



Ultramini



Minicut



System DED / System ZTP



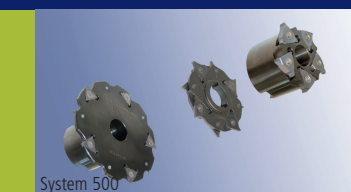
Tool Holders



Broaching



Rotaline



System 500



Swissline



MIKROMILL

GROOVE MILLING BY CIRCULAR INTERPOLATION STARTING AT Ø 1.3 mm



MINIMILL

GROOVE MILLING BY CIRCULAR INTERPOLATION WITH 3 & 6 CUTTING EDGES STARTING AT Ø 10 mm

Express Delivery Only Items

premium carbide cutting tools



Dümmel®



MIKROMILL



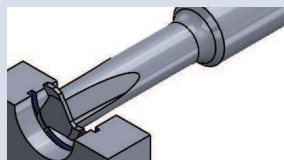
**Groove milling by circular
interpolation starting at Ø 1.3 mm**



MIKROMILL

groove milling
by circular interpolation

summary



inserts groove milling

page

Type MA6 / MA8

groove milling general use

D min. 6 / 8

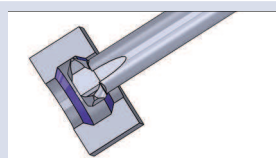
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Type MB6 / MB8

groove milling general use

D min. 6 / 8

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inserts forward and backward chamfering

dimensions

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Type MA6 / MA8

forward and backward chamfering

D min. 6 / 8

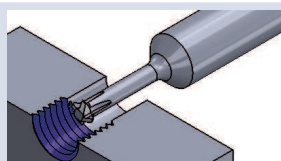
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Type MB6 / MB8

forward and backward chamfering

D min. 6 / 8

... 281



inserts threading

dimensions

page

Type MA3 / MA5

metric ISO-standard thread milling,
partial profile

M2 - M7

... 282

**Type MA3 / MA5 /
MA6 / MA8**

metric ISO-fine thread milling,
partial profile

M1.6 - M10

... 283

Type MB6 / MB8

metric ISO-fine thread milling,
partial profile

M7 - M10

... 284

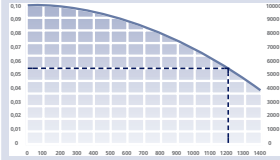
MIKROMILL

groove milling

by circular interpolation



summary



Technical Instructions

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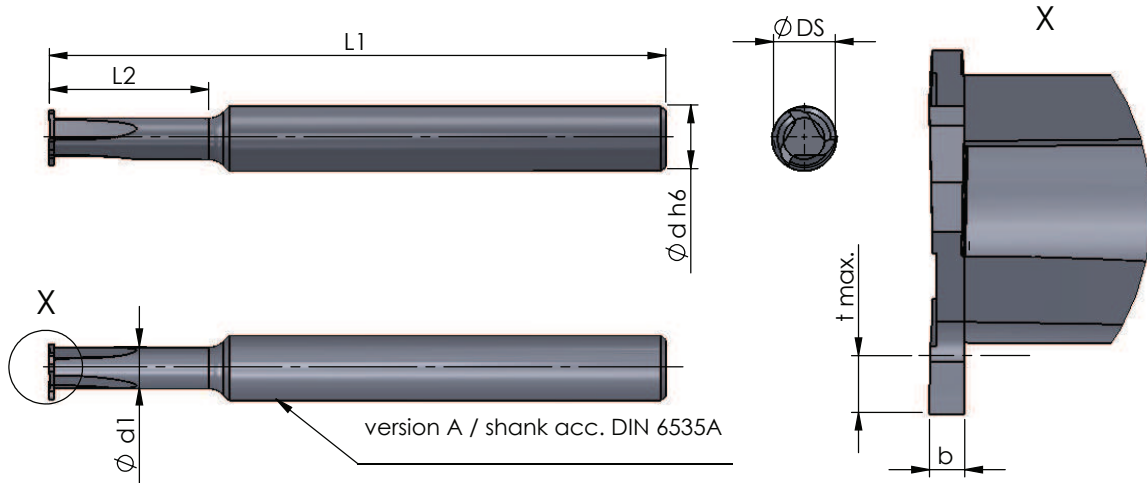
MIKROMILL

groove milling
by circular interpolation

Type MA6 / MA8

groove milling general use

bore Ø from 6 / 8 mm



dimensions in mm

part number	D min.	b ± 0.02	L2	L1	Ø d h6	Ø d1	Ø DS	t max.	cutting edge	K10F	AL41F	P18C
MA6.0050.00-15	6	0.5	15	58	6	3.8	5.8	0.8	3	●	●	●
MA6.0060.00-15	6	0.6	15	58	6	3.8	5.8	0.8	3	●	●	●
MA6.0070.00-15	6	0.7	15	58	6	3.8	5.8	0.8	3	●	●	●
MA6.0080.00-15	6	0.8	15	58	6	3.8	5.8	0.8	3	●	●	●
MA6.0090.00-15	6	0.9	15	58	6	3.8	5.8	0.8	3	●	●	●
MA6.0100.00-15	6	1.0	15	58	6	3.8	5.8	0.8	3	●	●	●
MA6.0150.00-15	6	1.5	15	58	6	3.8	5.8	0.8	3	●	●	●
MA8.0070.00-25	8	0.7	25	68	8	5	7.8	1.2	3	●	●	●
MA8.0080.00-25	8	0.8	25	68	8	5	7.8	1.2	3	●	●	●
MA8.0090.00-25	8	0.9	25	68	8	5	7.8	1.2	3	●	●	●
MA8.0100.00-25	8	1.0	25	68	8	5	7.8	1.2	3	●	●	●
MA8.0150.00-25	8	1.5	25	68	8	5	7.8	1.2	3	●	●	●
MA8.0200.00-25	8	2.0	25	68	8	5	7.8	1.2	3	●	●	●

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
MA6.0050.00-15/AL41F



Dümmel
WERKZEUGFABRIK

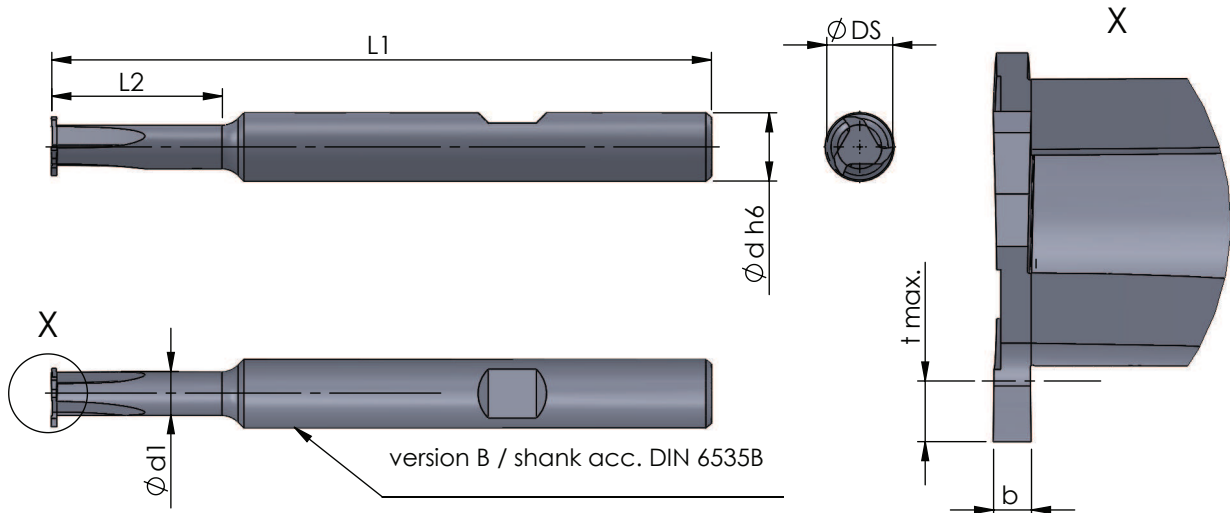
MIKROMILL

groove milling
by circular interpolation

Type MB6 / MB8

groove milling general use

bore Ø from 6 / 8 mm



dimensions in mm

part number	D min.	b ± 0.02	L2	L1	Ø d h6	Ø d1	Ø DS	t max.	cutting edge	K10F	AL41F	P18C
MB6.0050.00-15	6	0.5	15	58	6	3.8	5.8	0.8	3	●		
MB6.0060.00-15	6	0.6	15	58	6	3.8	5.8	0.8	3		●	
MB6.0070.00-15	6	0.7	15	58	6	3.8	5.8	0.8	3		●	
MB6.0080.00-15	6	0.8	15	58	6	3.8	5.8	0.8	3		●	
MB6.0090.00-15	6	0.9	15	58	6	3.8	5.8	0.8	3		●	
MB6.0100.00-15	6	1.0	15	58	6	3.8	5.8	0.8	3		●	
MB6.0150.00-15	6	1.5	15	58	6	3.8	5.8	0.8	3		●	
MB8.0070.00-25	8	0.7	25	68	8	5	7.8	1.2	3		●	
MB8.0080.00-25	8	0.8	25	68	8	5	7.8	1.2	3		●	
MB8.0090.00-25	8	0.9	25	68	8	5	7.8	1.2	3		●	
MB8.0100.00-25	8	1.0	25	68	8	5	7.8	1.2	3		●	
MB8.0150.00-25	8	1.5	25	68	8	5	7.8	1.2	3		●	
MB8.0200.00-25	8	2.0	25	68	8	5	7.8	1.2	3		●	

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
MB6.0050.00-15/AL41F



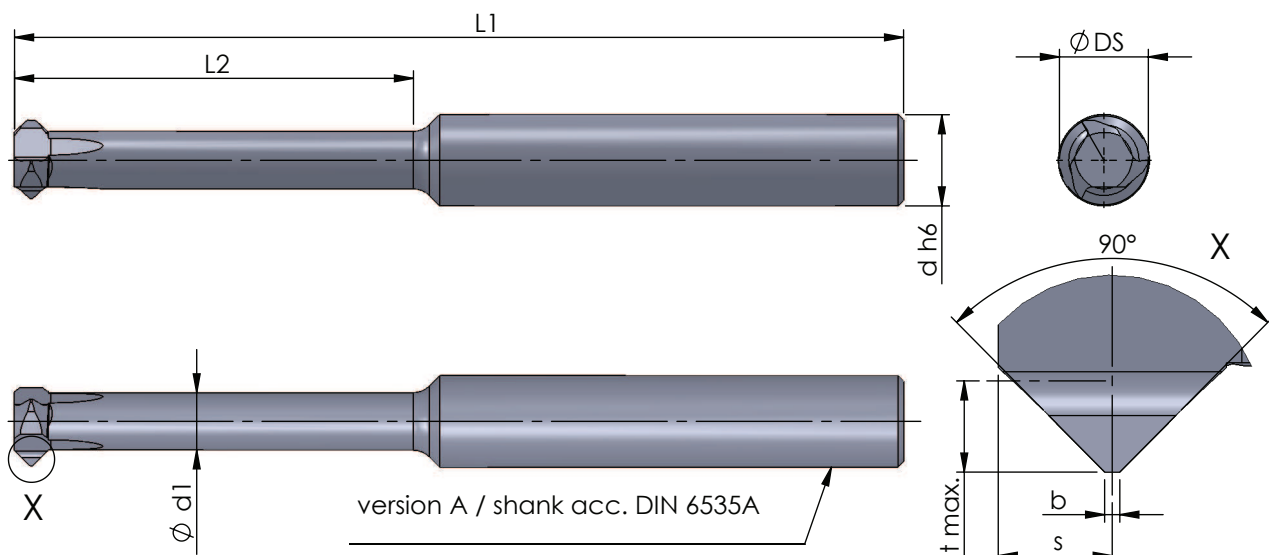
MIKROMILL

groove milling
by circular interpolation

Type MA6 / MA8

forward and backward chamfering

bore Ø from 6 / 8 mm



dimensions in mm

part number	D min.	b	L2	L1	s	Ø d h6	Ø d1	Ø DS	t max.	cutting edge	K10F	AL41F	P18C
MA6.4545.02-15	6	0.2	15	58	1	6	4	5.8	0.6	3	●	●	
MA6.4545.02-25	6	0.2	25	68	1	6	4	5.8	0.6	3		●	●
MA8.4545.02-25	8	0.2	25	68	1.5	8	5	7.8	1.2	3		●	●
MA8.4545.02-35	8	0.2	35	78	1.5	8	5	7.8	1.2	3		●	●

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
MA6.4545.02-15/AL41F

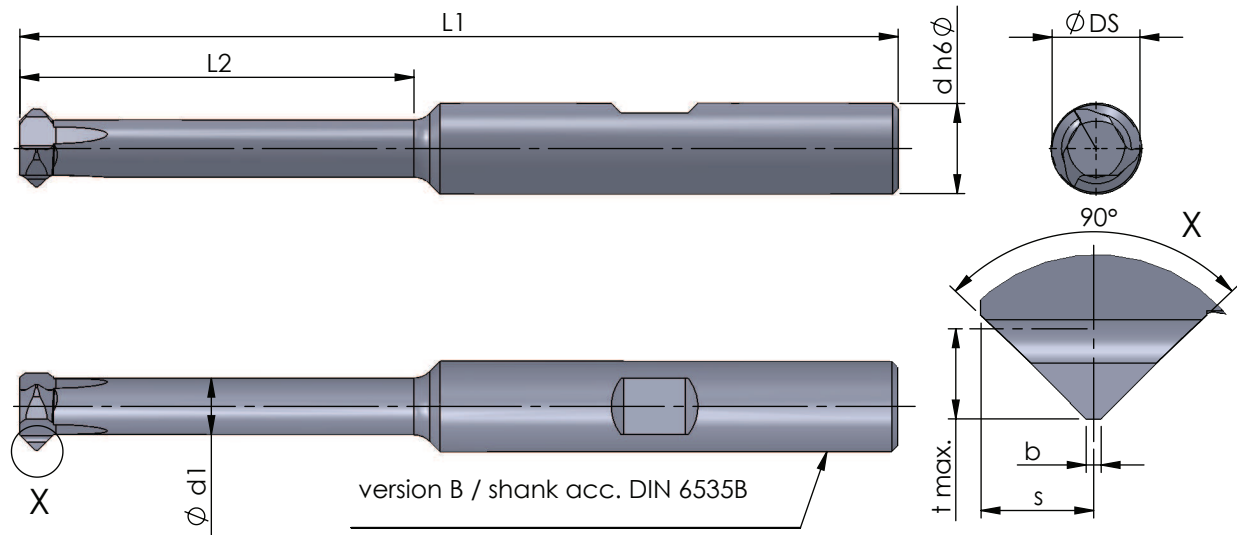
MIKROMILL

groove milling
by circular interpolation

Type MB6 / MB8

forward and backward chamfering

bore \varnothing from 6 / 8 mm



dimensions in mm



part number	D min.	b	L2	L1	s	\varnothing d h6	\varnothing d1	\varnothing DS	t max.	cutting edge			
											K10F	AL41F	P18C
MB6.4545.02-15	6	0.2	15	58	1	6	4.2	5.8	0.6	3		●	
MB6.4545.02-25	6	0.2	25	68	1	6	4.2	5.8	0.6	3		●	
MB8.4545.02-25	8	0.2	25	68	1.5	8	5	7.8	1.2	3		●	
MB8.4545.02-35	8	0.2	35	78	1.5	8	5	7.8	1.2	3		●	

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
MB6.4545.02-15/AL41F

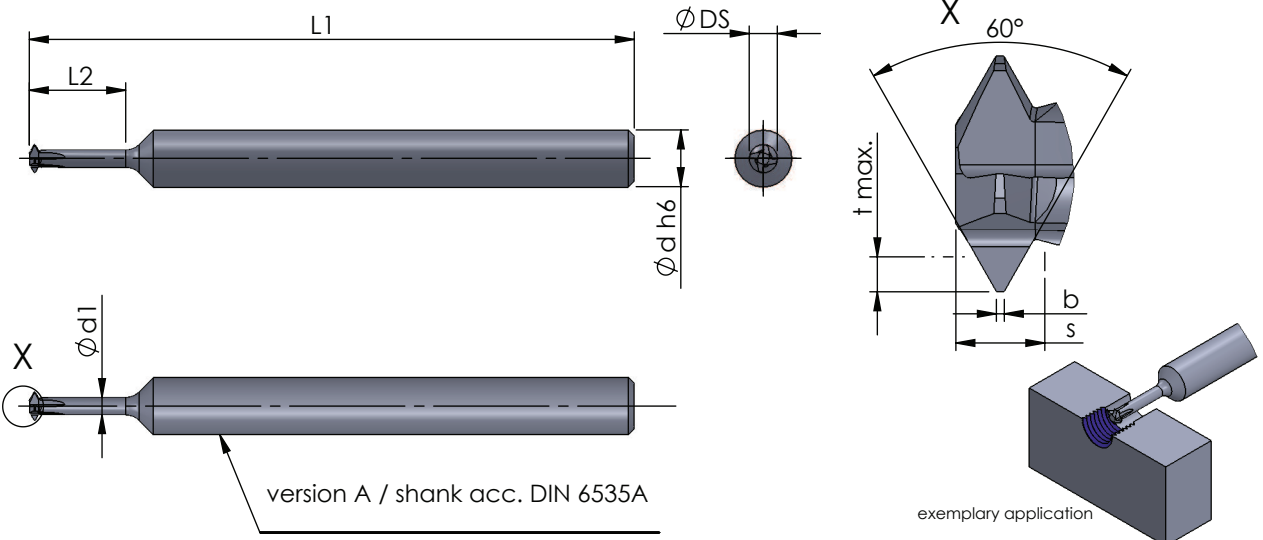
MIKROMILL

groove milling
by circular interpolation

Type MA3 / MA5

metric ISO-standard thread milling,
partial profile

bore Ø from 1.5 mm



dimensions in mm

part number	min. thread size	pitch P	length				flute geometry			cutting edge	material			
			L2	L1	b	s	t max.	Ø d h6	Ø d1		Ø DS	K10F	AL41F	P18C
MA3.MR20.01-5	M2	0.4-0.45	5	32	0.05	0.6	0.27	3	0.77	1.45	4	●	●	●
MA3.MR25.01-6	M2.5	0.45-0.5	6	32	0.05	0.6	0.29	3	1.06	1.8	4	●	●	●
MA3.MR30.01-7	M3	0.5-0.6	7	32	0.06	0.6	0.35	3	1.27	2.15	4	●	●	●
MA3.MR35.01-8	M3.5	0.6-0.7	8	32	0.07	0.8	0.40	3	1.39	2.4	4	●	●	●
MA5.MR40.01-9	M4	0.7-0.8	9	44	0.08	0.8	0.46	5	1.58	2.7	4	●	●	●
MA5.MR50.01-10	M5	0.8-1.0	10	44	0.1	1.0	0.59	5	2.14	3.57	4	●	●	●
MA5.MR60.01-12	M6	1.0-1.25	12.2	44	0.12	1.2	0.74	5	2.44	4.2	4	●	●	●
MA5.MR70.01-15	M7	1.0-1.25	15.2	44	0.12	1.2	0.74	5	3.34	5.15	4	●	●	●

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
MA3.MR20.01-5/AL41F

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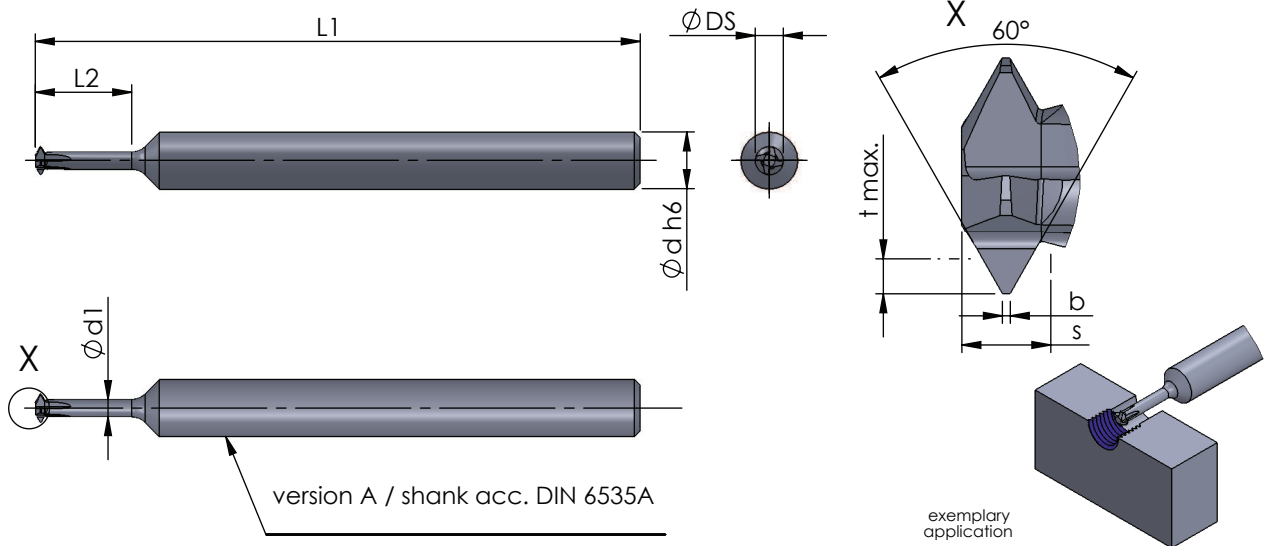
groove milling

by circular interpolation

Type MA3 / MA5 / MA6 / MA8

metric ISO-fine thread milling,
partial profile

bore \varnothing from 1.3 mm



dimensions in mm

part number	D min.	pitch P	min. thread size	L		b	s	t max.	$\varnothing d h6$	$\varnothing d1$	$\varnothing DS$	cutting edge	Material		
				L2	L1								K10F	AL41F	P18C
MA3.0035.01-4	1.3	0.35	M1.6	4	32	0.04	0.4	0.19	3	0.67	1.18	3	●	●	●
MA3.0035.01-5	1.58	0.35	M1.8	5	32	0.04	0.4	0.19	3	0.86	1.38	3	●	●	●
MA3.0040.01-5	2.07	0.4	M2.5	5	32	0.05	0.6	0.22	3	0.92	1.5	4	●	●	●
MA3.0045.01-6	2.52	0.45	M3.0	6	32	0.06	0.6	0.25	3	1.28	1.95	4	●	●	●
MA3.0050.01-7	2.96	0.5	M3.5	7	32	0.06	0.6	0.27	3	1.67	2.4	4	●	●	●
MA3.0060.01-8	3.35	0.6	M4.0	8	32	0.08	0.8	0.33	3	1.93	2.8	4	●	●	●
MA5.0070.01-9	3.74	0.7	M4.5	9	44	0.09	0.8	0.38	5	2.12	3.1	4	●	●	●
MA5.0080.01-10	4.63	0.8	M5.5	10	44	0.10	1.0	0.43	5	2.97	4.1	4	●	●	●
MA5.0100.01-12	5.92	1.0	M7	12	44	0.13	1.2	0.54	5	3.51	4.9	4	●	●	●
MA5.0100.01-15	6.92	1.0	M7	15	44	0.13	1.2	0.54	5	3.5	4.9	4	●	●	●
MA6.0815.01-15	6.0	0.5-1.5	M7	15	58	0.06	1.6	0.92	6	3.5	5.8	3	●	●	●
MA8.0815.01-25	8.0	0.5-1.5	M9	25	68	0.06	2.0	0.91	8	5.5	7.8	3	●	●	●
MA8.1020.01-25	8.0	1.0-2.0	M10	25	68	0.12	2.0	1.19	8	5.0	7.8	3	●	●	●

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
MA3.0035.01-4/AL41F

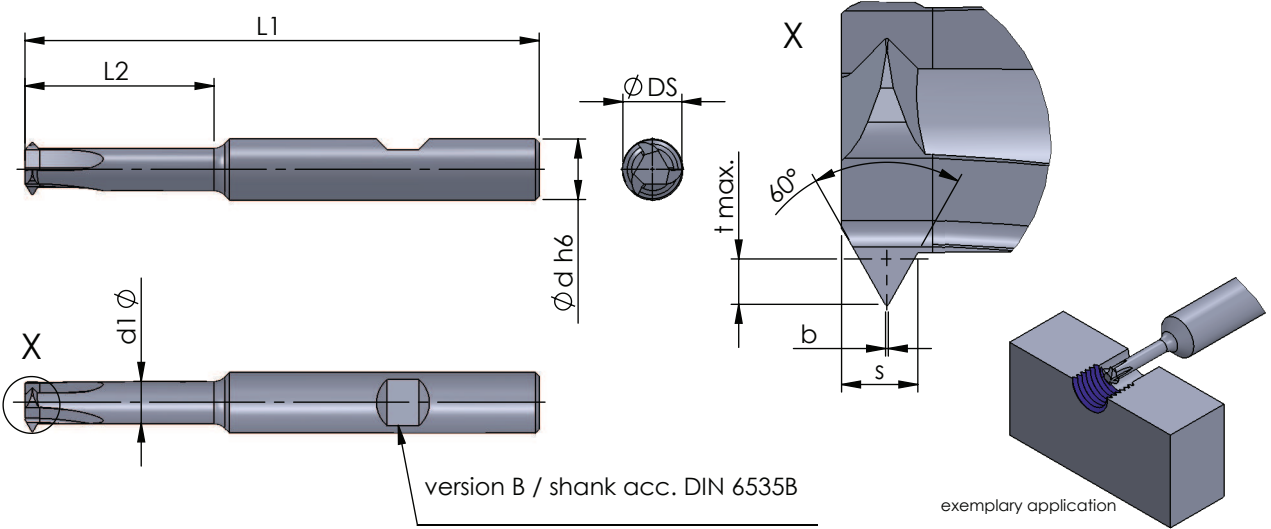
MIKROMILL

groove milling
by circular interpolation

Type MB6 / MB8

metric ISO- ine thread milling,
partial pro ile

bore Ø from 6 mm



dimensions in mm

part number	min. thread size	pitch P	pitch P		b	s	t max.	Ø d h6	Ø d1	Ø DS	cutting edge	material		
			L2	L1								K10F	AL41F	P18C
MB6.0815.01-15	M7	0.5-1.5	15	58	0.06	1.6	0.91	6	3.5	5.8	3	●	●	●
MB8.0815.01-25	M9	0.5-1.5	25	68	0.06	2.0	0.91	8	5.5	7.8	3	●	●	●
MB8.1020.01-25	M10	1.0-2.0	25	68	0.12	2.0	1.19	8	5.0	7.8	3	●	●	●

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
MB6.0815.01-15/AL41F

MIKROMILL

groove milling

by circular interpolation

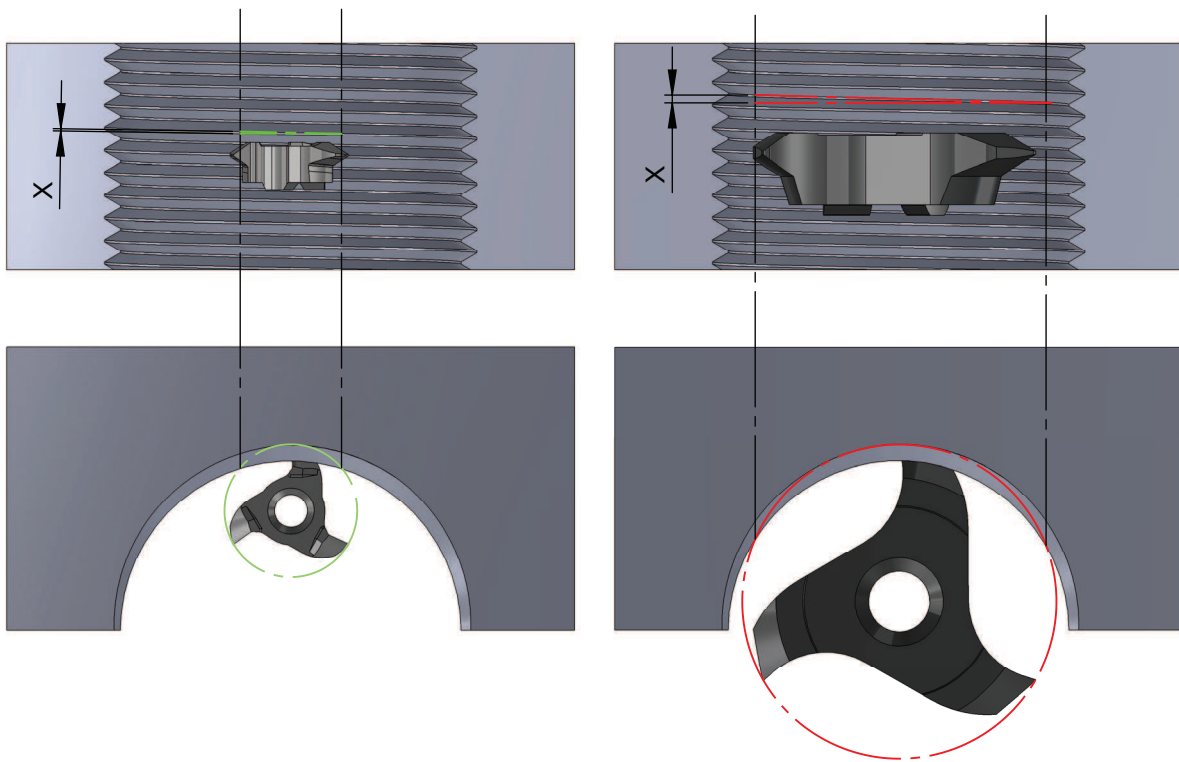
Basic information about thread milling

Thread profile violation

Thread milling by interpolation causes a profile violation. To keep the violation minimal you should use the cutting circle as small as possible.

The following sketch shows the relations during the process:

(green: profile violation X low = good; red: profile violation X big = bad)



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groove milling

by circular interpolation

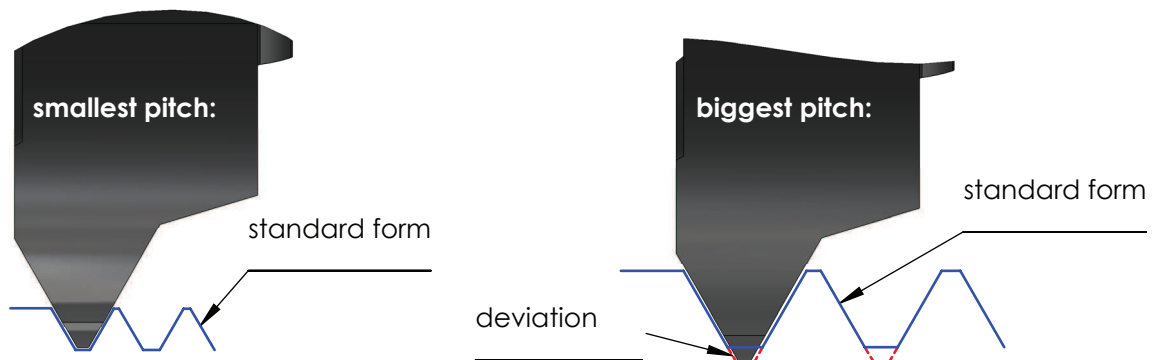
Basic information about thread milling



Partial profile

Tools with partial profile are multi-purpose tools, that means you can process several pitches with one tool. The processed shape has a small difference to the standard profile. Created is that tool for the smallest pitch, this profile depends to the standard.

All other pitches are producible, but only with a small deviation. Normally this causes no problem, but sometimes you have to decide case by case.



Selection guide multi-purpose-tools

In the following chart are all DÜMMEL - multi-purpose-tools listed. This chart shows the possible area of application (blue= optimal profile; grey= possible profiles):

starting with thread-size	pitch (mm)																		
	0,5	0,6	0,7	0,8	0,9	1	1,1	1,2	1,25	1,3	1,4	1,5	1,6	1,7	1,75	1,8	1,9	2	
MA/MB 6.0815.01-15	M6,5	M7	M7	M7,5	M8	M8	M8,5	M8,5	M8,5	M8,5	M9	M9							
MA/MB 8.0815.01-25	M8,5	M9	M9,5	M9,5	M10	M10	M10,5	M10,5	M10,5	M11	M11	M11							
MA/MB 8.1020.01-25						M10	M10,5	M10,5	M10,5	M11	M11	M11	M11,5	M11,5	M11,5	M11,5	M11,5	M11,5	M12



MIKROMILL

groove milling
by circular interpolation

Technical instructions,
carbide grade and coatings

K10F

All purpose micrograin carbide with good abrasion resistance. Uncoated for applications with low or medium cutting speeds and machining of nonferrous materials.

CBN

Ductile CBN grade for applications with lower cutting speed. Suitable for hardened steel, interrupted cuts and cast iron.

CN45F

All purpose PVD-TiN coating. This allround grade is suitable for low and medium cutting speed with restrictions on non-ferrous materials.

AL41F

Very universal TiAlN coating with a high resistance to high temperature and hardness. Very suitable also for non-ferrous metals.

PD2F

Coating for universal use with medium and low speed.

XC2A

Coating with excellent hot hardness, high oxidation resistance and thermal insulation capacity. Perfect for hard machining >60 HRC

MIKROMILL

groove milling

by circular interpolation

Technical instructions,
carbide grade and coatings



P01C

Coating for the processing in tough material with medium or low cutting speed

P03C

Coating for materials which are difficult to machine. Perfect to use for dry machining.

P07C

Coating to machine titanium and stainless steel.

P18C

Very universal high performance coating with high oxidation resistance, wear resistance and hot hard-ness resistance.

NEME

Coating for machining aluminium, alloys, non-ferrous metals and composite materials.

MIKROMILL

groove milling

by circular interpolation

Technical instructions, cutting data



	Werkstoff	Festigkeit	Werkstoff-Nr	Werkstoffbezeichnung	Werkstoff-Nr
P	Allgemeiner Baustahl	< 800 N/mm2	1.0037	St37-2	1.0570
	Automatenstahl	< 800 N/mm2	1.0718	9SMnPb28	1.0727
	Einsatzstahl unlegiert	< 800 N/mm2	1.0401	C15	1.0481
	Einsatzstahl legiert	< 1000 N/mm2	1.7331	16MnCr5 (EC80)	1.7015
	Vergütungsstahl unlegiert	< 850 N/mm2	1.0503	C45	1.1191
	Vergütungsstahl unlegiert	< 1000 N/mm2	1.0601	C60	1.1221
	Vergütungsstahl legiert	< 800 N/mm2	1.5131	50MnSi4	1.7030
	Vergütungsstahl legiert	< 1300 N/mm2	1.5755	31NiCr14	1.7033
	Stahlguss	< 850 N/mm2	0.9650	G-X260Cr27	1.6750
	Nitrierstahl	< 1000 N/mm2	1.8504	34CrAl6	1.8507
	Nitrierstahl	< 1200 N/mm2	1.8515	31CrMo12	1.8523
	Wälzlagerstahl	< 1200 N/mm2	1.3505	100Cr6 (W3)	1.3543
	Federstahl	< 1200 N/mm2	1.5026	55Si7	1.7176
	Schnellarbeitsstahl	< 1300 N/mm2	1.3344	S 6-5-3	1.3255
	Werkzeugstahl für Kaltarbeit	< 1300 N/mm2	1.2312	40CrMnMoS8 6	1.2379
	Werkzeugstahl für Warmbeit	< 1300 N/mm2	1.2343	X38CrMoV 5 1	1.2767
M	Stahl und Stahlguss rostfrei geschwefelt	< 850 N/mm2	1.4305	X8CrNiS18 9	1.4105
	Nichtrostender Stahl, ferritisch	< 750 N/mm2	1.4510	X3CrTi17	1.4528
	Nichtrostender Stahl, martensitisch	< 900 N/mm2	1.4034	X46Cr13	1.4116
	Nichtrost. Stahl, ferritisch/martensit.	<1100 N/mm2	1.4313	X3CrNi13-4	1.4028
	Nichtrost. Stahl, austenitisch/ferritisch	< 850 N/mm2	1.4460	X8CrNiMo27 5	1.4821
	Nichtrostender Stahl, austenitisch	< 750 N/mm2	1.4301	X5CrNi18-10	1.4571
K	Hitzebeständig	< 1100 N/mm2	1.4747	X80CrNiSi20	1.4876
	Grauguss mit Lammellengraphit	100-350N/mm2	0.6010	GG10	0.6025
	Grauguss mit Lammellengraphit	300-1000N/mm2	0.6030	GG30	0.6045
	Kugelgraphitguss	300-500N/mm2	0.7040	GGG40	0.7050
	Kugelgraphitguss	550-800N/mm2	0.7060	GGG60	0.7080
	Temperguss weis	350-450N/mm2	0.8035	GTW35	0.8045
	Temperguss weis	500-650N/mm2	0.8055	GTW55	0.8065
	Temperguss schwarz	350-450N/mm2	0.8135	GTS35	0.8145
N	Temperguss schwarz	500-700N/mm2	0.8155	GTS55	0.8170
	Aluminium (unlegiert, niedrig legiert)	< 350 N/mm2	3.0255	Al99,5	3.3308
	Aluminiumlegierungen < 0,5% Si	< 500 N/mm2	3.0515	AlMn1	3.1355
	Aluminiumlegierungen 0,5-10% Si	< 400 N/mm2	3.2152	GD-AlSi6Cu4	3.2373
	Aluminiumlegierungen 10-15% Si	< 400 N/mm2	3.2381	G-AlSi10Mg	3.5562
	Aluminiumlegierungen > 15% Si	< 400 N/mm2		G-AlSi17Cu4	
	Kupfer (unlegiert, niedrig legiert)	< 350 N/mm2	2.0060	E-Cu57	2.0090
	Kupfer-Knetlegierungen	< 700 N/mm2	2.0240	CuZn15	2.0265
	Kupfer-Sonderlegierungen	< 200 HB	2.0916	CuAl5	2.1525
	Kupfer-Sonderlegierungen	< 300HB	2.0978	CuAl11Ni6Fe5	
	Kupfer-Sonderlegierungen	> 300 HB	2.1247	CuBe2F125	
	Messing kurzspanend, Bronze, Rotguss	< 600 N/mm2	2.0360	CuZn40 (Ms60)	2.0380
	Messing langspanend	< 600 N/mm2	2.0335	CuZn36 (Ms63)	2.1293
	Thermoplaste			Delrin, Hostalen	
	Duroplaste			Ferrozell, Bakelit	
	Faserverstärkte Kunststoffe			GFK (Glasfaserverstärkt)	
	Magnesium und Magnesiumlegierungen	< 850 N/mm2	3.5200	M2, MgMn2	3.5612
	Graphit			C8000, R8500X	
Wolfram und Wolframlegierungen			W-NiFe (Densimet W)		
Molybdän und Molybdänlegierungen			Mo , Mo-50Re		
S	Reinnickel		1.3911	RNi24	1.3927
	Nickellegierungen		1.3912	Ni36 (Invar)	1.3924
	Nickellegierungen	< 850 N/mm2	2.4360	S-NiCu 30 Fe	
	Nickel-Chromlegierungen		2.4886	SG-NiMo16Cr16W	2.4610
	Nickel- und Kobaltlegierungen	< 1300 N/mm2	2.4632	NiCr20Co18Ti	2.4631
	Nickel- und Kobaltlegierungen	< 1300 N/mm2	2.4634	NiCo20Cr15MoAlTi	2.4654
	Hochwärmefeste Legierungen	< 1300 N/mm2		Hardox 400	1.4939
	Nickel-Kobalt-(Chrom-)legierungen	< 1400 N/mm2	2.4806	SG-NiCr20Nb, Inconel 82	2.4851
	Reintitan	< 900 N/mm2	3.7025	Ti99,8	3.7034
	Titanlegierungen	< 700 N/mm2	3.7114	TiAl5Sn2	3.7174
	Titanlegierungen	< 1200 N/mm2	3.7164	TiAl5V4	3.7144
H	Stahl gehärtet	< 45 HRc			
		46-55HRc			
		56-60 HRc			
		61-65 HRc			
		65-70 HRc			

MIKROMILL

groove milling

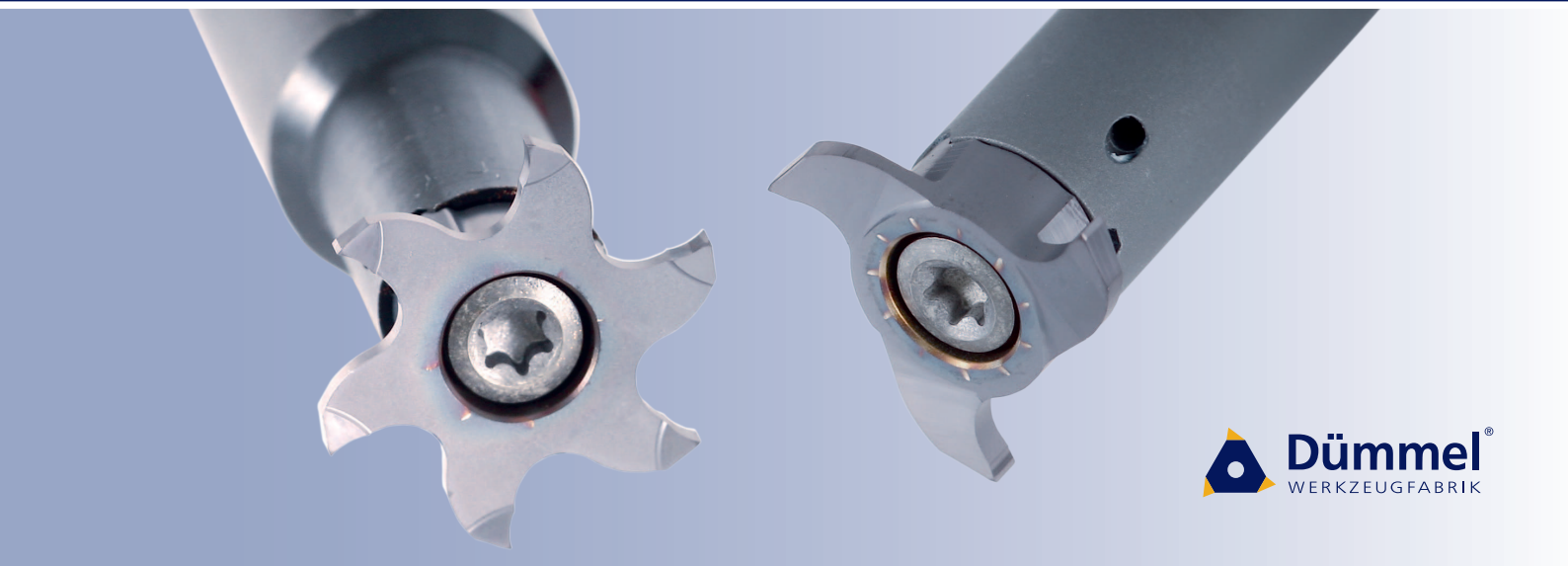
by circular interpolation

Technical instructions, cutting data



Werkstoffbezeichnung	Werkstoff- Nr	Werkstoffbezeichnung	Vc (m/min.)	fz (mm)	
St52-3	1.0060	St60-2	40-120	0,02 - 0,05	Haupt-Anwendung
45S20	1.0757	46SPb2		0,02 - 0,05	
17Mn4	1.1141	C15E (CK15)		0,02 - 0,05	
13Cr3 (EC60)	1.5919	15CrNi6	0,01 - 0,04		
Ck45	1.0535	C55	0,02 - 0,05		
Ck60	1.0540	C50	0,01 - 0,04		
28Cr4	1.7225	42CrMo4	0,02 - 0,05		
34Cr4	1.3565	48CrMo4	0,007 - 0,03		
GS-20NiCrMo3 7	1.6582	GS-34 CrNiMo 6	0,02 - 0,05		
34AlMo5	1.8509	41CrAlMo7	0,01 - 0,04		
39CrMoV19 3	1.8550	34 CrAlNi 7	0,007 - 0,02		
X192CrMo17	1.3520	100 CrMn 6 (W4)	0,005 - 0,01		
55Cr3	1.7701	51CrMoV4	0,005 - 0,01		
S 18-1-2-5	1.3294	PMH56-5-3-8; ASP30	0,005 - 0,01		
X155CrVMo12 1	1.2316	X38CrMo16; RAMAX	0,005 - 0,01		
X45NiCrMo4	1.2842	90MnCrV8	0,005 - 0,01		
X4CrMoS18	1.4107	GX8CrNi12	0,01 - 0,04		
X105CrCoMo18 2	1.4016	X6Cr17	0,02 - 0,05		
X50CrMoV15	1.4106	X2CrMoSi18-2-1	0,007 - 0,03		
X30Cr13	1.4104	X14CrMoS17	0,007 - 0,03		
X20CrNiSi25 4	1.4462	X2CrNiMoN22-5-3 (Duplex)	0,007 - 0,03		
X6CrNiMoTi17 12 2	1.4449	X3CrNiMo18-12-3	0,007 - 0,03		
X10NiCrAlTi32-21	1.4825	GX25CrNiSi18-9	0,007 - 0,03		
GG25			0,02 - 0,05		
GG45			0,02 - 0,05		
GGG50			0,02 - 0,05		
GGG80			0,02 - 0,05		
GTW45			0,02 - 0,05		
GTW65			0,02 - 0,05		
GTS45			0,02 - 0,05		
GTS70			0,02 - 0,05		
Al99,9Mg0,5	3.0256	E-Al H	0,02 - 0,07		
AlCuMg2	3.3315	AlMg1	0,02 - 0,07		
GD-AlSi9Mg	3.2134	GD-AlSi5Cu1Mg	0,02 - 0,07		
G-MgAl6	3.2525	S-AlSi12	0,02 - 0,07		
G-AlSi25CuNiMg		G-AlSi21CuNiMg	0,02 - 0,07		
SF-Cu	2.1522	CuSi2Mn	0,02 - 0,07		
CuZn30	2.0321	CuZn37	0,02 - 0,07		
CuSi3Mn		Ampco 8-16	0,02 - 0,07		
		Ampco18-26	0,02 - 0,07		
		Ampco M-4	0,02 - 0,07		
CuZn39Pb2 (Ms58)	2.0410	CuZn44Pb2	0,02 - 0,07		
CuCrZr	2.1080	CuSn6Zn6	0,02 - 0,07		
Makrolon, Novodur		Acrylglas, Polystyrol	0,02 - 0,1		
Pertinax		Resopal	0,02 - 0,1		
CFK (Kohlefaserverstärkt)		AFK (Amidfaserverstärkt)	0,02 - 0,07		
MgAl6Zn1	3.5812	MgAl8Zn1	0,02 - 0,05		
R8650		Technograph15	0,02 - 0,07		
W-Cu80/20		W93NiFe (DENAL)	0,02 - 0,05		
TZC, TZM		MHC, ODS	0,02 - 0,05		
RNi8	1.3926	RNi12	0,007 - 0,02		
Ni54	1.3921	Ni49	0,007 - 0,02		
NiCu 30 Fe		Monel 400	0,007 - 0,02		
NiMo16Cr16Ti		Hastelloy C-276	0,007 - 0,02		
NiCr20TiAl		Nimonic 80	0,007 - 0,02		
NiCr19Co14Mo4Ti		Waspaloy	0,007 - 0,02		
X12CrNiMo12	1.4980	X6NiCrTiMoVB25-15-2	0,007 - 0,02		
NiCr23Fe, Inconel 601	2.4667	SG-NiCr19NbMoTi	0,007 - 0,02		
Ti99,7	3.7064	Ti99,5	0,007 - 0,02		
TiAl6V6Sn2	3.7124	TiCu2	0,007 - 0,02		
TiAl6Sn2Zr4Mo2	3.7154	TiAl6Zr5	0,007 - 0,02		
			0,007 - 0,02		
			0,007 - 0,02		
			0,007 - 0,02		
			-		
			-		

For thread milling the cutting speed can be reduces, because the maximum speed is reached.



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**Groove milling by circular interpolation with
three and six cutting edges starting at Ø 10 mm**

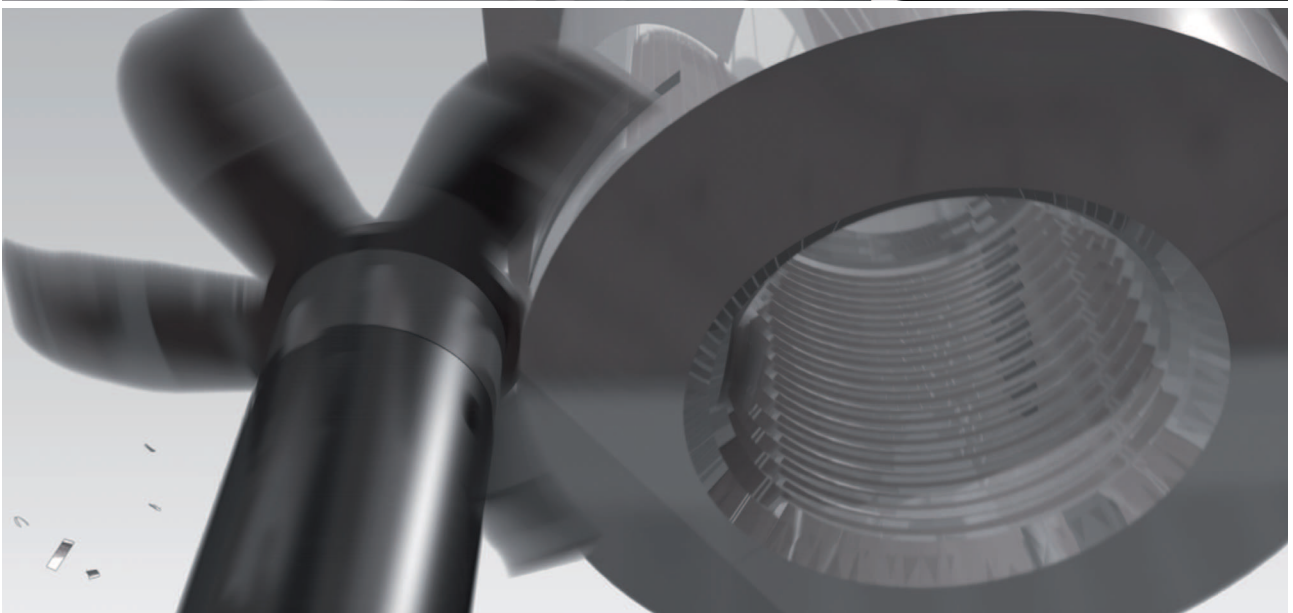
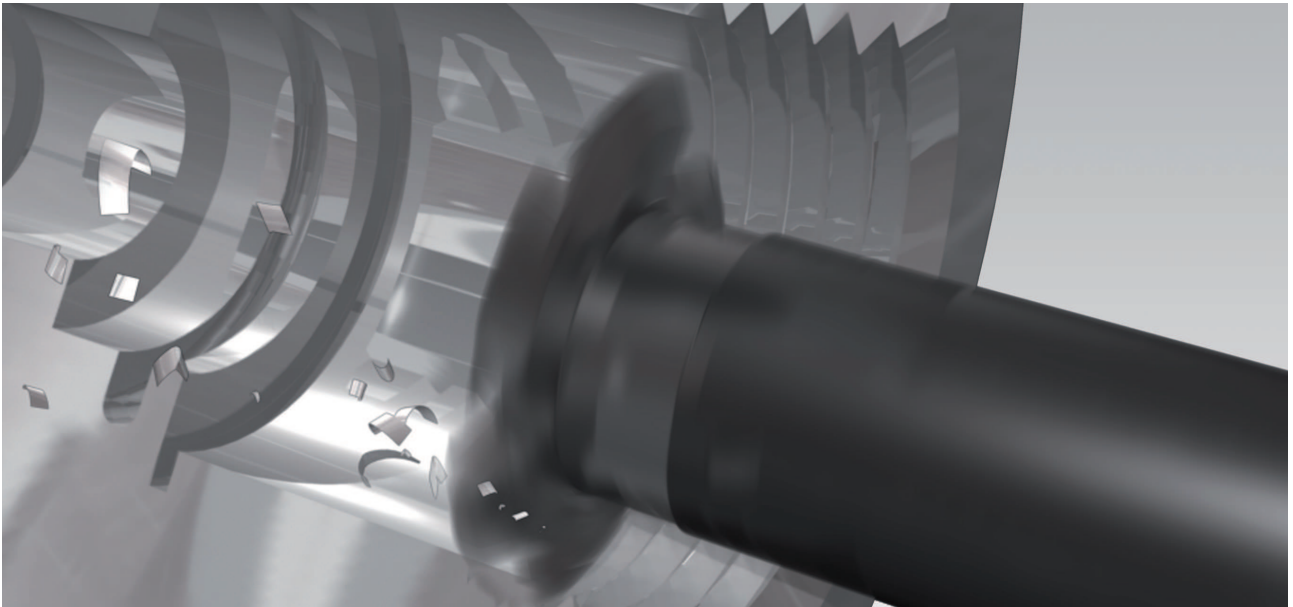


MINIMILL

groove milling by circular
interpolation

summary

The indexable carbide inserts are clamped with the common three
rips coupling. All inserts and toolholders are available on stock.



MINIMILL

groove milling by circular
interpolation

summary



	toolholder with through coolant for inserts	dimensions	page
Typ ZH10	toolholder steel	D min. 10	... 302
Typ ZH10	toolholder carbide	D min. 10	... 303
Typ ZH14	toolholder steel	D min. 14	... 304
Typ ZH14	toolholder carbide	D min. 14	... 305
Typ ZH18	toolholder steel	D min. 18	... 306
Typ ZH18	toolholder carbide	D min. 18	... 307
Typ ZH22	toolholder steel	D min. 22	... 308
Typ ZH22	toolholder carbide	D min. 22	... 309
Typ ZH28	toolholder steel	D min. 25	... 310
Typ ZH28	toolholder carbide	D min. 25	... 311
Typ ZH28	toolholder heavy metal	D min. 28	... 312
Typ ZH33	toolholder carbide	D min. 28	... 313



MINIMILL

groove milling by circular
interpolation

summary



	inserts groove milling	dimensions	page
Typ Z10	for circlips DIN 471/472, groove milling general use	D min. 10 t max. = 1.5	... 314
Typ Z12	for circlips DIN 471/472, groove milling general use	D min. 12 t max. = 2.5	... 315
Typ Z612 / Z612.X	groove milling general use	D min. 12 t max. = 2	... 316
Typ Z14	groove milling general use	D min. 14 t max. = 2.5	... 317
Typ Z16	groove milling general use	D min. 16 t max. = 3.5	... 318
Typ Z616 / Z616.X	groove milling general use	D min. 16 t max. = 2.5	... 319
Typ Z18	for circlips DIN 471/472, groove milling general use	D min. 18	... 320
Typ Z618	for circlips DIN 471/472	D min. 18	... 321
Typ Z618 / Z618.X / Z620 / Z620.X	groove milling general use	D min. 18 / 20 t max. = 4 / 5	... 322
Typ Z22	for circlips DIN 471/472, groove milling general use	D min. 22	... 323
Typ Z22	for circlips DIN 471/472 with chamfer	D min. 22	... 325
Typ Z622 / Z622.X	groove milling general use	D min. 22 t max. = 4.5	... 326
Typ Z25	groove milling general use	D min. 25 t max. = 5.0	... 327
Typ Z28	groove milling general use	D min. 28 t max. = 6.5	... 328
Typ Z28	groove milling general use	D min. 28.3 t max. = 9.3	... 329
Typ Z628 / Z628.X	for circlips DIN 471/472, groove milling general use	D min. 28 t max. = 6.5	... 330
Typ Z628	groove milling general use	D min. 28 t max. = 9.3	... 331
Typ Z32	groove milling general use	D min. 32 t max. = 8.5	... 332

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Nut- und Formzirkularfräsen

groove milling by circular interpolation

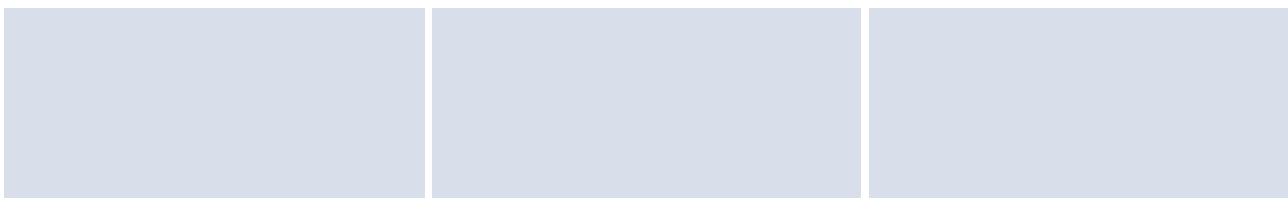
Übersicht

summary



	inserts groove milling	dimensions	page
Typ Z33	groove milling general use	D min. 33 t max. = 10 / 12	... 333
Typ Z635 / Z635.X	groove milling general use	D min. 35 t max. = 10	... 334
Typ Z637 / Z640	groove milling general use	D min. 37 / 40 t max. = 12 / 13.5	... 335
Typ Z637 / Z640	for groove and keyway milling b = 0.4 - 0.8 mm	D min. 37 / 40 t max. = 12 / 13.5	... 336
Typ Z12	full radius	D min. 12 t max. = 2.5	... 337
Typ Z16	full radius	D min. 16 t max. = 3.5	... 338
Typ Z18	full radius	D min. 18 t max. = 3.5	... 339
Typ Z22	full radius	D min. 22 t max. = 4,5	... 340

	inserts thread milling	dimensions	page
Typ Z610	metric ISO-thread milling, internal partial profile	D min. 10	... 341
Typ Z12	metric ISO-thread milling, internal partial profile	D min. 12	... 342
Typ Z614	metric ISO-thread milling, internal partial profile	D min. 14	... 343
Typ Z16	metric ISO-thread milling, internal partial profile	D min. 16	... 344
Typ Z18	metric ISO-thread milling, internal partial profile	D min. 18	... 345
Typ Z618	metric ISO-thread milling, internal partial profile	D min. 18	... 346
Typ Z18	metric ISO-thread milling, internal full profile	D min. 18	... 347





MINIMILL

groove milling by circular
interpolation

summary

	inserts thread milling	dimensions	page
Typ Z22	metric ISO-thread milling, internal partial profile	D min. 22	... 348
Typ Z622	metric ISO-thread milling, internal partial profile	D min. 22	... 349
Typ Z22	metric ISO-thread milling, internal full profile	D min. 22	... 350
Typ Z622	metric ISO-thread milling, internal full profile	D min. 22	... 351
Typ Z28	metric ISO-thread milling, internal partial profile	D min. 28	... 352
Typ Z628	metric ISO-thread milling, internal partial profile	D min. 28	... 353
Typ Z622	metric ISO-thread milling, external full profile		... 354
Typ Z12	for Whitworth threading internal full profile	G 3/8"	... 355
Typ Z614	for Whitworth threading internal full profile	G 3/4"	... 356
Typ Z18	for Whitworth threading internal full profile	G 3/4"	... 357
Typ Z22	for Whitworth threading internal full profile	BSW1 1/2"	... 358
Typ Z622	for Whitworth threading internal full profile	BSW1 1/2"	... 359

MINIMILL

groove milling by circular interpolation

summary



	inserts chamfering	dimensions	page
Typ Z10 / Z12	forward & backward chamfering	D min. 10 / 12	... 360
Typ Z610	forward & backward chamfering	D min. 10	... 361
Typ Z614	forward & backward chamfering	D min. 14	... 362
Typ Z16	forward & backward chamfering	D min. 16	... 363
Typ Z18	forward & backward chamfering	D min. 15	... 364
Typ Z18	forward & backward chamfering with radius	D min. 18	... 365
Typ Z22	forward & backward chamfering	D min. 22	... 366
Typ Z618 / Z622 / Z628	forward & backward chamfering	D min. 15/18/ 22 /28	... 367

	inserts face milling	dimensions	page
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Typ Z620 / Z628	face milling	D min. 20 / 28	... 368
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MINIMILL

groove milling by circular
interpolation

summary

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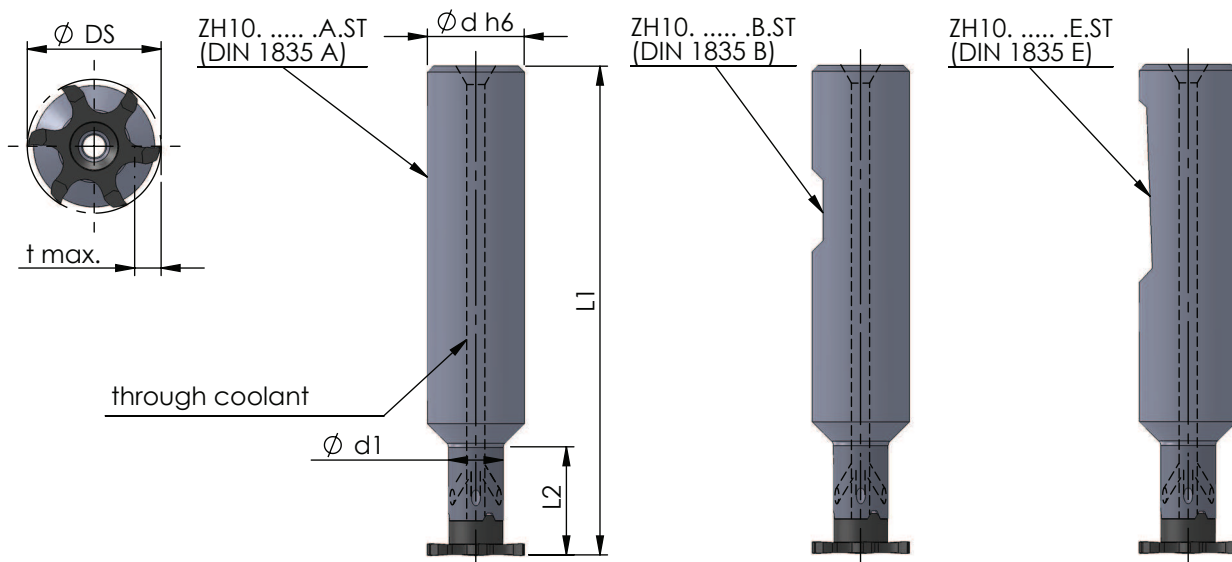
MINIMILL

groove milling by circular interpolation

Type ZH10

toolholder steel

bore Ø from 10 mm



dimensions and descriptions are valid for all variations

part number						Typ: t max./ Schneidkreis-Ø DS	screw	key driver	torque	für Schneidplatte
	Ø d h6	d1	L1	L2						
ZH10.1006.15.A.ST	10	6	60	15		Z10: 1.5 / 9.7	M2.6-MM	T 8F	2.0 Nm	Z10
ZH10.1606.12.A.ST / ...B.ST / ...E.ST	16	6	80	12		Z12: 2.5 / 11.7 Z612: 2 / 11.7				Z610 Z612

order-example:
ZH10.1606.12.A.ST

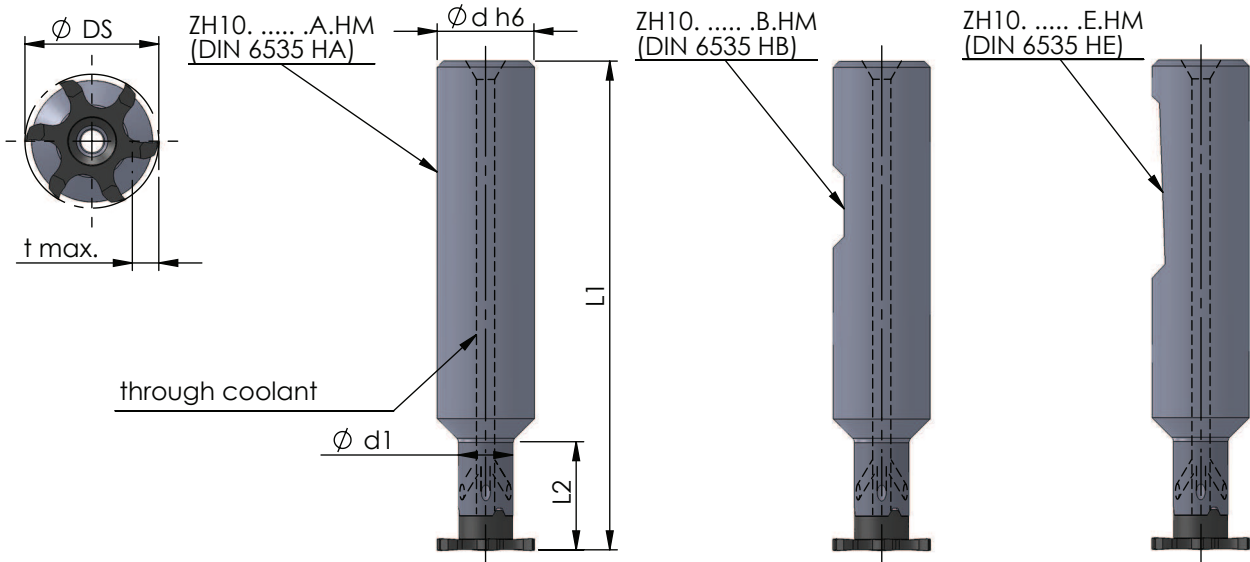
MINIMILL

groove milling by circular interpolation

Type ZH10

toolholder carbide

bore Ø from 10 mm



dimensions and descriptions are valid for all variations

part number	Ø d h6	d1	L1	L2	Typ: t max./ Schneidkreis-Ø DS	screw	key driver		für Schneidplatte
							torque		
ZH10.1206.21.A.HM /...B.HM /...E.HM	12	6	80	21	Z10: 1.5 / 9.7 Z12: 2.5 / 11.7 Z612: 2 / 11.7	M2.6-MM	T 8F	2.0 Nm	Z10 Z12 Z610 Z612
ZH10.1206.30.A.HM /...B.HM /...E.HM	12	6	90	30					
ZH10.1206.42.A.HM /...B.HM /...E.HM	12	6	100	42					
ZH10.1207.30.A.HM /...B.HM /...E.HM	12	7.3	90	30					
ZH10.1607.25.A.HM /...B.HM /...E.HM	16	7.3	100	25					

order-example:
ZH10.1607.25.A.HM

note:
carbide-toolholder with damaged seating can be repaired by Dümmel.



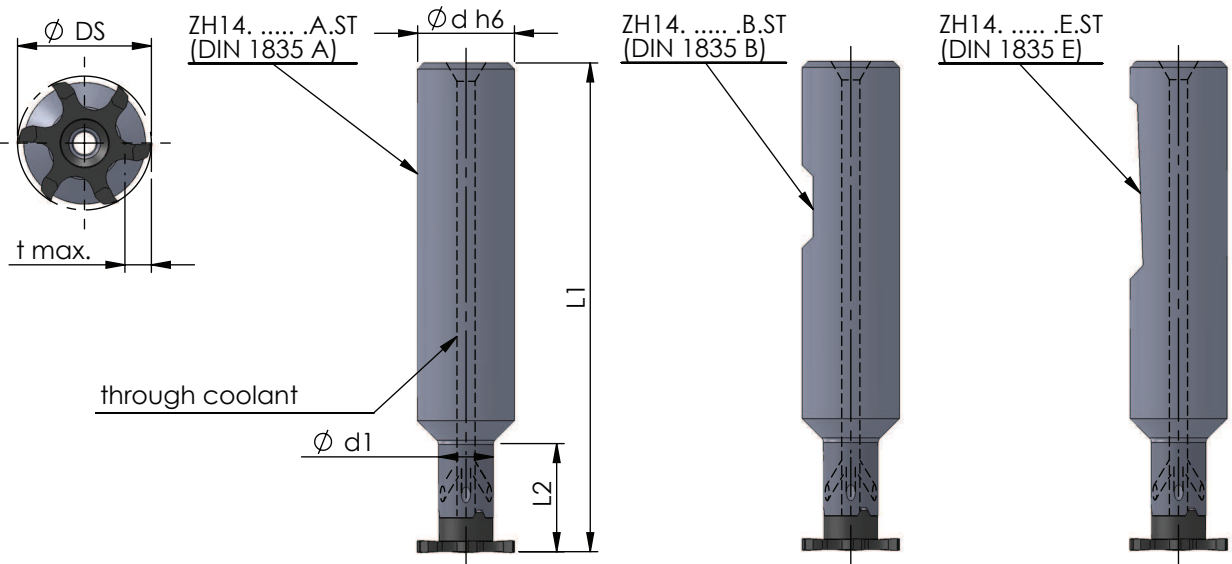
MINIMILL

groove milling by circular interpolation

Type ZH14

toolholder steel

bore Ø from 14 mm



dimensions and descriptions are valid for all variations

part number	Dimensions				Typ: t max./ Schneidkreis-Ø DS	screw	key driver	torque	für Schneidplatte
	Ø d h6	d1	L1	L2					
ZH14.1008.17.A.ST	10	8	60	17	Z14: 2.5 / 13.7 Z16: 3.5 / 15.7 Z616: 2.5 / 15.7	M3.5-MM	T 10F	3.5 Nm	Z14
ZH14.1308.25.A.ST	13	8	70	25					Z16
ZH14.1608.16.A.ST /...B.ST /...E.ST	16	8	80	16					Z616

order-example:
ZH14.1608.16.A.ST

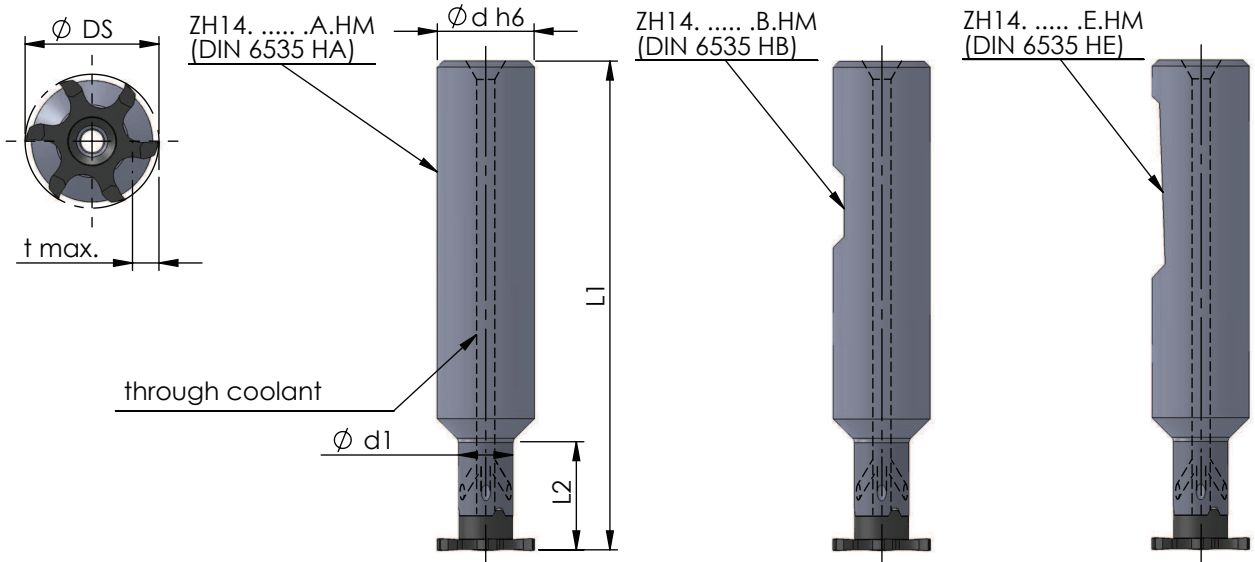
MINIMILL

groove milling by circular interpolation

Type ZH14

toolholder carbide

bore Ø from 14 mm



dimensions and descriptions are valid for all variations



part number					Typ: t max./ Schneidkreis-Ø DS	screw	key driver	torque	für Schneidplatte
	Ø d h6	d1	L1	L2					
ZH14.1208.29.A.HM /...B.HM /...E.HM	12	8	95	29	Z14: 2.5 / 13.7 Z16: 3.5 / 15.7 Z616: 2.5 / 15.7	M3.5-MM	T 10F	3.5 Nm	Z14 Z16 Z614 Z616
ZH14.1208.42.A.HM /...B.HM /...E.HM	12	8	110	42					
ZH14.1208.56.A.HM /...B.HM /...E.HM	12	8	120	56					
ZH14.1209.42.A.HM /...B.HM /...E.HM	12	9.5	110	42					
ZH14.1609.33.A.HM /...B.HM /...E.HM	16	9.5	110	33					

order-example:
ZH14.1609.33.A.HM

note:
carbide-toolholder with damaged seating can be repaired by Dümmel.



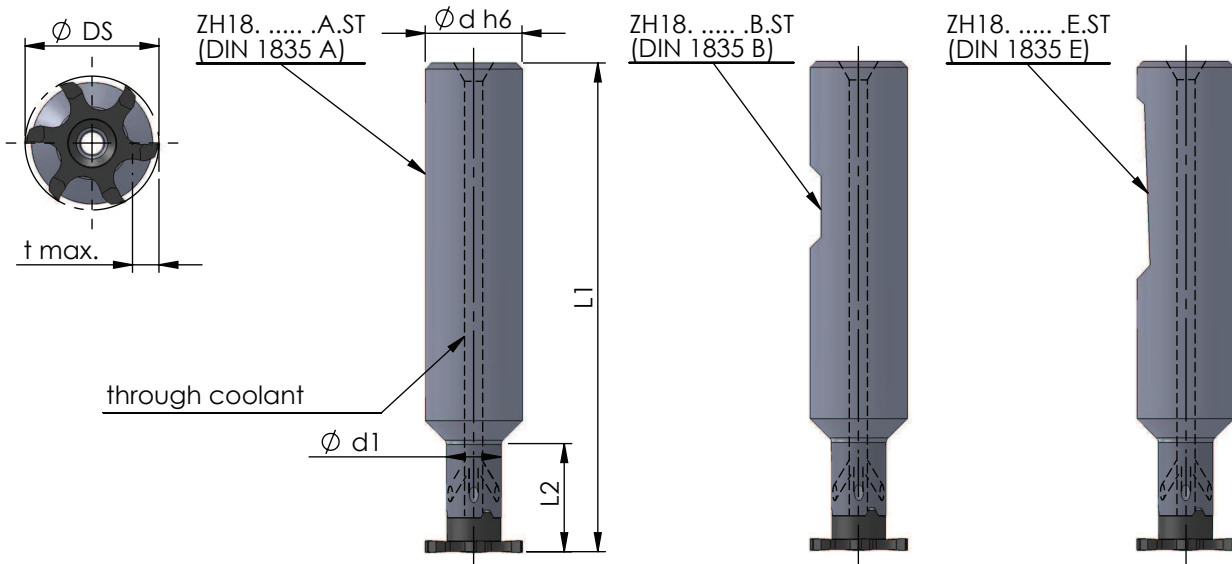
MINIMILL

groove milling by circular interpolation

Type ZH18

toolholder steel

bore Ø from 18 mm



dimensions and descriptions are valid for all variations

part number						Typ: t max./ Schneidkreis-Ø DS	screw	key driver	torque	für Schneidplatte
	Ø d h6	d1	L1	L2						
ZH18.1009.17.A.ST	10	9	60	17						
ZH18.1309.25.A.ST	13	9	70	25						
ZH18.1609.18.A.ST /...B.ST /...E.ST	16	9	80	18	Z18: 3.5 / 17.7 Z618: 4 / 17.7 Z620: 5 / 19.7	M4-MM	T 15F	4.5 Nm		Z18 Z618 Z620

order-example:
ZH18.1609.18.A.ST

MINIMILL

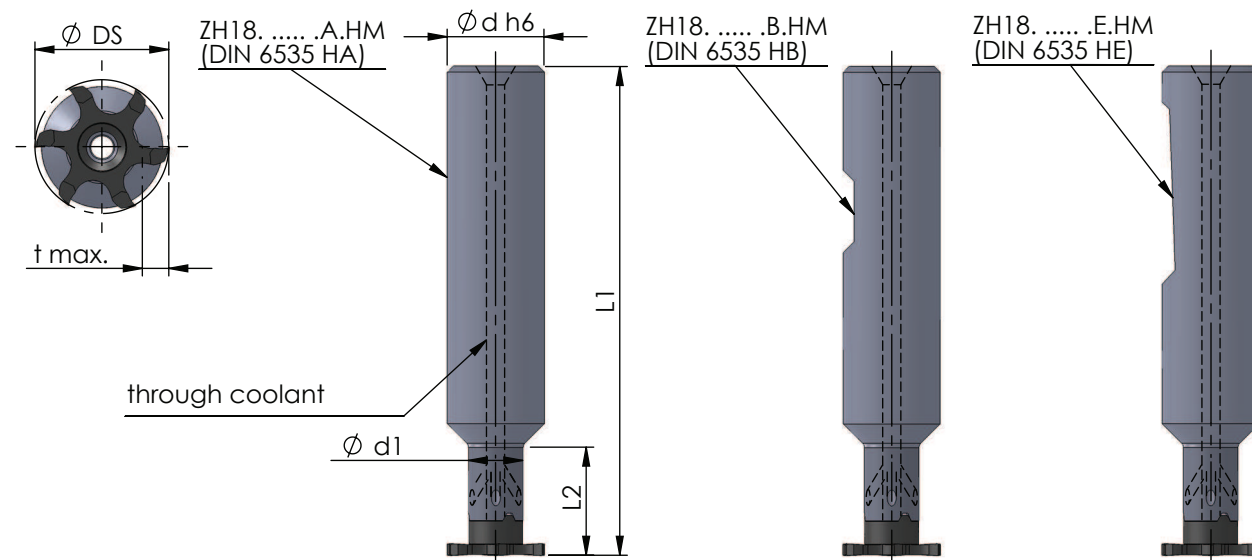
groove milling by circular

interpolation

Type ZH18

toolholder carbide

bore Ø from 18 mm



dimensions and descriptions are valid for all variations

part number	Ø d h6	d1	L1	L2	Typ: t max./ Schneidkreis-Ø DS	screw	key driver	torque	für Schneidplatte
ZH18.1209.32.A.HM /...B.HM /...E.HM	12	9	100	32	Z18: 3.5 / 17.7 Z618: 4 / 17.7 Z620: 5 / 19.7	M4-MM	T 15F	4.5 Nm	Z18 Z618 Z620
ZH18.1209.45.A.HM /...B.HM /...E.HM	12	9	100	45					
ZH18.1209.64.A.HM /...B.HM /...E.HM	12	9	120	64					
ZH18.1609.25.A.HM /...B.HM /...E.HM	16	9	93	25					
ZH18.1609.32.A.HM /...B.HM /...E.HM	16	9	100	32					
ZH18.1609.45.A.HM /...B.HM /...E.HM	16	9	110	45					
ZH18.1609.64.A.HM /...B.HM /...E.HM	16	9	130	64					
ZH18.1613.64.A.HM /...B.HM /...E.HM	16	13	110	64					
ZH18.1613.66.A.HM /...B.HM /...E.HM	16	13	130	66					

order-example:
ZH18.1613.66.A.HM

note:
carbide-toolholder with damaged seating can be repaired by Dümmel.





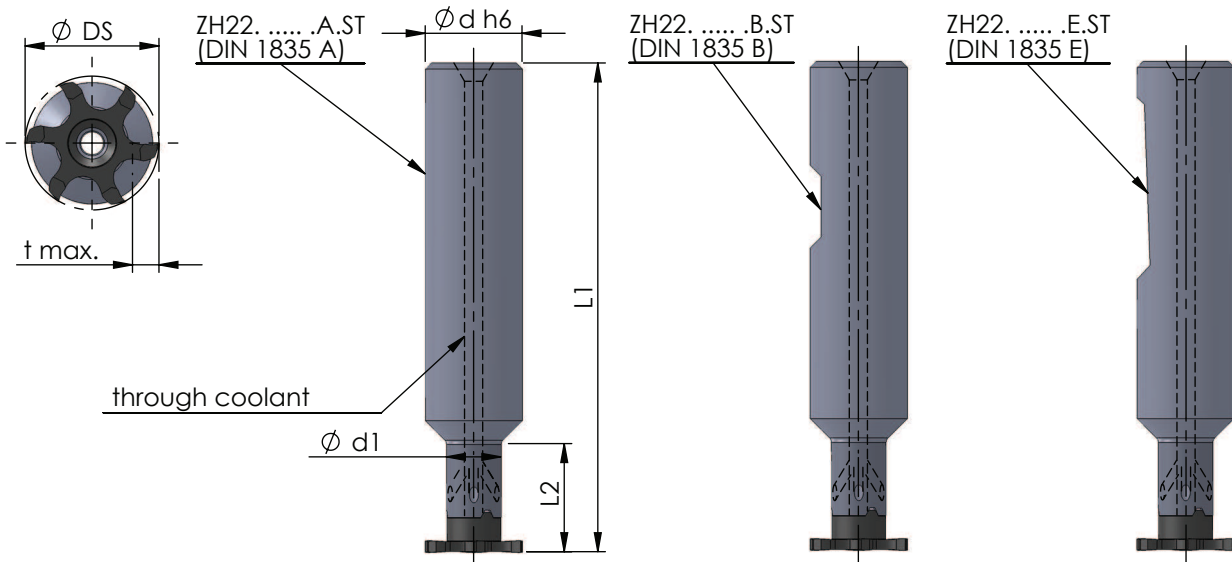
MINIMILL

groove milling by circular interpolation

Type ZH22

toolholder steel

bore Ø from 22 mm



dimensions and descriptions are valid for all variations

part number						Typ: t max./ Schneidkreis-Ø DS	screw	key driver	torque	für Schneidplatte
	Ø d h6	d1	L1	L2						
ZH22.1011.10.A.ST	10	11.3	60	10.7		Z22: 4.5 / 21.7 Z622: 4.5 / 21.7 Z33: 10 / 32.7 Z33: 12 / 32.7 Z637: 12 / 36.7 Z640: 13.5 / 39.7	M5-MM	T 20F	7.0 Nm	Z22
ZH22.1311.25.A.ST	13	11.3	70	25.7	Z622					
ZH22.1612.24.A.ST /...B.ST /...E.ST	16	12	80	24	Z33 Z637 Z640					

order-example:
ZH22.1612.24.A.ST

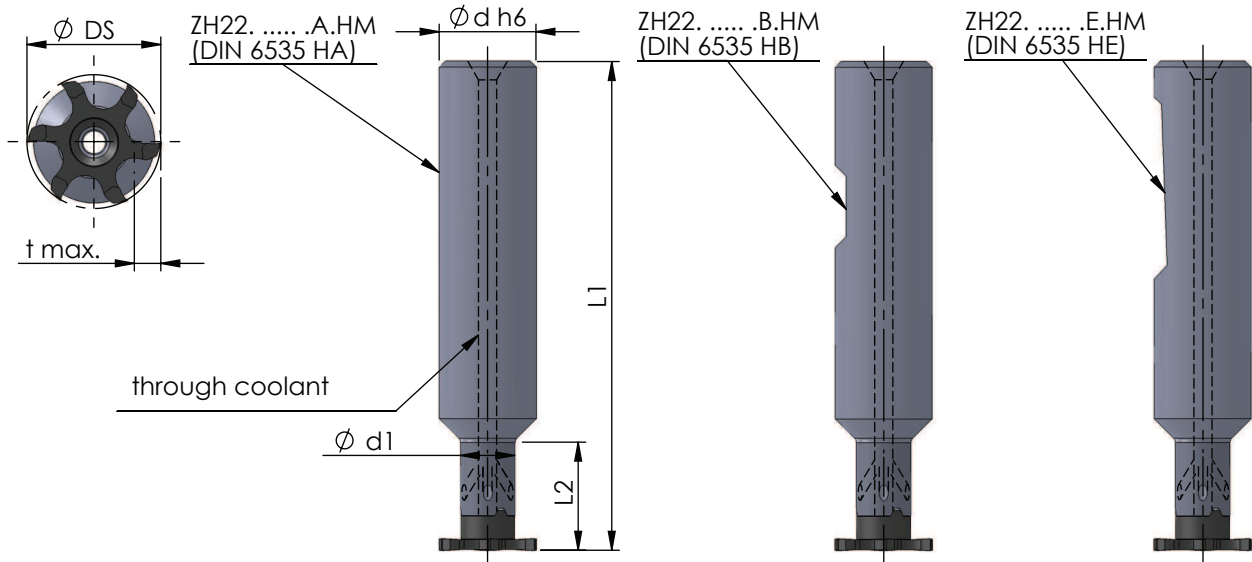
MINIMILL

groove milling by circular interpolation

Type ZH22

toolholder carbide

bore Ø from 22 mm



dimensions and descriptions are valid for all variations

part number	Ø d h6	d1	L1	L2	Typ: t max./ Schneidkreis-Ø DS	screw	key driver	torque	für Schneidplatte	
ZH22.1212.42.A.HM /...B.HM /...E.HM	12	-	100	42	Z22: 4.5 / 21.7 Z622: 4.5 / 21.7 Z33: 10 / 32.7 Z33: 12 / 32.7 Z637: 12 / 36.7 Z640: 13.5 / 39.7	M5-MM	T 20F	7.0 Nm	Z22 Z622 Z33 Z637 Z640	
ZH22.1212.60.A.HM /...B.HM /...E.HM	12	-	130	60						
ZH22.1611.30.A.HM /...B.HM /...E.HM	16	11.5	90	30						
ZH22.1612.42.A.HM /...B.HM /...E.HM	16	12	100	42						
ZH22.1612.60.A.HM /...B.HM /...E.HM	16	12	130	60						
ZH22.1612.85.A.HM /...B.HM /...E.HM	16	12	160	85						
ZH22.2016.45.A.HM /...B.HM /...E.HM	20	16	110	45						t max. reduziert
ZH22.2016.65.A.HM /...B.HM /...E.HM	20	16	130	65						t max. reduced

order-example:
ZH22.2016.65.A.HM

note:
carbide-toolholder with damaged seating can be repaired by Dümmel.



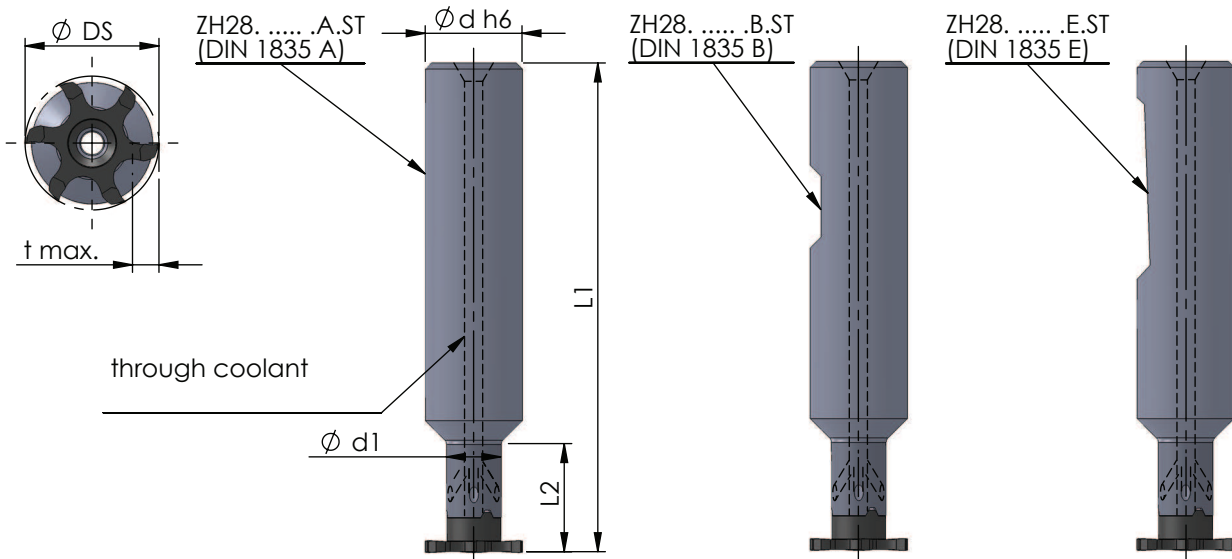
MINIMILL

groove milling by circular interpolation

Type ZH28

toolholder steel

bore Ø from 25 mm



dimensions and descriptions are valid for all variations

part number					Typ: t max./ Schneidkreis- \varnothing DS	screw	key driver	torque	für Schneidplatte
	$\varnothing d h_6$	d1	L1	L2					
ZH28.1314.10.A.ST	13	14	70	10.7	Z25: 5 / 24.8 Z28: 6.5 / 27.7 Z628: 6.5 / 27.7 Z32: 8.5 / 31.7 Z635: 10 / 34.7	M5-MM	T 20F	7.0 Nm	Z25 Z28 Z628 Z32 Z635
ZH28.2014.35.A.ST / ...B.ST	20	14	100	35.7					

order-example:
ZH28.2014.35.A.ST

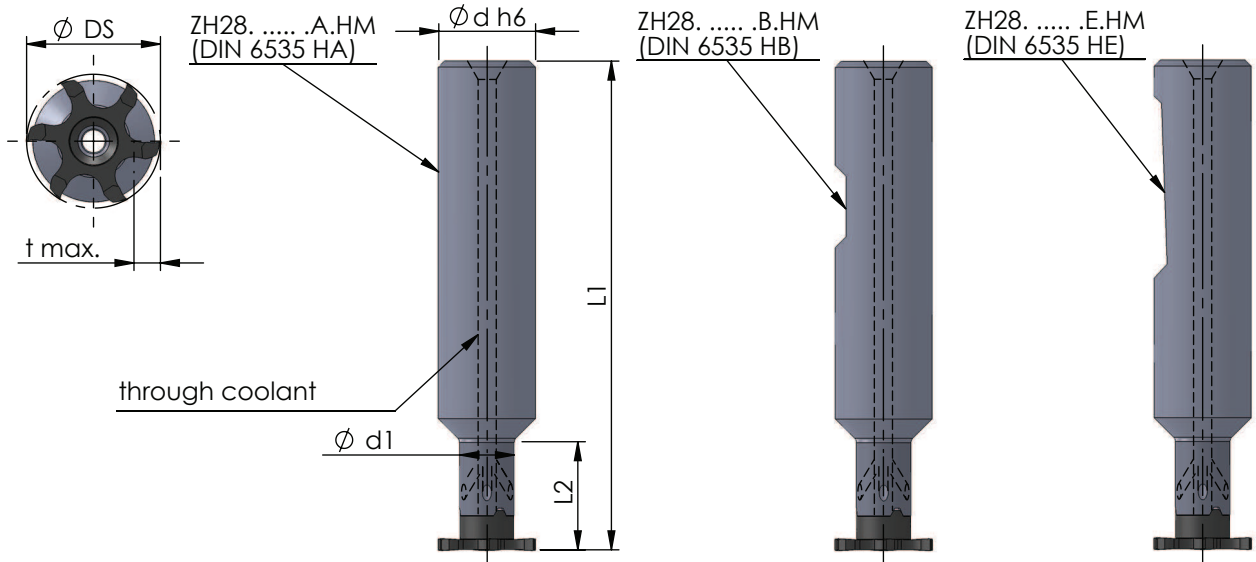
MINIMILL

groove milling by circular interpolation

Type ZH28

toolholder carbide

bore Ø from 25 mm



dimensions and descriptions are valid for all variations

part number	$\varnothing d_{h6}$	d1	L1	L2	Typ: t max./ Schneidkreis- $\varnothing DS$	screw	key driver		für Schneidplatte
							torque		
ZH28.1614.42.A.HM /...B.HM /...E.HM	16	14.3	100	42	Z25: 5 / 24.8 Z28: 6.5 / 27.7 Z628: 6.5 / 27.7 Z32: 8.5 / 31.7 Z635: 10 / 34.7	M5-MM	T 20F	7.0 Nm	Z25 Z28 Z628 Z32 Z635
ZH28.1614.60.A.HM /...B.HM /...E.HM	16	14.3	130	60					
ZH28.1614.85.A.HM /...B.HM /...E.HM	16	14.3	160	85					
ZH28.2013.35.A.HM /...B.HM /...E.HM	20	13.5	104	35					
ZH28.2014.85.A.HM /...B.HM /...E.HM	20	14.3	160	85					

order-example:
ZH28.2014.85.A.HM

note:
carbide-toolholder with damaged seating can be repaired by Dümmel.



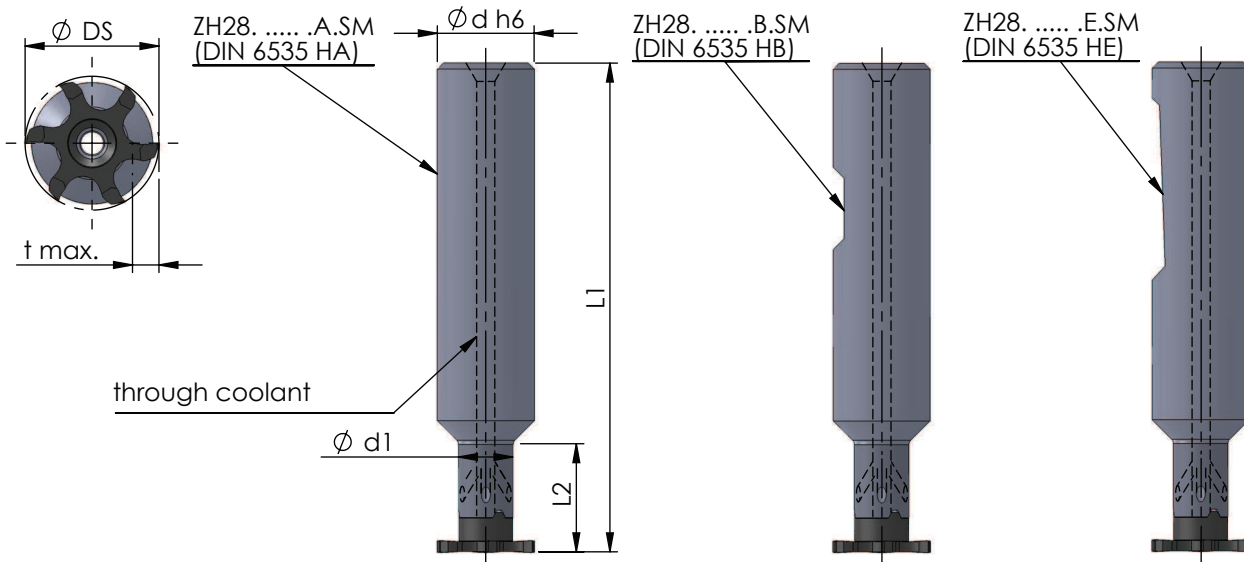
MINIMILL

groove milling by circular interpolation

Type ZH28

toolholder heavy metal

bore Ø from 28 mm



dimensions and descriptions are valid for all variations

part number	$\varnothing d h6$	d1 *	L1	L2	Typ: t max./ * Schneidkreis- $\varnothing DS$	screw	key driver		für Schneidplatte
							torque		
ZH28.2015.20.A.SM /...B.SM /...E.SM	20	15	130	20	Z28: 6.5 / 27.7 Z628: 6.5 / 27.7 Z32: 8.5 / 31.7 Z635: 10 / 34.7	M5-MM	T 20F	7.0 Nm	Z28 Z628 Z32 Z635
ZH28.2020.35.A.SM /...B.SM /...E.SM	20	20	145	-					
ZH28.2015.30.A.SM /...B.SM /...E.SM	20	15	160	30					
ZH28.2020.90.A.SM /...B.SM /...E.SM	20	20	200	-					

order-example:
ZH28.2020.90.A.SM

* attention:
The measure t max. is reduced by the extra-stable implementation.

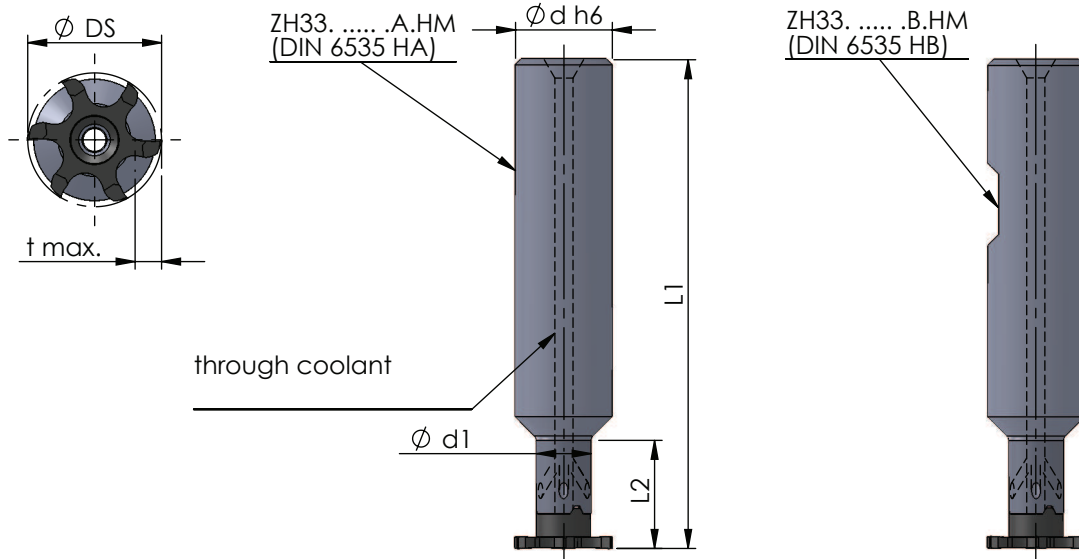
MINIMILL

groove milling by circular interpolation

Type ZH33

toolholder carbide

bore Ø from 28 mm



dimensions and descriptions are valid for all variations



part number	Ø d h6	d1	L1	L2	Typ: t max./ Schneidkreis-Ø DS	screw	key driver	torque	für Schneidplatte
ZH33.1609.33.A.HM /...B.HM	16	9	100	33	Z28: 9.3 / 28 Z628.....9 : 9.3 / 27.7 Z33.....12 : 12 / 33.6	M5-MM	T 20F	7.0 Nm	Z28 Z628.150.02.9 Z33.170.42.12

order-example:
ZH33.1609.33.A.,HM

note:
carbide-toolholder with damaged seating can be repaired by Dümmel.



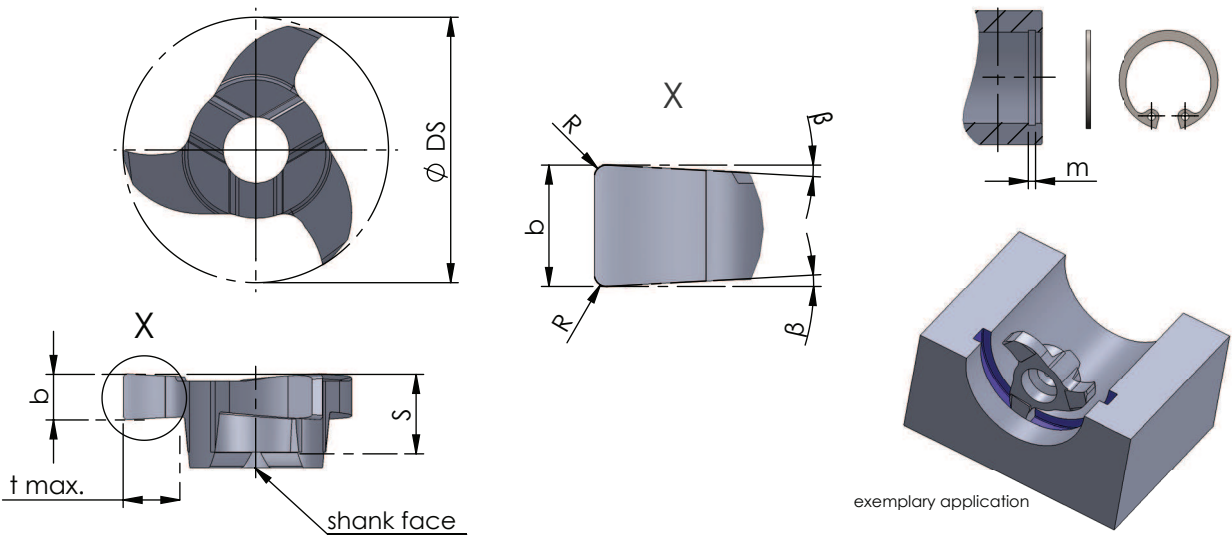
MINIMILL

groove milling by circular interpolation

Type Z10

for circlip grooves DIN 471 / 472 and general use

bore Ø from 10 mm



dimensions in mm

part number	D min.	groove dim. m	DIN 471 / DIN 472	s	β	R	Ø DS	b +0.02	t max.	number of teeth	material			toolholder type
											K10F	AL41F	P18C	
Z10.0070.00	10	0.7		3.5	1°	-	9.7	0.74*	1.5	3	●	●	●	ZH10
Z10.0080.00	10	0.8		3.5	1°	-	9.7	0.84*	1.5	3	●	●	●	
Z10.0090.00	10	0.9		3.5	1°	-	9.7	0.94*	1.5	3	●	●	●	
Z10.0100.00	10	-	-	3.5	3°	0.1	9.7	1.00	1.5	3	●	●	●	
Z10.0110.00	10	1.1		3.5	3°	-	9.7	1.21*	1.5	3	●	●	●	
Z10.0130.00	10	1.3		3.5	3°	0.1	9.7	1.41*	1.5	3	●	●	●	
Z10.0150.00	10	-	-	3.5	3°	0.2	9.7	1.50	1.5	3	●	●	●	
Z10.0160.00	10	1.6		3.5	3°	0.1	9.7	1.71*	1.5	3	●	●	●	
Z10.0200.00	10	-	-	3.5	3°	0.2	9.7	2.00	1.5	3	●	●	●	
Z10.0250.00	10	-	-	3.5	3°	0.2	9.7	2.50	1.5	3	●	●	●	

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

* tolerance: b-0.02

order-example:
grade AL41F: Z10.0160.00/AL41F

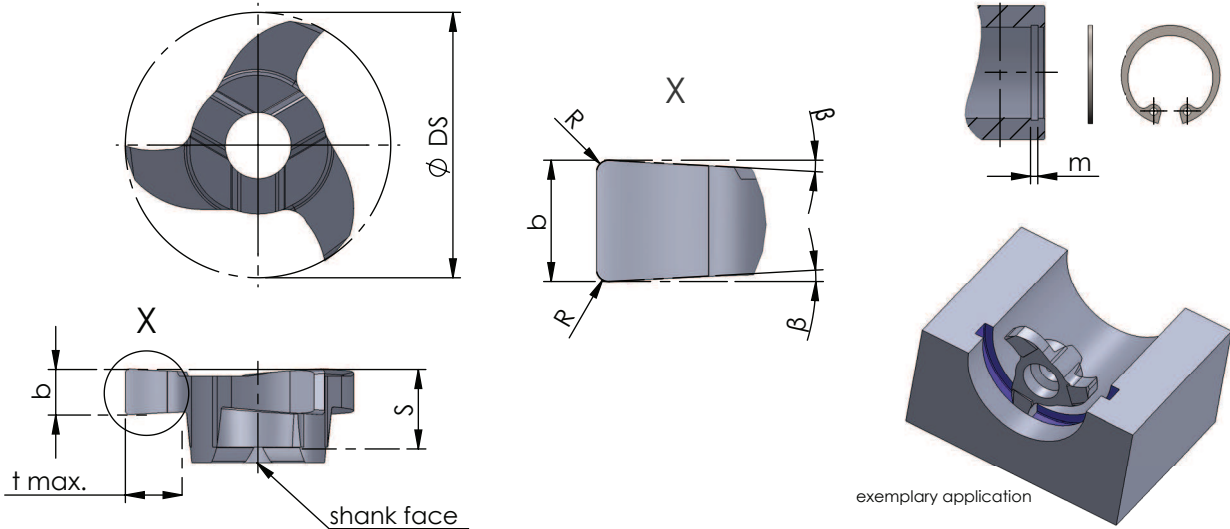
MINIMILL

groove milling by circular interpolation

Type Z12

for circlip grooves DIN 471 / 472 and general use

bore Ø from 12 mm



dimensions in mm

part number	D min.	groove dim. m	DIN 471 / DIN 472	s	β	R	Ø DS	b +0.02	t max.	number of teeth	material			for toolholder type
											K10F	AL41F	P18C	
Z12.0110.00	12	1.1		3.5	3°	-	11.7	1.21*	2.5	3	●	●	●	ZH10
Z12.0130.00	12	1.3		3.5	3°	0.1	11.7	1.41*	2.5	3	●	●	●	
Z12.0150.02	12	-		3.5	3°	0.2	11.7	1.50	2.5	3	●	●	●	
Z12.0160.00	12	1.6		3.5	3°	0.1	11.7	1.71*	2.5	3	●	●	●	
Z12.0200.00	12	-		3.5	3°	0.2	11.7	2.00	2.5	3	●	●	●	
Z12.0250.00	12	-		3.5	3°	0.2	11.7	2.50	2.5	3	●	●	●	

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

* tolerance: b-0.02

order-example:
grade AL41F: Z12.0160.00/AL41F



MINIMILL

groove milling by circular interpolation

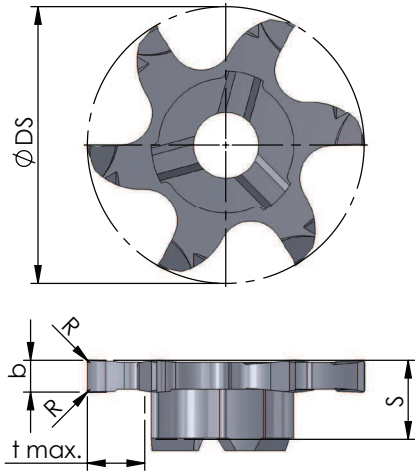
Type Z612 / Z612.X

for groove milling general use

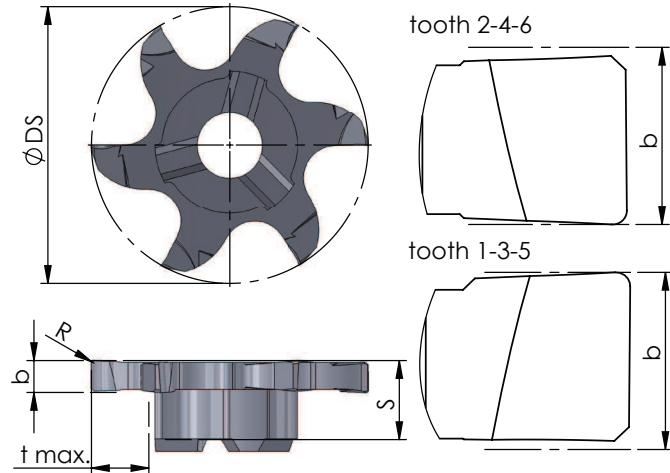
bore Ø from 12 mm



Z612 spur-toothed



Z612.X cross-toothed



dimensions in mm

part number	D min.	S	R	Ø DS	b +0.02	t max.	number of teeth	material			for toolholder type
								K10F	AL41F	P18C	
Z612.0150.02	12	3.5	0.2	11.7	1.5	2.0	6	●			ZH10
Z612.X150.02	12	3.5	0.2	11.7	1.5	2.0	6		●		
Z612.0200.02	12	3.5	0.2	11.7	2.0	2.0	6		●		
Z612.X200.02	12	3.5	0.2	11.7	2.0	2.0	6		●		

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z612.0150.02/AL41F

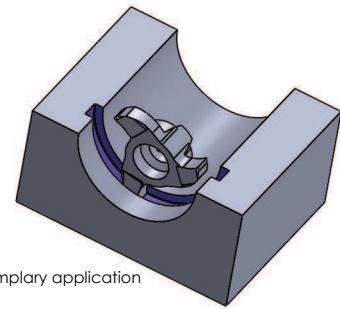
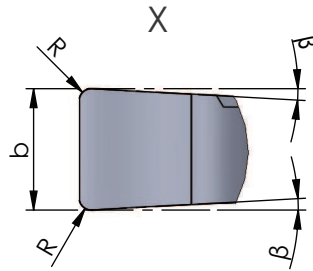
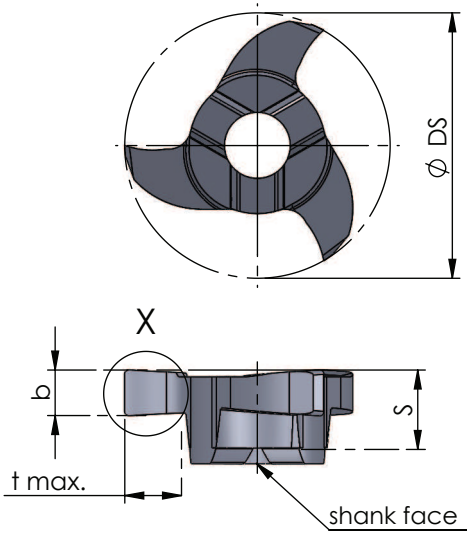
MINIMILL

groove milling by circular interpolation

Type Z14

for groove milling general use

bore Ø from 14 mm



exemplary application

dimensions in mm

part number	D min.	S	β	R	Ø DS	b +0.02	t max.	number of teeth				toolholder type
									K10F	AL41F	P18C	
Z14.0100.00	14	4.5	3°	-	13.7	1.0	2.5	3		●		ZH14
Z14.0150.00	14	4.5	3°	0.2	13.7	1.5	2.5	3		●		
Z14.0200.02	14	4.5	3°	0.2	13.7	2.0	2.5	3		●		
Z14.0250.02	14	4.5	3°	0.2	13.7	2.5	2.5	3		●		

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z14.0150.00/AL41F



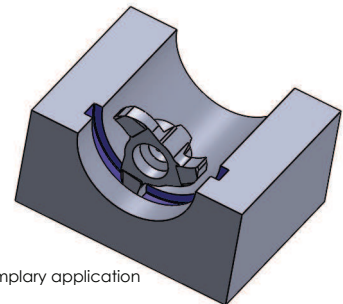
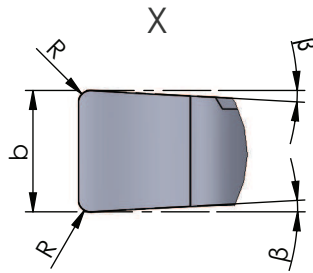
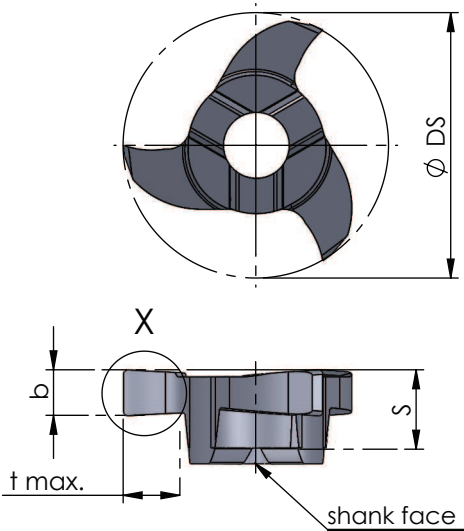
MINIMILL

groove milling by circular interpolation

Type Z16

for groove milling general use

bore Ø from 16 mm



dimensions in mm

part number	D min.	S	β	R	Ø DS	b +0.02	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z16.0150.00	16	4.5	3°	0.2	15.7	1.5	3.5	3	●			ZH14
Z16.0200.02	16	4.5	3°	0.2	15.7	2.0	3.5	3		●		
Z16.0250.02	16	4.5	3°	0.2	15.7	2.5	3.5	3			●	

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z16.0150.00/AL41F

MINIMILL

groove milling by circular interpolation

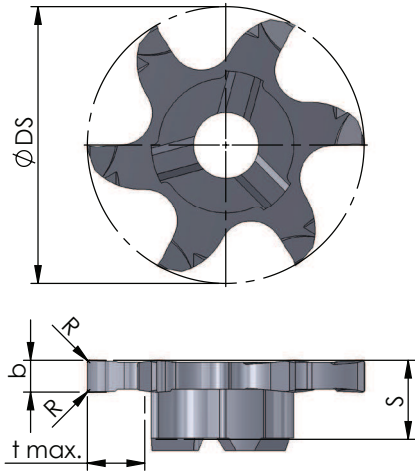
Type Z616 / Z616.X for

groove milling general use

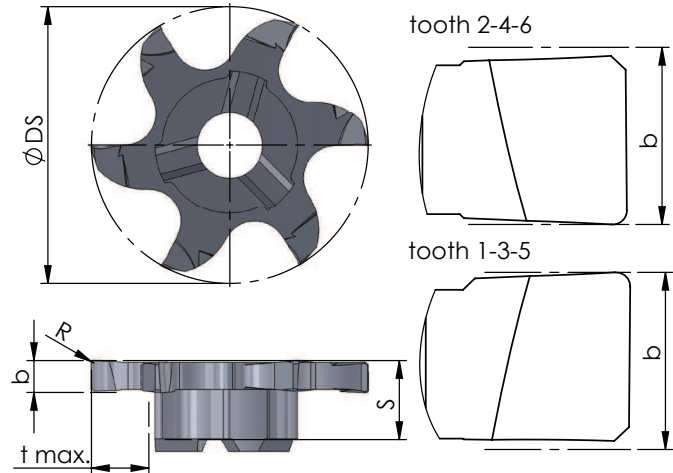
bore Ø from 16 mm



Z616 spur-toothed



Z616.X cross-toothed



dimensions in mm



part number	D min.	S	R	Ø DS	b +0.02	t max.	number of teeth				toolholder type
								K10F	AL41F	P18C	
Z616.0150.02	16	4.5	0.2	15.7	1.5	2.5	6	●			ZH14
Z616.X150.02	16	4.5	0.2	15.7	1.5	2.5	6		●		
Z616.0200.02	16	4.5	0.2	15.7	2.0	2.5	6		●		
Z616.X200.02	16	4.5	0.2	15.7	2.0	2.5	6		●		
Z616.0250.02	16	4.5	0.2	15.7	2.5	2.5	6		●		
Z616.X250.02	16	4.5	0.2	15.7	2.5	2.5	6		●		

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z616.X150.02/AL41F



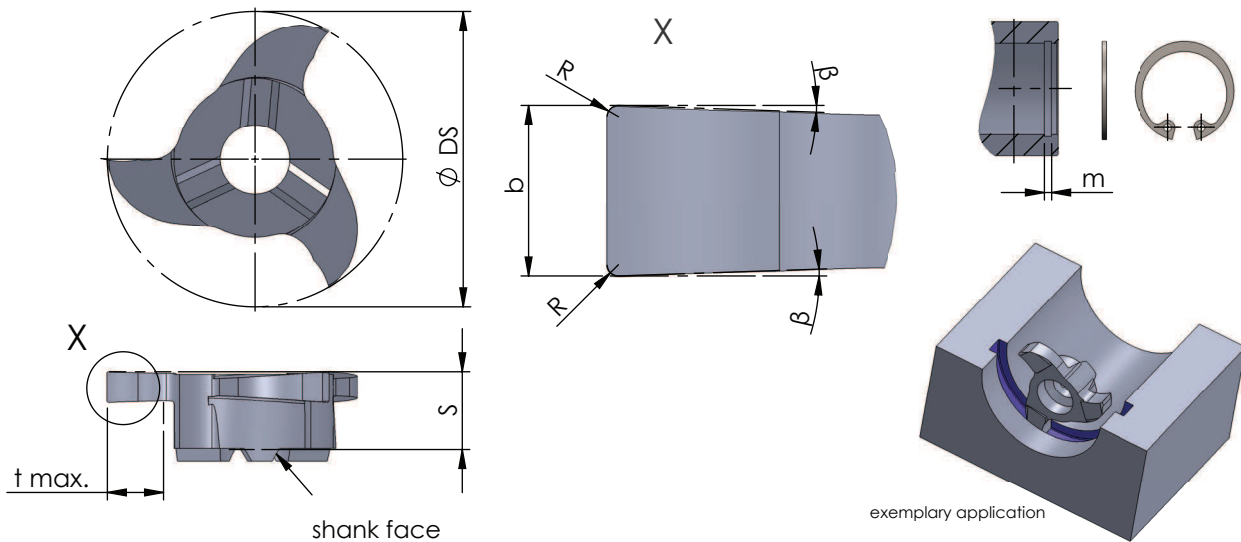
MINIMILL

groove milling by circular interpolation

Type Z18

for circlip grooves DIN 471 / 472 and general use

bore Ø from 18 mm



dimensions in mm

part number	D min.	groove dim. m	DIN 471 / DIN 472	S	β	R	$\varnothing DS$	b +0.02	t max.	number of teeth	material			toolholder type
											K10F	AL41F	P18C	
Z18.0070.00	18	0.7		5.8	1°	-	17.7	0.74*	1.5	3		●		ZH18
Z18.0080.00	18	0.8		5.8	1°	-	17.7	0.84*	1.7	3		●		
Z18.0090.00	18	0.9		5.8	1°	-	17.7	0.94*	1.9	3		●		
Z18.0110.00	18	1.1		5.8	3°	-	17.7	1.21*	3.5	3		●		
Z18.0150.00	18	-	-	5.8	3°	0.2	17.7	1.50	3.5	3		●		
Z18.0130.00	18	1.3		5.8	3°	0.1	17.7	1.41*	3.5	3		●		
Z18.0160.00	18	1.6		5.8	3°	0.1	17.7	1.71*	3.5	3		●		
Z18.0200.02	18	-	-	5.8	3°	0.2	17.7	2.00	3.5	3		●		
Z18.0250.02	18	-	-	5.8	3°	0.2	17.7	2.50	3.5	3		●		
Z18.0300.02	18	-	-	5.8	3°	0.2	17.7	3.00	3.5	3		●		
Z18.0400.02	18	-	-	5.8	3°	0.2	17.7	4.00	3.5	3		●		

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

* tolerance: b-0.02

order-example:
grade AL41F: Z18.0110.00/AL41F

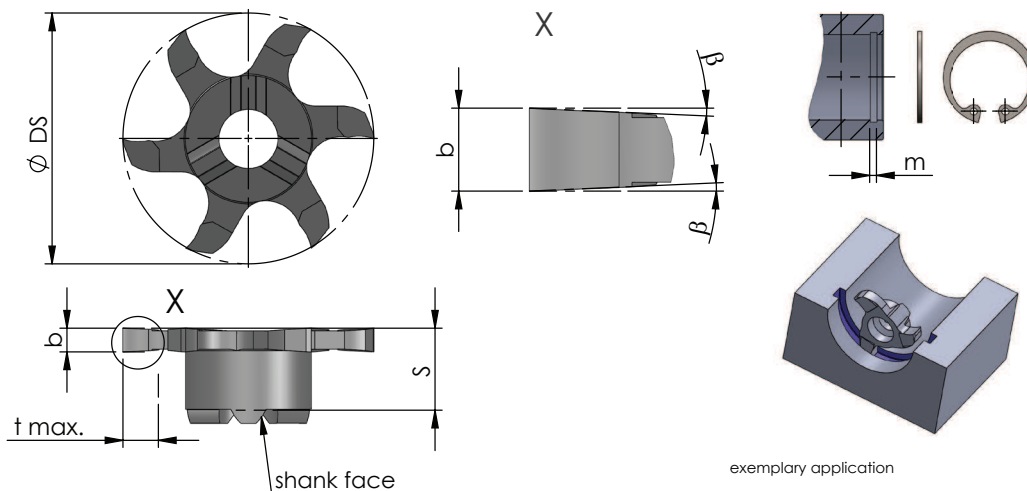
MINIMILL

groove milling by circular interpolation

Type Z618

for circlip grooves DIN 471 / 472

bore Ø from 18 mm



dimensions in mm

part number	DIN 471 / DIN 472							number of teeth	material			toolholder type	
	D min.	groove dim. m	S	β	R	Ø DS	b -0.02		t max.	K10F	AL41F		P18C
Z618.0110.00	18	1.1	5.8	3°	-	17.7	1.21	4	6	●			ZH18
Z618.0130.00	18	1.3	5.8	3°	-	17.7	1.41	4	6	●			
Z618.0160.00	18	1.6	5.8	3°	-	17.7	1.71	4	6	●			

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z618.0110.00/AL41F



MINIMILL

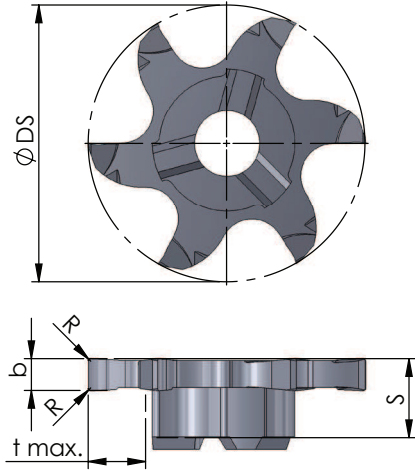
groove milling by circular interpolation

Type Z618 / Z618.X / Z620 / Z620.X

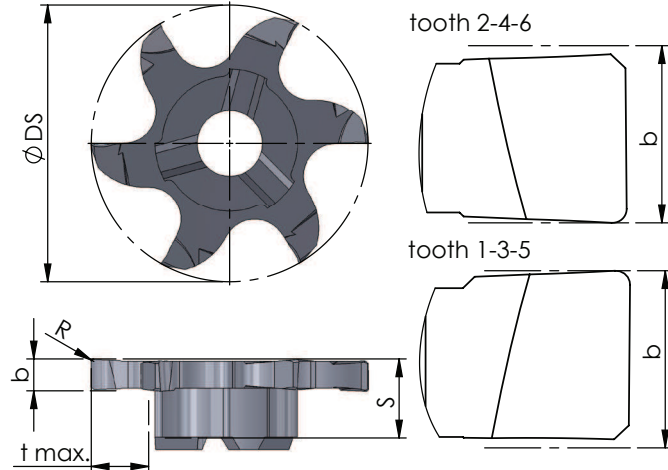
for groove milling general use

bore \varnothing from 18 / 20 mm

Z618/Z620 spur-toothed



Z618.X/Z620.X cross-toothed



dimensions in mm

part number	D min.	S	R	Ø DS	b +0.02	t max.	number of teeth	material			toolholder type
								K10F	AL41F	P18C	
Z618.0150.01	18	5.8	0.1	17.7	1.5	4	6	●	●	●	ZH18
Z618.0200.02	18	5.8	0.2	17.7	2.0	4	6	●	●	●	
Z618.X200.02	18	5.8	0.2	17.7	2.0	4	6	●	●	●	
Z618.0250.02	18	5.8	0.2	17.7	2.5	4	6	●	●	●	
Z618.X250.02	18	5.8	0.2	17.7	2.5	4	6	●	●	●	
Z618.0300.02	18	5.8	0.2	17.7	3.0	4	6	●	●	●	
Z618.X300.02	18	5.8	0.2	17.7	3.0	4	6	●	●	●	
Z620.0150.01	20	5.8	0.1	19.7	1.5	5	6	●	●	●	
Z620.0200.02	20	5.8	0.2	19.7	2.0	5	6	●	●	●	
Z620.X200.02	20	5.8	0.2	19.7	2.0	5	6	●	●	●	
Z620.0250.02	20	5.8	0.2	19.7	2.5	5	6	●	●	●	
Z620.X250.02	20	5.8	0.2	19.7	2.5	5	6	●	●	●	
Z620.0300.02	20	5.8	0.2	19.7	3.0	5	6	●	●	●	
Z620.X300.02	20	5.8	0.2	19.7	3.0	5	6	●	●	●	

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z618.0150.01/AL41F

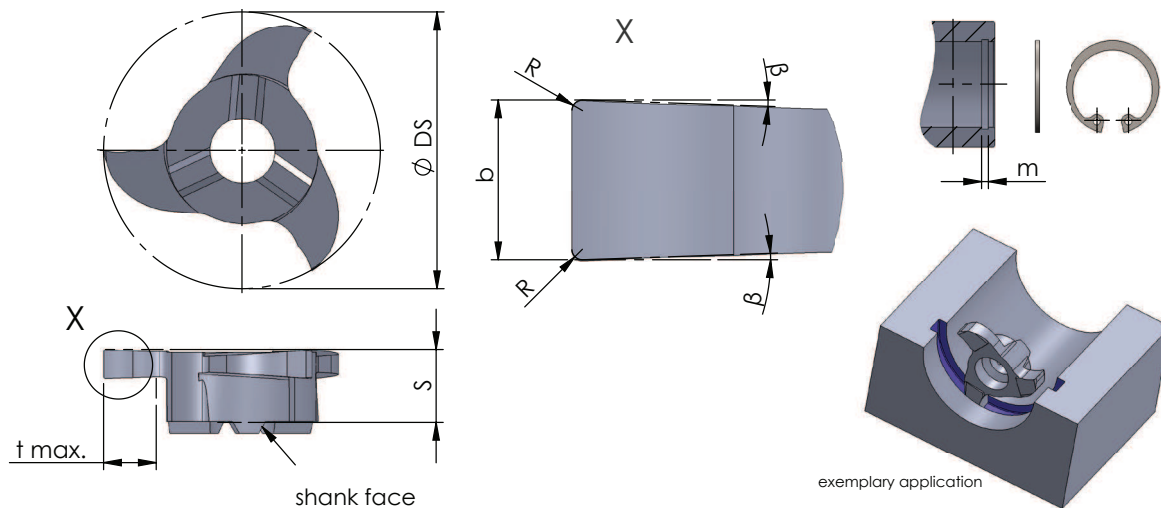
MINIMILL

groove milling by circular interpolation

Type Z22

for circlip grooves DIN 471 / 472 and general use

bore Ø from 22 mm



dimensions in mm

part number	D min.	groove dim. m	DIN 471 / DIN 472	s	β	R	Ø DS	b +0.02	t max.	number of teeth	material			toolholder type
											K10F	AL41F	P18C	
Z22.0070.00	22	0.7		5.7	1°	-	21.7	0.74*	1.5	3	●			ZH22
Z22.0080.00	22	0.8		5.7	1°	-	21.7	0.84*	1.7	3	●			
Z22.0090.00	22	0.9		5.7	1°	-	21.7	0.94*	1.9	3	●			
Z22.0100.00	22	1.0		5.7	1°	-	21.7	1.04*	2.1	3	●			
Z22.0100.01	22	-	-	5.7	3°	0.10	21.7	1.00	4.5	3	●			
Z22.0110.00	22	1.1		5.7	1°	-	21.7	1.21*	2.5	3	●			
Z22.0130.00	22	1.3		5.7	3°	0.10	21.7	1.41*	4.5	3	●			
Z22.0150.02	22	-	-	5.7	3°	0.20	21.7	1.50	4.5	3	●			
Z22.0160.00	22	1.6		5.7	3°	0.10	21.7	1.71*	4.5	3	●			
Z22.0185.02	22	1.85		5.7	3°	0.15	21.7	1.96*	4.5	3	●			
Z22.0200.02	22	-	-	5.7	3°	0.20	21.7	2.00	4.5	3	●			
Z22.0215.02	22	2.15		5.7	3°	0.15	21.7	2.26*	4.5	3	●			
Z22.0250.02	22	-	-	5.7	3°	0.20	21.7	2.50	4.5	3	●			
Z22.0265.02	22	2.65		5.7	3°	0.15	21.7	2.76*	4.5	3	●			
Z22.0300.02	22	-	-	5.7	3°	0.20	21.7	3.00	4.5	3	●			

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

* tolerance: b-0.02

order-example:
grade AL41F: Z22.0110.00/AL41F



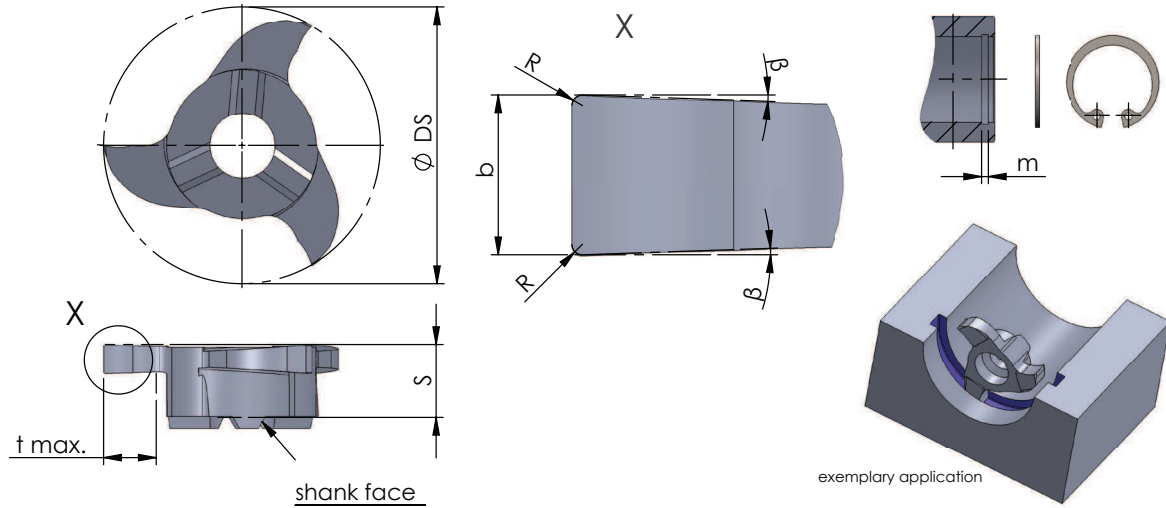
MINIMILL

groove milling by circular interpolation

Type Z22

for circlip grooves DIN 471 / 472 and general use

bore Ø from 22 mm



dimensions in mm

part number	D min.	groove dim. m DIN 471 / DIN 472	s	β	R	$\varnothing DS$	b +0.02	t max.	number of teeth	material			toolholder type
										K10F	AL41F	P18C	
Z22.0315.02	22	3.15	5.7	3°	0.15	21.7	3.26*	4.5	3	●			ZH22
Z22.0350.02	22	-	5.7	3°	0.20	21.7	3.50	4.5	3		●		
Z22.0400.02	22	-	5.7	3°	0.20	21.7	4.00	4.5	3		●		
Z22.0415.02	22	4.15	5.7	3°	0.15	21.7	4.26*	4.5	3		●		
Z22.0515.02	22	5.15	5.7	3°	0.15	21.7	5.26*	4.5	3		●		

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

* tolerance: b-0.02

order-example:
grade AL41F: Z22.0515.02/AL41F

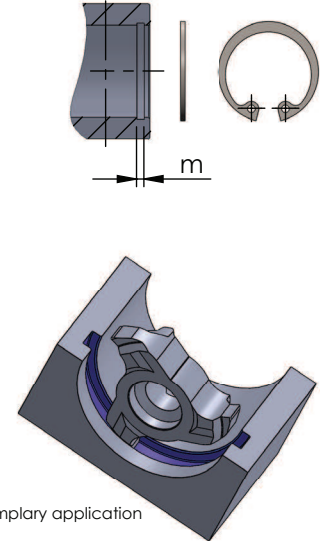
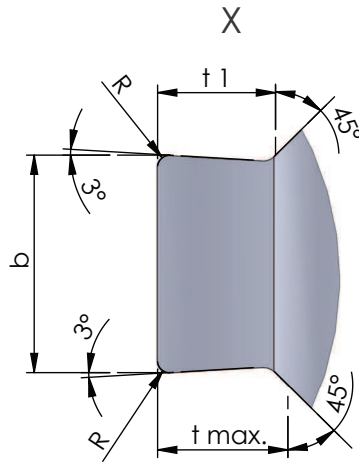
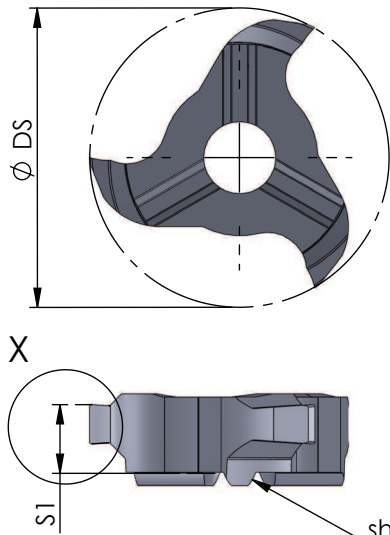
MINIMILL

groove milling by circular interpolation

Type Z22

for circlip grooves with chamfer
DIN 471 / 472

bore Ø from 22 mm



exemplary application

dimensions in mm

part number	D min.	groove dim. m	DIN 471 / DIN 472	S1	R	Ø DS	b -0.02	t1 -0.04 depth of form	t max.	number of teeth				toolholder type
											K10F	AL41F	P18C	
Z22.1105.30	22	1.1		5.0	-	21.7	1.21	0.49	0.50	3		●		ZH22 ZH28
Z22.1307.30	22	1.3		5.2	-	21.7	1.41	0.67	0.70	3		●		
Z22.1308.30	22	1.3		5.2	-	21.7	1.41	0.83	0.85	3		●		
Z22.1609.35	22	1.6		5.0	-	21.7	1.71	0.83	0.85	3		●		
Z22.1610.35	22	1.6		5.0	-	21.7	1.71	0.95	1.00	3		●		
Z22.1812.35	22	1.85		5.2	0.15	21.7	1.96	1.23	1.25	3		●		
Z22.2215.35	22	2.15		5.3	0.15	21.7	2.26	1.47	1.50	3		●		
Z22.2616.45	22	2.65		5.0	0.15	21.7	2.76	1.47	1.50	3		●		
Z22.2617.45	22	2.65		5.0	0.15	21.7	2.76	1.72	1.75	3		●		
Z22.3118.45	22	3.15		5.3	0.2	21.7	3.26	1.72	1.75	3		●		
Z22.4120.55	22	4.15		5.3	0.2	21.7	4.26	1.97	2.00	3		●		
Z22.4125.55	22	4.15		5.3	0.2	21.7	4.26	2.47	2.50	3		●		

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z22.4125.55/AL41F



MINIMILL

groove milling by circular interpolation

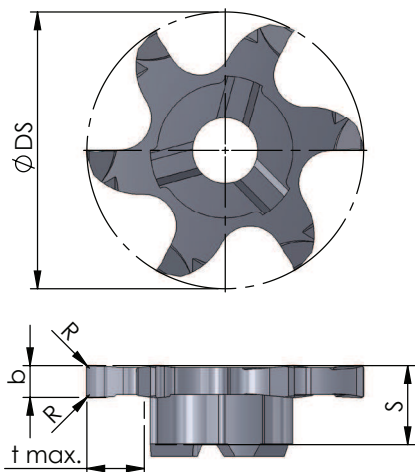
Type Z622 / Z622.X

for groove milling general use

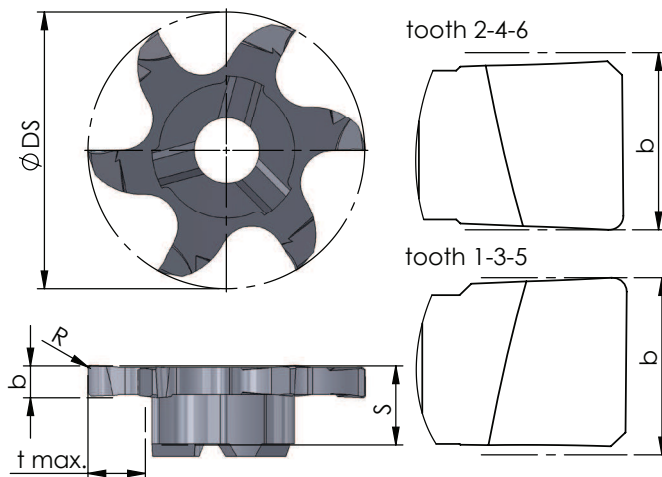
bore \varnothing from 22 mm



Z622 spur-toothed



Z622.X cross-toothed



dimensions in mm

part number	D min.	S	R	$\varnothing DS$	b +0.02	t max.	number of teeth	material			toolholder type
								K10F	AL41F	P18C	
Z622.0100.01	22	6.2	0.1	21.7	1.0	4.5	6	●			ZH22
Z622.0150.01	22	6.2	0.1	21.7	1.5	4.5	6		●		
Z622.0200.02	22	6.2	0.2	21.7	2.0	4.5	6		●		
Z622.0250.02	22	6.2	0.2	21.7	2.5	4.5	6		●		
Z622.X250.02	22	6.2	0.2	21.7	2.5	4.5	6		●		
Z622.0300.02	22	6.2	0.2	21.7	3.0	4.5	6		●		
Z622.X300.02	22	6.2	0.2	21.7	3.0	4.5	6		●		
Z622.0400.02	22	6.2	0.2	21.7	4.0	4.5	6		●		
Z622.X400.02	22	6.2	0.2	21.7	4.0	4.5	6		●		

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z622.0150.01/AL41F

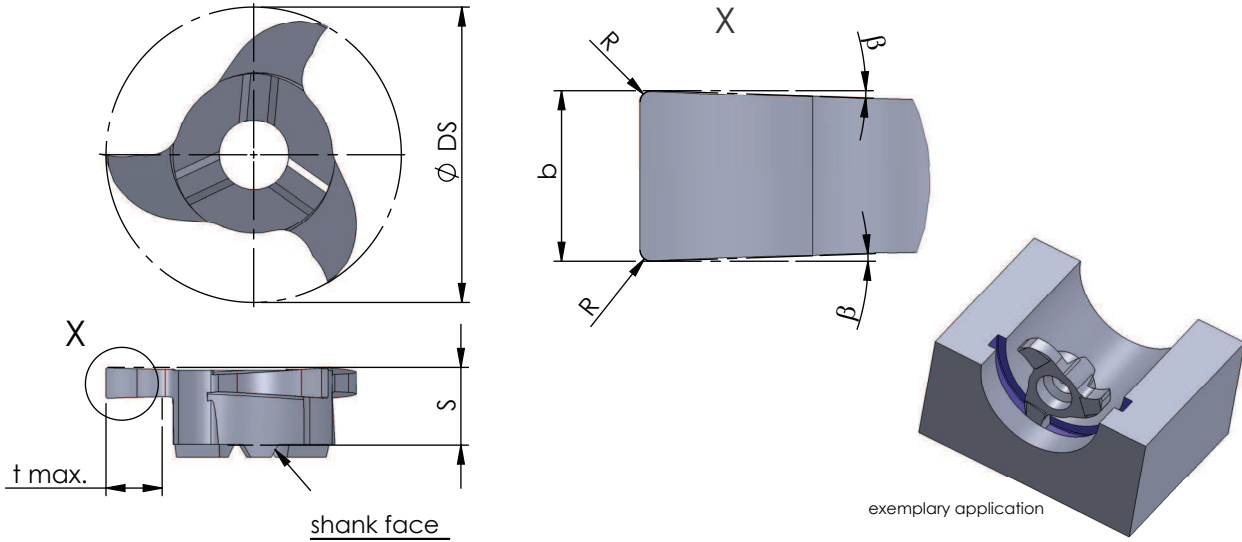
MINIMILL

groove milling by circular interpolation

Type Z25

for groove milling general use

bore Ø from 25 mm



dimensions in mm

part number	D min.	S	β	R	Ø DS	b +0.02	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z25.0200.02	25	6.5	3°	0.2	24.8	2.0	5.0	3	●			ZH28
Z25.0250.02	25	6.5	3°	0.2	24.8	2.5	5.0	3		●		
Z25.0300.02	25	6.5	3°	0.2	24.8	3.0	5.0	3		●		
Z25.0350.02	25	6.5	3°	0.2	24.8	3.5	5.0	3		●		
Z25.0400.02	25	6.5	3°	0.2	24.8	4.0	5.0	3		●		

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z25.0350.02/AL41F



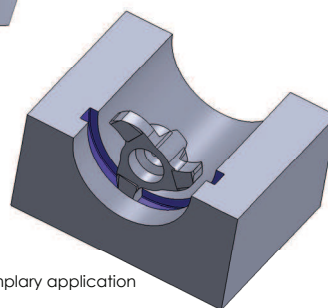
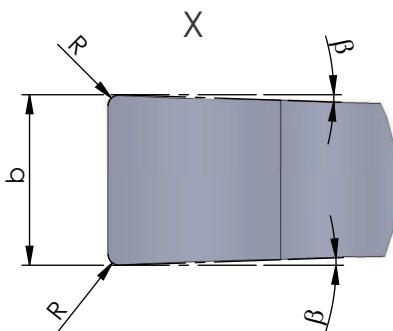
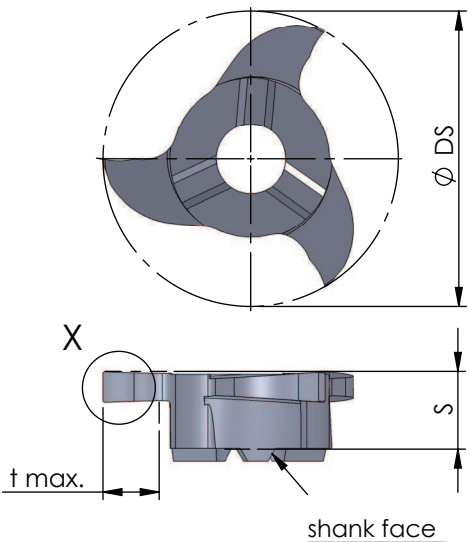
MINIMILL

groove milling by circular interpolation

Type Z28

for groove milling general use

bore Ø from 28 mm



dimensions in mm

part number	D min.	S	β	R	Ø DS	b +0.02	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z28.0150.00	28	6.5	3°	0.2	27.7	1.5	6.5	3	●	●	●	ZH28
Z28.0200.02	28	6.5	3°	0.2	27.7	2.0	6.5	3	●	●	●	
Z28.0250.02	28	6.5	3°	0.2	27.7	2.5	6.5	3	●	●	●	
Z28.0300.02	28	6.5	3°	0.2	27.7	3.0	6.5	3	●	●	●	
Z28.0350.02	28	6.5	3°	0.2	27.7	3.5	6.5	3	●	●	●	
Z28.0400.02	28	6.5	3°	0.2	27.7	4.0	6.5	3	●	●	●	
Z28.0500.02	28	6.5	3°	0.2	27.7	5.0	6.5	3	●	●	●	
Z28.0600.02	28	6.5	3°	0.2	27.7	6.0	6.5	3	●	●	●	

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z28.0350.02/AL41F

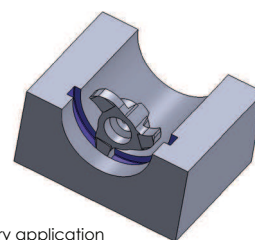
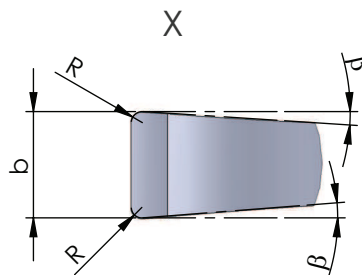
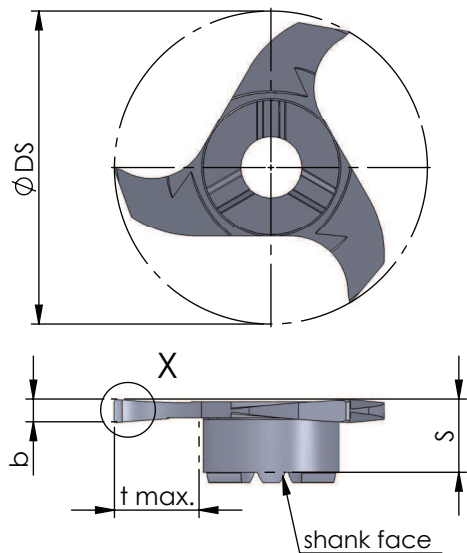
MINIMILL

groove milling by circular interpolation

Type Z28

for groove milling general use with $t_{max.} = 9.3$

bore \varnothing from 28.3 mm



exemplary application

dimensions in mm

part number	dimensions in mm								material			toolholder type
	D min.	S	β	R	$\varnothing DS$	b -0.02	t max.	number of teeth	K10F	AL41F	P18C	
Z28.0150.02.9	28.3	6.5	3°	0.2	28	1.5	9.3	3	●			ZH33
Z28.0200.02.9	28.3	6.5	3°	0.2	28	2.0	9.3	3		●		
Z28.0250.02.9	28.3	6.5	3°	0.2	28	2.5	9.3	3			●	

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z28.0150.02.9/AL41F



MINIMILL

groove milling by circular interpolation

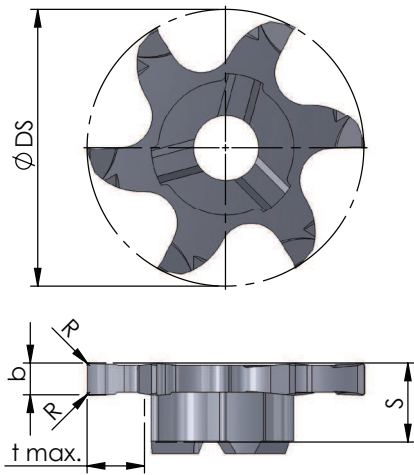
Type Z628 / Z628.X

for circlip grooves DIN 471 / 472 and general use

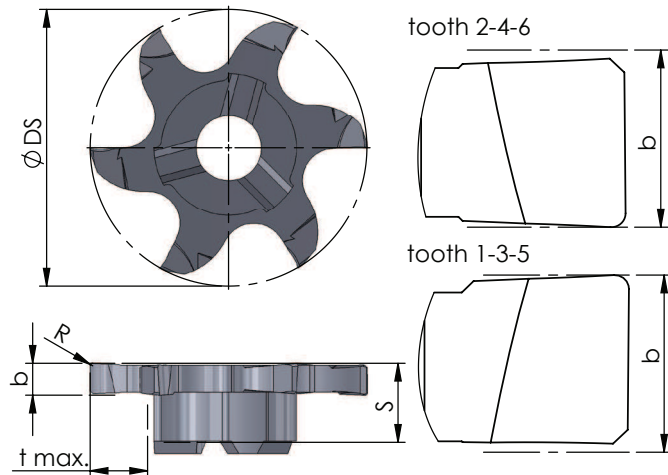
bore Ø from 28 mm



Z628 spur-toothed



Z628.X cross-toothed



dimensions in mm

New

part number	D min.		groove dim. m		S	R	Ø DS	b +0.02	t max.	number of teeth	K10F	AL41F	P18C	toolholder type
				DIN 471 / DIN 472										
Z628.0100.01	28	-	-	-	6.2	0.1	27.7	1.0	6.5	6	●			ZH28
Z628.0150.01	28	-	-	-	6.2	0.1	27.7	1.5	6.5	6	●			
Z628.0185.02	28	1.85	☺	-	6.2	0.2	27.7	1.96 *	6.5	6	●			
Z628.0200.02	28	-	-	-	6.2	0.2	27.7	2.0	6.5	6	●			
Z628.0215.02	28	2.15	☺	-	6.2	0.2	27.7	2.24 *	6.5	6	●			
Z628.0250.02	28	-	-	-	6.2	0.2	27.7	2.5	6.5	6	●			
Z628.X250.02	28	-	-	-	6.2	0.2	27.7	2.5	6.5	6	●			
Z628.0300.02	28	-	-	-	6.2	0.2	27.7	3.0	6.5	6	●			
Z628.X300.02	28	-	-	-	6.2	0.2	27.7	3.0	6.5	6	●			
Z628.0400.02	28	-	-	-	6.2	0.2	27.7	4.0	6.5	6	●			
Z628.X400.02	28	-	-	-	6.2	0.2	27.7	4.0	6.5	6	●			
Z628.0500.02	28	-	-	-	6.2	0.2	27.7	5.0	6.5	6	●			
Z628.X500.02	28	-	-	-	6.2	0.2	27.7	5.0	6.5	6	●			
Z628.0600.02	28	-	-	-	6.2	0.2	27.7	6.0	6.5	6	●			
Z628.X600.02	28	-	-	-	6.2	0.2	27.7	6.0	6.5	6	●			

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

* tolerance: b-0.02

order-example:
grade AL41F: Z628.0150.01/AL41F

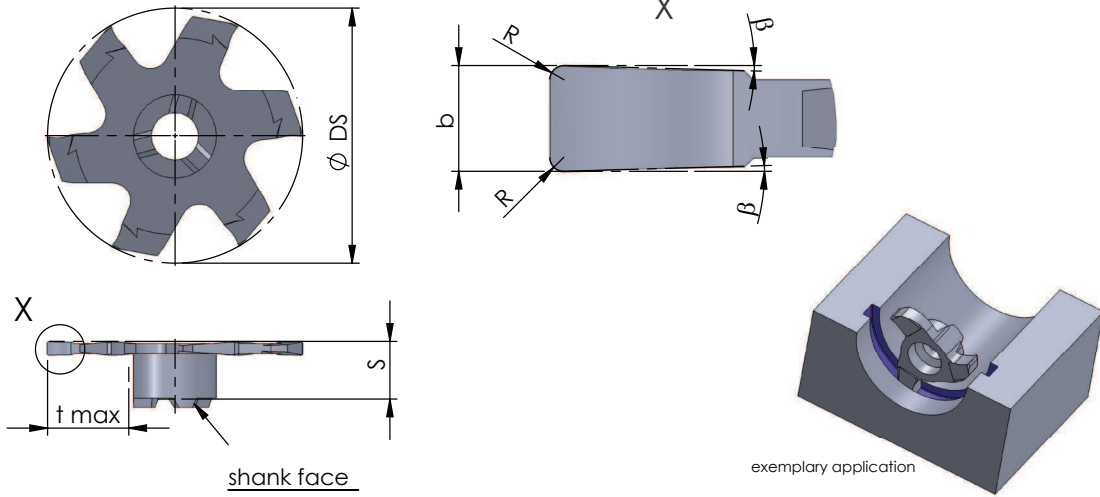
MINIMILL

groove milling by circular interpolation

Type Z628

for groove milling general use with $t_{max.} = 9.3$

bore \varnothing from 28 mm



dimensions in mm

part number	D min.	S	β	R	$\varnothing DS$	b +0.02	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z628.150.02.9	28	6.5	3°	0.2	27.7	1.5	9.3	6	●			ZH33

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z628.150.02.9/AL41F



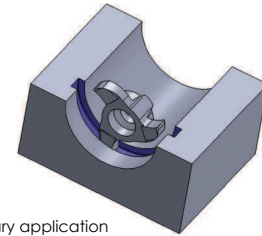
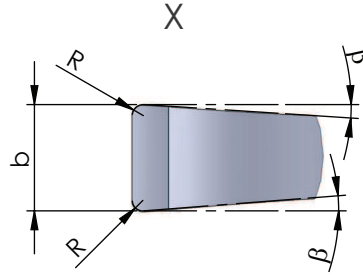
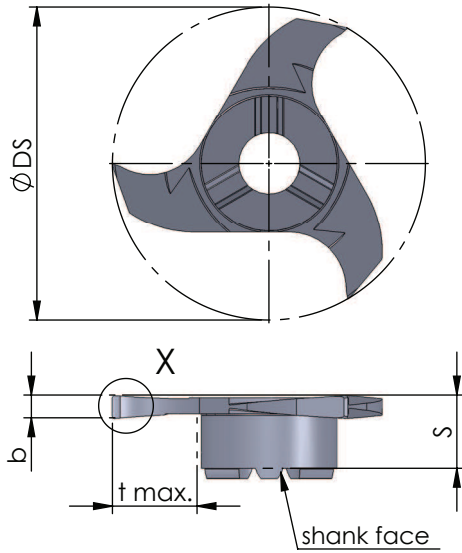
MINIMILL

groove milling by circular interpolation

Type Z32

for groove milling general use

bore Ø from 32 mm



exemplary application

dimensions in mm

part number	D min.	S	β	R	Ø DS	b +0.02	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z32.0200.00	32	6.5	3°	0.2	31.7	2.0	8.5	3	●			ZH28
Z32.0250.02	32	6.5	3°	0.2	31.7	2.5	8.5	3		●		
Z32.0300.02	32	6.5	3°	0.2	31.7	3.0	8.5	3			●	

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z32.0300.02/AL41F

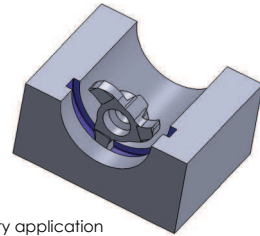
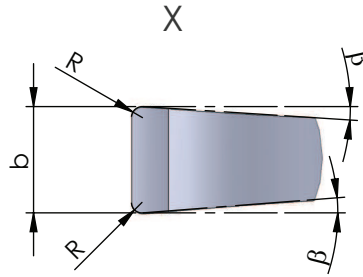
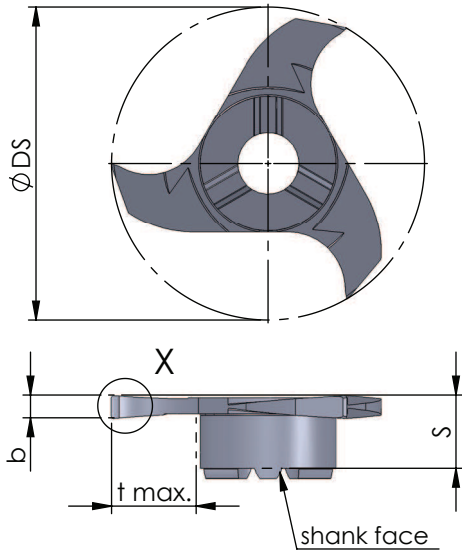
MINIMILL

groove milling by circular interpolation

Type Z33

for groove milling general use

bore Ø from 33 mm



exemplary application

dimensions in mm

part number	D min.	S	β	R	Ø DS	b -0.02	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z33.110.42.10	33	6.5	3°	0.2	32.7	1.10	10	3	●			ZH22
Z33.120.42.10	33	6.5	3°	0.2	32.7	1.20	10	3		●		
Z33.132.42.10	33	6.5	3°	0.15	32.7	1.32	10	3		●		
Z33.150.42.10	33	6.5	3°	0.2	32.7	1.50	10	3		●		
Z33.160.42.10	33	6.5	3°	0.2	32.7	1.60	10	3		●		
Z33.170.42.10	33	6.5	3°	0.2	32.7	1.70	10	3		●		
Z33.200.42.10	33	6.5	3°	0.2	32.7	2.00	10	3		●		
Z33.250.42.10	33	6.5	3°	0.2	32.7	2.50	10	3		●		
Z33.170.42.12	33.9	6.5	3°	0.2	33.6	1.70	12	3		●		ZH33

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z33.200.42.10/AL41F



MINIMILL

groove milling by circular interpolation

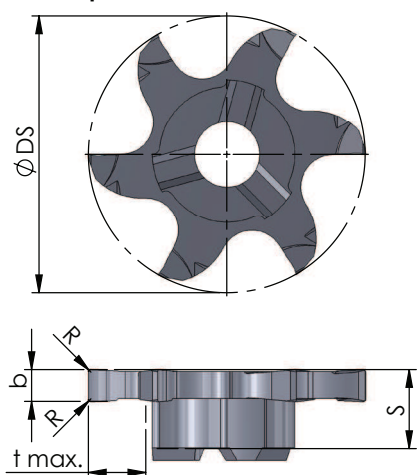
Type Z635 / Z635.X for

groove milling general use

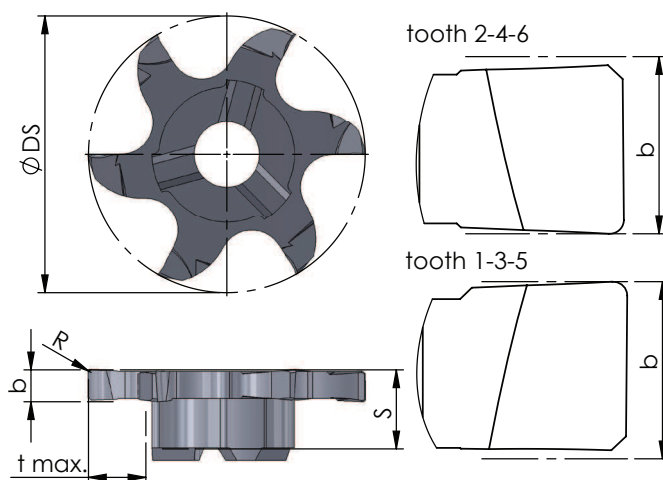
bore Ø from 35 mm



Z635 spur-toothed



Z635.X cross-toothed



dimensions in mm

part number	dimensions in mm							material			toolholder type
	D min.	S	R	Ø DS	b +0.02	t max.	number of teeth	K10F	AL41F	P18C	
Z635.0150.01	35	6.2	0.1	34.7	1.5	10.0	6		●		ZH28
Z635.0200.02	35	6.2	0.2	34.7	2.0	10.0	6		●		
Z635.X200.02	35	6.2	0.2	34.7	2.0	10.0	6		●		
Z635.0250.02	35	6.2	0.2	34.7	2.5	10.0	6		●		
Z635.X250.02	35	6.2	0.2	34.7	2.5	10.0	6		●		
Z635.0300.02	35	6.2	0.2	34.7	3.0	10.0	6		●		
Z635.X300.02	35	6.2	0.2	34.7	3.0	10.0	6		●		

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z635.0150.01/AL41F

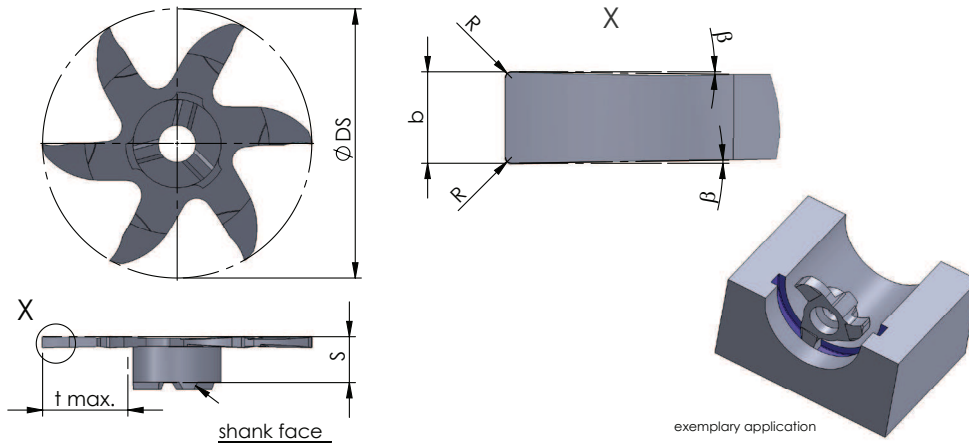
MINIMILL

groove milling by circular interpolation

Type Z637 / Z640

for groove milling general use

bore Ø from 37 / 40 mm



dimensions in mm



new

part number	D min.	S	β	R	Ø DS	b +0.02	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z637.0100.01	37	6.2	1°	0.1	36.7	1.0	12.0	6	●	●	●	ZH22
Z640.0100.01	40	6.2	1°	0.1	39.7	1.0	13.5	6	●	●	●	
Z637.0150.01	37	6.2	1°	0.1	36.7	1.5	12.0	6	●	●	●	
Z640.0150.01	40	6.2	1°	0.1	39.7	1.5	13.5	6	●	●	●	
Z637.0200.02	37	6.2	1°	0.2	36.7	2.0	12.0	6	●	●	●	

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z637.0100.01/AL41F



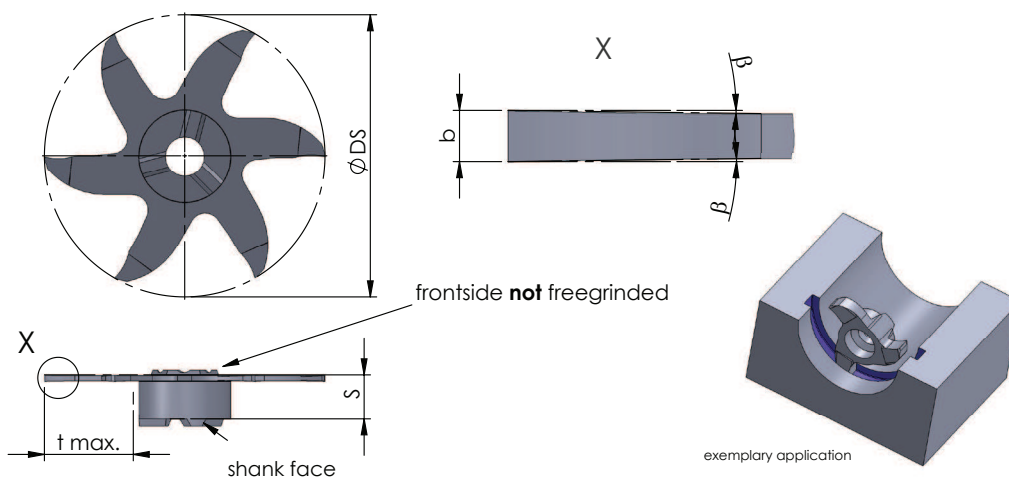
MINIMILL

groove milling by circular interpolation

Type Z637 / Z640

for groove and key way milling
 $b = 0.4 - 0.8 \text{ mm}$

bore \varnothing from 37 / 40 mm



dimensions in mm

part number	D min.	S	β	$\varnothing DS$	b +0.05	t max.	number of teeth				toolholder type
								K10F	AL41F	P18C	
Z640.0040.00	40	5.5	1°	39.7	0.4	13.5	6		●		ZH22
Z637.0050.00	37	5.6	1°	36.7	0.5	12.0	6		●		
Z640.0050.00	40	5.6	1°	39.7	0.5	13.5	6		●		
Z637.0060.00	37	5.7	1°	36.7	0.6	12.0	6		●		
Z640.0060.00	40	5.7	1°	39.7	0.6	13.5	6		●		
Z637.0080.00	37	6.0	1°	36.7	0.8	12.0	6		●		
Z640.0080.00	40	6.0	1°	39.7	0.8	13.5	6		●		

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
 grade AL41F:
 Z637.0050.00/AL41F

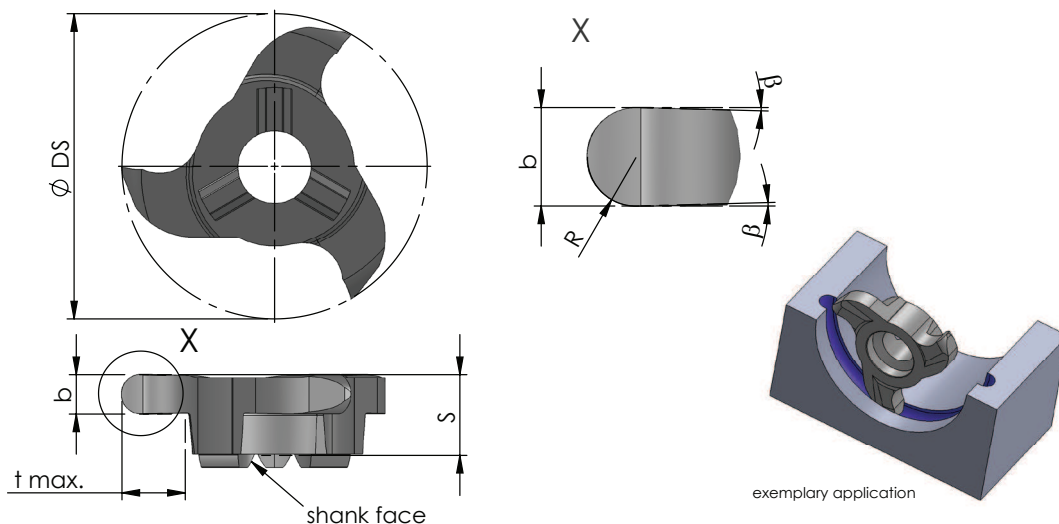
MINIMILL

groove milling by circular interpolation

Type Z12

full radius

bore Ø from 12 mm



dimensions in mm

part number	dimensions in mm								number of teeth	material			toolholder type
	D min.	S	β	R	Ø DS	b +0.03	t max.	K10F		AL41F	P18C		
Z12.0011.22	12	3.5	3°	1.1	11.7	2.2	2.5	3	●			ZH10	

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z12.0011.22/AL41F



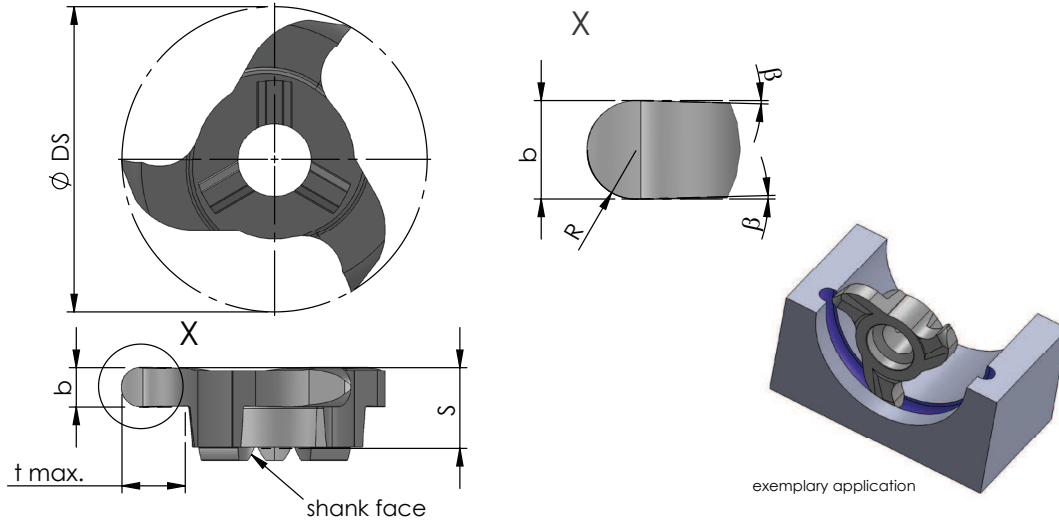
MINIMILL

groove milling by circular interpolation

Type Z16

full radius

bore Ø from 16 mm



dimensions in mm

part number	D min.	S	β	R	$\varnothing DS$	b +0.03	t max.	number of teeth	K10F	AL41F	P18C	toolholder type
Z16.0011.22	16	4.6	3°	1.1	15.7	2.2	3.5	3		●		ZH14

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z16.0011.22/AL41F

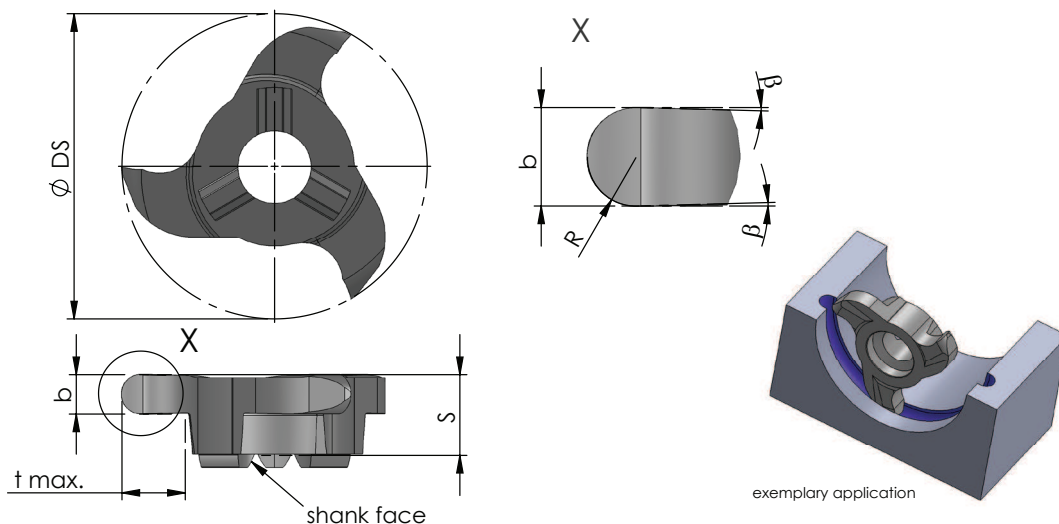
MINIMILL

groove milling by circular interpolation

Type Z18

full radius

bore Ø from 18 mm



dimensions in mm

part number	D min.	S	β	R	Ø DS	b +0.03	t max.	number of teeth				toolholder type
									K10F	AL41F	P18C	
Z18.0010.20	18	5.8	3°	1.0	17.7	2.0	3.5	3		●		ZH18
Z18.0011.22	18	5.8	3°	1.1	17.7	2.2	3.5	3		●		
Z18.0015.30	18	5.8	3°	1.5	17.7	3.0	3.5	3		●		

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z18.0010.20/AL41F



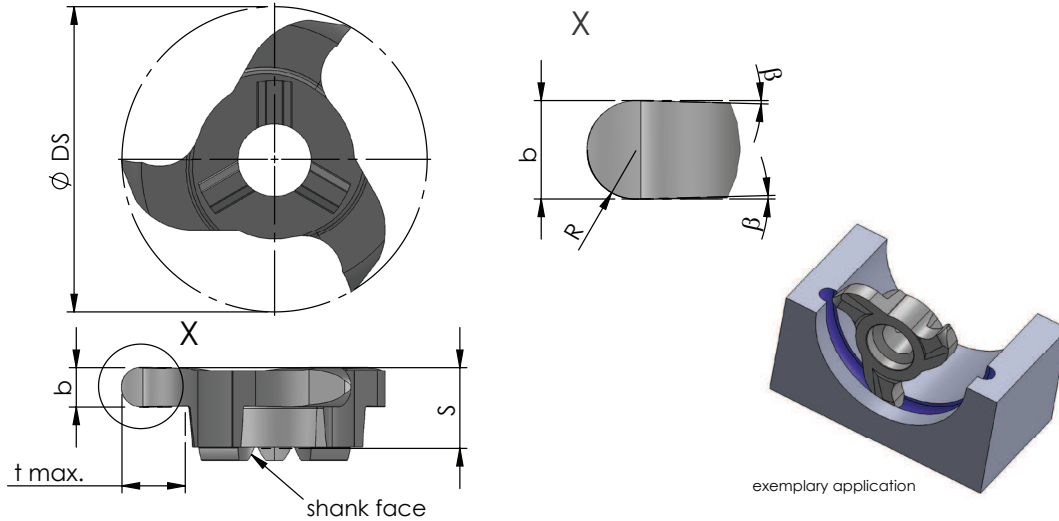
MINIMILL

groove milling by circular interpolation

Type Z22

full radius

bore Ø from 22 mm



dimensions in mm

part number	D min.	S	β	R	$\varnothing DS$	b +0.03	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z22.0005.10	22	5.8	1°	0.5	21.7	1.0	4.5	3		●		ZH22
Z22.0008.16	22	5.8	2°	0.8	21.7	1.6	4.5	3		●		
Z22.0010.20	22	5.8	2°	1.0	21.7	2.0	4.5	3		●		
Z22.0012.24	22	5.8	3°	1.2	21.7	2.4	4.5	3		●		
Z22.0014.28	22	5.8	3°	1.4	21.7	2.8	4.5	3		●		
Z22.0015.30	22	5.8	3°	1.5	21.7	3.0	4.5	3		●		
Z22.0020.40	22	5.8	3°	2.0	21.7	4.0	4.5	3		●		
Z22.0022.44	22	5.8	3°	2.2	21.7	4.4	4.5	3		●		
Z22.0025.50	22	5.8	3°	2.5	21.7	5.0	4.5	3		●		

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z22.0025.50/AL41F

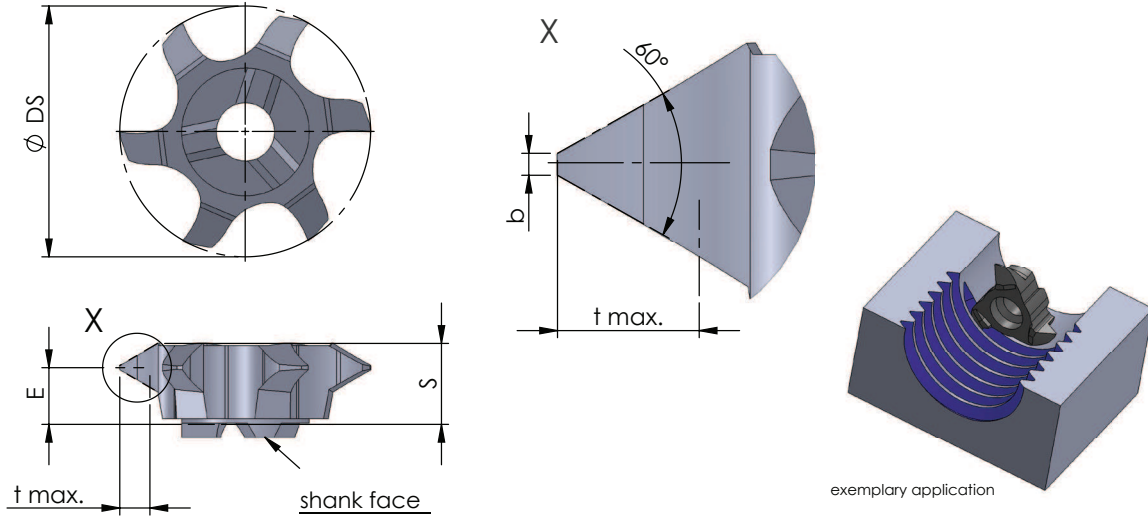
MINIMILL

groove milling by circular interpolation

Type Z610

for metric standard threading internal partial profile

bore Ø from 10 mm



dimensions in mm

part number	min. thread size	pitch	S	E	Ø DS	b	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z610.0510.01	M12	1.0-1.75	3.2	2.4	9.8	0.13	1.08	6	●	●	●	ZH10
Z610.0720.01	M14	1.0-2.0	3.2	2.2	10.1	0.13	1.25	6	●	●	●	
Z610.0815.01	M16	1.5-2.75	3.2	2.0	11.0	0.19	1.67	6	●	●	●	
Z610.2530.01	M16	2.0-3.0	3.2	1.9	11.1	0.25	1.78	6	●	●	●	

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z610.0510.01/AL41F



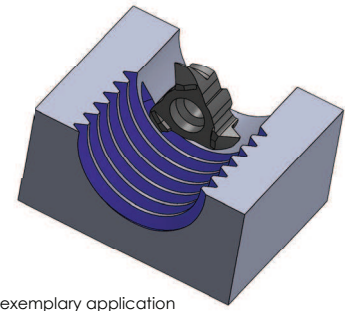
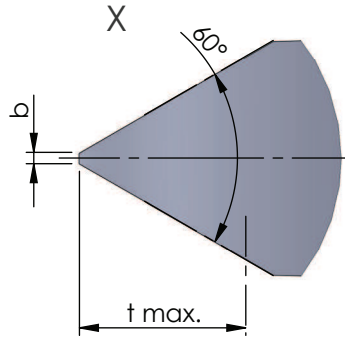
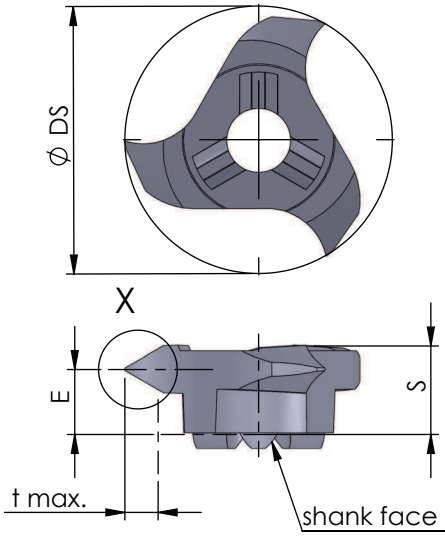
MINIMILL

groove milling by circular interpolation

Type Z12

for metric standard threading internal partial profile

bore Ø from 12 mm



exemplary application

dimensions in mm

part number	min. thread size	pitch	S	E	Ø DS	b	t max.	number of teeth				toolholder type
									K10F	AL41F	P18C	
Z12.0510.01	M14	1.0-1.75	3.6	2.8	11.7	0.13	1.08	3	●			ZH10
Z12.0720.01	M14	1.0-2.0	3.6	2.8	11.7	0.13	1.25	3		●		
Z12.0815.01	M16	1.5-2.75	3.6	2.4	11.7	0.19	1.67	3		●		
Z12.2530.01	M16	2.0-3.0	3.6	2.2	11.7	0.25	1.78	3		●		

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z12.0510.01/AL41F

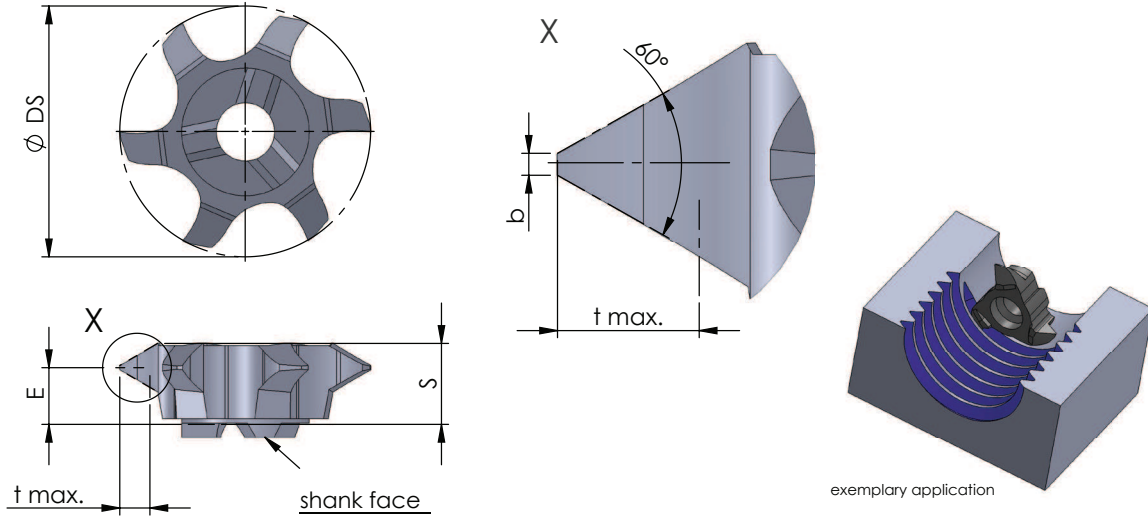
MINIMILL

groove milling by circular interpolation

Type Z614

for metric standard threading internal partial profile

bore Ø from 14 mm



dimensions in mm

part number	min. thread size	pitch	S	E	Ø DS	b	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z614.0510.01	M16	1.0-1.75	4.2	3.4	12.0	0.13	1.08	6	●			ZH14
Z614.0720.01	M16	1.0-2.0	4.2	3.6	12.3	0.13	1.25	6	●			
Z614.0815.01	M18	1.5-2.75	4.2	3.0	13.2	0.19	1.67	6	●			
Z614.2530.01	M18	2.0-3.0	4.2	2.8	13.3	0.25	1.78	6	●			

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z614.0510.01/AL41F



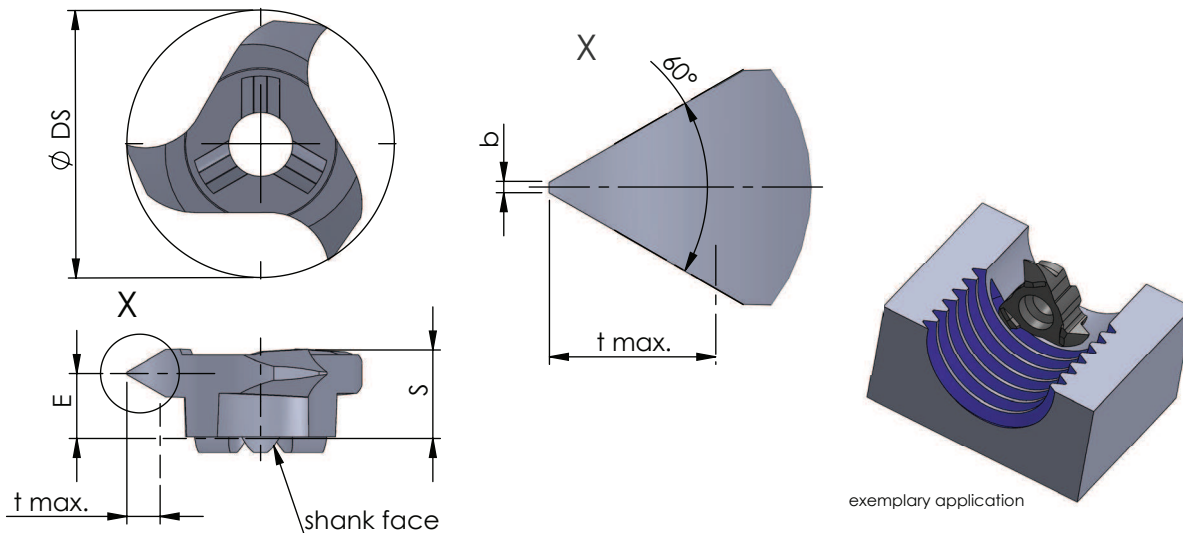
MINIMILL

groove milling by circular interpolation

Type Z16

for metric standard threading internal partial profile

bore Ø from 16 mm



dimensions in mm

part number	min. thread size	pitch	S	E	Ø DS	b	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z16.0510.01	M18	1.0-1.75	4.6	3.8	15.7	0.12	1.08	3	●			ZH14
Z16.0720.01	M18	1.0-2.0	4.6	3.5	15.7	0.12	1.25	3		●		
Z16.0815.01	M20	1.5-2.75	4.6	3.5	15.7	0.19	1.67	3		●		
Z16.2530.01	M22	2.5-3.0	4.6	3.4	15.7	0.31	1.78	3		●		

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z16.0510.01/AL41F

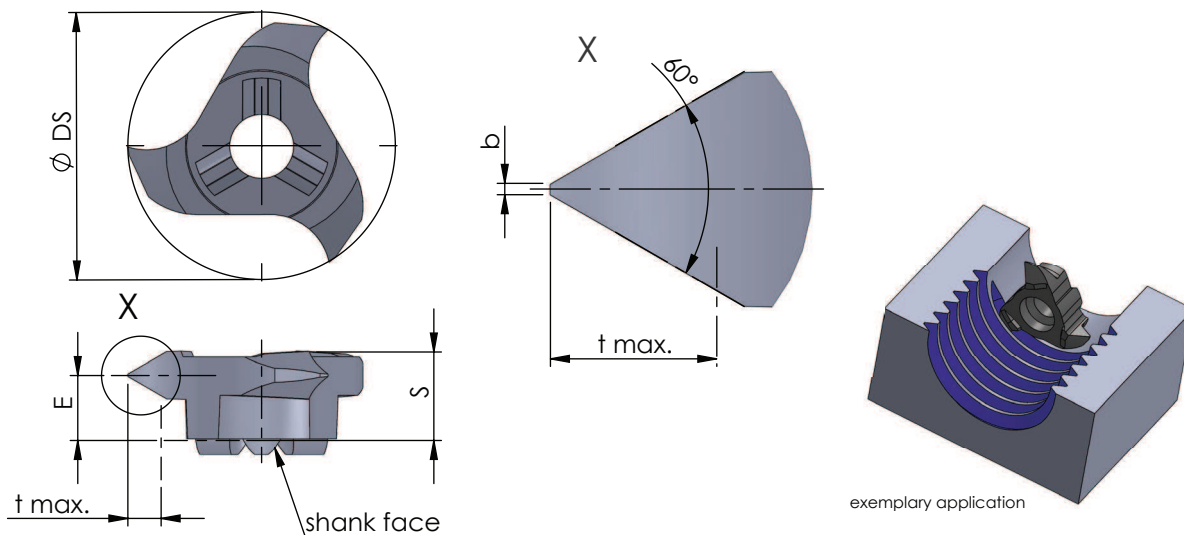
MINIMILL

groove milling by circular interpolation

Type Z18

for metric standard threading internal partial profile

bore Ø from 18 mm



dimensions in mm

part number	min. thread size	pitch	S	E	Ø DS	b	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z18.0510.01	M22	1.0-1.75	5.85	5.0	17.7	0.12	1.03	3	●			ZH18
Z18.0720.01	M22	1.0-2.0	5.85	4.7	17.7	0.12	1.19	3		●		
Z18.0815.01	M22	1.5-2.75	5.85	4.6	17.7	0.19	1.62	3		●		
Z18.1020.01	M24	2.0-3.75	5.85	4.2	17.7	0.25	2.22	3		●		
Z18.1325.01	M24	2.0-3.0	5.85	4.4	17.7	0.25	1.73	3		●		
Z18.1630.01	M24	2.5-5.0	5.85	3.8	17.7	0.31	2.98	3		●		
Z18.1835.01	M24	3.0-5.5	5.85	3.6	17.7	0.38	3.25	3		●		
Z18.2535.01	M24	2.0-3.5	5.85	4.2	17.7	0.25	2.06	3		●		

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z18.0510.01/AL41F



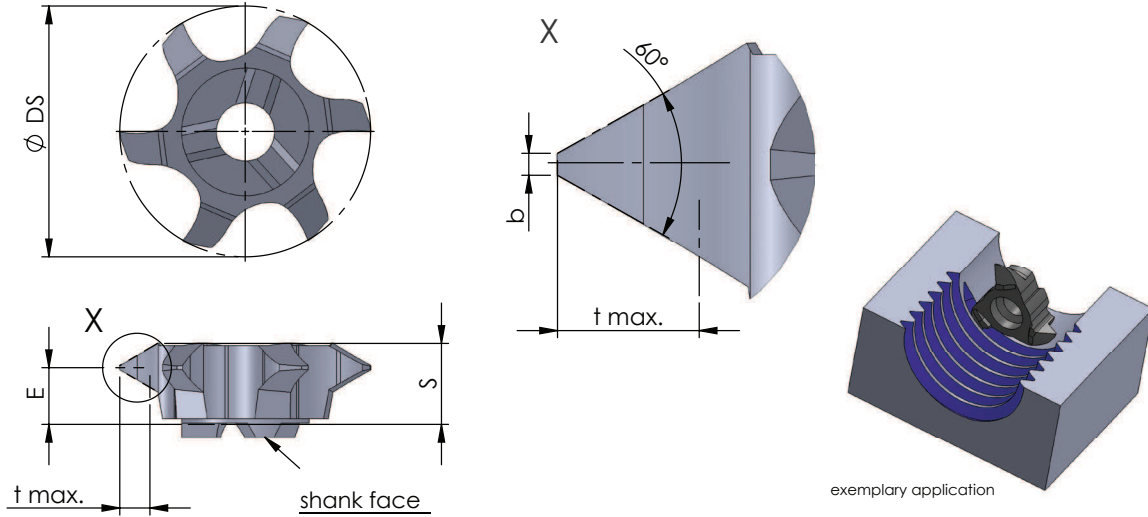
MINIMILL

groove milling by circular interpolation

Type Z618

for metric standard threading internal partial profile

bore Ø from 18 mm



dimensions in mm

part number	min. thread size	pitch	S	E	Ø DS	b	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z618.0720.01	M22	1.0-2.0	5.85	5.0	17.7	0.12	1.19	6	●			ZH18
Z618.2545.01	M24	2.0-3.5	5.85	4.3	17.7	0.25	2.06	6	●			ZH18

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z618.0720.01/AL41F

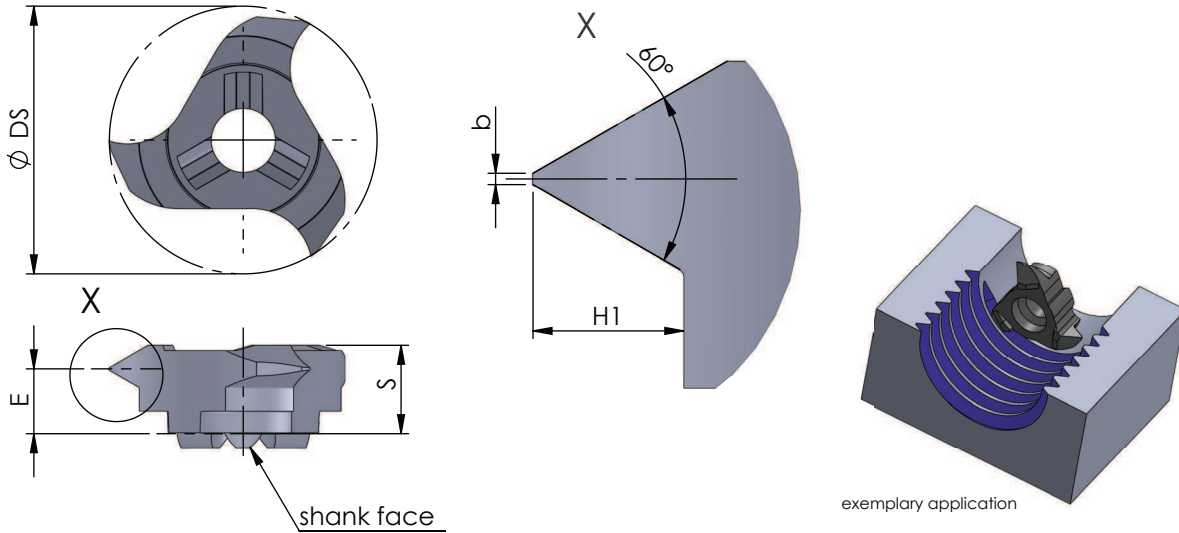
MINIMILL

groove milling by circular interpolation

Type Z18

for metric standard threading
internal full profile

bore Ø from 18 mm



dimensions in mm

part number	min. thread size	pitch	S	E	Ø DS	b	H1	number of teeth				toolholder type
									K10F	AL41F	P18C	
Z18.0815.02	M22	1.50	5.85	4.8	17.7	0.18	0.81	3	●			ZH18
Z18.0917.02	M22	1.75	5.85	4.7	17.7	0.20	0.95	3	●			
Z18.1020.02	M22	2.00	5.85	4.6	17.7	0.25	1.08	3	●			
Z18.1325.02	M24	2.50	5.85	4.4	17.7	0.31	1.35	3	●			
Z18.1630.02	M27	3.00	5.85	4.3	17.7	0.37	1.62	3	●			
Z18.1835.02	M27	3.50	5.85	4.0	17.7	0.43	1.89	3	●			

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z18.0815.02/AL41F



MINIMILL

Nut- und Formzirkularfräsen

groove milling by circular interpolation

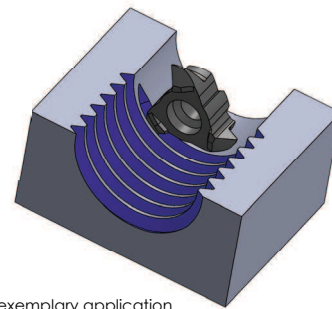
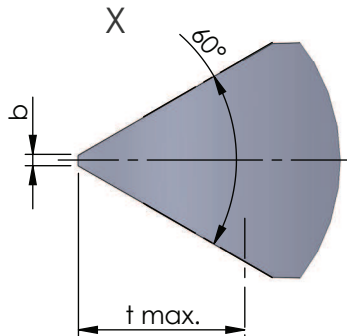
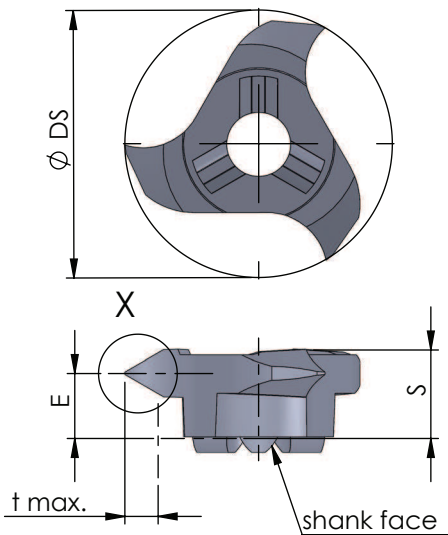
Typ Z22

für metrisches ISO-Gewinde innen Teilprofil

for metric standard threading internal partial profile

Bohrungs-Ø ab 22 mm

bore Ø from 22 mm



exemplary application

dimensions in mm

part number	min. thread size	pitch	S	E	Ø DS	b	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z22.0720.01	M27	1.0-2.0	5.85	4.6	21.7	0.12	1.19	3	●			ZH22
Z22.0815.01	M27	1.5-2.75	5.85	4.5	21.7	0.18	1.62	3		●		
Z22.1020.01	M27	2.0-3.75	5.85	4.2	21.7	0.25	2.22	3		●		
Z22.1630.01	M30	2.5-5.0	5.85	3.8	21.7	0.31	2.98	3		●		
Z22.2140.01	M30	3.5-6.0	5.85	3.4	21.7	0.44	3.52	3		●		
Z22.2445.01	M30	3.5-6.5	5.85	3.2	21.7	0.44	3.84	3		●		
Z22.2545.01	M27	2.5-4.5	5.85	3.7	21.7	0.25	2.70	3		●		

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z22.0720.01/AL41F

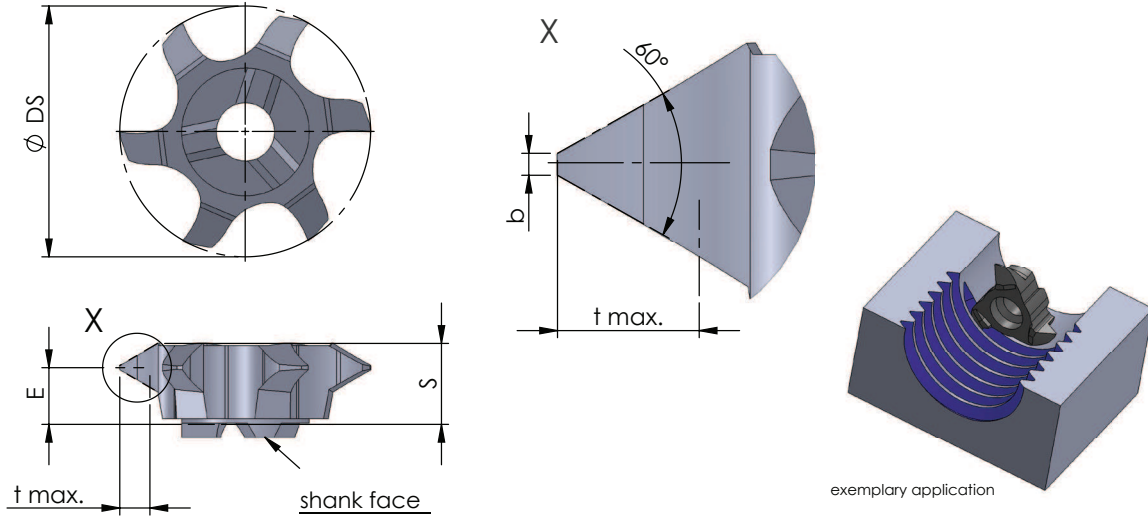
MINIMILL

groove milling by circular interpolation

Type Z622

for metric standard threading internal partial profile

bore Ø from 22 mm



dimensions in mm

part number	min. thread size	pitch	S	E	Ø DS	b	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z622.0720.01	M27	1.0-2.0	6.2	5.0	21.7	0.12	1.19	6	●	●	●	ZH22
Z622.2545.01	M27	2.0-4.5	6.05	4.2	21.7	0.25	2.7	6	●	●	●	ZH22

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z622.0720.01/AL41F



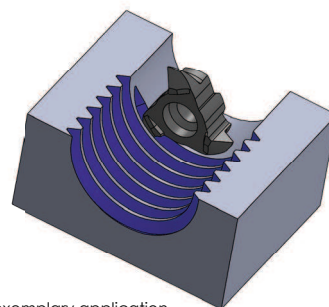
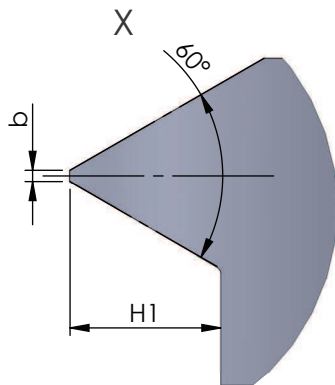
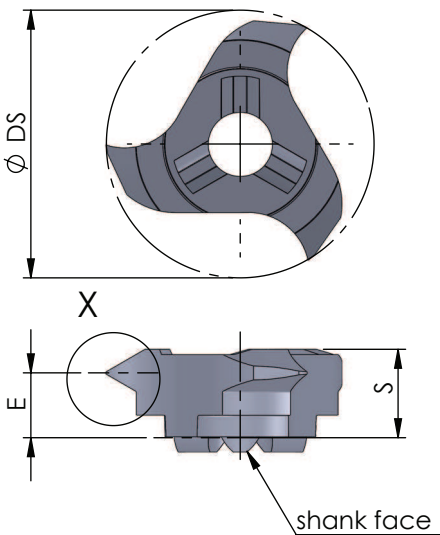
MINIMILL

groove milling by circular interpolation

Type Z22

for metric standard threading internal full profile

bore Ø from 22 mm



exemplary application

dimensions in mm

part number	min. thread size	pitch	S	E	Ø DS	b	H1	number of teeth				toolholder type
									K10F	AL41F	P18C	
Z22.0815.02	M24	1.50	5.85	4.8	21.7	0.19	0.81	3		●		ZH22
Z22.0917.02	M27	1.75	5.85	4.7	21.7	0.22	0.95	3		●		
Z22.1020.02	M27	2.00	5.85	4.6	21.7	0.25	1.08	3		●		
Z22.1630.02	M30	3.00	5.85	4.3	21.7	0.37	1.62	3		●		
Z22.1835.02	M30	3.50	5.85	4.0	21.7	0.43	1.89	3		●		
Z22.2140.02	M33	4.00	5.85	3.9	21.7	0.50	2.16	3		●		
Z22.2445.02	M33	4.50	5.85	3.7	21.7	0.56	2.43	3		●		

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z22.0815.02/AL41F

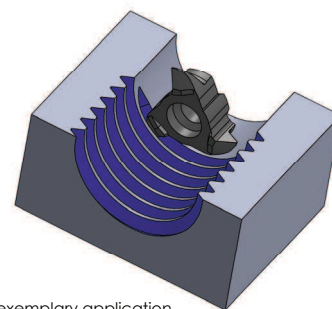
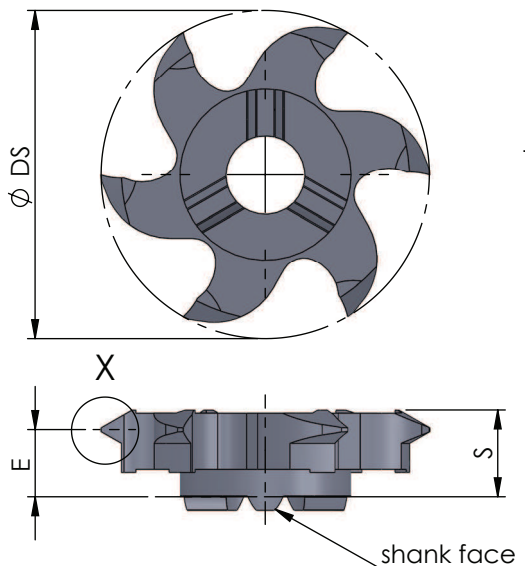
MINIMILL

groove milling by circular interpolation

Type Z622

for metric standard threading
internal full profile

bore Ø from 22 mm



dimensions in mm

part number	min. thread size	pitch	S	E	Ø DS	b	H1	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z622.0815.02	M24	1.50	6.2	5.3	21.7	0.19	0.81	6	●	●	●	ZH22
Z622.0917.02	M27	1.75	6.2	5.2	21.7	0.22	0.95	6	●	●	●	
Z622.1020.02	M27	2.00	6.2	5.0	21.7	0.25	1.08	6	●	●	●	
Z622.1630.02	M30	3.00	6.2	4.8	21.7	0.37	1.62	6	●	●	●	
Z622.2140.02	M33	4.00	6.2	4.4	21.7	0.50	2.16	6	●	●	●	

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z622.0815.02/AL41F



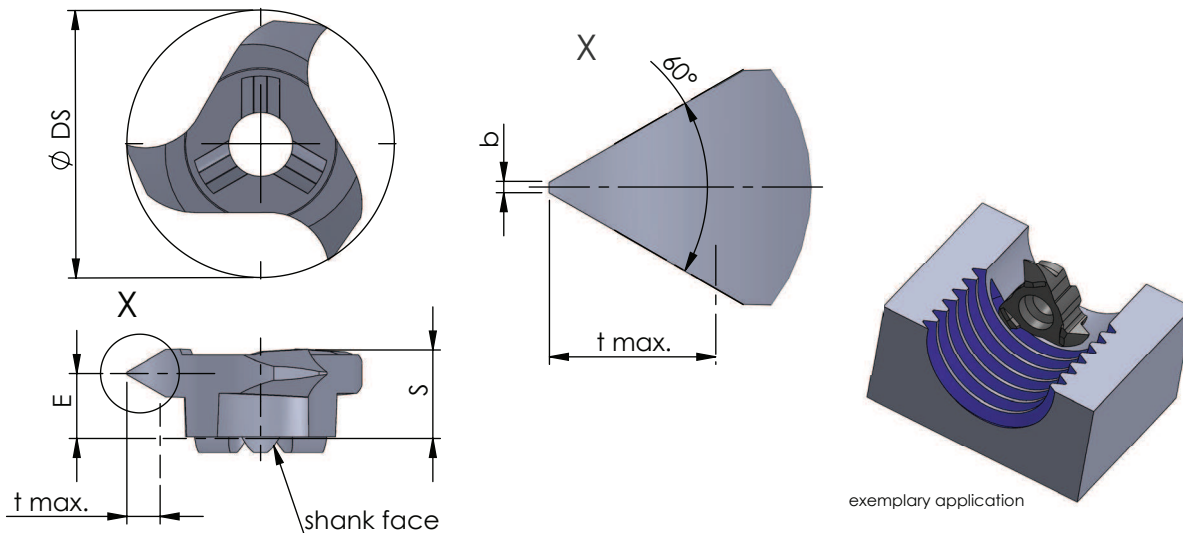
MINIMILL

groove milling by circular interpolation

Type Z28

for metric standard threading internal partial profile

bore Ø from 28 mm



dimensions in mm

part number	min. thread size	pitch	S	E	Ø DS	b	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z28.0720.01	M33	1.0-2.0	6.6	4.6	27.7	0.12	1.20	3	●	●	●	ZH28
Z28.1525.01	M33	1.5-2.5	6.6	4.3	27.7	0.18	1.49	3	●	●	●	
Z28.3050.01	M36	2.5-5.0	6.6	4.0	27.7	0.37	2.93	3	●	●	●	
Z28.5060.01	M39	4.0-6.0	6.6	3.6	27.7	0.62	3.37	3	●	●	●	

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z28.0720.01/AL41F

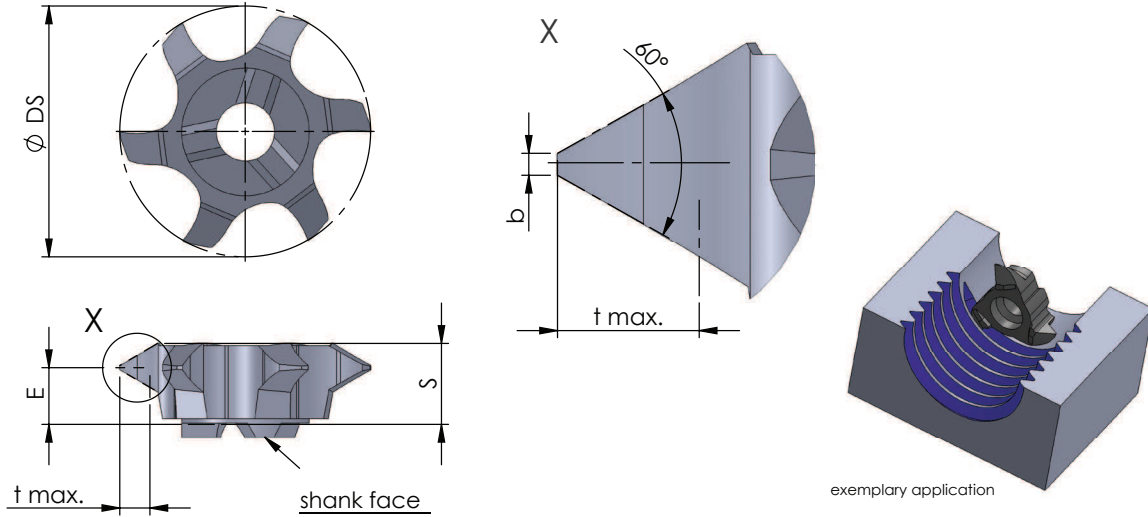
MINIMILL

groove milling by circular interpolation

Type Z628

for metric standard threading internal partial profile

bore Ø from 28 mm



dimensions in mm

part number	min. thread size	pitch	S	E	Ø DS	b	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z628.1525.01	M33	1.5-2.5	6.1	5.0	27.7	0.19	1.6	6	●	●	●	ZH28
Z628.3050.01	M36	2.5-5.0	6.1	2.3	27.7	0.38	2.93	6	●	●	●	ZH28

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z628.1525.01/AL41F

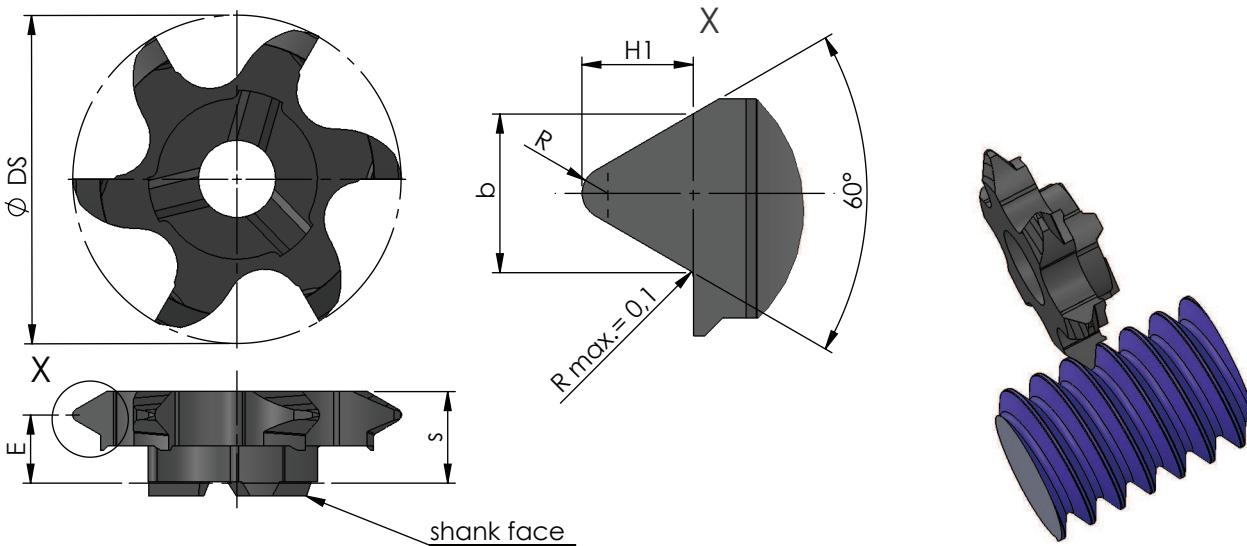


MINIMILL

groove milling by circular interpolation

Type Z622

for metric standard threading external full profile



shank face

dimensions in mm

	part number	pitch	S	E	R	$\varnothing DS$	$b \pm 0.01$	H1	number of teeth	K10F AL41F P18C	toolholder type
new	Z622.E0815.02	1.50	6.25	5.35	0.22	21.7	1.316	0.92	6	●	ZH22
new	Z622.E0917.02	1.75	6.25	5.25	0.25	21.7	1.524	1.07	6	●	
new	Z622.E1020.02	2.00	6.25	5.10	0.29	21.7	1.755	1.23	6	●	
new	Z622.E1630.02	3.00	6.25	4.50	0.43	21.7	2.621	1.84	6	●	
new	Z622.E2140.02	4.00	6.25	4.00	0.58	21.7	3.499	2.45	6	●	

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z622.E0815.02/AL41F

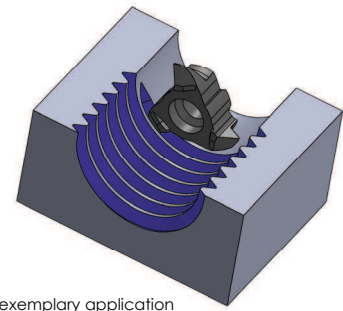
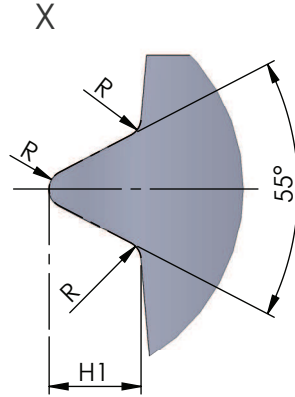
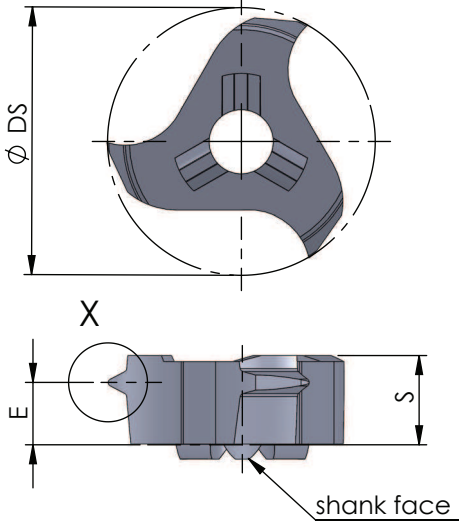
MINIMILL

groove milling by circular interpolation

Type Z12

for Whitworth threading
internal full profile

bore Ø from 12 mm



dimensions in mm

part number	min. thread size	stars/inch	S	E	Ø DS	H1	R	number of teeth				toolholder type
									K10F	AL41F	P18C	
Z12.0813.19	G ³ / ₈ "	19	3.6	2.5	11.7	0.86	0.18	3	●			ZH10
Z12.1118.14	G ¹ / ₂ "	14	3.6	2.3	11.7	1.16	0.24	3	●			
Z12.1423.11	G1"	11	3.6	2.0	11.7	1.48	0.31	3	●			

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z12.1423.11/AL41F



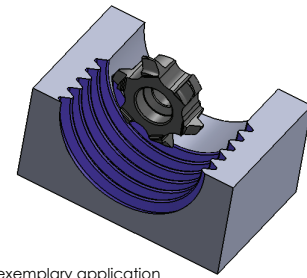
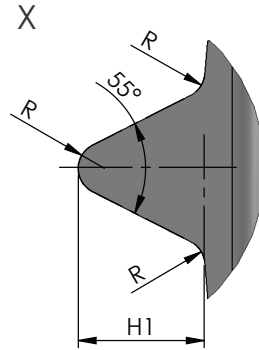
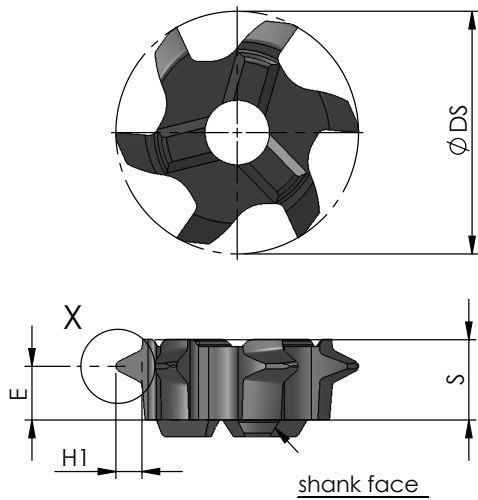
MINIMILL

groove milling by circular interpolation

Type Z614

for Whitworth threading
internal full profile

bore Ø from 14 mm



dimensions in mm

part number	min. thread size	stars/inch	S	E	Ø DS	H1	R	number of teeth	K10F	AL41F	P18C	toolholder type
Z614.5514.02	G¾"	14	4.6	3.3	13.7	1.16	0.24	6	●			ZH14
Z614.5511.02	G1"	11	4.6	3.1	13.7	1.48	0.31	6	●			ZH14

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z614.5514.02/AL41F

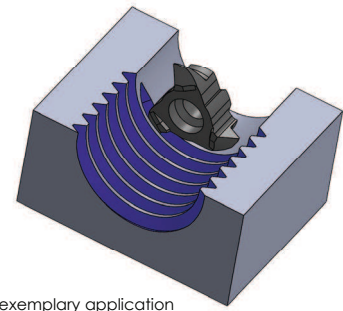
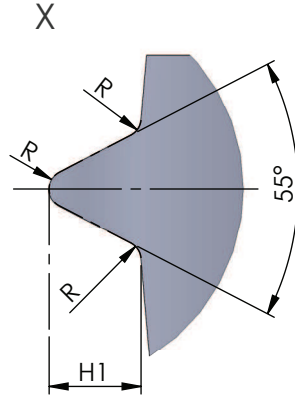
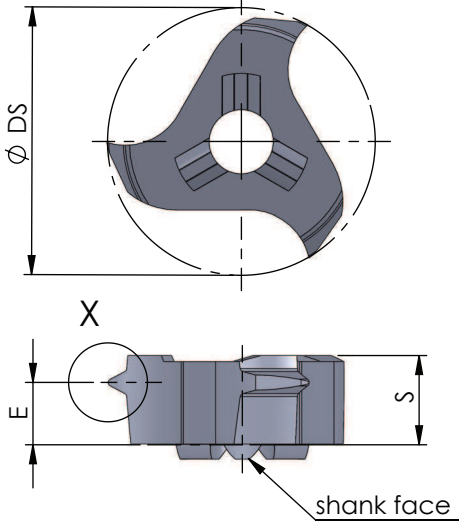
MINIMILL

groove milling by circular interpolation

Type Z18

for Whitworth threading
internal full profile

bore Ø from 18 mm



exemplary application

dimensions in mm

part number	min. thread size	stars/inch	S	E	Ø DS	H1	R	number of teeth				toolholder type
									K10F	AL41F	P18C	
Z18.5511.02	G1"	11	5.85	4.4	17.7	1.48	0.31	3	●			ZH18
Z18.5514.02	G¾"	14	5.85	4.6	17.7	1.16	0.24	3	●			
Z18.5519.02	-	19	5.85	4.9	17.7	0.856	0.18	3	●			

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z18.5519.02/AL41F



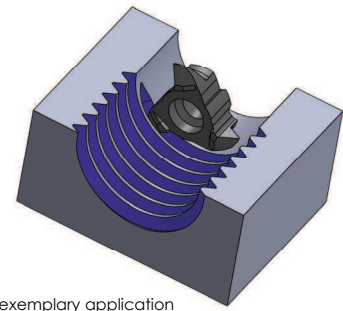
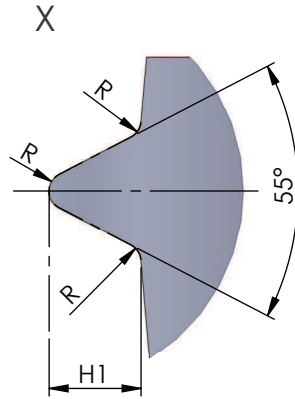
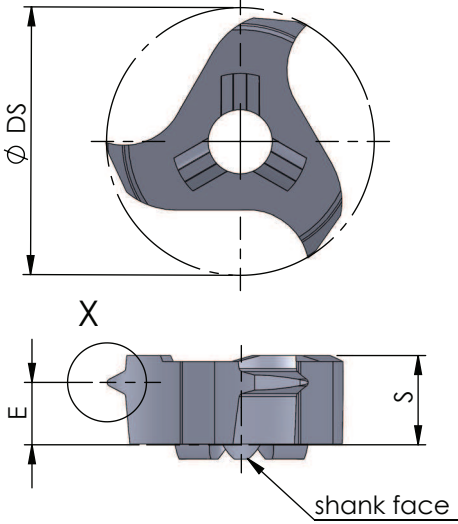
MINIMILL

groove milling by circular interpolation

Type Z22

for Whitworth threading
internal full profile

bore Ø from 22 mm



exemplary application

dimensions in mm

part number	min. thread size	stars/inch	S	E	Ø DS	H1	R	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z22.5506.02	BSW1½"	6	5.85	3.1	21.7	2.71	0.58	3	●			ZH22
Z22.5508.02	-	8	5.85	3.5	21.7	2.03	0.43	3	●			
Z22.5511.02	G1"	11	5.85	4.0	21.7	1.48	0.31	3	●			

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z22.5508.02/AL41F

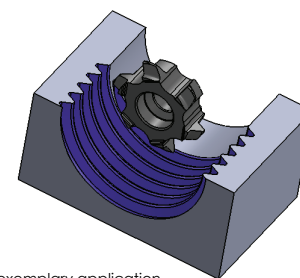
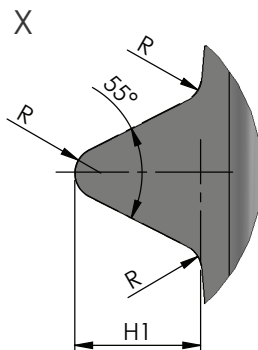
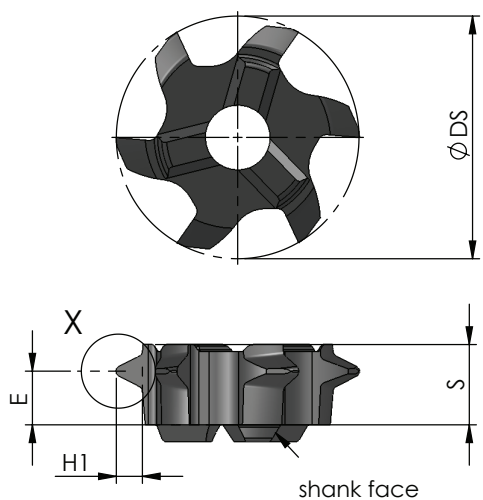
MINIMILL

groove milling by circular interpolation

Type Z622

for Whitworth threading
internal full profile

bore Ø from 22 mm



exemplary application

dimensions in mm

part number	min. thread size	stars/inch	S	E	$\varnothing DS$	H1	R	number of teeth	K10F	AL41F	P18C	toolholder type
Z622.5506.02	BSW1½"	6	6.05	3.8	21.7	2.71	0.58	6	●			ZH22
Z622.5508.02	-	8	6.31	4.2	21.7	2.03	0.43	6	●			
Z622.5511.02	G1"	11	6.35	4.8	21.7	1.48	0.31	6	●			

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z622.5506.02/AL41F



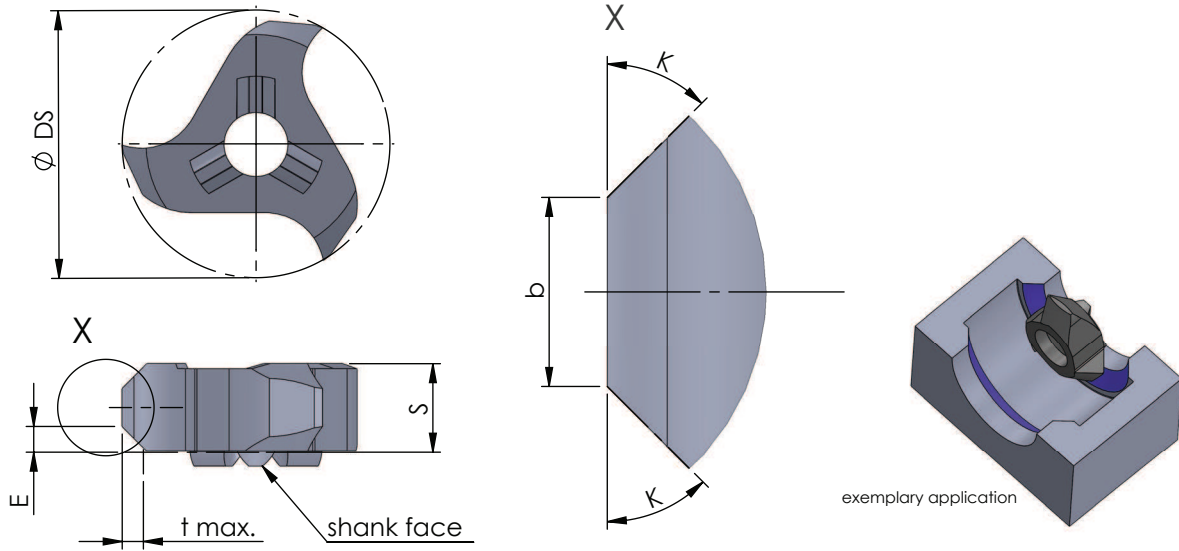
MINIMILL

groove milling by circular interpolation

Type Z10 / Z12

forward & backward chamfering

bore Ø from 10 / 12 mm



dimensions in mm

part number	K	D min.	S	E	$\varnothing DS$	b	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z10.4545.35	45°	10	3.5	1.35	9.7	0.9	1.0	3	●			ZH10
Z12.4545.35	45°	12	3.5	1.2	11.7	1.2	0.8	3	●			ZH10

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z12.4545.35/AL41F

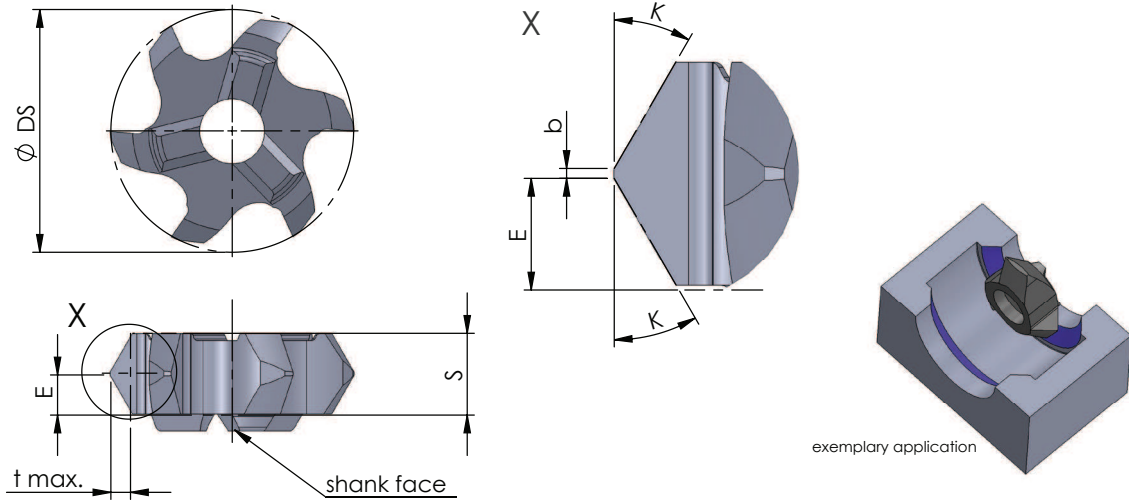
MINIMILL

groove milling by circular interpolation

Type Z610

forward & backward chamfering

bore Ø from 10 mm



dimensions in mm

part number	K	D min.	S	E	$\varnothing DS$	b	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z610.1515.02	15°	10	3.6	1.8	9.7	0.2	0.35	6	●	●	●	ZH10
Z610.2020.02	20°	10	3.6	1.8	9.7	0.2	0.45	6	●	●	●	
Z610.3030.02	30°	10	3.6	1.8	9.7	0.2	0.7	6	●	●	●	
Z610.4545.02	45°	10	3.6	1.8	9.7	0.2	1.2	6	●	●	●	

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z610.1515.02/AL41F



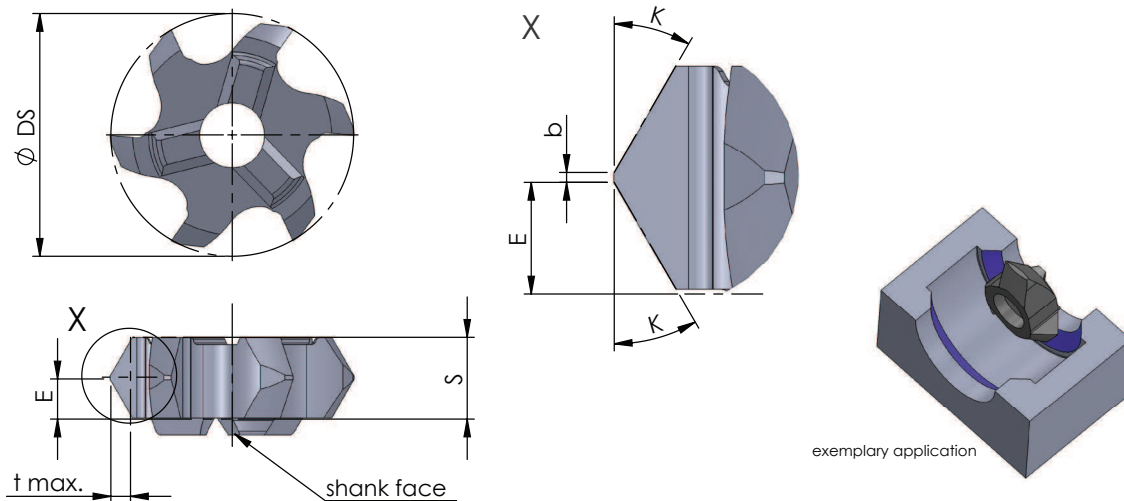
MINIMILL

groove milling by circular interpolation

Type Z614

forward & backward chamfering

bore Ø from 14 mm



dimensions in mm

part number	K	D min.	S	E	$\varnothing DS$	b	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z614.1515.02	15°	14	4.6	2.3	13.7	0.2	0.35	6	●	●	●	ZH14
Z614.2020.02	20°	14	4.6	2.3	13.7	0.2	0.45	6	●	●	●	
Z614.3030.02	30°	14	4.6	2.3	13.7	0.2	0.7	6	●	●	●	
Z614.4545.02	45°	14	4.6	2.3	13.7	0.2	1.8	6	●	●	●	

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z614.1515.02/AL41F

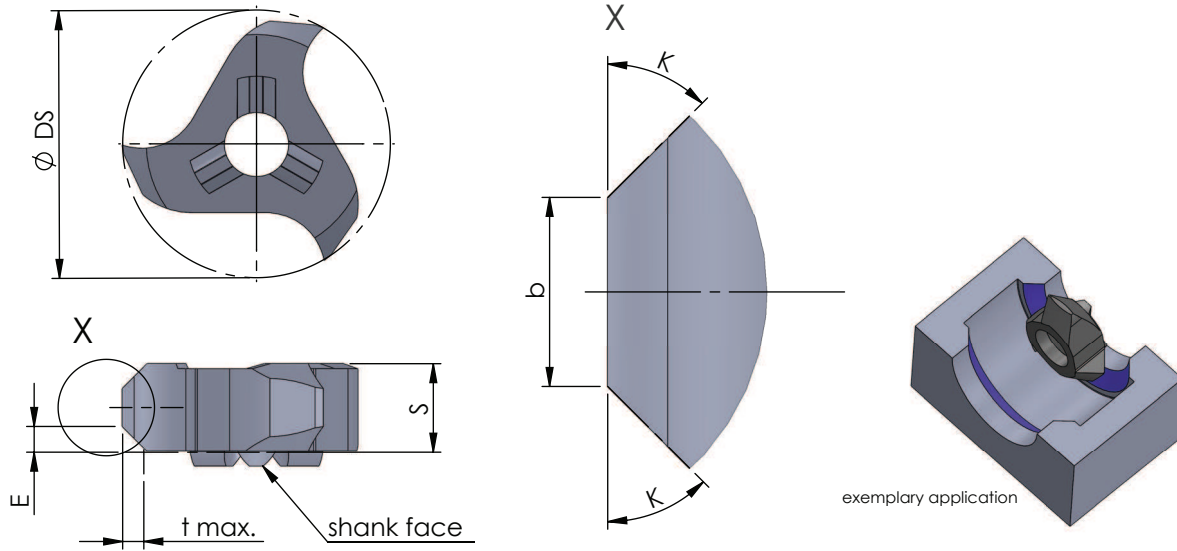
MINIMILL

groove milling by circular interpolation

Type Z16

forward & backward chamfering

bore Ø from 16 mm



dimensions in mm

part number	K	D min.	S	E	Ø DS	b	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z16.4545.35	45°	16	4.5	1.6	15.7	1.4	1.4	3	●			ZH14
Z16.4545.02	45°	16	4.5	2.2	15.7	0.2	1.8	3	●			ZH14

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z16.4545.35/AL41F



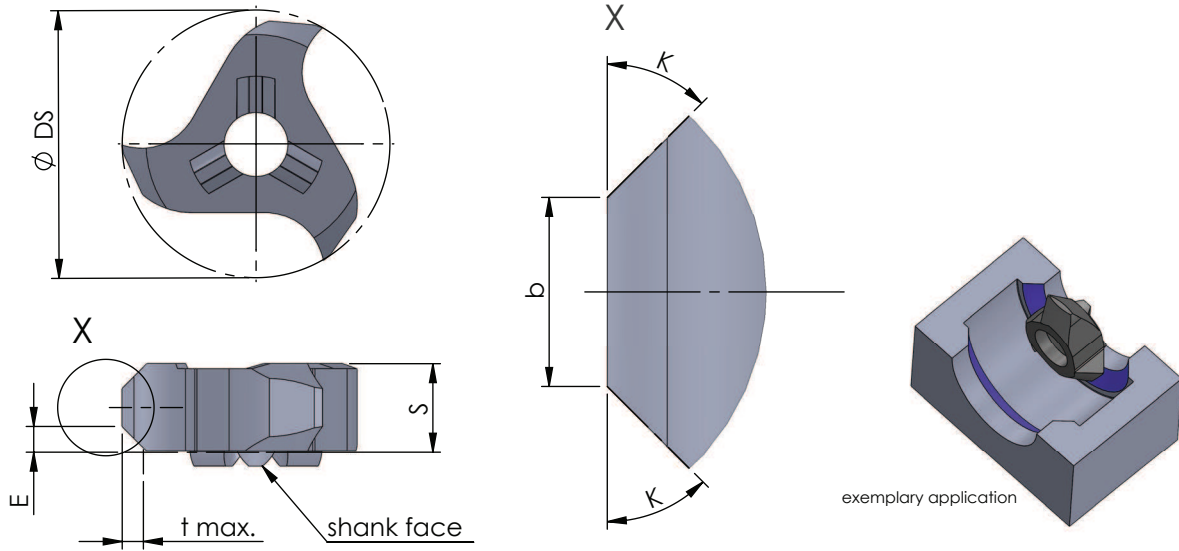
MINIMILL

groove milling by circular interpolation

Type Z18

forward & backward chamfering

bore Ø from 15 mm



dimensions in mm

part number	K	D min.	S	E	Ø DS	b	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z18.4545.DS15	45°	15	5.85	2.9	14.7	0.2	2.5	3	●			ZH18
Z18.4545.58	45°	18	5.85	1.75	17.7	2.5	1.4	3	●			ZH18

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z18.4545.58/AL41F

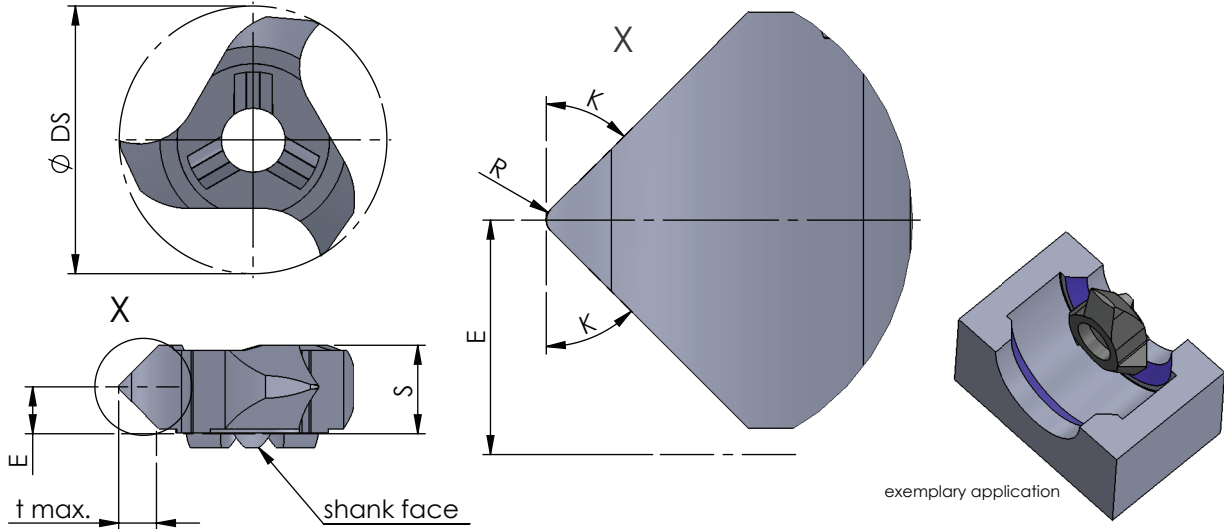
MINIMILL

groove milling by circular interpolation

Type Z18

forward & backward chamfering with radius

bore Ø from 18 mm



dimensions in mm

part number	K	D min.	S	E	R	Ø DS	t max.	number of teeth	K10F AL41F P18C	toolholder type
Z18.4545.02	45°	18	5.85	3	0.2	17.7	2.5	3	●	ZH18

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z18.4545.02/AL41F



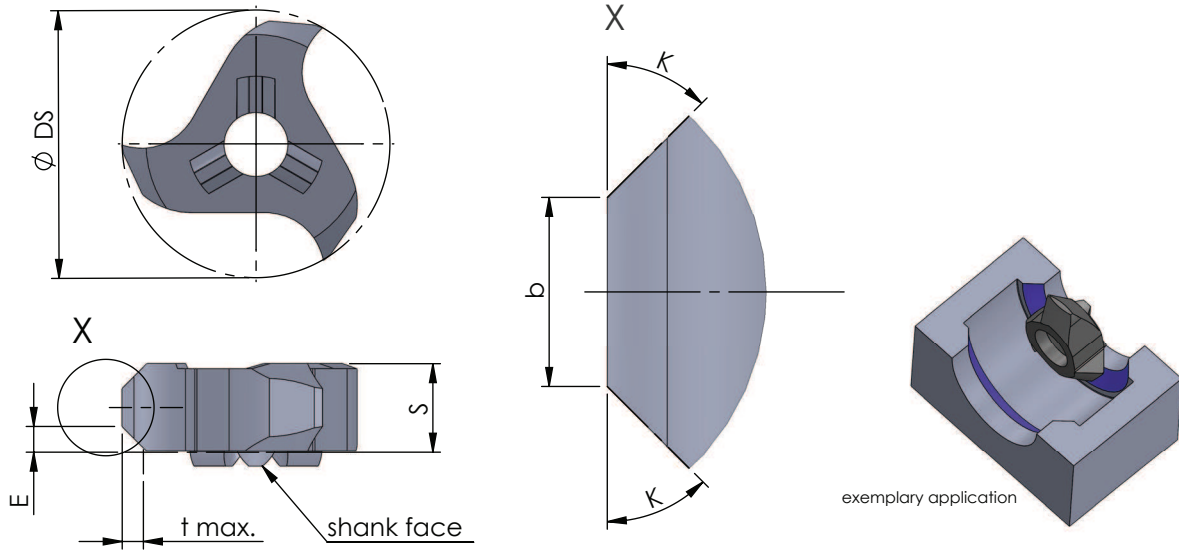
MINIMILL

groove milling by circular interpolation

Type Z22

forward & backward chamfering

bore Ø from 22 mm



dimensions in mm

part number	K	D min.	S	E	$\varnothing DS$	b	t max.	number of teeth	Material			toolholder type
									K10F	AL41F	P18C	
Z22.4545.58	45°	22	5.85	2.0	21.7	2.0	1.7	3	●	●	●	ZH22
Z22.4545.94 *	45°	22	9.4	3.3	21.7	3.0	3.0	3	●	●	●	ZH22

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

*attention: this insert needs special screw M5/16-MM

order-example: grade AL41F: Z22.4545.58/AL41F

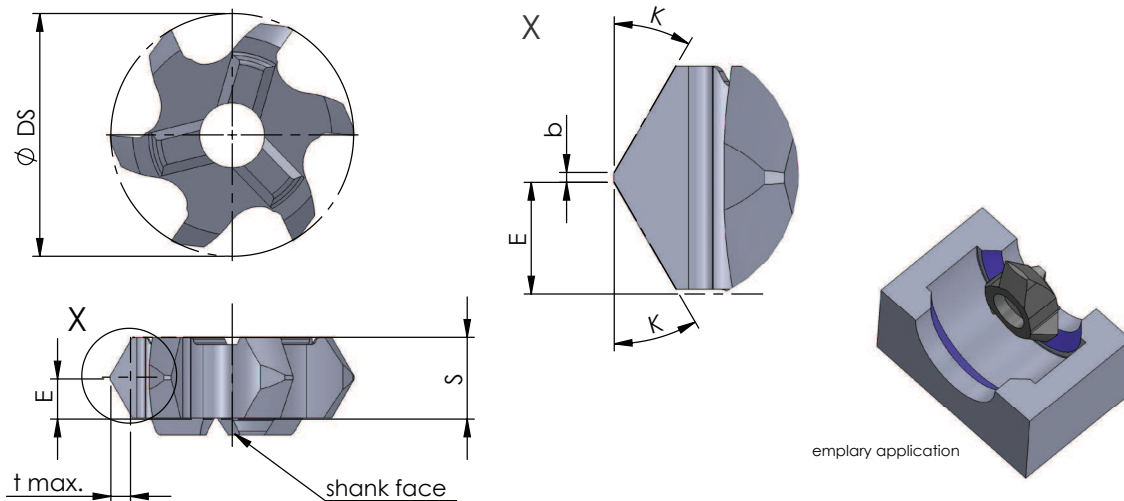
MINIMILL

groove milling by circular interpolation

Type Z618 / Z622 / Z628

forward & backward chamfering

bore Ø from 15 - 28 mm



dimensions in mm

part number	K	D min.	S	E	Ø DS	b	t max.	number of teeth	material			toolholder type
									K10F	AL41F	P18C	
Z618.4545.DS15	45°	15	5.75	2.75	14.7	0.5	1.6	6	●	●	●	ZH18
Z618.4545.58	45°	18	5.75	2.9	17.7	0.2	2.2	6	●	●	●	ZH18
Z622.4545.63	45°	22	6.05	3.7	21.7	0.2	1.9	6	●	●	●	ZH22
Z628.4545.02	45°	28	6.05	3.7	27.7	0.2	1.9	6	●	●	●	ZH28

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z618.4545.58/AL41F



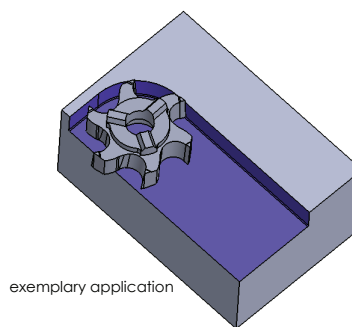
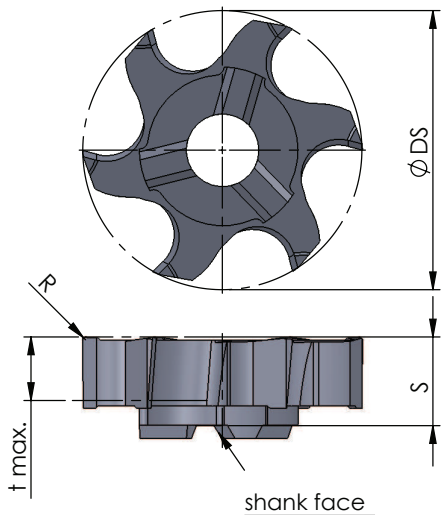
MINIMILL

groove milling by circular interpolation

Type Z620 / Z628

face milling

bore Ø from 20 / 28 mm



dimensions in mm

part number	D min.	S	R	Ø DS	t max.	number of teeth	material			toolholder type
							K10F	AL41F	P18C	
Z620.SP50.02	20	6.2	0.2	20	5.0	6	●	●		ZH22
Z628.SP50.02	28	6.2	0.2	27.7	5.0	6	●	●		ZH28

More carbide grades you can find in the grades summary in the chapter "technical instructions" and in the price list.

order-example:
grade AL41F:
Z620.SP50.02/AL41F

MINIMILL

groove milling by circular interpolation

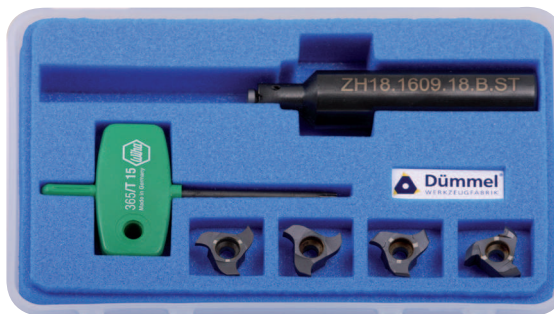
Sets

Minimill

12 mm / 18 mm



part number	Content	K10F AL41F P18C	for toolholder type
SET12MM	1x ZH10.1606.12.B.ST		
	1x Z12.0150.02	●	ZH10
	1x Z12.0200.00	●	ZH10
	1x Z12.0011.22	●	ZH10
	1x Z12.4545.35	●	ZH10



part number	Content	K10F AL41F P18C	for toolholder type
SET18MM	1x ZH18.1609.18.B.ST		
	1x Z18.0150.00	●	ZH18
	1x Z18.0300.02	●	ZH18
	1x Z18.0011.22	●	ZH18
	1x Z12.4545.58	●	ZH18



MINIMILL

groove milling by circular interpolation

Sets

Minimill

22 mm / 37 mm



part number	Content	Material			for toolholder type
		K10F	AL41F	P18C	
SET22MM	1x ZH22.1612.24.B.ST				
	1x Z622.0150.01		●		ZH22
	1x Z622.0400.02		●		ZH22
	1x Z22.0014.28		●		ZH22
	1x Z12.4545.58		●		ZH22



part number	Content	Material			for toolholder type
		K10F	AL41F	P18C	
SET637MM	1x ZH22.1612.24.B.ST				
	2x Z637.0150.01		●		ZH22
	1x M5-MM				
	1x TF20				

MINIMILL

groove milling by circular
interpolation

Basic information about thread milling

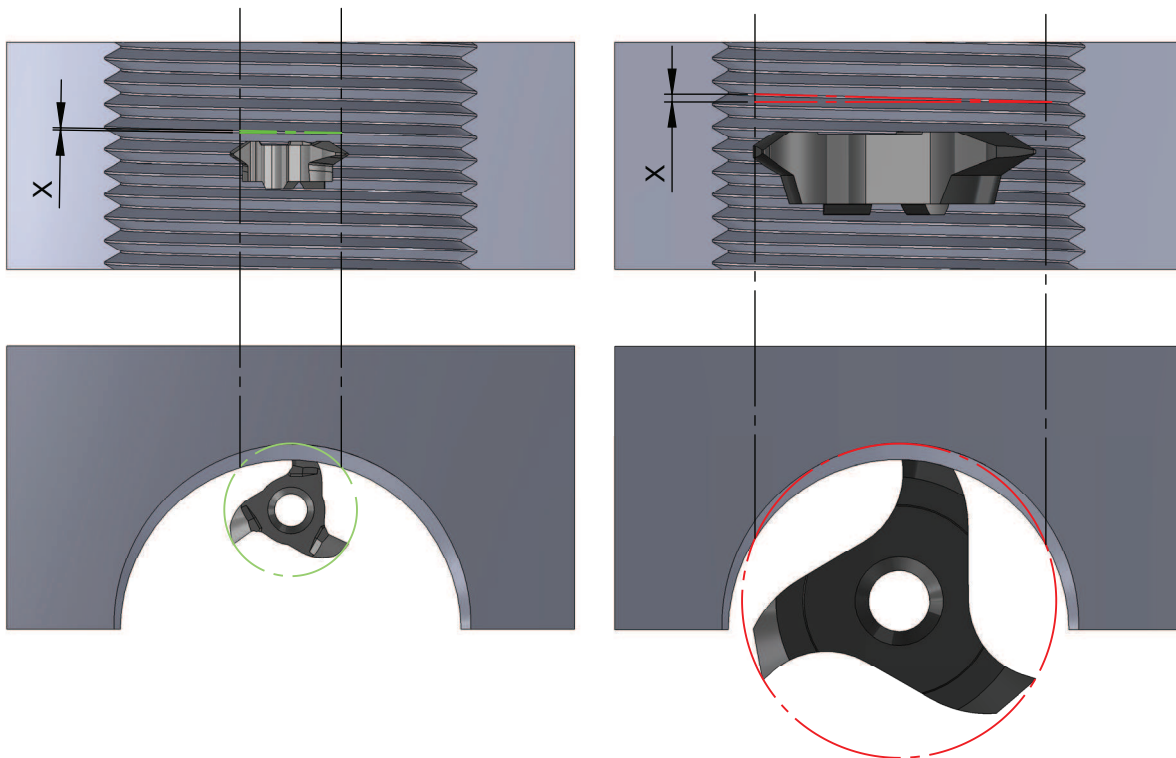


Thread profile violation

Thread milling by interpolation causes a profile violation. To keep the violation minimal you should use the cutting circle as small as possible.

The following sketch shows the relations during the process:

(green: profile violation X low = good; red: profile violation X big = bad)





MINIMILL

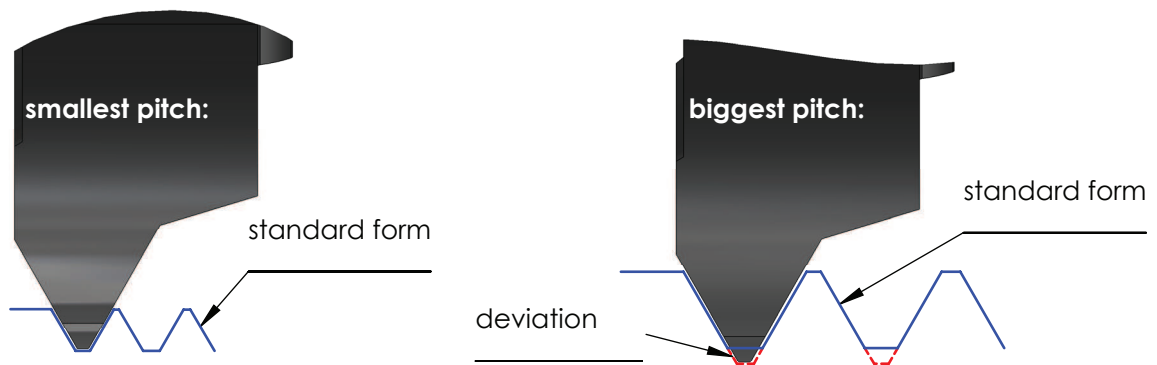
groove milling by circular interpolation

Basic information about thread milling

Partial profile

Tools with partial profile are multi-purpose tools, that means you can process several pitches with one tool. The processed shape has a small difference to the standard profile. Created is that tool for the smallest pitch, this profile depends to the standard.

All other pitches are producible, but only with a small deviation. Normally this causes no problem, but sometimes you have to decide case by case.



MINIMILL

groove milling by circular

interpolation

Basic information about thread milling



Selection guide multi-purpose-tools

In the following chart are all DÜMMEL - multi-purpose-tools listed. This chart shows the possible area of application (blue= optimal profile; grey= possible profiles):



starting with thread-size	pitch (mm)															
	1	1,25	1,5	1,75	2	2,5	2,75	3	3,5	3,75	4	4,5	5	5,5	6	
Z610.0510.01	M12	M13	M14	M14												
Z610.0720.01	M13	M13	M14	M14	M15											
Z610.0815.01			M15	M15	M16	M18	M18									
Z610.2530.01					M16	M18	M18	M19								
Z12.0510.01	M14	M15	M15	M16												
Z12.0720.01	M14	M15	M15	M16	M16											
Z12.0815.01			M15	M16	M16	M17	M17									
Z12.2530.01					M16	M17	M17	M18								
Z614.0510.01	M15	M15	M16	M16												
Z614.0720.01	M15	M15	M16	M17	M17											
Z614.0815.01			M17	M17	M18	M20	M21									
Z614.2530.01					M18	M20	M21	M21								
Z16.0510.01	M18	M19	M20	M20												
Z16.0720.01	M18	M19	M20	M20	M21											
Z16.0815.01			M20	M20	M21	M21	M22									
Z16.2530.01					M21	M21	M22	M22								
Z18.0510.01	M21	M21	M22	M22												
Z18.0720.01/Z618.0720.01	M21	M21	M22	M22	M23											
Z18.0815.01			M22	M22	M23	M24	M24									
Z18.1325.01					M23	M24	M24	M24								
Z18.2535.01/Z618.2545.01					M23	M24	M24	M24	M25							
Z18.1020.01					M23	M24	M24	M24	M25	M26						
Z18.1630.01						M24	M24	M24	M25	M26	M26	M27	M28			
Z18.1835.01								M24	M25	M26	M26	M27	M28	M28		
Z22.0720.01/Z622.0720.01	M25	M25	M25	M26	M27											
Z22.0815.01			M26	M26	M27	M28	M28									
Z22.1020.01					M27	M28	M28	M29	M30	M30						
Z22.2545.01/Z622.2545.01					M27	M28	M28	M29	M30	M30	M30	M31				
Z22.1630.01						M28	M28	M29	M30	M30	M30	M31	M32			
Z22.2140.01									M30	M30	M30	M31	M32	M33	M34	
Z22.2445.01									M30	M30	M30	M31	M32	M33	M34	
Z28.0720.01	M31	M31	M32	M32	M33											
Z28.1525.01/Z628.1525.01			M32	M32	M33	M34										
Z28.3050.01/Z628.3050.01						M34	M35	M35	M36	M36	M37	M38	M39			
Z28.5060.01											M37	M38	M39	M39	M40	



MINIMILL

groove milling by circular interpolation

Technical instructions, carbide grade and coatings



K10F

All purpose micrograin carbide with good abrasion resistance. Uncoated for applications with low or medium cutting speeds and machining of nonferrous materials.

CBN

Ductile CBN grade for applications with lower cutting speed. Suitable for hardened steel, interrupted cuts and cast iron.

CN45F

All purpose PVD-TiN coating. This allround grade is suitable for low and medium cutting speed with restrictions on non-ferrous materials.

AL41F

Very universal TiAlN coating with a high resistance to high temperature and hardness. Very suitable also for non-ferrous metals.

PD2F

Coating for universal use with medium and low speed.

XC2A

Coating with excellent hot hardness, high oxidation resistance and thermal insulation capacity. Perfect for hard machining >60 HRC

MINIMILL

groove milling by circular
interpolation

Technical instructions,
carbide grade and coatings



P01C

Coating for the processing in tough material with medium or low cutting speed

P03C

Coating for materials which are difficult to machine. Perfect to use for dry machining.

P07C

Coating to machine titanium and stainless steel.

P18C

Very universal high performance coating with high oxidation resistance, wear resistance and hot hard-ness resistance.

NEME

Coating for machining aluminum, alloys, non-ferrous metals and composite materials.



MINIMILL

groove milling by circular interpolation

Technical instructions, cutting data



	Werkstoff	Festigkeit	Werkstoff-Nr	Werkstoffbezeichnung	Werkstoff-Nr
P	Allgemeiner Baustahl	< 800 N/mm2	1.0037	St37-2	1.0570
	Automatenstahl	< 800 N/mm2	1.0718	9SMnPb28	1.0727
	Einsatzstahl unlegiert	< 800 N/mm2	1.0401	C15	1.0481
	Einsatzstahl legiert	< 1000 N/mm2	1.7331	16MnCr5 (EC80)	1.7015
	Vergütungsstahl unlegiert	< 850 N/mm2	1.0503	C45	1.1191
	Vergütungsstahl unlegiert	< 1000 N/mm2	1.0601	C60	1.1221
	Vergütungsstahl legiert	< 800 N/mm2	1.5131	50MnSi4	1.7030
	Vergütungsstahl legiert	< 1300 N/mm2	1.5755	31NiCr14	1.7033
	Stahlguss	< 850 N/mm2	0.9650	G-X260Cr27	1.6750
	Nitrierstahl	< 1000 N/mm2	1.8504	34CrAl6	1.8507
	Nitrierstahl	< 1200 N/mm2	1.8515	31CrMo12	1.8523
	Wälzlagerstahl	< 1200 N/mm2	1.3505	100Cr6 (W3)	1.3543
	Federstahl	< 1200 N/mm2	1.5026	55Si7	1.7176
	Schnellarbeitsstahl	< 1300 N/mm2	1.3344	S 6-5-3	1.3255
	Werkzeugstahl für Kaltarbeit	< 1300 N/mm2	1.2312	40CrMnMoS8 6	1.2379
	Werkzeugstahl für Warmbeit	< 1300 N/mm2	1.2343	X38CrMoV 5 1	1.2767
	M	Stahl und Stahlguss rostfrei geschwefelt	< 850 N/mm2	1.4305	X8CrNiS18 9
Nichtrostender Stahl, ferritisch		< 750 N/mm2	1.4510	X3CrTi17	1.4528
Nichtrostender Stahl, martensitisch		< 900 N/mm2	1.4034	X46Cr13	1.4116
Nichtrost. Stahl, ferritisch/martensit.		<1100 N/mm2	1.4313	X3CrNi13-4	1.4028
Nichtrost. Stahl, austenitisch/ferritisch		< 850 N/mm2	1.4460	X8CrNiMo27 5	1.4821
Nichtrostender Stahl, austenitisch		< 750 N/mm2	1.4301	X5CrNi18-10	1.4571
Hitzebeständig		< 1100 N/mm2	1.4747	X80CrNiSi20	1.4876
K	Grauguss mit Lammellengraphit	100-350N/mm2	0.6010	GG10	0.6025
	Grauguss mit Lammellengraphit	300-1000N/mm2	0.6030	GG30	0.6045
	Kugelgraphitguss	300-500N/mm2	0.7040	GGG40	0.7050
	Kugelgraphitguss	550-800N/mm2	0.7060	GGG60	0.7080
	Temperguss weis	350-450N/mm2	0.8035	GTW35	0.8045
	Temperguss weis	500-650N/mm2	0.8055	GTW55	0.8065
	Temperguss schwarz	350-450N/mm2	0.8135	GTS35	0.8145
Temperguss schwarz	500-700N/mm2	0.8155	GTS55	0.8170	
N	Aluminium (unlegiert, niedrig legiert)	< 350 N/mm2	3.0255	Al99,5	3.3308
	Aluminiumlegierungen < 0,5% Si	< 500 N/mm2	3.0515	AlMn1	3.1355
	Aluminiumlegierungen 0,5-10% Si	< 400 N/mm2	3.2152	GD-AlSi6Cu4	3.2373
	Aluminiumlegierungen 10-15% Si	< 400 N/mm2	3.2381	G-AlSi10Mg	3.5562
	Aluminiumlegierungen > 15% Si	< 400 N/mm2		G-AlSi17Cu4	
	Kupfer (unlegiert, niedrig legiert)	< 350 N/mm2	2.0060	E-Cu57	2.0090
	Kupfer-Knetlegierungen	< 700 N/mm2	2.0240	CuZn15	2.0265
	Kupfer-Sonderlegierungen	< 200 HB	2.0916	CuAl5	2.1525
	Kupfer-Sonderlegierungen	< 300HB	2.0978	CuAl11Ni6Fe5	
	Kupfer-Sonderlegierungen	> 300 HB	2.1247	CuBe2F125	
	Messing kurzspanend, Bronze, Rotguss	< 600 N/mm2	2.0360	CuZn40 (Ms60)	2.0380
	Messing langspanend	< 600 N/mm2	2.0335	CuZn36 (Ms63)	2.1293
	Thermoplaste			Delrin, Hostalen	
	Duroplaste			Ferrozell, Bakelit	
	Faserverstärkte Kunststoffe			GFK (Glasfaserverstärkt)	
	Magnesium und Magnesiumlegierungen	< 850 N/mm2	3.5200	M2, MgMn2	3.5612
	Graphit			C8000, R8500X	
Wolfram und Wolframlegierungen			W-NiFe (Densimet W)		
Molybdän und Molybdänlegierungen			Mo , Mo-50Re		
S	Reinnickel		1.3911	RNi24	1.3927
	Nickellegierungen		1.3912	Ni36 (Invar)	1.3924
	Nickellegierungen	< 850 N/mm2	2.4360	S-NiCu 30 Fe	
	Nickel-Chromlegierungen		2.4886	SG-NiMo16Cr16W	2.4610
	Nickel- und Kobaltlegierungen	< 1300 N/mm2	2.4632	NiCr20Co18Ti	2.4631
	Nickel- und Kobaltlegierungen	< 1300 N/mm2	2.4634	NiCo20Cr15MoAlTi	2.4654
	Hochwärmefeste Legierungen	< 1300 N/mm2		Hardox 400	1.4939
	Nickel-Kobalt-(Chrom-)legierungen	< 1400 N/mm2	2.4806	SG-NiCr20Nb, Inconel 82	2.4851
	Reintitan	< 900 N/mm2	3.7025	Ti99,8	3.7034
	Titanlegierungen	< 700 N/mm2	3.7114	TiAl5Sn2	3.7174
	Titanlegierungen	< 1200 N/mm2	3.7164	TiAl5V4	3.7144
H	Stahl gehärtet	< 45 HRc			
		46-55HRc			
		56-60 HRc			
		61-65 HRc			
		65-70 HRc			

MINIMILL

groove milling by circular

interpolation

Technical instructions, cutting data



Werkstoffbezeichnung	Werkstoff- Nr	Werkstoffbezeichnung	Vc (m/min.)	fz (mm)	h max. (mm)	
St52-3	1.0060	St60-2	80-200	0,03 - 0,10	0,03-0,05	Haupt-Anwendung
45S20	1.0757	46SPb2		0,03 - 0,10	0,03-0,05	
17Mn4	1.1141	C15E (CK15)		0,03 - 0,10	0,03-0,05	
13Cr3 (EC60)	1.5919	15CrNi6	60-180	0,03 - 0,08	0,03-0,05	
Ck45	1.0535	C55		0,03 - 0,08	0,03-0,05	
Ck60	1.0540	C50		0,03 - 0,08	0,03-0,05	
28Cr4	1.7225	42CrMo4	60-160	0,03 - 0,10	0,03-0,05	
34Cr4	1.3565	48CrMo4		0,02 - 0,07	0,03-0,05	
GS-20NiCrMo3 7	1.6582	GS-34 CrNiMo 6		0,03 - 0,10	0,03-0,05	
34AlMo5	1.8509	41CrAlMo7	30-100	0,03 - 0,10	0,03-0,05	
39CrMoV19 3	1.8550	34 CrAlNi 7		0,02 - 0,08	0,03-0,05	
X192CrMo17	1.3520	100 CrMn 6 (W4)		0,02 - 0,07	0,03-0,05	
55Cr3	1.7701	51CrMoV4	80-120	0,02 - 0,07	0,03-0,05	
S 18-1-2-5	1.3294	PMH56-5-3-8; ASP30		0,02 - 0,07	0,03-0,05	
X155CrVMo12 1	1.2316	X38CrMo16; RAMAX		0,02 - 0,07	0,03-0,05	
X45NiCrMo4	1.2842	90MnCrV8	100-170	0,02 - 0,07	0,03-0,05	
X4CrMoS18	1.4107	GX8CrNi12		0,03 - 0,08	0,03-0,05	
X105CrCoMo18 2	1.4016	X6Cr17		0,03 - 0,10	0,03-0,05	
X50CrMoV15	1.4106	X2CrMoSiS18-2-1	250-800	0,02 - 0,07	0,03-0,05	
X30Cr13	1.4104	X14CrMoS17		0,02 - 0,07	0,03-0,05	
X20CrNiSi25 4	1.4462	X2CrNiMoN22-5-3 (Duplex)		0,02 - 0,07	0,03-0,05	
X6CrNiMoTi17 12 2	1.4449	X3CrNiMo18-12-3	200-500	0,02 - 0,07	0,03-0,05	
X10NiCrAlTi32-21	1.4825	GX25CrNiSi18-9		0,02 - 0,07	0,03-0,05	
GG25				0,03 - 0,10	0,03-0,05	
GG45			150-180	0,03 - 0,10	0,03-0,05	
GGG50				0,03 - 0,10	0,03-0,05	
GGG80				0,03 - 0,10	0,03-0,05	
GTW45			10-100	0,03 - 0,10	0,03-0,05	
GTW65				0,03 - 0,10	0,03-0,05	
GTS45				0,03 - 0,10	0,03-0,05	
GTS70			20-100	0,03 - 0,10	0,03-0,05	
Al99,9Mg0,5	3.0256	E-Al H		0,04 - 0,15	0,03-0,05	
AlCuMg2	3.3315	AlMg1		0,04 - 0,15	0,03-0,05	
GD-AlSi9Mg	3.2134	GD-AlSi5Cu1Mg	10-60	0,04 - 0,15	0,03-0,05	
G-MgAl6	3.2525	S-AlSi12		0,04 - 0,15	0,03-0,05	
G-AlSi25CuNiMg		G-AlSi21CuNiMg		0,04 - 0,15	0,03-0,05	
SF-Cu	2.1522	CuSi2Mn	-	0,04 - 0,15	0,03-0,05	
CuZn30	2.0321	CuZn37		0,04 - 0,15	0,03-0,05	
CuSi3Mn		Ampco 8-16		0,04 - 0,15	0,03-0,05	
		Ampco18-26	-	0,04 - 0,15	0,03-0,05	
		Ampco M-4		0,04 - 0,15	0,03-0,05	
CuZn39Pb2 (Ms58)	2.0410	CuZn44Pb2		0,04 - 0,15	0,03-0,05	
CuCrZr	2.1080	CuSn6Zn6	-	0,04 - 0,15	0,03-0,05	
Makrolon, Novodur		Acrylglas, Polystyrol		0,04 - 0,15	0,03-0,05	
Pertinax		Resopal		0,04 - 0,15	0,03-0,05	
CFK (Kohlefaserverstärkt)		AFK (Amidfaserverstärkt)	-	0,04 - 0,15	0,03-0,05	
MgAl6Zn1	3.5812	MgAl8Zn1		0,02 - 0,10	0,03-0,05	
R8650		Technograph15		0,04 - 0,15	0,03-0,05	
W-Cu80/20		W93NiFe (DENAL)	-	0,02 - 0,10	0,03-0,05	
TZC, TZM		MHC , ODS		0,02 - 0,10	0,03-0,05	
RNi8	1.3926	RNi12		-	0,005 - 0,05	0,03-0,05
Ni54	1.3921	Ni49	0,005 - 0,05		0,03-0,05	
NiCu 30 Fe		Monel 400	0,005 - 0,05		0,03-0,05	
NiMo16Cr16Ti		Hastelloy C-276	-	0,005 - 0,05	0,03-0,05	
NiCr20TiAl		Nimonic 80		0,005 - 0,05	0,03-0,05	
NiCr19Co14Mo4Ti		Waspaloy		0,005 - 0,05	0,03-0,05	
X12CrNiMo12	1.4980	X6NiCrTiMoVB25-15-2	-	0,005 - 0,05	0,03-0,05	
NiCr23Fe, Inconel 601	2.4667	SG-NiCr19NbMoTi		0,005 - 0,05	0,03-0,05	
Ti99,7	3.7064	Ti99,5		0,005 - 0,05	0,03-0,05	
TiAl6V6Sn2	3.7124	TiCu2	-	0,005 - 0,05	0,03-0,05	
TiAl6Sn2Zr4Mo2	3.7154	TiAl6Zr5		0,005 - 0,05	0,03-0,05	
				0,002 - 0,05		
			-	0,002 - 0,05		
				0,002 - 0,05		
				0,002 - 0,05		
			-	-		
			-	-		



