

NL Snijnelheden draaien
FR Vitesse de coupe de tournage
ES Velocidades de corte para tornear
DE Schnittgeschwindigkeit Drehen
EN Cutting speeds Turning

		HM								
ISO	Gr.	UI10	UI20	P25	PC10	PC20	PC30	MSI20	KC10	K10
		Vc (m/min)								
P	11	130-225	120-220	100-140	180-270	170-240	120-210	130-230	220-400	
	12	130-225	120-220	100-140	180-270	170-240	120-210	130-230	200-320	100-250
	13	130-225	120-220	100-140	180-270	170-240	120-210	130-230	200-320	100-250
	14			60-100	120-205	110-185	75-175			
H	15									
M	21	105-205	95-195			65-220	65-210	105-205		
	22	100-195	90-185			55-210	50-200	100-195		
K	31				110-330	100-230			190-330	
	32				110-250	105-220			135-265	
N	41									375-2400
	42									375-1500
	51									375-630
	52									375-630
	61									80-180
S	71	40-110	35-105					45-115		
	72	45-120	40-115					50-125		

NL Snijnelheden steken
FR Vitesse de coupe de tronçonnage
ES Velocidades de corte para tronzar
DE Schnittgeschwindigkeit Stechen
EN Cutting speeds, parting

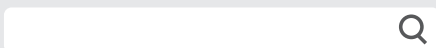
		HM		
ISO	Gr.	K10	PC30	UI30
		Vc (m/min)		
P	11		90-200	50-150
	12		70-160	50-140
	13		70-160	50-140
	14		50-130	40-130
H	15			
M	21		60-80	50-110
	22			40-110
K	31		50-140	70-150
	32		40-120	50-140
N	41	80-250		
	42	60-200		
	51	100-180		
	52	100-180		
	61	100-210		
S	71			15-50
	72			20-80

NL Snijnelheden draadsnijden
FR Vitesse de coupe de filetage
ES Velocidades de corte para roscar
DE Schnittgeschwindigkeit Gewindeschneiden
EN Cutting speed, threadcutting

		HM		
ISO	Gr.	UI20	MSI20	P30
		Vc (m/min)		
P	11	115-190		70-130
	12	85-145		70-120
	13	85-145		70-120
	14	70-120		50-80
H	15	45-60		
M	21	70-140	70-160	75-110
	22	40-110	40-120	30-80
K	31	70-130		
	32	125-160		
N	41	100-365		
	42	200-400		
	51	80-225		70-170
	52	80-225		70-170
	61			
S	71	20-30	20-40	
	72	50-70	50-80	

NL Snijnelheden frezen
FR Vitesse de coupe de fraisage
ES Velocidades de corte para fresar
DE Schnittgeschwindigkeit Fräsen
EN Cutting speeds, milling

		HM		
ISO	Gr.	K10	PI20	UI30
		Vc (m/min)		
P	11		150-230	130-160
	12		140-220	120-150
	13		140-220	120-150
	14		130-180	100-130
H	15			
M	21			80-110
	22			70-100
K	31			110-220
	32			80-170
N	41	100-2000		
	42			
	51			
	52			
	61	100-210		
S	71			30-80
	72			40-100

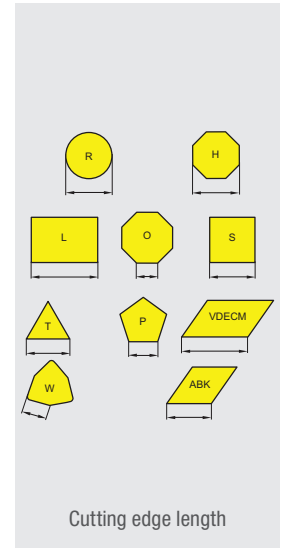
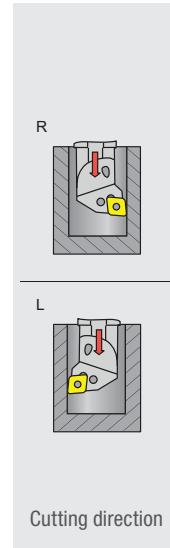
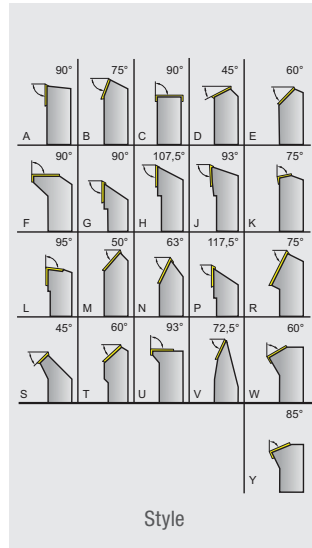
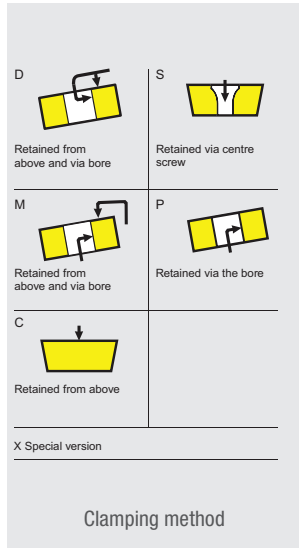


NL ISO Wissellaathouder inwendig draaien
FR Porte-plaquette ISO tournage intérieur
ES Portaplaquita ISO torneado interior
DE ISO Klemmhalter innen drehen
EN ISO Turning tool, internal

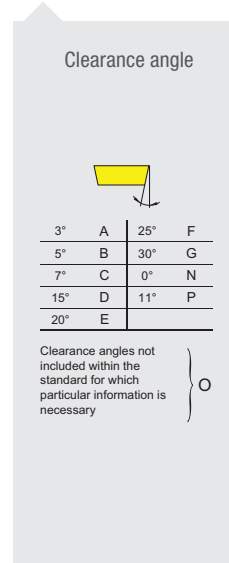
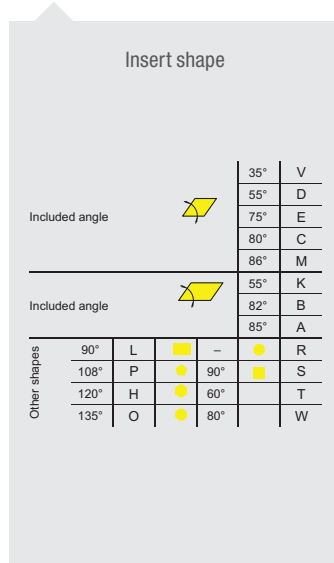
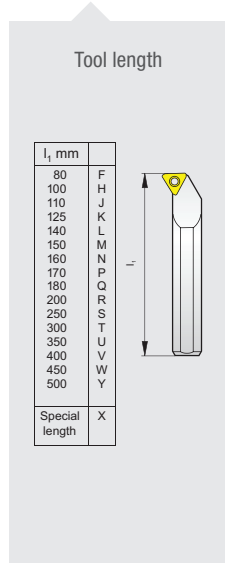
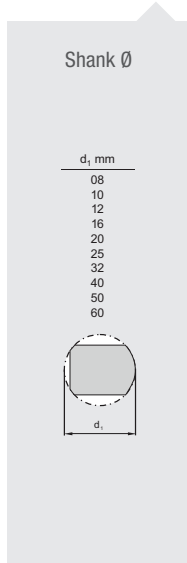


S	Steel shank	E	As C with coolant hole
A	Steel shank with coolant hole	F	As C with anti-vibration system
B	Steel shank with anti-vibration system	G	As C with coolant hole and anti-vibration system
D	Steel shank with coolant hole and anti-vibration system	H	Heavy metal
C	Carbide shank with steel thread	J	Heavy metal with coolant hole

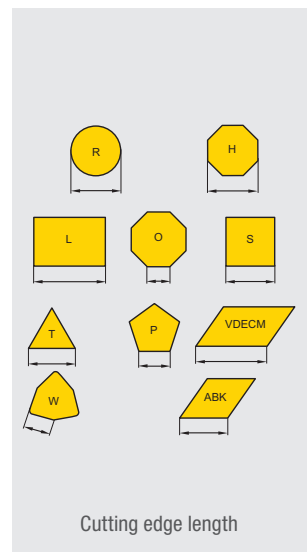
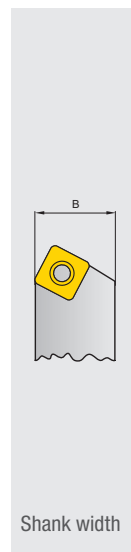
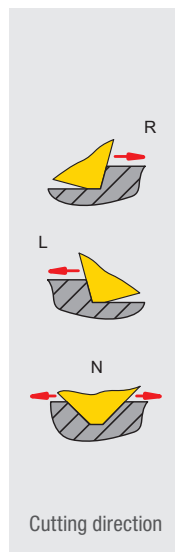
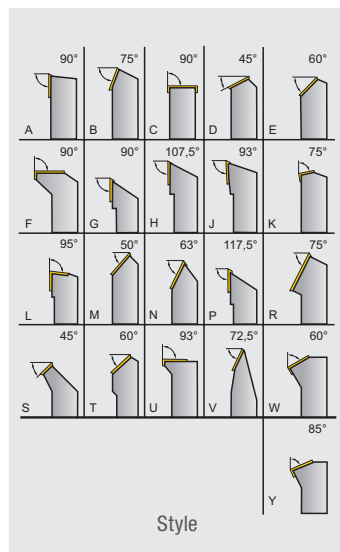
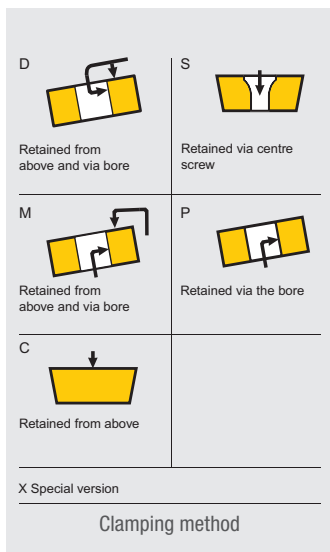
Shank version



S 32 U - P C L N R 12



NL ISO Wisselplaatouder uitwendig draaien
 FR Porte-plaquette ISO tournage extérieur
 ES Portaplaquita ISO torneado exterior
 DE ISO Klemmhalter außen drehen
 EN ISO Turning tool, external



P C L N R 25 25 - M 12

Insert shape

Included angle	35°	V		
	55°	D		
	75°	E		
	80°	C		
	86°	M		
Included angle	55°	K		
	82°	B		
	85°	A		
Other shapes	90°	L	—	R
	108°	P	90°	S
	120°	H	60°	T
	135°	O	80°	W

Clearance angle

3°	A	25°	F
5°	B	30°	G
7°	C	0°	N
15°	D	11°	P
20°	E		

Clearance angles not included within the standard for which particular information is necessary } O

Shank height

Tool holder

Cartridge

Round shank

00

Tool length

l ₁ , mm	A	l ₁ , mm	N
32	A	160	N
40	B	170	P
50	C	180	Q
60	D	200	R
70	E	250	S
80	F	300	T
90	G	350	U
100	H	400	V
110	J	450	W
125	K	500	Y
140	L	Special	X
150	M		





NL ISO Wisselplaten
FR Plaquettes ISO
ES Plaquitas ISO
DE ISO Wendepplatten
EN ISO Inserts



<p>Included angle</p> <table border="1"> <tr><td>35°</td><td>V</td></tr> <tr><td>55°</td><td>D</td></tr> <tr><td>75°</td><td>E</td></tr> <tr><td>80°</td><td>C</td></tr> <tr><td>86°</td><td>M</td></tr> </table>		35°	V	55°	D	75°	E	80°	C	86°	M			<table border="1"> <tr><td>N</td><td></td><td></td></tr> <tr><td>R</td><td></td><td></td></tr> <tr><td>F</td><td></td><td></td></tr> <tr><td>A</td><td></td><td></td></tr> <tr><td>M, P</td><td></td><td></td></tr> <tr><td>G, P</td><td></td><td></td></tr> <tr><td>W</td><td></td><td></td></tr> <tr><td>T</td><td></td><td></td></tr> <tr><td>Q</td><td></td><td></td></tr> <tr><td>U</td><td></td><td></td></tr> <tr><td>B</td><td></td><td></td></tr> <tr><td>H</td><td></td><td></td></tr> <tr><td>C</td><td></td><td></td></tr> <tr><td>J</td><td></td><td></td></tr> <tr><td>X</td><td colspan="2">Special version</td></tr> </table>	N			R			F			A			M, P			G, P			W			T			Q			U			B			H			C			J			X	Special version		<table border="1"> <tr><th colspan="4">d mm</th></tr> <tr><td>06</td><td>08</td><td>10</td><td>12</td></tr> <tr><td>16</td><td>20</td><td>25</td><td>32</td></tr> </table>	d mm				06	08	10	12	16	20	25	32	<table border="1"> <tr><th>Inch</th><th>mm</th><th>Index</th></tr> <tr><td>1/16</td><td>1,59</td><td>01</td></tr> <tr><td>3/32</td><td>2,38</td><td>02</td></tr> <tr><td>1/8</td><td>3,18</td><td>03</td></tr> <tr><td>5/32</td><td>3,97</td><td>T3</td></tr> <tr><td>3/16</td><td>4,76</td><td>04</td></tr> <tr><td>7/32</td><td>5,56</td><td>05</td></tr> <tr><td>1/4</td><td>6,35</td><td>06</td></tr> <tr><td>5/16</td><td>7,94</td><td>07</td></tr> <tr><td>3/8</td><td>9,52</td><td>09</td></tr> </table>	Inch	mm	Index	1/16	1,59	01	3/32	2,38	02	1/8	3,18	03	5/32	3,97	T3	3/16	4,76	04	7/32	5,56	05	1/4	6,35	06	5/16	7,94	07	3/8	9,52	09	<table border="1"> <tr><th>Code</th><th>Corner radius mm</th></tr> <tr><td>00</td><td>≤ 0,05</td></tr> <tr><td>01</td><td>0,1</td></tr> <tr><td>02</td><td>0,2</td></tr> <tr><td>04</td><td>0,4</td></tr> <tr><td>08</td><td>0,8</td></tr> <tr><td>12</td><td>1,2</td></tr> <tr><td>16</td><td>1,6</td></tr> <tr><td>24</td><td>2,4</td></tr> <tr><td>32</td><td>3,2</td></tr> </table>	Code	Corner radius mm	00	≤ 0,05	01	0,1	02	0,2	04	0,4	08	0,8	12	1,2	16	1,6	24	2,4	32	3,2																									
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Other shapes: 90° L, 108° P, 120° H, 135° O, 90° S, 60° T, 80° W

Clearance angles not included within the standard for which particular information is necessary: O

Insert shape: C, N, M, G

Clearance angle: 3°, 5°, 7°, 15°, 20°, 25°, 30°, 0°, 11°

Tolerances: A, F, C, H, E, G, J, K, L, M, N, U

Form of top surface: N, R, F, A, M, P, G, P, W, T, Q, U, B, H, C, J, X

Cutting edge length: 06, 08, 10, 12, 16, 20, 25, 32, 11, 16, 22, 27, 33, 44

Insert thickness: 1/16, 3/32, 1/8, 5/32, 3/16, 7/32, 1/4, 5/16, 3/8

Corner radius: 00, 01, 02, 04, 08, 12, 16, 24, 32

C

N

M


G

12

04

08

NL Draadsnijden
 FR Filetage
 ES Roscar
 DE Gewindedrehen
 EN Thread cutting

 <table border="1"> <thead> <tr> <th>mm</th> <th>Inch</th> <th>mm</th> </tr> </thead> <tbody> <tr> <td>09</td> <td>7/32</td> <td>5,56</td> </tr> <tr> <td>11</td> <td>1/4</td> <td>6,35</td> </tr> <tr> <td>16</td> <td>3/8</td> <td>9,52</td> </tr> <tr> <td>22</td> <td>1/2</td> <td>12,7</td> </tr> <tr> <td>27</td> <td>5/8</td> <td>15,8</td> </tr> </tbody> </table> <p>Insert size</p>	mm	Inch	mm	09	7/32	5,56	11	1/4	6,35	16	3/8	9,52	22	1/2	12,7	27	5/8	15,8	<table border="1"> <tr> <td>E</td> <td>External</td> </tr> <tr> <td>I</td> <td>Internal</td> </tr> <tr> <td>EI</td> <td>Ex- & Internal</td> </tr> </table> <p>Type of Insert</p>	E	External	I	Internal	EI	Ex- & Internal	<table border="1"> <tr> <td>R</td> <td>Right Hand</td> </tr> <tr> <td>L</td> <td>Left Hand</td> </tr> </table> <p>RH/LH Insert</p>	R	Right Hand	L	Left Hand	<table border="1"> <thead> <tr> <th colspan="2">Full Profile - Pitch Range</th> </tr> <tr> <th>mm</th> <th>tpi</th> </tr> </thead> <tbody> <tr> <td>0.35-25.0</td> <td>72-1</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="2">Partial Profile - Pitch Range</th> </tr> <tr> <th></th> <th>tpi</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>48-16</td> </tr> <tr> <td>AG</td> <td>48-8</td> </tr> <tr> <td>G</td> <td>14-8</td> </tr> <tr> <td>N</td> <td>7-5</td> </tr> </tbody> </table> <p>Pitch</p>	Full Profile - Pitch Range		mm	tpi	0.35-25.0	72-1	Partial Profile - Pitch Range			tpi	A	48-16	AG	48-8	G	14-8	N	7-5	<p>Partial Profile</p> <table border="1"> <tr> <td>60°</td> <td>60° Partial profile</td> </tr> <tr> <td>55°</td> <td>55° Partial profile</td> </tr> </table> <p>Full Profile</p> <table border="1"> <tr> <td>ISO</td> <td>ISO Metric</td> </tr> <tr> <td>UN</td> <td>American UN</td> </tr> <tr> <td>W</td> <td>Whitworth BSW/BSP</td> </tr> <tr> <td>TR</td> <td>Trapez</td> </tr> </table> <p>Thread Standard</p>	60°	60° Partial profile	55°	55° Partial profile	ISO	ISO Metric	UN	American UN	W	Whitworth BSW/BSP	TR	Trapez	<table border="1"> <tr> <td>B</td> <td>With chipbreaker</td> </tr> <tr> <td>-</td> <td>Without</td> </tr> </table> <p>Chipbreaker</p>	B	With chipbreaker	-	Without
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16

E

R

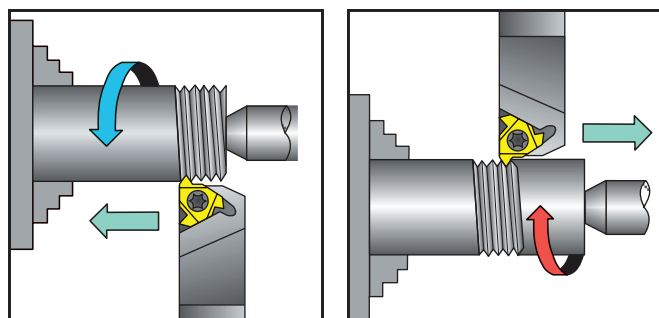
175

ISO

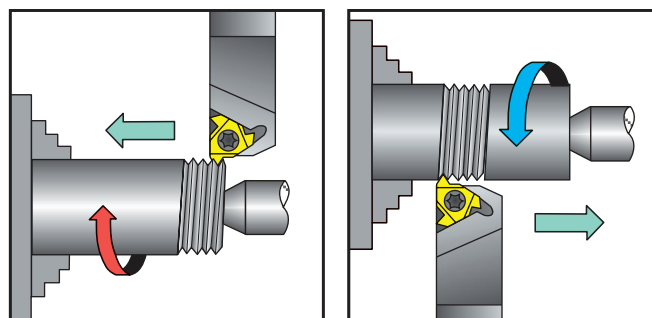
B

NL Schroefdraadsnij methodes
 FR Méthodes de filetage en tournage
 ES Métodos de torneado de roscas
 DE Gewindedrehverfahren
 EN Screw thread cutting methods

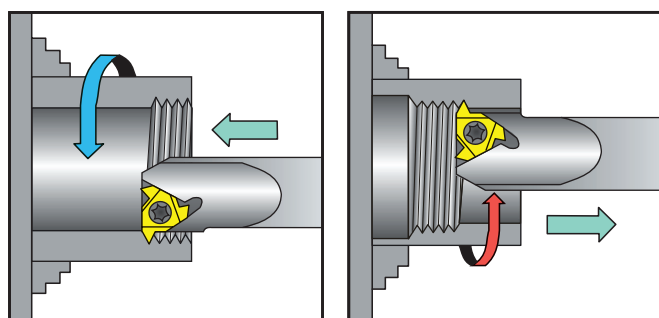
External RH Thread



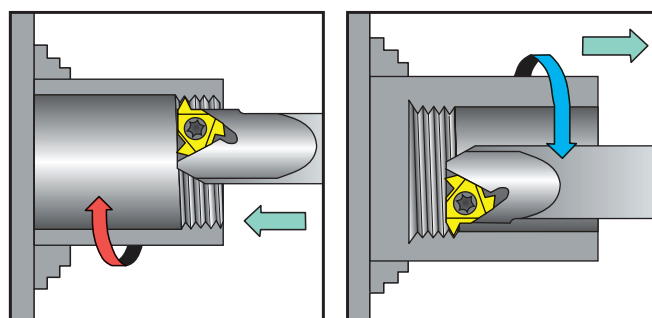
External LH Thread

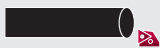


Internal RH Thread

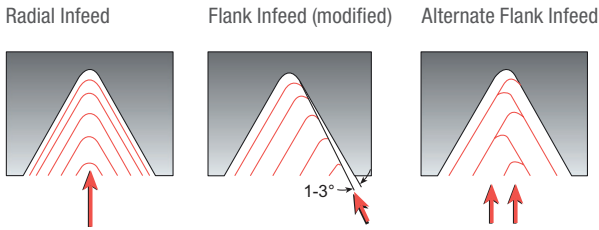


Internal LH Thread

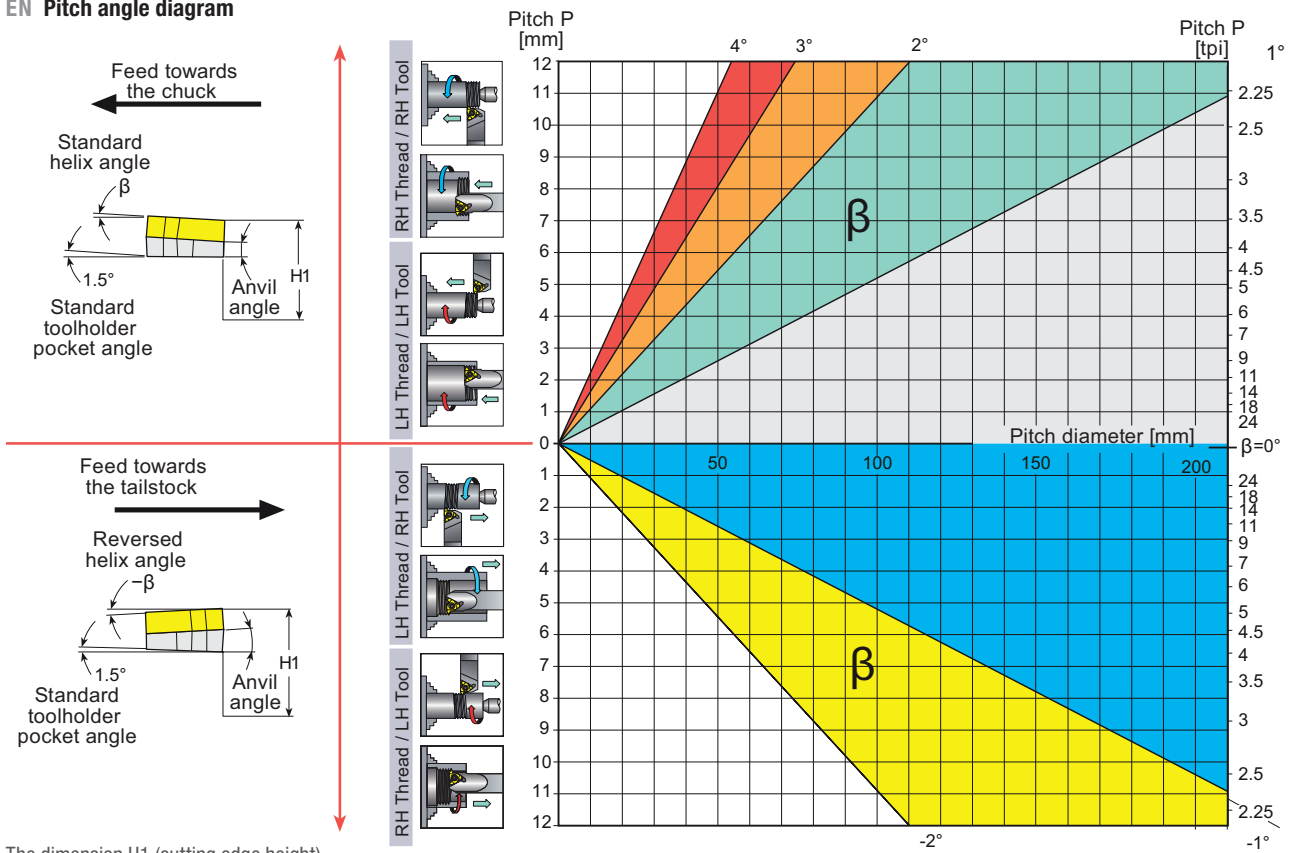




NL Invoer methoden
 FR Méthode angle d'attaque
 ES Métodos de ataque de la rosca
 DE Gewindezustellverfahren
 EN Infeed methods



NL Schroefdraadhelingshoek diagram
 FR Diagramme de l'angle d'hélice
 ES Diagrama del ángulo de hélice
 DE Teilungswinkel Diagramm
 EN Pitch angle diagram

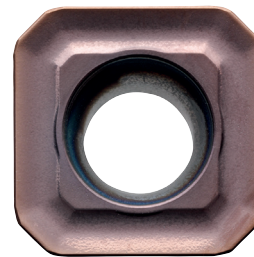


The dimension H1 (cutting edge height) remains constant with every insert / anvil combination.

NL Onderlegplaten
 FR Sous-plaquettes
 ES Placa base
 DE Unterlegplatten
 EN Shims

Resultant Helix Angle		β Holder	β						
Insert Size	L mm		3.5°	2.5°	1.5°	0.5°	0°	-0.5°	-1.5°
IC	L mm		Ordering Code						
3/8"	16	ER / IL	743980170	743980175	743980165	74398180	-	743980190	743980195
		EL / IR	743980265	743980270	743980260	743980275	-	743980280	743980285
1/2"	22	ER / IL	743980205	743980210	743980200	743980215	-	743980220	743980225
		EL / IR	743980295	743980300	743980290	743980305	-	743980310	743980315
3/8" Groove	16	ER / IL	-	-	-	-	743980400	-	-
		EL / IR	-	-	-	-	743980500	-	-

NL ISO Wisselplaten
FR Plaquettes ISO
ES Plaquitas ISO
DE ISO Wendepfannen
EN ISO inserts

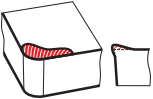



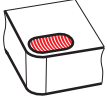




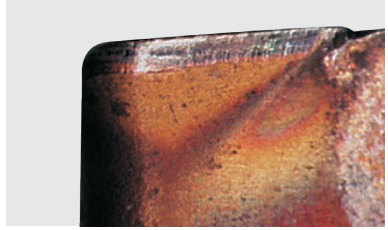
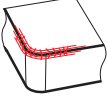

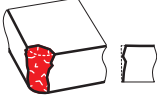
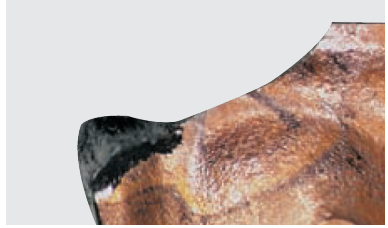


<p>A 85° B 82° K 55°</p>	<table border="1"> <tr><td>α</td></tr> <tr><td>A 3°</td></tr> <tr><td>B 5°</td></tr> <tr><td>C 7°</td></tr> <tr><td>D 15°</td></tr> <tr><td>E 20°</td></tr> <tr><td>F 25°</td></tr> <tr><td>G 30°</td></tr> <tr><td>N 0°</td></tr> <tr><td>P 11°</td></tr> <tr><td>O Special version</td></tr> </table>	α	A 3°	B 5°	C 7°	D 15°	E 20°	F 25°	G 30°	N 0°	P 11°	O Special version	<table border="1"> <tr><td>d [±mm]</td><td>m [±mm]</td><td>s [±mm]</td></tr> <tr><td>A .025</td><td>.005</td><td>.025</td></tr> <tr><td>C .025</td><td>.013</td><td>.025</td></tr> <tr><td>E .025</td><td>.025</td><td>.025</td></tr> <tr><td>F .013</td><td>.005</td><td>.025</td></tr> <tr><td>G .025</td><td>.025</td><td>.13</td></tr> <tr><td>H .013</td><td>.013</td><td>.025</td></tr> <tr><td>J .05</td><td>.005</td><td>.025</td></tr> <tr><td>K .08</td><td>.013</td><td>.025</td></tr> <tr><td>.10</td><td>.013</td><td>.025</td></tr> </table>	d [±mm]	m [±mm]	s [±mm]	A .025	.005	.025	C .025	.013	.025	E .025	.025	.025	F .013	.005	.025	G .025	.025	.13	H .013	.013	.025	J .05	.005	.025	K .08	.013	.025	.10	.013	.025	<p>A</p> <p>F</p> <p>G</p> <p>M</p> <p>N</p> <p>Q</p> <p>R</p> <p>T</p> <p>U</p> <p>W</p> <p>X Special shapes</p>	<table border="1"> <tr><th>d[mm]</th><th>A</th><th>T/V</th><th>C/S</th><th>H</th><th>L</th><th>R</th><th>W</th><th>O</th></tr> <tr><td>5.00</td><td>-</td><td>-</td><td>-</td><td>-</td><td>05</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>5.56</td><td>-</td><td>09</td><td>05</td><td>-</td><td>08</td><td>-</td><td>03</td><td>-</td></tr> <tr><td>6.00</td><td>-</td><td>-</td><td>-</td><td>-</td><td>06</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>6.35</td><td>-</td><td>11</td><td>06</td><td>03</td><td>10</td><td>-</td><td>04</td><td>02</td></tr> <tr><td>6.65</td><td>10</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>7.94</td><td>-</td><td>-</td><td>07</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>8.00</td><td>-</td><td>-</td><td>-</td><td>-</td><td>12</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>9.00</td><td>-</td><td>-</td><td>-</td><td>-</td><td>12</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>9.52</td><td>16</td><td>09</td><td>05</td><td>15</td><td>-</td><td>06</td><td>04</td><td>-</td></tr> <tr><td>9.57</td><td>15</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>10.00</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>12.00</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>12</td><td>-</td><td>-</td></tr> <tr><td>12.70</td><td>22</td><td>12</td><td>07</td><td>20</td><td>-</td><td>08</td><td>05</td><td>-</td></tr> <tr><td>15.87</td><td>27</td><td>15</td><td>09</td><td>-</td><td>-</td><td>10</td><td>06</td><td>-</td></tr> <tr><td>16.00</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>16.74</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>16</td><td>-</td><td>-</td></tr> <tr><td>19.05</td><td>33</td><td>19</td><td>11</td><td>-</td><td>-</td><td>13</td><td>07</td><td>-</td></tr> <tr><td>20.00</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>20</td><td>-</td><td>-</td></tr> </table>	d[mm]	A	T/V	C/S	H	L	R	W	O	5.00	-	-	-	-	05	-	-	-	5.56	-	09	05	-	08	-	03	-	6.00	-	-	-	-	06	-	-	-	6.35	-	11	06	03	10	-	04	02	6.65	10	-	-	-	-	-	-	-	7.94	-	-	07	-	-	-	-	-	8.00	-	-	-	-	12	-	-	-	9.00	-	-	-	-	12	-	-	-	9.52	16	09	05	15	-	06	04	-	9.57	15	-	-	-	-	-	-	-	10.00	-	-	-	-	-	-	-	-	12.00	-	-	-	-	-	12	-	-	12.70	22	12	07	20	-	08	05	-	15.87	27	15	09	-	-	10	06	-	16.00	-	-	-	-	-	-	-	-	16.74	-	-	-	-	-	16	-	-	19.05	33	19	11	-	-	13	07	-	20.00	-	-	-	-	-	20	-	-	<table border="1"> <tr><th>s [mm]</th></tr> <tr><td>01 1.59</td></tr> <tr><td>T1 1.98</td></tr> <tr><td>02 2.38</td></tr> <tr><td>T3 3.18</td></tr> <tr><td>03 3.97</td></tr> <tr><td>04 4.76</td></tr> <tr><td>05 5.56</td></tr> <tr><td>06 6.35</td></tr> <tr><td>07 7.94</td></tr> <tr><td>09 9.52</td></tr> </table>	s [mm]	01 1.59	T1 1.98	02 2.38	T3 3.18	03 3.97	04 4.76	05 5.56	06 6.35	07 7.94	09 9.52	<table border="1"> <tr><th>1st sign k</th><th>2nd sign α'</th></tr> <tr><td>A 45°</td><td>A 3°</td></tr> <tr><td>D 60°</td><td>B 5°</td></tr> <tr><td>E 75°</td><td>C 7°</td></tr> <tr><td>F 85°</td><td>D 15°</td></tr> <tr><td>P 90°</td><td>E 20°</td></tr> <tr><td>Z Others</td><td>F 25°</td></tr> <tr><td></td><td>G 30°</td></tr> <tr><td></td><td>N 0°</td></tr> <tr><td></td><td>P 11°</td></tr> <tr><td></td><td>Z Others</td></tr> </table>	1st sign k	2nd sign α'	A 45°	A 3°	D 60°	B 5°	E 75°	C 7°	F 85°	D 15°	P 90°	E 20°	Z Others	F 25°		G 30°		N 0°		P 11°		Z Others	<p>F Sharp</p> <p>E Honed</p> <p>S Chamfered and honed</p> <p>T Chamfered</p>	<p>R</p> <p>L</p> <p>N</p>
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<p>Insert shape</p>	<p>Clearance angle</p>	<p>Tolerances</p>	<p>Form of top surface</p>	<p>Cutting edge length</p>	<p>Insert thickness</p>	<p>Facet corner radius</p>	<p>Cutting edge</p>	<p>Cutting direction</p>																																																																																																																																																																																																																																																					

S E H T 12 03 AE SN



NL Slijtage soorten
 FR Types d'usure
 ES Tipos de desgaste
 DE Verschleißarten
 EN Types of wear

	<p>Built-up edge (Adhesive wear)</p>	
	<p>Notching (Adhesive/Mechanic)</p>	
	<p>Crater (Chemical wear)</p>	
	<p>Flank wear (Abrasive wear)</p>	
	<p>Plastic deformation (Thermal wear)</p>	
	<p>Thermal cracks (Thermal wear)</p>	
	<p>Breakage (Mechanic wear)</p>	

NL Maatregelen bij draaiproblemen
 FR Problèmes de tournage et solutions
 ES Problemas de torneado y soluciones
 DE Maßnahmen bei Drehproblemen
 EN Measures & solutions for turning problems

Type of problem												Corrective measures			
Build up edge	Notching	Cratering	Flank wear	Plastic deformation	Breakage	Edge chipping	Surface quality	Vibration	Formation of burrs and chips	Long chips (tangled swarf)	Short chips (fragmented chips)				
↑	↓	↓	↓	↓			↑	↓				Cutting speed	Cutting values		
			■							↑	↓	Feed rate			
		↓				↓			↓			Feed - center area			
↓		↓	■	■		↑		■	↓	↓		Chip groove	Selection of inserts	R	↑
			↑	↑		↑								M	
														F	
			↑	↑		↑			↓			Corner radius	Larger	↓	↑
													smaller		
		↑	↑	↑	↓	↓						Cutting material	wear resistance	↓	↑
													toughness		
			■	■	■	■	■					Clamping of tool	General criteria		
			■	■	■	■	■					Clamping of workpiece			
□			□	□			□		□	□		Coolant			

↑ Raise, increase ↓ Avoid, reduce ■ Check, optimize □ Use

SC 1
 HSS/E 1
 2
 SC 3
 HSS-F 3
 4
 5
 6
 7



NL Maatregelen bij freesproblemen
FR Problèmes de fraisage et solutions
ES Problemas de fresado y soluciones
DE Maßnahmen bei Fräsproblemen
EN Measures & solutions for milling problems

Type of problem											Corrective measures
Build up edge	Notching	Cratering	Flank wear	Plastic deformation	Thermal cracks	Breakage	Edge chipping	Bad workpiece surface	Chattering vibration	Edge chipping on the workpiece	
↑	↓	↓	↓	↓	↓		↑	↑	■		Cutting speed
↑	↓	↓	↑	↓	↓	↓	↓	↓	■		Feed rate per tooth
	↑					■	↑	↑			Thoughness of cutting material
		↑	↑	↑							Wear resistance of cutting material
■	↓				↓				↓	↓	Approach angle
↑	■			↑		■	■		↑		Rake angle
■	↑						↑	↓		↓	Cutting edge facet
						↑	↑	↑			Stability
								↑	↑		Precision of axial & radial run-out
			■	■		■	■			■	Wear of cutting edge
↑	↑	↑		■	↑			■			Cooling, chipremoval
	■					■	■	■	■	↓	Dept of cut

Raise, increase
 Lower, decrease
 Check, optimize