in]		
	M9340	M8310	M8325	M8345	7205	HF7	d	d_1	s
RDHX 12T3M0T		●	●	●	●		.472	.154	.156
RDHX 1604M0T		●	●	●			.630	.205	.187
RDGT 12T3M0T	●	●	●	●			.472	.154	.156
RDGT 1604M0T	●	●	●	●			.630	.205	.187
RDHT 12T3M0-FA						●	.472	.154	.156
RDHT 1604M0-FA						●	.630	.205	.187

SPARE PARTS

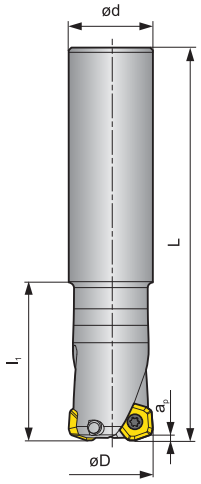
*) For screw torques see pages: M191 - M193.

Designation of cutter	Clamping screw*	Clamping screw	Clamp	Screwdriver
200A05R-ISCM0RD12-C	US 3507-T15	CS 12	-	SDR T15
250A06R-ISCM0RD12-C	US 3507-T15	CS 12	-	SDR T15
300A07R-ISCM0RD12-C	US 3507-T15	CS 12	-	SDR T15
250A04R-ISCM0RD16-C	US 4511-T20	-	LA 12T3	SDR T20
300A05R-ISCM0RD16-C	US 4511-T20	-	LA 12T3	SDR T20
400A06R-ISCM0RD16-C	US 4511-T20	-	LA 12T3	SDR T20

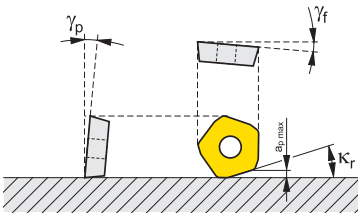
● stocked as standard /○ not stocked as standard
See price list for current availability.

ISPD09

PENTA HF



γ_p	10°	κ_r	19°
γ_f	-10° – -24°	$a_{p\,max}$	.079 in



Z* - Number of teeth

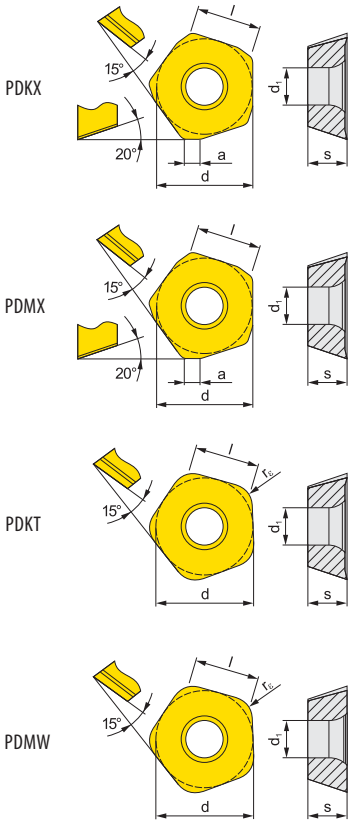
Dimensions [in].

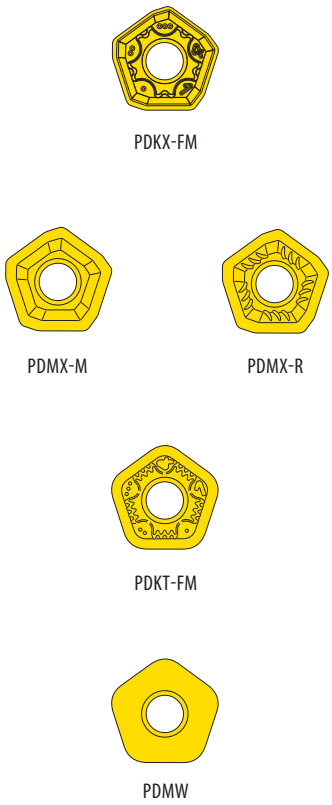
Designation	Assortment	Dimensions											Cooling	[lbs]
		D	d	L	l_1	Z*								
125E2R236C125-ISPD09-C	●	1.250	1.250	9.843	2.362	2							+	3.13
150E3R236C125-ISPD09-C	●	1.500	1.250	9.843	2.362	3							+	3.31

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

ISPD09





INDEXABLE CUTTING INSERTS

Designation	Grades					Dimensions					
	M9325	M9340	M8345	8215	8230	l	d	s	d_1	a	r_ε
PDKX 0905ZEER-FM		●	●			.354	.531	.215	.217	.079	-
PDMX 0905ZEER-M		●	●	●	●	.354	.531	.215	.217	.079	-
PDMX 0905ZESR-R			●	●	●	.354	.531	.215	.217	.079	-
PDKT 090530ER-FM			●	●	●	.354	.531	.215	.217	-	.118
PDMW 090530SR	●		●			.354	.531	.215	.217	-	.118

SPARE PARTS

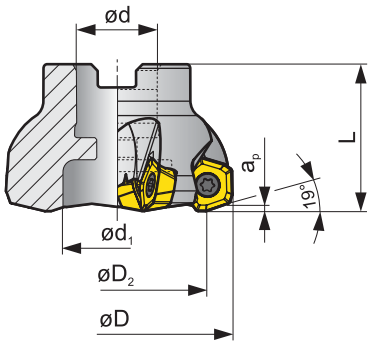
*) For screw torques see pages: M191 - M193.

Diameter of cutter	Clamping screw*	Screwdriver
1.250 – 1.500	US 45011-T20P	FLAG T20P

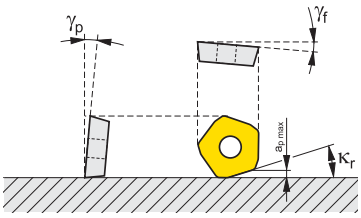
● stocked as standard /○ not stocked as standard
See price list for current availability.

IS19PD09

PENTA HF



γ_p	10°	κ_r	19°
γ_f	-1° – -24°	$a_{p\,max}$	.079 in



Z* - Number of teeth

Dimensions [in].

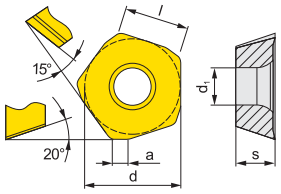
Designation	Assortment	Dimensions											Cooling	[lbs]
		D	D$_2$	d	d$_1$	L	b	t	Z*					
200A04R-IS19PD09-C	●	2.000	1.433	.750	.630	1.575	.321	.193	4				+	.50
250A05R-IS19PD09-C	●	2.500	1.931	.750	.630	1.575	.321	.193	5				+	.68
300A05R-IS19PD09-C	●	3.000	2.432	1.000	.827	1.969	.382	.224	5				+	1.83
400A06R-IS19PD09-C	●	4.000	3.431	1.500	1.417	1.969	.630	.382	6				+	3.09
400A08R-IS19PD09-C	●	4.000	3.431	1.500	1.417	1.969	.630	.382	8				+	3.04

PRAMET

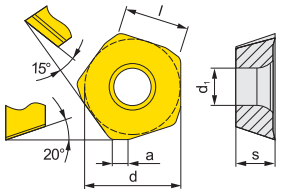
● stocked as standard /○ not stocked as standard
See price list for current availability.

IS19PD09

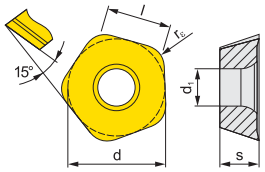
PDKX



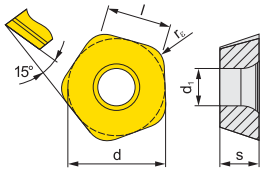
PDMX



PDKT



PDMW

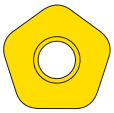


PDKX-FM

PDMX-M

PDMX-R

PDKT-FM



PDMW

INDEXABLE CUTTING INSERTS

Designation	Grades					Dimensions					
	M9325	M9340	M8345	8215	8230	l	d	s	d_1	a	r_ε
PDKX 0905ZEER-FM		●	●			.354	.531	.215	.217	.079	-
PDMX 0905ZEER-M		●	●	●	●	.354	.531	.215	.217	.079	-
PDMX 0905ZESR-R			●	●	●	.354	.531	.215	.217	.079	-
PDKT 090530ER-FM			●	●	●	.354	.531	.215	.217	-	.118
PDMW 090530SR	●		●			.354	.531	.215	.217	-	.118

SPARE PARTS

*) For screw torques see pages: M191 - M193.

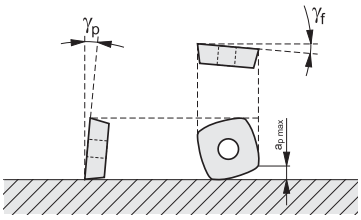
Diameter of cutter	Clamping screw*	Screwdriver	Screw for taper clamping
2.000 – 2.500	US 45011-T20P	SDR T20P-T	HS 037100
3.000	US 45011-T20P	SDR T20P-T	HS 050125
4.000	US 45011-T20P	SDR T20P-T	HCS 075175

PRAMET

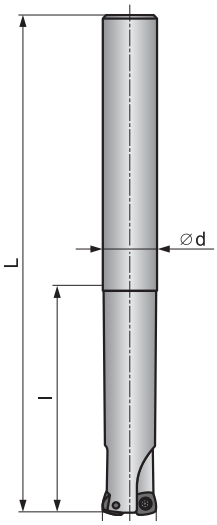
● stocked as standard /○ not stocked as standard
See price list for current availability.

ISZD

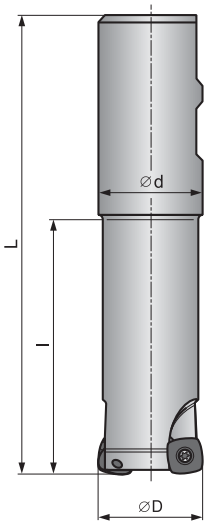
γ_p	+8°; +10°	κ_r	
γ_f	-5°; -6°	$a_{p\,max}$	.039; .063 in



FEED ZD



CYLINDRICAL



WELDON

Z* - Number of teeth

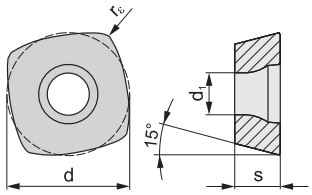
Dimensions [in].

Designation	Assortment	Dimensions D	d	L	l	Z*	Inserts	Cooling	[lbs]
CYLINDRICAL									
062E2R118C062-ISZD07-C	●	.625	.625	3.937	1.181	2	ZD.. 0703	+	.22
062E2R256C062-ISZD07-C	●	.625	.625	5.709	2.559	2	ZD.. 0703	+	.44
075E3R157C075-ISZD07-C	●	.750	.750	4.724	1.575	3	ZD.. 0703	+	.66
075E3R315C075-ISZD07-C	●	.750	.750	6.496	3.150	3	ZD.. 0703	+	.66
100E3R197C100-ISZD07-C	●	1.000	1.000	5.512	1.969	3	ZD.. 0703	+	1.10
100E3R394C100-ISZD07-C	●	1.000	1.000	7.480	3.937	3	ZD.. 0703	+	1.32
WELDON									
100E2R315W100-ISZD09-C	●	1.000	1.000	5.512	3.150	2	ZD.. 09T3	+	.99
100E2R551W100-ISZD09-C	●	1.000	1.000	7.874	5.512	2	ZD.. 09T3	+	1.43
125E2R315W125-ISZD09-C	●	1.250	1.250	5.512	3.150	2	ZD.. 09T3	+	1.65
125E2R551W125-ISZD09-C	●	1.250	1.250	7.874	5.512	2	ZD.. 09T3	+	2.43
150E4R315W125-ISZD12-C	●	1.500	1.250	5.512	3.150	4	ZD.. 1204	+	1.76
150E4R551W125-ISZD12-C	●	1.500	1.250	7.874	5.512	4	ZD.. 1204	+	2.43

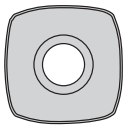
● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

ISZD



ZDCW / ZDEW



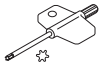
ZDCW / ZDEW

INDEXABLE CUTTING INSERTS

Designation	Grades						Dimensions				
	M8310	M8325	M8345	7205	7215	7230	l	d	s	d_1	r_ε
ZDCW 070304		●	●		●	●	.268	.268	.125	.102	.016
ZDCW 09T304	●	●	●	●	●	●	.375	.375	.156	.134	.016
ZDEW 120408	●	●	●	●			.500	.500	.187	.173	.031

SPARE PARTS

*) For screw torques see pages: M191 - M193.

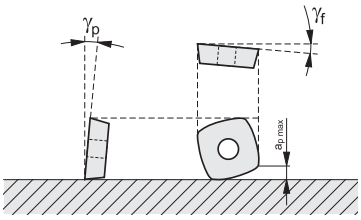
Marking of cutter	Clamping screw*	Screwdriver
		
..ISZD07	US 2205-T07P	FLAG T07P
..ISZD09	US 3006-T09P	FLAG T09P
..ISZD12	US 4011-T15P	FLAG T15P

● stocked as standard /○ not stocked as standard
See price list for current availability.

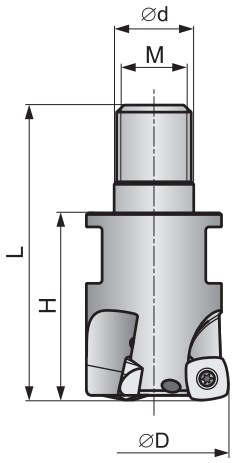
ISZD

EXCHANGEABLE HEADS FOR HIGH FEED MILLING

γ_p	+8°; +10°	κ_r	
γ_f	-5°; -6°	$a_{p\,max}$	.039; .063 in



FEED ZD



Z* - Number of teeth

Dimensions [in].

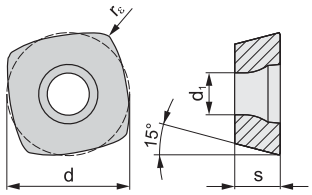
Designation	Assortment	Dimensions										Cooling	[lbs]
		D	d	M	H	L	Z*	Inserts					
062E2R118M08-ISZD07-C	●	.625	.335	M8	1.181	1.890	2	ZD.. 0703				+	.22
075E3R118M10-ISZD07-C	●	.750	.413	M10	1.181	1.929	3	ZD.. 0703				+	.22
100E3R130M12-ISZD07-C	●	1.000	.492	M12	1.300	2.165	3	ZD.. 0703				+	.22
100E4R130M12-ISZD07-C	●	1.000	.492	M12	1.300	2.165	4	ZD.. 0703				+	.22
125E4R157M16-ISZD07-C	●	1.250	.669	M16	1.575	2.480	4	ZD.. 0703				+	.44
100E2R130M12-ISZD09-C	●	1.000	.492	M12	1.300	2.165	2	ZD.. 09T3				+	.22
100E3R130M12-ISZD09-C	●	1.000	.492	M12	1.300	2.165	3	ZD.. 09T3				+	.22
125E3R157M16-ISZD09-C	●	1.250	.669	M16	1.575	2.480	3	ZD.. 09T3				+	.44
125E3R157M16-ISZD12-C	●	1.250	.669	M16	1.575	2.480	3	ZD.. 1204				+	.37
150E4R157M16-ISZD12-C	●	1.500	.669	M16	1.575	2.480	4	ZD.. 1204				+	.44

PRAMET

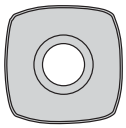
● stocked as standard /○ not stocked as standard
See price list for current availability.

ISZD

INSERTS FOR EXCHANGEABLE HEADS FOR HIGH FEED MILLING



ZDCW / ZDEW



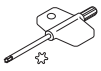
ZDCW / ZDEW

INDEXABLE CUTTING INSERTS

Designation	Grades						Dimensions				
	M8310	M8325	M8345	7205	7215	7230	l	d	s	d_1	r_ε
ZDCW 070304		●	●		●	●	.268	.268	.125	.102	.016
ZDCW 09T304	●	●	●	●	●	●	.375	.375	.156	.134	.016
ZDEW 120408	●	●	●	●			.500	.500	.187	.173	.031

SPARE PARTS

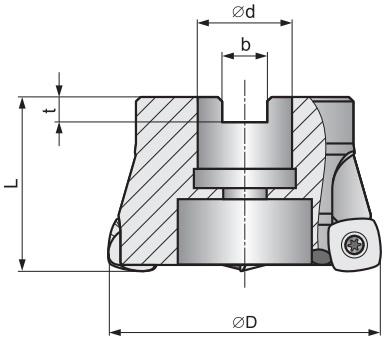
*) For screw torques see pages: M191 - M193.

Marking of cutter	Clamping screw*	Screwdriver
		
..ISZD07	US 2205-T07P	FLAG T07P
..ISZD09	US 3006-T09P	FLAG T09P
..ISZD12	US 4011-T15P	FLAG T15P

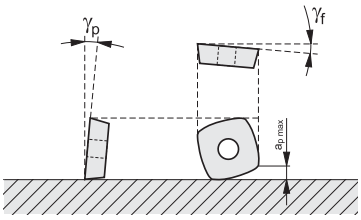
● stocked as standard /○ not stocked as standard
See price list for current availability.

ISMOZD

FEED ZD



γ_p	+10°	κ_r	
γ_f	-6°	$a_{p\,max}$	.039; .063 in



Z* - Number of teeth

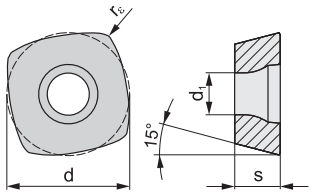
Dimensions [in].

Designation	Assortment	Dimensions										Cooling	[lbs]
		D	d	d_1	L	b	t	Z*	Inserts				
150A04R-ISMOZD09-C	●	1.500	.500	.433	1.575	.258	.165	4	ZD.. 09T3			+	.44
200A04R-ISMOZD12-C	●	2.000	.750	.630	1.575	.321	.193	4	ZD.. 1204			+	.49
250A05R-ISMOZD12-C	●	2.500	.750	.630	1.575	.321	.193	5	ZD.. 1204			+	.93
300A05R-ISMOZD12-C	●	3.150	1.063	.827	1.969	.382	.224	5	ZD.. 1204			+	2.21

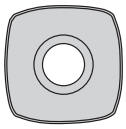
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

ISMOZD



ZDCW / ZDEW



ZDCW / ZDEW

INDEXABLE CUTTING INSERTS

Designation	Grades						Dimensions				
	M8310	M8325	M8345	7205	7215	7230	l	d	s	d_1	r_ε
ZDCW 09T304	●	●	●	●	●	●	.375	.375	.156	.134	.016
ZDEW 120408	●	●	●	●			.500	.500	.187	.173	.031

SPARE PARTS

*) For screw torques see pages: M191 - M193.

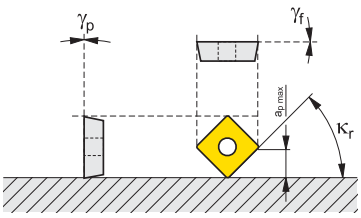
Diameter of cutter	Clamping screw*	Driver	Driver handle	Screw for taper clamping
1.500	US 3006-T09P	D-T07P/T09P	FG-15	HS 025100
2.000 – 2.500	US 4011-T15P	D-T08P/T15P	FG-15	HS 037100
3.000	US 4011-T15P	D-T08P/T15P	FG-15	HS 050125

● stocked as standard /○ not stocked as standard
See price list for current availability.

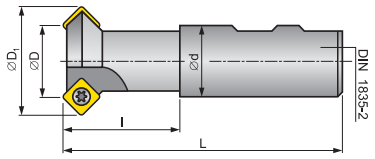
ISSD09

SHANK CUTTERS FOR 45° CHAMFERING

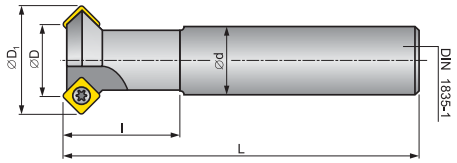
γ_p	0°	κ_r	45°
γ_f	0°	$a_{p\,max}$	.177 in



WELDON



CYLINDRICAL



Z* - Number of teeth

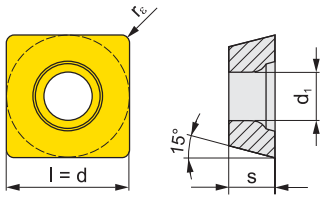
Dimensions [in].

Designation	Assortment	Dimensions											Cooling	[lbs]
		D	D_1	d	L	l_1	Z*							
WELDON														
037N1R106W062-ISSD09	●	.375	.847	.625	2.969	1.063	1							.26
062N2R106W062-ISSD09	●	.625	1.097	.625	2.969	1.063	2							.44
100N3R128W100-ISSD09	●	1.000	1.472	1.000	3.780	1.280	3							.88
CYLINDRICAL														
062N2R106C062-ISSD09	●	.625	1.097	.625	7.874	1.063	2							.88
100N3R128C100-ISSD09	●	1.000	1.472	1.000	7.874	1.280	3							1.54

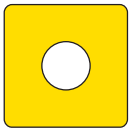
● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

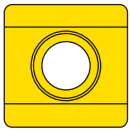
ISSD09



SDEW / SDEX



SDEW EN/SN



SDEX-74

INDEXABLE CUTTING INSERTS

Designation	Grades			Dimensions				
	M8340	8215	8230	l	d	s	d_1	r_ε
SDEW 322EN	●		●	.375	.375	.125	.173	.031
SDEW 322SN	●	●	●	.375	.375	.125	.173	.031
SDEX 322FN-74			●	.375	.375	.125	.173	.031

SPARE PARTS

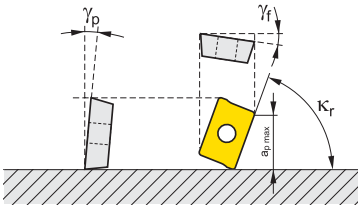
*) For screw torques see pages: M191 - M193.

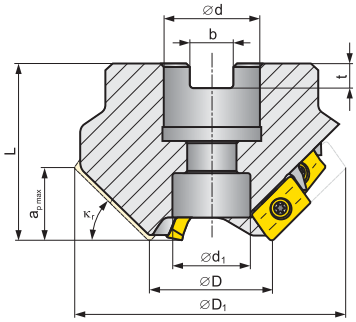
Diameter of cutter	Clamping screw*	Screwdriver
.375 - .625	US 3507-T15	FLAG T15P
1.000	US 3509-T15	FLAG T15P

● stocked as standard /○ not stocked as standard
See price list for current availability.

ISxxXP

γ_p	-1° - +5°	κ_r	30° - 60°
γ_f	-6° - -4°	$a_{p\,max}$	-





Z* - Number of teeth
ZN* - Number of inserts

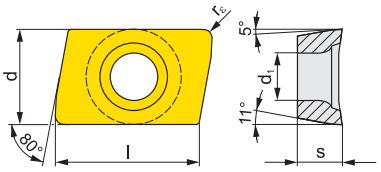
Dimensions [in].

Designation	Assortment	Dimensions											Cooling	[lbs]
		D	k_r	$a_{p\,max}$	d	d_1	L	D_1	b	t	Z*	ZN*		
150T03R-IS30XP16-C	●	1.500	30	.551	1.000	.827	1.969	3.350	.382	.224	3	6		2.14
150T03R-IS45XP16-C	●	1.500	45	.787	1.000	.827	1.969	3.035	.382	.224	3	6		1.70
150T03R-IS60XP16-C	●	1.500	60	.984	1.000	.827	1.969	2.642	.382	.224	3	6		1.17
200T04R-IS30XP16-C	●	2.000	30	.551	1.000	.827	1.969	3.850	.382	.224	4	8		2.38
200T04R-IS45XP16-C	●	2.000	45	.787	1.000	.827	1.969	3.575	.382	.224	4	8		1.98
200T04R-IS60XP16-C	●	2.000	60	.984	1.000	.827	1.969	3.102	.382	.224	4	8		1.50

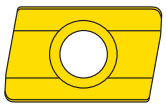
PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

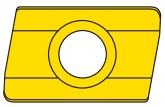
ISxxXP



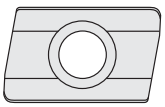
XPHT



XPHT 16-E



XPHT 16-S



XPHT 16-FA

INDEXABLE CUTTING INSERTS

Designation	Grades							Dimensions				
	M9325	M9340	M8340	8215	8230	8240	HF7	l	d	d_1	s	r_ε
XPHT 160412E				●	●			.625	.375	.173	.187	.047
XPHT 160412S	●	●	●	●	●			.625	.375	.173	.187	.047
XPHT 160408F-FA							●	.625	.375	.173	.187	.031

SPARE PARTS

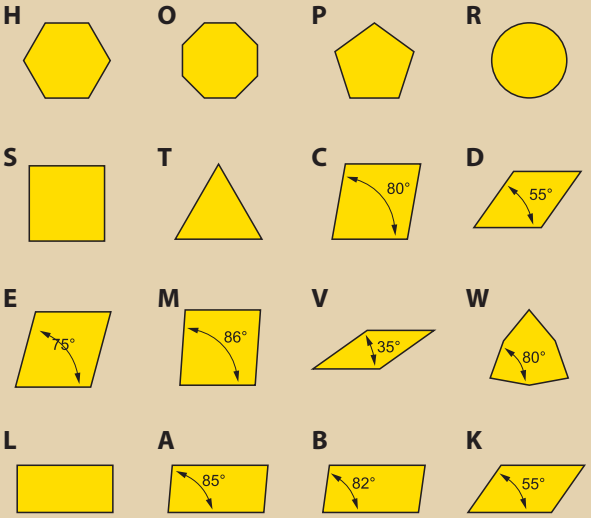
*) For screw torques see pages: M191 - M193.

Diameter of cutter	Clamping screw*	Driver	Driver handle	Screw for taper clamping
1.500 - 2.000	US 3509-T15	D-T07P/T15	FG-15	HS 050125

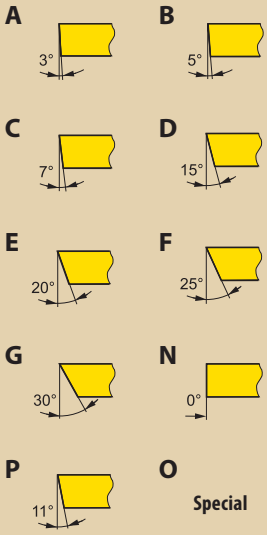
● stocked as standard /○ not stocked as standard
See price list for current availability.

CODE DESIGNATION - INDEXABLE CUTTING INSERTS FOR MILLING

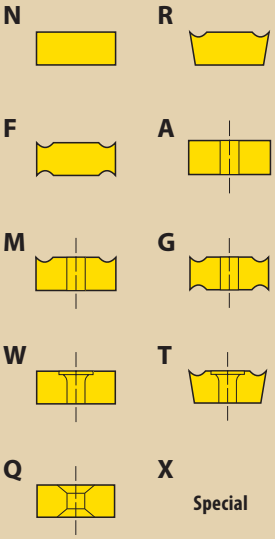
1 Insert shape

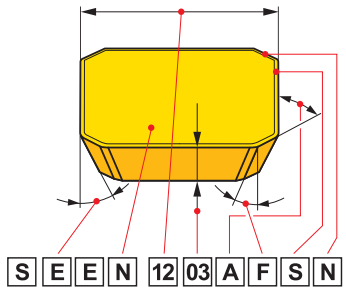


2 Clearance angle



4 Insert type

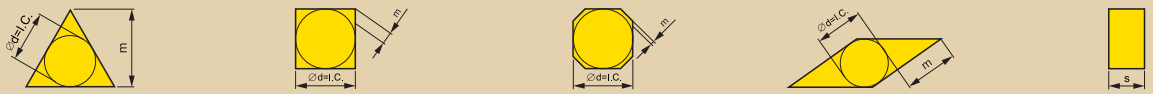




	1	2	3	4
ISO	S	P	G	N
	S	E	E	N
ANSI	S	P	G	
	S	E	E	N

3 Tolerances

Symbol	Tolerances [mm]			Tolerances [in]		
	m (±)	s (±)	d = I.C. (±)	m (±)	s (±)	d = I.C. (±)
A	0,005	0,025	0,025	0,0002	0,001	0,0010
F	0,005	0,025	0,013	0,0002	0,001	0,0005
C	0,013	0,025	0,025	0,0005	0,001	0,0010
H	0,013	0,025	0,013	0,0005	0,001	0,0005
E	0,025	0,025	0,025	0,0010	0,001	0,0010
G	0,025	0,130	0,025	0,0010	0,005	0,0010
J	0,005	0,025	0,05 – 0,13	0,0002	0,001	0,002 – 0,005
K	0,013	0,025	0,05 – 0,13	0,0005	0,001	0,002 – 0,005
L	0,025	0,025	0,05 – 0,13	0,0010	0,001	0,002 – 0,005
M	0,08 – 0,18	0,130	0,05 – 0,13	0,003 – 0,007	0,005	0,002 – 0,005
N	0,08 – 0,18	0,025	0,05 – 0,13	0,003 – 0,007	0,001	0,002 – 0,005
U	0,05 – 0,38	0,130	0,05 – 0,13	0,005 – 0,015	0,005	0,003 – 0,010



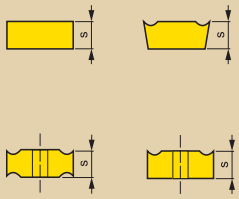
5

Cutting edge length

d = I.C. mm	d = I.C. [in]	R	S	T	C	D	V	W
3,97	5/32"			06				
5,00	-	05						
5,56	7/32"			09				03
6,00	-	06						
6,35	1/4"			11	06	07		04
8,00	-	08						
9,525	3/8"	09	09	16	09	11	16	06
10,0	-	10						
12,0	-	12						
12,7	1/2"	12	12	22	12	15		08
15,875	5/8"	15	15	27	16			
16,0	-	16						
19,05	3/4"	19	19	33	19			
20,0	-	20						
25,0	-	25						
25,4	1"	25	25		25			
31,75	1 1/4"	31						
32,0	-	32						

6

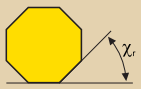
Thickness



Symbol	s [mm]	s [in]
01	1,59	1/16"
T1	1,98	5,64"
02	2,38	3/32"
03	3,18	1/8"
T3	3,97	5,32"
04	4,76	3/16"
05	5,56	7/32"
06	6,35	1/4"
07	7,94	5/16"
09	9,52	3/8"

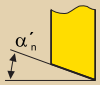
7

Cutting edge angles



	χ_r
A	45°
D	60°
E	75°
F	85°
P	90°
Z	Special

Clearance angle



	α'_n
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
Z	Special

ZZ - Special

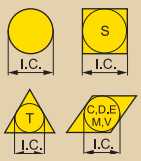
5	6	7	8	9
12	03	08		
12	03	AF	S	N

5a	6a	7a	8	9
4	2	2		
4	2	AF	S	N

ANSI

5a

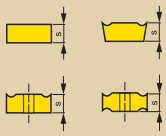
Inscribed circle



Symbol	d = I.C. [mm]	d = I.C. [in]
1	3,175	1/8"
(1.2)	3,969	5/32"
(1.5)	4,763	3/16"
(1.8)	5,556	7/32"
2	6,350	1/4"
(2.5)	7,938	5/16"
3	9,525	3/8"
4	12,700	1/2"
5	15,875	5/8"
6	19,050	3/4"
7	22,225	7/8"
8	25,400	1"
10	31,750	5/8"

6a

Thickness



Symbol	s [mm]	s [in]
1	1,588	1/16"
(1.2)	1,984	5/64"
(1.5)	2,381	3/32"
(1.8)	3,175	1/8"
2	3,969	5/32"
(2.5)	4,763	3/16"
3	5,556	7/32"
4	6,350	1/4"
5	7,938	5/16"
6	9,525	3/8"
7	11,113	7/16"
8	12,700	1/2"
9	14,288	9/16"
10	15,875	5/8"

7a

Nose radius

Symbol	r_ε [mm]	r_ε [in]
0	0,050	1/512"
(0.2)	0,099	1/256"
(0.5)	0,198	1/128"
1	0,397	1/64"
2	0,794	1/32"
3	1,191	3/64"
4	1,588	1/16"
5	1,984	5/64"
6	2,381	3/32"
7	2,778	7/64"
8	3,175	1/8"
10	3,969	5/32"
12	4,763	3/16"
14	5,556	7/32"
16	6,350	1/4"
x	ostat.	

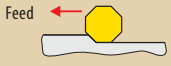
8

Cutting edge design

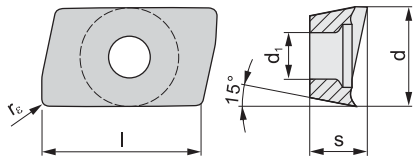
F	Sharp edges	E	Rounded edges
T	Edges with facet	S	Rounded edges with facet
K	Edges with double facet	P	Rounded edges with double facet

9

Feed direction

R	
L	
N	

ADEX-FA



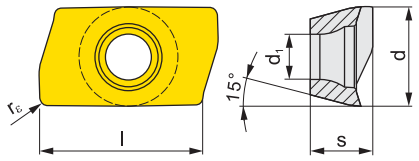
Dimensions	l	d	d_1	s		
11T3	.382	.250	.114	.138		
1606	.630	.392	.177	.246		

Dimensions [in]

See tools on pages: M28, M32, M36, M40, M42, M44, M64, M66

Geometry	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		M0315	HF7														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**ADEX 11T304FR-FA**	●	●														.016	.001	.012	.016	.354
	ADEX 11T308FR-FA	●	●														.031	.001	.012	.031	.354
	ADEX 11T316FR-FA		●														.063	.001	.012	.063	.354
	ADEX 160608FR-FA		●														.031	.002	.014	.039	.512

ADEX 16-FM



Dimensions	l	d	d_1	s		
1606	.630	.392	.177	.246		

Dimensions [in]

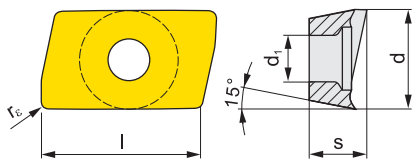
See tools on pages: M40, M42, M44

Geometry	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		M9325	M9340	M8340	8215	8230											r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**ADEX 160608SR-FM**	●	●	●	●	●											.031	.004	.008	.039	.512

● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

ADEX-HF

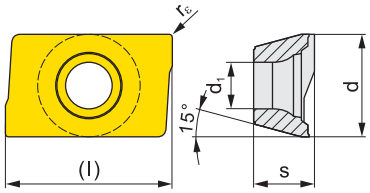


Dimensions	l	d	d_1	s		
11T3	.433	.257	.114	.156		

See tools on pages: M28, M32, M36

Geometry	Designation	Grades														Radius	Feed/rev.		Depth of cut	
		M8340	8215	8230												r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**ADEX 11T308SR-HF**	●	●	●												.031	.024	.051	.006	.024

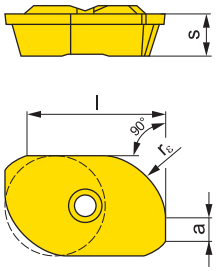
ADKT 15



Dimensions	l	d	d_1	s		
1505	.612	.375	.173	.220		

Geometry	Designation	Grades														Radius	Feed/rev.		Depth of cut	
		M9315	M9325	M8340	8230											r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**ADKT 1505PDER-M**	●	●	●	●												.006	.009	.039	.512

ADKX 15



Dimensions	l	d	s	a		
15T3	.480	.375	.156	.102		

Dimensions [in]

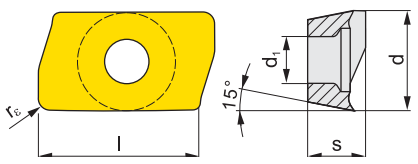
See tools on pages: M46, M48, M50

Geometry	Designation	Grades		Radius	Feed/rev.		Depth of cut	
		M8345	8230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**ADKX 15T304ER-F**	●	●	.016	.002	.004	.012	.394
	ADKX 15T308ER-F	●	●	.031	.002	.005	.012	.394
	**ADKX 15T330ER-F**	●	●	.118	.002	.006	.012	.394
	ADKX 15T340ER-F	●	●	.157	.002	.007	.012	.394
	ADKX 15T360ER-F	●	●	.236	.002	.010	.012	.394

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

ADMX 11



Dimensions	l	d	d_1	s		
11T3	.433	.257	.114	.156		

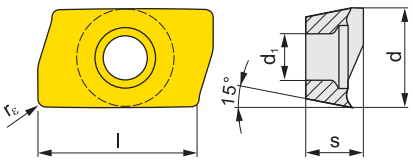
Dimensions [in]

See tools on pages: M28, M32, M36, M64, M66

Geometry	Designation	Grades							Radius	Feed/rev.		Depth of cut	
		M5315	M9315	M9325	M9340	M8340	8215	8230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
F	**ADMX 11T304SR-F**				●	●	●	●	.016	.003	.004	.016	.354
F	**ADMX 11T308SR-F**				●	●	●	●	.031	.003	.004	.031	.354
M	**ADMX 11T302SR-M**					●		●	.008	.004	.007	.008	.354
M	**ADMX 11T304SR-M**			●	●	●	●	●	.016	.004	.006	.016	.354
M	**ADMX 11T308SR-M**	●	●	●	●	●	●	●	.031	.004	.006	.031	.354
M	**ADMX 11T310SR-M**					●		●	.039	.004	.009	.031	.354
M	**ADMX 11T312SR-M**					●	●	●	.047	.004	.009	.031	.354
M	**ADMX 11T316SR-M**					●	●	●	.063	.004	.009	.031	.354
M	**ADMX 11T320SR-M**					●		●	.079	.004	.009	.031	.354
M	**ADMX 11T325SR-M**					●		●	.098	.004	.009	.031	.354
M	**ADMX 11T330SR-M**					●		●	.118	.004	.009	.031	.354
R	**ADMX 11T308PR-R**	●	●	●		●	●	●	.031	.006	.008	.031	.354
R	**ADMX 11T316PR-R**			●		●	●	●	.063	.004	.007	.031	.354

● stocked as standard /○ not stocked as standard
See price list for current availability.

ADMX 16



Dimensions	l	d	d_1	s		
1606	.630	.392	.177	.246		

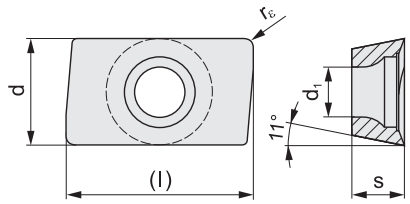
Dimensions [in]

See tools on pages: M40, M42, M44

Geometry	Designation	Grades							Radius	Feed/rev.		Depth of cut	
		M5315	M9315	M9325	M9340	M8340	8215	8230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
F	**ADMX 160608SR-F**				●	●	●	●	.031	.003	.005	.039	.512
M	**ADMX 160608SR-M**	●	●	●	●	●	●	●	.031	.004	.008	.039	.512
M	**ADMX 160616SR-M**			●		●	●	●	.063	.004	.009	.039	.512
M	**ADMX 160632SR-M**			●		●	●	●	.126	.004	.009	.039	.512
R	**ADMX 160608PR-R**	●	●	●		●	●	●	.031	.007	.011	.039	.512

● stocked as standard /○ not stocked as standard
See price list for current availability.

APET 16-FA

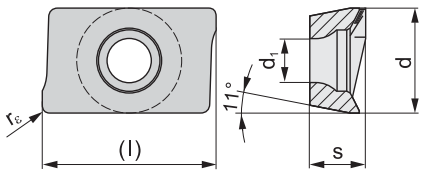


Dimensions	l	d	d_1	s		
1604	.669	.378	.177	.187		

Dimensions [in]

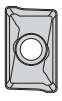
Geometry	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		HF7															r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**APET 160408FR-FA**	●															.031	.002	.016	.031	.591

APKT 10-FA

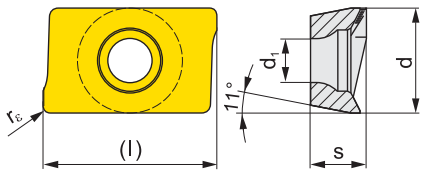


Dimensions	l	d	d_1	s		
1003	.433	.264	.113	.138		

Dimensions [in]

Geometry	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		HF7															r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**APKT 1003PDFR-FA**	●																.002	.012	.031	.354

APKT 10-M

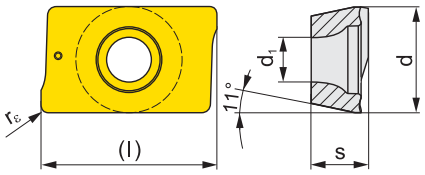


Dimensions	l	d	d_1	s		
1003	.433	.264	.113	.138		

Dimensions [in]

Geometry	Designation	Grades						Radius	Feed/rev.		Depth of cut	
		M9315	M9325	M9340	M8340	8215	8230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**APKT 1003PDER-M**	●	●	●	●	●	●		.004	.008	.039	.354

APKT 16



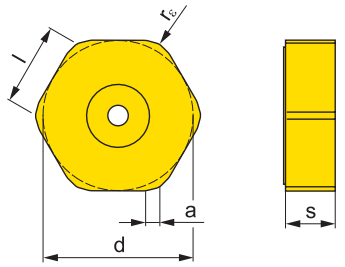
Dimensions	l	d	d_1	s		
1604	.669	.372	.181	.223		

Dimensions [in]

Geometry	Designation	Grades							Radius	Feed/rev.		Depth of cut	
		M5315	M9315	M9325	M9340	M8340	8215	8230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**APKT 1604PDR-GM**		●	●	●	●		●		.006	.009	.039	.512
	APKT 1604PDR-HM	●	●	●		●	●	●		.008	.014	.039	.512
	**APKT 160404-HM**					●			.016	.008	.014	.039	.512
	APKT 160416-HM					●			.063	.008	.014	.039	.512
	APKT 160431-HM					●			.122	.008	.014	.039	.512

● stocked as standard /○ not stocked as standard
See price list for current availability.

HNEF 09



Dimensions	l	d	s	a		
0905	.370	.638	.222	.063		

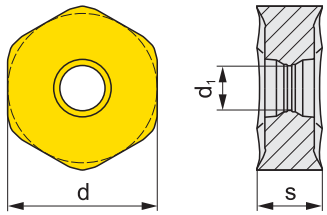
Dimensions [in]

See tools on pages: M24

Geometry	Designation	Grades					Radius	Feed/rev.		Depth of cut	
		M5315	M9325	M8310	8215		r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**HNEF 0905DNFN-F**	●	○	●	●			.003	.008	.012	.118
	**HNEF 090508EN-M**	●	○		●		.031	.007	.012	.039	.157
	**HNEF 0905ZZL-W**	○			○			.003	.008	.012	.118
	HNEF 0905ZZR-W	●	○	●	●			.003	.008	.012	.118

● stocked as standard / ○ not stocked as standard
See price list for current availability.

HNGX 06



Dimensions	d	s	d_1			
0604	.413	.207	.146			

Dimensions [in]

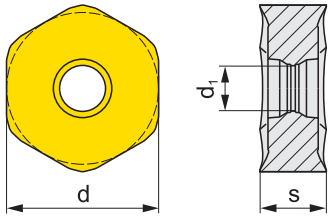
See tools on pages: M10, M12, M14

Geometry	Designation	Grades							Radius	Feed/rev.		Depth of cut	
		M5315	M9315	M9325	M9340	M8340	8215	8230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**HNGX 0604ANSN-F**				●	●	●	●		.003	.007	.012	.118
	**HNGX 0604ANSN-M**	●	●	●	●	●	●	●		.005	.010	.024	.118
	**HNGX 0604ANSN-R**	●	●	●		●	●	●		.007	.012	.039	.118

● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

HNGX 09



Dimensions	d	s	d_1			
0906	.650	.250	.193			

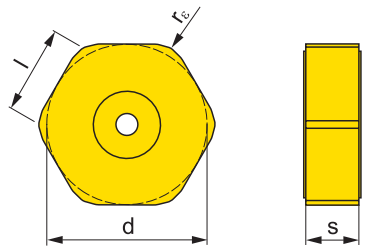
Dimensions [in]

See tools on pages: M16

Geometry	Designation	Grades							Radius	Feed/rev.		Depth of cut	
		M5315	M9315	M9325	M9340	M8340	8215	8230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**HNGX 0906ANEN-FF**				●		●	●		.002	.008	.020	.197
	**HNGX 0906ANSN-F**				●	●	●	●		.004	.008	.020	.197
	**HNGX 0906ANSN-M**	●	●	●	●	●	●	●		.007	.014	.031	.197
	**HNGX 0906ANSN-R**	●	●	●		●	●	●		.012	.020	.039	.197

● stocked as standard /○ not stocked as standard
See price list for current availability.

HNMF 09



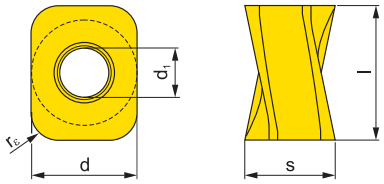
Dimensions	l	d	s			
0905	.370	.638	.222			

Dimensions [in]

See tools on pages: M24

Geometry	Designation	Grades				Radius	Feed/rev.		Depth of cut	
		M5315	M9325	8215		r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**HNMF 090516SN-R**	●	●	●		.063	.009	.020	.059	.236

LNGU 12-M



Dimensions	l	d	s	d_1		
1205	.472	.374	.280	.177		

Dimensions [in]

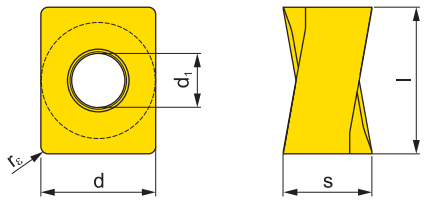
See tools on pages: M52, M54, M56

Geometry	Designation	Grades				Radius	Feed/rev.		Depth of cut	
		M8340	8230			r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**LNGU 120525ER-M**	●	●			.098	.002	.010	.039	.354
	LNGU 120530ER-M	●	●			.118	.002	.010	.039	.354

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

LNGU 16-M



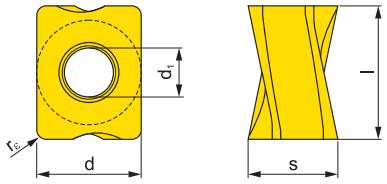
Dimensions	l	d	s	d_1		
1607	.654	.520	.394	.224		

Dimensions [in]

See tools on pages: M58

Geometry	Designation	Grades					Radius	Feed/rev.		Depth of cut	
		M9315	M9325	M8340	8215	8230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**LNGU 160708SR-M**	●	●	●	●	●	.031	.004	.010	.039	.512

LNGX 12-FA



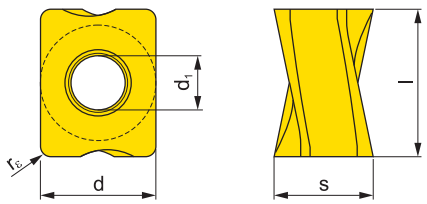
Dimensions	l	d	s	d_1		
1205	.472	.374	.280	.177		

Dimensions [in]

See tools on pages: M52, M54, M56

Geometry	Designation	Grades					Radius	Feed/rev.		Depth of cut	
		M0315	HF7				r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**LNGX 120504FR-FA**		●				.016	.001	.014	.016	.354
	LNGX 120508FR-FA	●	●				.031	.001	.014	.031	.354

LNGX 12-M



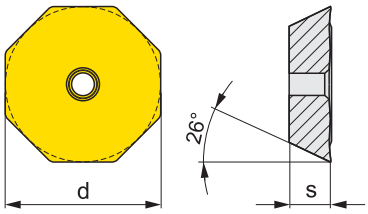
Dimensions	l	d	s	d_1		
1205	.472	.374	.280	.177		

Dimensions [in]

See tools on pages: M52, M54, M56

Geometry	Designation	Grades							Radius	Feed/rev.		Depth of cut	
		M5315	M9315	M9325	M9340	M8340	8215	8230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**LNGX 120504ER-F**					●	●	●	.016	.002	.006	.016	.354
	LNGX 120508ER-F					●	●	●	.031	.002	.006	.031	.354
	LNGX 120504ER-M					●		●	.016	.002	.010	.039	.354
	LNGX 120508ER-M		●	●	●	●	●	●	.031	.002	.006	.039	.354

OFKR 07-M



Dimensions	d	s				
0704	.703	.180				

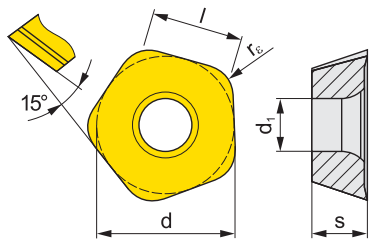
Dimensions [in]

Geometry	Designation	Grades							Radius	Feed/rev.		Depth of cut	
		M9340	M8340	8230					r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**OFKR 0704SN-M**	●	●	●						.004	.012	.020	.472

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

PDKT 09-FM



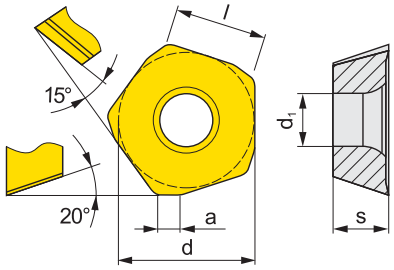
Dimensions	l	d	s	d_1		
0905	.354	.531	.215	.217		

Dimensions [in]

See tools on pages: M78, M80

Geometry	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		M8345	8215	8230													r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	PDKT 090530ER-FM	●	●	●													.118	.020	.098	.012	.079

PDKX 09-FM



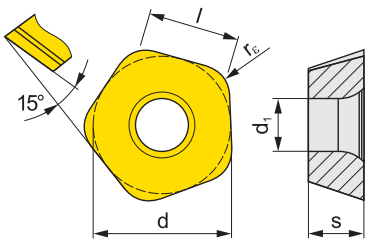
Dimensions	l	d	s	d_1	a	
0905	.354	.531	.215	.217	.079	

Dimensions [in]

See tools on pages: M78, M80

Geometry	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		M9340	M8345														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	PDKX 0905ZEER-FM	●	●															.020	.069	.012	.079

PDMW 09



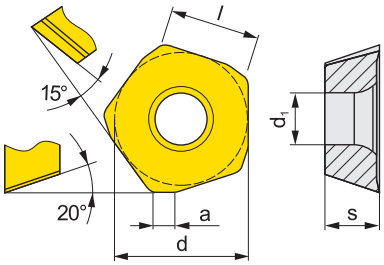
Dimensions	l	d	s	d_1		
0905	.354	.531	.215	.217		

Dimensions [in]

See tools on pages: M78, M80

Geometry	Designation	Grades														Radius	Feed/rev.		Depth of cut	
		M9325	M8345													r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**PDMW 090530SR**	●	●													.118	.020	.069	.012	.079

PDMX 09



Dimensions	l	d	s	d_1	a	
0905	.354	.531	.215	.217	.079	

Dimensions [in]

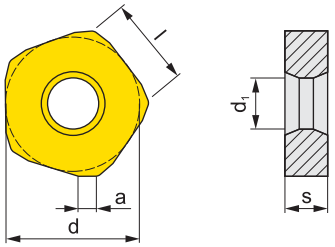
See tools on pages: M78, M80

Geometry	Designation	Grades														Radius	Feed/rev.		Depth of cut	
		M9340	M8345	8215	8230											r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**PDMX 0905ZEER-M**	●	●	●	●												.020	.069	.012	.079
	**PDMX 0905ZESR-R**		●	●	●												.020	.098	.012	.079

● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

PNMQ 13



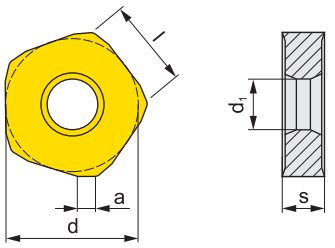
Dimensions	l	d	s	d_1	a	
1308	.512	.961	.313	.394	.118	

Dimensions [in]

See tools on pages: M22

Geometry	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		M9340	M8345	8230													r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**PNMQ 1308DNSN**	●	●	●														.012	.023	.020	.394

PNMU 13-M



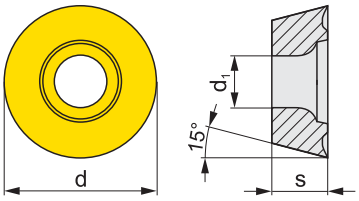
Dimensions	l	d	s	d_1	a	
1308	.512	.961	.313	.394	.118	

Dimensions [in]

See tools on pages: M22

Geometry	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		M9340	M8345	8215	8230												r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**PNMU 1308DNSR-M**	●	●	●	●													.010	.023	.020	.394

RDET

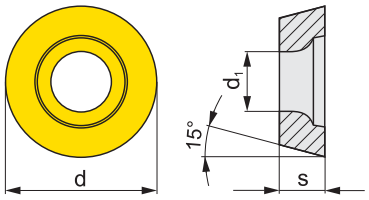


Dimensions	d	d1	s			
1003	.394	.173	.125			
10T3	.394	.173	.156			
12T3	.472	.173	.156			

Dimensions [in]

Geometry	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		M8340	8230														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**RDET 1003MOSN**	●	●															.004	.012	.020	.098
	RDET 10T3MOSN	●																.004	.014	.020	.098
	RDET 12T3MOSN	●	●															.004	.014	.020	.118

RDEW



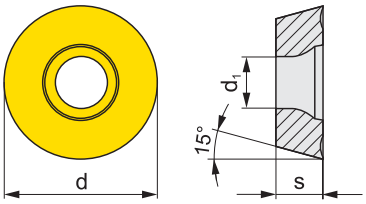
Dimensions	d	d1	s			
1003	.394	.173	.125			
10T3	.394	.173	.156			
12T3	.472	.173	.156			

Dimensions [in]

Geometry	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		8215	8230														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**RDEW 1003MOSN**	●	●															.004	.014	.020	.098
	RDEW 10T3MOSN		●															.004	.014	.020	.098
	RDEW 12T3MOSN		●															.005	.016	.020	.118

● stocked as standard /○ not stocked as standard
See price list for current availability.

RDEX-12

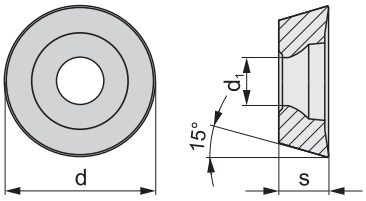


Dimensions	d	d1	s			
1204	.472	.173	.187			

Dimensions [in]

Geometry	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		M8340	8230														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**RDEX 1204M0SN-12**	●	●															.005	.016	.020	.118

RDGT



Dimensions	d	d1	s			
0702	.276	.110	.094			
1003	.394	.154	.125			
12T3	.472	.154	.156			
1604	.630	.205	.187			

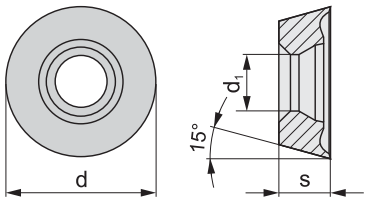
Dimensions [in]

See tools on pages: M74, M74, M76

Geometry	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		M9340	M8310	M8325	M8345												r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**RDGT 0702M0T**		○	○	○													.004	.008	.012	.079
	RDGT 1003M0T	●	●	●	●													.004	.009	.020	.098
	RDGT 12T3M0T	●	●	●	●													.004	.010	.039	.118
	RDGT 1604M0T	●	●	●	●													.004	.012	.039	.157

● stocked as standard /○ not stocked as standard
See price list for current availability.

RDHT-FA



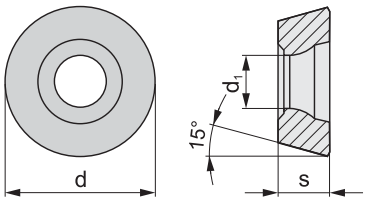
Dimensions	d	d1	s
0702	.276	.110	.094
1003	.394	.154	.125
12T3	.472	.154	.156
1604	.630	.205	.187

Dimensions [in]

See tools on pages: M74, M74, M76

Geometry	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		HF7															r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**RDHT 0702M0-FA**	●																.004	.008	.012	.079
	RDHT 1003M0-FA	●																.004	.012	.012	.098
	RDHT 12T3M0-FA	●																.004	.012	.012	.118
	RDHT 1604M0-FA	●																.004	.016	.012	.157

RDHX M0T



Dimensions	d	d1	s
0702	.276	.110	.094
1003	.394	.154	.125
12T3	.472	.154	.156
1604	.630	.205	.187
2006	.787	.205	.250

Dimensions [in]

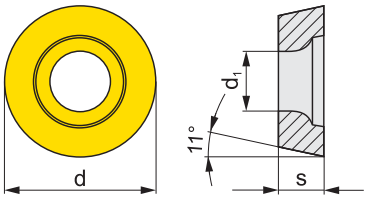
See tools on pages: M74, M74, M76

Geometry	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		M8310	M8325	M8345	7205												r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**RDHX 0702M0T**	●	●		●													.004	.007	.020	.079
	RDHX 1003M0T	●	●	●	●													.004	.012	.012	.098
	RDHX 12T3M0T	●	●	●	●													.004	.014	.039	.118
	RDHX 1604M0T	●	●	●														.008	.016	.039	.157
	RDHX 2006M0T	●	●															.008	.024	.039	.197

● stocked as standard /○ not stocked as standard
See price list for current availability.

PRAMET

RPET 12

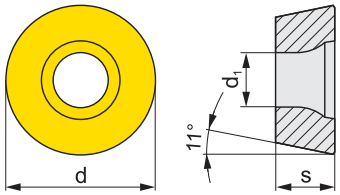


Dimensions	d	d1	s			
1204	.472	.173	.187			

Dimensions [in]

Geometry	Designation	Grades			Radius	Feed/rev.		Depth of cut	
		M8340	8215	8230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**RPET 1204M0SN**	●	●	●		.005	.016	.020	.118

RPEW 12

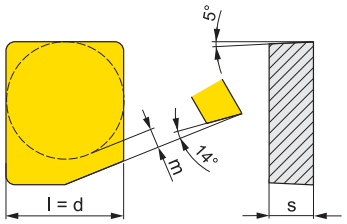


Dimensions	d	d_1	s			
1204	.472	.173	.187			

Dimensions [in]

Geometry	Designation	Grades			Radius	Feed/rev.		Depth of cut	
		M8325	8215	8230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**RPEW 1204M0SN**	●	●	●		.004	.016	.020	.118

SBKX 22



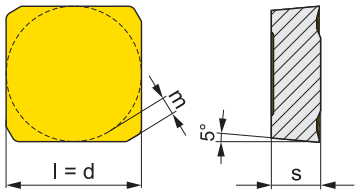
Dimensions	l	d	s	m		
2207	.866	.866	.335	.127		

Dimensions [in]

See tools on pages: M26

Geometry	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		M8326															r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**SBKX 2207DZER**	●																.014	.031	.020	.118

SBMR 22



Dimensions	l	d	s	m		
2207	.866	.866	.335	.111		

Dimensions [in]

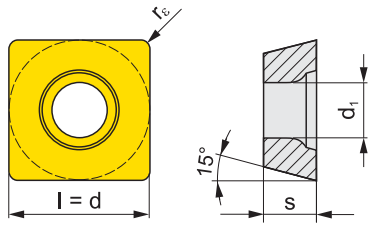
See tools on pages: M26

Geometry	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		M8326	M8346														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**SBMR 2207DZSR**	●	●															.014	.031	.047	.591

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

SDEW 09



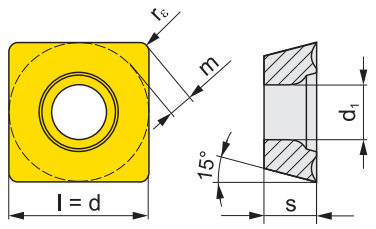
Dimensions	l	d	s	d_1
322E	.375	.375	.125	.173
322S	.375	.375	.125	.173

Dimensions [in]

See tools on pages: M88

Geometry	Designation	Grades			Radius	Feed/rev.		Depth of cut	
		M8340	8215	8230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	SDEW 322EN	●		●	.031	.004	.012	.039	.177
	SDEW 322SN	●	●	●	.031	.004	.012	.039	.177

SDEX 09-74



Dimensions	l	d	s	d_1
322F	.375	.375	.125	.173

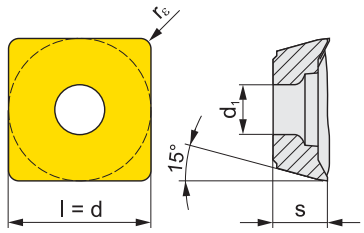
Dimensions [in]

See tools on pages: M88

Geometry	Designation	Grades	Radius	Feed/rev.		Depth of cut	
		8230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	SDEX 322FN-74	●	.031	.004	.012	.020	.177

● stocked as standard /○ not stocked as standard
See price list for current availability.

SDMT 12



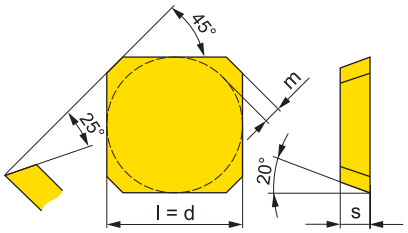
Dimensions	l	d	s	d_1		
1205	.500	.500	.197	.173		

Dimensions [in]

Geometry	Designation	Grades					Radius	Feed/rev.		Depth of cut	
		M9315	M9325	M8340	8215	8230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**SDMT 120508SR-F**			●		●	.031	.003	.010	.039	.197
	**SDMT 120508SR-M**		●	●	●	●	.031	.004	.007	.039	.394
	**SDMT 120508PR-R**	●	●	●		●	.031	.004	.010	.039	.394

● stocked as standard /○ not stocked as standard
See price list for current availability.

SEEN

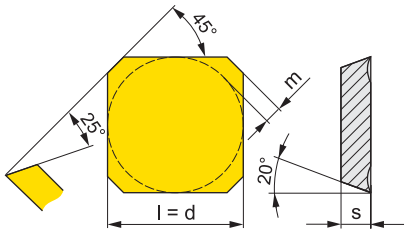


Dimensions	l	d	s	m		
42AF	.500	.500	.125	.063		
53AF	.625	.625	.187	.079		

Dimensions [in]

Geometry	Designation	Grades						Radius	Feed/rev.		Depth of cut	
		M9315	M9325	M9340	M8340	8215	8230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	SEEN 42AFFN			●	●		●		.002	.010	.020	.256
	SEEN 42AFSN	●	●	●	●	●	●		.006	.012	.039	.256
	SEEN 53AFSN	●	●	●	●		●		.008	.013	.039	.354

SEER



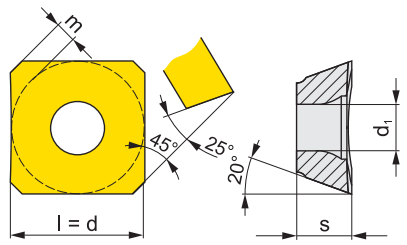
Dimensions	l	d	s	m		
42AF	.500	.500	.125	.063		
53AF	.625	.625	.187	.079		

Dimensions [in]

Geometry	Designation	Grades						Radius	Feed/rev.		Depth of cut	
		M9325	M9340	M8340	8230			r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	SEER 42AFEN				●				.008	.016	.020	.256
	SEER 42AFSN	●	●	●	●				.008	.012	.039	.256
	SEER 53AFEN				●				.008	.016	.020	.354
	SEER 53AFSN	●	●	●	●				.008	.012	.020	.354

● stocked as standard /○ not stocked as standard
See price list for current availability.

SEET 09



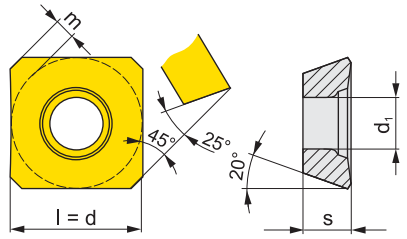
Dimensions	l	d	s	d_1		
09T3	.375	.375	.156	.138		

Dimensions [in]

See tools on pages: M18, M20

Geometry	Designation	Grades					Radius	Feed/rev.		Depth of cut	
		M9325	M9340	M8340	8215	8230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**SEET 09T3AFEN**	●	●	●	●	●		.003	.010	.012	.177

SEMT 09



Dimensions	l	d	s	m	d_1	
09T3	.375	.375	.156	.048	.138	

Dimensions [in]

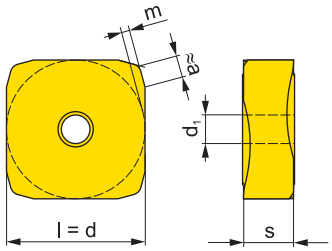
See tools on pages: M18, M20

Geometry	Designation	Grades					Radius	Feed/rev.		Depth of cut	
		M9325	M9340	M8340	8215	8230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**SEMT 09T3AFSN**	●	●	●	●	●		.005	.010	.020	.177

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

SNHF-M

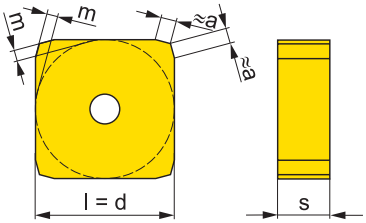


Dimensions	l	d	s	m	a	
43EN	.500	.500	.187	.020	.079	
53EN	.625	.625	.187	.043	.055	

Dimensions [in]

Geometry	Designation	Grades																Radius	Feed/rev.		Depth of cut	
		M9325	M8340	8230														r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**SNHF 43ENSR-M**	●	●	●															.006	.012	.039	.236
	SNHF 53ENSR-M		●	●															.006	.016	.039	.354

SNHN

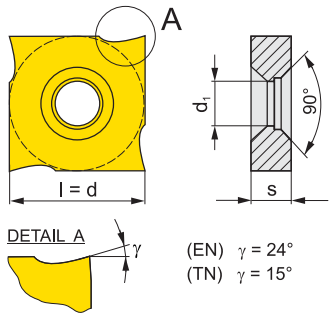


Dimensions	l	d	s	m	a	
43EN	.500	.500	.187	.037	.055	
53EN	.625	.625	.187	.051	.055	

Dimensions [in]

Geometry	Designation	Grades																Radius	Feed/rev.		Depth of cut	
		M9315	M9325	M8340	8215	8230												r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**SNHN 43ENEN**	●	●	●	●	●													.004	.013	.020	.354
	SNHN 53ENEN			●	●	●													.004	.016	.020	.531

SNHQ AZ



Dimensions	l	d	s	d_1		
1102	.433	.433	.091	.169		
1103	.433	.433	.106	.169		
1204	.500	.500	.177	.197		
1205	.500	.500	.213	.197		
12T3	.500	.500	.157	.197		

Dimensions [in]

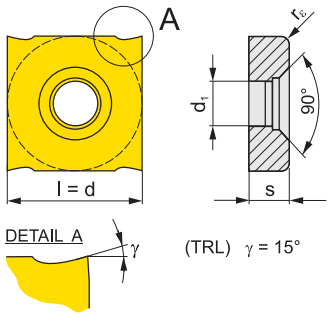
See tools on pages: M68, M70

Geometry	Designation	Grades			Radius	Feed/rev.		Depth of cut	
		M8340	8215	8230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	SNHQ 1102AZTN	●		●		.008	.020	-	-
	SNHQ 1103AZTN	●		●		.008	.020	-	-
	SNHQ 12X4AZEN	●							
	**SNHQ 12X4AZTN**	●		●					
	SNHQ 1204AZEN	●	●			.008	.016	-	-
	SNHQ 1204AZTN	●		●		.008	.016	-	-
	SNHQ 1205AZEN	●	●			.008	.020	-	-
	SNHQ 1205AZTN	●		●		.008	.020	-	-

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

SNHQ 12 TRL



Dimensions	l	d	s	d_1	γ°	
1204	.500	.500	.177	.197	15	
1205	.500	.500	.213	.197	15	
12T3	.500	.500	.157	.197	15	

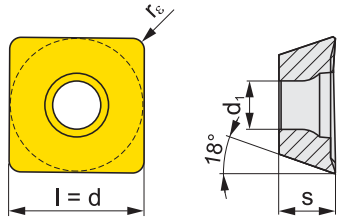
Dimensions [in]

See tools on pages: M68, M70

Geometry	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		M8340															r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**SNHQ 12T305TRL**	●															.020	.008	.020	-	-
	SNHQ 12T310TRL	●															.039	.008	.020	-	-
	SNHQ 12T315TRL	●															.059	.008	.020	-	-
	SNHQ 120405TRL	●															.020	.008	.020	-	-
	SNHQ 120410TRL	●															.039	.008	.020	-	-
	SNHQ 120415TRL	●															.059	.008	.020	-	-
	SNHQ 120505TRL	●															.020	.008	.020	-	-
	SNHQ 120510TRL	●															.039	.008	.020	-	-
	SNHQ 120515TRL	●															.059	.008	.020	-	-

● stocked as standard /○ not stocked as standard
See price list for current availability.

SOMT 09



Dimensions	l	d	s	d_1		
09T3	.376	.376	.156	.138		

Dimensions [in]

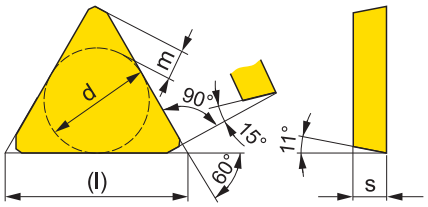
See tools on pages: M60, M62

Geometry	Designation	Grades								Radius	Feed/rev.		Depth of cut	
		M5315	M9315	M9325	M9340	M8310	M8340	8215	8230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**SOMT 09T308-M**	●	●				●	●	●	.031	.005	.012	.039	.315
	**SOMT 09T304-MI**		●		●	●	●	●	●	.016	.003	.010	.020	.315
	**SOMT 09T304-P**			●			●		●	.016	.003	.010	.020	.315

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

TPKN ER

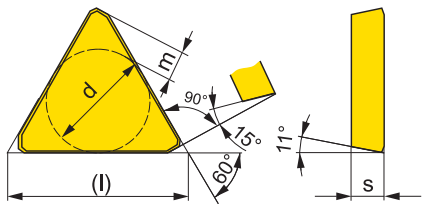


Dimensions	l	d	s	m		
32PD	.650	.375	.125	.096		
43PD	.866	.500	.187	.140		

Dimensions [in]

Geometry	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		M8340	8215	8230													r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TPKN 32PDER	●		●														.004	.008	.039	.630
	TPKN 43PDER	●	●	●														.004	.010	.039	.866

TPKN SR



Dimensions	l	d	s	m		
32PD	.650	.375	.125	.096		
43PD	.866	.500	.187	.140		

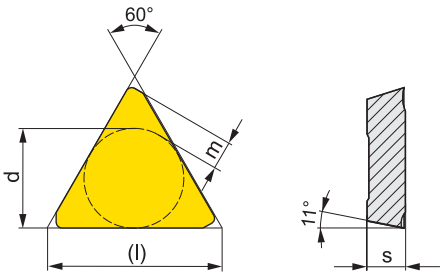
Dimensions [in]

Geometry	Designation	Grades															Radius	Feed/rev.		Depth of cut	
		M9325	M8340	8230													r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TPKN 32PDSR		●	●														.008	.010	.039	.630
	TPKN 43PDSR	●	●	●														.008	.010	.039	.866

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

TPKR

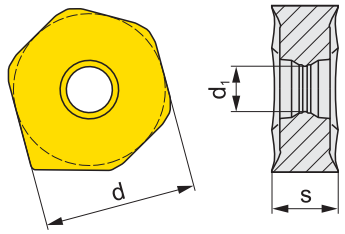


Dimensions	l	d	s	m		
32PD	.650	.375	.125	.096		
43PD	.866	.500	.187	.140		

Dimensions [in]

Geometry	Designation	Grades				Radius	Feed/rev.		Depth of cut	
		M9325	M9340	M8340	8230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	TPKR 32PDSR		●	●	●		.004	.009	.039	.630
	TPKR 43PDSR	●	●	●	●		.004	.012	.039	.866

XNGX



Dimensions	d	s	d_1			
0604	.413	.207	.146			
0906	.650	.250	.193			

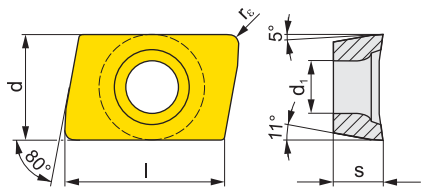
Dimensions [in]

See tools on pages: M10, M12, M14, M16

Geometry	Designation	Grades	Radius	Feed/rev.		Depth of cut	
		8215	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	XNGX 0604ANSN	●		.005	.010	.028	.118
	XNGX 0906ANSN	●		.007	.020	.031	.197

● stocked as standard /○ not stocked as standard
See price list for current availability.

XPHT 16



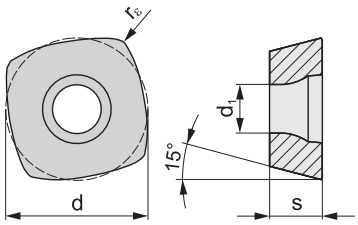
Dimensions	l	d	d_1	s		
1604	.625	.375	.173	.187		

Dimensions [in]

See tools on pages: M90

Geometry	Designation	Grades						Radius	Feed/rev.		Depth of cut	
		M9325	M9340	M8340	8215	8230	HF7	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**XPHT 160412E**				●	●		.047	.002	.012	.047	.591
	XPHT 160412S	●	●	●	●	●		.047	.004	.009	.047	.591
	**XPHT 160408F-FA**						●	.031	.002	.012	.031	.591

ZDCW



Dimensions	l	d	s	d_1		
0703	.268	.268	.125	.094		
09T3	.375	.375	.156	.134		

Dimensions [in]

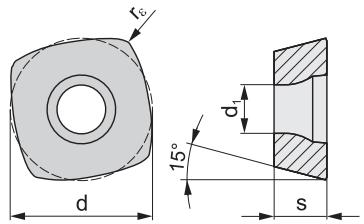
See tools on pages: M82, M84, 86

Geometry	Designation	Grades						Radius	Feed/rev.		Depth of cut	
		M8310	M8325	M8345	7205	7215	7230	r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**ZDCW 070304**		●	●		●	●	.016	.006	.059	.012	.039
	ZDCW 09T304	●	●	●	●	●	●	.016	.012	.079	.012	.039

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

ZDEW 12



Dimensions	l	d	s	d_1		
1204	.500	.500	.187	.173		

Dimensions [in]

See tools on pages: M84, M86

Geometry	Designation	Grades					Radius	Feed/rev.		Depth of cut	
		M8310	M8325	M8345	7205		r_ε	f_{min}	f_{max}	$a_{p\,min}$	$a_{p\,max}$
	**ZDEW 120408**	●	●	●	●		.031	.008	.059	.012	.039

PRAMET

● stocked as standard /○ not stocked as standard
See price list for current availability.

TECHNICAL INFORMATION

Correctly identifying the machined material is one of the most important factors when choosing the tool and the initial machining conditions. To facilitate this, the machined materials are divided into six basic groups, or into twenty-four subgroups, combining materials that qualitatively cause the same type of loading (straining) on the cutting edge and therefore a similar type of wear.

Thus the first step is to assign the workpiece material to one of the (sub)groups - see table 1. below.

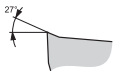
Table 1

Group	Subgroup	Subgroup definition	Example ANSII/SAE	Correction to standard	DORMER AMG	VDI 3323
P	P1	Steel and cast steel with very good (enhanced) machinability; automatic steel and low-carbon steel	1213	1.33	**1.1, 1.2**	**1**
	P2	Non-alloy and low-alloy cast steel and steel with a medium carbon content (.25<C<.55); rigidity of up to 900 MPa and hardness of 160-255 HB	Gr.1043	1.00	**1.3**	**2, 3, 6**
	P3	Less machinable non-alloy and low-alloy cast steel and steel with a medium carbon content; rigidity of up to 1000 MPa and hardness of up to 300 HB	Cl. A	.80	**1.4**	**4, 5, 7, 8, (10)**
	P4	Medium- to high-alloy cast steel and steel (usually with a carbon content of .55 <C); rigidity of up to 1270 MPa and hardness of up to 375HB (resp. 40 HRC)	D3	.60	**1.5**	**9, (10), 11**
M	M1	Ferritic corrosion-resistant steel	Type 430	1.09	**2.1**	**12**
	M2	Martensitic corrosion-resistant steel	440 C	1.06	**(2.1,2.4)**	**13.1, 13.2**
	M3	Austenitic corrosion-resistant steel	Type 321	1.00	**2.2**	**14.1**
	M4	Ferritic-austenitic (duplex) and super-austenitic corrosion-resistant steel	EV 12	.93	**2.3, 2.4**	**14.2, 14.3, 14.4**
K	K1	Grey cast iron	C1.35B	1.00	**3.1, 3.2**	**15, 16**
	K2	Tempered cast iron	Gr.45006	.95	**3.1, 3.2**	-
	K3	Ductile cast iron ferritic and ferrite-pearlite	Gr.60-40-18	.90	**3.3**	**17, 19**
	K4	Ductile cast iron pearlite-ferritic, pearlite-sorbitic and pearlite	Gr.100-70-03	.85	**3.4**	**18, 20**
N	N1	Aluminium and its soft alloys (with a low Si content), particularly formed and cast (non-hardened); hardness of up to 100 HB	A96061	1.00	**7.1**	**21, 22**
	N2	Hard Al alloys, particularly cast and hardened (with a high Si content)	A04130	.65	**7.2, 7.3, 7.4**	**23, 24, 25**
	N3	Soft Cu alloys, automatic brass and other types of soft brass and bronze	C83600	.60	**6.1,6.2, 6.3**	**26, (27)**
	N4	Less machinable and hard Cu alloys	C95200	.40	**6.4**	**(27), 28**
S	S1	Technically pure Ti, alloys a , a+b and b, refined and aged alloys	TiAl6V4, AMS R56400	1.75	**4.1, 4.2, 4.3**	**36, 37**
	S2	Fe-based alloys	INCOLOY 800, B 163	1.20	**(9.1)**	**31, 32**
	S3	Ni-based alloys	INCONEL 718, AMS 5589	1.00	**5.1, 5.2, 5.3**	**33, 34, 35**
	S4	Co-based alloys	Haynes 25, AMS 5759	.75	**(9.1)**	**33, 34, 35**
H	H1	Highly rigid and hard tool steel and hardened and refined steel with a hardness of 40-50 HRC	T 4	1.15	**1.6**	**38.1**
	H2	Hardened and white cast iron 350-600 HV	Gr.1	1.10	-	**40.1, 40.2 41.1, 41.2**
	H3	Hardened and refined steel with hardness in the 50-55 HRC range	H11	1.00	**1.7**	**38.2**
	H4	Hardened and refined (mostly tool) steel with hardness of more than 55 HRC	D3	.95	**1.8**	**39.1, 39.2**

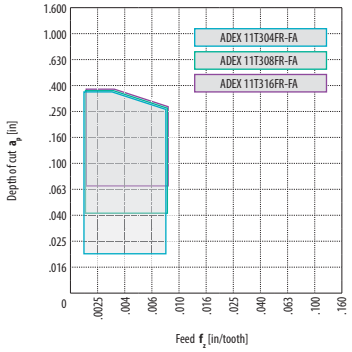
ADEX11-FA

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Profile of cutting edge



Finishing	■
Medium	■
Roughing	■



Applied to inserts: ADEX 11T304FR-FA, ADEX 11T308FR-FA, ADEX 11T316FR-FA

- High positive geometry with a sharp cutting edge
- Main application is machining materials in group N
- Polished insert face to reduce sticking of the machined material

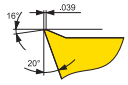
Range of cutting conditions:

f_z	.001 – .008 [in/tooth]
a_p	according to dimension of cutting insert

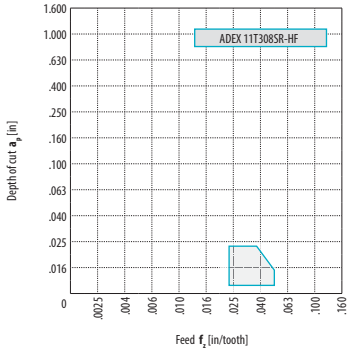
ADEX 11-HF

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Profile of cutting edge



Finishing	■ ■ □ ◪
Medium	■ ◪ □ □
Roughing	



Applied to inserts: ADEX 11T308SR-HF

- Special geometry for HFC technology
- Suitable for machining material groups P, M, K and S
- Particularly suited to light and medium machining

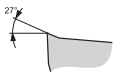
Range of cutting conditions:

f_z	.024 – .051 [in/tooth]
a_p	.006 – .024 [in]

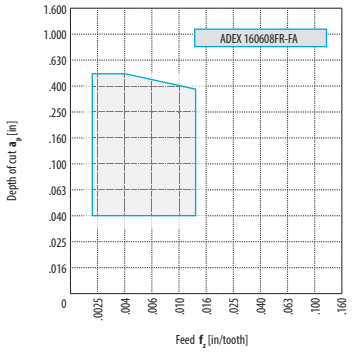
ADEX16-FA

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Profile of cutting edge



Finishing	■
Medium	■
Roughing	■



Applied to inserts: ADEX 160608FR-FA

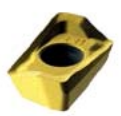
- High positive geometry with a sharp cutting edge
- Main application is machining materials in group N
- Polished insert face to reduce sticking of the machined material

Range of cutting conditions:

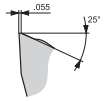
f_z	.002 – .014 [in/tooth]
a_p	.04 – .511 [in]

ADEX16-FM

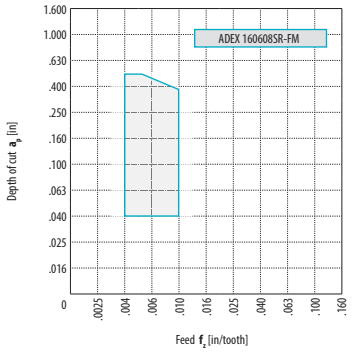
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description



Profile of cutting edge



Finishing	■ ■ ■ ◪
Medium	■ ■ ■ □
Roughing	◪ ◪ ◪ □



Applied to inserts: ADEX 160608SR-FM

- High positive geometry with medium T-land
- Suitable for machining material groups P, M, K, and S
- For medium machining conditions
- Special adjustment for better surface quality

Range of cutting conditions:

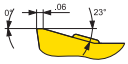
f_z	.004 – .01 [in/tooth]
a_p	.04 – .511 [in]

■ Main application ◪ Secondary application □ Supplementary application

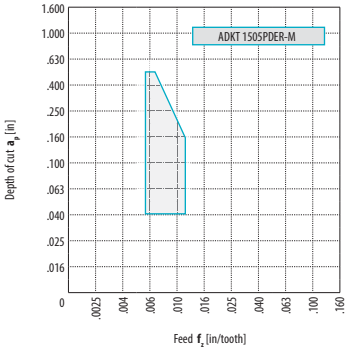
ADKT

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Profile of cutting edge



	Finishing	Medium	Roughing
P	■	■	◥
M	■	■	◥
K	■	■	◥
N			
S	◥	□	□
H			



Applied to inserts: ADKT 1505PDER-M

- Geometry with a high positive face angle and ribs to reduce contact between the chip and the face
- Suitable for machining material groups P, M, and K; can also be used with material group S

Range of cutting conditions:

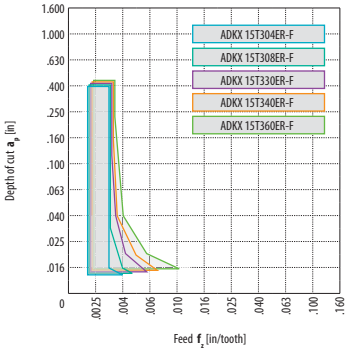
f_z	.006 – .0118 [in/tooth]
a_p	.04 – .511 [in]

ADKX-F

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Profile of cutting edge

	Finishing	Medium	Roughing
P	■	■	◥
M	■	■	◥
K	□	□	
N	□	□	◥
S	■	◥	□
H			



Applied to inserts: ADKX 15T3..ER-F

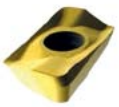
- Very positive and sharp cutting geometry
- Suitable for machining material groups P, M, and S; potentially for material groups K and N
- Particularly suited to light and medium machining

Range of cutting conditions:

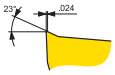
f_z	according to dimension of cutting insert
a_p	according to dimension of cutting insert

ADMX11-F

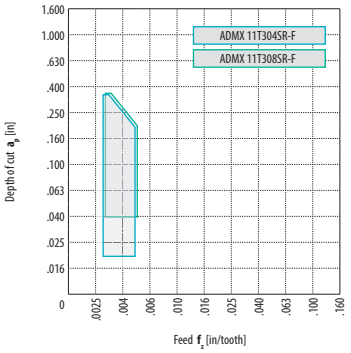
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description



Profile of cutting edge



	Finishing	Medium	Roughing
P	■	■	□
M	■	■	□
K	◥	□	□
N	■	◥	◥
S	◥	□	□
H			



Applied to inserts: ADMX 11T304SR-F, ADMX 11T308SR-F

- Very positive geometry with a narrow peripheral chamfered edge
- Suitable for machining material groups P, M, and N; also for groups K and S
- Particularly suited to light machining

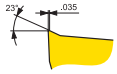
Range of cutting conditions:

f_z	.003 – .005 [in/tooth]
a_p	(.02) .04 – .354 [in]

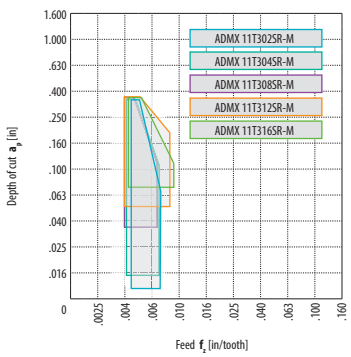
ADMX 11-M (02-16)

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Profile of cutting edge



	Finishing	Medium	Roughing
P	■	■	◥
M	■	■	◥
K	■	■	◥
N		◥	◥
S	◥	□	□
H			



Applied to inserts: ADMX 11T302SR-M, ADMX 11T304SR-M, ADMX 11T308SR-M, ADMX 11T312SR-M, ADMX 11T316SR-M

- Very positive geometry with a medium peripheral chamfered edge
- Suitable for machining material groups P, M, K, and S; potentially also group N
- Particularly suited to light and medium machining

Range of cutting conditions:

f_z	.004 – .009 [in/tooth]
a_p	.008 – .354 [in]

■ Main application ◥ Secondary application □ Supplementary application

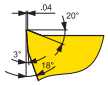
PRAMET

ADMX 11-M (20-30)

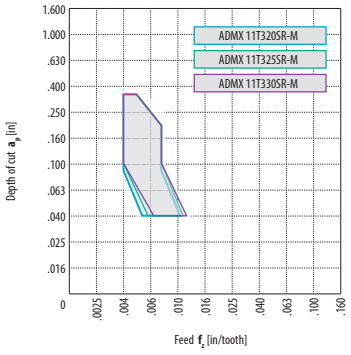
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Applied to inserts:
ADMX 11T320SR-M, ADMX 11T325SR-M, ADMX 11T330SR-M

Profile of cutting edge



Milling	P	M	K	N	S	H
Finishing	■	■	◪		□	
Medium	■	■	◪		□	
Roughing	◪	◪	◪			



- High positive geometry
- Suitable for machining material groups P, M, S and K
- For medium machining

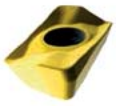
Range of cutting conditions:

f_z	.004 – .012 [in/tooth]
a_p	.04 – .354 [in]

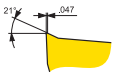
ADMX 11-R

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

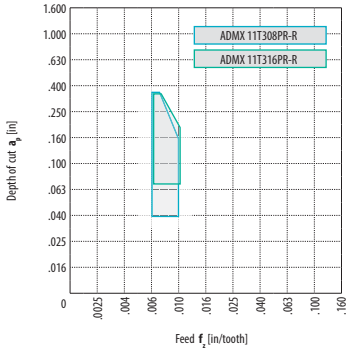
Applied to inserts:
ADMX 11T308PR-R, ADMX 11T316PR-R



Profile of cutting edge



Milling	P	M	K	N	S	H
Finishing	■	◪	■		◪	◪
Medium	■	◪	■		□	□
Roughing	■	◪	■		□	□



- Positive geometry with a double T-land
- Suitable for machining material groups P, M, K, and S
- Geometry also suited to less stable working conditions

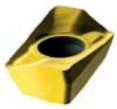
Range of cutting conditions:

f_z	.006 – .01 [in/tooth]
a_p	.04 – .354 [in]

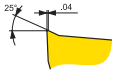
ADMX16-F

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

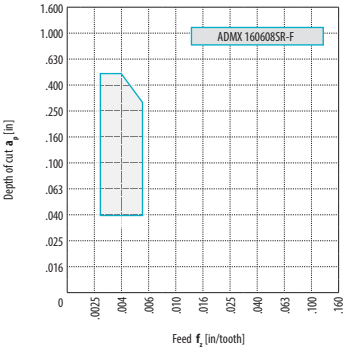
Applied to inserts:
ADMX 160608SR-F



Profile of cutting edge



Milling	P	M	K	N	S	H
Finishing	■	■	◪	■	◪	
Medium	■	■	◪	◪	□	
Roughing	□	□	□	◪	□	



- High positive geometry with a narrow T-land
- Suitable for machining materials in all groups except for group H
- Particularly suited to light and medium machining conditions

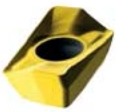
Range of cutting conditions:

f_z	.003 – .006 [in/tooth]
a_p	.04 – .512 [in]

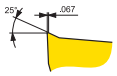
ADMX16-M

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

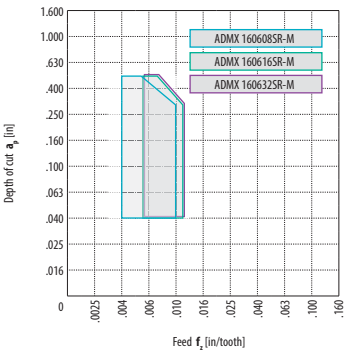
Applied to inserts:
ADMX 160608SR-M, ADMX 160616SR-M
ADMX 160632SR-M



Profile of cutting edge



Milling	P	M	K	N	S	H
Finishing	■	■	■		◪	
Medium	■	■	■		□	
Roughing	◪	◪	◪		□	



- High positive geometry with a medium T-land
- Suitable for machining material groups P, M, K, and S
- Suited to medium machining conditions
- Also available with corner radii of .063 and .126 in

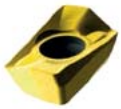
Range of cutting conditions:

f_z	.004 (.006) – .01 (.0118) [in/tooth]
a_p	.04 – .512 [in]

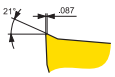
■ Main application ◪ Secondary application □ Supplementary application

ADMX16-R

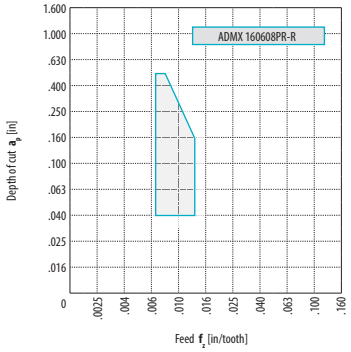
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: ADMX 160608PR-R



Profile of cutting edge



	P	M	K	N	S	H
Finishing	■	◪	■		◪	◪
Medium	■	◪	■		□	◪
Roughing	■	◪	■		□	



- Positive geometry with a double peripheral chamfered edge
- Suitable for machining material groups P, M, K, and also S and H
- Geometry also suited to medium and heavier machining conditions

Range of cutting conditions:

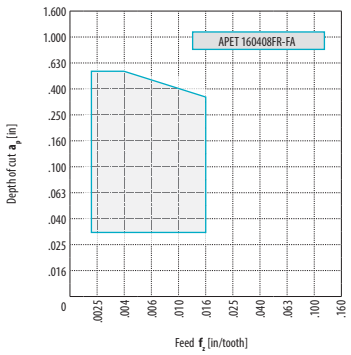
f_z	.007 – .014 [in/tooth]
a_p	.04 – .512 [in]

APET-FA

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: APET 160408FR-FA

Profile of cutting edge

	P	M	K	N	S	H
Finishing				■		
Medium				■		
Roughing				■		



- Geometry with a positive face angle and a sharp cutting edge
- Suitable for machining non-ferrous, i.e. in material group N

Range of cutting conditions:

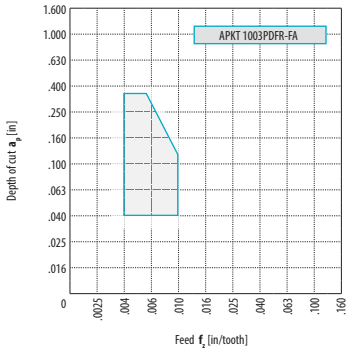
f_z	.002 – .0157 [in/tooth]
a_p	.0315 – .59 [in]

APKT 10-FA

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: APKT 1003PDFR-FA

Profile of cutting edge

	P	M	K	N	S	H
Finishing				■		
Medium				■		
Roughing						



- Geometry with a positive face angle and minimum cutting edge roundness
- Suitable for machining non-ferrous, i.e. in material group N
- Light to medium machining conditions

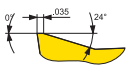
Range of cutting conditions:

f_z	.004 – .01 [in/tooth]
a_p	.04 – .354 [in]

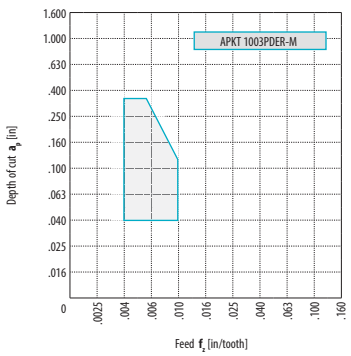
APKT 10-M

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: APKT 1003PDER-M

Profile of cutting edge



	P	M	K	N	S	H
Finishing	■	■	■		◪	
Medium	■	■	■		◪	
Roughing	◪	◪	◪		□	



- Geometry with a high positive face angle and a narrow peripheral chamfered edge
- Suitable for machining material groups P, M, and K; can also be used for material group S
- Light to heavier machining conditions

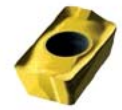
Range of cutting conditions:

f_z	.004 – .01 [in/tooth]
a_p	.04 – .354 [in]

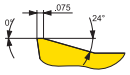
■ Main application ◪ Secondary application □ Supplementary application

APKT-GM

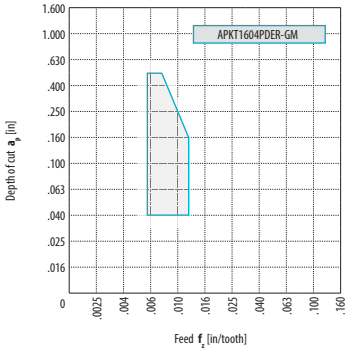
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description



Profile of cutting edge



Finishing: ■ ■ ■ ◪
Medium: ■ ■ ■ ◪
Roughing: ◪ ◪ ◪ □



Applied to inserts: APKT 1604PDER-GM

- Geometry with a high positive face angle and a narrow peripheral chamfered edge
- Suitable for machining material groups P, M, and K; can also be used for material group S
- Light to heavier machining conditions

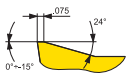
Range of cutting conditions:

f_z	.006 – .0118 [in/tooth]
a_p	.04 – .512 [in]

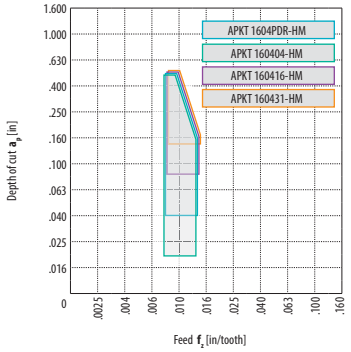
APKT-HM

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Profile of cutting edge



Finishing: ■ ■ ■ □
Medium: ■ ■ ■ ◪
Roughing: ■ ■ ■ ◪



Applied to inserts: APKT 1604PDER-HM, APKT 160404-HM, APKT 160416-HM, APKT 160431-HM

- Geometry with a high positive face angle and a medium peripheral chamfered edge
- Suitable for machining material groups P, M, and K; can also be used for material group S
- Offered with radii of .016, .063, .126
- Light to heavier machining conditions

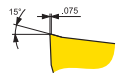
Range of cutting conditions:

f_z	.0079 – .0138 [in/tooth]
a_p	.0197 – .512 [in]

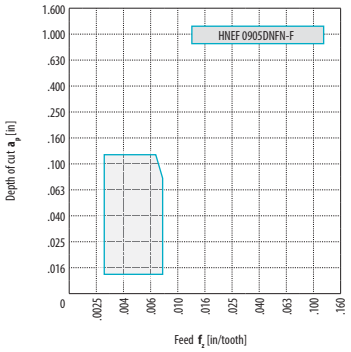
HNEF-F

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Profile of cutting edge



Finishing: ◪ ■ ◪ ◪
Medium: □ ◪ □ □
Roughing:



Applied to inserts: HNEF 0905DNFN-F

- Positive geometry without chamfered edge
- Specially designed for machining material group K and potentially for material groups P, N, and S (due to the fine pitch of the cutters on the milling cutters, there is a danger of the chip space being clogged by a continuous chip)
- Particularly suited to light machining

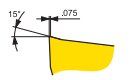
Range of cutting conditions:

f_z	.003 – .008 [in/tooth]
a_p	.012 – .118 [in]

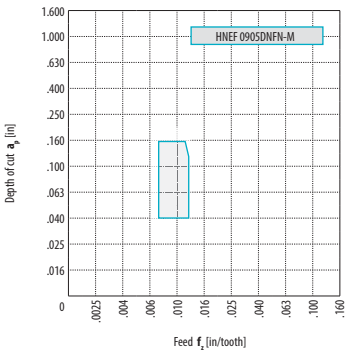
HNEF-M

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Profile of cutting edge



Finishing: ◪ ■
Medium: □ ■
Roughing:



Applied to inserts: HNEF 0905DNFN-M

- Positive geometry with a medium peripheral chamfered edge
- Specially designed for machining material group K and potentially material group P (due to the fine pitch of the cutters on the milling cutters, there is a danger of the chip space being clogged by a continuous chip)
- Particularly suited to light and medium machining

Range of cutting conditions:

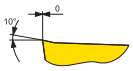
f_z	.007 – .012 [in/tooth]
a_p	.04 – .157 [in]

■ Main application ◪ Secondary application □ Supplementary application

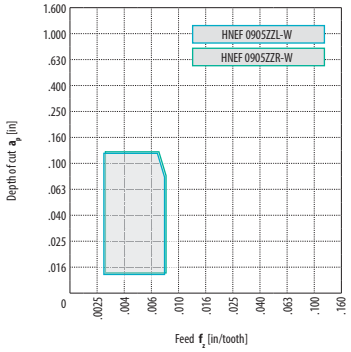
HNEF-W

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: HNEF 0905ZZL-W, HNEF 0905ZZR-W

Profile of cutting edge



Finishing: ■ ◪ ■ ◪ ◪
Medium: □ ◪ □ □
Roughing:



- Finishing geometry
- Specially designed for machining material group K and potentially material groups P, N, and S (due to the fine pitch of the cutters on the milling cutters, there is a danger of the chip space being clogged by a continuous chip)
- One insert is fixed to a millling cutter (normal inserts are to be attached to the remaining positions)
- Particularly suited to light machining

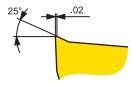
Range of cutting conditions:

f_z	.003 – .008 [in/tooth]
a_p	.012 – .118 [in]

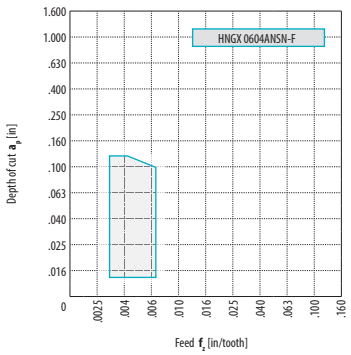
HNGX 06-F

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: HNGX 0604ANSN-F

Profile of cutting edge



Finishing: ■ ◪ □ □ □
Medium: ■ ◪ □ □ □
Roughing: ◪ □



- High positive geometry with a narrow peripheral chamfered edge
- Suitable for machining material group P and potentially material groups M, K, N, and S
- Particularly suited to light machining and stable machining conditions

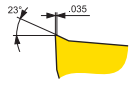
Range of cutting conditions:

f_z	.0003 – .007 [in/tooth]
a_p	.012 – .118 [in]

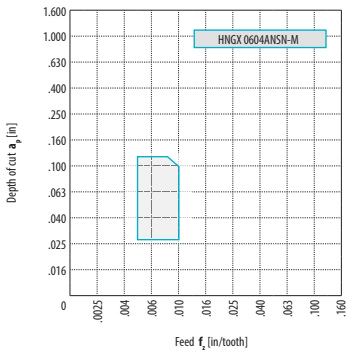
HNGX 06-M

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: HNGX 0604ANSN-M

Profile of cutting edge



Finishing: ■ ◪ ■ □
Medium: ■ ◪ ■ □ □
Roughing: ◪ ◪ ◪ □



- High positive geometry with medium T-land
- Suitable for machining material groups P and K, potentially groups M, N, and S
- Particularly suited to medium machining

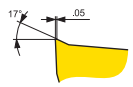
Range of cutting conditions:

f_z	.005 – .01 [in/tooth]
a_p	.028 – .118 [in]

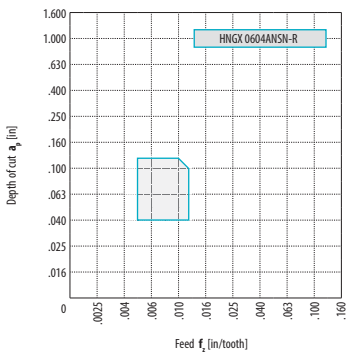
HNGX 06-R

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: HNGX 0604ANSN-R

Profile of cutting edge



Finishing: ■ □ ■ □ ◪
Medium: ■ ◪ ■ ◪ ◪
Roughing: ■ ◪ ■ □ □



- High positive geometry with medium T-land
- Suitable for machining material groups P and K, potentially groups M, S, and H
- Particularly suited to medium to heavy machining

Range of cutting conditions:

f_z	.005 – .012 [in/tooth]
a_p	.04 – .118 [in]

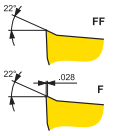
■ Main application ◪ Secondary application □ Supplementary application

PRAMET

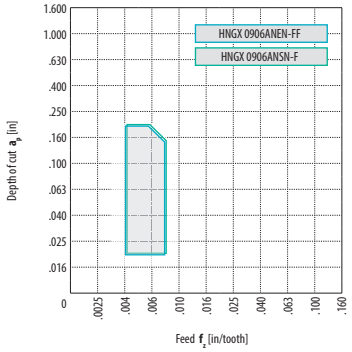
HNGX 09 -FF/-F

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Profile of cutting edge



Workpiece material group	P	M	K	N	S	H
Finishing	■	■	□	□	□	
Medium	■	■	□	□	□	
Roughing	◪	□				



Applied to inserts: HNGX 0906ANEN-FF, HNGX 0906ANSN-F

- High positive geometry with a narrow peripheral chamfered edge (geometry F) or without peripheral chamfered edge (geometry FF)
- Suitable for machining material groups P and M; potentially also material groups K, N, and S
- Particularly suited to light and medium machining

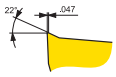
Range of cutting conditions:

f_z	.004 – .008 [in/tooth]
a_p	.02 – .197 [in]

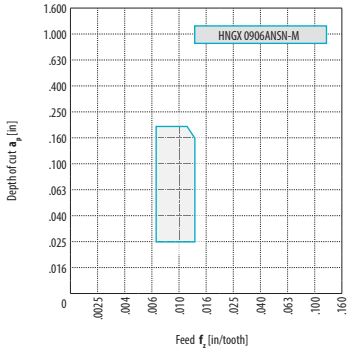
HNGX 09 -M

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Profile of cutting edge



Workpiece material group	P	M	K	N	S	H
Finishing	■	■	■		□	
Medium	■	■	■	□	□	
Roughing	◪	◪	◪		□	



Applied to inserts: HNGX 0906ANSN-M

- High positive geometry with a medium T-land
- Suitable for machining material groups P, M, and K; potentially groups N and S
- Particularly suited to medium machining

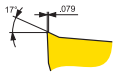
Range of cutting conditions:

f_z	.007 – .014 [in/tooth]
a_p	.032 – .197 [in]

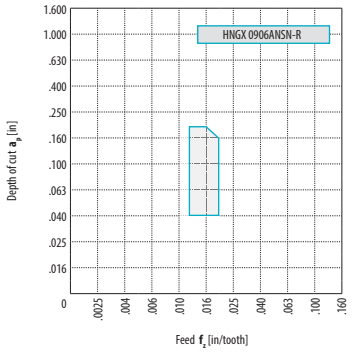
HNGX 09 -R

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Profile of cutting edge



Workpiece material group	P	M	K	N	S	H
Finishing	■	□	■		□	◪
Medium	■	◪	■		◪	◪
Roughing	■	◪	■		□	□



Applied to inserts: HNGX 0906ANSN-R

- Positive geometry with a medium T-land
- Suitable for machining material groups P and K, and also groups M, S, and H
- Particularly suited to medium and heavy machining

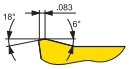
Range of cutting conditions:

f_z	.012 – .02 [in/tooth]
a_p	.04 – .197 [in]

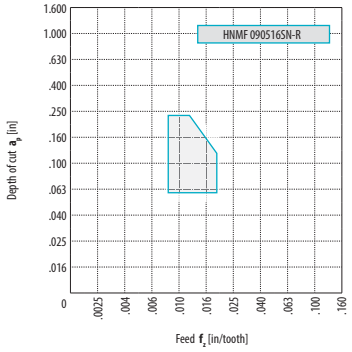
HNMF-R

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Profile of cutting edge



Workpiece material group	P	M	K	N	S	H
Finishing			◪			◪
Medium	□		■			□
Roughing			■			



Applied to inserts: HNMF 090516SN-R

- Positive but stable cutting geometry with a little negative chamfered edge
- Specially designed for machining material group K and potentially material groups P and H (due to the fine pitch of the cutters on the milling cutters, there is a danger of the chip space being clogged by a continuous chip)
- Particularly suited to light and heavy machining

Range of cutting conditions:

f_z	.009 – .0197 [in/tooth]
a_p	.059 – .236 [in]

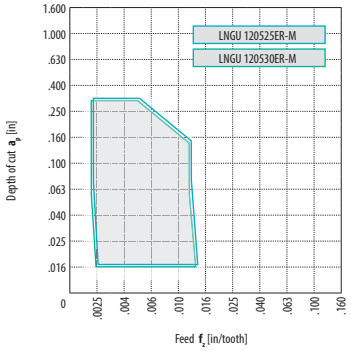
LNGU 12-M

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Applied to inserts: LNGU 120525ER-M, LNGU 120530ER-M

Profile of cutting edge

Finishing	■ □ ■
Medium	■ □ ■
Roughing	



- Positive geometry without a peripheral stabilizing chamfered edge
- Suitable for machining material groups P and K, and some materials in group M
- Suited to light and medium machining

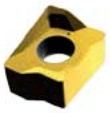
Range of cutting conditions:

f_z	.002 – .015 [in/tooth]
a_p	.016 – .354 [in]

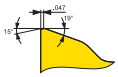
LNGU 16-M

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

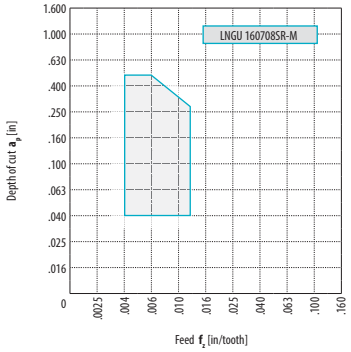
Applied to inserts: LNGU 160708SR-M



Profile of cutting edge



Finishing	■ □ ■ ◪
Medium	■ □ ■ □
Roughing	◪ □ ■



- High positive geometry
- Suitable for machining material groups P and K, potentially group H
- For medium machining
- Geometry suited to less stable machining conditions

Range of cutting conditions:

f_z	.004 – .012 [in/tooth] (.004 – .01 for MT-CVD)
a_p	.04 – .512 [in]

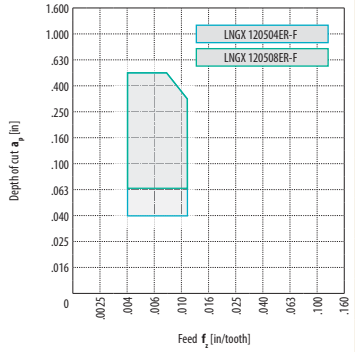
LNGX-F

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Applied to inserts: LNGX 120504ER-F, LNGX 120508ER-F

Profile of cutting edge

Finishing	■ ◪ ◪ □
Medium	◪ ◪ ◪ □
Roughing	



- Positive geometry without a peripheral stabilizing chamfered edge
- Suitable for machining material groups P, potentially also group K, M and S
- Particularly suited to light machining

Range of cutting conditions:

f_z	.002 – .006 [in/tooth]
a_p	.04 – .512 [in]

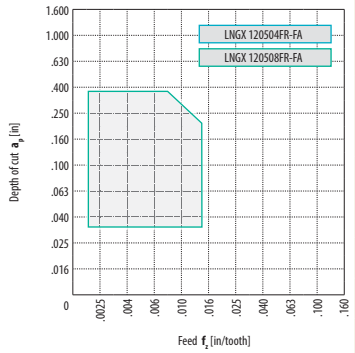
LNGX-FA

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Applied to inserts: LNGX 120504FR-FA, LNGX 120508FR-FA

Profile of cutting edge

Finishing	◪ ■ ◪
Medium	□ ◪ □
Roughing	



- High positive geometry
- Suitable for machining material groups N, potentially also group M and S
- Polished insert face to reduce sticking of the machined material

Range of cutting conditions:

f_z	.001 – .014 [in/tooth]
a_p	.04 – .512 [in]

■ Main application ◪ Secondary application □ Supplementary application

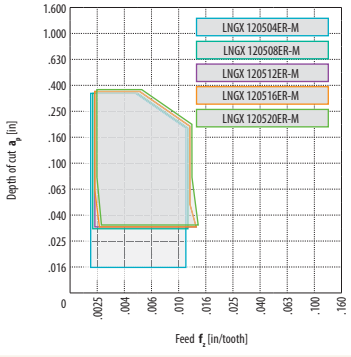
PRAMET

LNGX-M

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Profile of cutting edge

Milling	P	M	K	N	S	H
Finishing	■	□	■			
Medium	■	□	■			
Roughing						



Applied to inserts:
LNGX 120504ER-M, LNGX 120508ER-M,
LNGX 120512ER-M, LNGX 120516ER-M, LNGX 120520ER-M

- Positive geometry without a peripheral stabilizing chamfered edge
- Suitable for machining material groups P and K, and some materials in group M
- Suited to light and medium machining

Range of cutting conditions:

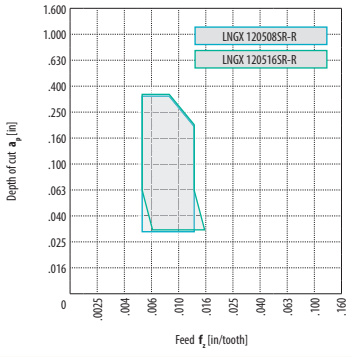
f_z	.002 – .0015 [in/tooth]
a_p	.0016 – .354 [in]

LNGX-R

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Profile of cutting edge

Milling	P	M	K	N	S	H
Finishing	■	◪	■		□	□
Medium	■	◪	■		□	□
Roughing	■	◪	■		□	□



Applied to inserts:
LNGX 120508SR-R, LNGX 120516SR-R

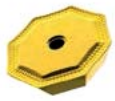
- Positive geometry with a peripheral stabilizing chamfered edge
- Suitable for machining material groups P, M, K, and also S and H
- Suited for less stable machining conditions

Range of cutting conditions:

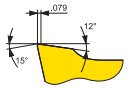
f_z	.005 – .016 [in/tooth]
a_p	.031 – .354 [in]

OFKR-M

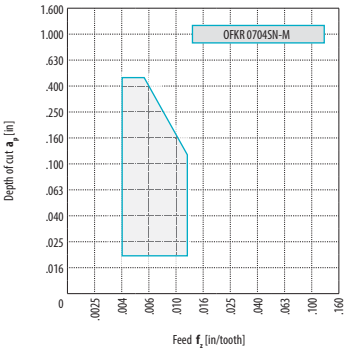
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description



Profile of cutting edge



Milling	P	M	K	N	S	H
Finishing	■	■	◪			
Medium	■	■	◪			
Roughing						



Applied to inserts:
OFKR 0704SN-M

- Geometry with a slightly positive face angle and a narrow peripheral chamfered edge
- Suitable for machining material groups P and M, can also be used for material group K
- Up to eight edges can be used depending on the maximum depth of the cut
- Suited to light to slightly impaired machining conditions

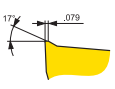
Range of cutting conditions:

f_z	.004 – .0118 [in/tooth]
a_p	.0197 – .472 [in]

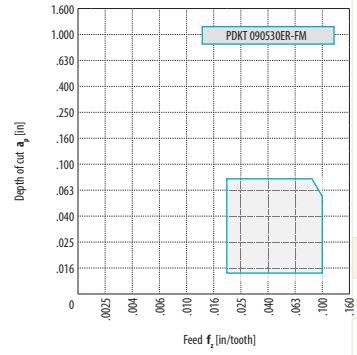
PDKT-FM

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Profile of cutting edge



Milling	P	M	K	N	S	H
Finishing	■	■	◪		□	□
Medium	■	■	□		□	□
Roughing	□	□				



Applied to inserts:
PDKT 090530ER-FM

- High positive geometry with a medium peripheral chamfered edge with an insert corner radius of r = .118 in
- Suitable for machining material groups P and M, potentially for material groups K, N, and S
- Particularly suited to light and medium machining

Range of cutting conditions:

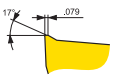
f_z	.0197 – .098 [in/tooth]
a_p	.0118 – .079 [in]

■ Main application ◪ Secondary application □ Supplementary application

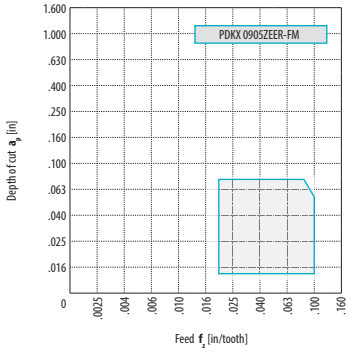
PDKX-FM

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: PDKX 0905ZEER-FM

Profile of cutting edge



	P	M	K	N	S	H
Finishing	■	■	■	□	□	
Medium	■	■	■	□	□	
Roughing	■	◪	■			



- High positive geometry with a finishing auxiliary chamfered edge with a length of .079 in
- Suitable for machining material groups P, M, and K, potentially for material groups N and S
- Particularly suited to medium machining

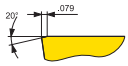
Range of cutting conditions:

f_z	.02 – .098 [in/tooth]
a_p	.012 – .079 [in]

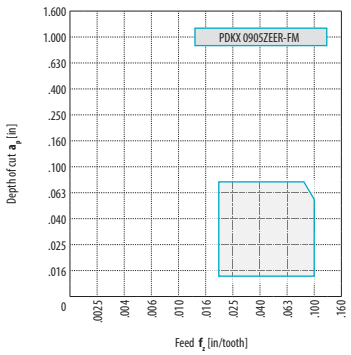
PDMW

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: PDMW 090530SR

Profile of cutting edge



	P	M	K	N	S	H
Finishing	□		■			■
Medium	◪	□	■			◪
Roughing	◪	□	■			



- High positive geometry with a zero face angle and a large negative chamfered edge with an insert corner radius of r = .018 in
- Suitable for machining material groups K and H, potentially for material groups P and M
- Particularly suited to medium to heavy machining conditions

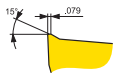
Range of cutting conditions:

f_z	.02 – .098 [in/tooth]
a_p	.012 – .079 [in]

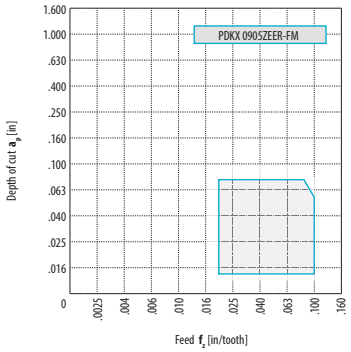
PDMX-M

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: PDMX 0905ZEER-M

Profile of cutting edge



	P	M	K	N	S	H
Finishing	□		■			◪
Medium	◪	□	■		□	□
Roughing	◪	□	■		□	



- Geometry with a negative peripheral chamfered edge with a finishing cutting edge with a length of .079 in
- Suitable for machining material group K, potentially for material groups P, H, M, and S
- Particularly suited to medium to heavy machining conditions

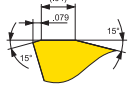
Range of cutting conditions:

f_z	.02 – .098 [in/tooth]
a_p	.012 – .079 [in]

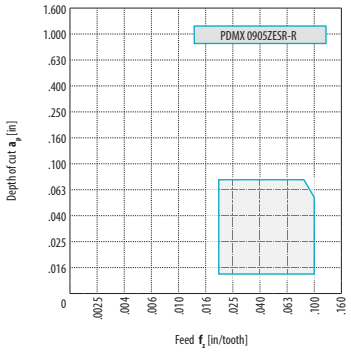
PDMX-R

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: PDMX 0905ZESR-R

Profile of cutting edge



	P	M	K	N	S	H
Finishing	□		■			◪
Medium	◪	□	■		□	□
Roughing	◪	□	■		□	



- Geometry with a negative peripheral chamfered edge with a finishing cutting edge with a length of .079 in
- Suitable for machining material group K, potentially for material groups P, H, M, and S
- Particularly suited to medium to heavy machining conditions

Range of cutting conditions:

f_z	.02 – .098 [in/tooth]
a_p	.012 – .079 [in]

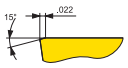
■ Main application ◪ Secondary application □ Supplementary application

PRAMET

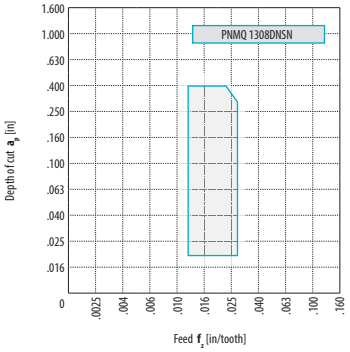
PNMQ

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: PNMQ 1308DNSN

Profile of cutting edge



Finishing: K, H
Medium: K
Roughing: P, K



- Highly stable cutting geometry with a zero face angle with a very large negative chamfered edge
- Suitable for machining material group K, potentially for material groups P and H
- Particularly suited to roughing

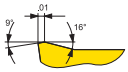
Range of cutting conditions:

f_z	.012 – .028 [in/tooth]
a_p	.02 – .394 [in]

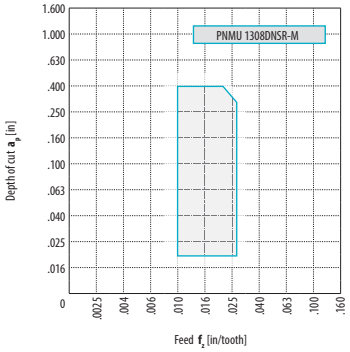
PNMU-M

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: PNMU 1308DNSR-M

Profile of cutting edge



Finishing: P, M, K, H
Medium: P, K
Roughing: P, K, S



- Positive but stable cutting geometry with a slightly negative chamfered edge
- Suitable for machining material groups P and K, potentially for material groups M, S, and H
- Particularly suited to roughing

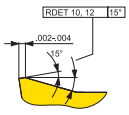
Range of cutting conditions:

f_z	.01 – .028 [in/tooth]
a_p	.02 – .394 [in]

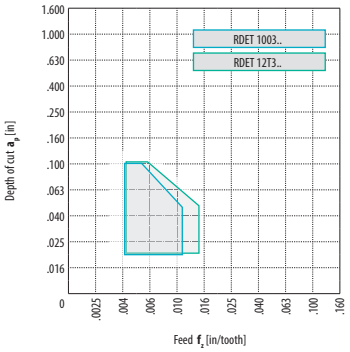
RDET

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: RDET 10.., 12..

Profile of cutting edge



Finishing: P, M, K, S
Medium: P, M, K, S
Roughing: P, M, K, S



- Cutting geometry with a positive rake angle
- Suitable for machining material groups P and M; can also be used with groups K and S, and potentially group H
- Diameters .315 and .393 in are supplied in two different thicknesses

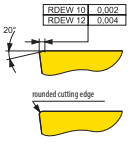
Range of cutting conditions:

f_z	according to dimension of cutting insert
a_p	according to dimension of cutting insert

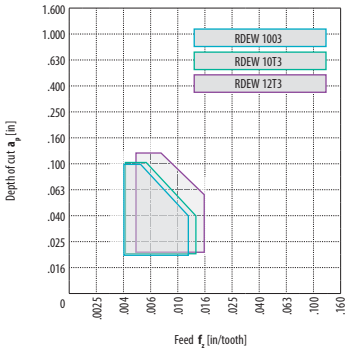
RDEW

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: RDEW 10.., 12..

Profile of cutting edge



Finishing: P, M, K, H
Medium: P, M, K, H
Roughing: P, M, K, H



- Flat top
- Suitable for machining material groups K and H; can also be used with group P and potentially group M
- Diameters .315 and .393 in are supplied in two different thicknesses

Range of cutting conditions:

f_z	according to dimension of cutting insert
a_p	according to dimension of cutting insert

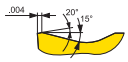
■ Main application ◪ Secondary application □ Supplementary application

RDEX-12

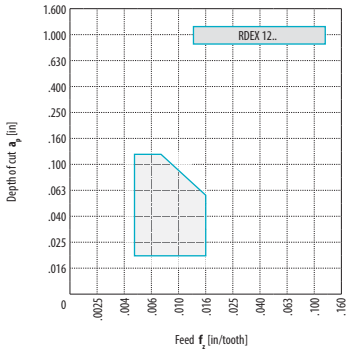
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Applied to inserts: RDEX 12..

Profile of cutting edge



Finishing ■ ■ ◥ ◥ □
Medium ■ ■ ◥ ◥ □
Roughing ■ ■ ◥ ◥ □



- Cutting geometry with a positive rake angle and a negative T-land
- Suitable for machining material groups P and M; can also be used with groups K and S, and potentially group H

Range of cutting conditions:

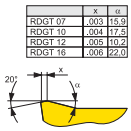
f_z	.005 – .0157 [in/tooth]
a_p	.0197 – .1574 [in]

RDGT

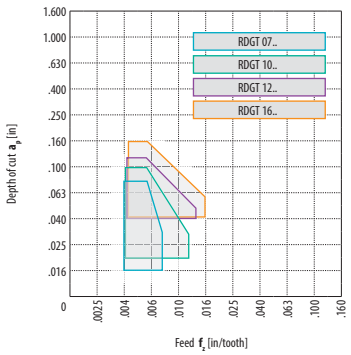
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Applied to inserts: RDGT 07.. (10.., 12.., 16..) MOT

Profile of cutting edge



Finishing ■ ■ ◥ ◥ □
Medium ■ ■ ◥ ◥ □
Roughing ■ ■ ◥ ◥ □



- Cutting geometry with a positive rake angle and a negative T-land
- Suitable for machining material groups P and M; can also be used with groups K and S, and potentially group H

Range of cutting conditions:

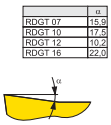
f_z	according to dimension of cutting insert
a_p	according to dimension of cutting insert

RDHT-FA

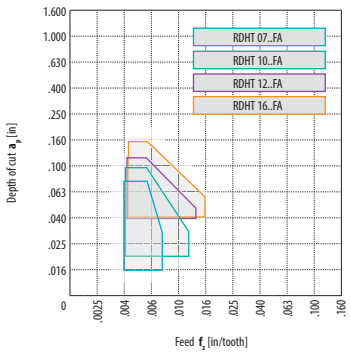
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Applied to inserts: RDHT 07.. (10.., 12.., 16..) MO-FA

Profile of cutting edge



Finishing ■
Medium ■
Roughing ■



- Geometry with a positive rake angle and sharp geometry
- Suitable for machining non-iron materials in group N

Range of cutting conditions:

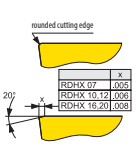
f_z	according to dimension of cutting insert
a_p	according to dimension of cutting insert

RDHX

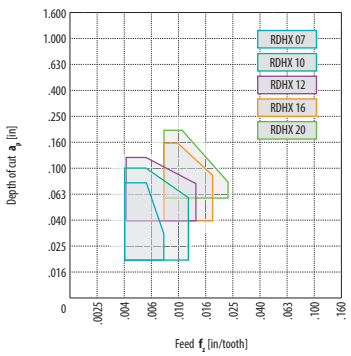
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Applied to inserts: RDHX (07.., 10.., 12.., 16.., 20..) MOT

Profile of cutting edge



Finishing ◥ □ ■ ■
Medium ◥ □ ■ ■
Roughing ◥ □ ■ ■



- Flat top
- Suitable for machining material groups K and H; can also be used with group P and potentially group M

Range of cutting conditions:

f_z	according to dimension of cutting insert
a_p	according to dimension of cutting insert

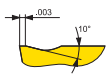
■ Main application ◥ Secondary application □ Supplementary application

PRAMET

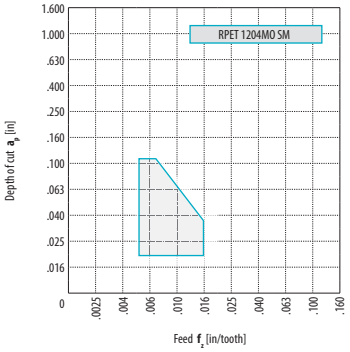
RPET

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: RPET 1204MOSM

Profile of cutting edge



	P	M	K	N	S	H
Finishing	■	■	◪		◪	□
Medium	■	■	◪		◪	□
Roughing	■	■	◪		◪	□



- Geometry with a positive rake angle and zero T-land rake
- Suitable for machining material groups P and M; can also be used with groups K and S, and potentially group H

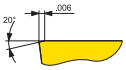
Range of cutting conditions:

f_z	.005 – .016 [in/tooth]
a_p	.020 – .118 [in]

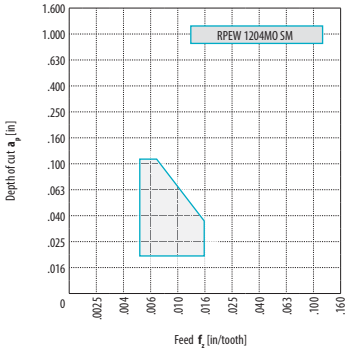
RPEW

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: RPEW 1204MOS

Profile of cutting edge



	P	M	K	N	S	H
Finishing	◪	□	■			■
Medium	◪	□	■			■
Roughing	◪	□	■			■



- Flat top
- Suitable for machining material groups K and H; can also be used with group P and potentially group M

Range of cutting conditions:

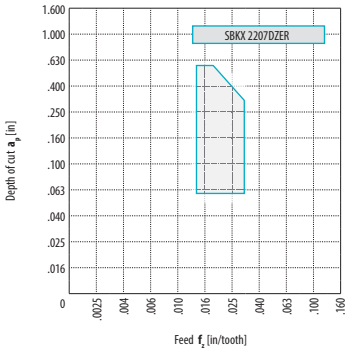
f_z	.005 – .016 [in/tooth]
a_p	.020 – .118 [in]

SBKX

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: SBKX 2207DZER

Profile of cutting edge

	P	M	K	N	S	H
Finishing	■	□	■			
Medium	■	□	■			
Roughing	■	□	■			



- Wiper flat top
- Accessory for SBMR indexable cutting inserts
- Suitable for machining material groups P, K, and M

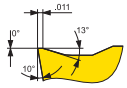
Range of cutting conditions:

f_z	.014 – .031 [in/tooth]
a_p	.059 – .59 [in]

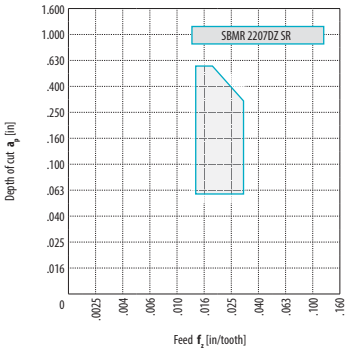
SBMR

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: SBMR 2207DZ SR

Profile of cutting edge



	P	M	K	N	S	H
Finishing	■	■	■		◪	
Medium	■	■	■		■	
Roughing	■	■	■		■	



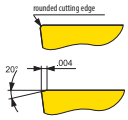
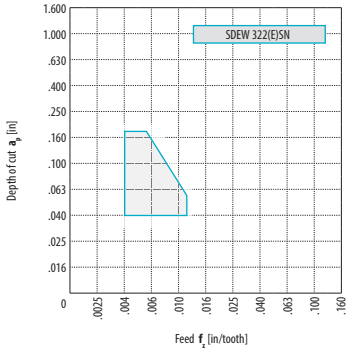
- Stable cutting geometry
- Suitable for machining material groups P, M, K, and S
- Suited to roughing and finishing

Range of cutting conditions:

f_z	.014 – .031 [in/tooth]
a_p	.059 – .59 [in]

■ Main application ◪ Secondary application □ Supplementary application

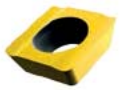
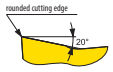
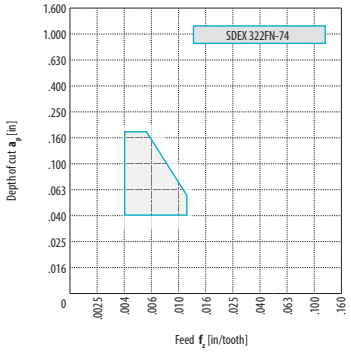
SDEW

Geometry	Insert	Workpiece material group (Milling)	Application range	Description	Applied to inserts:
SDEW	 Profile of cutting edge 	P M K N S H Finishing ■ □ ■ Medium ■ □ ■ ■ Roughing ■ □ ■ ■		- Flat top - Suitable for machining material groups K and H; can also be used with group P and potentially group M - Inserts are manufactured for end milling cutters with a setting angle of 45° - Supplied with "E" and "S" cutting edge designs	SDEW 322(E)SN

Range of cutting conditions:

f_z	.004 – .012 [in/tooth]
a_p	.04 – .177 [in]

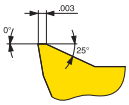
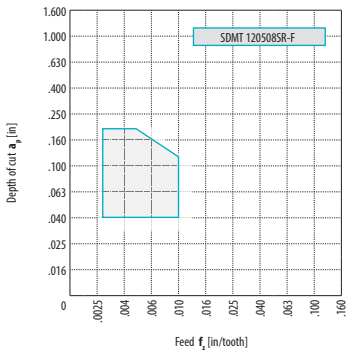
SDEX-74

Geometry	Insert	Workpiece material group (Milling)	Application range	Description	Applied to inserts:
SDEX-74	 Profile of cutting edge 	P M K N S H Finishing ■ ■ ■ ■ ■ Medium ■ ■ ■ ■ ■ Roughing ■ ■ ■ ■ ■		- Geometry with a positive rake angle - Ground chip-forming geometry - Suitable for machining material groups P, M, and N; can also be used for groups K and S - Inserts are manufactured for end milling cutters with a setting angle of 45°	SDEX 322FN-74

Range of cutting conditions:

f_z	.004 – .012 [in/tooth]
a_p	.04 – .177 [in]

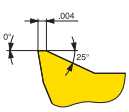
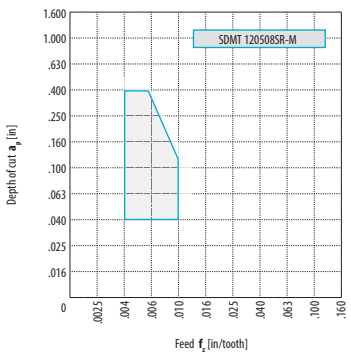
SDMT-F

Geometry	Insert	Workpiece material group (Milling)	Application range	Description	Applied to inserts:
SDMT-F	 Profile of cutting edge 	P M K N S H Finishing ■ ■ ■ ■ ■ Medium ■ ■ ■ ■ ■ Roughing ■		- Geometry with a positive rake angle, which ensures minimum cutting resistance - For light to medium cutting conditions - Suitable for machining material groups P, M, K, and S, and potentially group N - Stable working conditions	SDMT 120508SR-F

Range of cutting conditions:

f_z	.003 – .01 [in/tooth]
a_p	.02 – .197 [in]

SDMT-M

Geometry	Insert	Workpiece material group (Milling)	Application range	Description	Applied to inserts:
SDMT-M	 Profile of cutting edge 	P M K N S H Finishing ■ ■ ■ ■ ■ Medium ■ ■ ■ ■ ■ Roughing □ □ ■ ■		- Geometry with a positive rake angle, which ensures minimum cutting resistance - For light to medium cutting conditions - Suitable for machining material groups P, M, K, and S, and potentially group N	SDMT 120508SR-M

Range of cutting conditions:

f_z	.004 – .01 [in/tooth]
a_p	.04 – .394 [in]

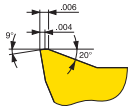
■ Main application ◪ Secondary application □ Supplementary application

SDMT-R

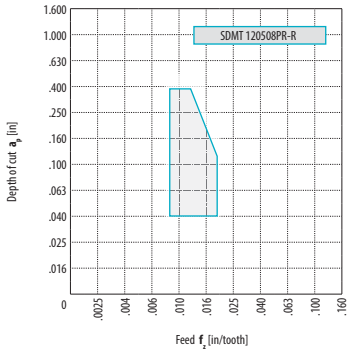
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Applied to inserts: SDMT 120508PR-R

Profile of cutting edge



Finishing ■ ■ ◪ ◪
Medium ■ ■ ◪ ◪
Roughing ■ ■ ◪ ◪



- Positive cutting geometry with very stable cutting edge
- Suitable for machining material groups P, M, K, and S, and potentially group N
- Geometry suited to less stable working conditions

Range of cutting conditions:

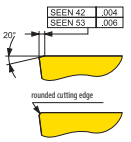
f_z	.008 – .018 [in/tooth]
a_p	.04 – .394 [in]

SEEN

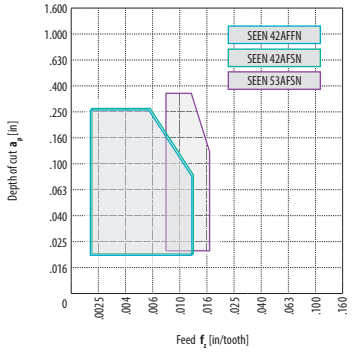
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Applied to inserts: SEEN 42AFFN, SEEN 42AFSN, SEEN 53AFSN

Profile of cutting edge



Finishing ◪ □ ■ ■
Medium ◪ □ ■ ■
Roughing ◪ □ ■ ■



- Flat top
- Suitable for machining material groups K and H; can also be used with group P and potentially group M
- Supplied with "E" and "S" cutting edge designs

Range of cutting conditions:

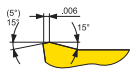
f_z	according to cutting edge condition and dimension of cutting insert
a_p	according to cutting edge condition and dimension of cutting insert

SEER

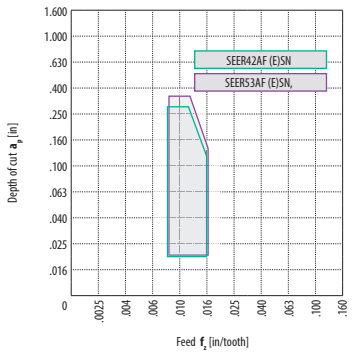
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Applied to inserts: SEER 42AFFN, SEER 42AFSN SEER 53AFFN, SEER 53AFSN

Profile of cutting edge



Finishing ■ ■ ◪ ◪ □
Medium ■ ■ ◪ ◪ □
Roughing ■ ■ ◪ ◪ □



- Geometry with a positive rake angle
- Suitable for machining material groups P and M; can also be used with groups K and S, and potentially group H

Range of cutting conditions:

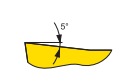
f_z	according to cutting edge condition and dimension of cutting insert
a_p	according to cutting edge condition and dimension of cutting insert

SEET 09

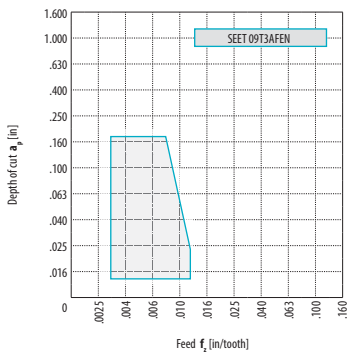
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Applied to inserts: SEET 09T3AFEN

Profile of cutting edge



Finishing ■ ■ □ ■
Medium ■ ■ □ ■
Roughing



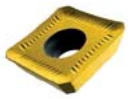
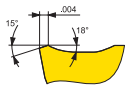
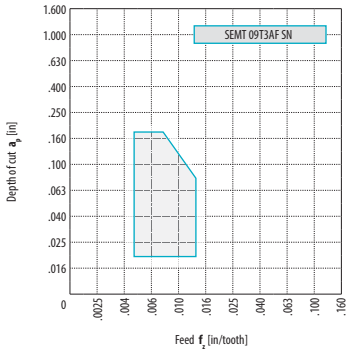
- Geometry with a positive face angle
- Suitable for milling material groups P, M, and S
- Particularly suited to light to medium milling

Range of cutting conditions:

f_z	.0003 – .012 [in/tooth]
a_p	.012 – .177 [in]

■ Main application ◪ Secondary application □ Supplementary application

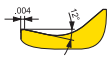
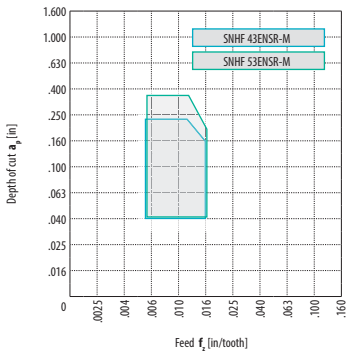
SEMT

Geometry	Insert	Workpiece material group (Milling)	Application range	Description	Applied to inserts:
SEMT	 Profile of cutting edge 	P M K N S H Finishing ■ ■ ■ □ ◪ Medium ■ ■ ■ □ ◪ Roughing ◪ ◪ ◪ □		- Geometry with a positive rake angle - Suitable for machining material groups P, M, and K; can also be used with group S and potentially group N - Particularly suited to light and medium machining conditions	SEMT 09T3AFSN

Range of cutting conditions:

f_z	.005 – .014 [in/tooth]
a_p	.02 – .177 [in]

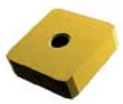
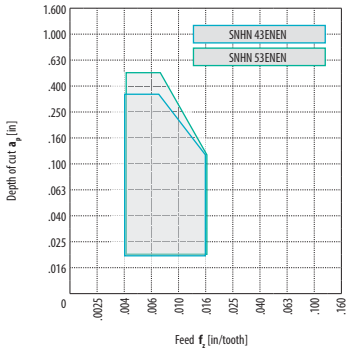
SNHF-M

Geometry	Insert	Workpiece material group (Milling)	Application range	Description	Applied to inserts:
SNHF-M	 Profile of cutting edge 	P M K N S H Finishing ■ □ ■ Medium ■ □ ■ Roughing ■ □ ■		- Geometry with a positive face angle - Suitable for machining material groups P and K - Particularly suited to light and medium milling	SNHF 43ENSR-M, SNHF 53ENSR-M

Range of cutting conditions:

f_z	.006 – .016 [in/tooth]
a_p	.04 – (.236) .354 [in]

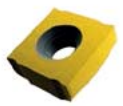
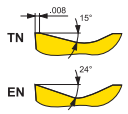
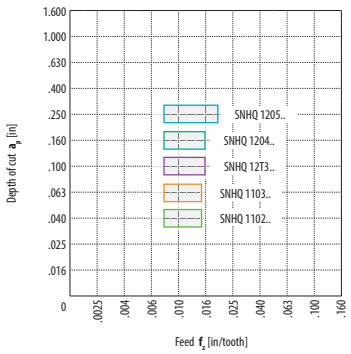
SNHN

Geometry	Insert	Workpiece material group (Milling)	Application range	Description	Applied to inserts:
SNHN	 Profile of cutting edge 	P M K N S H Finishing ◪ ■ ■ Medium ◪ ■ ■ Roughing ◪ ■ ■		- Standard negative milling geometry - Suitable for machining material groups K and H; can also be used for group P - Inserts are manufactured for milling cutters with a setting angle of 75°	SNHN 43ENEN, SNHN 53ENEN

Range of cutting conditions:

f_z	(.004) – .016 [in/tooth]
a_p	.02 – (.354) 13,5 [in]

SNHQ

Geometry	Insert	Workpiece material group (Milling)	Application range	Description	Applied to inserts:
SNHQ	 Profile of cutting edge 	P M K N S H Finishing ■ ■ ■ ◪ ◪ □ Medium ■ ■ ■ ◪ ◪ □ Roughing ■ ■ ■ □ ◪ □		- On-edge inserts for disc milling cutters with ground chip-forming geometry - This geometry can be used with all types of materials - The recommended feed range is for information only: a_e/D ratio is very important	SNHQ 11.., SNHQ 12..

Range of cutting conditions:

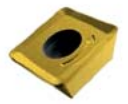
f_z	.008 – (.016) .02 [in/tooth]
a_p	-

■ Main application ◪ Secondary application □ Supplementary application

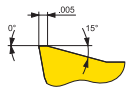
PRAMET

SOMT-M

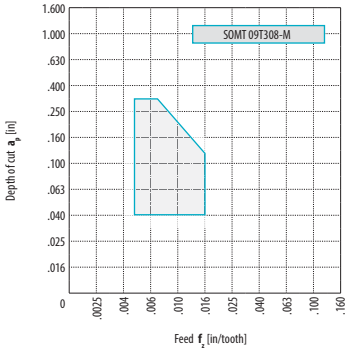
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: SOMT 09T308-M



Profile of cutting edge



	P	M	K	N	S	H
Finishing	■	◪	■		□	□
Medium	■	◪	■		□	□
Roughing	■	◪	■		□	□



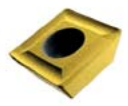
- Positive geometry with a medium T-land
- Suitable for machining material groups P and K; can also be used with group M and potentially groups S and H
- For medium machining conditions on hard materials
- For unstable machining conditions

Range of cutting conditions:

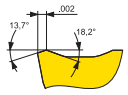
f_z	.005 – .016 [in/tooth]
a_p	.04 – .315 [in]

SOMT-MI

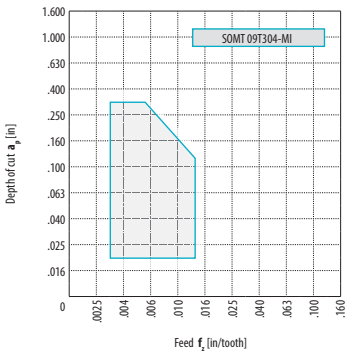
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: SOMT 09T304-MI



Profile of cutting edge



	P	M	K	N	S	H
Finishing	◪	■	■	□	◪	
Medium	■	■	■	□	◪	
Roughing	■	■	■		□	



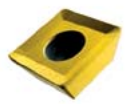
- Stable cutting geometry with a positive rake angle and a negative T-land
- Suitable for machining material groups P, M, and K; can also be used with group S and potentially group N

Range of cutting conditions:

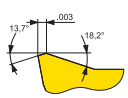
f_z	.0003 – .014 [in/tooth]
a_p	.02 – .315 [in]

SOMT-P

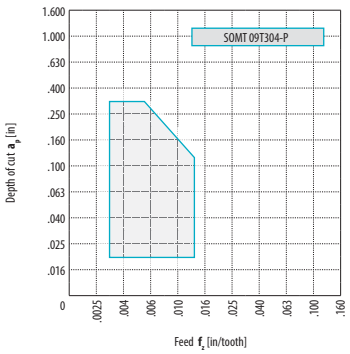
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: SOMT 09T304-P



Profile of cutting edge



	P	M	K	N	S	H
Finishing	■	■	◪	□	◪	
Medium	■	■	◪	□	◪	
Roughing	■	■	□		□	



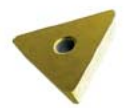
- High positive milling geometry with a negative T-land
- Suitable for machining material groups P, M, and K; can also be used with group S and potentially group N

Range of cutting conditions:

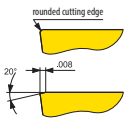
f_z	.0003 – .014 [in/tooth]
a_p	.02 – .315 [in]

TPKN

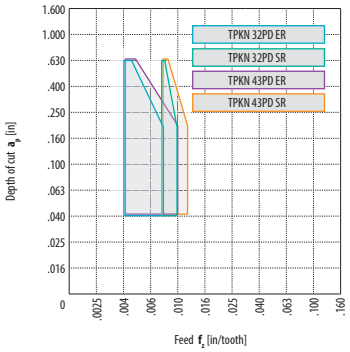
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: TPKN 32PD(E)SR, TPKN 43PD(E)SR



Profile of cutting edge



	P	M	K	N	S	H
Finishing	◪	□	■			■
Medium	◪	□	■			■
Roughing						



- Flat top
- Suitable for machining material groups K and H; can also be used with group P and potentially group M
- For milling cutters with a setting angle of 90°
- Supplied with "E" and "S" cutting edge designs, for right feed direction on dimensions .650 and .866 in

Range of cutting conditions:

f_z	according to cutting edge condition and dimension of cutting insert
a_p	according to cutting edge condition and dimension of cutting insert

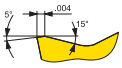
■ Main application ◪ Secondary application □ Supplementary application

TPKR

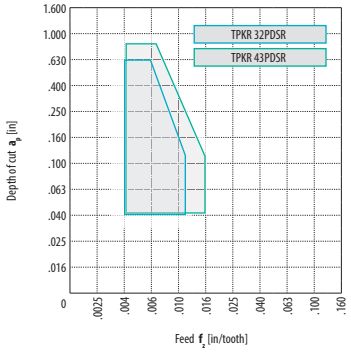
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Applied to inserts: TPKR 32PDSR, TPKR 43PDSR

Profile of cutting edge



Finishing ■ ◪ ■
Medium ■ ◪ ■
Roughing



- Geometry with a positive rake angle
- Suitable for machining material groups P, K, and potentially group M
- For milling cutters with a setting angle of 90°
- Supplied with "E" and "S" cutting edge designs, for right feed direction on dimensions .650 and .866 in

Range of cutting conditions:

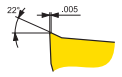
f_z	.004 – (.012) .016 [in/tooth]
a_p	.04 – (.63) .866 [in]

XNGX 06

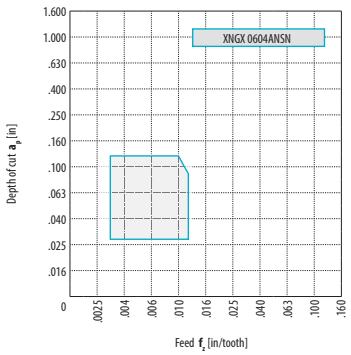
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Applied to inserts: XNGX 0604ANSN

Profile of cutting edge



Finishing ■ ■
Medium ■ ■
Roughing □ □



- Smooth geometry
- Suitable for machining material groups P and K
- Particularly suited to finishing and medium machining

Range of cutting conditions:

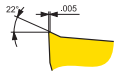
f_z	.005 – .012 [in/tooth]
a_p	.028 – .118 [in]

XNGX 09

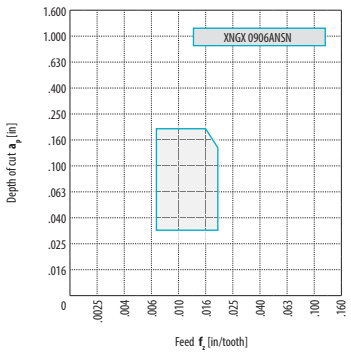
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Applied to inserts: XNGX 0906ANSN

Profile of cutting edge



Finishing ■ ■
Medium ■ ■
Roughing □ □



- Smoothing geometry
- Suitable for machining material groups P and K
- Suited to light and medium milling

Range of cutting conditions:

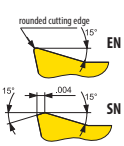
f_z	.007 – .02 [in/tooth]
a_p	.032 – .197 [in]

XPHT

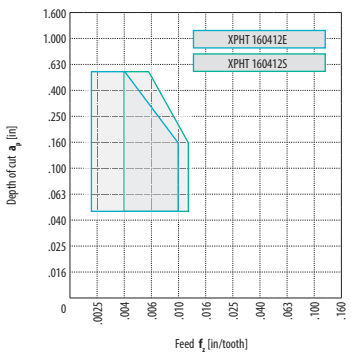
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description

Applied to inserts: XPHT 160412, XPHT 160412S

Profile of cutting edge



Finishing ■ ■ ◪ □
Medium ■ ■ ◪ □
Roughing ■ ■ ◪ □



- High positive milling geometry
- Supplied with "EN" and "SN" cutting edge designs
- Suitable for machining material groups P and M; can also be used with group K and potentially group S

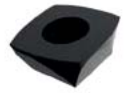
Range of cutting conditions:

f_z	.002(.004) – .012 [in/tooth]
a_p	.047 – .59 [in]

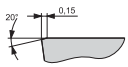
■ Main application ◪ Secondary application □ Supplementary application

ZDCW 07

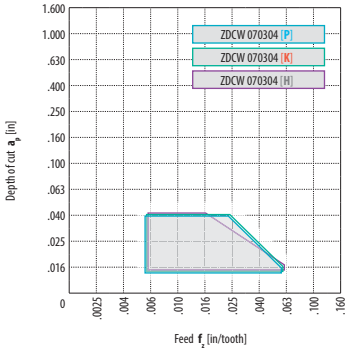
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: ZDCW 070304



Profile of cutting edge



	P	M	K	N	S	H
Finishing	■	□	■			■
Medium	■	□	■			■
Roughing	■	□	■			◥



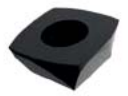
- Special geometry for HFC technology
- Suitable for machining material groups P, K, and H
- Suitable for finishing and medium milling at low depths of cut

Range of cutting conditions:

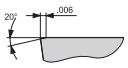
f_z	.006 – .059 [in/tooth]
$a_{p\ max}$	.012 – .04 [in]

ZDCW 09

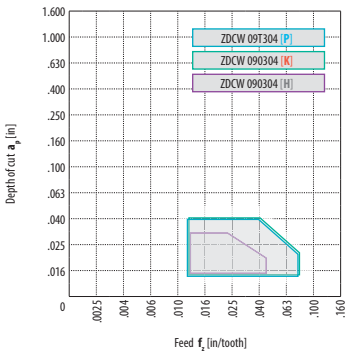
Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: ZDCW 09T304



Profile of cutting edge



	P	M	K	N	S	H
Finishing	■	□	■			■
Medium	■	□	■			■
Roughing	■	□	■			◥



- Special geometry for HFC technology
- Suitable for machining material groups P, K, and H
- Suitable for finishing and medium milling
- Suitable for copy and general machining

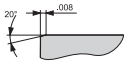
Range of cutting conditions:

f_z	.012 – .079 [in/tooth]
$a_{p\ max}$	.04 [in]

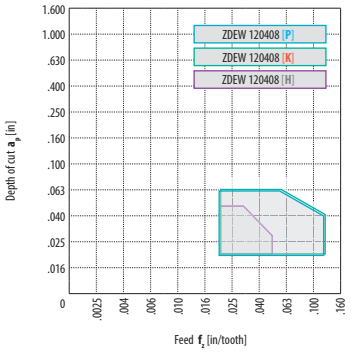
ZDEW

Geometry | Insert | Workpiece material group (Milling: P M K N S H) | Application range | Description | Applied to inserts: ZDEW 120408

Profile of cutting edge



	P	M	K	N	S	H
Finishing	■	□	■			■
Medium	■	□	■			■
Roughing	■	□	■			◥



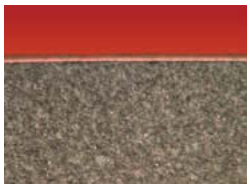
- Special geometry for HFC technology
- Suitable for machining material groups P, K, and H
- Suitable for finishing and medium milling
- Suitable for copy milling and general applications

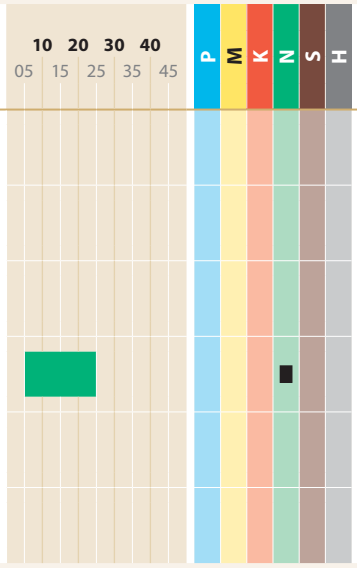
Range of cutting conditions:

f_z	.02 – .118 [in/tooth]
$a_{p\ max}$	.063 [in]

Designation and microstructure	Applications areas	Workpiece material group	Grade description and recommended application

M0315

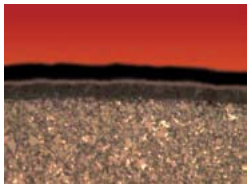


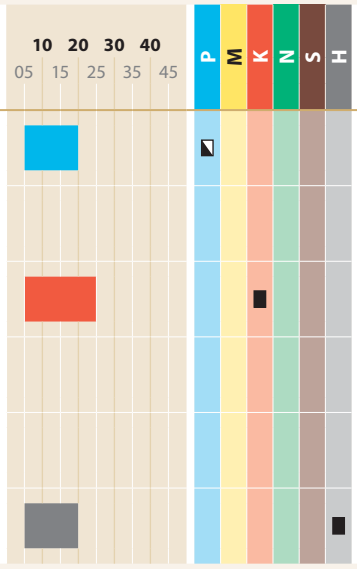


UP! GRADE®

- Sub-micron substrate with a relatively low bonding agent content
- Coating with a very small friction coefficient, applied by PVD method
- Specific cutting edge finish
- Special material for machining non-ferrous metals
- Finishing, semi-roughing work
- Suited to stable machining conditions

M5315

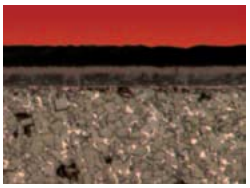


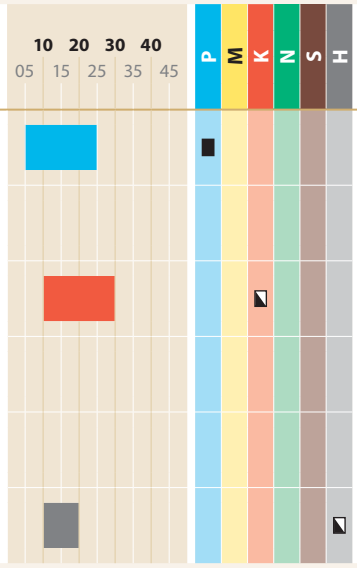


UP! GRADE®

- Type H substrate with a relatively low cobalt content
- Thin MT-CVD coating with a unique Al_2O_3 layer
- First choice for milling grey and ductile cast iron and hardened and heat-treated materials; can also be used for milling harder materials in group P
- High wear resistance
- Suited to stable machining conditions
- Suited to medium to high cutting speeds
- Can be used with dry machining

M9315





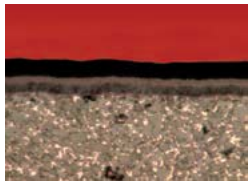
UP! GRADE®

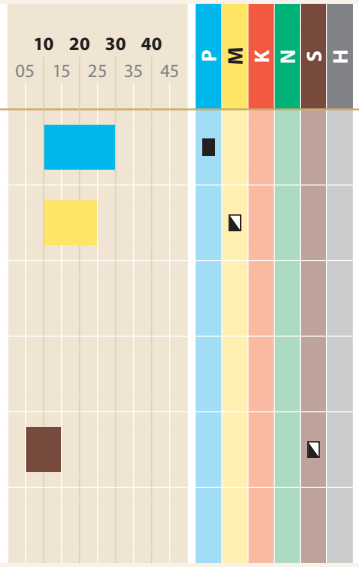
- Fine-grained substrate with a lower content of bonding cobalt phase
- Thin MT-CVD coating with a unique Al_2O_3 layer
- Suitable for machining material group P, potentially for groups K and H
- Suited to medium to high cutting speeds
- High abrasion resistance while retaining a good level of strength
- Can be used with dry machining

■ Main application ◥ Secondary application ☐ Supplementary application

Designation and microstructure	Applications areas	Workpiece material group	Grade description and recommended application

M9325

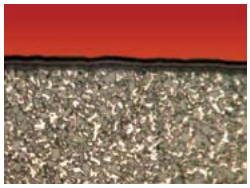


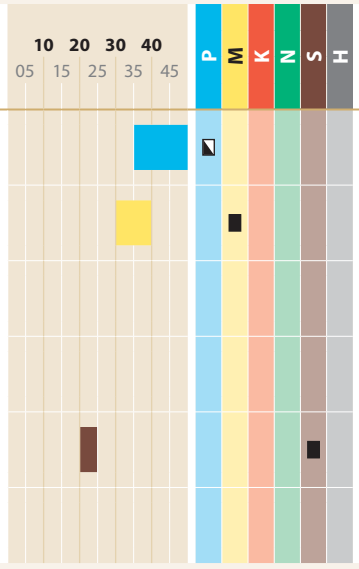


UP! GRADE®

- Fine-grained substrate with a higher content of bonding cobalt phase
- Thin MT-CVD coating with a unique Al_2O_3 layer
- Suitable for machining material group P, potentially also groups M and S
- Suited to medium to higher cutting speeds
- High strength and operational reliability
- Good wear resistance
- Can be used with dry machining; however, when the cutting conditions are ideal, coolant can also be used

M9340

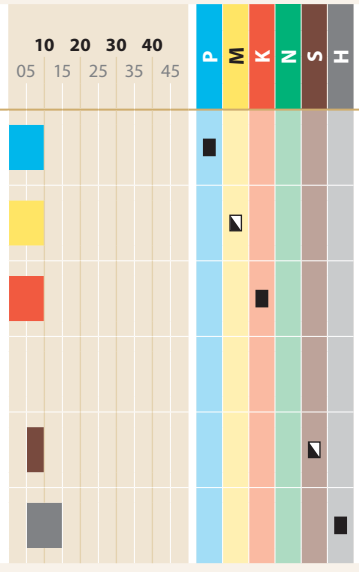




UP! GRADE®

- Substrate with a medium grain size and a high content of bonding cobalt phase
- Thin coating applied by the MT-CVD method with a unique Al_2O_3 layer
- Suitable for machining material groups M, S, and potentially also group P
- Suited to low to medium cutting speeds
- M9300 series material with the highest strength
- For machining with or without a coolant

M8310



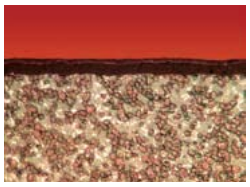
UP! GRADE®

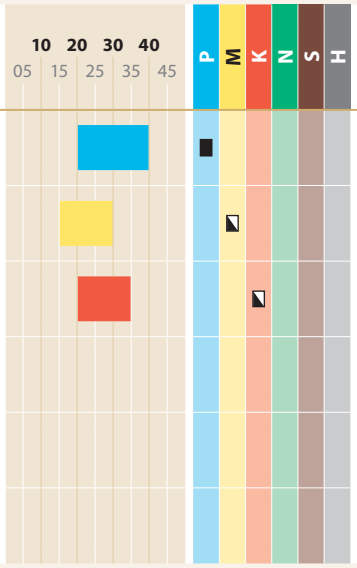
- Highly abrasion-resistant material of the M8300 series
- Ultra sub-micron substrate with a relatively low bonding agent content
- New multi layer AlTiN and TiAlSiN based PVD coating
- Special final coating finish
- Suitable for machining material groups P, K, H, and potentially groups M and S
- Suited to stable machining conditions
- For finishing and semi-finishing operations

■ Main application ◥ Secondary application ☐ Supplementary application

Designation and microstructure	Applications areas	Workpiece material group	Grade description and recommended application

M8325

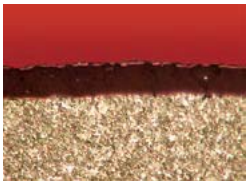


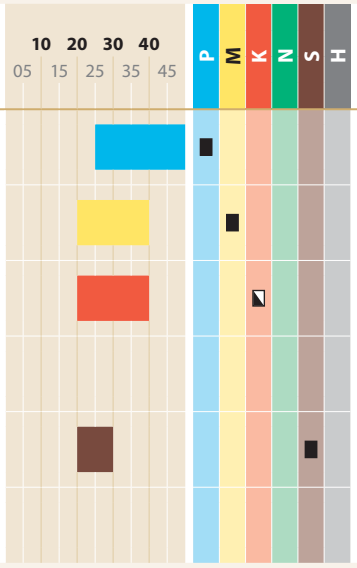


UP! GRADE®

- Type S substrate with a high cubic carbide content
- High level of thermal stability
- New multi layer AlTiN and TiAlSiN based PVD coating
- Special final coating finish
- Suitable for machining material group P, and potentially groups M and K
- Suited to stable machining conditions
- Suited to medium to high cutting speeds and feeds

M8340

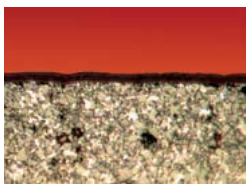


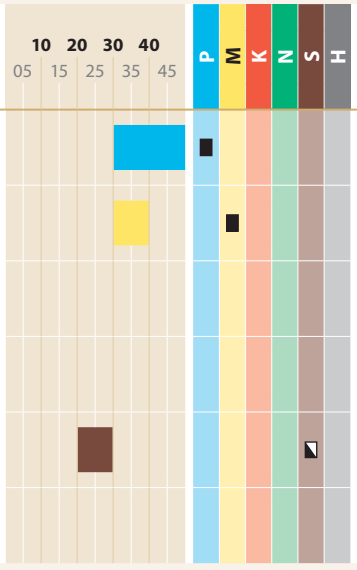


UP! GRADE®

- Wear resistant type H sub-micron substrate
- New pvd coating based on altin layers
- Multilayer coating system for enhanced toughness
- Reduces the occurrence and spreading of comb micro cracks
- Suitable for operations with a high thermal load
- Larger chip cross-sections, wide range of cutting speeds
- Suitable for machining group P, M, S materials, conditionally group K
- Applications with coolant
- Unstable working conditions

M8345





UP! GRADE®

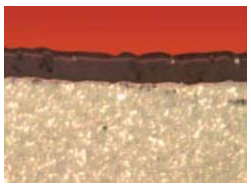
- Fine-grained substrate with a high content of bonding cobalt phase
- High operational reliability (the highest toughness of the 83xx series)
- New multi layer AlTiN and TiAlSiN based PVD coating
- Special final coating finish
- Suitable for machining material groups P and M, and potentially group S
- Suited to unstable machining conditions
- For roughing applications

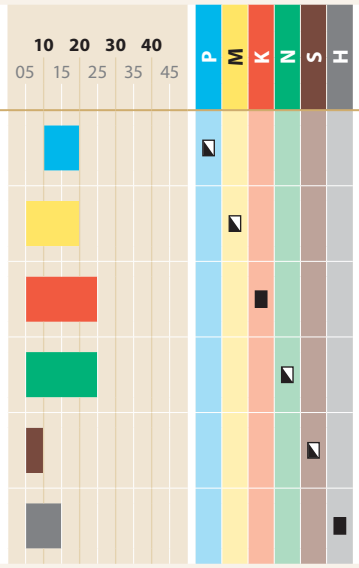
■ Main application ◥ Secondary application ☐ Supplementary application

PRAMET

Designation and microstructure	Applications areas	Workpiece material group	Grade description and recommended application

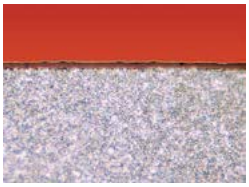
8215

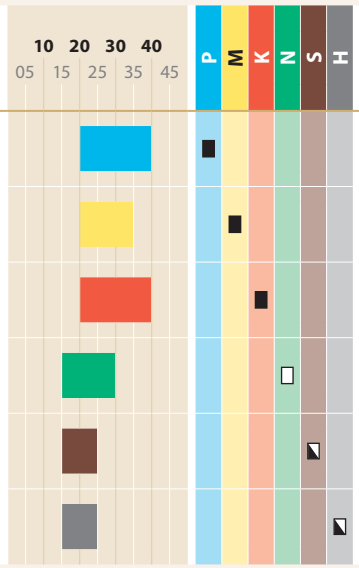




- Type H sub-micron substrate with a relatively low cobalt content
- High abrasion resistance
- New multi layer AlTiN and TiAlSiN based PVD coating
- Very good resistance to spreading micro fissures
- Suitable for a wide range of applications, can be used with almost all machined material groups
- Suitable for operations with a high thermal load
- Suited to high cutting speeds
- Suited to stable machining conditions

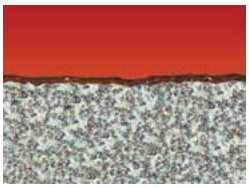
8230

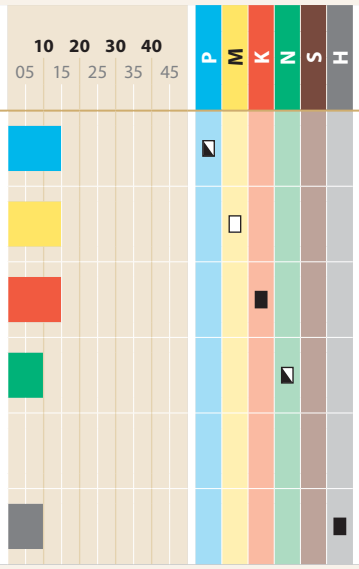




- Type H sub-micron substrate
- Nano-structure thin coating with a high content of Al, applied by PVD method
- Highly versatile cutting material
- Combines good abrasion resistance with good operative reliability
- Can be used with all groups of machined materials
- Medium cutting speeds
- Also suited to unstable machining conditions

7205

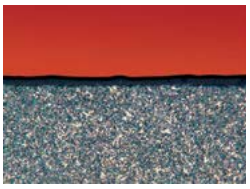


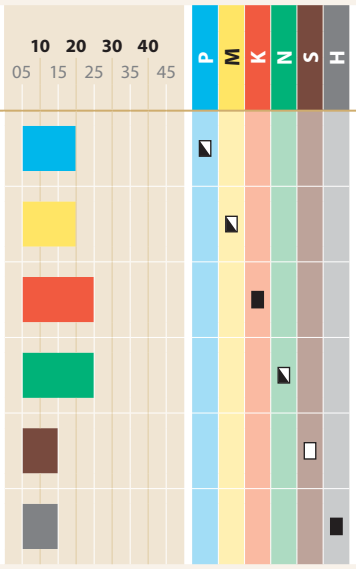


- Ultra sub-micron substrate without cubic carbides (type H) and with a very low cobalt content
- High hardness while maintaining flexural strength
- Very good resistance to mechanical wear
- New type of PVD coating with enhanced resistance to oxidation and unique friction properties
- High speeds and lower to medium chip cross-sections
- Suited to stable machining conditions
- Can be used with practically all groups of machined materials, with the exception of super-alloys (group S)

Designation and microstructure	Applications areas	Workpiece material group	Grade description and recommended application

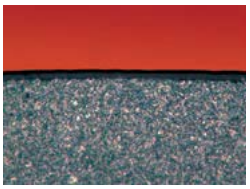
7215

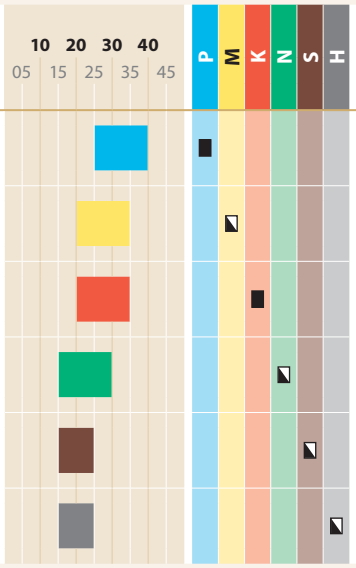




- Sub-micron substrate without cubic carbides (type H) and with a low cobalt content
- New gradient coating applied with the PVD method
- Medium to higher cutting speeds and small to medium chip cross-sections
- Enhanced oxidation resistance
- Unique friction properties
- Suited to stable machining conditions
- Can be used with practically all groups of machined materials

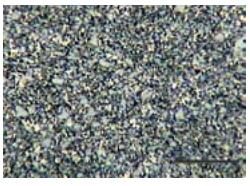
7230

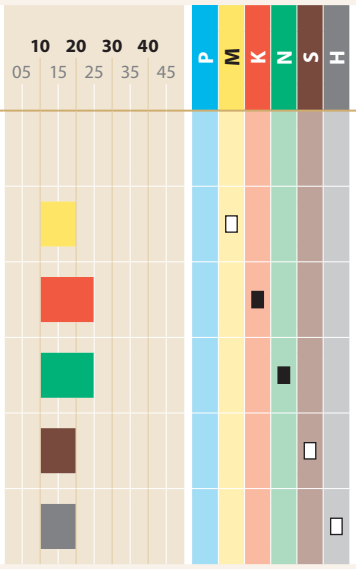




- Sub-micron substrate without cubic carbides (type H) and with a higher cobalt content
- New gradient coating with enhanced resistance to oxidation applied with the PVD method
- Unique friction properties
- Medium cutting speeds and smaller to medium chip cross-sections
- Suited to less favourable machining conditions
- Can be used with practically all groups of machined materials

HF7





- Sub-micron material without cubic carbides (type H) and with a low cobalt content
- Very versatile in terms of machined materials
  (recommended for all material groups with the exception of group P)
- Small to medium chip cross-sections
- Suited to stable machining conditions

■ Main application ◪ Secondary application □ Supplementary application

1. The first step is to assign the material to be machined into one of six groups – see table 1. on page M128.
2. Specify the cutting conditions (light-, medium-, or heavy-duty milling).

   Light milling – one interruption per revolution, good cutting conditions, workpiece with pre-machined surface or surface of rolled blanks and forgings without major defects or roughness in depth of cut $a_p \leq .079$ in.

   Medium milling – one or two interruptions per revolution. Not possible to choose the optimal cutting conditions. Surface of workpiece with skin of rolled blanks, forgings and castings or with minor defects in depth of cut $a_p = .079 – .0157$ in.

   Heavy milling – multiple interruptions per revolution. Unfavourable cutting conditions (negative rake of working angle). Surface of work piece with rough skin of castings, forgings and burnt parts. Variable depth of cut $a_p = .118 – .394$ in.

   Feed range for each group dependent on cutting conditions. At the worsening of cutting conditions, it is necessary to reduce the upper limit of feed.
3. In accordance with tables 2a – 7a on pages M154 – M164, choose the suitable combination of grade and cutting edge with regard to the machined material and the pre-chosen cutting insert and tool. There are three possible solutions for each group of machined materials.
4. Use tables 2b – 7b on pages M155 – M165 to choose the initial cutting speed with regard to type of tool or cutting insert, cutting conditions and milling grade.
5. In tables 2b – 7b on pages M155 – M165 are the speed factors for recalculating the cutting speed with regard to the machine's condition, the tool and cutting edge service life, and the hardness of the workpiece material. If needed, however, the following can be used to calculate the actual speed:

$$v_c = v_{30} \cdot k_{VX} \cdot k_{VT} \cdot k_{VHB} \cdot (k_{VM})$$

Note: The cutting speed calculated in this way is the initial value (default), which is used to establish the basic cutting speed for a given operation.

Variations in the machinability of the workpiece material are the main reason for needing to adjust the cutting speed.

PRAMET

Table 2a

CHOICE OF MILLING CUTTER AND INITIAL CUTTING CONDITIONS

Group	P																	
	Type of tool											Type of insert	Cutting conditions					
													Finishing		Medium		Roughing	
1												HNGX 06 HNGX 09 HNEF 0905…….	I	M9315 M5315 S (E)	I	M9325 S	I	M9340 S
	S45HN06C S45HN09C	SNH06	SNH06	C60HN09									II	8215 M8310	II	8215 M8310 S	II	8230 S
													III	8230 S (E)	III	8230 S	III	M8340 S
2												SEMT 09 SDEW, SDEX 09.. SOMT 09T3.. XPHT 1604..	I	8215 M9315 S (E)	I	8230 M9325 S	I	M8340 M9340 S
	S45SE09F	SSE09	SSD09		SXP16								II	8230 S (E)	II	8230 S	II	M8340 S
													III	8230 S (E)	III	M8340 S	III	M8340 S
3												ADMX, ADEX 11T3.. ADMX, ADEX 1606.. APKT 1003PD, APKT 1604.. LNGX 12, LNGU 16 SOMT 09T30.. SDMT 120508SR.. ADKX 15T3…..	I	8215 M9315 S (E)	I	8230 M9325 S	I	M8340 M9340 S, P
	S90AD11E S90AD16E	SAD11E SAD16E	SAD11E SAD16E	S90LN12 S90LN16	SLN12	SLN12	S90S009	SS009	C90AD15	CAD15	CAD15		II	8215 S (E)	II	8230 S	II	M8340 S, P
													III	8230 S (E)	III	M8340 S	III	M8340 S, P
4												RDHX, RDGT, RDHT 0702.., RDHX, RDGT, RDHT 1003.. RDHX, RDGT, RDHT 12T3.. RDHX, RDGT, RDHT 1604.. ZDCW 07, ZDCW 09, ZDEW 12 PD..0905	I	M8310 7205 E (S)	I	M8325 7215 S (E)	I	M8345 7230 S
	SCRD12, 16	SRD07, 10, 12, 16	W-SRD10	SMORC12, 16	SMOZD09, 12	SZD07, 09, 12	SZD07 SZD09, SZD12	S19SPD09	SPD09				II	M8310 8215 E (S)	II	M8325 8230 S (E)	II	M8345 M8340 S
													III	8215 E (S)	III	8230 S (E)	III	M8340 S
5												SN.. 11 (12)	I	8215 E (S)	I	8230 S (E)	I	M8340 S
	S90SN	S90SN-R											II	8230 S (E)	II	8230 S (E)	II	8230 S (E)
													III	–	III	–	III	–
6												ADMX, ADEX 11T3..	I	8230 M9315 S (E)	I	8230 M9325 S (E)	I	M8340 M9340 S
	S90AD11E	SAD11E											II	8230 S	II	8230 S	II	M8340 S
													III	–	III	–	III	–
7												SBMR 22 PNMU 1308..	I	8230 S	I	M8345 S	I	M8345 S
	F60SB22	S57PN13											II	8215 S	II	8230 S	II	–
													III	–	III	–	III	–

Group	Feed range according to the cutting conditions			M5315	M9315	M9325	M9340	M8310	M8325	M8326	M8340	M8345	M8346	8215	8230	7205	7215	7230
				P														
1	Finishing	.004	.008	1425	1395	1345	885	985	-	-	1150	-	-	1200	1050	-	-	-
	Medium	.004	.010	1330	1280	1215	855	885	-	-	1015	-	-	1015	920	-	-	-
	Roughing	.004	.012	1215	1150	1065	835	770	-	-	885	-	-	855	785	-	-	-
2	Finishing	.004	.008	1330	1310	1295	785	950	-	-	1100	-	-	1180	1015	-	-	-
	Medium	.004	.012	1215	1180	1150	755	835	-	-	970	-	-	1000	885	-	-	-
	Roughing	.004	.014	1165	1100	1015	805	740	-	-	835	-	-	805	755	-	-	-
3	Finishing	.004	.006	1245	1215	1180	770	855	-	-	985	740	-	1035	920	-	-	-
	Medium	.004	.010	1200	1150	1085	770	805	-	-	920	690	-	920	835	-	-	-
	Roughing	.004	.012	1130	1065	985	770	720	-	-	820	625	-	785	740	-	-	-
4	Finishing	-	-	-	-	1380	985	1015	870	-	1165	870	-	1165	1050	1035	950	805
	Medium	-	-	-	-	1265	900	935	805	-	1065	805	-	1065	970	950	870	740
	Roughing	-	-	-	-	1150	755	855	720	-	970	720	-	1015	885	855	785	675
5	Finishing	.004	.008	-	-	-	-	-	-	-	970	-	-	970	885	-	-	-
	Medium	.004	.012	-	-	-	-	-	-	-	870	-	-	885	805	-	-	-
	Roughing	.004	.020	-	-	-	-	-	-	-	770	-	-	805	720	-	-	-
6	Finishing	.004	.006	820	770	720	540	540	460	-	605	460	-	605	560	-	-	-
	Medium	.004	.008	720	675	605	490	460	395	-	510	395	-	475	460	-	-	-
	Roughing	.003	.010	-	-	490	460	-	-	-	410	310	-	-	360	-	-	-
7	Finishing	.010	.016	-	-	-	-	-	-	705	-	625	590	885	820	-	-	-
	Medium	.010	.020	-	-	-	-	-	-	575	-	510	460	690	640	-	-	-
	Roughing	.010	.024	-	-	-	-	-	-	510	-	445	395	-	560	-	-	-

P

CORRECTION v_c

Subgroup	P1	P2	P3	P4
Workpiece hardness factor				
Hardness	kv_{HBP1}	kv_{HBP2}	kv_{HBP3}	kv_{HBP4}
120	**1.53**	1.18	.94	.71
140	**1.46**	1.12	.90	.67
160	**1.37**	1.05	.84	.63
180	**1.30**	**1.00**	.80	.60
200	**1.24**	**.95**	.76	.57
220	**1.17**	**.90**	**.72**	.54
240	**1.12**	**.86**	**.69**	.52
260	**1.07**	**.82**	**.66**	**.49**
280	1.04	**.80**	**.64**	**.48**
300	1.00	**.77**	**.62**	**.46**
320	.96	.74	**.59**	**.44**
340	.92	.71	**.57**	**.43**
360	.88	.68	.54	**.41**
375	.85	.65	.52	**.39**

Correction for durability (general machining)

Durability [min]	k_{vT}
15	1.23
20	1.13
30	1.00
45	.89
60	.81
90	.72

Correction for durability (heavy roughing)

Durability [min]	k_{vT}
30	1.23
60	1.00
90	.89
120	.81

Speed factor k_{vx}

Forged and cast piece skin	.70 - .90
Good machine conditions	1.05 - 1.20
Bad machine conditions	.85 - .95

PRAMET

Table 3a

CHOICE OF MILLING CUTTER AND INITIAL CUTTING CONDITIONS

M

Group	Type of tool											Type of insert	Cutting conditions					
													Finishing		Medium		Roughing	
1												HNGX 06 HNGX 09 HNEF 0905…….	I	M9325 S (E)	I	8215 S	I	M9340 S
													II	8215 (M8310) S (E)	II	8230 S	II	8230 S
	S45HN06C S45HN09C	SNH06	SNH06	C60HN09									III	M9340 S (E)	III	8230 S	III	M8340 S
2												SEMT 09 SDEW, SDEX 09.. SOMT 09T3.. XPHT 1604..	I	8215 S (E)	I	8230 M9325 S	I	M8340 M9340 S
													II	8230 S (E)	II	8230 S	II	M8340 S
	S45SE09F	SSE09	SSD09		SXP16								III	8230 S (E)	III	M8340 S	III	M8340 S
3												ADMX, ADEX 11T3.. ADMX ,ADEX 1606.. APKT 1003PD, APKT 1604.. LNGX 12, LNGU 16 SOMT 09T30.. SDMT 120508SR.. ADKX 15T3…..	I	8215 M8310 S (E)	I	8230 M9325 S	I	M8340 M9340 S, P
													II	8215 M8310 S (E)	II	8230 S	II	M8340 S, P
	S90AD11E S90AD16E	SAD11E SAD16E	SAD11E SAD16E	S90LN12 S90LN16	SLN12	SLN12	S90S009	SS009	C90AD15	CAD15	CAD15		III	8230 M8325 S (E)	III	M8340 S	III	M8340 S, P
4												RDHX, RDGT, RDHT 0702.., RDHX, RDGT, RDHT 1003.. RDHX, RDGT, RDHT 12T3.. RDHX, RDGT, RDHT 1604.. ZDCW 07, ZDCW 09, ZDEW 12 PD..0905	I	M8310 7205 E (S)	I	M8325 7215 S (E)	I	M8345 7230 S
													II	M8310 8215 E (S)	II	M8325 8230 S (E)	II	M8345 M8340 S
	SCRD12, 16	SRD07, 10, 12, 16	W-SRD10	SMORC12, 16	SMOZD09, 12	SZD07, 09, 12	SZD07 SZD09, SZD12	S19SPD09	SPD09				III	8215 E (S)	III	8230 S (E)	III	M8340 S
5												SN.. 11 (12)	I	8215 E (S)	I	8230 S (E)	I	M8340 S
													II	8230 S (E)	II	M8340 S	II	M8340 S
	S90SN	S90SN-R											III	–	III	–	III	–
6												ADMX, ADEX 11T3..	I	8230 M9325 S (E)	I	8230 M9325 S (E)	I	M8340 M9340 S
													II	8230 S	II	8230 S	II	M8340 S
	S90AD11E	SAD11E											III	–	III	–	III	–
7												SBMR 22 PNMU 1308..	I	8230 S	I	M8345 S	I	M8345 S
													II	8215 S	II	8230 S	II	–
	F60SB22	S57PN13											III	–	III	–	III	–

Group	M															
	Feed range according to the cutting conditions			M9325	M9340	M8310	M8325	M8340	M8345	M8346	8215	8230	7205	7215	7230	HF7
1	Finishing	.004	.008	805	525	590	-	690	-	-	705	625	-	-	-	-
	Medium	.004	.010	720	510	525	-	605	-	-	605	540	-	-	-	-
	Roughing	.004	.012	640	490	460	-	525	-	-	510	460	-	-	-	-
2	Finishing	.004	.008	770	460	560	-	655	-	-	705	605	-	-	-	245
	Medium	.004	.012	690	445	490	-	575	-	-	590	525	-	-	-	215
	Roughing	.004	.014	605	475	445	-	490	-	-	475	445	-	-	-	-
3	Finishing	.004	.006	705	460	510	-	590	445	-	605	540	-	-	-	215
	Medium	.004	.010	640	460	475	-	540	410	-	540	490	-	-	-	215
	Roughing	.004	.012	590	460	425	-	490	360	-	460	445	-	-	-	-
4	Finishing	-	-	820	590	605	510	690	510	-	690	625	605	560	475	260
	Medium	-	-	755	540	560	475	640	475	-	640	575	560	510	445	245
	Roughing	-	-	690	445	510	425	575	425	-	605	525	510	460	395	-
5	Finishing	.004	.008	-	-	-	-	575	-	-	575	525	-	-	-	-
	Medium	.004	.012	-	-	-	-	510	-	-	525	475	-	-	-	-
	Roughing	.004	.020	-	-	-	-	460	-	-	475	425	-	-	-	-
6	Finishing	.004	.006	425	310	310	260	360	260	-	360	330	-	-	-	130
	Medium	.004	.008	360	295	260	230	295	230	-	280	260	-	-	-	115
	Roughing	.003	.010	295	260	-	-	245	180	-	-	215	-	-	-	-
7	Finishing	.010	.016	-	-	-	-	-	360	345	525	490	-	-	-	-
	Medium	.010	.020	-	-	-	-	-	295	260	410	375	-	-	-	-
	Roughing	.010	.024	-	-	-	-	-	260	230	-	330	-	-	-	-

M

CORRECTION v_c

Subgroup	M1	M2	M3	M4
Workpiece hardness factor				
Hardness	kv_{HBP1}	kv_{HBP2}	kv_{HBP3}	kv_{HBP4}
120	**1.35**	1.31	1.24	1.15
140	**1.28**	**1.24**	1.18	1.10
160	**1.22**	**1.18**	**1.12**	1.04
180	**1.14**	**1.11**	**1.05**	.98
200	**1.09**	**1.06**	**1.00**	.93
220	**1.03**	**1.00**	**.95**	.88
240	.98	**.95**	**.90**	**.84**
260	.93	**.91**	**.86**	**.80**
280	.89	**.87**	**.82**	**.76**
300	.87	**.84**	**.80**	**.74**
320	.84	**.81**	.77	**.72**
340	.80	.78	.74	**.69**
360	.77	.75	.71	**.66**
375	.74	.72	.68	**.63**

Correction for durability (general machining)

Durability [min]	k_{vT}
15	1.23
20	1.13
30	1.00
45	.89
60	.81
90	.72

Correction for durability (heavy roughing)

Durability [min]	k_{vT}
30	1.23
60	1.00
90	.89
120	.81

Speed factor k_{vx}

Forged and cast piece skin	.70 - .90
Good machine conditions	1.05 - 1.20
Bad machine conditions	.85 - .95

PRAMET

Table 4a

CHOICE OF MILLING CUTTER AND INITIAL CUTTING CONDITIONS

K

Group	Type of tool											Type of insert	Cutting conditions					
													Finishing		Medium		Roughing	
1												HNGX 06 HNGX 09 HNEF 0905…….	I	M5315 S (E)	I	M9315 S	I	M9325 S
	S45HN06C S45HN09C	SNH06	SNH06	C60HN09									II	8215 M8310	II	8215 M8310 S	II	8230 S
													III	8230 S (E)	III	8230 S	III	M8340 S
2												SEMT 09 SDEW, SDEX 09.. SOMT 09T3.. XPHT 1604..	I	8215 M5315 S (E)	I	8230 M9315 S	I	M8340 M9325 S
	S45SE09F	SSE09	SSD09		SXP16								II	8230 S (E)	II	8230 S	II	M8340 S
													III	8230 S (E)	III	M8340 S	III	M8340 S
3												ADMX, ADEX 11T3.. ADMX, ADEX 1606.. APKT 1003PD, APKT 1604.. LNGX 12, LNGU 16 SOMT 09T30.. SDMT 120508SR.. ADKX 15T3…..	I	8215 M5315 S (E)	I	8230 M9315 S	I	M8340 M9325 S, P
	S90AD11E S90AD16E	SAD11E SAD16E	SAD11E SAD16E	S90LN12 S90LN16	SLN12	SLN12	S90S009	SS009	C90AD15	CAD15	CAD15		II	8215 S (E)	II	8230 S	II	M8340 S, P
													III	8230 S (E)	III	8230 S	III	M8340 S, P
4												RDHX, RDGT, RDHT 0702.., RDHX, RDGT, RDHT 1003.. RDHX, RDGT, RDHT 12T3.. RDHX, RDGT, RDHT 1604.. ZDCW 07, ZDCW 09, ZDEW 12 PD.. 0905	I	M8310 7205 E (S)	I	M8325 7215 S (E)	I	M8345 7230 S
	SCRD12, 16	SRD07, 10, 12, 16	W-SRD10	SMORC12, 16	SMOZD09, 12	SZD07, 09, 12	SZD07 SZD09, SZD12	S19SPD09	SPD09				II	M8310 8215 E (S)	II	M8325 8230 S (E)	II	M8325 M8340 S
													III	8215 E (S)	III	8230 S (E)	III	M8340 S
5												SN.. 11 (12)	I	8215 E (S)	I	8230 S (E)	I	M8340 S
	S90SN	S90SN-R											II	–	II	–	II	–
													III	–	III	–	III	–
6												ADMX, ADEX 11T3..	I	8230 M9315 S (E)	I	8230 M9325 S (E)	I	M8340 M9325 S
	S90AD11E	SAD11E											II	8230 S	II	8230 S	II	M8340 S
													III	–	III	–	III	–
7												SBMR 22 PNMU 1308..	I	8230 S	I	M8345 S	I	M8345 S
	F60SB22	S57PN13											II	8215 S	II	8230 S	II	–
													III	–	III	–	III	–

Group	K														
	Feed range according to the cutting conditions			M5315	M9315	M9325	M8310	M8325	M8340	8215	8230	7205	7215	7230	HF7
1	Finishing	.004	.008	1345	1310	1265	935	-	1085	1130	985	-	-	-	-
	Medium	.004	.010	1245	1215	1150	835	-	950	950	870	-	-	-	-
	Roughing	.004	.012	1150	1085	1000	720	-	835	805	740	-	-	-	-
2	Finishing	.004	.008	1245	1245	1230	900	-	1035	1115	950	-	-	-	395
	Medium	.004	.012	1150	1115	1085	785	-	920	935	835	-	-	-	345
	Roughing	.004	.014	1100	1035	950	690	-	785	755	705	-	-	-	-
3	Finishing	.004	.006	1180	1150	1115	805	-	935	970	870	-	-	-	345
	Medium	.004	.010	1130	1085	1015	755	-	870	870	785	-	-	-	330
	Roughing	.004	.012	1065	1000	935	675	-	770	740	690	-	-	-	-
4	Finishing	-	-	-	-	1295	950	820	1100	1100	985	970	900	755	410
	Medium	-	-	-	-	1200	885	755	1000	1000	920	900	820	690	375
	Roughing	-	-	-	-	1085	805	675	920	950	835	805	740	625	-
5	Finishing	.004	.008	-	-	-	-	-	920	920	835	-	-	-	-
	Medium	.004	.012	-	-	-	-	-	820	835	755	-	-	-	-
	Roughing	.004	.020	-	-	-	-	-	720	755	675	-	-	-	-
6	Finishing	.004	.006	770	720	675	510	425	575	575	525	-	-	-	215
	Medium	.004	.008	675	625	575	425	360	475	445	425	-	-	-	180
	Roughing	.003	.010	-	-	460	-	-	375	-	330	-	-	-	-
7	Finishing	.010	.016	-	-	-	-	-	-	835	770	-	-	-	-
	Medium	.010	.020	-	-	-	-	-	-	640	605	-	-	-	-
	Roughing	.010	.024	-	-	-	-	-	-	-	525	-	-	-	-

K

CORRECTION v_c

Subgroup	K1	K2	K3	K4
Workpiece hardness factor				
Hardness	kv_{HBP1}	kv_{HBP2}	kv_{HBP3}	kv_{HBP4}
120	1.60	1.52	1.44	1.36
140	1.45	1.38	1.31	1.23
160	1.35	**1.28**	1.22	1.15
180	1.25	**1.19**	**1.13**	1.06
200	**1.10**	**1.05**	**.99**	.94
220	**1.00**	**.95**	**.90**	.85
240	**.90**	**.86**	**.81**	.77
260	**.80**	.76	.72	.68
280	**.70**	.67	.63	**.60**
300	.65	.62	.59	**.55**
320	.60	.57	.54	**.51**
340	.55	.52	.50	**.47**
360	.50	.48	.45	.43
380	.40	.38	.36	.34

Correction for durability (general machining)	
Durability [min]	k_{vT}
15	1.23
20	1.13
30	1.00
45	.89
60	.81
90	.72

Correction for durability (heavy roughing)	
Durability [min]	k_{vT}
30	1.23
60	1.00
90	.89
120	.81

Speed factor k_{vx}	
Forged and cast piece skin	.70 - .90
Good machine conditions	1.05 - 1.20
Bad machine conditions	.85 - .95

PRAMET

Table 5a

CHOICE OF MILLING CUTTER AND INITIAL CUTTING CONDITIONS

N

Group	Type of tool											Type of insert	Cutting conditions					
													Finishing		Medium		Roughing	
1												HNGX 06 HNGX 09 HNEF 0905…….	I	8215 (M8310) F (E)	I	8215 (M8310) F (E)	I	8215 (M8310) E (F)
													II	–	II	–	II	–
	S45HN06C S45HN09C	SNH06	SNH06	C60HN09									III	–	III	–	III	–
2												SEMT 09 SDEW, SDEX 09.. SOMT 09T3.. XPHT 1604..	I	8215 (M8310) F (E)	I	8215 (M8310) F (E)	I	8215 (M8310) E (F)
													II	HF7 F (E)	II	HF7 F (E)	II	HF7 F (E)
	S45SE09F	SSE09	SSD09		SXP16								III	–	III	–	III	–
3												ADMX, ADEX 11T3.. ADMX, ADEX 1606.. APKT 1003PD, APKT 1604.. LNGX 12, LNGU 16 SOMT 09T30.. SDMT 120508SR.. ADKX 15T3….	I	8215 M8310 F (E)	I	8215 M8310 F (E)	I	8215 M8310 F (E)
													II	–	II	–	II	–
	S90AD11E S90AD16E	SAD11E SAD16E	SAD11E SAD16E	S90LN12 S90LN16	SLN12	SLN12	S90S009	SS009	C90AD15	CAD15	CAD15		III	–	III	–	III	–
4												RDHX, RDGT, RDHT 0702.., RDHX, RDGT, RDHT 1003.. RDHX, RDGT, RDHT 12T3.. RDHX, RDGT, RDHT 1604.. ZDCW 07, ZDCW 09, ZDEW 12 PD.. 0905	I	HF7 F (E)	I	HF7 F (E)	I	HF7 F (E)
													II	M8310 F (E)	II	M8310 F (E)	II	M8310 F (E)
	SCRD12, 16	SRD07, 10, 12, 16	W-SRD10	SMORC12, 16	SMOZD09, 12	SZD07, 09, 12	SZD07 SZD09, SZD12	S19SPD09	SPD09				III	–	III	–	III	–
5												SN.. 11 (12)	I	8215 8230 E	I	8215 8230 E	I	8215 8230 E
													II	–	II	–	II	–
	S90SN	S90SN-R											III	–	III	–	III	–
6												ADMX, ADEX 11T3..	I	–	I	–	I	–
													II	–	II	–	II	–
	S90AD11E	SAD11E											III	–	III	–	III	–
7												SBMR 22 PNMU 1308..	I	–	I	–	I	–
													II	–	II	–	II	–
	F60SB22	S57PN13											III	–	III	–	III	–

CHOICE OF MILLING CUTTER AND INITIAL CUTTING CONDITIONS

Group	N								
	Feed range according to the cutting conditions			M0315	8215	8230	7205	7215	7230	HF7
1	Finishing	.004	.008	-	2985	2625	-	-	-	-
	Medium	.004	.010	-	2545	2295	-	-	-	-
	Roughing	.004	.012	-	2135	1970	-	-	-	-
2	Finishing	.004	.008	2380	2955	2545	-	-	-	1065
	Medium	.004	.012	2085	2495	2215	-	-	-	935
	Roughing	.004	.014	1835	2000	1885	-	-	-	-
3	Finishing	.004	.006	2135	2575	2295	-	-	-	935
	Medium	.004	.010	2000	2295	2085	-	-	-	900
	Roughing	.004	.012	1805	1970	1835	-	-	-	-
4	Finishing	-	-	2545	2905	2625	2575	2380	2000	1100
	Medium	-	-	2330	2660	2410	2380	2165	1835	1015
	Roughing	-	-	2135	2545	2215	2135	1970	1675	-
5	Finishing	.004	.008	-	2410	2215	-	-	-	-
	Medium	.004	.012	-	2215	2000	-	-	-	-
	Roughing	.004	.020	-	2000	1805	-	-	-	-
6	Finishing	.004	.006	-	-	-	-	-	-	-
	Medium	.004	.008	-	-	-	-	-	-	-
	Roughing	.003	.010	-	-	-	-	-	-	-
7	Finishing	.010	.016	-	-	-	-	-	-	-
	Medium	.010	.020	-	-	-	-	-	-	-
	Roughing	.010	.024	-	-	-	-	-	-	-

N

CORRECTION v_c

Subgroup	N1	N2	N3	N4

Workpiece hardness factor

Legierungsarten / Alloy type	k_{vx}	Sub-group
Electrotechnical aluminium	2.00	N1
Al alloys formed. unhardened HB 60	1.50	
Al alloys formed. hardened HB100	**1.00**	
Al alloys cast. unhardened HB75	.90	N2
Al alloys cast. hardened HB90	.65	
Al alloys cast. unhardened HB 130 >12% Si	1.0 PKD / .20	
Highly machinable alloys (>1%Pb)	.90	N3
Brass and lead bronze (<1%Pb)	.75	
Other brass HB <90	.60	
Other brass HB >90	.54	N4
Bronze electrolytic Cu	.40	
Hard and very hard bronze	.6 PKD / .20	

Correction for durability (general machining)

Durability [min]	k_{VT}
15	1.23
20	1.13
30	1.00
45	.89
60	.81
90	.72

Speed factor k_{vx}

Forged and cast piece skin	.70 - .90
Good machine conditions	1.05 - 1.20
Bad machine conditions	.85 - .95

PRAMET

Table 6a

CHOICE OF MILLING CUTTER AND INITIAL CUTTING CONDITIONS

S

Group	Type of tool											Type of insert	Cutting conditions					
													Finishing		Medium		Roughing	
1												HNGX 06 HNGX 09 HNEF 0905…….	I	M9325 S (E)	I	8215 S	I	–
													II	8215 (M8310) S (E)	II	8230 S	II	–
	S45HN06C S45HN09C	SNH06	SNH06	C60HN09									III	M9340 S (E)	III	8230 S	III	–
2												SEMT 09 SDEW, SDEX 09.. SOMT 09T3.. XPHT 1604..	I	8215 S (E)	I	8230 M9325 S	I	–
													II	8230 S (E)	II	8230 S	II	–
	S45SE09F	SSE09	SSD09		SXP16								III	8230 S (E)	III	M8340 S	III	–
3												ADMX, ADEX 11T3.. ADMX, ADEX 1606.. APKT 1003PD, APKT 1604.. LNGX 12, LNGU 16 SOMT 09T30.. SDMT 120508SR.. ADKX 15T3…..	I	8215 M8310 S (E)	I	8230 M9325 S	I	–
													II	8215 M8310 S (E)	II	8230 S	II	–
	S90AD11E S90AD16E	SAD11E SAD16E	SAD11E SAD16E	S90LN12 S90LN16	SLN12	SLN12	S90S009	SS009	C90AD15	CAD15	CAD15		III	8230 M8325 S (E)	III	M8340 S	III	–
4												RDHX, RDGT, RDHT 0702.., RDHX, RDGT, RDHT 1003.. RDHX, RDGT, RDHT 12T3.. RDHX, RDGT, RDHT 1604.. ZDCW 07, ZDCW 09, ZDEW 12 PD.. 0905	I	M8310 7205 E (S)	I	M8325 7215 S (E)	I	–
													II	M8310 8215 E (S)	II	M8325 8230 S (E)	II	–
	SCRD12, 16	SRD07, 10, 12, 16	W-SRD10	SMORC12, 16	SMOZD09, 12	SZD07, 09, 12	SZD07 SZD09˝, SZD12	S19SPD09	SPD09				III	8215 E (S)	III	8230 S (E)	III	–
5												SN.. 11 (12)	I	8215 E (S)	I	8230 S (E)	I	–
													II	8230 S (E)	II	M8340 S	II	–
	S90SN	S90SN-R											III	–	III	–	III	–
6												ADMX, ADEX 11T3..	I	–	I	–	I	–
													II	–	II	–	II	–
	S90AD11E	SAD11E											III	–	III	–	III	–
7												SBMR 22 PNMU 1308..	I	–	I	–	I	–
													II	–	II	–	II	–
	F60SB22	S57PN13											III	–	III	–	III	–

Group	S											
	Feed range according to the cutting conditions			M9325	M9340	M8310	M8340	M8345	8215	8230	7215	7230	HF7
1	Finishing	.004	.008	395	260	295	345	-	345	310	-	-	-
	Medium	.004	.010	360	245	260	295	-	295	260	-	-	-
	Roughing	.004	.012	-	-	-	260	-	-	-	-	-	-
2	Finishing	.004	.008	375	230	280	330	-	345	295	-	-	115
	Medium	.004	.012	345	215	245	280	-	295	260	-	-	100
	Roughing	.004	.014	-	-	-	245	-	-	-	-	-	-
3	Finishing	.004	.006	345	230	245	295	215	295	260	-	-	100
	Medium	.004	.010	310	230	230	260	195	260	245	-	-	100
	Roughing	.004	.012	-	-	-	245	-	-	-	-	-	-
4	Finishing	-	-	410	295	295	345	245	345	310	280	230	130
	Medium	-	-	375	260	280	310	230	310	280	245	215	115
	Roughing	-	-	-	-	-	280	-	-	-	-	-	-
5	Finishing	.004	.008	-	-	-	280	-	280	260	-	-	-
	Medium	.004	.012	-	-	-	245	-	260	230	-	-	-
	Roughing	.004	.020	-	-	-	230	-	-	-	-	-	-
6	Finishing	.004	.006	-	-	-	180	-	-	-	-	-	-
	Medium	.004	.008	-	-	-	150	-	-	-	-	-	-
	Roughing	.003	.010	-	-	-	115	-	-	-	-	-	-
7	Finishing	.010	.016	-	-	-	-	-	-	-	-	-	-
	Medium	.010	.020	-	-	-	-	-	-	-	-	-	-
	Roughing	.010	.024	-	-	-	-	-	-	-	-	-	-

S

CORRECTION v_c

Subgroup	S1	S2	S3	S4
Workpiece hardness factor				
Hardness	kv_{HBP1}	kv_{HBP2}	kv_{HBP3}	kv_{HBP4}
180	**2.14**	**1.46**	1.22	.92
200	**2.01**	**1.38**	1.15	**.93**
210	**1.93**	**1.32**	1.10	**.83**
220	**1.89**	**1.30**	1.08	**.81**
230	**1.84**	**1.26**	**1.05**	**.79**
240	**1.80**	**1.24**	**1.03**	**.77**
250	**1.75**	**1.20**	**1.00**	**.75**
260	**1.70**	**1.16**	**.97**	**.73**
280	**1.61**	**1.10**	**.92**	**.69**
300	**1.54**	1.06	**.88**	**.66**
320	**1.47**	1.01	**.84**	**.63**
340	**1.40**	.96	**.80**	.60
350	**1.37**	.94	**.78**	.59
360	**1.30**	.89	.74	.56

Correction for durability (general machining)

Durability [min]	k_{vT}
15	1.23
20	1.13
30	1.00
45	.89
60	.81
90	.72

Speed factor k_{vx}

Forged and cast piece skin	.70 - .90
Good machine conditions	1.05 - 1.20
Bad machine conditions	.85 - .95

PRAMET

Table 7a

CHOICE OF MILLING CUTTER AND INITIAL CUTTING CONDITIONS

H

Group	Type of tool											Type of insert	Cutting conditions					
													Finishing		Medium		Roughing	
1												HNGX 06 HNGX 09 HNEF 0905……	I	M5315 S (E)	I	M9315 S	I	–
													II	8215 M8310	II	8215 M8310 S	II	–
	S45HN06C S45HN09C	SNH06	SNH06	C60HN09									III	8230 S (E)	III	8230 S	III	–
2												SEMT 09 SDEW, SDEX 09.. SOMT 09T3.. XPHT 1604..	I	8215 M5315 S (E)	I	8230 M9315 S	I	–
													II	8230 S (E)	II	8230 S	II	–
	S45SE09F	SSE09	SSD09		SXP16								III	8230 S (E)	III	M8340 S	III	–
3												ADMX, ADEX 11T3.. ADMX, ADEX 1606.. APKT 1003PD, APKT 1604.. LNGX 12, LNGU 16 SOMT 09T30.. SDMT 120508SR.. ADKX 15T3…..	I	8215 M5315 S (E)	I	8230 M9315 S	I	–
													II	8215 S (E)	II	8230 S	II	–
	S90AD11E S90AD16E	SAD11E SAD16E	SAD11E SAD16E	S90LN12 S90LN16	SLN12	SLN12	S90S009	SS009	C90AD15	CAD15	CAD15		III	8230 S (E)	III	8230 S	III	–
4												RDHX, RDGT, RDHT 0702.., RDHX, RDGT, RDHT 1003.. RDHX, RDGT, RDHT 12T3.. RDHX, RDGT, RDHT 1604.. ZDCW 07, ZDCW 09, ZDEW 12 PD.. 0905	I	M8310 7205 E (S)	I	M8325 7215 S (E)	I	–
													II	M8310 8215 E (S)	II	M8325 8230 S (E)	II	–
	SCRD12, 16	SRD07, 10, 12, 16	W-SRD10	SMORC12, 16	SMOZD09, 12	SZD07, 09, 12	SZD07 SZD09, SZD12	S19SPD09	SPD09				III	8215 E (S)	III	8230 S (E)	III	–
5												SN.. 11 (12)	I	8215 E (S)	I	8230 S (E)	I	–
													II	–	II	–	II	–
	S90SN	S90SN-R											III	–	III	–	III	–
6												ADMX, ADEX 11T3..	I	–	I	–	I	–
													II	–	II	–	II	–
	S90AD11E	SAD11E											III	–	III	–	III	–
7												SBMR 22 PNMU 1308..	I	–	I	–	I	–
													II	–	II	–	II	–
	F60SB22	S57PN13											III	–	III	–	III	–

Group	H											
	Feed range according to the cutting conditions			M5315	M9315	M9325	M8310	8215	8230	7205	7215	7230	HF7
1	Finishing	.004	.008	280	280	260	195	230	195	-	-	-	-
	Medium	.004	.010	260	245	230	165	195	180	-	-	-	-
	Roughing	.004	.012	-	-	-	-	-	-	-	-	-	-
2	Finishing	.004	.008	260	260	245	180	230	195	-	-	-	80
	Medium	.004	.012	230	230	230	165	195	165	-	-	-	65
	Roughing	.004	.014	-	-	-	-	-	-	-	-	-	-
3	Finishing	.004	.006	245	230	230	165	195	180	-	-	-	65
	Medium	.004	.010	230	230	215	150	180	165	-	-	-	65
	Roughing	.004	.012	-	-	-	-	-	-	-	-	-	-
4	Finishing	-	-	-	-	260	195	230	195	195	180	150	80
	Medium	-	-	-	-	245	180	215	180	180	165	150	80
	Roughing	-	-	-	-	-	-	-	-	-	-	-	-
5	Finishing	.004	.008	-	-	-	-	180	165	-	-	-	-
	Medium	.004	.012	-	-	-	-	165	150	-	-	-	-
	Roughing	.004	.020	-	-	-	-	-	-	-	-	-	-
6	Finishing	.004	.006	-	-	-	-	-	-	-	-	-	-
	Medium	.004	.008	-	-	-	-	-	-	-	-	-	-
	Roughing	.003	.010	-	-	-	-	-	-	-	-	-	-
7	Finishing	.010	.016	-	-	-	-	-	-	-	-	-	-
	Medium	.010	.020	-	-	-	-	-	-	-	-	-	-
	Roughing	.010	.024	-	-	-	-	-	-	-	-	-	-

H

CORRECTION v_c

Subgroup	H1	H2	H3	H4
Workpiece hardness factor				
Hardness	kv_{HBP1}	kv_{HBP2}	kv_{HBP3}	kv_{HBP4}
380 / 4.8	**1.84**	**1.76**	1.60	1.52
400 / 42.7	**1.73**	**1.65**	1.50	1.43
420 / 44.6	**1.61**	**1.54**	1.40	1.33
440 / 46.5	**1.50**	**1.43**	1.30	1.24
460 / 48.1	**1.38**	**1.32**	1.20	1.14
500 / 5.8	**1.15**	**1.10**	**1.00**	.95
520 / 52.0	1.09	1.05	**.95**	.90
540 / 53.5	1.04	.99	**.90**	.96
560 / 54.7	.98	.94	**.85**	.81
580 / 55.7	.92	.88	**.80**	**.76**
600 / 56.8	.86	.93	.75	**.71**
620 / 57.9	.81	.77	.70	**.67**
640 / 59.0	.75	.72	.65	**.62**
>640 / >59	.69	.66	.60	**.57**

Correction for durability (general machining)

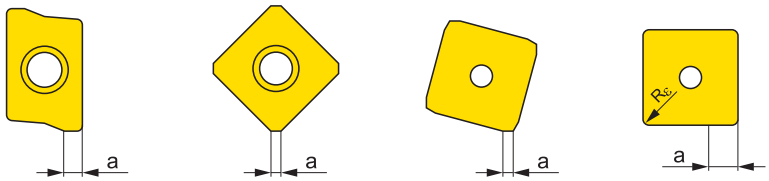
Durability [min]	k_{vT}
15	1.23
20	1.13
30	1.00
45	.89
60	.81
90	.72

Speed factor k_{vx}

Forged and cast piece skin	.70 - .90
Good machine conditions	1.05 - 1.20
Bad machine conditions	.85 - .95

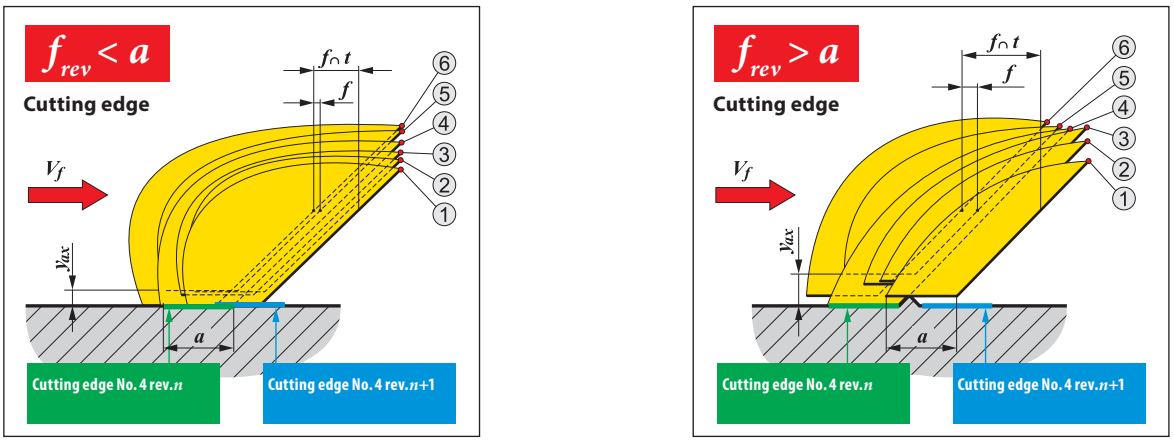
Milling inserts are produced with a wiper edge as a part of the minor cutting edge (with specific width and setting angle $\kappa_r = 0°$) to achieve the best quality surface finish. See picture No.1

Picture 1



However, the wiper edge is no guarantee of a good quality surface finish. In milling, the surface is cut by more than one edge and therefore surface quality can be affected by the axial run-out of the cutter. The surface finish can be affected by the most prominent axial edge (see picture No. 2). In this case the feed per revolution f_{rev} is lower than the width of wiper edge a, the surface finish is influenced by the most prominent axial edge and therefore the surface quality is good.

Picture 2



As there is only 1 wiper insert per cutter it is necessary to follow the maximum feed per tooth depending on the amount of inserts on the cutter.

If the total feed per rev (f_z) exceeds the wiper edge width (a) then you will lose the effectiveness of the wiper insert and will not achieve the desired quality of surface finish.

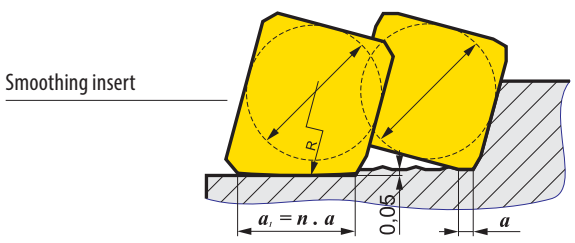
In the following table No.8 you will find the maximum values of feed per tooth (f_z) in relation to the number of teeth on the milling cutter.

Table 8

TYPE OF INSERT	ADMX 16 LNGU 16	PNMQ 13 PNMU 13	SBMR 22 SEEN 53 SEER 53	ADKX 15 APKT 16 SDMT 12	ADKX 15 LNGX 12 PDKT 09 PDMT 09 PDMW 09 SEEN 42 SEER 42	OFKR 07 SOMT09-M SOMT09-MI SOMT09-P	ADMX 11 HNEF 09-F HNGX 09 SEMT 09 SNHF 42 SNHF 53 SNHN 43 TPKN 32 TPKN 43 TPKR 32 TPKR 43
Width of wiper edge (segment) a [in]	.125	.110	.098	.086	.078	.063	.055
Number of teeth	max f_z						
1	.1004	.0878	.0784	.0690	.0627	.0502	.0439
2	.0502	.0439	.0392	.0345	.0314	.0251	.0220
3	.0333	.0294	.0263	.0231	.0208	.0169	.0145
4	.0251	.0220	.0196	.0173	.0157	.0125	.0110
5	.0200	.0176	.0157	.0137	.0125	.0102	.0086
6	.0169	.0145	.0129	.0114	.0106	.0082	.0075
7	.0145	.0125	.0114	.0098	.0090	.0071	.0063
8	.0125	.0110	.0098	.0086	.0078	.0063	.0055
9	.0110	.0098	.0086	.0078	.0071	.0055	.0047
10	.0102	.0086	.0078	.0071	.0063	.0051	.0043
11	.0090	.0078	.0071	.0063	.0059	.0047	.0039
12	.0082	.0075	.0067	.0059	.0051	.0043	.0035
13	.0078	.0067	.0059	.0055	.0047	.0039	.0035
14	.0071	.0063	.0055	.0051	.0043	.0035	.0031
15	.0067	.0059	.0051	.0047	.0043	.0035	.0027
16	.0063	.0055	.0051	.0043	.0039	.0031	.0027
17	.0059	.0051	.0047	.0039	.0035	.0031	.0027
18	.0055	.0047	.0043	.0039	.0035	.0027	.0024

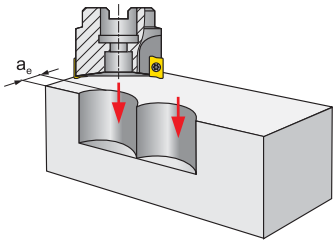
Using a special wiper insert is an effective way of improving the quality of the machined surface – simply fit a wiper insert into the milling cutter instead of an indexable cutting insert. See picture 3.

Picture 3



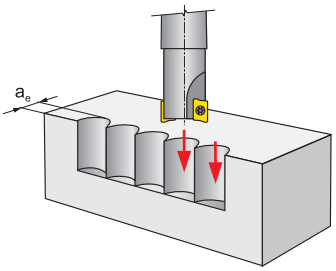
PLUNGE MILLING

SHELL CUTTER BODIES



Tool		Inserts	Diameter of cutter [in]	a_{emax}
	IS90AD11E	ADMX 11....	1.500 - 5.000	.175
	IS90AD16E	ADMX 16....	1.500 - 6.000	.295
	IS90LN12	LN.. 12....	1.500 - 5.000	.135
	IS90LN16	LN.. 16....	2.500 - 6.000	.275
	IS90S009	SOMT 09....	1.500 - 5.000	.235
	IS19PD09	PD.. 0905..	1.500	.195
			2.000	.235
			2.500	.275
			3.000 - 4.000	.315
	ISM0ZD09	ZDCW 09....	1.500	.235
	ISM0ZD12	ZDEW 12....	2.000 - 3.000	.355

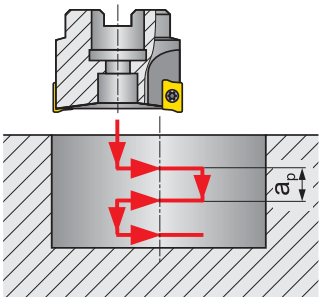
END MILLING CUTTERS



	ISAD11E	ADMX 11....	.625 - 1.500	.175
	ISAD16E	ADMX 16....	1.000 - 1.500	.295
	ISLN12	LN.. 12....	1.000 - 1.500	.135
	ISS009	SOMT 09....	.750 - 1.250	.235
	ISPD09	PD.. 0905..	1.250 - 1.500	.155
	ISZD09	ZDCW 09....	1.000, 1.250	.235
	ISZD12	ZDEW 12....	1.250, 1.500	.355

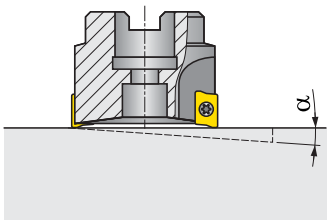
PRAMET

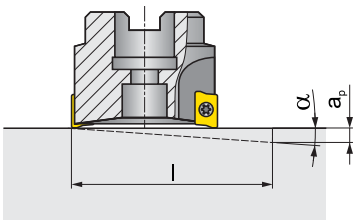
PROGRESSIVE PLUNGING

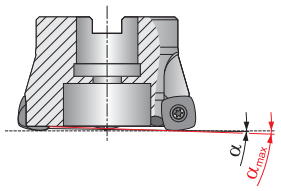


Tool		Inserts	Diameter of cutter [in]	a_{emax}
SHELL CUTTER BODIES				
	**IS90AD11E**	**ADMX 11....**	1.500 - 3.000	.065
	IS90AD16E	**ADMX 16....**	1.500 - 3.000	.100
	**IS90LN12**	**LN.. 12....**	1.500 - 4.500	.015
	**IS19PD09**	**PD.. 09....**	2.000 - 4.000	.080
	**ISCM0RD**	**RD.. 12....**	2.000 - 3.000	.110
		RD.. 16....	2.000 - 4.000	.165
	**IS45HN06C**	**HNGX 06....**	1.500 - 5.000	.035
	IS45HN09C	**HNGX 09....**	2.000 - 4.000	.075
END MILLING CUTTERS				
	**ISAD11E**	**ADMX 11....**	.625 - 1.500	.065
	ISAD16E	**ADMX 16....**	1.000 - 1.500	.100
	**ISLN12**	**LN.. 12...**	1.000 - 1.500	.015
	**ISPD09**	**PD.. 09....**	1.250 - 1.500	.070
	**IS(C)RD**	**RD.. 07....**	.625 - 1.000	.045
		RD.. 10....	.750 - 1.500	.100
		**RD.. 12....**	1.000 - 1.500	.120
	**ISHN06**	**HNGX 06....**	1.000 - 1.500	.035

RAMPING







SHELL CUTTER BODIES

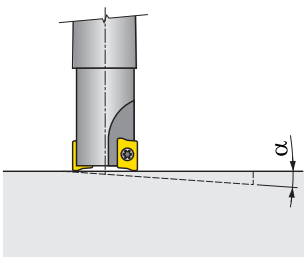
Tool	Inserts	Diameter of cutter [in]	α_{max} [°]	a_p/l [in]
 IS90AD11E	ADMX 11....	1.500	3.800	.255/4.000
		2.000	2.800	.190/4.000
		2.500	1.800	.120/4.000
		3.000	1.600	.105/4.000
		4.000	1.200	.080/4.000
IS90AD16E	ADMX 16....	1.500	5.000	.335/4.000
		2.000	3.500	.235/4.000
		2.500	2.500	.170/4.000
		3.000	2.000	.135/4.000
 IC90AD15	AD.. 15T3..	1.500	.830	.050/4.000
		2.000	.660	.045/4.000
		2.500	.500	.030/4.000
		3.000	.330	.020/4.000
 IS90LN12	LNGX 12....	1.500	.850	.055/4.000
		2.000	.650	.040/4.000
		2.500	.450	.025/4.000
		3.000	.350	.020/4.000
		4.000	.250	.010/4.000
		4.400	.200	.010/4.000
 ISCMORD	RD.. 12....	2.000	4.000	.235/3.50
		2.500	3.000	.200/4.000
		3.000	2.200	.145/4.000
	RD.. 16....	2.000	8.000	.3150/2.35
		2.500	6.000	.315/3.000
		3.000	4.000	.270/4.000
		4.000	3.000	.200/4.000
 IS19PD09	PD.. 0905..	2.000	8.000	.080/.650
		2.500	7.000	.080/.750
		2.500	6.000	.080/.850
		3.000	5.000	.080/1.000
		4.000	3.000	.080/1.500
 ISM0ZD09	ZDCW 09....	1.500	.350** (2.700)*	.020/4.000
ISM0ZD12	ZDEW 12....	2.000	.500** (2.600)*	.030/4.000
		2.500	.350** (1.800)*	.020/4.000
		3.000	.290** (1.300)*	.015/4.000
 IS45HN06C	HNGX 06....	1.500	1.500	.100/4.000
		2.000	1.150	.075/4.000
		2.500	.890	.060/4.000
		3.000	.680	.045/4.000
		4.000	.540	.030/4.000
		5.000	.420	.025/4.000
 IS45HN09C	HNGX 09....	2.000	2.100	.140/4.000
		2.500	1.500	.100/4.000
		3.000	1.100	.070/4.000
		4.000	.900	.060/4.000
		5.000	.700	.045/4.000
		6.000	.500	.030/4.000

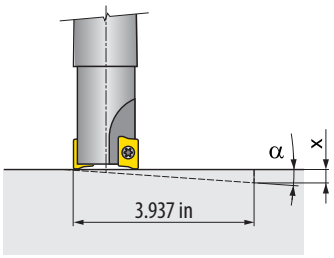
*) Valid for conventional milling.
**) Can be used for HFC cutters.

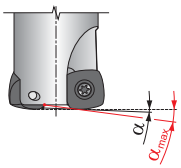
PRAMET

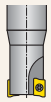
RAMPING

SHANK TOOLS





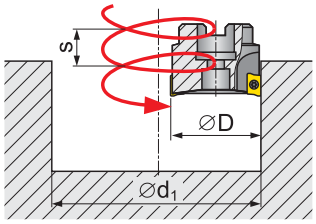


Tool		Inserts		Diameter of cutter [in]	α_{max} [°]	a_p/l [in]
	ISAD11E	ADMX 11....		.625	10.500	.355 / 1.550
				.750	9.000	.355 / 2.240
				1.000	6.000	.355 / 3.450
				1.250	5.300	.355 / 4.000
				1.500	3.800	.255 / 4.000
	ISAD16E	ADMX 16....		1.000	12.500	.510 / 2.240
				1.250	7.500	.510 / 4.000
				1.500	5.000	.335 / 4.000
	ICAD15	AD.. 15T3..		1.000	1.750	.120 / 4.000
				1.250	1.250	.080 / 4.000
				1.500	.830	.050 / 4.000
	ISLN12	LNGX 12....		1.000	2.200	.145 / 4.000
				1.250	1.200	.080 / 4.000
				1.500	.850	.055 / 4.000
		RD.. 07....		.6250	11.000	.080 / .500
				.750	7.000	.080 / .710
				1.000	6.000	.080 / .830
		RD.. 10....		.750	2.000	.100 / .750
				1.000	12.000	.100 / .870
				1.250	8.000	.100 / .750
				1.500	7.000	.100 / .870
		RD.. 12....		1.000	25.000	.120 / .320
				1.500	9.000	.120 / .830
				1.500	8.000	.120 / .900
		RD.. 16....		1.250	25.000	.155 / .430
	ISPD09	PD.. 0905..		1.250		
				1.500	8.000	
	ISZD07	ZDCW 07....		.625	.500** (7.800)*	.030 / 4.000
				.750	.300** (1.200)*	.015 / 4.000
				1.000	.200** (5.400)*	.010 / 4.000
				1.250	.100** (3.300)*	.005 / 4.000
	ISZD09	ZDCW 09....		1.000	.900** (6.500)*	.060 / 4.000
				1.250	.500** (4.000)*	.030 / 4.000
	ISZD12	ZDEW 12....		1.250	1.200** (4.000)*	.065 / 3.000
				1.500	.700** (3.700)*	.065 / 4.000
	ISHN06	HNGX 06....		1.000	2.690	.120 / 2.550
				1.250	1.960	.120 / 3.500
				1.500	1.500	.120 / 4.000

*) Valid for conventional milling.
**) Can be used for HFC cutters.

MILLING BY HELICAL INTERPOLATION

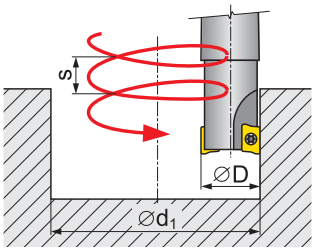
SHELL CUTTER BODIES



Tool		Inserts	Diameter of cutter	d_{min}	d_{max}	s_{max}
			[in]			
	IS90AD11E	ADMX 11....	1.500	2.950	–	.060
				–	3.050	.080
	IS90AD16E	ADMX 16....	1.500	2.800	–	.195
				–	3.050	.315
			2.000	3.600	–	.175
				–	3.850	.235
			2.500	4.650	–	.155
				–	4.850	.195
			3.000	5.350	–	.060
				–	6.200	.080
	IS90LN12	LNGX 12....	1.500	2.850	3.050	.070
			2.000	3.650	3.850	.065
			2.500	4.650	4.850	.060
	ISCM0RD	RD.. 12....	2.000	3.200	4.000	.110
			2.500	4.300	5.200	.110
			3.000	5.350	6.250	.110
		RD.. 16....	2.000	2.900	4.100	.155
			2.500	4.000	5.200	.155
			3.000	5.100	6.250	.155
			4.000	6.650	7.850	.155
	IS19PD09	PD.. 0905..	2.000	3.250	3.600	.080
			2.500	4.300	4.850	.080
			3.000	5.600	6.200	.080
			4.000	7.200	7.750	.080
	ISM0ZD09	ZDCW 09....	1.500	2.500	3.000	.015
	ISM0ZD12	ZDEW 12....	2.000	3.100	3.750	.025
			2.500	4.100	4.800	.030
			3.000	5.450	6.100	.030

MILLING BY HELICAL INTERPOLATION

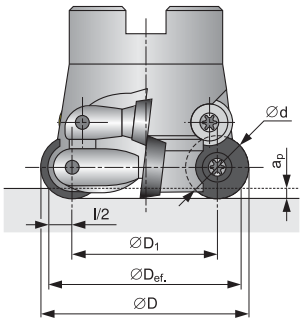
SHANK TOOLS



Tool	Inserts	Diameter of cutter	d_{min}	d_{max}	s_{max}
		[in]			
 ISAD11E	ADMX 11....	.625	1.050	–	.325
			–	1.200	.355
		.750	1.350	–	.295
			–	1.500	.355
		1.000	1.750	–	.255
			–	1.900	.295
		1.250	2.300	–	.155
			–	2.450	.175
		1.500	2.950	–	.060
			–	3.050	.080
ISAD16E	ADMX 16....	1.000	1.650	–	.390
			–	1.900	.490
		1.250	2.150	–	.255
			–	2.450	.355
		1.500	2.800	–	.195
			–	3.050	.315
 ISLN12	LNGX 12....	1.000	1.700	1.900	.110
		1.250	2.250	2.450	.080
		1.500	2.850	3.050	.070
 IS(C)RD	RD.. 07....	.625	.650	1.200	.055
		.750	1.100	1.550	.055
		1.000	1.500	1.950	.060
	RD.. 10....	.750	.850	1.550	.100
		1.000	1.250	1.950	.100
		1.250	1.650	2.350	.090
		1.500	2.050	2.750	.100
	RD.. 12....	1.000	1.000	1.900	.120
		1.500	1.800	2.750	.120
		1.500	2.450	3.200	.135
 ISPD09	PD.. 0905..	1.500	2.500	3.050	.080
 ISZD07	ZDCW 07....	.625	.800	1.200	.015
		.750	1.100	1.500	.015
		1.000	1.500	1.900	.015
		1.250	2.050	2.450	.015
ISZD09	ZDCW 09....	1.000	1.350	1.900	.015
		1.250	1.900	2.350	.015
ISZD12	ZDEW 12....	1.250	1.700	2.450	.025
		1.500	2.300	3.050	.025

TOROIDAL MILLING CUTTER

It is necessary to take the effective diameter into account when calculating the cutting speed.



$$v_c = \frac{\pi \cdot D_{ef} \cdot n}{12} \quad \text{[ft/min]}$$

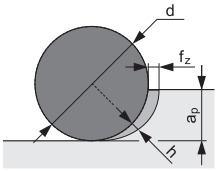
$$D_{ef.} = D_1 + l \quad \text{[in]}$$

Values of l [in] for different values of a_p [in]:

d [in]	a_p [in]									
	.020	.040	.060	.080	.100	.120	.135	.155	.175	.195
.276	.140	.190	.225	.245	-	-	-	-	-	-
.315	.155	.210	.245	.270	-	-	-	-	-	-
.394	.175	.235	.280	.315	.340	-	-	-	-	-
.472	.190	.260	.310	.350	.380	.410	-	-	-	-
.630	.220	.300	.365	.415	.455	.490	.520	.545	-	-
.787	.245	.340	.410	.470	.520	.560	.595	.625	.655	.680

The optimum feed from the recommended chip thickness depends on the machined material and the depth of cut.*

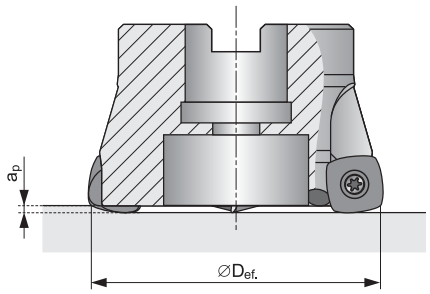
*) The recommended depth of cut can be found in the relevant product page in the catalogue.



$$f_z = h_m \sqrt{\frac{d}{a_p}} \quad \text{[in/tooth]}$$

Marking of inserts	a_{pmax}	Recommended chip thicknesses for the machined material groups					
	[in]	P	M	K	N	S	H
RD ..0702	.080	.00120 - .00430	.00195 - .00315	.00120 - .00430	.00195 - .00510	.00195 - .00315	.00080 - .00315
RD.. 0802	.080	.00120 - .00590	.00195 - .00390	.00120 - .00590	.00195 - .00705	.00195 - .00390	.00120 - .00390
RD.. 1003	.100	.00120 - .00590	.00195 - .00390	.00120 - .00590	.00195 - .00705	.00195 - .00390	.00120 - .00390
RD.. 12T3	.120	.00155 - .00705	.00275 - .00510	.00155 - .00705	.00275 - .00785	.00275 - .00510	.00120 - .00510
RD(P).. 1204	.120	.00155 - .00785	.00275 - .00590	.00155 - .00785	.00275 - .00980	.00275 - .00590	.00120 - .00590
RD.. 1604	.155	.00195 - .00785	.00390 - .00590	.00195 - .00785	.00390 - .00980	.00390 - .00590	.00155 - .00590
RD.. 2006	.195	.00195 - .01175	.00390 - .00785	.00195 - .01175	.00390 - .01570	.00390 - .00785	.00155 - .00785

HIGH FEED CUTTERS (HF CUTTERS)



Formula for calculating cutting speed:

$$v_c = \frac{\pi \cdot D_{ef} \cdot n}{12} \quad \text{[ft/min]}$$

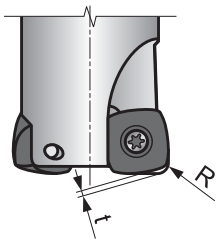
Effective diameter of cutter for face milling:

Cutter Ø [in]	Insert	Effective diameter D_{ef} in relation to a_p [in]		
		$a_p = 0$	$a_p = 0,5$	$a_p = 1,0$
.625	ZDCW 070304	.235	.480	.600
.750		.390	.635	.755
1.000		.590	.830	.955
1.250		.865	1.105	1.225
1.000	ZDCW 09T304	.455	.825	.930
1.250		.735	1.095	1.205
1.500		1.085	1.410	1.520

Cutter Ø [in]	Insert	Effective diameter D_{ef} in relation to a_p [in]			
		$a_p = 0$	$a_p = 0,5$	$a_p = 1,0$	$a_p = 1,5$
1.250	ZDEW 120408	.570	.970	1.100	1.180
1.500	ZDEW 120408	.880	1.285	1.415	1.500
2.00	ZDEW 120408	1.275	1.680	1.810	1.895
2.500	ZDEW 120408	1.785	2.195	2.320	2.405
3.000	ZDEW 120408	2.450	2.865	2.990	3.070

Cutter Ø [in]	Insert	Effective diameter D_{ef} in relation to a_p [in]				
		$a_p = 0$	$a_p = 0,5$	$a_p = 1,0$	$a_p = 1,5$	$a_p = 2,0$
1.250	PD .. 0905	.730	.835	.940	1.045	1.155
1.500		1.010	1.125	1.240	1.355	1.465
2.00		1.395	1.510	1.625	1.735	1.850
2.500		1.905	2.020	2.135	2.250	2.365
3.000		2.575	2.685	2.800	2.920	3.030
4.000		3.355	3.470	3.585	3.700	3.810

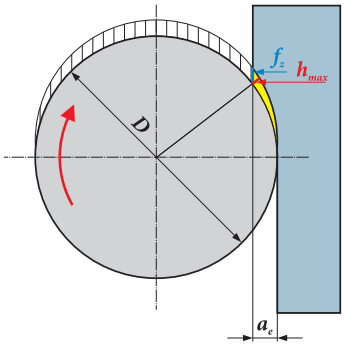
Information for CNC programming:



Insert	*R*	*t*
	[in]	[in]
ZDCW 070304	.065	.025
ZDCW 09T304	.090	.020
ZDEW 120408	.140	.025
PD.. 0905..	.175	.045
ADEX 11T308SR-HF	.056	.014

MILLING DEEP SHOULDERS

Recommended feed/chip thickness range:



Disc cutters:

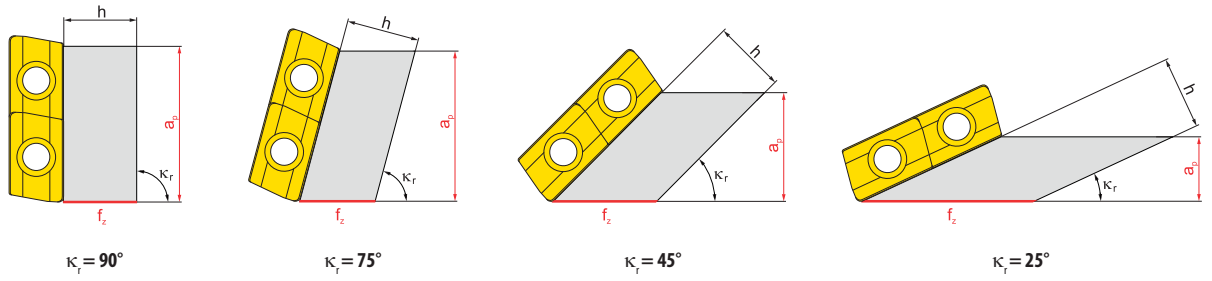
Ø cutter	Rec. medium chip thickness	a_e = .100		a_e = .200		a_e = .400		a_e = .800		a_e = 1.550		a_e = 3.150	
		$f_{z\,min}$	$f_{z\,max}$	$f_{z\,min}$	$f_{z\,max}$	$f_{z\,min}$	$f_{z\,max}$	$f_{z\,min}$	$f_{z\,max}$	$f_{z\,min}$	$f_{z\,max}$	$f_{z\,min}$	$f_{z\,max}$
[in]	h_m [in]	[in/tooth]											
2.500	.0025 - .0035	.0155	.0200	.0100	.0125	–	–	–	–	–	–	–	–
3.000	.0025 - .0035	.0175	.0225	.0110	.0145	.0080	.0100	–	–	–	–	–	–
4.000	.0025 - .0035	.0195	.0250	.0125	.0160	.0090	.0115	.0065	.0080	–	–	–	–
5.000	.0025 - .0035	.0220	.0280	.0140	.0180	.0100	.0125	.0070	.0090	–	–	–	–
6.000	.0025 - .0035	.0245	.0315	.0155	.0200	.0110	.0145	.0080	.0100	.0055	.0075	–	–
8.000	.0025 - .0035	.0275	.0355	.0175	.0225	.0125	.0160	.0090	.0115	.0065	.0080	–	–
10.000	.0025 - .0035	.0305	.0395	.0195	.0250	.0140	.0180	.0100	.0125	.0070	.0090	.0050	.0065
12.000	.0025 - .0035	.0345	.0445	.0220	.0280	.0155	.0200	.0110	.0140	.0080	.0100	.0055	.0075

Type J-SAD11E / T-S90AD11E cylindrical cutters:

Ø cutter	Rec. medium chip thickness	a_e = .100		a_e = .150		a_e = .300		a_e = .500		a_e = .650	
		$f_{z\,min}$	$f_{z\,max}$	$f_{z\,min}$	$f_{z\,max}$	$f_{z\,min}$	$f_{z\,max}$	$f_{z\,min}$	$f_{z\,max}$	$f_{z\,min}$	$f_{z\,max}$
[in]	h_m [in]	[in/tooth]									
1.000	.0020 - .0030	.0070	.0110	.0050	.0080	.0035	.0060				
1.250	.0020 - .0030	.0080	.0125	.0055	.0090	.0040	.0065				
1.500	.0020 - .0030	.0090	.0140	.0065	.0100	.0045	.0075	.0040	.0060		
2.000	.0020 - .0030	.0100	.0160	.0070	.0110	.0050	.0080	.0040	.0065	.0035	.0060

MILLING CUTTER FOR CHAMFERING SxxXP16

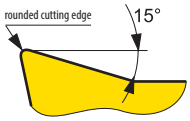
Influence of feed on chip thickness and setting angle:



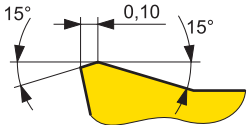
$\kappa_r = 90°$ $\kappa_r = 75°$ $\kappa_r = 45°$ $\kappa_r = 25°$

Cutting edge design:

Type **E**



Type **S**

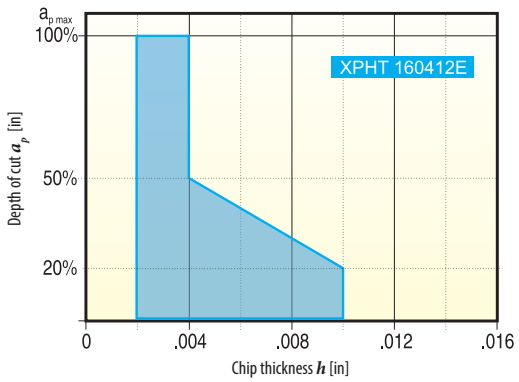


Influence of max. depth on setting angle:

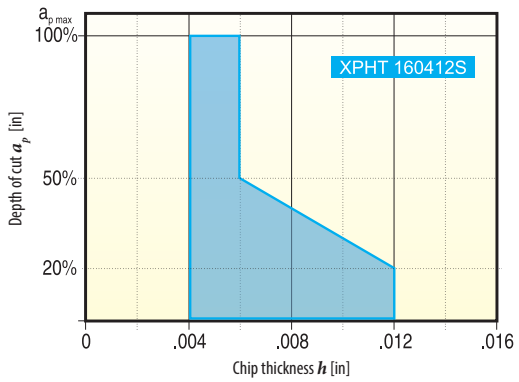
κ_r	$sin\ \kappa_r$	$tg\ \kappa_r$	$a_{p\ max}$ [in]	Chip thickness h [in]	
				Type **E**	Type **S**
15°	.259	.268	.275	.002 - .0025 - .004	.004 - .0045 - .006
25°	.423	.466	.470		
30°	.500	.577	.550		
35°	.574	.700	.625		
40°	.643	.839	.705		
45°	.707	1.000	.785		
50°	.766	1.192	.865		
55°	.819	1.428	.900		
60°	.866	1.732	1.000		
75°	.966	3.732	1.100		

Application diagram for SxxXP16:

For inserts with cutting edge design **E**



For inserts with cutting edge design **S**



PRAMET

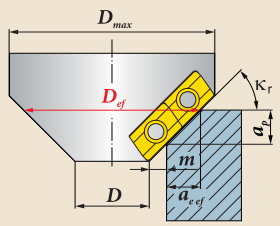
Initial cutting conditions:

κ_r	$a_{e\,ef}/D_{ef}$							
	0,10	0,15	0,20	0,25	0,30	0,35	0,40	1,00
15°	.0240 - **.0335** - .0480	.0195 - **.0275** - .0390	.0170 - **.0235** - .0335	.0155 - **.0210** - .0300	.0135 - **.0190** - .0280	.0130 - **.0180** - .0255	.0120 - **.0170** - .0240	.0075 - **.0105** - .0155
25°	.0145 - **.0205** - .0295	.0120 - **.0170** - .0240	.0100 - **.0145** - .0210	.0095 - **.0130** - .0185	.0085 - **.0120** - .0170	.0080 - **.0110** - .0155	.0075 - **.0100** - .0145	.0095 - **.0110** - .0135
30°	.0125 - **.0175** - .0245	.0100 - **.0140** - .0205	.0085 - **.0120** - .0175	.0080 - **.0110** - .0155	.0070 - **.0100** - .0145	.0065 - **.0095** - .0135	.0065 - **.0085** - .0125	.0080 - **.0095** - .0120
35°	.0110 - **.0155** - .0215	.0090 - **.0125** - .0175	.0075 - **.0105** - .0155	.0065 - **.0095** - .0135	.0065 - **.0085** - .0125	.0060 - **.0080** - .0115	.0110 - **.0130** - .0160	.0065 - **.0080** - .0100
40°	.0100 - **.0135** - .0190	.0080 - **.0110** - .0155	.0065 - **.0095** - .0135	.0065 - **.0085** - .0120	.0110 - **.0135** - .0170	.0100 - **.0125** - .0155	.0100 - **.0120** - .0145	.0065 - **.0075** - .0090
45°	.0085 - **.0120** - .0175	.0070 - **.0100** - .0145	.0065 - **.0085** - .0125	.0110 - **.0135** - .0165	.0100 - **.0120** - .0155	.0095 - **.0115** - .0140	.0085 - **.0105** - .0135	.0055 - **.0065** - .0080
50°	.0080 - **.0115** - .0160	.0065 - **.0095** - .0135	.0115 - **.0135** - .0175	.0100 - **.0120** - .0155	.0095 - **.0115** - .0140	.0085 - **.0100** - .0130	.0080 - **.0100** - .0120	.0050 - **.0065** - .0080
55°	.0075 - **.0105** - .0155	.0065 - **.0085** - .0125	.0105 - **.0130** - .0160	.0095 - **.0115** - .0145	.0085 - **.0105** - .0130	.0080 - **.0100** - .0120	.0075 - **.0090** - .0115	.0045 - **.0060** - .0070
60°	.0070 - **.0100** - .0145	.0120 - **.0140** - .0175	.0100 - **.0120** - .0155	.0090 - **.0110** - .0135	.0080 - **.0100** - .0125	.0080 - **.0090** - .0115	.0070 - **.0085** - .0105	.0045 - **.0055** - .0065
75°	.0065 - **.0090** - .0130	.0105 - **.0125** - .0155	.0090 - **.0110** - .0135	.0080 - **.0100** - .0120	.0075 - **.0090** - .0110	.0065 - **.0080** - .0100	.0065 - **.0080** - .0100	.0040 - **.0045** - .0065
v_c [ft/min]	920	835	770	740	705	675	655	525

Type E: XPHT 160412E | **Type S:** XPHT 160412S

Relations for calculating cutting conditions with chamfering cutters:

CHAMFER



Relation a_p and $a_{e\,ef}$

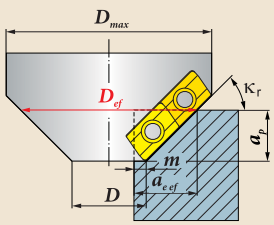
$$a_p = a_{e\,ef} \,.\, tg\,\kappa_r \quad \text{[in]}$$

$$a_{e\,ef} = \frac{a_p}{tg\,\kappa_r} \quad \text{[in]}$$

Effective diameter D_{ef}

$$D_{ef} = D + 2\,.\,(a_{e\,ef} + m) \quad \text{[in]}$$

CHAMFER WITH SHOULDER



Relation a_p and $a_{e\,ef}$

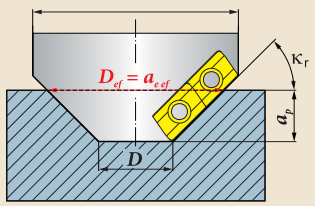
$$a_p = (a_{e\,ef} - m)\,.\,tg\,\kappa_r \quad \text{[in]}$$

$$a_{e\,ef} = m + \frac{a_p}{tg\,\kappa_r} \quad \text{[in]}$$

Effective diameter D_{ef}

$$D_{ef} = D + 2\,.\,(a_{e\,ef} - m) \quad \text{[in]}$$

SLOT



Relation a_p and $a_{e\,ef}$

$$a_p = \frac{a_{e\,ef} - D}{2} \,.\, tg\,\kappa_r \quad \text{[in]}$$

$$a_{e\,ef} = D + \frac{2\,.\,a_p}{tg\,\kappa_r} \quad \text{[in]}$$

Effective diameter D_{ef}

$$D_{ef} = a_{e\,ef} \quad \text{[in]}$$

Feed per tooth f_z

$$f_z = \frac{h}{sin\,\kappa_r} \,.\, \sqrt{\frac{D_{ef}}{a_{e\,ef}}} \quad \text{[in/tooth]}$$

Feed per tooth f_z

$$f_z = \frac{h}{sin\,\kappa_r} \quad \text{[in/tooth]}$$

Revolutions n

$$n = \frac{v_c\,.\,12}{D_{ef}\,.\,\pi} \quad \text{[rev./min]}$$

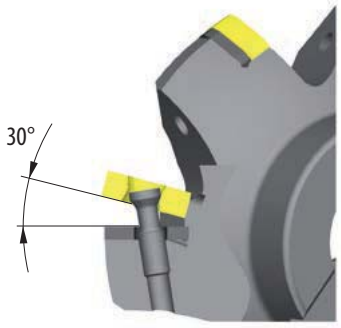
Table feed f_{min}

$$f_{min} = f_z\,.\,z\,.\,n \quad \text{[in/min]}$$

TYPE IS57PN 13 FACE CUTTERS

Replacing the cutting inserts without the need to remove the fixing screw:

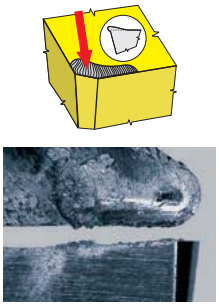
1 Place the insert into the seat at a 30° angle.

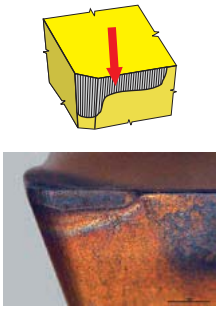


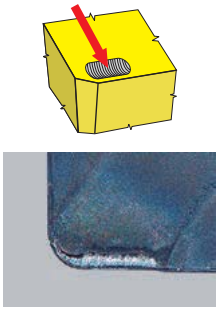
2 Position the insert on a shim in the required position in the milling cutter seat.

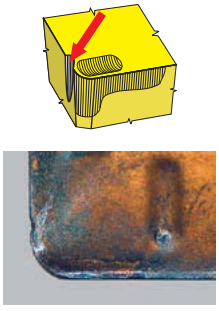
3 Tighten the screw.

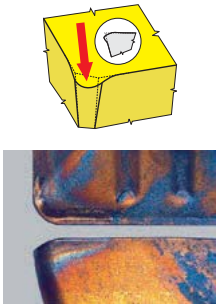
4 Torque 15 Nm.

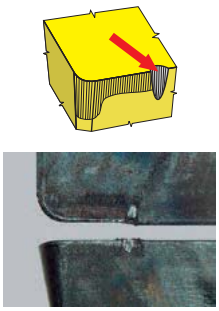
Picture	BUILT-UP EDGE	
	**Description and cause:** The machined material gets stuck to the cutting edge of the insert. The build--up has the properties of weld deposits on the cutting edge. Removing it can damage the cutting edge, which has a negative effect on the quality of the machined surface.	**Corrective measures:** - increase the cutting speed - increase the feed rate - use a coated grade - use a different milling geometry - use a coolant with more effective anti-sticking properties (or no coolant at all)

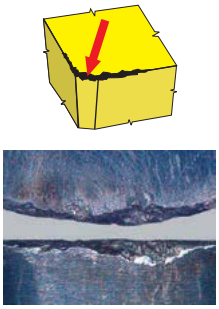
Picture	FLANK WEAR	
	**Description and cause:** Flank wear is one of the main factors that affects the service life of the insert. It is caused by friction between the insert and the machined material. It cannot be fully eliminated, but it can be reduced.	**Corrective measures:** - use a more wear-resistant grade - reduce the cutting speed - increase the feed rate (if it is under 0.1 mm per tooth) - use coolant or increase cooling

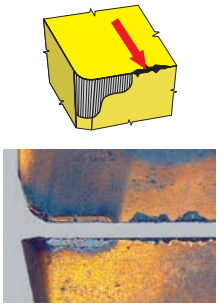
Picture	CRATERING	
	**Description and cause:** Cratering usually appears on inserts with a plain face.	**Corrective measures:** - use more wear resistant grade - use coated grade, primarily (MT) CVD - reduce the cutting speed - use different milling geometry - more positive - use coolant or increase the intensity of cooling

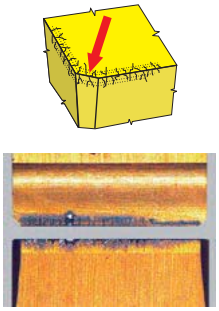
Picture	OXIDATION GROOVE ON THE MINOR EDGE	
	**Description and cause:** The main criterion which limits the tool life. It usually appears in turning. A combination of oxidation groove and cratering causes increased roughness on the machined surface.	**Corrective measures:** - use a coated or more wear-resistant grade - if possible use Al_2O_3 coated inserts - use coolant or increase the intensity of cooling - reduce the cutting speed

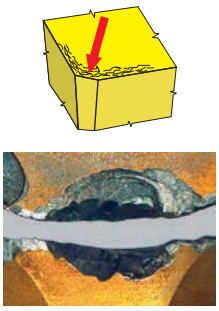
Picture	PLASTIC DEFORMATION	
	**Description and cause:** This is caused by high thermal stress on the cutting edge (high feed rate and cutting speed).	**Corrective measures:** - use a more wear-resistant grade - reduce the cutting speed - reduce the feed rate - use a coolant or increase cooling - use a cutting insert with a larger corner radius - use a cutting insert with a larger corner angle

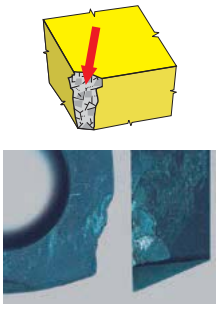
Picture	NOTCH WEAR	
	**Description and cause:** It is created when the insert edge contacts the surface of the work piece. It is mainly caused by hardening of the surface layer of work piece and burrs. Usually appears in austenitic stainless steels.	**Corrective measures:** - use a coated or more abrabion-resistant type of cemented carbide (if conditions allow) - use an insert with a coating containing Al_2O_3 - choose a tool with a smaller setting angle

Picture	CHIPPING OF CUTTING EDGE	
	**Description and cause:** Brittle chipping (micro-chipping) usually occurs in combination with other types of wear and is difficult to identify separately. It is caused by low rigidity of the machine-tool-workpiece assembly or by "hard forming".	**Corrective measures:** - use a more rigid type of cemented carbide - choose less intensive machining conditions - use a different cutting geometry - reduce the feed at entering the cut

Picture	CHIPPING OF CUTTING EDGE (OUT OF CUT)	
	**Description and cause:** This is caused by inadequate chip forming, which causes mechanical damage to the cutting edge.	**Corrective measures:** - change the feed rate - choose a tool with a different setting angle - use an insert with a different geometry - use a tougher grade

Picture	COMB CRACKS	
	**Description and cause:** This is caused by high thermal stress on the cutting edge during interrupted cut.	**Corrective measures:** - use plenty of coolant or stop using coolant (air can be used to eliminate burrs on the cutting area) - reduce the cutting speed - reduce the feed rate - use a tougher grade

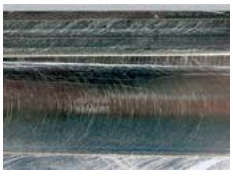
Picture	CRACKS ALONG THE FLANK	
	**Description and cause:** This is caused by high dynamic stress on the area behind the cutting edge.	**Corrective measures:** - use a tougher grade - change the cutting conditions - use a milling insert with a different geometry or an insert with a different cutting edge condition (...T, ...S, ...K, ...P) - change the feed rate - change the position of the cutter

Picture	INSERT FRACTURE	
	**Description and cause:** The cutting edge or tip of the tool is destroyed, this has numerous causes and depends on the tool material, workpiece material and condition and rigidity of the machine-tool-workpiece assembly in particular. The amount of wear, type and the machining conditions also have a certain influence.	**Corrective measures:** - use a tougher grade - reduce the feed rate and depth of cut - use an insert with a larger corner radius - use a cutting insert with a larger corner angle - use a milling insert with a different geometry - improve stability - change the position of the cutter (reduce the feed rate)

Picture	POOR SURFACE QUALITY	
	**Description and cause:** Numerous causes depending on the workpiece material, cutting conditions (feed rate and cutting speed), the condition of the cutting edge, the extent and type of wear, and the condition and rigidity of the machine-tool--workpiece assembly. - incorrect tool chosen - incorrect chip thickness - incorrect cutting speed - coolant is needed - high feed rate	**Corrective measures:** - use a finishing insert, or an insert with finishing segment - use an insert with suitable cutting geometry - reduce the feed rate - adjust (usually increase) the cutting speed - use coolant or lubrication (MQL) - eliminate vibrations - use a tool with which the position of the individual inserts can be adjusted more accurately - change the chip thickness (modify the machining conditions)

Picture	VIBRATIONS	
	**Description and cause:** This is a very common problem, which is mainly caused by an unbalanced workpiece or tool, unstable fixing of the machined part and high cutting forces. - low rigidity of machine-tool-workpiece assembly - excessive chip depth (both axial and radial) - run-out - poor workpiece or tool balance - large tool overhang	**Corrective measures:** - check the stability of the workpiece fixing - check the stability of the tool fixing - reduce the cutting depth - use a tool with smaller overhang - modify the cutting speed - reduce the chip thickness (change the cutting or machining conditions) - choose a suitable cutting geometry and tool material to minimize the cutting process force balance (as sharp and as positive as possible), i.e. use a tool with a lower cutting resistance - when milling, use a tool with a smaller setting angle

Picture	BURRS	
	**Description and cause:** This usually occurs on soft steels and plastic materials.	**Corrective measures:** - use a cutting insert with a sharp cutting edge - use a cutting insert with positive geometry - use a tool with a smaller setting angle

Picture	ERRORS IN DIMENSIONS AND SHAPE OF WORKPIECE	
	**Description and cause:** Depends on a number of factors.	**Corrective measures:** - use a wear-resistant cutting insert - improve the stability of the cutter and workpiece - minimize tool overhang - use a workpiece with a suitable machining allowance

Picture	INADEQUATE CHIP FORMATION	
	**Description and cause:** Using a chip with a suitable shape is as important as its durability (service life of the tool). The workpiece material, the feed rate, the depth of cut and the cutting geometry all have an effect on chip forming. A chip that is too long is unacceptable for various reasons, while a chip that is too short is undesirable as it overloads the cutting edge and causes vibrations.	**Corrective measures:** - change the fee rate and depth of cut - use a more suitable cutting geometry - change the cutting conditions

GENERAL PRINCIPLES

Check the seat condition of the cutting insert:

Before clamping a new cutting insert or changing the edge, it is necessary to clean the seat and check its condition or the condition of the anvil and wedge (especially the damage under the corner of the cutting insert).

Check and service the clamping parts:

It is also important to check the clamping parts, including clamping levers, screws, wedges and clamps. Only use original, undamaged parts (found in the catalogue). Regularly lubricate the threads and the binding surface of screws, for example using heat-resistant lubricant (Molyko G.). For assembly and disassembly, only use screwdrivers and wrenches specified in our catalogue or recommended by the tool manufacturer. Pay attention to the correct torque settings (proportional) - it is advisable to use a torque wrench.

Check the tightening:

Before tightening, check the fit of the cutting insert on the whole of the binding surface and in the radial and axial directions. Cutting inserts and tools must always be clean and undamaged.

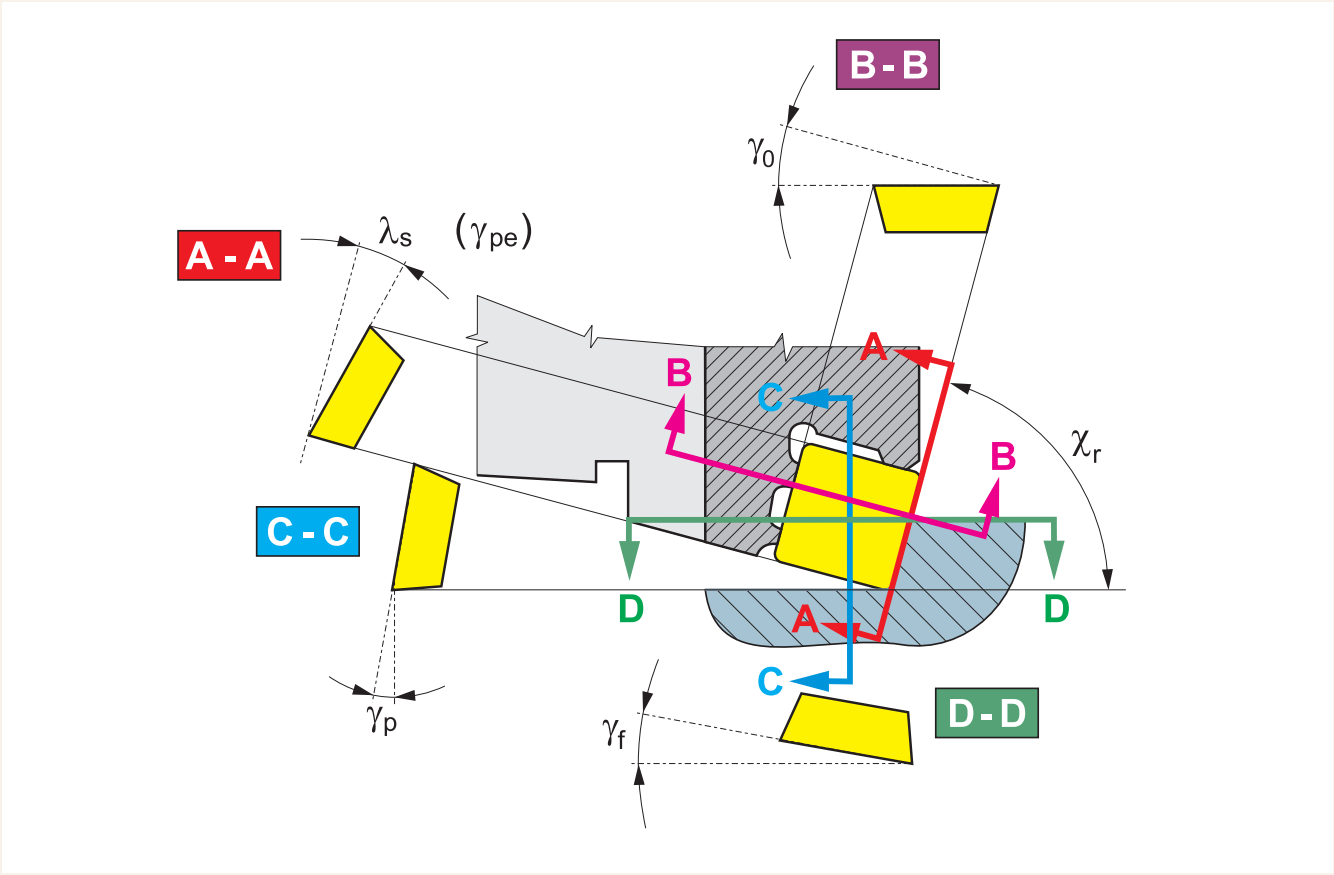
FORMULA FOR CALCULATING CUTTING PARAMETERS

Quantity	Formula	Unit	Note
Number of revolutions	$n = \frac{v_c \cdot 12}{D \cdot \pi}$	[rev/min]	
Cutting speed	$v_c = \frac{\pi \cdot D \cdot n}{12}$	[ft/min]	
Feed per revolution	$f_{rev} = \frac{f_{min}}{n} = f_z \cdot z$	[in/rev.]	
Feed per minute (speed of feed)	$f_{min} = v_f = f_{rev} \cdot n = f_z \cdot z \cdot n$	[in/min]	
Feed per tooth	$f_z = \frac{f_{rev.}}{z} = \frac{f_{min}}{n \cdot z}$	[in/tooth]	
Chip cross section	$A = f_z \cdot a_p$	[in^2]	
Chip thickness (For insert with straight edge)	$h = f_z \cdot \sin \kappa_r$	[in]	
Chip thickness (For round cutting insert)	$h = f_z \cdot \sqrt{\frac{a_p}{D}}$	[in]	
Metal removal rate	$Q = a_p \cdot a_e \cdot f_{min}$	[in^3/min]	

n Number of revolutions [rev/min]
D Diameter (of tool or work piece) [in]
v_c Cutting speed [ft/min]
f_{ot} Feed per revolution [in/rev]
f_{min} Feed per minute (sometimes called speed of feed) [in/min]
f_z Feed per tooth [in/tooth]
z Number of teeth [1]

A Chip cross section [in^2]
f_{ot} Feed per revolution [in/rev]
a_p Axial depth of cut (depth of cut) [in]
a_e Radial depth of cut (width of cut) [in]
κ_r Major edge setting angle [°]
h Chip thickness [in]
v_c Cutting speed [in/min]
f_{min} Feed per minute (sometimes called speed of feed) [in/min]
f_z Feed per tooth [in/tooth]
Q Material removal rate per minute [in^3/min]

Picture 4



The position of the cutting insert clamped in the tool is determined by several angles - see picture 4.

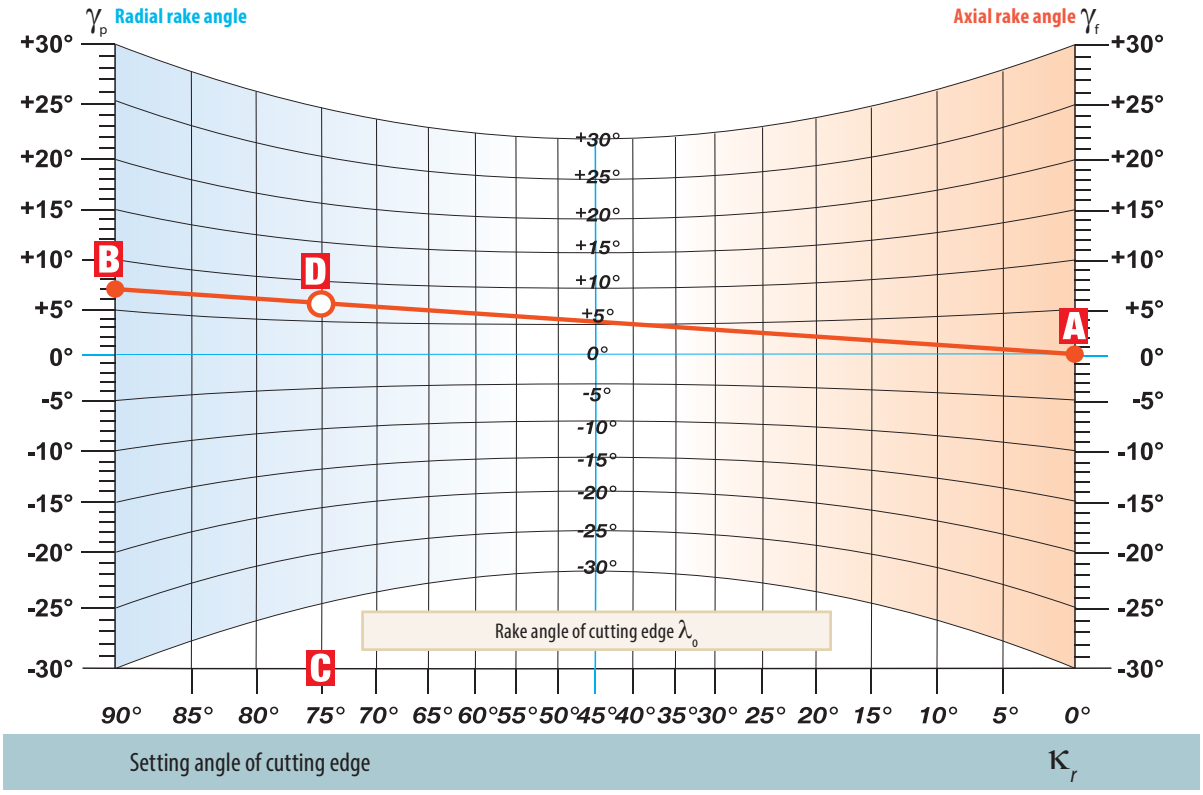
Constructional angles determine the basic orientation of the seat position that the cutting insert is clamped in and are therefore important for the design of the milling cutter body. There are two angles: axial face angle γ_p (tool back rake) and radial face angle γ_f (tool side rake) - see picture 5.

Working angles are the setting angle χ_r, the orthogonal face angle γ_o and the rake angle of the cutting edge λ_s.

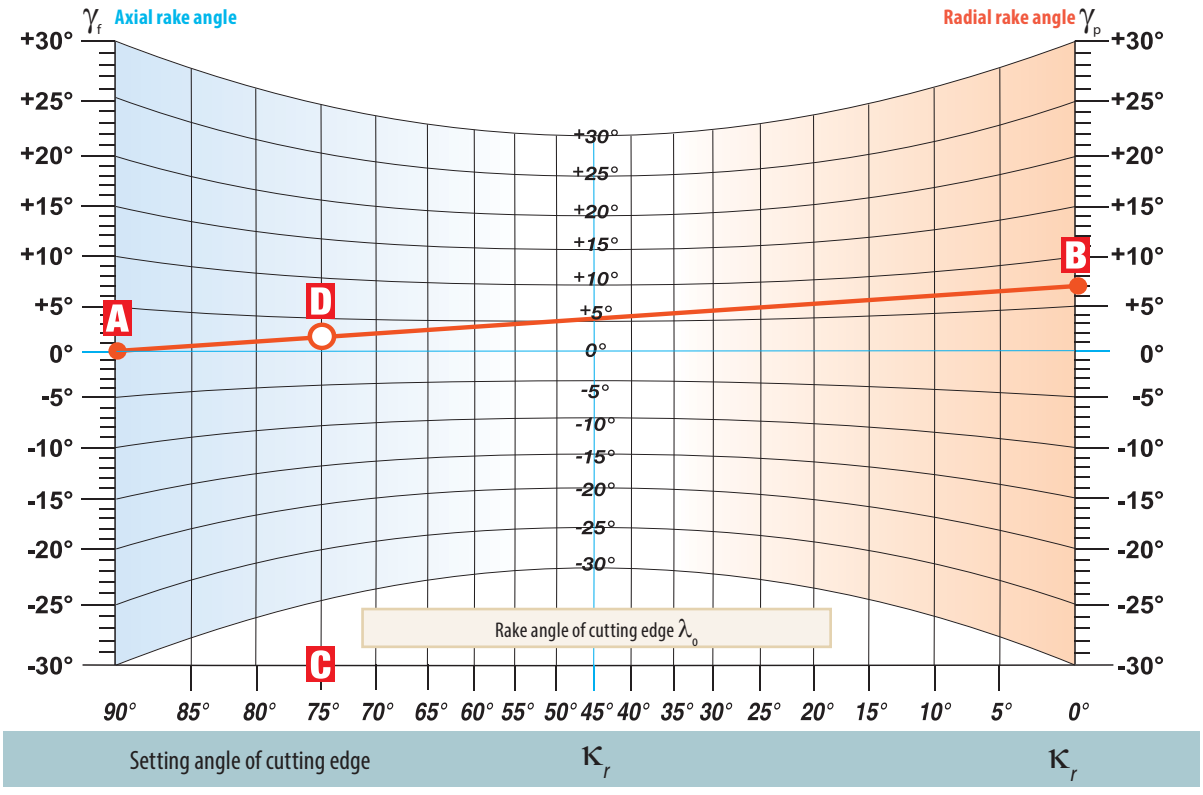
- **Orthogonal face angle** γ_o - affects not only the extent of plastic deformation of the cut chip but also the cutting force and temperature. The bigger the rake angle γ_o, the lower the cutting force and power demand of the milling machine engine (and vice versa).
- **Setting angle** χ_r - determines the thickness of the chip at a specific feed per tooth f_z and axial depth of cut a_p. It therefore affects cutting forces, specifically load, wear and tool service life. Reducing the setting angle χ_r at a constant feed f_z causes a decrease in the chip thickness h.
- **Rake angle of cutting edge** λ_s - together with setting angle χ_r and face angle γ_o, this determines the point of first contact between the edge and work piece. That is why it affects the resistance of the edge to chipping during interrupted cut. At the same time, it affects the direction of chip evacuation.

Picture 5

$$\tan \gamma_o = \tan \gamma_p \cdot \sin \kappa_o + \tan \gamma_f \cdot \cos \kappa_r$$



$$\tan \lambda_s = \tan \gamma_f \cdot \sin \kappa_r - \tan \gamma_p \cdot \cos \kappa_r$$

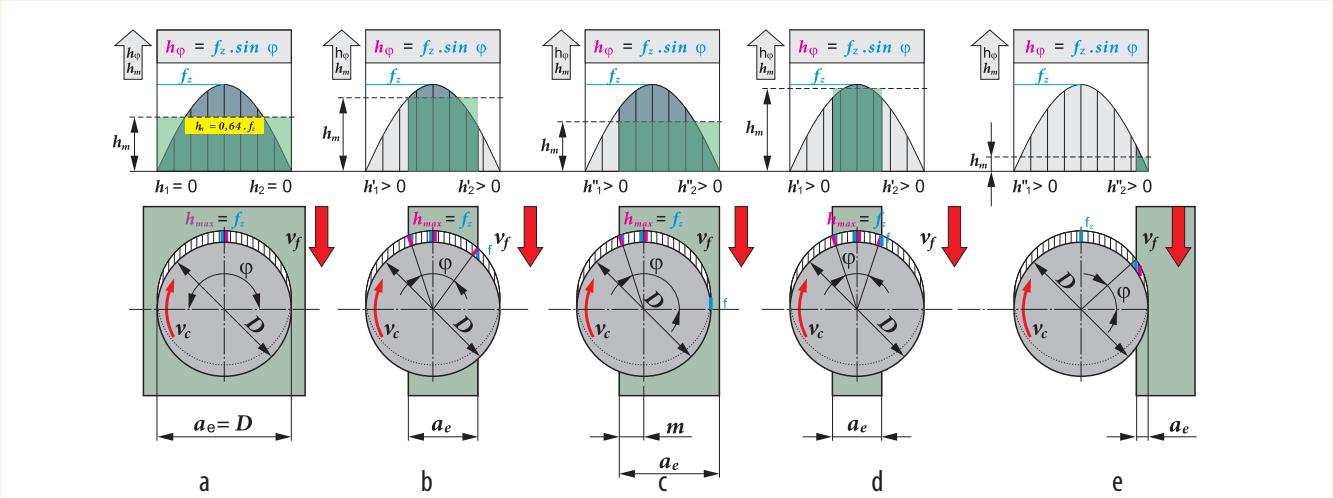


The entering and exiting conditions are decisive for tool service life. Choosing these conditions correctly has an influence on milling - the quality of the surface and the cutting output.

When entering the workpiece, the cutting edge is exposed to intense mechanical shock, which causes mechanical stress on the cutting edge. This shock can cause chipping on the cutting edge (fracture or abrasion) under incorrect cutting conditions.

In spite of this, we recommend using tools with indexable cutting inserts at down cut (the maximum chip thickness to be cut). Furthermore, the point of first contact between the cutting edge and the workpiece should not be on the corner of the cutting edge. This depends partly on the basic geometry of the cutting edge - angles γ_o, λ_s, χ_r - and partly on the relative position of the axis of the milling cutter and the entering edge of the workpiece.

Picture 6



The exiting of the cutting edge from the cut is also accompanied by thermal stress, caused by a rapid reduction in temperature of the surface layer of the cutting edge and mechanical stress caused by elastic deformation relief of the surface layer of workpiece at a rapid drop in cutting force.

That is why we use the average value of chip thickness h_m for any calculations.

The chip thickness h fluctuates during one revolution depending on angle φ in accordance with formulae $h\varphi = f_z \times sin\varphi$.

The maximum chip thickness equal to f_z is reached at the axis of the milling cutter. The average chip thickness h_m cut by one tooth during one revolution is equal to the height of the rectangle of the same area as the area under the sine curve relates to the radial depth of cut a_e. The average chip thickness h_m depends on the type of milling cutter and the cutting conditions, especially on the relation a_e/D, feed per tooth f_z and the setting angle χ_r. See picture 6. on the next page for an illustrative example.

The following formula can be used to calculate h_m (picture 6a, b, c, d):

$$h_m = f_z . sin\,\kappa_r \ .114,6 . \left(\frac{a_e}{D . arccos . \left[1 - \frac{2a_e}{D} \right]} \right)$$

The following formula can be used to calculate the feed f_z for the given value of h_m:

$$f_z = \frac{h_m}{sin\,\kappa_r} \cdot \left(\frac{D . arccos . \left[1 - \frac{2a_e}{D} \right]}{114,6 . a_e} \right)$$

where
h_m - average chip thickness [in]
f_z - feed per tooth [in/tooth]
a_e - radial depth of cut [in]
D - diameter [in]
χ_r - setting angle of major edge [°]

The following formula can be used to calculate h_m (picture 6e) if $a_e/D < 0,2$:

$$h_m = f_z\, sin\,\kappa_r \sqrt{\frac{a_e}{D}}$$

The following formula can be used to calculate the feed f_z for the given value of h_m:

$$f_z = \frac{h_m}{sin\,\kappa_r} \sqrt{\frac{D}{a_e}}$$

CALCULATING THE AVERAGE CHIP THICKNESS RANGES

There is an optimum average chip thickness range for each type of tool included in this catalogue. When using values lower than the stated range, there is a risk that the tool "will not cut", that there will be excessive wear, or even that the the insert will be severely damaged in the process. Exceeding the recommended value also risks damaging the insert due to tool overloading. The following table provides the cutter types together with the recommended average chip thickness ranges.

FACE MILLING CUTTERS				
$\kappa_r = 60°$	$\kappa_r = 75°$	$\kappa_r = 75°$	$\kappa_r = 45°$	With round inserts
–	Negative	Positive	–	Negative
ø 5.000 – 12.000 in	ø 3.000 – 12.000 in	ø 2.500 – 10.000 in	ø 2.000 – 12.000 in	ø 1.500 – 4.000 in
h_m .0030 – .0195 in	h_m .0030 – .0155 in	h_m .0025 – .0135 in	h_m .0060 – .0155 in	h_m .0025 – .0155 in

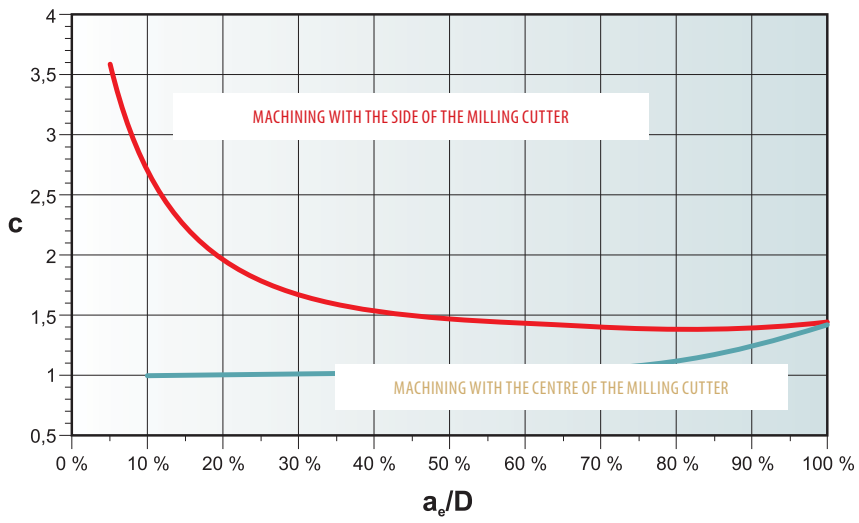
SHOULDER MILLING CUTTERS	HELICAL CUTTERS		DISC CUTTERS
$\kappa_r = 90°$	–	–	–
–	–	–	–
ø 1.500 – 6.000 in	ø 2.000 – 3.000 in	ø 1.000 – 1.500 in	Width .156 – .551 in
h_m .0030 – .0100 in	h_m .0040 – .0060 in	h_m .0025 – .0030 in	h_m .0025 – .0035 in

END MILLING CUTTERS		
$\kappa_r = 90°$	$\kappa_r = 45°$	With round inserts
–	–	–
ø .625 – 1.500 in	ø .375 – 1.250 in	ø .315 – 1.000 in
h_m .0025 – .0050 in	h_m .0025 – .0100 in	h_m .0025 – .0070 in

To achieve optimum application of any milling tool, it is therefore recommended to check the chip thickness or choose (calculate) a suitable feed based on the recommended range of h_m. It is also necessary to take the geometry of the insert into account. The formula above can be used to calculate f_z, or the following formula can be used instead.

The value of coefficent c can be read from the following chart:

$$f_z = \frac{h_m}{sin \cdot \kappa_r} \cdot c$$



FACE MILLING CUTTERS

Marking of cutter	Clamping screw	Torque [Nm]	Driver	Driver handle	Screwdriver	Screwdriver	Key	Clamping screw Thread	Clamping screw Length [in]
									
ISHN06	US 3007-T09P	**2.0**	–	–	–	FLAG T09P	–	**M 3**	**.280**
IS45HN06C	US3007-T09P	**2.0**	D-T07P/T09P	FG-15	–	–	–	**M 3**	**.280**
IS45HN09C	US 3512-T15P	**3.0**	D-T08P/T15P	FG-15	–	–	–	**M 3,5**	**.470**
ISSE09	US 3007-T09P	**2.0**	–	–	SDR T09P	–	–	**M 3**	**.280**
IS45SE09F	US 3007-T09P	**2.0**	–	–	SDR T09P	–	–	**M 3**	**.280**
IS57PN13	US 68026-T30P	**15.0**	–	–	SDR T30P-T	–	–	**M 8**	**1.020**
IC60HN09	US 74016-T15P	**3.5**	D-T08P/T15P	FG-15	–	–	–	**M 4**	**.630**
IF60SB22X	DS 01Z	**6.0**	–	–	–	–	KL 04	**M 8**	**.790**

SHOULDER MILLING CUTTERS

Marking of cutter	Clamping screw	Torque [Nm]	Driver	Driver handle	Screwdriver	Screwdriver	Key	Clamping screw Thread	Clamping screw Length [in]
									
ISAD11E	US 2505-T08P	**1.2**	–	–	–	FLAG T08P	–	**M 2,5**	**.200**
IS90AD11E	US 2505-T08P	**1.2**	D-T08P/T15P	FG-15	–		–	**M 2,5**	**.200**
ISAD16E	US 4008-T15P	**3.5**	–	–	–	FLAG T15P	–	**M 4**	**.310**
IS90AD16E	US 4011-T15P	**3.5**	D-T08P/T15P	FG-15	–	–	–	**M 4**	**.430**
IS90AD16E	US 4008-T15P	**3.5**	D-T08P/T15P	FG-15	–	–	–	**M 4**	**.310**
ICAD15	US 63511D-T15P	**3.0**	–	–	–	FLAG T15P	–	**M 3,5**	**.430**
IC90AD15	US 63511D-T15P	**3.0**	D-T08P/T15P	FG-15	–	–	–	**M 3,5**	**.430**
ISLN12	US 44012-T15P	**3.5**	–	–	–	FLAG T15P	–	**M 4**	**.470**
IS90LN12	US 44012-T15P	**3.5**	D-T08P/T15P	FG-15	–	–	–	**M 4**	**.470**
IS90LN16	US 45012-T20P	**5.0**	–	–	SDR T20P-T	–	–	**M 5**	**.470**
ISSO09	US 3006-T09P	**2.0**	–	–	SDR T09P	–	–	**M 3**	**.240**
IS90SO09	US 3006-T09P	**2.0**	–	–	SDR T09P	–	–	**M 3**	**.24**

HELICAL CUTTERS

Marking of cutter	Clamping screw	Torque [Nm]	Driver	Driver handle	Screwdriver	Screwdriver	Clamping screw Thread	Clamping screw Length [in]
								
J-ISAD11E	US 2506-T07P	**1.2**	–	–	–	FLAG T07P	**M 2,5**	**.240**
T-IS90AD11E	US 2506-T07P	**1.2**	D-T07P/T09P	FG-15	–	–	**M 2,5**	**.240**

DISC CUTTERS

Marking of cutter	Clamping screw	Torque	Screwdriver	Clamping screw Thread	Clamping screw Length [in]
		[Nm]			
IS90SN11N2.5	US 3504-T09P	**3.0**	SDR T09P	**M 3,5**	**.160**
IS90SN12N4	US 94006-T15	**5.0**	SDR T15	**M 4**	**.236**
IS90SN12N5	US 71	**5.0**	SDR T15	**M 4**	**.280**
IS90SN12N6	US 94008-T15	**5.0**	SDR T15	**M 4**	**.315**
IS90SN11N2.5-R	US 3504-T09P	**3.0**	SDR T09P	**M 3,5**	**.160**
IS90SN11N3-R	US 3505-T09P	**3.0**	SDR T09P	**M 3,5**	**.197**
IS90SN12N4-R	US 70	**5.0**	SDR T15	**M 4**	**.200**
IS90SN12N6-R	US 72	**5.0**	SDR T15	**M 4**	**.350**

COPY MILLING CUTTERS

Marking of cutter	Clamping screw	Torque	Driver	Driver handle	Driver	Torque handle	Screwdriver	Screwdriver	Clamping screw Thread	Clamping screw Length [in]
		[Nm]								
W-ISRD07	US 25	**1.2**	–	–	–	–	SDR T07	–	**M 2,5**	**.200**
W-ISRD10	US 3507-T15	**3.0**	–	–	–	–	SDR T15	–	**M 3,5**	**.280**
ISRD07	US 25	**1.2**	–	–	–	–	SDR T07	–	**M 2,5**	**.200**
ISRD10	US 3507-T15	**3.0**	–	–	–	–	SDR T15	–	**M 3,5**	**.280**
ISCRD12	US 3507-T15	**3.0**	–	–	–	–	SDR T15	–	**M 3,5**	**.280**
ISRD12	US 3507-T15	**3.0**	–	–	–	–	SDR T15	–	**M 3,5**	**.280**
ISCRD16	US 4511-T20	**5.0**	–	–	–	–	SDR T20	–	**M 4,5**	**.430**
ISCMORD12	US 3507-T15	**3.0**	–	–	–	–	SDR T15	–	**M 3,5**	**.280**
ISCMORD16	US 4511-T20	**5.0**	–	–	–	–	SDR T20	–	**M 4,5**	**.430**
ISPD09	US 45011-T20P	**5.0**	–	–	–	–	–	FLAG T20P	**M 5**	**.430**
IS19PD09	US 45011-T20P	**5.0**	–	–	–	–	SDR T20P-T	–	**M 5**	**.430**
C-ISZD07	US 2205-T07P	**.9**	–	–	–	–	–	FLAG T07P	**M 2,2**	**.200**
W-ISZD09	US 3006-T09P	**2.0**	–	–	–	–	–	FLAG T09P	**M 3**	**.240**
W-ISZD12	US 4011-T15P	**3.5**	–	–	–	–	–	FLAG T15P	**M 4**	**.430**
ISZD07	US 2205-T07P	**.9**	–	–	–	–	–	FLAG T07P	**M 2,2**	**.200**
ISZD09	US 3006-T09P	**2.0**	–	–	–	–	–	FLAG T09P	**M 3**	**.240**
ISZD12	US 4011-T15P	**3.5**	–	–	–	–	–	FLAG T15P	**M 4**	**.430**
ISMOZD09	US 3006-T09P	**2.0**	D-T07P/T09P	FG-15	–	–	–	–	**M 3**	**.240**
ISMOZD12	US 4011-T15P	**3.5**	D-T08P/T15P	FG-15	–	–	–	–	**M 4**	**.430**

CUTTERS FOR SPECIAL APPLICATIONS

Marking of cutter	Clamping screw	Torque	Driver	Driver handle	Screwdriver	Clamping screw Thread	Clamping screw Length [in]
		[Nm]					
ISSD09	US 3509-T15	**3.0**	–	–	SDR T15	**M 3,5**	**.35**
ISSD09	US 3507-T15	**3.0**	–	–	SDR T15	**M 3,5**	**.28**
ISxxXP16	US 3509-T15	**3.0**	D-T07/T15	FG-15		**M 3,5**	**.35**

TORQUE HANDLE

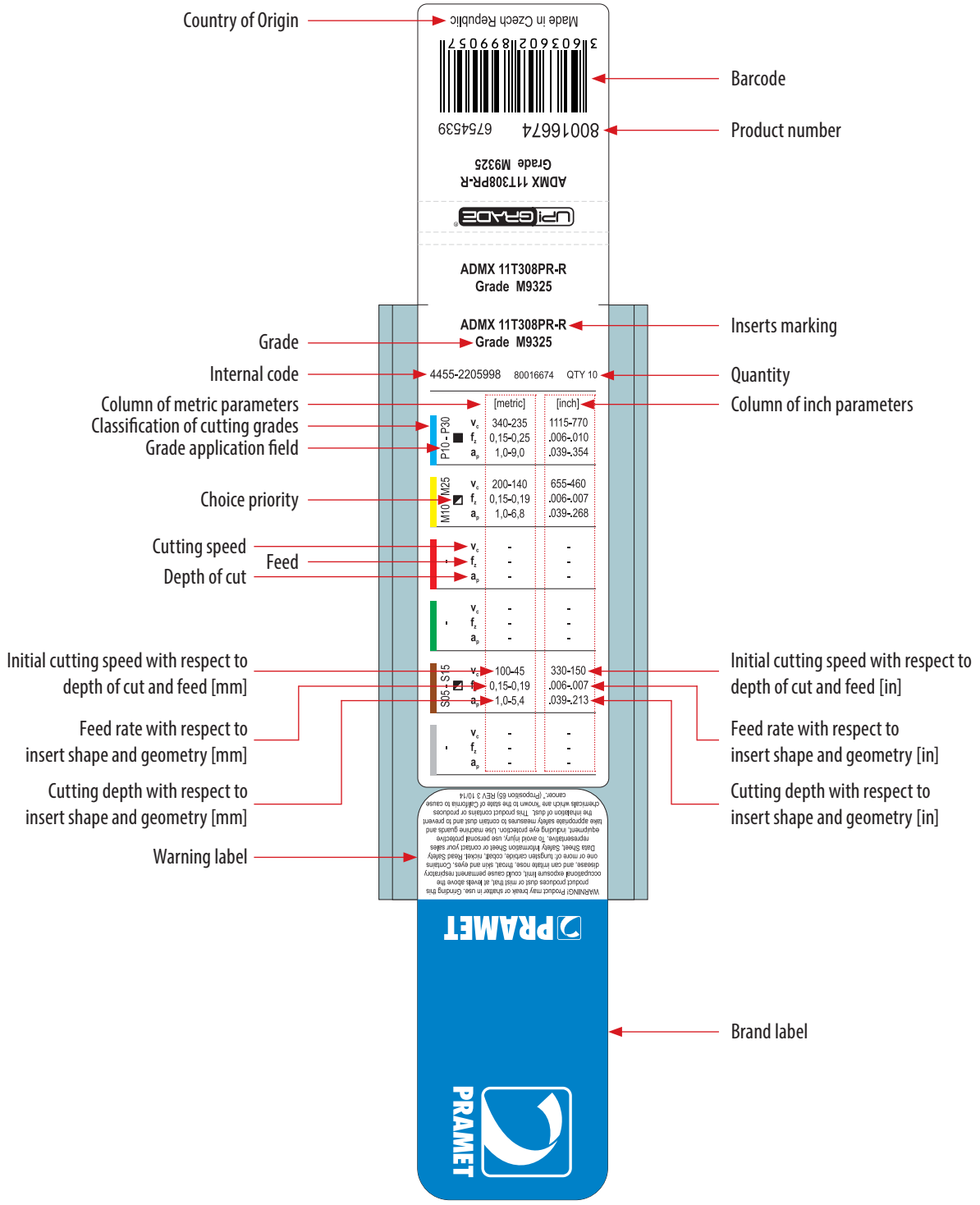
Torque handle 	Torque [Nm]	Thread of clamping screw
MR-0,8-2,0 vario	.8 - 2.0	M 2 - M 3
MR-1,0-5,0 vario	1.0 - 5.0	M 2,5 - M 5
MR-0,9 fix	.9	M 2
MR-2,0 fix	2.0	M 3
MR-3,0 fix	3.0	M 3,5
MR-3,5 fix	3.5	M 4
MR-5,0 fix	5.0	M 5

DRIVERS

Exchangeable driver 
D-T6
D-T6P
D-T7
D-T7P
D-T8
D-T8P
D-T9
D-T9P
D-T15
D-T15P
D-T20
D-T20P

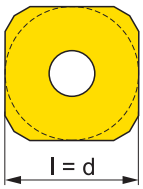
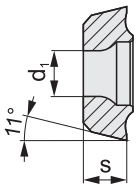
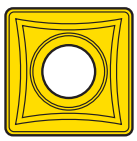
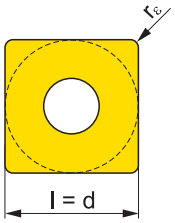
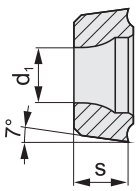
SCREW LUBRICATION

Owing to the high thermal stress on the clamping screws, it is advisable to lubricate them with a high-quality paste such as MOLYKOTE 100. This paste can be ordered in the same way as spare parts.

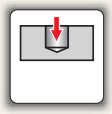
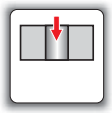
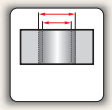
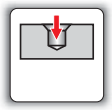
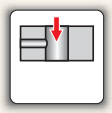
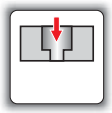
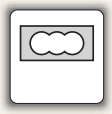
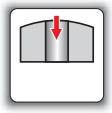

Country of Origin
Made in Czech Republic
Barcode
Product number
8001667 4 6754539
Grade M9325
ADMX 11T308PR-R
UPGRADE
ADMX 11T308PR-R
Grade M9325
Grade
Internal code
Column of metric parameters
Classification of cutting grades
Grade application field
Choice priority
Cutting speed
Feed
Depth of cut
ADMX 11T308PR-R
Grade M9325
4455-2205998 80016674 QTY 10
[metric] [inch]
P10 - P30
M10 M25
SD5 + S15
340-235 1115-770
0,15-0,25 .006-.010
1,0-9,0 .039-.354
200-140 655-460
0,15-0,19 .006-.007
1,0-6,8 .039-.268
100-45 330-150
0,15-0,19 .006-.007
1,0-5,4 .039-.213
Inserts marking
Quantity
Column of inch parameters
Initial cutting speed with respect to depth of cut and feed [mm]
Feed rate with respect to insert shape and geometry [mm]
Cutting depth with respect to insert shape and geometry [mm]
Warning label
Initial cutting speed with respect to depth of cut and feed [in]
Feed rate with respect to insert shape and geometry [in]
Cutting depth with respect to insert shape and geometry [in]
PRAMET
Brand label

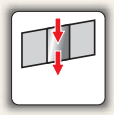
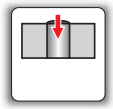
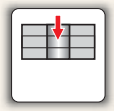
2015

DRILLING

2D	2D	3D	3D	4D	4D	SCET -UD	XPET -AP	Working length
								Picture
						-	-	Coolant
D8 – D9	D10 – D11	D12 – D13	D14 – D15	D16 – D17	D18 – D19	D21	D22	Page
802D (inch)	802D (metric)	803D (inch)	803D (metric)	804D (inch)	804D (metric)	-	-	Drill type
± .002	± .05	± .002	± .05	± .002	± .05			Drill tolerance
0 / + .008	0 / + .2	0 / + .012	0 / + .3	0 / + .016	0 / + .4	-	-	Hole tolerance *
Ra 80 – 240 µin	Ra 2 – 6 µm	Ra 80 – 240 µin	Ra 2 – 6 µm	Ra 80 – 240 µin	Ra 2 – 6 µm	-	-	Surface finish *
.594 – 2.000	15.0 – 40.0	.594 – 2.000	15.0 – 58.0	.594 – 2.000	17.0 – 58.0	-	-	Diameter range
  						■	■	P1
						■	■	P2
						■	■	P3
						■	■	P4
						■	■	M1
						■	■	M2
						□	□	M3
						□	□	M4
						■	■	K1
						■	■	K2
						■	■	K3
						■	■	K4
  						-	-	N1
						□	□	N2
						□	□	N3
						□	□	N4
						-	-	S1
						□	□	S2
						□	□	S3
						□	□	S4
						■	■	H1
						■	■	H2
						□	□	H3
						□	□	H4

* The tolerance of drilled hole and surface finish are heavily dependent on machining conditions.

Symbol	Description
	Blind hole drilling
	Through hole drilling
	Adjustable drill diameter
	Drilling into center drilled hole
	Drilling across an existing hole
	Boring
	Interrupted cut or plunging
	Drilling on curved surface

Symbol	Description
	Drilling on angled surface
	Welded joint drilling
	Drilling of stacked materials
	Cutting material
	Type of shank - universal
	Approximate working length
	Internal Coolant
	Type of tool - drill

NOTES

802D (inch)

D8

802D (metric)

D10

803D (inch)

D12

803D (metric)

D14

804D (inch)

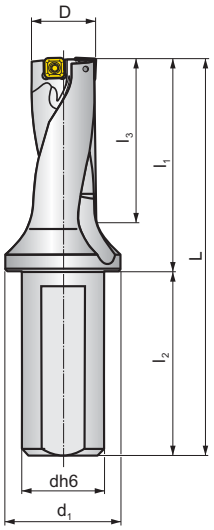
D16

804D (metric)

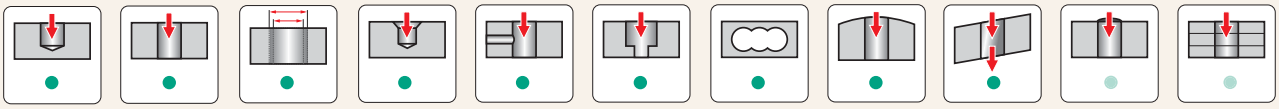
D18

TYPE 802D (INCH)

See page D20



Other versions available on request.



● Recommended application ● Possible applications (see more on pg. D27) ○ Not recommended

D [in]	h [in]	Designation	Assortment	Dimensions [in] L	l_1	l_2	l_3	dh6	d_1	Centre insert XPET	Peripheral insert SCET	Radial adjustment [in] -	+
.594	1.188	**802D-0594-118-S100**	●	4.417	2.173	2.244	1.346	1.000	1.378	0502AP	0502..	.012	.012
.625	1.250	**802D-0625-125-S100**	●	4.480	2.236	2.244	1.425	1.000	1.378	0502AP	0502..	.006	.016
.656	1.312	**802D-0656-131-S100**	●	4.539	2.295	2.244	1.500	1.000	1.378	0502AP	0502..	.006	.016
.687	1.374	**802D-0687-137-S100**	●	4.602	2.358	2.244	1.559	1.000	1.378	0602AP	0502..	.020	.020
.709	1.418	**802D-0709-141-S100**	●	4.646	2.402	2.244	1.614	1.000	1.378	0602AP	0502..	.014	.008
.750	1.500	**802D-0750-150-S100**	●	4.728	2.484	2.244	1.677	1.000	1.378	0602AP	0502..	.012	.014
.766	1.532	**802D-0766-153-S100**	●	4.760	2.516	2.244	1.717	1.000	1.378	0602AP	0602..	.008	.020
.787	1.574	**802D-0787-157-S100**	●	4.803	2.559	2.244	1.772	1.000	1.378	0602AP	0602..	.008	.020
.812	1.624	**802D-0812-162-S100**	●	4.850	2.606	2.244	1.831	1.000	1.378	0602AP	0602..	.004	.019
.827	1.654	**802D-0827-165-S100**	●	4.882	2.638	2.244	1.870	1.000	1.378	0602AP	0602..	.004	.019
.875	1.750	**802D-0875-175-S100**	●	4.976	2.732	2.244	1.992	1.000	1.378	0703AP	0602..	.011	.019
.906	1.812	**802D-0906-181-S100**	●	5.039	2.795	2.244	2.067	1.000	1.378	0703AP	0703..	.008	.019
.922	1.844	**802D-0922-184-S100**	●	5.071	2.827	2.244	2.106	1.000	1.378	0703AP	0703..	.008	.019
.937	1.874	**802D-0937-187-S100**	●	5.102	2.858	2.244	2.146	1.000	1.378	0703AP	0703..	.004	.019
.984	1.969	**802D-0984-196-S125**	●	5.315	2.953	2.362	2.165	1.250	1.654	0703AP	0703..	.004	.019
1.000	2.000	**802D-1000-200-S125**	●	5.346	2.984	2.362	2.205	1.250	1.654	0703AP	0703..	.004	.019
1.032	2.064	**802D-1032-206-S125**	●	5.409	3.047	2.362	2.283	1.250	1.654	0903AP	0703..	.004	.019
1.062	2.124	**802D-1062-212-S125**	●	5.469	3.106	2.362	2.358	1.250	1.654	0903AP	0703..	.020	.008
1.109	2.218	**802D-1109-221-S125**	●	5.563	3.201	2.362	2.476	1.250	1.654	0903AP	09T3..	.020	.014
1.125	2.250	**802D-1125-225-S125**	●	5.598	3.236	2.362	2.520	1.250	1.654	0903AP	09T3..	.020	.014
1.172	2.344	**802D-1172-234-S125**	●	5.689	3.327	2.362	2.634	1.250	1.654	0903AP	09T3..	.014	.020
1.187	2.374	**802D-1187-237-S125**	●	5.720	3.358	2.362	2.669	1.250	1.654	0903AP	09T3..	.014	.020

● stocked as standard / ○ non stocked as standard
See price list for current availability.

PRAMET

TYPE 802D (INCH)

D [in]	h [in]	Designation	Assortment	Dimensions [in]						Centre insert XPET	Peripheral insert SCET	Radial adjustment [in]	
				L	l_1	l_2	l_3	dh6	d_1			-	+
1.250	2.500	**802D-1250-250-S150**	●	6.122	3.484	2.638	2.669	1.500	1.969	11T3AP	09T3..	.006	.020
1.312	2.624	**802D-1312-262-S150**	●	6.244	3.606	2.638	2.827	1.500	1.969	11T3AP	09T3..	.020	.020
1.344	2.688	**802D-1344-268-S150**	●	6.311	3.673	2.638	2.906	1.500	1.969	11T3AP	09T3..	.020	.020
1.375	2.750	**802D-1375-275-S150**	●	6.370	3.732	2.638	2.945	1.500	1.969	11T3AP	1204..	.008	.020
1.437	2.874	**802D-1437-287-S150**	●	6.496	3.858	2.638	3.098	1.500	1.969	11T3AP	1204..	.004	.020
1.500	3.000	**802D-1500-300-S150**	●	6.622	3.984	2.638	3.256	1.500	1.969	11T3AP	1204..	.006	.020
1.750	3.500	**802D-1750-350-S150**	●	7.094	4.457	2.638	3.894	1.500	1.969	1504AP	1204..	.020	.020
2.000	4.000	**802D-2000-400-S150**	●	7.626	4.988	2.638	4.394	1.500	2.205	1504AP	1505..	.006	.020

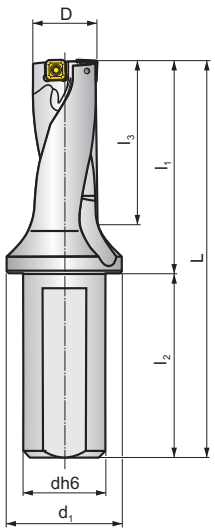
SPARE PARTS

Drill	Clamping screw - Centre insert	Clamping screw - Peripheral insert	Screwdriver
∅ **.594** - ∅ **.656**	US 2245-T07P	US 2245-T07P	FLAG T07P
∅ **.687** - ∅ **.750**	US 2205-T07P	US 2245-T07P	FLAG T07P
∅ **.766** - ∅ **.827**	US 2205-T07P	US 2205-T07P	FLAG T07P
∅ **.875**	US 2506-T07P	US 2506-T07P	FLAG T07P
∅ **.906** - ∅ **1.000**	US 2507-T08P	US 3007-T08P	FLAG T08P
∅ **1.032** - ∅ **1.062**	US 3007-T09P	US 3007-T09P	FLAG T09P
∅ **1.109** - ∅ **1.187**	US 3007-T09P	US 3009-T09P	FLAG T09P
∅ **1.250** - ∅ **1.344**	US 3510-T15P	US 3508-T15P	FLAG T15P
∅ **1.375** - ∅ **1.500**	US 3510-T15P	US 5012-T15P	FLAG T15P
∅ **1.750** - ∅ **2.000**	US 4011-T15P	US 5012-T15P	FLAG T15P

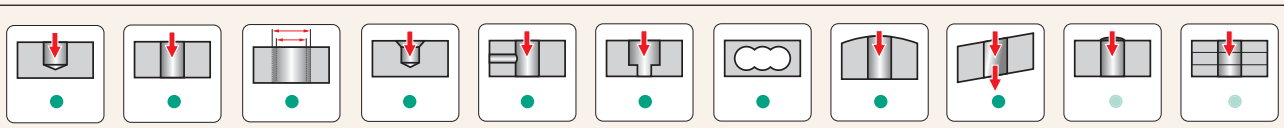
● stocked as standard / ○ non stocked as standard
See price list for current availability.

TYPE 802D (METRIC)

See page D20



Other versions available on request.



● Recommended application ● Possible applications (see more on pg. D27) ○ Not recommended

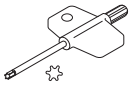
D [in]	D [mm]	h [mm]	Designation	Assortment	Dimensions [mm] L	l_1	l_2	l_3	dh6	d_1	Centre insert XPET	Peripheral insert SCET	Radial adjustment [mm] -	+
.591	15	30	**802D-15-30-S25**	●	111	55	56	34	25	35	0502AP	0502..	.25	.35
.630	16	32	**802D-16-32-S25**	●	113	57	56	36.5	25	35	0502AP	0502..	.15	.45
.669	17	34	**802D-17-34-S25**	●	115	59	56	39	25	35	0502AP	0502..	.10	.50
.709	18	36	**802D-18-36-S25**	●	117	61	56	41	25	35	0602AP	0502..	.35	.25
.748	19	38	**802D-19-38-S25**	●	119	63	56	43.5	25	35	0602AP	0502..	.15	.45
.787	20	40	**802D-20-40-S25**	●	121	65	56	45	25	35	0602AP	0602..	.10	.45
.827	21	42	**802D-21-42-S25**	●	123	67	56	47.5	25	35	0602AP	0602..	.10	.50
.866	22	44	**802D-22-44-S25**	●	125	69	56	50	25	35	0703AP	0602..	.45	.50
.906	23	46	**802D-23-46-S25**	●	127	71	56	52.5	25	35	0703AP	0703..	.35	.50
.945	24	48	**802D-24-48-S25**	●	129	73	56	55	25	35	0703AP	0703..	.15	.50
.984	25	50	**802D-25-50-S32**	●	135	75	60	55	32	42	0703AP	0703..	.15	.50
1.024	26	52	**802D-26-52-S32**	●	137	77	60	57.5	32	42	0703AP	0703..	.50	.15
1.063	27	54	**802D-27-54-S32**	●	139	79	60	60	32	42	0903AP	0703..	.50	.30
1.102	28	56	**802D-28-56-S32**	●	141	81	60	62.5	32	42	0903AP	09T3..	.30	.50
1.142	29	58	**802D-29-58-S32**	●	143	83	60	65	32	42	0903AP	09T3..	.20	.50
1.181	30	60	**802D-30-60-S32**	●	145	85	60	67.5	32	42	0903AP	09T3..	.15	.50
1.417	36	72	**802D-36-72-S32**	●	157	97	60	81.5	32	42	11T3AP	1204..	.10	.50
1.575	40	80	**802D-40-80-S32**	●	165	105	60	91.5	32	42	12T3AP	1204..	.20	.50

● stocked as standard / ○ non stocked as standard
See price list for current availability.

PRAMET

TYPE 802D (METRIC)

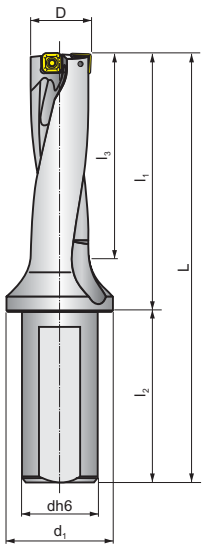
SPARE PARTS

Drill	Clamping screw - Centre insert 	Clamping screw - Peripheral insert 	Screwdriver 
∅**15** - ∅**17**	US 2245-T07P	US 2245-T07P	FLAG T07P
∅**17.5** - ∅**19**	US 2205-T07P	US 2245-T07P	FLAG T07P
∅**19.5** - ∅**21**	US 2205-T07P	US 2205-T07P	FLAG T07P
∅**21.5** - ∅**22**	US 2506-T07P	US 2506-T07P	FLAG T07P
∅**22.5** - ∅**26**	US 2507-T08P	US 3007-T08P	FLAG T08P
∅**26.5** - ∅**27**	US 3007-T09P	US 3007-T09P	FLAG T09P
∅**28** - ∅**31**	US 3007-T09P	US 3009-T09P	FLAG T09P
∅**35** - ∅**43**	US 3510-T15P	US 5012-T15P	FLAG T15P

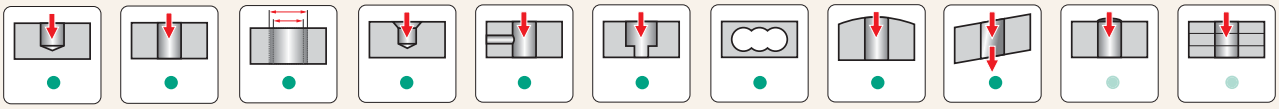
● stocked as standard / ○ non stocked as standard
See price list for current availability.

TYPE 803D (INCH)

See page D20



Other versions available on request.



● Recommended application ● Possible applications (see more on pg. D27) ○ Not recommended

D [in]	h [in]	Designation	Assortment	Dimensions [in]						Centre insert XPET	Peripheral insert SCET	Radial adjustment [in]	
				L	l_1	l_2	l_3	dh6	d_1			-	+
.594	1.783	**803D-0594-178-S100**	●	5.012	2.768	2.244	1.941	1.000	1.378	0502AP	0502..	.012	.012
.625	1.875	**803D-0625-187-S100**	●	5.102	2.858	2.244	2.047	1.000	1.378	0502AP	0502..	.006	.016
.656	1.969	**803D-0656-196-S100**	●	5.197	2.953	2.244	2.157	1.000	1.378	0502AP	0502..	.006	.016
.687	2.061	**803D-0687-206-S100**	●	5.287	3.043	2.244	2.244	1.000	1.378	0602AP	0502..	.020	.020
.709	2.127	**803D-0709-212-S100**	●	5.354	3.110	2.244	2.323	1.000	1.378	0602AP	0502..	.014	.008
.750	2.250	**803D-0750-225-S100**	●	5.476	3.232	2.244	2.425	1.000	1.378	0602AP	0502..	.012	.014
.766	2.298	**803D-0766-229-S100**	●	5.528	3.283	2.244	2.484	1.000	1.378	0602AP	0602..	.008	.020
.787	2.361	**803D-0787-236-S100**	●	5.591	3.346	2.244	2.559	1.000	1.378	0602AP	0602..	.008	.020
.812	2.436	**803D-0812-243-S100**	●	5.665	3.421	2.244	2.646	1.000	1.378	0602AP	0602..	.004	.019
.827	2.481	**803D-0827-248-S100**	●	5.709	3.465	2.244	2.697	1.000	1.378	0602AP	0602..	.004	.019
.875	2.625	**803D-0875-262-S100**	●	5.854	3.610	2.244	2.866	1.000	1.378	0703AP	0602..	.011	.019
.906	2.718	**803D-0906-271-S100**	●	5.945	3.701	2.244	2.972	1.000	1.378	0703AP	0703..	.008	.019
.922	2.766	**803D-0922-276-S100**	●	5.996	3.752	2.244	3.031	1.000	1.378	0703AP	0703..	.008	.019
.937	2.811	**803D-0937-281-S100**	●	6.039	3.795	2.244	3.083	1.000	1.378	0703AP	0703..	.004	.019
.984	2.952	**803D-0984-295-S125**	●	6.299	3.937	2.362	3.150	1.250	1.654	0703AP	0703..	.004	.019
1.000	3.000	**803D-1000-300-S125**	●	6.346	3.984	2.362	3.205	1.250	1.654	0703AP	0703..	.004	.019
1.032	3.096	**803D-1032-310-S125**	●	6.441	4.079	2.362	3.315	1.250	1.654	0903AP	0703..	.004	.019
1.062	3.186	**803D-1062-318-S125**	●	6.531	4.169	2.362	3.421	1.250	1.654	0903AP	0703..	.020	.008
1.109	3.327	**803D-1109-332-S125**	●	6.673	4.311	2.362	3.587	1.250	1.654	0903AP	09T3..	.020	.014
1.125	3.375	**803D-1125-337-S125**	●	6.720	4.358	2.362	3.642	1.250	1.654	0903AP	09T3..	.020	.014
1.172	3.516	**803D-1172-351-S125**	●	6.862	4.500	2.362	3.807	1.250	1.654	0903AP	09T3..	.014	.020
1.187	3.561	**803D-1187-356-S125**	●	6.906	4.543	2.362	3.858	1.250	1.654	0903AP	09T3..	.014	.020

● stocked as standard / ○ non stocked as standard
See price list for current availability.

PRAMET

TYPE 803D (INCH)

D [in]	h [in]	Designation	Assortment	Dimensions [in]						Centre insert XPET	Peripheral insert SCET	Radial adjustment [in]	
				L	l_1	l_2	l_3	dh6	d_1			-	+
1.250	3.750	**803D-1250-375-S150**	●	7.370	4.732	2.638	3.921	1.500	1.969	11T3AP	09T3..	.006	.020
1.312	3.936	**803D-1312-393-S150**	●	7.559	4.921	2.638	4.138	1.500	1.969	11T3AP	09T3..	.020	.020
1.344	4.032	**803D-1344-403-S150**	●	7.654	5.016	2.638	4.252	1.500	1.969	11T3AP	09T3..	.020	.020
1.375	4.125	**803D-1375-412-S150**	●	7.748	5.110	2.638	4.319	1.500	1.969	11T3AP	1204..	.008	.020
1.437	4.311	**803D-1437-431-S150**	●	7.933	5.295	2.638	4.535	1.500	1.969	11T3AP	1204..	.004	.020
1.500	4.500	**803D-1500-450-S150**	●	8.122	5.484	2.638	4.756	1.500	1.969	11T3AP	1204..	.006	.020
1.750	5.250	**803D-1750-525-S150**	●	8.843	6.205	2.638	5.642	1.500	1.969	1504AP	1204..	.020	.020
2.000	6.000	**803D-2000-600-S150**	●	9.626	6.988	2.638	6.394	1.500	2.205	1504AP	1505..	.006	.020

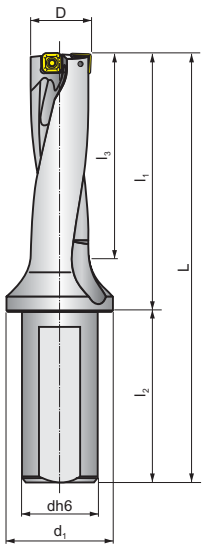
SPARE PARTS

Drill	Clamping screw - Centre insert	Clamping screw - Peripheral insert	Screwdriver
∅ **.594** - ∅ **.656**	US 2245-T07P	US 2245-T07P	FLAG T07P
∅ **.687** - ∅ **.750**	US 2205-T07P	US 2245-T07P	FLAG T07P
∅ **.766** - ∅ **.827**	US 2205-T07P	US 2205-T07P	FLAG T07P
∅ **.875**	US 2506-T07P	US 2506-T07P	FLAG T07P
∅ **.906** - ∅ **1.000**	US 2507-T08P	US 3007-T08P	FLAG T08P
∅ **1.032** - ∅ **1.062**	US 3007-T09P	US 3007-T09P	FLAG T09P
∅ **1.109** - ∅ **1.187**	US 3007-T09P	US 3009-T09P	FLAG T09P
∅ **1.250** - ∅ **1.344**	US 3510-T15P	US 3508-T15P	FLAG T15P
∅ **1.375** - ∅ **1.500**	US 3510-T15P	US 5012-T15P	FLAG T15P
∅ **1.750** - ∅ **2.000**	US 4011-T15P	US 5012-T15P	FLAG T15P

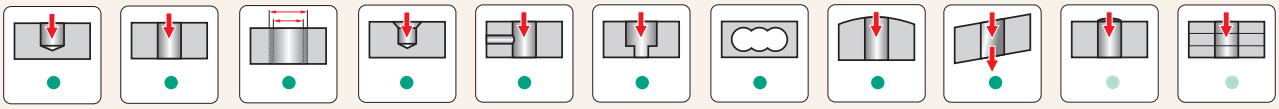
● stocked as standard / ○ non stocked as standard
See price list for current availability.

TYPE 803D (METRIC)

See page D20



Other versions available on request.



● Recommended application ● Possible applications (see more on pg. D27) ○ Not recommended

D [in]	D [mm]	h [mm]	Designation	Assortment	Dimensions [mm] L	l_1	l_2	l_3	dh6	d_1	Centre insert XPET	Peripheral insert SCET	Radial adjustment [mm] -	+
.591	15	45	**803D-15-45-S25**	●	126	70	56	49	25	35	0502AP	0502..	.25	.35
.610	15.5	46.5	**803D-15.5-46.5-S25**	●	127.5	71.5	56	5.8	25	35	0502AP	0502..	.30	.35
.630	16	48	**803D-16-48-S25**	●	129	73	56	52.5	25	35	0502AP	0502..	.15	.45
.650	16.5	49.5	**803D-16.5-49.5-S25**	●	13.5	74.5	56	54.2	25	35	0502AP	0502..	.15	.40
.669	17	51	**803D-17-51-S25**	●	132	76	56	56	25	35	0502AP	0502..	.10	.50
.689	17.5	52.5	**803D-17.5-52.5-S25**	●	133.5	77.5	56	57.2	25	35	0602AP	0502..	.50	.50
.709	18	54	**803D-18-54-S25**	●	135	79	56	59	25	35	0602AP	0502..	.35	.25
.728	18.5	55.5	**803D-18.5-55.5-S25**	●	136.5	8.5	56	6.7	25	35	0602AP	0502..	.35	.25
.748	19	57	**803D-19-57-S25**	●	138	82	56	62.5	25	35	0602AP	0502..	.15	.45
.768	19.5	58.5	**803D-19.5-58.5-S25**	●	139.5	83.5	56	63.2	25	35	0602AP	0602..	.25	.40
.787	20	60	**803D-20-60-S25**	●	141	85	56	65	25	35	0602AP	0602..	.10	.45
.807	2.5	61.5	**803D-2.5-61.5-S25**	●	142.5	86.5	56	66.7	25	35	0602AP	0602..	.10	.50
.827	21	63	**803D-21-63-S25**	●	144	88	56	68.5	25	35	0602AP	0602..	.10	.50
.846	21.5	64.5	**803D-21.5-64,5-S25**	●	145.5	89.5	56	7.2	25	35	0703AP	0602..	.35	.50
.866	22	66	**803D-22-66-S25**	●	147	91	56	72	25	35	0703AP	0602..	.45	.50
.886	22.5	67.5	**803D-22.5-67.5-S25**	●	148.5	92.5	56	73.8	25	35	0703AP	0703..	.35	.50
.906	23	69	**803D-23-69-S25**	●	150	94	56	75.5	25	35	0703AP	0703..	.35	.50
.925	23.5	7.5	**803D-23.5-7.5-S25**	●	151.5	95.5	56	77.2	25	35	0703AP	0703..	.10	.50
.945	24	72	**803D-24-72-S25**	●	153	97	56	79	25	35	0703AP	0703..	.15	.50
.965	24.5	73.5	**803D-24.5-73.5-S25**	●	154.5	98.5	56	8.8	25	35	0703AP	0703..	.10	.50
.984	25	75	**803D-25-75-S32**	●	160	100	60	80	32	42	0703AP	0703..	.15	.50
1.004	25.5	76.5	**803D-25.5-76.5-S32**	●	161.5	101.5	60	81.8	32	42	0703AP	0703..	.50	.10

● stocked as standard / ○ non stocked as standard
See price list for current availability.

TYPE 803D (METRIC)

D [in]	D [mm]	h [mm]	Designation	Assortment	Dimensions [mm]						Centre insert XPET	Peripheral insert SCET	Radial adjustment [mm]	
					L	l_1	l_2	l_3	dh6	d_1			-	+
1.024	26	78	**803D-26-78-S32**	●	163	103	60	83.5	32	42	0703AP	0703..	0.50	0.15
1.043	26.5	79.5	**803D-26,5-79,5-S32**	●	164.5	104.5	60	85.2	32	42	0903AP	0703..	0.50	0.10
1.063	27	81	**803D-27-81-S32**	●	166	106	60	87	32	42	0903AP	0703..	0.50	0.30
1.102	28	84	**803D-28-84-S32**	●	169	109	60	90.5	32	42	0903AP	09T3..	0.30	0.50
1.142	29	87	**803D-29-87-S32**	●	172	112	60	94	32	42	0903AP	09T3..	0.20	0.50
1.181	30	90	**803D-30-90-S32**	●	175	115	60	97.5	32	42	0903AP	09T3..	0.15	0.50
1.378	35	105	**803D-35-105-S32**	●	190	130	60	114	32	42	11T3AP	1204..	0.25	0.50
1.575	40	120	**803D-40-120-S32**	●	205	145	60	131.5	32	42	12T3AP	1204..	0.20	0.50

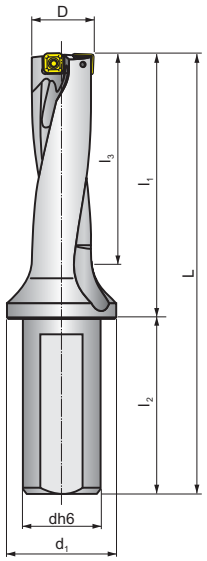
SPARE PARTS

Drill	Clamping screw - Centre insert	Clamping screw - Peripheral insert	Screwdriver
∅**15** - ∅**17**	US 2245-T07P	US 2245-T07P	FLAG T07P
∅**17.5** - ∅**19**	US 2205-T07P	US 2245-T07P	FLAG T07P
∅**19.5** - ∅**21**	US 2205-T07P	US 2205-T07P	FLAG T07P
∅**21.5** - ∅**22**	US 2506-T07P	US 2506-T07P	FLAG T07P
∅**22.5** - ∅**26**	US 2507-T08P	US 3007-T08P	FLAG T08P
∅**26.5** - ∅**27**	US 3007-T09P	US 3007-T09P	FLAG T09P
∅**28** - ∅**31**	US 3007-T09P	US 3009-T09P	FLAG T09P
∅**35** - ∅**43**	US 3510-T15P	US 5012-T15P	FLAG T15P

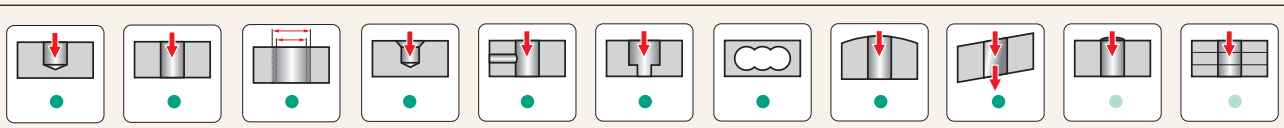
● stocked as standard / ○ non stocked as standard
See price list for current availability.

TYPE 804D (INCH)

See page D20



Other versions available on request.



● Recommended application ● Possible applications (see more on pg. D27) ○ Not recommended

D [in]	h [in]	Designation	Assortment	Dimensions [in] L	l_1	l_2	l_3	dh6	d_1	Centre insert XPET	Peripheral insert SCET	Radial adjustment [in] -	+
.594	2.376	**804D-0594-237-S100**	●	5.606	3.362	2.244	2.535	1.000	1.378	0502AP	0502..	.012	.012
.625	2.500	**804D-0625-250-S100**	●	5.728	3.484	2.244	2.673	1.000	1.378	0502AP	0502..	.006	.016
.656	2.624	**804D-0656-262-S100**	●	5.850	3.587	2.244	2.811	1.000	1.378	0502AP	0502..	.006	.016
.687	2.748	**804D-0687-274-S100**	●	5.976	3.732	2.244	2.933	1.000	1.378	0602AP	0502..	.020	.020
.709	2.836	**804D-0709-283-S100**	●	6.063	3.819	2.244	3.031	1.000	1.378	0602AP	0502..	.014	.008
.750	3.000	**804D-0750-300-S100**	●	6.228	3.984	2.244	3.217	1.000	1.378	0602AP	0502..	.012	.014
.766	3.064	**804D-0766-306-S100**	●	6.291	4.047	2.244	3.248	1.000	1.378	0602AP	0602..	.008	.020
.787	3.148	**804D-0787-314-S100**	●	6.378	4.134	2.244	3.346	1.000	1.378	0602AP	0602..	.008	.020
.812	3.248	**804D-0812-324-S100**	●	6.476	4.232	2.244	3.457	1.000	1.378	0602AP	0602..	.004	.019
.827	3.308	**804D-0827-330-S100**	●	6.535	4.291	2.244	3.524	1.000	1.378	0602AP	0602..	.004	.019
.875	3.500	**804D-0875-350-S100**	●	6.728	4.484	2.244	3.740	1.000	1.378	0703AP	0602..	.011	.019
.906	3.624	**804D-0906-362-S100**	●	6.850	4.606	2.244	3.878	1.000	1.378	0703AP	0703..	.008	.019
.922	3.688	**804D-0922-368-S100**	●	6.917	4.673	2.244	3.953	1.000	1.378	0703AP	0703..	.008	.019
.937	3.748	**804D-0937-374-S100**	●	6.976	4.732	2.244	4.020	1.000	1.378	0703AP	0703..	.004	.019
.984	3.936	**804D-0984-393-S125**	●	7.283	4.921	2.362	4.134	1.250	1.654	0703AP	0703..	.004	.019
1.000	4.000	**804D-1000-400-S125**	●	7.346	4.984	2.362	4.205	1.250	1.654	0703AP	0703..	.004	.019
1.032	4.128	**804D-1032-412-S125**	●	7.476	5.114	2.362	4.350	1.250	1.654	0903AP	0703..	.004	.019
1.062	4.248	**804D-1062-424-S125**	●	7.594	5.232	2.362	4.248	1.250	1.654	0903AP	0703..	.020	.008
1.109	4.437	**804D-1109-443-S125**	●	7.783	5.421	2.362	4.697	1.250	1.654	0903AP	09T3..	.020	.014
1.125	4.500	**804D-1125-450-S125**	●	7.846	5.484	2.362	4.768	1.250	1.654	0903AP	09T3..	.020	.014
1.172	4.688	**804D-1172-468-S125**	●	8.035	5.673	2.362	4.980	1.250	1.654	0903AP	09T3..	.014	.020
1.187	4.748	**804D-1187-474-S125**	●	8.094	5.732	2.362	5.043	1.250	1.654	0903AP	09T3..	.014	.020

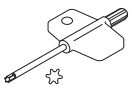
● stocked as standard / ○ non stocked as standard
See price list for current availability.

PRAMET

TYPE 804D (INCH)

D [in]	h [in]	Designation	Assortment	Dimensions [in]						Centre insert XPET	Peripheral insert SCET	Radial adjustment [in]	
				L	l_1	l_2	l_3	dh6	d_1			-	+
1.250	5.000	**804D-1250-500-S150**	●	8.622	5.984	2.638	5.169	1.500	1.969	11T3AP	09T3..	.006	.020
1.312	5.248	**804D-1312-524-S150**	●	8.870	6.232	2.638	5.449	1.500	1.969	11T3AP	09T3..	.020	.020
1.344	5.374	**804D-1344-537-S150**	●	8.996	6.358	2.638	5.594	1.500	1.969	11T3AP	09T3..	.020	.020
1.375	5.500	**804D-1375-550-S150**	●	9.122	6.484	2.638	5.693	1.500	1.969	11T3AP	1204..	.008	.020
1.437	5.748	**804D-1437-574-S150**	●	9.370	6.732	2.638	5.748	1.500	1.969	11T3AP	1204..	.004	.020
1.500	6.000	**804D-1500-600-S150**	●	9.622	6.984	2.638	6.256	1.500	1.969	11T3AP	1204..	.006	.020
1.750	7.000	**804D-1750-700-S150**	●	10.622	7.984	2.638	7.421	1.500	1.969	1504AP	1204..	.020	.020
2.000	8.000	**804D-2000-800-S150**	●	11.622	8.984	2.638	8.390	1.500	2.205	1504AP	1505..	.006	.020

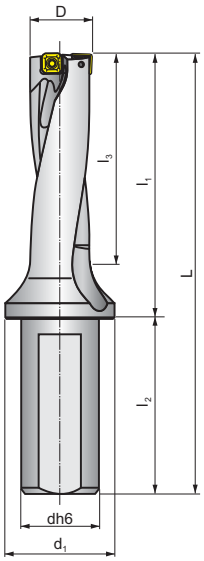
SPARE PARTS

Drill	Clamping screw - Centre insert	Clamping screw - Peripheral insert	Screwdriver
			
∅ **.594** - ∅ **.656**	US 2245-T07P	US 2245-T07P	FLAG T07P
∅ **.687** - ∅ **.750**	US 2205-T07P	US 2245-T07P	FLAG T07P
∅ **.766** - ∅ **.827**	US 2205-T07P	US 2205-T07P	FLAG T07P
∅ **.875**	US 2506-T07P	US 2506-T07P	FLAG T07P
∅ **.906** - ∅ **1.000**	US 2507-T08P	US 3007-T08P	FLAG T08P
∅ **1.032** - ∅ **1.062**	US 3007-T09P	US 3007-T09P	FLAG T09P
∅ **1.109** - ∅ **1.187**	US 3007-T09P	US 3009-T09P	FLAG T09P
∅ **1.250** - ∅ **1.344**	US 3510-T15P	US 3508-T15P	FLAG T15P
∅ **1.375** - ∅ **1.500**	US 3510-T15P	US 5012-T15P	FLAG T15P
∅ **1.750** - ∅ **2.000**	US 4011-T15P	US 5012-T15P	FLAG T15P

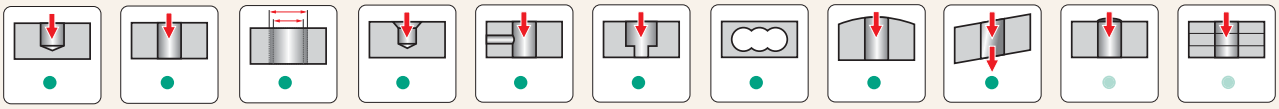
● stocked as standard / ○ non stocked as standard
See price list for current availability.

TYPE 804D (METRIC)

See page D20



Other versions available on request.



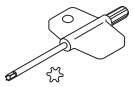
● Recommended application ● Possible applications (see more on pg. D27) ○ Not recommended

D [in]	D [mm]	h [mm]	Designation	Assortment	Dimensions [mm] L	l_1	l_2	l_3	dh6	d_1	Centre insert XPET	Peripheral insert SCET	Radial adjustment [mm] -	+
.669	17	68	**804D-17-68-S25**	●	149	93	56	73	25	35	0502AP	0502..	0.10	0.50
.709	18	72	**804D-18-72-S25**	●	153	97	56	77	25	35	0602AP	0502..	0.35	0.25
.748	19	76	**804D-19-76-S25**	●	157	101	56	81.5	25	35	0602AP	0502..	0.15	0.45
.787	20	80	**804D-20-80-S25**	●	161	105	56	85	25	35	0602AP	0602..	0.10	0.45
.827	21	84	**804D-21-84-S25**	●	165	109	56	89.5	25	35	0602AP	0602..	0.10	0.50
.866	22	88	**804D-22-88-S25**	●	169	113	56	94	25	35	0703AP	0602..	0.45	0.50
.906	23	92	**804D-23-92-S25**	●	173	117	56	98.5	25	35	0703AP	0703..	0.35	0.50
.945	24	96	**804D-24-96-S25**	●	177	121	56	103	25	35	0703AP	0703..	0.15	0.50
.984	25	100	**804D-25-100-S32**	●	185	125	60	105	32	42	0703AP	0703..	0.15	0.50
1.024	26	104	**804D-26-104-S32**	●	189	129	60	109.5	32	42	0703AP	0703..	0.50	0.15
1.063	27	108	**804D-27-108-S32**	●	193	133	60	114	32	42	0903AP	0703..	0.50	0.30
1.102	28	112	**804D-28-112-S32**	●	197	137	60	118.5	32	42	0903AP	09T3..	0.30	0.50
1.142	29	116	**804D-29-116-S32**	●	201	141	60	123	32	42	0903AP	09T3..	0.20	0.50
1.181	30	120	**804D-30-120-S32**	●	205	145	60	127.5	32	42	0903AP	09T3..	0.15	0.50
1.378	35	140	**804D-35-140-S32**	●	225	165	60	149	32	42	11T3AP	1204..	0.25	0.50
1.575	40	160	**804D-40-160-S32**	●	245	185	60	171.5	32	42	12T3AP	1204..	0.20	0.50

● stocked as standard / ○ non stocked as standard
See price list for current availability.

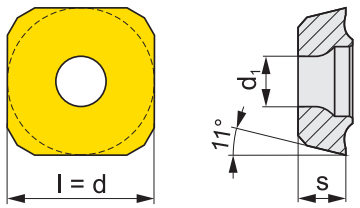
TYPE 804D (METRIC)

SPARE PARTS

Drill	Clamping screw - Centre insert 	Clamping screw - Peripheral insert 	Screwdriver 
∅**15** - ∅**17**	US 2245-T07P	US 2245-T07P	FLAG T07P
∅**17.5** - ∅**19**	US 2205-T07P	US 2245-T07P	FLAG T07P
∅**19.5** - ∅**21**	US 2205-T07P	US 2205-T07P	FLAG T07P
∅**21.5** - ∅**22**	US 2506-T07P	US 2506-T07P	FLAG T07P
∅**22.5** - ∅**26**	US 2507-T08P	US 3007-T08P	FLAG T08P
∅**26.5** - ∅**27**	US 3007-T09P	US 3007-T09P	FLAG T09P
∅**28** - ∅**31**	US 3007-T09P	US 3009-T09P	FLAG T09P
∅**35** - ∅**43**	US 3510-T15P	US 5012-T15P	FLAG T15P

● stocked as standard / ○ non stocked as standard
See price list for current availability.

XPET

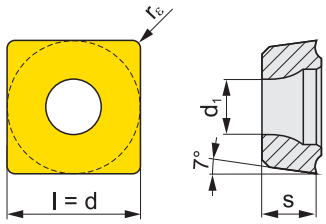


Dimensions	l	d	d_1	s		
0502	.219	.219	.094	.094		
0602	.250	.250	.094	.102		
0703	.312	.312	.125	.114		
0903	.375	.375	.125	.138		
11T3	.453	.453	.156	.154		
12T3	.500	.500	.156	.154		
1504	.625	.625	.187	.177		
1904	.750	.750	.187	.177		

All dimension [in].

Chip breaker	ISO	Grades																
		D8345																
	XPET 0502AP	●																
	XPET 0602AP	●																
	XPET 0703AP	●																
	XPET 0903AP	●																
	XPET 11T3AP	●																
	XPET 12T3AP	●																
	XPET 1504AP	●																
	XPET 1904AP	●																

SCET



Dimensions	l	d	d_1	s		
0502	.219	.219	.094	.094		
0602	.250	.250	.094	.114		
0703	.312	.312	.125	.138		
09T3	.375	.375	.156	.177		
1204	.500	.500	.187	.220		
1505	.625	.625	.219	.220		

All dimension [in].

Chip breaker	ISO	Grades																Radius
		D8330	D9335															r_ε
	SCET 050204-UD	●	●															.016
	SCET 060204-UD	●	●															.016
	SCET 070308-UD	●	●															.031
	SCET 09T308-UD	●	●															.031
	SCET 120408-UD	●	●															.031
	SCET 150512-UD	●	●															.047

● stocked as standard / ○ non stocked as standard
See price list for current availability.

TECHNICAL INFORMATION

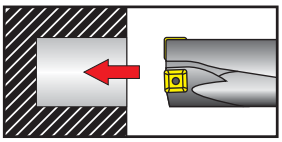
802D, 803D

Workpiece material group	D9335		D8330		D8345	Feed f [in.rev^{-1}]					
		V_c [ft.min^{-1}]		V_c [ft.min^{-1}]		∅ .5905	∅ .7875	∅ .9845	∅ 1.181	∅ 1.575	∅ 2.2835
P1	■	1100	■	885	■	.0028	.0032	.0036	.0040	.0047	.0063
P2	■	820	■	655	■	.0044	.0051	.0059	.0067	.0083	.0110
P3	■	655	■	525	■	.0051	.0059	.0071	.0079	.0095	.0126
P4	■	490	■	395	■	.0047	.0055	.0063	.0071	.0087	.0118
M1	■	460	■	425	■	.0047	.0055	.0063	.0071	.0087	.0118
M2	■	445	■	410	■	.0044	.0051	.0059	.0067	.0083	.0110
M3	□	410	□	375	□	.0028	.0032	.0036	.0040	.0047	.0063
M4	□	395	□	360	□	.0028	.0032	.0036	.0040	.0047	.0063
K1	■	625	■	490	■	.0055	.0063	.0075	.0083	.0103	.0134
K2	■	605	■	475	■	.0055	.0063	.0075	.0083	.0103	.0134
K3	■	575	■	445	■	.0055	.0063	.0075	.0083	.0103	.0134
K4	■	540	■	425	■	.0055	.0063	.0075	.0083	.0103	.0134
N1	-	-	-	-	-	-	-	-	-	-	-
N2	□	970	□	855	□	.0051	.0059	.0071	.0079	.0095	.0126
N3	□	885	□	785	□	.0051	.0059	.0071	.0079	.0095	.0126
N4	□	590	□	525	□	.0047	.0055	.0063	.0071	.0087	.0118
S1	-	-	-	-	-	-	-	-	-	-	-
S2	□	150	□	130	□	.0032	.0036	.0040	.0044	.0055	.0071
S3	□	115	□	100	□	.0028	.0032	.0036	.0040	.0047	.0063
S4	□	100	□	80	□	.0028	.0032	.0036	.0040	.0047	.0063
H1	■	195	■	180	■	.0036	.0044	.0047	.0055	.0067	.0091
H2	■	180	■	165	■	.0036	.0040	.0044	.0051	.0063	.0083
H3	□	165	□	150	□	.0032	.0036	.0040	.0044	.0055	.0071
H4	□	165	□	150	□	.0028	.0032	.0036	.0040	.0047	.0063

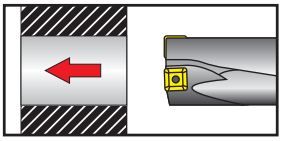
804D

Workpiece material group	D9335		D8330		D8345	Feed f [in.rev^{-1}]					
		V_c [ft.min^{-1}]		V_c [ft.min^{-1}]		∅ .5905	∅ .7875	∅ .9845	∅ 1.181	∅ 1.575	∅ 2.2835
P1	■	1100	■	885	■	.0024	.0028	.0032	.0036	.0040	.0055
P2	■	820	■	655	■	.0040	.0047	.0055	.0063	.0075	.0099
P3	■	655	■	525	■	.0047	.0055	.0063	.0071	.0087	.0118
P4	■	490	■	395	■	.0044	.0051	.0059	.0067	.0083	.0110
M1	■	460	■	425	■	.0044	.0051	.0059	.0067	.0083	.0110
M2	■	445	■	410	■	.0040	.0047	.0055	.0063	.0075	.0099
M3	□	410	□	375	□	.0024	.0028	.0032	.0036	.0040	.0055
M4	□	395	□	360	□	.0024	.0028	.0032	.0036	.0040	.0055
K1	■	625	■	490	■	.0051	.0059	.0071	.0079	.0095	.0126
K2	■	605	■	475	■	.0051	.0059	.0071	.0079	.0095	.0126
K3	■	575	■	445	■	.0051	.0059	.0071	.0079	.0095	.0126
K4	■	540	■	425	■	.0051	.0059	.0071	.0079	.0095	.0126
N1	-	-	-	-	-	-	-	-	-	-	-
N2	□	970	□	855	□	.0047	.0055	.0063	.0071	.0087	.0118
N3	□	885	□	785	□	.0047	.0055	.0063	.0071	.0087	.0118
N4	□	590	□	525	□	.0044	.0051	.0059	.0067	.0083	.0110
S1	-	-	-	-	-	-	-	-	-	-	-
S2	□	150	□	130	□	.0028	.0032	.0036	.0040	.0047	.0063
S3	□	115	□	100	□	.0024	.0028	.0032	.0036	.0040	.0055
S4	□	100	□	80	□	.0024	.0028	.0032	.0036	.0040	.0055
H1	■	195	■	180	■	.0036	.0040	.0044	.0051	.0063	.0083
H2	■	180	■	165	■	.0032	.0036	.0040	.0044	.0055	.0071
H3	□	165	□	150	□	.0028	.0032	.0036	.0040	.0047	.0063
H4	□	165	□	150	□	.0024	.0028	.0032	.0036	.0040	.0055

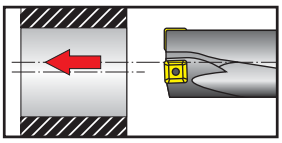
Clamping screw	Torque [lbf.ft]	Screwdriver	Clamping screw	
			Thread	Lenght [in]
US 2505-T08P	.89	FLAG T08P	M 2,5	.20
US 2505-T08P	.89	FLAG T08P	M 2,5	.20
US 4008-T15P	2.58	FLAG T15P	M 4	.31
US 4011-T15P	2.58	FLAG T15P	M 4	.43
US 4008-T15P	2.58	FLAG T15P	M 4	.31
US 63511D-T15P	2.21	FLAG T15P	M 3,5	.43
US 63511D-T15P	2.21	FLAG T15P	M 3,5	.43
US 2506-T07P	.89	FLAG T15P	M 2,5	.24
US 2506-T07P	.89	FLAG T15P	M 2,5	.24
US 4008-T15P	2.58	FLAG T15P	M 4	.31



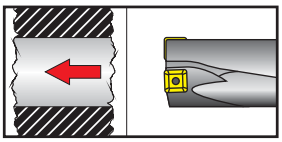
BLIND HOLE DRILLING
Do not use chamfer drills.



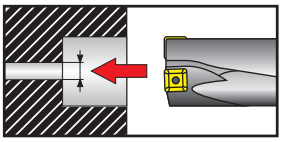
THROUGH HOLE DRILLING
Do not use chamfer drills.
A disc can be produced when the indexable drill exits the material, this disc can be ejected at high speed when the workpiece is rotating. It is essential that the machine is adequately guarded to ensure operator safety



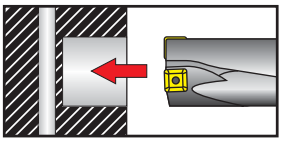
OFF-CENTER DRILLING
Decrease the feed for indexable drills.
Do not exceed radial adjustment values.



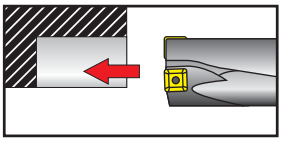
STARTING ON UNEVEN AND CAST SURFACES
Decrease the feed on entrance for indexable drills until both inserts are engaged.
Starting surface must be faced before using a solid drill.



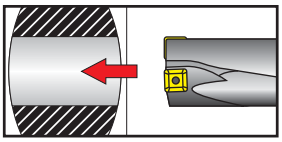
BORING AND DRILLING INTO CENTER DRILLED HOLE
If a pre-drilled hole is larger than 1/4 drill diameter, decrease the feed.



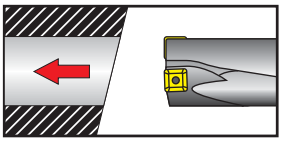
DRILLING ACROSS AN EXISTING HOLE
Decrease the feed when drilling across an existing hole.



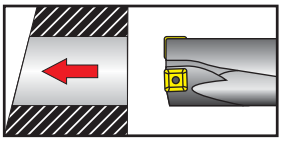
INTERRUPTED CUT AND PLUNGING
Decrease the feed for indexable drills.



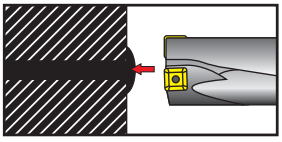
DRILLING ON CURVED SURFACE
Centered drilling can be started with reduced feed rate.
Spot facing is required for solid drills when the point for starting the hole is outside the radius center.



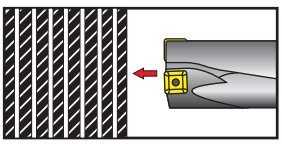
STARTING ON ANGLED SURFACE
Decrease the feed on entrance for indexable drills until both inserts are engaged if angle of entrance is more than 5°.



ANGLED BORE EXIT
Decrease the feed on exit if angle of exit is more than 5°.



STARTING ON A WELDED SEAM
Facing is recommended before the start of drilling. Decrease the feed until drilling welded material.



DRILLING OF STACKED MATERIALS
Avoid spaces larger .008 in between elements. The component must be securely fixed. If necessary reduce the feed.

RADIAL ADJUSTMENT

Hole diameter adjustment and set-up recomendation

Radial adjustment is possible with insert drills to achieve a smaller or larger hole diameter than the actual drill.

Radial adjustment values are available in the main drill data tables.

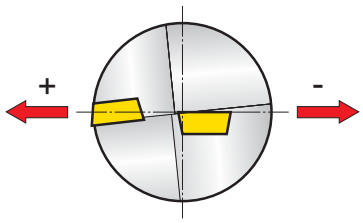
Rotating tool

Adjustable holder is recommended for precision hole diameter IT10 setting when using line 80×D as rotating drills.

Stationary tool

When mounting the drill make sure the drill centre line and workpiece centre are aligned.

To achieve a larger hole diameter displace the drill so that the peripheral insert moves in a + direction from the workpiece centre line.

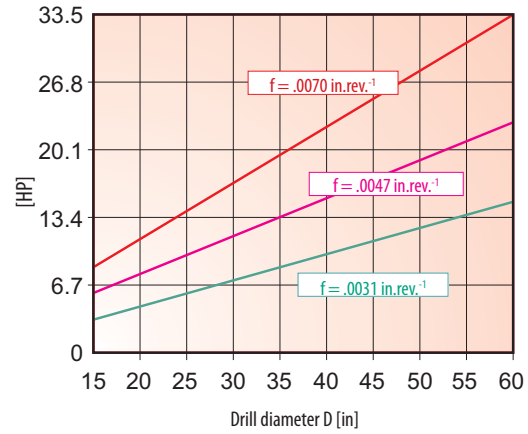


TOOL LIFE

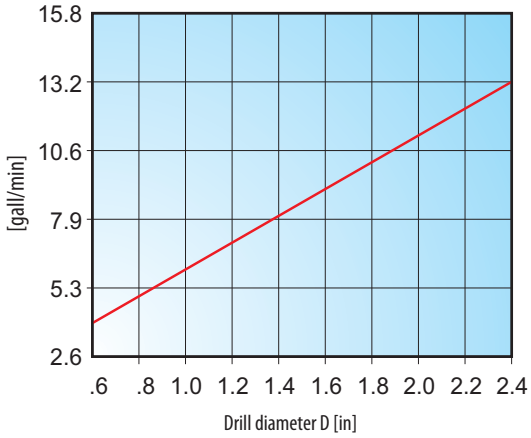
Inserts should not be used with flank wear exceeding .008 - .016 in measured at the largest point. Cutting data recommendations in this catalogue are aimed at achieving tool life of 23 feet drilling depth on the peripheral insert (20 - 30 mins contact).

RECOMMENDED PRESSURE OF SUPPLIED CUTTING FLUID

Drill diameter **D** [in]	Pressure of cutting fluid **p**	
	Drill length	
	2.0 ÷ 2.5 D	**3.0 ÷ 5.0 D**
.6 ÷ 1	87 psi	174 psi
1 ÷ 1.6	65 psi	130 psi
> 1.6	43 psi	87 psi



NET POWER CONSUMPTION



COOLANT VOLUME REQUIREMENT

DRY DRILLING

It is possible to drill without coolant in cast iron and steel, pressurised air through the drill is required.

TROUBLESHOOTING FOR INDEXABLE DRILLS, NOMENCLATURE AND FORMULA

LOW PERFORMANCE OF DRIVING MOTOR (LOW TWISTING MOMENT AT SPINDLE)

a) reduce cutting speed
b) reduce feed

CHIPPING OF CENTER INSERT

a) reduce feed on entry
b) check the drill and work piece clamping

EXCESSIVE WEAR OF EDGE OF PERIPHERAL CUTTING INSERT

a) reduce cutting speed
b) select a more wear resistant grade
c) increase coolant volume and pressure

CONTINUOUS, BADLY FORMED CHIP

a) change the feed
b) increase the cutting speed and simultaneously reduce the feed

CHIPPING OF PERIPHERAL INSERT

a) reduce feed during drilling (especially on entry in uneven surfaces)
b) select a tougher insert grade
c) reduce the cutting speed

CROWDING OF SHORT CHIPS IN THE PERIPHERY GROOVES

a) increase coolant volume and pressure
b) reduce the cutting speed
c) change the feed

NOMENCLATURE AND FORMULAE

Parameter	Formulae	Unit
RPM	$n = \frac{v_c \cdot 12}{D \cdot \pi}$	[1.min^{-1}]
Cutting speed	$v_c = \frac{\pi \cdot D \cdot n}{12}$	[ft.min^{-1}]
Feed per minute (speed of feed)	$v_f = n \cdot f$	[in.min^{-1}]
Cross section area of the hole	$A = \frac{\pi \cdot D^2}{4}$	[inch^2]
Metal removal rate	$Q = f_{min} \cdot A$	[inch^3.min^{-1}]
Machining time	$T_c = \frac{L + h}{f_{min}}$	[min / pcs]

D Diameter of drill [in]
f Feed per revolution [in.rev^{-1}]
h Distance from drill point to workpiece before feeding [in]
L Depth of hole [in]

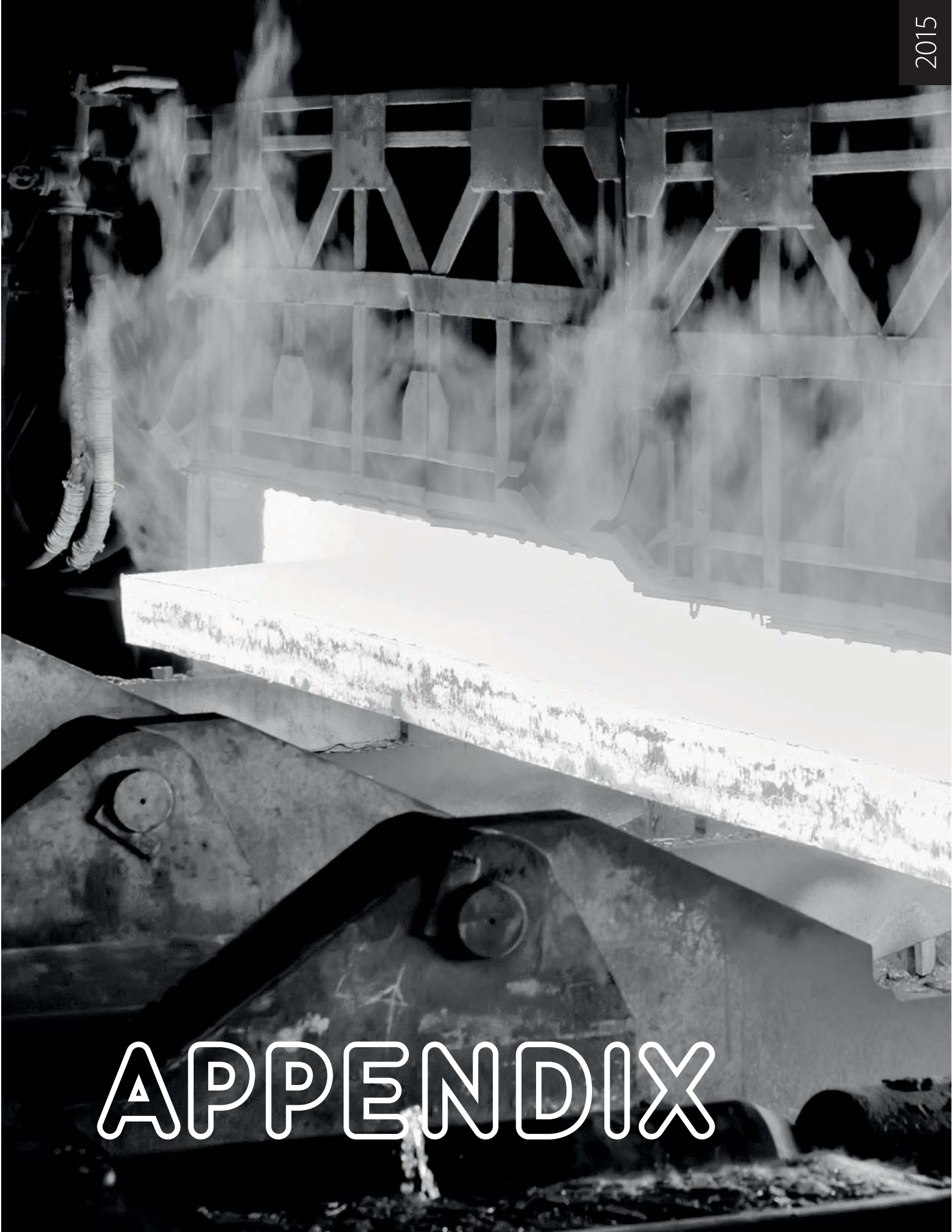
PRAMET

Correctly identifying the machined material is one of the most important factors when choosing the tool and the initial machining conditions. To facilitate this, the machined materials are divided into six basic groups, or into twenty-four subgroups, combining materials that qualitatively cause the same type of loading (straining) on the cutting edge and therefore a similar type of wear. Thus the first step is to assign the workpiece material to one of the (sub)groups - see table below.

Group	Subgroup	Subgroup definition	Example ANSII/SAE	Correction to standard	DORMER AMG	VDI 3323
P	P1	Steel and cast steel with very good (enhanced) machinability; automatic steel and low-carbon steel	1213	1.33	1.1, 1.2	1
	P2	Non-alloy and low-alloy cast steel and steel with a medium carbon content (.25<C<.55); rigidity of up to 900 MPa and hardness of 160-255 HB	Gr.1043	1.00	1.3	2, 3, 6
	P3	Less machinable non-alloy and low-alloy cast steel and steel with a medium carbon content; rigidity of up to 1000 MPa and hardness of up to 300 HB	Cl. A	.80	1.4	4, 5, 7, 8, (10)
	P4	Medium- to high-alloy cast steel and steel (usually with a carbon content of.55 <C); rigidity of up to 1270 MPa and hardness of up to 375HB (resp. 40 HRC)	D3	.60	1.5	9, (10), 11
M	M1	Ferritic corrosion-resistant steel	Type 430	1.09	2.1	12
	M2	Martensitic corrosion-resistant steel	440 C	1.06	(2.1,2.4)	13.1, 13.2
	M3	Austenitic corrosion-resistant steel	Type 321	1.00	2.2	14.1
	M4	Ferritic-austenitic (duplex) and super-austenitic corrosion-resistant steel	EV 12	.93	2.3, 2.4	14.2, 14.3, 14.4
K	K1	Grey cast iron	C1.35B	1.00	3.1, 3.2	15, 16
	K2	Tempered cast iron	Gr.45006	.95	3.1, 3.2	-
	K3	Ductile cast iron ferritic and ferrite-pearlite	Gr.60-40-18	.90	3.3	17, 19
	K4	Ductile cast iron pearlite-ferritic, pearlite-sorbitic and pearlite	Gr.100-70-03	.85	3.4	18, 20
N	N1	Aluminium and its soft alloys (with a low Si content), particularly formed and cast (non-hardened); hardness of up to 100 HB	A96061	1.00	7.1	21, 22
	N2	Hard Al alloys, particularly cast and hardened (with a high Si content)	A04130	.65	7.2, 7.3, 7.4	23, 24, 25
	N3	Soft Cu alloys, automatic brass and other types of soft brass and bronze	C83600	.60	6.1,6.2, 6.3	26, (27)
	N4	Less machinable and hard Cu alloys	C95200	.40	6.4	(27), 28
S	S1	Technically pure Ti, alloys α , $\alpha+\beta$ and b, refined and aged alloys	TiAl6V4, AMS R56400	1.75	4.1, 4.2, 4.3	36, 37
	S2	Fe-based alloys	INCOLOY 800, B 163	1.20	(9.1)	31, 32
	S3	Ni-based alloys	INCONEL 718, AMS 5589	1.00	5.1, 5.2, 5.3	33, 34, 35
	S4	Co-based alloys	Haynes 25, AMS 5759	.75	(9.1)	33, 34, 35
H	H1	Highly rigid and hard tool steel and hardened and refined steel with a hardness of 40-50 HRC	T 4	1.15	1.6	38.1
	H2	Hardened and white cast iron 350-600 HV	Gr.1	1.10	-	40.1, 40.2 41.1, 41.2
	H3	Hardened and refined steel with hardness in the 50-55 HRC range	H11	1.00	1.7	38.2
	H4	Hardened and refined (mostly tool) steel with hardness of more than 55 HRC	D3	.95	1.8	39.1, 39.2

NOTES

PRAMET



APPENDIX

ISO 513	Subgroup	International equivalents																
		CZ	PRC	EU	ISO	F	I	J	D	D	PL	A	RUS	S	GB	USA	E	
		ČSN	GB	EN	ISO	AFNOR	UNI	JIS	DIN	W.-nr	PN	ONORM	GOST	SS	BS	AISI/SAE		
P	1	10 000		S 185	Fe 310	A 33	Fe 320		ST 33.1			ST 00H	St 0	1300-00	S 185	Gr.A	S 185	
	1	10 004	Q 195	S 185	Fe 310-0	A 33	Fe 320		St 33-2	1.0035	St 0 S	St 00 H	St 0	1300	15 HR, HS	Gr.A	AE 235 B	
	1	10 216		Fe B22		Fe E24			IG				A I					
	1	11 109		11SMn28	Type 2	S 250	CF 9 SMn 28	SUM 22	9SMn28	1.0715	A 10X			1912-04	230M07	1213	11SMn28	
	1	11 110	Y12	10S20		10F1	CF10S20		10S20	1.0721	A11		A12	1912	210M15	Gr.1108	10S20	
	1	11 120	Y20			20F2			22S20	1.0724								
	2	11 140	Y35	35S20	35S20	35 MF 6	CF 35 Smn 10		35S20		A 35		A 30	1957-03	212M36	1140	35 MnS 6	
	1	11 300					3CD5	SWRM6	D6-2	1.0314		UC6	05kp			Gr.1005		
	1	11 301		FeP 02	Cr 04			SPCD	USt 13	1.0333		St 03F		1146	2HR,HS,CR,CS	1008		
	1	11 304	08 F	FeP 03						USt 14	1.0336							
	1	11 305		FeP04	Cr 04	ES		SPCE	St14	1.0338	08J		08Ju	1147	1 HR,HS,CR,CS	A619	DC04	
	1	11 320			Cr 03	Fd 4			St 14	1.0322	08X		08kp	1144				
	1	11 321		DC 01	Cr 01	FeP 01	DC 01/FeP 01	SPCC	St 12			St 02F	08Ju	1142	DC 01/FeP 01	1008	DC 01	
	1	11 325						SPCE									AP 04	
	1	11 330			Cr 0			SPC Cl.2	St 3				08J		Cr 2			
	1	11 331		FeP01/DC01	CR1	DC01/FeP01	FeP01/DC01	SPCC	St2	1.0330		St02F		1142	3CR	366	FeP01/DC01	
	1	11 343	A3	S235JRG1		A34-2	Fe330	SS 330	St34-2	1.0028	St3SX	St34RG	16D	1312	CEW2BK	Gr.C	S235JRG1	
	1	11 353					Fe360	STKM12A	St35	1.0308	R35		10	1233	CFS3	1120		
	1	11 364		P235GH		A 37 AP,CP	FeE235	SPV 450	H 1	1.0345	St 36 K	St 35 KW	12K	1330	141-360	Gr.55	F.6304	
	1	11 366		P235GH	P 3	A 37 AP	Fe 360-1KG,KW	SGV 410	H I	1.0345	St 36K	St 35KW	12K	1330	141-360	Gr. A	A 37RCI	
	1	11 368			P 5	A 37 AP	Fe 360-1 KG	SGV 410	ASt 35			St 35 KW	15 K	1330			A 37 RBII	
	1	11 369				A37FP	Fe 360-2KG	STPL380	ASt35				15K	1332		Gr. 1	A37RBII	
	1	11 373		S235JRG1	Fe360 B	S235JRG1	Fe360BFU	STKM12A	USt37-2	1.0036	St3SX	St37F	St3kp	1311	Fe360B	Gr.C	S235JRG1	
	1	11 375	Q235C	S235JRG2	Fe360B	E24-2NE	S235JRG2	SS330	S235JRG2		St3S	RSt360B	St3sp	1312	S235JRG-2	Gr.36	S235JRG2	
	1	11 378		Fe37B1, FN, FU	Fe 360C	E 24-3	Fe 360C		St 37-3		St 3W	St 37TK	16D	1312	40 D	Gr.58	AE 235D	
	1	11 379		S235JRG2Cu					RSt 37-2 Cu3	1.0167	St 3 SCu							
	1	11 381				A37FP	Fe360-2KG		ASt35							Gr.55	A37RBII	
	1	11 416		P265GH	F 5	A 42 AP	Fe 410KG,KT,KW	SG 295	H II	1.0425	St 41 K	St 41 KW	16K	1430	151-400	Gr.A	A 42RCII	
	1	11 418		P265GH	F7	A 42F	P 265 GH	SG 295	St 45.8			St 41 KW	20K	1430	161-430	Gr.60	A 42RBII	
	1	11 419		P310NB		A 42 FP1	Fe 410-2KG		ASt 41	1.0437					224-400	Gr.60	A 42 RBII	
	1	11 423				E 28-2		SS 41	USt 42.2		St 3 SX	St 42 RG,RGT	VSt 4 kp,ps		43/25 HR,HS	1020		
	1	11 425	Q225A	S275JR		E28-2	Fe430B	SS400	RSt42-2		St4V	St42F	St4	1411	161-430	Gr.D	AE275B	
	1	11 428				E 28-3	Fe 430 C	SM 400 C	St 42-3		St 4 W	St 44 T	VSt 4 sp	1411	43 C	Gr.70	AE 275 D	
	1	11 431				A 42 F	Fe 410-2 KG,KW	SLA 2	ASt 41	1.0426	St 3M		20K		400-22	X 42	F.6310	
	1	11 443		Fe 42B	Fe 430B	E 28-2			St 44-2	1.0044			St 4sp		43B,C			
	1	11 453						STKM 13B	St 45		R 45				430	1035		
	1	11 474		P 295 NH	P 11	A 48 CP	Fe 460-1 KG		H IV	1.0445			16 GS		223-490	Gr.F		
	1	11 478		P 295 GH	P 11	A 48 FP	Fe 460-1 KG,KW	SG 365	ASt 45				14G2		224-460 B	Gr.B, C	P 295 GH	
	1	11 481		P295GH		A 48 AP,FP	Fe 510-1 KG,KW	SPV 315	ASt 45	1.0436		17Mn4KW	18K	2103	430 LT	X 46	A 47 RCI	
	1	11 483	16Mn	S355J2G3	Fe510D	E36-3	Fe 510	SM490	ST52-3	1.0570	G355	St52F	S345	2132	50C	Gr.50 type 1 až 4	S355J2G3	
	1	11 484				A 48FP1												
	2	11 500	Q275	E295	Fe490	A50	Fe490	SS490	St50-2	1.0050	St5	St50F	S285	2172	43/35 HS	Gr.50	A490-2	
	1	11 523	16Mn	Fe510	Fe510	E36-3	Fe510	SM520C	St52-3	1.0570	16G2	St510D	17GS	2132	50/35HR	Gr.15180	S355J2G3	
	1	11 529		S355J2G3Cu					St 52-3 Cu3	1.0585	1862 A-Cu		1062 BD					
	1	11 531		Fe 510 D2		A 52 FP	S355J2G4		ASt 52	1.0577					224-460	Gr.A	AE 355 D	
	2	11 550		S355J0Cu	R50-NBK		Fe 540	STKM 16 A	ST 55	1.0507	R 55		BSt 5 ps		CDS 7	1050		
	2	11 600		E355	Fe590	E335	E335	SM570	E335	1.0060	MSt6	St60F	St6sp	1650	E335	Gr.65	Fe590-2FN	
	3	11 700		E360	Fe690	A70	Fe690		St70-2	1.0070	St7	St70F	S375	1655	E360		E360	
	1	12 010	10	2C10	C10	XC10	C10	S9CK	C10	1.1121	10	RC12	08	1265	045A10	Gr. 1010,1011,M1010	C10k	
	1	12 011											08					
	1	12 014									E2		10880					
	1	12 014									E2		10880					

PRAMET

ISO 513	Subgroup	International equivalents															
		CZ	PRC	EU	ISO	F	I	J	D	D	PL	A	RUS	S	GB	USA	E
		ČSN	GB	EN	ISO	AFNOR	UNI	JIS	DIN	W.-nr	PN	ONORM	GOST	SS	BS	AISI/SAE	
P	1	12 020	15	C15E	C15E4	C18RR	C15		C15	1.1141				1370-40	080M15	Gr.1016	C16k
	1	12 021			TS 5		C 14	STB 340	St 35.8	1.0305	K 10		10			Gr.A	
	1	12 022			TS 14		C 18	STB 410	St 45.8	1.0405	K 18		20		430	Gr.B	
	1	12 023	15	C15E	C15E4	XC15	C15	S15C	C15	1.1141	15	RC15	15		040A15	Gr.1015	
	1	12 024	20	C 22	C 25	XC 18	C 21	S 22C	C 22	1.0402	20		20	1450	070M20	1020	
	3	12 030	25	2C25	C25E4	XC25	C25	S28C	C25	1.0406	25		25		070M26	Gr.1025	C25k
	1	12 031	30	C 30	C 30 E4	XC 32	C 30	S 30 C	Ck 30	1.0528			30		080M32	1030	
	3	12 040	35	C35	C35E4	C35	C35	S35C	C35	1.0501	35	C35	35	1550	40HS	Gr.1035	C35
	3	12 041	40	C 40	C 40E4	XC 42 HI	C 40	S 40C	Ck 40	1.0511	40		40		080M40	1040	C 40
	1	12 042	35 B	C 35 BKD		38 B3	C 35 BKB	SWRCHB 234	35 B2								F.1295
	2	12 050	45	C45	C60E4	C45	C45	S45C	C45	1.0503	45	C45SW	45	1650	50HS	Gr.1043	C45k
	2	12 051	50	C 50	C50E4	XC 48 H1	C 50	S 50 C	Ck 50	1.1206			50	1674	080M50	1050	1 C 50
	3	12 060	55	C55	C55E4	C54	C55	S55C	C55	1.0535	55		50	1655	50	Gr.1055	C55
	4	12 061	60	2 C 60	C 60 E4	C 60	C 60	S 58 C	Ck 60	1.0601	60		60	1665	60 HS,CS	1060	C60
	2	12 071		1 CS67		C 68	C 67	S 70C-CSP	Ck 67				65		080A67	Gr.1070	
	2	12 081	75	1CS75	CS75	XC75	C75		Ck75	1.1248	75		75	1774	80HS	Gr.1078	
	3	12 090	85	2 CS 85	CS 85	C 90RR	C 85	SK 5-CSP	C 85E	1.1269	85		85		80HS,CS	1086	
	2	13 141	30Mn2	28Mn6	28Mn6	35M5	C28Mn	SCMn2	28Mn6	1.1165	30G2		30G2		120M36	Gr.1330	30Mn5
	2	13 151				45 S 7			46 Si 7	1.5024	45 S					9250	46 Si 7
	4	13 180							80Mn4		65G		70G				
	3	13 240	35SiMn			38MS5			37MnSi5	1.5122	35SG		35SG				
	3	13 242							42MnV7	1.5223							
	4	13 251		45Si7	Type 3	45S7			46Si7	1.5024	45S		50S2		250A53	9250	F. 1451
	4	13 270	60Si2Mn	60Si7		60S7	60Si7	SUP6	60Si7	1.5028	60S2		60S2		251A58	Gr.9260H	60Si7
	3	14 100	G Cr 15	100Cr6	Type 1-0	100C6	100Cr6	SUJ 2	100Cr6		LH 15		Šch 15	2258	534A99	52100	F.1310
	2	14 109	GCr 15	100Cr6	Type 1-0	100Cr6	100Cr6	SUJ 2	100Cr6	1.3505	LH 15		ŠCh15	2258	535 A99	52100	100Cr6
	1	14 120	15Cr	15Cr2	37Cr4	12C8		SCr 415	15Cr3	1.7015	15 H		15Ch		523M15	5015	
	2	14 140	35Cr	37Cr4	TYPE 2	37Cr4	38Cr4	SCr435H	37Cr4	1.7034	40H	41Cr4SP	38ChA	2245	530A36	Gr.5135	37Cr4
	3	14 160				55 C 3							50ChG				
	3	14 209	Cr9SiMn	100CrMn6	TYPE 3	100CM6		SUJ3	100CrMn6	1.3520	LH15SG		ŠCh15SG		535A99	Gr.2	100CrMn6
	1	14 220	15CrMn	16MnCr5	TYPE 5	16MC5	16MnCr5		16MnCr5	1.7131	15HG		18ChG	2127	527M17	No.5115	16MnCr5
	1	14 221	20CrMn	20MnCr5	Type 7	20MC5	20MnCr5	SMnC 420 H	20MnCr5	1.7147	18HGT		18ChG			5120	F.150.D
	1	14 223											18ChGT				
	3	14 230											27ChGR				
	3	14 231											30ChGT				
	3	14 240	35Mn2					SMn438	36Mn5	1.5067			35G2			Gr.1340H	
	3	14 260	60Si2CrA			54SiCr6	48Si7	SUP7	54SiCr6	1.7102	60S2		60S2ChA	2090	250A61	9260	
	3	14 331									30HGS		30ChGSA				
	3	14 340							34CrAl6	1.8504			38Ch2Ju				
	3	14 341									37HS		38ChS				
	1	15 020		16Mo3	F26,P26,TS26	15D3	15Mo3	STBA12	15Mo3	1.5415	16M	15Mo3KW		2912	240	Gr.A	16Mo3
	1	15 121	12CrMo	13CrMo4-5	F32,P32,TS26	15CD4-5	14CrMo3	SFVAF12	13CrMo4-4	1.7335	15HM	13CrMo44KW	12ChM	2216	620-440	Gr.P12	14CrMo45
	1	15 124		18CrMo4	18CrMo4	18CrMo4	18CrMo4	SCM418	18CrMo4		18HGM		20ChM		708H20		18CrMo4-1
	1	15 128		13MoCrV6	TS33,P33,F33				14MoV6-3	1.7715	13HMF				660-460	Gr.P24	13MoCrV6
	2	15 130	30CrMo	25CrMo4	25CrMo4	25CD4	25CrMo4	SCM 430	25CrMo4		25 HM	24CrMo5 S	20ChM	2225	708A25	4130	25CrMo4
	3	15 131	30CrMo	34CrMo4KD		25CD4	30CrMo4	SCM 420	34CrMo4	1.7220	26HM		30ChM	2225	708A25	4130	AM 34CrMo4
	2	15 142	42CrMo	41CrMo4	TYPE 3	42CD4	38CrMo4KB	SCM440	41CrMo4	1.7225	40HM	42CrMo4SP	38ChM	2244	708M40	Gr.4140	42CrMo4
	1	15 217	09CuPCrNi-A	S355J0WP	Fe 355W-1A	E 36W-A3	S355J0WP	SPA-H	9CrNiCuP 324	1.8962	10 H				WR 50A,B,C	Gr.1	
	1	15 221											15ChF			Gr.6118	
	1	15 223													CDS 109	Gr.B	
	2	15 230								1.7361							
	3	15 231							27MnCrV4	1.8162							

ISO 513	Subgroup	International equivalents																
		CZ	PRC	EU	ISO	F	I	J	D	D	PL	A	RUS	S	GB	USA	E
		ČSN	GB	EN	ISO	AFNOR	UNI	JIS	DIN	W.-nr	PN	ONORM	GOST	SS	BS	AISI/SAE	
P	2	15 236	25Cr2MoVA						24CrMoV55	1.7733			25Ch1MF				
	2	15 240											40ChFA			6135	
	2	15 241							42CrV6								
	2	15 260	50CrVA	51CrV4	TYPE 13	51CrV4	50CrV4	SUP 10	50CrV4	1.8159	50HF		50ChFA	2230	735A50	Gr.6150	51CrV4
	3	15 261							58CrV4	1.8159							
	1	15 313	12CrMo	10CrMo9-10	P34, TS34,F34	10CD9.10	12CrMo910	SCMV4	10CrMo9-10	1.7380	10H2M	10CrMo910KW		2218	622	Gr.P22	12CrMo910
	3	15 320					24CrMoV55		24CrMoV55	1.7733		24CrMoV55	20ChMFL		671-850		
	1	15 323							17CrMoV10	1.7766							
	2	15 330					31CrMoV10		30CrMoV9	1.7707	30H2MF		30Ch3MF				31CrMoV10
	3	15 340	38CrMoAl			40CAD 6.12	41CrAlMo7	SACM 645	41CrAlMo7	1.8509	38HMJ		38Ch2MJuA		905M39	Cl. A	41CrAlMo7
	3	15 341			42CrMo4			SCM 4	42CrMo4								
	1	15 412							10CrMo11	1.7276							
	1	15 423							20CrMoV 1 3 5	1.7779							
	1	16 220	12CrNi2	15NiCr6		16NC6	16CrNi4		15CrNi6	1.5713	15HN		12ChN2	2512	815M17	Gr.4320	16NiCr4
	1	16 222				1,5 Ni											
	1	16 231				20NC6	20CrNi4		19CrNi8				20Ch2N4A		822M17	3120	
	3	16 240				35NC6		SNC 236	36NiCr6	1.5710			40ChN			3135	
	1	16 320					18Ni14						12ChN3		En 33		
	3	16 341		36CrNiMo4		40NCD3	38NiCrMo4KB	SCNM439	36CrNiMo4		36HNM		40ChN2MA		817A37	Gr.9840	35NiCrMo4
	3	16 342		34CrNiMo6	36CrNiMo6	35NCD6	35NiCrMo6 KB	SNCM 447	34CrNiMo6				40ChNMA		817M40	4340	
	3	16 343		34CrNiMo6	Type 3	35NCD6	35CrNiMo6	SNCM 447	34CrNiMo6	1.6582	34 HNM		38Ch2N2MA	2541	817M40	4340	34CrNiMo6
	1	16 420				13NiCr14		SNC815	14NiCr14	1.5752			12Ch2N4A		655H13	E3310X	
	3	16 431							26NiCrMo8-5	1.6931							
	3	16 440				30NC12		SNC 836	31NiCr14	1.5755	37HN3A		30ChN3A				
	3	16 444		34CrNiMo6	Type 3	35NCD6	35NiCrMo6 KB	SNCM 447	34CrNiMo6		34HNM		36Ch2N2MFA	2541	817M40	4340	34CrNiMo6
	3	16 532									30HGSNA		30ChGSN2A				
	3	16 540											34ChN3MA				
	3	16 640				40NC17			35NiCr18						835M30		
	1	16 720									18H2N4WA		18Ch2N4MA				
	1	19 065							C35W3								
	2	19 083				Y342			C45W3	1.1730		K945					F5131
	2	19 103				Y355		SK7	C60W3	1.1740	N5	K960					
	2	19 125				Y3 65		SK 7	C67W	1.1744	N6						
	2	19 132	T7	CT70	C70 U	C70 E2U	C70 KU	SK 6	C 70 W2		N7	K 970	U7-1			W 1-7	F.5103
	2	19 133	T7	CT70	C70U	Y170	C70KU	SK6	C70W	1.1620	N7	K970	U7				C70U
	2	19 152	T8	CT80	C80U	Y180	C80KU	SK5	C80W2	1.1625	N8	K980	U8-1		BW1A	W1Gr.A	C80U
	2	19 191	T10A	CT105	C105U	C105E2U	C100KU	SK3	C105W1	1.1645	N10E	K990	U101	1880	BW1B	W5	C102U
	2	19 192	T 10	CT 105	C 90 U	C 105 E2U	C 100 KU	SK 3	C 105 W2		N 10	K990	U 10-1			W 110	F.5117
	3	19 221	T11	CT120	C120U	Y2120	C120KU		C110W2	1.1654	N12	K990	U12-1		BW1C		F-5123
	4	19 255		CT 120	TC 120	C120 E3U	C120 KU	SK 2	C125 W	1.1663	N 12	K 995	U 13-1			W 112	C120 U
	3	19 312		90MnV8	90MnCrV8	90MnV8	90MnVCr8KU		90MnCrV8	1.2842	NMV	K720	9G2V		B02	02	90 MnCrV 8
	3	19 313		90MnV8	90MnCrV8	90MnV8	90MnVCr8 KU		90MnCrV8		NMV	K 720	9GF2		BO 2	02	90MnCrV8
	3	19 340		60SiMn7		60Si8	56SiMn7 KU		70SI7					No 22			
	2	19 356		100 V2	TCV 105	C 105 E2 UV1	102 V2 KU	SKS 43	100 V1	1.2833	NV	K 760			BW 2	W 210	100 V2
	3	19 418							80CrV5		NCV 1		8Ch				80CrV2
	3	19 419							80CrV2		NCV 1		8Ch				80CrV2
	4	19 420	Cr 06			Y2 140 C		SKS 8	140Cr2	1.2008	NC 5	K 205	13Ch				140Cr2
	3	19 421		107CrV3			107CrV3KU		115CrV3	1.2210		K510				L2	120CrV2
	3	19 422							145Cr6		NC 6	K 505					
	2	19 423						SKC 11	90Cr3	1.2056			9ChF			L 2	
	2	19 426	9CV2						85Cr7			K 201	9Ch1				
	3	19 434		X21Cr13		X20Cr13	X21Cr13KU		X20Cr13 1.2082	1.2082							X20Cr13 F5261

PRAMET

ISO 513	Subgroup	International equivalents															
		CZ	PRC	EU	ISO	F	I	J	D	D	PL	A	RUS	S	GB	USA	E
		ČSN	GB	EN	ISO	AFNOR	UNI	JIS	DIN	W.-nr	PN	ONORM	GOST	SS	BS	AISI/SAE	
P	3	19 435		X41Cr13	X40Cr14	X40Cr14	X41Cr13KU	SUS 420 J2	X42Cr13		4H13		40Ch13	2314	420S45		F.5263
	4	19 436		X210Cr12	C210Cr12	Z200C12	X205Cr12KU	SKD1	X210Cr12	1.2080	NC11	K100	Ch12		BD3	D3	X210Cr12
	4	19 437		X210CrW 12-1	X210CrW12	X210CrW 12-1	215CrW 12-1 KU		X210CrW12					2313			2313
	3	19 452				Y60SC7			58SiCr8	1.2103		K244					
	1	19 487							21MnCr5	1.2162							
	4	19 512				45CDV6	35CrMo8 KU		48CrMoV 6 7								
	4	19 520		35CrMo8	35CrMo7	40CrMnMo8	35CrMo8KU		40CrMnMo7		WLB						40CrMnMo7
	2	19 541		30CrMoV12-11	32CrMoV12-28	32CDV12-28	30CrMoV12-27KU	SKD7	X32CrMoV33	1.2365	WLV	W320	3Ch3M3F		BH10	H10	30CrMoV12
	3	19 552	4Cr5MoSiV	X37CrMoV5-1	X37CrMoV5 1	Z38CDV5	X37CrMoV51KU	SKD6	X38CrMoV5.1	1.2343	WCL	W300	4Ch5MFS		BH11	H11	X37CrMoSiV5
	3	19 553	4Cr5MoSiV	X37CrMoV5-1	X37CrMoV5 1	Z38CDV5	X37CrMoV51KU	SKD6	X38CrMoV5.1	1.2343	WCL	W300	4Ch5MFS		BH11	H11	
	3	19 554	4Cr5MoSiV1	X40CrMoV511	40CrMoV5 1	X40CrMoV5	X40CrMoV511KU	SKF61	X40CrMoV51	1.2344	WCLV	W302	4Ch5MF1S	2214	BH 13	H13	X37CrMoSiV5
	3	19 561														H 42	
	3	19 571	Cr5Mo1V	X100CrMoV 5 1	X100CrMoV5	Z100CDV5	X100CrMOV51KU	SKD 12	X100CrMoV 5 1		NCLV	K 305	9Ch5VF	2260	BA 2	A 2	F.5227
	3	19 572		X160CrMoV 12 1		Z160CDV12	C165CrMoV12KU	SKD 11	x165cRmOv 12			k 105	Ch12MF	2310		D 2	F.5211
	4	19 581														A7	
	3	19 614							55NiCr10	1.2718		K605		2550			F.5224
	3	19 642		40NiCrMoV16			40NiCrMoV16 KU		35NiMo16			W502			BP 30		35NiCrMo16
	3	19 655		40NiCrMo16	45NiCrMo16	40NCDV16	40NiCrMoV16KU		X45NiMo4II1.2	1.2767		K600					
	3	19 662	5CrNiMo	55NiCrMoV7		55NCDV7	44NiCrMoV7 KU	SKT 4	55NiCrMoV6	1.2711	WNL	W 502	5ChNM		BH 224/5	L 6	F.520.S
	3	19 663		55NiCrMoV7	55NiCrMoV7	55NCDV7	56NiCrMoV7KU	SKT4	56NiCrMoV7	1.2714	WNLV	W501	5ChNV		BH224/5	L6	55NiCrMoV7
	4	19 675							28NiCrMoV10	1.2740							
	4	19 680							X50NiCrWV 13-13								
	3	19 710	W					SKS 7M	120 W 4	1.2414	NW 1	K 405				F 1	F.5238
	3	19 711					110W4 KU	SKS 2	120 WV 4	1.2516			ChV 1		BF 1		F.520C
	3	19 712							110WCrV5				ChV6				
	3	19 714						SKS 11	X 130W5			K 400	ChV 4F			F 2	
	2	19 720	30W4Cr2VA	X30WCrV 5 3	30WCrV5	X32WCrV5	X30WCrV 5 3KU	SKD 4	30WCrV 5.3			W 105					
	3	19 721	3Cr2W8V	X30WCrV93	X30WCrV9-3	Z30WCV9	X30WCrV93KU	SKD5	X30WCrV9.3	1.2581	WWW	W100	3Ch2V8F		BH21	H21	X30WCrV9
	3	19 723									WWN 1	W-103			BH 21A		
	3	19 732		45WCrSiV8	50WCrV8	45WCV20	45WCrV8KU		45WCrV7	1.2542	NZ2	K450	50ChV2SF	2710	BS1	S1	45 WCrSiV8
	3	19 733		55WCrV8	60WCrV8	55WC20	55WCrV8 KU		60WCrV7		NZ 3	K 455	5ChV2S		BS 1	S 1	60WCrSiV8
	3	19 740							30 WCrV 151	1.2564	WWS 1	W 106					F.527
	3	19 802						SKH6	S 12-1-2	1.3318	SW12		R12F3				
	4	19 810				Z130WV 13.4			S 12-1-4	1.3302	SW12		R9F5				
	3	19 824	W18Cr4V	HSv18-0-1	HS 18-0-1	Z80WCV18-04-01	HS 18-0-1	SKH 2	HS 18-0-1	1.3355	SW18	S 200	R18	2750	BT1	T1	HS 18-0-1
	4	19 830	W6Mo5Cr4V2	HS 6-5-2	HS 6-5-2	Z85WDCV06-05-04-02	HS 6-5-2	SKH51	HS 6-5-2	1.3343	SW7M	S600	R6M5	2722	BM2	M2	HS 6-5-2
	4	19 852	W6Mo5Cr4V2Co5	HS 6-5-2-5	HS 6-5-2-5	Z85WDKCV06-05-04-02	HS 6-5-2-5	SKH55	HS 6-5-2-5	1.3243	SK5M	S705	R6M5K5	2723	BM35		HS 6-5-2-5
	4	19 855	W18Cr4VCo4	HS18-1-1-5		Z80WKCV 18-05-04-01	HS 18-1-1-5	SKH 3	HS 18-1-2-5			S 305	R18k5F2		BT 4	T 4	F.5530
	4	19 856											R9K5				
	4	19 858	W12Cr4V5Co5	HS12-1-5-5	HS12-1-5-5	HS 12-1-5-5	HS12-1-5-5	SKH 10	HS 12-1-4-5	1.3202	SK 5V	S 308	R13F4K5		BT 15	T 15	HS12-1-5-5
	4	19 861		HS 10-4-3-10		Z130WKCDV	HS 10-4-3-10	SKH57	HS 10-4-3-10	1.3207	SK10V	S700	R12F3K10M3-Š	2736	BT42		HS 10-4-3-10
	1	422630		C18D	20-40	20-40M	FeG400	SC37	GS38	1.0416	LII400	GS38	15L-I		AM1	Gr.N1	
	1	422633				A 42 C-M	FeG38VR	SC 360	GS-38.3	1.0416	L II 400	GS-38	15 L-III	1306	AM 1	Gr.N 1	
	1	422640			23-45	A 48 M1	FeG 45	SC 46	GS-45	1.0443	LII 400	GS-45	25 L	1305	161-430 A	N 1	
	1	422643			33-45	FB-M	GC20	SC450	GS-45	1.0443	L20	GS45	20L		430A	Gr.WCA	
	1	422650			26-52	E26-52-M	FeG49-1	SC480	GS-52	1.0551	LII500	GS52	30L		161Gr400A	Gr.N-2	
	2	422653															
	2	422660	ZG 310-570		30-57	30M6M	FeG 570	SCC 3	GS-60	1.0553	LII 600	GS-60	45L2	1606	A 3	Gr.80-40	
	2	422670				E26-52-M		SCC5	GS-62	1.0554			55L		AW3	Gr.105-85	
	2	422709				35M5		SCMn2	GS-20Mn5		L20G		35G		Gr.A	Gr.80-40	AM30Mn5
	1	422712				20 M 6 M	FeG 49-2	SCW 480	GS-20Mn5		L 20G		20 GL	2172	161-540 A	Gr.A	F.8310
	1	422713		G17Mn5		20 M5M			GS-16Mn5						G17Mn5	WCC	G17Mn5

ISO 513	Subgroup	International equivalents																
		CZ	PRC	EU	ISO	F	I	J	D	D	PL	A	RUS	S	GB	USA	E	
		ČSN	GB	EN	ISO	AFNOR	UNI	JIS	DIN	W.-nr	PN	ONORM	GOST	SS	BS	AISI/SAE		
P	1	422714		G-21 Mn5			G 22mN3	SCA 1	GS-20Mn5	1.1133	L20G	GS-21Mn5	20GL		Gr.A	LCB	AM 22Mn5	
	3	422715	Z640Mn			35M5		SCMn3	GS-36Mn5	1.1167			35G2				36Mn5	
	3	422719													Gr.A			
	3	422724											30ChGSFL					
	3	422726									L35HGS		35ChGSL					
	1	422733							GS 24CrV42									
	1	422744		GS-17CrMo55		15CD5-05M	G 15CrMo55	SCPH 21	GS-17CrMo55		L18HM	GS-17CrMo55	20ChMFL		621	Gr.WC6	AM-18CrMo05-05	
	1	422745		G17CrMoV511		15CDV4-10M		SCPH23	GS-17CrMo511		L15HMF	GS-17CrMoV511				Gr.9		
	3	422750											40 ChNL					
	1	422771				Z15CD 505-M	GX15CrMo5	SCPH 61					20Ch5ML		625	C 5	AM-X18CrMo5	
	4	422992											R9					

PRAMET

ISO 513	Subgroup	International equivalents																
		CZ	PRC	EU	ISO	F	I	J	D	D	PL	A	RUS	S	GB	USA	E
		ČSN	GB	EN	ISO	AFNOR	UNI	JIS	DIN	W.-nr	PN	ONORM	GOST	SS	BS	AISI/SAE	
M	1	17 020	0Cr13	X6Cr13	TYPE 1	Z6C13	X6Cr13	SUS410S	X7Cr14	1.4000	0H13		08Ch13	2301	403S17	Type 403	X6Cr13
	1	17 021	1Cr12	X10Cr13	Type3	Z12C13	X12Cr13	SUS 410	X10Cr13	1.4006	1H13		12Ch13	2302	410S2	Type 410	X12Cr13
	2	17 022	2Cr13	X20Cr13	Type 4	X20Cr13	X20Cr13	SUS420J1	X20Cr13	1.4021	2H13		12Ch13	2302	420S37	Type 420	X20Cr13
	2	17 023	3Cr13	X30Cr13	Type 5	Z30Cr13	X30Cr13	SUS420J2	X30Cr13	1.4028	3H13		30Ch13	2304-03	420S45	Type 420	2304-03
	2	17 024	4C13	X39Cr13	Type 6	Z40C13	X40Cr14		X39Cr13	1.4031	4H13		40Ch13		X39Cr13	Type 420	X39Cr13
	2	17 029								1.4034							
	1	17 040	1Cr15	X6Cr17	Type 8	Z8C17	X8Cr17	SUS 430	X6Cr17	1.4016	H17		12Ch17	2320	430S18	Type 430	X6Cr17
	1	17 041	1Cr15	X8Cr17	TYPE 8	Z8C17	X8Cr17	SUS430	X6Cr17	1.4016	H17		12Ch17	2320	430S15	Type 430	X6Cr17
	2	17 042									H18		95Ch18			440 C	
	1	17 102	10MoCr50	5CrMo16	TS 37	Z10CD5-05	A16CrMo 25 5 KG, KW	SFVAB 5 A,B	12CrMo19 5	1.7362	H5M		15Ch5M		625	Type 501, 502	F.240B
	1	17 113		X10CrAlSi7		Z8CA7	X7AL		X10CrAlSi7	1.4713			15Ch6SJu				X10CrAl7
	2	17 115	4Cr9Si2	X 45CrSi8	TYPE 1	Z 45CS9	X 45CrSi8	SUH 1	X 45 CrSi 9.3	1.4718	H9S2		40Ch9S2		401S45	HNV 3	F.3220
	2	17 116			TS38		X12Cr9KG	SFVAF9	X12CrMo9-1					2203	629-470	Gr.F9	
	2	17 125	0Cr13Al	X10CrAl13	TYPE H3	Z 13C13	X 10CrAl12		X10CrAl13	1.4724	H13JS		10Ch13SJu			TYPE 405	F.3152
	2	17 134			TS40	Z21CDV12	X20CrMoNi201KG,KW		X20CrMoV121		23H11MNF	X22CrMoV121S		2317			
	2	17 153	1Cr25Ti			Z10C24	X16Cr26	SUH446	X8CrTi25				15Ch25T	2322		446	
	3	17 240	0Cr18Ni9	X5CrNi18-10	Type11	X5CrNi18-10	X5CrNi18-10	SUS304	X5CrNi18-10	1.4301	0H18N9	X5CrNi18-10S	08Ch18N10	2333-02	304S31	Type 304	X5CrNi1810
	3	17 241					X10CrNi18 09	SUS 302	X12CrNi 18 8	1.4300	1H18N9					302	
	3	17 242				Z10CN1809	X15CrNi1809		X12CrNi188		1H18N9		17Ch18N9		302S25	Gr.302	
	3	17 246	1Cr18Ni9Ti	X10CrNiTi18-10	TYPE 15	Z6CNT18-10	X8CrNiTi1811	SUS321	X12CrNiTi189	1.4878	1H18N9T	X6CrNiTi1810KKW	08Ch18N10T	2337-02	321S12	321	X6CrNiTi1810
	3	17 247	0Cr18Ni10Ti	X 6CrNiTi 18-10	TYPE 15	Z 6CNT 18-10	X 6CrNiTi 18 11	SUS 321	X 6CrNiTi 18 10	1.4541		X 6CrNiTi 18 10 S	08Ch18N10T	2337	321S31	Type 321	F.3523
	3	17 248	0Cr18Ni10Ti	X6CrNiTi18-10	Type 15	Z6CNT18-10	X6CrNiTi1811	SUS321	X6CrNiTi1810	1.4541	0H18N10T	X6CrNiTi1810KKW	08Ch18N10T	2337	321S31	Type 321	X6CrNiTi18-10
	3	17 249	00Cr19Ni10	X2CrNi 18 10	Type 15	Z3CN 18-11	X2CrNi 18.11	SUS 304	X2CrNi 19 11	1.4306		X2CrNi19 11 KKW	03Ch18N11	2352	304S11	304 L	X2CrNi 18 10
	3	17 251	1Cr20Ni14Si2	X 15CrNiSi 20 12	TYPE H13	Z 17CNS 20 12	X 16CrNi 23 14	SUH 309	X 15CrNiSi 20 12	1.4828	H20N12S2		20Ch20N14S2		309S24	TYPE 309	F.3312
	3	17 253	1Cr16Ni35	X12NiCrSi35-16	H17	Z12NCS37.18		SUH330	X12NiCrSi36-16		H16N36S2					330	X12CrNiSi36-16
	4	17 254											12Ch21N5T				
	3	17 255	1Cr25Ni20Si2	X8CrNi25-21	H16	Z8CN25-20	X6CrNi2520	SUS310S	X8CrNi25-21	1.4845	H25N20S2		20Ch23N18	2361	310S31	310S	X15CrNiSi25-20
	3	17 322											4Cr14Ni14W2Mo		331S42	Ev9	
	3	17 335											ChN35 VT				
	3	17 341			TS 63	Z6CND 17-13B	X5CrNiMo1712		X6CrNiMo1713	1.4919		X5CrNiMo17122S			316S51	TP316H	X5CrNiMo17122
	3	17 346	0Cr17Ni12Mo2	X 5CrNiMo 17 12 2	TYPE 20	Z 6CND 17.11	X 5CrNiMo 17 12	SUS 316	X 5CrNiMo 17 12 2	1.4401		X 5CrNIMo 17 12 2 KW		2347	316S31	TYPE 316	X 5CrNiMo 17 12 2
	3	17 347															
	3	17 348	0Cr18Ni12Mo2Ti	X6CrNiMoTi17-12-2	21	Z6CNDT17-12	X6CrNiMoTi17-12	SUS316Ti	X6CrNiMoTi17-12-2		H17N13M2T	X6CrNiMoTi17122S	10Ch17N13M2T	2350-02	321S12	316Ti	X6CrNiMoTi17122
	3	17 349	00Cr17Ni14Mo2	X2CrNiMo 17-12-2	Type 19	Z3CND 18-12-02	X2CrNiMo 17 12	SUS 316	X2CrNiMo 17 13 2	1.4404	00H17N14M2	X2CrNiMo 17 13 2KKW	03Ch17N14M2	2348	316S11	316 L	X2CrNiMo 17 13 2
	3	17 350	00Cr17Ni14Mo2	X2CrNiMo18-14-3	TYPE 19a	Z3CND 17-12-03	X2CrNiMo1713	SUS 316L	X2CrNiMo18-14-3	1.4435		X2CrNiMo18143KW	03Ch17N14M2	2353	316S14	TP316L	X2CrNiMo18143
	4	17 351			TYPE 7											TYPE 635	
	4	17 351.9			TYPE 7											TYPE 635	
	3	17 352	0Cr17Ni12Mo2	X3CrNiMo 17-13-3	Type 20a	Z7CND 18-12-3	X5CrNiMo 17 13	SUS 316	X5 CrNiMo 17 13 3	1.4436		X5CrNiMo 17 13 3 KW		2343	316S31	316	X5CrNiMo 17 13 3
	3	17 356	1Cr18Ni12Mo3Ti				X6CrNiMoTi17-13	316Ti	X10CrNiMoT18-12		H17N13M2T		08Ch17N13M2T		320S33	316Ti	
	3	17 436							X40MnCr18	1.3817							
	3	17 460								1.3965	1H17N4G9		12Ch17G9AN4			Gr.202	
	4	17 465	5Cr21Mn9Ni4N	X 53 CrMnNiN21 9	Type 9	Z 52 CMN 21.09	X 53CrMnNiN 21 9	SUH 35	X 53 CrMnNiN21 9	1.4871	50 H21G9N4		55Ch20G9AN4		349S54	EV 12	F.3217
	3	17 536							Ni 36	1.3912	FeNi36Pr		36N		NILO 36	NILO 36	
	4	17 618.4				Z120M12			X120Mn12	1.3401			110G13L	2183			
	1	422904	ZG1Cr13			Z6CN12-1M	GX12Cr13	SCS1	GX8CrNi13	1.4008			10Ch12NPL		410C21		
	1	422905	ZG1Cr13			Z12C13-M	G X12Cr13	SCS 1	G-X12Cr13		LOH 13		15 Ch13L		410C21	Gr.CA-15	F.8401
	2	422906	Z G2Cr13			Z20C13-M	G X30Cr13	SCS 2	G-X20Cr14	1.4027	LH 14		20Ch13 1		420C24	Gr.CA-40	F.8387
	2	422911	ZG1Cr17			Z20CN17-2	GX35Cr17		G-X22CrNi17						ANC 2	Gr.CB30	
	2	422912							G-X40CrSi17								
	2	422913				Z40C28 M		SCH 2	G-X40CrSi23		LH 26				452C11	Gr.HC	
	2	422914	Z GCr28			Z40C28-M	G X35Cr28	SCH 2	G-X70Cr29		LH 26		75Ch28L		452C11	Gr.HC	
	2	422916		G-X22CrMoV12-1					G-X22CrMoV12-1	1.4922		G-X22CrMoV12-1	20Ch12WNMFL			Gr.CA28MnV	

ISO 513	Subgroup	International equivalents															
		CZ	PRC	EU	ISO	F	I	J	D	D	PL	A	RUS	S	GB	USA	E
		ČSN	GB	EN	ISO	AFNOR	UNI	JIS	DIN	W.-nr	PN	ONORM	GOST	SS	BS	AISI/SAE	
M	2	422917		GX8CrNi12		Z6CN12-1M			GX8CrNi12			G-X8CrNi12	20Ch12WNMFL				
	4	422920	ZGMn13-1-4			Z120M12M	XG120Mn12	SCHMnH1 až 3	G-X120Mn13	1.3802	C120G13	AöMn10	110G13L		BW 10	B-1 až 4	AM-X120Mn12
	4	422921				Z120M12-M	G X120MnCr 12 02	SCMnH 11			L120G13H					Gr.C	
	3	422931	ZG1Cr18Ni9			Z6CN 18-10M	G X6CrNi 20 10	SCS 12	G-X10CrNi 18 8	1.4312	LH18N9		10Ch18N9L	2333	302C25	CF-16F	
	3	422932				Z 25 CN 20-10 M	G X30CrNi 20 10		G X25CrNiSi 18 9	1.4825					302C35	CF 20	
	3	422933				Z6CNNb1810-M	GX8CrNiNb2011	SCS21	G-X7CrNiNb189		LH18N9T	G-X5CrNiNb 189	10Ch18N9TL		347C17	CF-8C	AM-X7CrNiNb2010
	3	422934						SCH 12	G X40CrNiSi 22 9	1.4826	LH23N18C		40Ch24N12SL		309C30	HF	
	3	422936				Z40CN 25-12 M	G X35CrNi 25 12	SCH 13A	G-X40CrNiSi 25 12	1.4837			40Ch24N12SL		309C35	HH	
	2	422938											12Ch21N5G2STL				
	3	422941				Z 6CNDNb 18 12-M	G X6CrNiMoNb 20 11	SCS 22			LH18N10M2T	G-X5CrNiMoNb 18 10	10Ch18N12M3T		318C17	CF 3 MN	
	3	422942				Z6CND 18-12 M	G X6CrNiMo 20 11	SCS 14	G-X10CrNiMo 18 9	1.4410	LH18N10M2			2243	315C16	CF-8M	
	3	422944					G X35CrNi 28 09	SCH 17							309C40	HE	
	3	422952				Z40CN 25-20 M	G X40CrNi 26 20	SCH 22	G-X40CrNiSi 25 20	1.4848	LH25N19S2		20Ch25N19S2L		310C40	HK	F.8452
	3	422953									LH21N5		12Ch21N5G2SL				
	3	422955					G X50NiCr 39 19	SCH 20	G-X40NiCrSi 35 25						331C40	HU	
	3	422958				Z 6NCDV 25-20-04 M	G X5NiCrCuMo 29 21	SCS 15	G X7CrNiMoCuNb 18 18					2564		CN-7M	

ISO 513	Subgroup	International equivalents															
		CZ	PRC	EU	ISO	F	I	J	D	D	PL	A	RUS	S	GB	USA	E
		ČSN	GB	EN	ISO	AFNOR	UNI	JIS	DIN	W.-nr	PN	ONORM	GOST	SS	BS	AISI/SAE	
K	3	422303				FGS 370-71	GS 370-17	FCD 370	GGG-35.3		Zs 35022		VČ 38-17	0717-15	Gr.350/22		FGE 38-17
	3	422304			400-12	FGS400-12	GS400-12	FCD40	GGG40		Zs40015		VČ40	0717-00	Gr.420-12	Gr.60-40-18	FGE 42-12
	3	422305		GJS 500-7	500-7	FGS 500-7	GS 500-7	FCD 500	GGG-50		Zs 50007	GGG 500	VČ 50-2	0727-02	500/7	65-45-12	FGE 50-7
	4	422306			600-3	FGS600-3	GS600-3	FCD60	GGG60		Zs60003	GGG600	VČ60	0732-03	Gr.600/3	Gr.80-55-06	FGE60-2
	4	422307		GJS-700-2	700-2	FGS 700-2	GS 700-2	FCD 700	GGG-70		Zs70002	GGG-700	VČ 70-3	0737-01	Gr.700/2	100-70-03	FGE 70-2
	4	422308			800-2	FGS800-2	GS800-2	FCD80	GGG80		ZS80002		VČ80		Gr.800/2	Gr.120-90-02	FGE 80-2
	1	422410			Gr.100	Ft10	G10	FC-100	GG10		ZI100	GG100	SČ10	0110-00		Class 20B	FG10
	1	422415				FGL 150	G 15	FC 150	GG-15		ZI 150	GG 150	SČ 15	0115-00	Gr.150	C1.25B	FG 15
	1	422420		FG20	Gr.200	Ft20	G20	FC-20	GG20		ZI200	GG200	SČ20	0120-00	Gr.220	Class 30B	FG20
	1	422425				FGL 250	G 25	FC 250	GG-25		ZI 250	GG-250	SČ 25	0125-00		C1.35B	FG 26
	1	422430			Gr.300	Ft 30	G 30	FC 300	GG-30		Z1 300	GG-300	SČ 30	0130-00	Gr. 300	No. 45	FG 30
	1	422435				Ft35	G35	FC35	GG35		ZI350	GG-350	SČ35	0135-00	Gr.350	Class50B	FGG35
	1	422456				FBO							AČS-15		1C		
	1	422465									ZISi5		ŽČS5				
	1	422472											ŽČCh 2			Type D, C1.III	
	1	422481									ZIAL7Cr		ŽČJu7Ch2				
	2	422532				MN 32-8	B 32-12	FCMB 310			Zcc 32000		KČ 33-8	0815-00	B 310/10		Type B
	2	422533			B-35-10	MN35-10	B35-10	FCMB35	GTS35-10		Zcc35010	GTS-350	KČ35-10	0815-00	B35-12	Gr.32510	Type A
	2	422534															
	2	422536			W35-04	MB35-7	GMN35	FCMN34	GTW35-04		Zcb 35004	GTW-350			W35-04		Type B
	2	422540			W 40-05	MB 400-5	GMN 40	FCMW 370	GTW 40-05		Zcb 40005	GTW 400			W 40-05		42 2540
	2	422545			P45-06	MN 450-6	P45-06	FCMP 440	GTS 45-06		Zcp 45006	GTS-450	KČ 45-7	0854-00	P45-06	Gr.45006	Type E
	2	422555			P55-04	MN 550-4	P55-04	FCMP 540	GTS 55-04		Zcp55004		KČ 55-4		P55-04	6004	Type C

PRAMET

ISO 513	Subgroup	CZ	PRC	EU	ISO	F	I	J	D	D	PL	A	RUS	S	GB	USA	E
		ČSN	GB	EN	ISO	AFNOR	UNI	JIS	DIN	W.-nr	PN	ONORM	GOST	SS	BS	AISI/SAE	
N	4	423001		Cu-ETP	Cu-ETP	Cu-a1	Cu9	C1100	E2-Cu58		Cu99,9E	Cu-E	Cu99,9	5010	C101	C110000	
	4	423001		Cu-ETP	Cu-ETP	Cu-a1	Cu9	C1100	E2-Cu58		Cu99,9E	Cu-E	Cu99,9	5010	C101	C110000	
	4	423001		Cu-ETP	Cu-ETP	Cu-a1	Cu9	C1100	E2-Cu58		Cu99,9E	Cu-E	Cu99,9	5010	C101	C110000	
	4	423001		Cu-ETP	Cu-ETP	Cu-a1	Cu9	C1100	E2-Cu58		Cu99,9E	Cu-E	Cu99,9	5010	C101	C110000	
	4	423001		Cu-ETP	Cu-ETP	Cu-a1	Cu9	C1100	E2-Cu58		Cu99,9E	Cu-E	Cu99,9	5010	C101	C110000	
	4	423001		Cu-ETP	Cu-ETP	Cu-a1	Cu9	C1100	E2-Cu58		Cu99,9E	Cu-E	Cu99,9	5010	C101	C110000	
	4	423001		Cu-ETP	Cu-ETP	Cu-a1	Cu9	C1100	E2-Cu58		Cu99,9E	Cu-E	Cu99,9	5010	C101	C110000	
	4	423001		Cu-ETP	Cu-ETP	Cu-a1	Cu9	C1100	E2-Cu58		Cu99,9E	Cu-E	Cu99,9	5010	C101	C110000	
	4	423001		Cu-ETP	Cu-ETP	Cu-a1	Cu9	C1100	E2-Cu58		Cu99,9E	Cu-E	Cu99,9	5010	C101	C110000	
	4	423004						C1821			Cu99,7G	Cu-C	M2				
	4	423005							C-Cu		Cu 99,56		M3		C107	C 14200	
	4	423016		CuSn6	CuSn6	CuSn6P		C5191	CuSn6		CuSn6	CuSn6	BrOF6,5-0,15	CuSn6	PB102	C51900	
	4	423018		CuSn8	CuSn8	CuSn9P	P-CuSn8	C5212	CuSn8		CuSn8	CuSn8	BrOF-0,2		PB104	C52100	CuSn8P
	4	423042		CuAl5As	CuAl5	CuAl6	P-CuAl5		CuAl5As		CuAl5As	CuAl5As	BrA5			C60800	CuAl5
	4	423044			CuAl9Mn2				CuAl9Mn2				BrAMc9-2				CuAl9Mn2
	4	423045			CuAl8Fe3								BrAZ9-4			C61900	
	4	423046		CuAl10Fe3Mn2	CuAl10Fe3				CuAl10Fe3Mn2		CuAl10Fe3Mn2	CuAl10Fe3Mn2	BrZMc10-3-1,5				CuAl10Fe3Mn2
	4	423047		CuAl10Ni5Fe4	CuAl10Ni5Fe4	CuAl9Ni5Fe3	P-CuAl10Fe5Ni5	C6301	CuAl10Ni5Fe4		CuAl10Ni5Fe4	CuAl10Ni5Fe4	BrAZN10-4-4		CA104	C63000	CuAl10Fe5Ni5
	4	423048															
	4	423053		CuSi3Mn1	CuSi3Mn1		P-CuSi3Mn1				CuSi3Mn1	CuSi3Mn	BrKMc3-1		CS101	C65500	CuSi3Mn1
	3	423058			CuCd1						CuCd1		BrKd1		C108	C16200	
	3	423064							CuNi30Mn								
	4	423065			CuNi44Mn1	CuNi44Mn	P-CuNi44Mn1		CuNi44Mn1		CuNi44Mn1	CuNi44Mn1	MNMc43-0,5				CuNi44Mn1
	3	423115			CuSn5												
	3	423119		CuSn10-C	CuSn10	CuSn8	G-CuSn10		G-CuSn10		CuSn10			CuSn10	CT1	C90700	CuSn10
	4	423120		CuSn11P-C	CuSn10P				CuSn10P		CuSn10P		Br 010F1		PB1		
	4	423120		CuSn11P-C	CuSn10P				CuSn10P		CuSn10P		Br 010F1		PB1		
	3	423121						C2	G-CuPb5Sn							C92700	
	3	423122		CuSn10Pb10-C	CuPb10Sn10	CuSn10Pb10	G CuPb10Sn10	LBC3	G-CuPb10Sn		CuPb10Sn10		BrO10S10	CuPb10Sn10	LB2	C93700	CuPb10Sn10
	4	423123		CuSn12-C	CuSn12	CuSn12	G-CuSn12		G-CuSn12					CuSn12	PB2	C91700	CuSn12
	4	423123		CuSn12-C	CuSn12	CuSn12	G-CuSn12		G-CuSn12					CuSn12	PB2	C91700	CuSn12
	4	423123		CuSn12-C	CuSn12	CuSn12	G-CuSn12		G-CuSn12					CuSn12	PB2	C91700	CuSn12
	3	423135		CuSn5Zn5Pb5-C	CuPb5Sn5Zn5	CuSn5Pb5Zn5	G-CuSn5Zn5Pb5	BC6	G-CuSn5Zn5Pb		CuSn5Zn5Pb5		BrO5C5S5	CuSn5Pb5Zn5	LG2	C83600	CuSn5Zn5Pb5
	3	423135		CuSn5Zn5Pb5-C	CuPb5Sn5Zn5	CuSn5Pb5Zn5	G-CuSn5Zn5Pb5	BC6	G-CuSn5Zn5Pb		CuSn5Zn5Pb5		BrO5C5S5	CuSn5Pb5Zn5	LG2	C83600	CuSn5Zn5Pb5
	3	423135		CuSn5Zn5Pb5-C	CuPb5Sn5Zn5	CuSn5Pb5Zn5	G-CuSn5Zn5Pb5	BC6	G-CuSn5Zn5Pb		CuSn5Zn5Pb5		BrO5C5S5	CuSn5Pb5Zn5	LG2	C83600	CuSn5Zn5Pb5
	3	423138			CuSn10Zn2		G-CuSn10Zn2	BC3	G-CuSn10Zn		CuSn10Zn2		BrO10C2	CuSn10Zn2	B1	C90500	CuSn10Zn2
	3	423138			CuSn10Zn2		G-CuSn10Zn2	BC3	G-CuSn10Zn		CuSn10Zn2		BrO10C2	CuSn10Zn2	B1	C90500	CuSn10Zn2
	4	423144											BrA9Mc2L				
	4	423144											BrA9Mc2L				
	4	423145		CuAl10Fe2-C	CuAl10Fe3	CuAl10Fe3	G-CuAl10Fe3	AlBC1	G-CuAl10Fe		CuAl10Fe3		BrA9Z3L	CuAl10Fe3	AB1	C95200	CuAl10Fe3
	4	423145		CuAl10Fe2-C	CuAl10Fe3	CuAl10Fe3	G-CuAl10Fe3	AlBC1	G-CuAl10Fe		CuAl10Fe3		BrA9Z3L	CuAl10Fe3	AB1	C95200	CuAl10Fe3
	4	423146									CuAl10Fe3Mn2		BrA10Zn3Mc2				
	4	423146									CuAl10Fe3Mn2		BrA10Zn3Mc2				
	4	423147		CuAl10Fe5Ni5-C	CuAl10Fe5Ni5	CuAl10Fe5Ni5		AlBC3	G-CuAl10Ni		CuAl10Fe4Ni4		BrAl10Z4N4L	CuAl10Fe5Ni5	AB2	C95500	CuAl10Fe4Ni5
	4	423147		CuAl10Fe5Ni5-C	CuAl10Fe5Ni5	CuAl10Fe5Ni5		AlBC3	G-CuAl10Ni		CuAl10Fe4Ni4		BrAl10Z4N4L	CuAl10Fe5Ni5	AB2	C95500	CuAl10Fe4Ni5
	3	423183							G-CuPb22Sn								
	3	423184			CuPb30			KJ3	CuPb30				BrS30				
	3	423200		CuZn5	Cu-Zn5	CuZn5		C21000	CuZn5		CuZn5		L 96		CZ125	Cu-5Zn	CuZn5
	3	423201		CuZn10	CuZn10	CuZn10	P-CuZn10	C2200	CuZn10		CuZn10	CuZn10	L90		CZ101	C22000	CuZn10
	3	423202		CuZn15	CuZn15	CuZn15	P-CuZn15	C2300	CuZn15		CuZn15	CuZn15	L85	CuZn15	CZ102	C23000	CuZn15
	3	423203		CuZn20	CuZn20	CuZn20		C2400	CuZn20		CuZn20	CuZn20	L80	CuZn20	CZ103	C24000	CuZn20
	3	423210		CuZn30	CuZn30	CuZn30	P-CuZn30	C2600	CuZn30		CuZn30	CuZn30	L70	CuZn30	CZ106	C26000	CuZn30

ISO 513	Subgroup	International equivalents																
		CZ	PRC	EU	ISO	F	I	J	D	D	PL	A	RUS	S	GB	USA	E	
		ČSN	GB	EN	ISO	AFNOR	UNI	JIS	DIN	W.-nr	PN	ONORM	GOST	SS	BS	AISI/SAE		
N	4	423212		CuZn33		CuZn33	P-CuZn33	C2680	CuZn33		CuZn33	CuZn33	L68				CuZn33	
	3	423213		CuZn36	CuZn37	CuZn36	P-CuZn37	C2720	CuZn37		CuZn37	CuZn37	L63	CuZn37	CZ108	C27400	CuZn37	
	4	423214		CuZn35Pb1	CuZn35Pb1	CuZn35Pb2	P-CuZn35Pb2	C3501	CuZn36Pb1,5		CuZn36Pb1,5	CuZn36Pb1,5	LS63-2		CZ 118	C34000	CuZn35Pb2	
	4	423220		CuZn40	CuZn40	CuZn40	P-CuZn40	C2801	CuZn40		CuZn40	CuZn40	L60		CZ109	C28000	CuZn40	
	4	423221		CuZn37Pb1	CuZn37Pb1	CuZn39Pb0,8	P-CuZn39Pb1	C3501	CuZn39Pb0,5				LS60-1	CuZn40Pb	CZ123	C36500	CuZn40Pb	
	4	423222		CuZn38Pb1	CuZn39Pb1			C3710	CuZn38Pb1,5		CuZn38Pb1,5	CuZn38Pb1	LS 59-1	CUZN38Pb1	CZ129	C37000	CuZn39Pb1	
	4	423223		CuZn39Pb2	CuZn40Pb2	CuZn39Pb2	P-CuZn40Pb2	C3771	CuZn40Pb2		CuZn40Pb2		LS 60-2	CuZn40Pb2	CZ 120	C37700	CuZn39Pb2	
	4	423231			CuZn39AlFeMn		CuZn39Al1FeMn1	C6782	CuZn40Al1		CuZn39Al1Fe1Mn1	CuZn37Al					CuZn39Al1FeMn	
	4	423234		CuZn40Mn2Fe1					CuZn40Mn2		CuZn40Mn1,5		Lmc58-2		CZ136			
	4	423237		CuZn38Sn1AS	CuZn38Sn1	CuZn38Sn1	P-CuZn39Sn1	C4640	CuZn38Sn1		CuZn38Sn1	CuZn39Sn	LO60-1		CZ 112	C46400	CuZn38Sn1	
	4	423256			CuNi15Zn21	CuNi15Zn22					CuNi15Zn21		MNC15-20		NS105		CuNi15Zn21	
	4	423303		CuZn16Si4-C				SzBC2	G-CuZn15Si4		CuZn16Si3,5		LC15K4			C87500		
	4	423311		CuZn25Al5Mn4Fe3-C	CuZn25Al6Fe3Mn3	CuZn19Al6Y20		HBsC4	G-CuZn25Al5				LC23AŽ3Mc			C86200	CuZn25Al6FeMn3	
	3	423313		CuZn33Pb2-C	CuZn33Pb2	CuZn33Pb-Y20	G-CuZn34Pb2	YBsC2	G-CuZn33Pb					CuZn33Pb2	SCB3		CuZn33Pb	
	3	423319					G-CuZn40											
	4	423320														C86500		
	4	423321		CuZn37Al1-C		CuZn40Y40	G-CuZn38Pb2	YBsC3	G-CuZn37Al1				LC40S	CuZn39Pb2Al	DCB1	C85800	CuZn40Pb	
	4	423322		CuZn32Al2Mn2Fe1-C	CuZn35AlFeMn	CuZn30AlFeMn	G-CuZn38Al1Fe1Mn1	HBsC1	G-CuZn34Al2		CuZn38Al2Mn1Fe			CuZn35AlFeMn	HTB1	C86400	CuZn35AlFeMn	
	1	424002		AW-Al99,8 (A)	Al99,8 (A)	1080A	P-Al99,8	1080A	Al99,8		Al99,8	Al99,8	AD000		1080A		Al-99,8 (A)	
	1	424003		AW-Al99,7	Al99,7	1070A	P-Al99,7	1070	Al99,7		Al99,7	Al99,7	AD00	Al99,7			Al-99,7	
	1	424004		AW-EAl99,5	E-Al99,5				E-Al		Al99,5E	E-Al	ADOE	EAl99,5	1350	1350	Al 99,5E	
	1	424005		AW-Al99,5	Al99,5	1050A	P-Al99,5	1050	Al99,5		Al99,5	Al99,5	ADO	Al99,5	1050A	A91060	Al-99,5	
	2	424201		AW-AlCu4MgSi	AlCuMgSi	2017A	P-AlCu4MgMnSi	2017	AlCuMg1		AlCuMg1	AlCuMg1	D1			A92017	Al-4CuMg	
	2	424203		Al-P2024	AlCu4Mg1	2024	P-AlCu4,4MgMn	2024	AlCuMg2		AlCu4Mg2	AlCuMg2	D16		2024	2024	Al-4Cu1Mg	
	2	424206									AlCu2SiMn		AK6					
	2	424218		AW-AlCu2Mg1,5Ni		2618A		2618			AlCu2Mg2Ni1		AK-1		2618A	A92618	Al-2CuMgNi	
	2	424222		Al-P7075	AlZn6MgCu	7075	P-AlZn5,8MgCuCr	7075	AlZnMgCu1,5		AlZn6Mg2Cu	AlZnMgCu1,5	V95		7075	A97075	Al-6ZnMgCu	
	2	424237		AW-AlSi12,2MgCuNi		4032	P-AlSi12MgCuNi	4032								A94032	Al-12SiNi	
	2	424253				2024-F	P-AlCu4,5MgMnplacc.		AlCuMg2pl				D16P			AlcladA9024		
	2	424254		AW-AlCu4PbMg	AlCu4PbMg	2030			AlCuMgPb									
	2	424315			Al-Cu4Ni2Mg2	A-U4NT	G-AlCu4NiMg	AC5A	G-AlCu4NiMg				AL1		AlCu4Ni2Mg2	A02420	Al-4Cu2NiMg	
	2	424330		AC-AlSi12(a)	Al-Si12	A-S12U	G-AlSi13CuMn	AC3A	G-AlSi11		AlSi11	GAlSi12	AK12	AlSi12Cu	LM20	A04130	Al-12Si1Cu	
	2	424331		AC-AlSi10Mg (A)	Al-Si10Mg	A-S10G	G-AlSi9Mg	ADC3	G-AlSi10Mg		AlSi9Mg	G AlSi10Mg	AK9	AlSi10Mg		A-0359.0		
	2	424332		AC-AlSi7Mg	Al-Si7Mg(FE)	A-S7G	G-AlSi7Mg				AlSi7Mg		AK7	AlSi7MgFe	LM25	A03560	Al-7SiMg	
	2	424336		AC-AlSi12CuNiMg		A-S11UNG		AC8A			AlSi13Mg1CuNi		AK12M2MgN		LM13		Al-12SiNi	
	2	424337				A-S9GU												
	2	424357			Al-SiCu3	A-S5U3G	G-Al5,5Cu	AC2A	G-AlSiCu4		AlSiCu4	GAlSi6Cu4	AK5M4	AlSi6Cu4	LM21	A03080	Al-6Si4Cu	
	2	424361				A-U8S										A02130	Al-7CuSi	
	2	424380											Al 5					
	2	424386				A-S18UNG		AC9A							LM28			
	1	ONZ 424400		Al-P6082	AlSi1MgMn	6082	P-AlSi1MgMn	6061	AlMgSi1		AlSi1MgMn	AlMgSi1	AD35	AlSi1MgMn	6082	A96061	Al-1SiMgMn	
	1	ON 424406		AW-Al99,98Mg0,5					AlRMg0,5									
	1	424412		AW-AlMg2	AlMg2	5052	P-AlMg2,5	5052	AlMg2,5		AlMg2	AlMg2,5	AlMg2	AlMg2,5	5251	A95052	Al-2,5Mg	
	1	424413		AW-AlMg3	AlMg3	5154 A	P-AlMg3,5	5154	AlMg2,7Mn		AlMg3	AlMg3	AMg3	AlMg3	5454	A95154	Al-3Mg	
	2	424415		AW-AlMg4	AlMg4,5Mn0,7	5183	P-AlMg4,4	5082	AlMg4,5		AlMg4,5Mn	AlMg4,5Mn	AMg4,5	AlMg4,5Mn	5083	A95083	Al-5Mg	
	1	ONZ 424432		AW-AlMn1	AlMn1	3103	P-AlMn1,2Cu	3003	AlMn1		AlMn1	AlMn	Amc	AlMn	3103	A93003	Al-1Mn	
	2	424515		AC-AlMg5Si	AlMg5Si1	A-G6			G-AlMg5Si		AlMg5Si1		AMg5K	AlMg5Si	LM5			
	2	424518																
	2	424519		AC-AlMg9	AlMg10	A-G10SY4		ADC5	GD-AlMg9				AMg10		LM10	A05200		

PRAMET

ISO 513	Subgroup	International equivalents															
		CZ	PRC	EU	ISO	F	I	J	D	D	PL	A	RUS		GB	USA	E
		ČSN	GB	EN	ISO	AFNOR	UNI	JIS	DIN	W.-nr	PN	ONORM	GOST	SS	BS	AISI/SAE	
S	2	Uranus B6				Z2NCDU25-20			X1NiCrMoCu25 20 5	1.4539				2562		904 L,UNSV0890A	
	2	Z8NCTV25-15BFF				E-Z 6 NCTDV 25.15			X5NiCrTi 2615	1.4980				2570		660	
	2	Incoloy 800 HT				Z10NC32-21			X10NiCrAlTi3221	1.4876						B 163	
	2	G-X40NiCrSi38 18					XG50NiCr39 19	SCH15	G-X40NiCrSi38 18	1.487					330C11		
	2	X5NiCrAlTi 31 20							X5NiCrAlTi 31 20	1.496						N 08330	
	2	X12NiCrSi 36 16				Z12NCS35-16	F-3313	SUH330	X12NiCrSi 36 16	1.4864						330	
	2	X2NiCrAlTi 32 20							X2NiCrAlTi 32 20	1.456					NA 15	N 08800	
	2	X1NiCrMoCu 32 28 7							X1NiCrMoCu 32 28 7	1,456						N 08831	
	2	X1NiCrMoCuN 31 27 4				Z1NCDU31-27-03			X1NiCrMoCuN 31 27 4	1.4563				2584		N08028	
	2	A -286							X 5 Ni CrTi 25 15							AMS 5732 - 5737	
	2	X40CoCrNi20 20				Z42CNKDWNb			X40CoCrNi20 20	1,498							
	3	Ni70Cu30			NiCu30	NiCu32Fe1,5Mn			NiCu30Fe		NiCu30		NMZMc28-2,5-1,5				
	3	NiFe17CuCr							NiFe16CuCr								
	3	NiFe48							NiFe47		NiFe49Pr						
	3	NiCr21Mo16Al														ALLOY 59	
	3	NiCr21Mo16W														INCONEL alloy 686	
	3	NiCrCo18Ti														NIMONIC alloy 90 (HEV6)	
	3	NiCo20Cr15MoAlTi														NIMONIC alloy 105	
	3	NiMoCr15W				NiMo16Cr16										UNS N10276	
	3	NiCr22Mo9Nb				NC22DNb											
	3	CoCr23Ni10W7Ta4														MAR-M509	
	3	Hastelloy C-4							NiMo16CrTi	2,461							
	3	Hastelloy X				NC22FeD				2.4603						AMS 5754	
	3	Hastelloy B				ND37FeV			S-NiMo30	2.4800						AMS 5396	
	3	Hastelloy C & C 276				ND16C15			G-NiMo30	2.481						AMS 5750	
	3	Nimonic C-263								2.4650							
	3	Nimonic 90				Nc20ATV			NiCr20Co18Ti	2.4632							
	3	Nimonic PE 13				NC22FeD			NiCr22Fe18Mo	2.4665						AMS 5754 E	
	3	Nimonic 115				NCK15ATD			NiCo15Cr15MoAlTi	2.4636							
	3	Nimonic 263 /C263				NCK20D			NiCr15Co19MoTi	2.4650							
	3	Nimonic 105				NCKD20ATV			NiCo20C15MoAlTi	2.4634							
	3	Nimonic PK33				NC19KDUV			NiCr20Co16MoTi								
	3	Nimonic 80A_				NC20TA			NiCr20TiAk	2.4631			EI –437 B		HR401,601	UNS N07080	
	3	Nimonic 901				ZSNCDT42			NiCr15MoTi	LW2 4662						AMS 5661 A	
	3	Nimonic PK 25				NK0D20ATU			NiCr18CoMo	2.4666						AMS 5753	
	3	Nimonic PE 16				NW11AC			NiFe33Cr17Mo								
	3	Nimonic 75				NC20T			NiCr20Ti	2.4630					HR5,203-4		
	3	Nimocast 842				NC13AD			S-NiCr13Al6MoNb	LW2.4670						SAE 5391 A	
	3	Inconel 600				NC15Fe			NiCr15Fe	2.4816						AMS 5665	
	3	Inconel 601							NiCr23Fe	2.4851						AMS 5715	
	3	Inconel 617			-	-	-		-		-	-	-	-		N06617	
	3	Inconel 625				NC22FeDNB			NiCr22Mo9Nb	2.4856						5666	
	3	Inconel 690				NC 30 Fe			NiCr29Fe	2.464							
	3	Inconel 706				38C16NBT										AMS 5702	
	3	Inconel 713				NC12AD			S-NiCr13Al6MoNb	LW2.4670						AMS 5391	
	3	Inconel 718				NC19FeNB			NiCr19Fe19NbMo	LW2.4668					HR8	AMS 5589	
	3	Inconel 722				NC16FeTi			NiCr16FeTi							AMS5541	
	3	Inconel X-750				NC15FeTNbA										AMS 5667	
	3	Inconel X-750				NC16FeTNb			NiCr16FeTi	2.4669						AMS 5582	
	3	Inconel 751							NiCr16Fe7TiAl	2,469							
	3	Incoloy 825				NC21FeDU			NiCr21Mo	2.4858							
	3	Incoloy 901				ZSNCDT42			NiFe35Cr14MoTi	LW2.4662						AMS 5660	

ISO 513	Subgroup	International equivalents															
		CZ	PRC	EU	ISO	F	I	J	D	D	PL	A	RUS	S	GB	USA	E
		ČSN	GB	EN	ISO	AFNOR	UNI	JIS	DIN	W.-nr	PN	ONORM	GOST	SS	BS	AISI/SAE	
S	3	René 41				NC19KDT			NiCr19Co11MoTi	2.4973						AMS 5399	
	3	René 95				NC14K8											
	3	Monel 400				NU30			NiCu30Fe	2.4360							
	3	Monel K-500				NU 30 AT			NiCu30Al	2.438					NA 18	4676	
	3	Udimet 500				NCK19DAT			NiCr18Co18MoTi	2.4983						AMS 5751	
	3	Udimet 710				NCK18TDA											
	3	Udimet 700				NCK20AT			NiCo15CrMoAlTi	2.4636							
	3	Udimet 718				NC19FeN			NiCr19Fe19NbMo	LW2.4668						5383	
	3	Udimet 720				NC18K15TDA											
	3	Waspaloy				NC20K14			NiCr19Fe19NbMo	LW2.4668						AMS 5544	
	4	Haynes 25				KC20WN				LW2.4964						AMS 5759	
	4	Haynes 188				KC22WN										AMS 5772	
	4	Air Resist 213			-	KC20WN	-		CoCr20W15Ni		-	-	-	-		5537C	
	4	Jetalloy 209			-	KC22WN	-		CoCr22W14Ni		-	-	-	-		AMS 5772	
	1	Ti 1 Pd							Ti 1 Pd	3,723					TP 1	R 52250	
	1	TiAl 3 V 2.5							TiAl 3 V 2.5	3,720							
	1	TiAl6V4ELI							TiAl6V4ELI						TA11	AMS R56401	
	1	TiAl5Sn2.5				T-A5E			TiAl5Sn2.5	3.7115					TA14/17	AMS R54520	
	1	TiAl5Sn2							TiAl5Sn2	3,712							
	1	TiAl6Sn2Zr4Mo2Si							TiAl6Sn2Zr4Mo2Si	3,715						R 54620	
	1	TiAl6V4				T-A6V			TiAl6V4	3.7165					TA10-13/TA28	AMS R56400	
	1	TiAl6V6Sn2							TiAl6V6Sn2	3,718							
	1	TiAl4Mo4Sn2Si0,5				T-A4DE			TiAl4Mo4Sn2Si0,5	3,719					TA 45-51/TA 57		

PRAMET

ISO 513	Subgroup	International equivalents															
		CZ	PRC	EU	ISO	F	I	J	D	D	PL	A	RUS	S	GB	USA	E
		ČSN	GB	EN	ISO	AFNOR	UNI	JIS	DIN	W.-nr	PN	ONORM	GOST	SS	BS	AISI/SAE	
H	4	12 010.4	10	2C10	C10	XC10	C10	S9CK	C10	1.1121	10	RC12	08	1265	045A10	Gr. 1010,1011,M1010	C10k
	4	12 020.4	15	C15E	C15E4	C18RR	C15		C15	1.1141				1370-40	080M15	Gr.1016	C16k
	4	12 023.4	15	C15E	C15E4	XC15	C15	S15C	C15	1.1141	15	RC15	15		040A15	Gr.1015	
	4	12 024.4	20	C 22	C 25	XC 18	C 21	S 22C	C 22	1.0402	20		20	1450	070M20	1020	
	4	12 071.4		1 CS67		C 68	C 67	S 70C-CSP	Ck 67				65		080A67	Gr.1070	
	4	14 100.4	G Cr15	100Cr6	Type 1-0	100C6	100Cr6	SUJ 2	100Cr6		LH 15		Šch 15	2258	534A99	52100	F.1311
	4	14 109.4	GCr 15	100Cr6	Type 1-0	100Cr6	100Cr6	SUJ 2	100Cr6	1.3505	LH 15		ŠCh15	2258	535 A99	52100	100Cr6
	4	14 120.4	15Cr	15Cr2	37Cr4	12C8		SCr 415	15Cr3	1.7015	15 H		15Ch		523M15	5015	
	4	14 209.4	Cr9SiMn	100CrMn6	TYPE 3	100CM6		SUJ3	100CrMn6	1.3520	LH15SG		ŠCh15SG		535A99	Gr.2	100CrMn6
	4	14 220.4	15CrMn	16MnCr5	TYPE 5	16MC5	16MnCr5		16MnCr5	1.7131	15HG		18ChG	2127	527M17	No.5115	16MnCr5
	4	14 221.4	20CrMn	20MnCr5	Type 7	20MC5	20MnCr5	SMnC 420 H	20MnCr5	1.7147	18HGT		18ChG			5120	F.150.D
	4	14 223.4											18ChGT				
	4	14 231.4											30ChGT				
	4	14 260	60Si2CrA			54SiCr6	48Si7	SUP7	54SiCr6	1.7102	60S2		60S2ChA	2090	250A61	9260	
	4	15 340.4	38CrMoAl			40CAD 6.12	41CrAlMo7	SACM 645	41CrAlMo7	1.8509	38HMJ		38Ch2MJuA		905M39	Cl. A	41CrAlMo7
	4	16 220.4	12CrNi2	15NiCr6		16NC6	16CrNi4		15CrNi6	1.5713	15HN		12ChN2	2512	815M17	Gr.4320	16NiCr4
	4	16 231.4				20NC6	20CrNi4		19CrNi8				20Ch2N4A		822M17	3120	
	4	16 420.4				13NiCr14		SNC815	14NiCr14	1.5752			12Ch2N4A		655H13	E3310X	
	4	16 532.4									30HGSNA		30ChGSN2A				
	4	16 720.4									18H2N4WA		18Ch2N4MA				
	3	17 023.4	3Cr13	X30Cr13	Type 5	Z30Cr13	X30Cr13	SUS420J2	X30Cr13	1.4028	3H13		30Ch13	2304-03	420S45	Type 420	2304-03
	3	17 024.4	4C13	X39Cr13	Type 6	Z40C13	X40Cr14		X39Cr13	1.4031	4H13		40Ch13		X39Cr13	Type 420	X39Cr13
	3	17 029.4								1.4034							
	4	17 042.4									H18		95Ch18			440C	
	4	19 083.4				Y342			C45W3	1.1730		K945					F.5131
	4	19 103.4				Y355		SK7	C60W3	1.1740	N5	K960					
	4	19 125.9				Y365		SK 7	C67W	1.1744	N6						
	4	19 132.4	T 7	CT 70	C 70 U	C70 E2U	C 70 KU	SK 6	C 70 W2		N7	K 970	U7-1			W 1-7	F.5103
	4	19 133.4	T7	CT70	C70U	Y170	C70KU	SK6	C70W	1.1620	N7	K970	U7				C70U
	4	19 152.4	T8	CT80	C80U	Y180	C80KU	SK5	C80W2	1.1625	N8	K980	U8-1		BW1A	W1Gr.A	C80U
	4	19 191.4	T10A	CT105	C105U	C105E2U	C100KU	SK3	C105W1	1.1645	N10E	K990	U101	1880	BW1B	W5	C102U
	4	19 192.4	T 10	CT 105	C 90 U	C 105 E2U	C 100 KU	SK 3	C 105 W2		N 10	K990	U 10-1			W 110	F.5117
	4	19 221.4	T11	CT120	C120U	Y2120	C120KU		C110W2	1.1654	N12	K990	U12-1		BW1C		F-5123
	4	19 255.4		CT 120	TC 120	C120 E3U	C120 KU	SK 2	C125 W	1.1663	N 12	K 995	U 13-1			W 112	C120 U
	4	19 312.4		90MnV8	90MnCrV8	90MnV8	90MnVCr8KU		90MnCrV8	1.2842	NMV	K720	9G2V		B02	02	90 MnCrV 8
	4	19 313.4		90MnV8	90MnCrV8	90MnV8	90MnVCr8 KU		90MnCrV8		NMV	K 720	9GF2		BO 2	02	90MnCrV8
	4	19 340.4		60SiMn7		60Si8	56SiMn7 KU		70SI7					No 22			
	4	19 356.4		100 V2	TCV 105	C 105 E2 UV1	102 V2 KU	SKS 43	100 V1	1.2833	NV	K 760			BW 2	W 210	100 V2
	4	19 418.4							80CrV5		NCV 1		8Ch				80CrV2
	4	19 419.4							80CrV2		NCV 1		8Ch				80CrV2
	4	19 420.4	Cr 06			Y2 140 C		SKS 8	140Cr2	1.2008	NC 5	K 205	13Ch				140Cr2
	4	19 421.4		107CrV3			107CrV3KU		115CrV3	1.2210		K510				L2	120CrV2
	4	19 422.4							145Cr6		NC 6	K 505					
	4	19 423.4						SKC 11	90Cr3	1.2056			9ChF			L 2	
	4	19 426.4	9CV2						85Cr7			K 201	9Ch1				
	1	19 434.4		X21Cr13		X20Cr13	X21Cr13KU		X20Cr13 1.2082	1.2082							X20Cr13 F5261
	3	19 435.4		X41Cr13	X40Cr14	X40Cr14	X41Cr13KU	SUS 420 J2	X42Cr13		4H13		40Ch13	2314	420S45		F.5263
	4	19 436.4		X210Cr12	C210Cr12	Z200C12	X205Cr12KU	SKD1	X210Cr12	1.2080	NC11	K100	Ch12		BD3	D3	X210Cr12
	4	19 437.4		X210CrW 12-1	X210CrW12	X210CrW 12-1	215CrW 12-1 KU		X210CrW12					2313			2313
	4	19 452.4				Y60SC7			58SiCr8	1.2103		K244					
	4	19 487.4							21MnCr5	1.2162							
	1	19 501		100CrMo7		100CD7	100CrMo7	SUJ4	100CrMo7	1.2303						L7	F.520.F

ISO 513	Subgroup	International equivalents																
		CZ	PRC	EU	ISO	F	I	J	D	D	PL	A	RUS	S	GB	USA	E
		ČSN	GB	EN	ISO	AFNOR	UNI	JIS	DIN	W.-nr	PN	ONORM	GOST	SS	BS	AISI/SAE	
H	4	19 501.4		100CrMo7		100CD7	100CrMo7	SUJ4	100CrMo7	1.2303						L7	F.520.F
	3	19 512.4				45CDV6	35CrMo8 KU		48CrMoV 6 7								
	3	19 520.4		35CrMo8	35CrMo7	40CrMnMo8	35CrMo8KU		40CrMnMo7		WLB						40CrMnMo7
	1	19 541.4		30CrMoV12-11	32CrMoV12-28	32CDV12-28	30CrMoV12-27KU	SKD7	X32CrMoV33	1.2365	WLV	W320	3Ch3M3F		BH10	H10	30CrMoV12
	3	19 552.4	4Cr5MoSiV	X37CrMoV5-1	X37CrMoV5 1	Z38CDV5	X37CrMoV51KU	SKD6	X38CrMoV5.1	1.2343	WCL	W300	4Ch5MFS		BH11	H11	X37CrMoSiV5
	3	19 553.9	4Cr5MoSiV	X37CrMoV5-1	X37CrMoV5 1	Z38CDV5	X37CrMoV51KU	SKD6	X38CrMoV5.1	1.2343	WCL	W300	4Ch5MFS		BH11	H11	
	3	19 554.4	4Cr5MoSiV1	X40CrMoV511	40CrMoV5 1	X40CrMoV5	X40CrMoV5 11KU	SKF61	X40CrMoV51	1.2344	WCLV	W302	4Ch5MF1S	2214	BH 13	H13	X37CrMoSiV5
	4	19 561.4														H 42	
	4	19 571.4	Cr5Mo1V	X100CrMoV 5 1	X100CrMoV5	Z100CDV5	X100CrMOV51KU	SKD 12	X100CrMoV 5 1		NCLV	K 305	9Ch5VF	2260	BA 2	A 2	F.5227
	4	19 581.4														A7	
	4	19 614.4							55NiCr11	1.2719		K 606		2551			F.5224
	1	19 642.4		40NiCrMoV16			40NiCrMoV16 KU		35NiMo16			W 502			BP 30		35NiCrMo16
	3	19 655.4		40NiCrMo16	45NiCrMo16	40NCDV16	40NiCrMoV16KU		X45NiMo4II1.2	1.2767		K 600					
	3	19 662.4	5CrNiMo	55NiCrMoV7		55NCDV7	44NiCrMoV7 KU	SKT 4	55NiCrMoV6	1.2711	WNL	W 502	5ChNM		BH 224/5	L 6	F.520.S
	1	19 675.4							28NiCrMoV10	1.2740							
	1	19 678							28NiMo17	1.2747							
	1	19 678.4							28NiMo17	1.2747							
	4	19 710.4	W					SKS 7M	120 W 4	1.2414	NW 1	K 405				F 1	F.5238
	4	19 712.4							110WCrV5				ChV6				
	4	19 714.4						SKS 11	X 130W5			K 400	ChV 4F			F 2	
	1	19 720.4	30W4Cr2VA	X30WCrV 5 3	30WCrV5	X32WCrV5	X30WCrV 5 3KU	SKD 4	30WCrV 5.3			W 105					
	1	19 721.4	3Cr2W8V	X30WCrV93	X30WCrV9-3	Z30WCV9	X30WCrV93KU	SKD5	X30WCrV9.3	1.2581	WWW	W100	3Ch2V8F		BH21	H21	X30WCrV9
	1	19 723.4									WWN 1	W-103			BH 21A		
	4	19 732.4		45WCrSiV8	50WCrV8	45WCV20	45WCrV8KU		45WCrV7	1.2542	NZ2	K450	50ChV2SF	2710	BS1	S1	45 WCrSiV8
	4	19 733.4		55WCrV8	60WCrV8	55WC20	55WCrV8 KU		60WCrV7		NZ 3	K 455	5ChV2S		BS 1	S 1	60WCrSiV8
	1	19 740.4							30 WCrV 151	1.2564	WWS 1	W 106					F.527
	4	19 802.4						SKH6	S 12-1-2	1.3318	SW12		R12F3				
	4	19 810.4				Z130WV 13.4			S 12-1-4	1.3302	SW12		R9F5				
	4	19 824.4	W18Cr4V	HSv18-0-1	HS 18-0-1	Z80WCV18-04-01	HS 18-0-1	SKH 2	HS 18-0-1	1.3355	SW18	S 200	R18	2750	BT1	T1	HS 18-0-1
	4	19 830.4	W6Mo5Cr4V2	HS 6-5-2	HS 6-5-2	Z85WDCV06-05-04-02	HS 6-5-2	SKH51	HS 6-5-2	1.3343	SW7M	S600	R6M5	2722	BM2	M2	HS 6-5-2
	4	19 852.4	W6Mo5Cr4V2Co5	HS 6-5-2-5	HS 6-5-2-5	Z85WDKCV06-05-04-02	HS 6-5-2-5	SKH55	HS 6-5-2-5	1.3243	SK5M	S705	R6M5K5	2723	BM35		HS 6-5-2-5
	4	19 855.4	W18Cr4VCo4	HS18-1-1-5		Z 80WKCV 18-05-04-01	HS 18-1-1-5	SKH 3	HS 18-1-2-5			S 305	R18K5F2		BT 4	T 4	F.5530
	4	19 856.4											R9K5				
	4	19 858.4	W12Cr4V5Co5	HS12-1-5-5	HS12-1-5-5	HS 12-1-5-5	HS12-1-5-5	SKH 10	HS 12-1-4-5	1.3202	SK 5V	S 308	R13F4K5		BT 15	T 15	HS12-1-5-5
	4	19 861.4		HS 10-4-3-10		Z130WKCDV	HS 10-4-3-10	SKH57	HS 10-4-3-10	1.3207	SK10V	S700	R12F3K10M3-Š	2736	BT42		HS 10-4-3-10
	4	42 2880.6											JuND4				
	4	42 2881.6											JuND8				
	4	42 2887.6							AlNiCo18/9								
	4	42 2891.6							AlNiCo 3515				JuN14DK25A				
	4	42 2893.6							AlNiCo 30/10								
	4	42 2895.6							AlNiCo44/5				JuN13DK24S				
	4	42 2992.4											R9				
	2	422478											ŽČCh3				
	2	422483									ZISi15		ČS15		Si14	Gr.1	
	2	422484											ŽČJu30				
	2	422491											ŽČCh16				
	2	G-X 260 NiCr 4 2							G-X 260 NiCr 4 2	0,962				0512-00	Grade 2 A	Ni-Hard 2	
	2	G-X 330 NiCr 4 2							G-X 330 NiCr 4 2	0,963				0513-00	Grade 2 B	Ni-Hard 1	
	2	G-X 260 NiCr 4 2							G-X 260 NiCr 4 2	0,962				0512-00	Grade 2 A	Ni-Hard 2	
	2	G-X 330 NiCr 4 2							G-X 330 NiCr 4 2	0,963				0513-00	Grade 2 B	Ni-Hard 1	
	2	G-X 300 CrNiSi 9 5 2							G-X 300 CrNiSi 9 5 2	0,963						Ni-Hard 4	
	2	G-X 300 CrMo 15 3							G-X 300 CrMo 15 3	0,964							

Strength [MPa]	Hardness			
	BRINELL	VICKERS	ROCKWELL	ROCKWELL
R_m	HB	HV	HRB	HRC
285	86	90	1190	-
320	95	100	56,2	-
350	105	110	62,3	-
385	114	120	66,7	-
415	124	130	71,2	-
450	133	140	75,0	-
480	143	150	78,7	-
510	152	160	81,7	-
545	162	170	85,8	-
575	171	180	87,1	-
610	181	190	89,5	-
640	190	200	91,5	-
675	199	210	93,5	-
705	209	220	95	-
740	219	230	96,7	-
770	228	240	98,1	-
800	238	250	99,5	-
820	242	255	-	23,1
850	252	265	-	24,8
880	261	275	-	26,4
900	266	280	-	27,1
930	276	290	-	28,5
950	280	295	-	29,2
995	295	310	-	31,0
1030	304	320	-	32,2
1060	314	330	-	33,3
1095	323	340	-	34,4
1125	333	350	-	35,5
1155	342	360	-	36,6

Strength [MPa]	Hardness			
	BRINELL	VICKERS	ROCKWELL	ROCKWELL
R_m	HB	HV	HRB	HRC
1190	352	370	-	37,7
1220	361	380	-	38,8
1255	371	390	-	39,8
1290	380	400	-	40,8
1320	390	410	-	41,8
1350	399	420	-	42,7
1385	409	430	-	43,6
1420	418	440	-	44,5
1455	428	450	-	45,3
1485	437	460	-	46,1
1520	447	470	-	46,9
1555	456	480	-	47,7
1595	466	490	-	48,4
1630	475	500	-	49,1
1665	485	510	-	49,8
1700	494	520	-	50,5
1740	504	530	-	51,1
1775	513	540	-	51,7
1810	523	550	-	52,3
1845	532	560	-	53,0
1880	542	570	-	53,6
1920	551	580	-	54,1
1955	561	590	-	54,7
1995	570	600	-	55,2
2030	580	610	-	55,7
2070	589	620	-	56,3
2105	599	630	-	56,8
2145	608	640	-	57,3
2180	618	650	-	57,8

SIMPLY RELIABLE

As a professional you can judge the quality of work by just looking at the chip. Our chip is a clean and uncomplicated shape that in itself tells a story. It is a clear and consistent signal and that's why we use it as a symbol for being **simply reliable**.

DORMER PRAMET

USA
2511 Technology Drive, Suite 113/114
Elgin, Illinois 60124
Phone: 800-877-3745
Fax: 847-783-5760

CANADA
2550 Meadowvale Blvd, Unit 3
Mississauga, ON L5N8C2
Phone: 888-336-7637
En Français: 888-368-8457
Fax: 905-542-7000

www.dormerpramet.com

EDP# 46826445

7 320760 689356