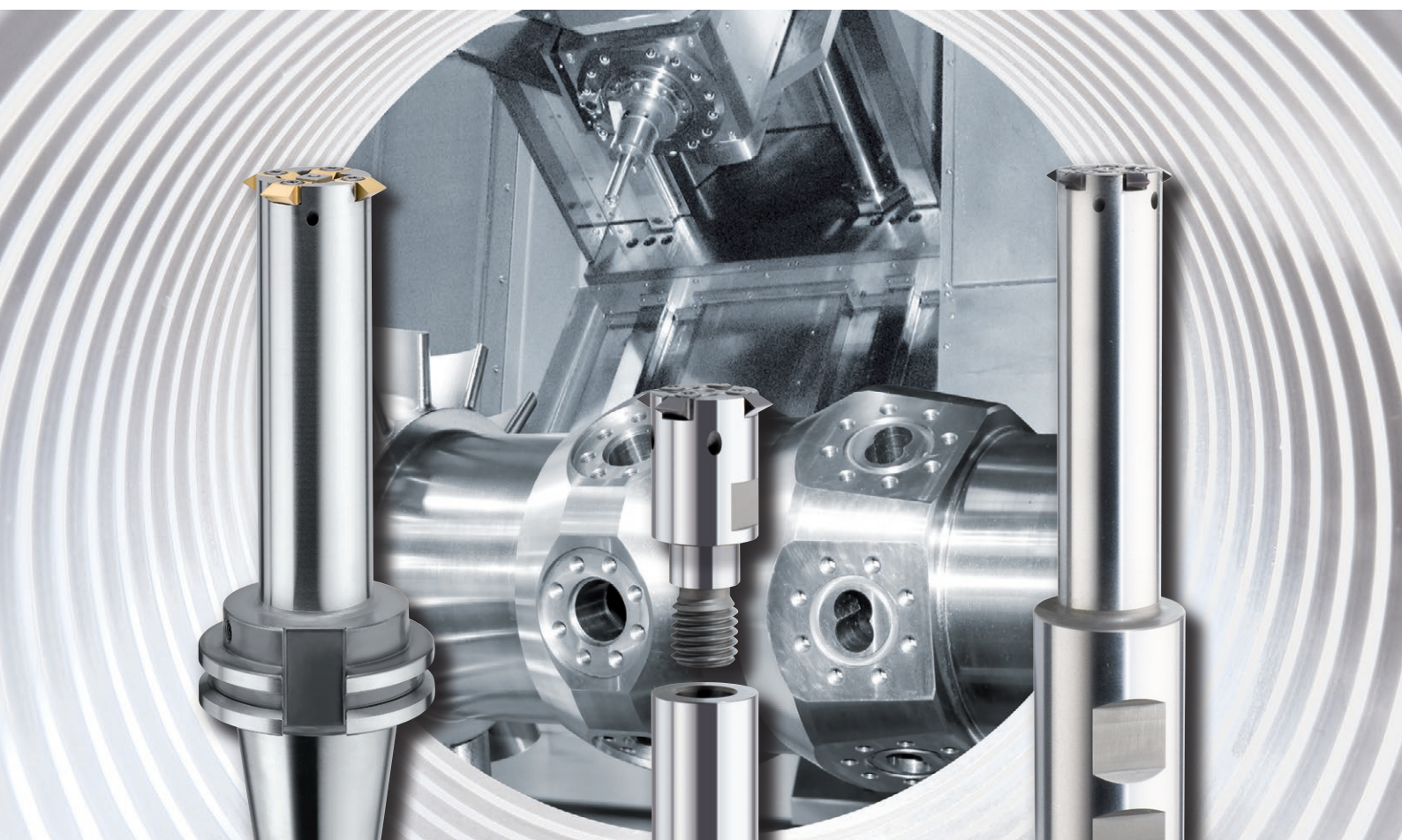




UNSERE PRÄZISION IST IHR ERFOLG



NORIS-NES

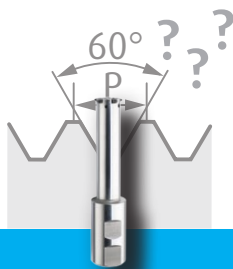
Gewindefrästechnik
Thread milling technology
Tecnologia della filettatura





NORIS-NES

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Der richtige Halter
für Ihr Gewinde

The right holder
for your thread

Lo strumento giusto
per il tuo filetto

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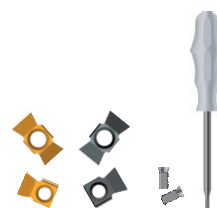


Übersicht
Gewindefräshalter

Holder overview

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Wendeplatten u.
Zubehör

Inserts and accessories

Inserti e accessori

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Technische Informationen

Technical information

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 Das Zirkular-Gewindefrässystem NORIS-NES mit auswechselbaren Hartmetall-Wendeschnidplatten wurde zur Herstellung von großen Gewinden (>M20) auf CNC-Werkzeugmaschinen konzipiert. Es vereint Universalität, Flexibilität und hohe Prozesssicherheit in einem Gewindefräswerkzeug. Halter und Wendeplatten arbeiten durchmesser- und steigungsübergreifend und erzeugen hohe Oberflächen- und Gewindegüten.

 The NORIS-NES circular thread milling system with indexable inserts is designed for the production of large threads (> M20) on CNC machines. It combines universality, flexibility and high process safety in a single thread mill. Holders and inserts are working diameter and pitch across and produce high quality surfaces and threads.

 Il sistema NES NORIS per filettature con inserti intercambiabili è stato progettato per la creazione di filetti di grandi dimensioni (> M20) su macchine a controllo numerico. Combina l'universalità, la flessibilità e la sicurezza di una lavorazione con un solo inserto. L'utilizzo di tale sistema produce un filetto ed una superficie di alta qualità.



NES TS



NES



NES Modular

 Kurze Bearbeitungszeiten durch eine größere Anzahl von Wendeschnidplatten

 Short processing times by increasing the number of inserts

 Riduzione dei tempi incrementando il numero di inserti

 Für den universellen Einsatz in nahezu allen Werkstoffen. Erste Wahl für die allgemeine Bearbeitung

 For universal use in almost all materials. First choice for general machining

 Per un utilizzo su gran parte dei materiali. Prima scelta nelle lavorazioni generiche

 Für tiefliegende Gewinde durch stabilen, schwingungsdämpfenden Hartmetallschaft mit auswechselbarem Wendeschnidplattenträger

 For deep threads, through stable, vibration-dampening carbide shank with replaceable carrier for carbide inserts

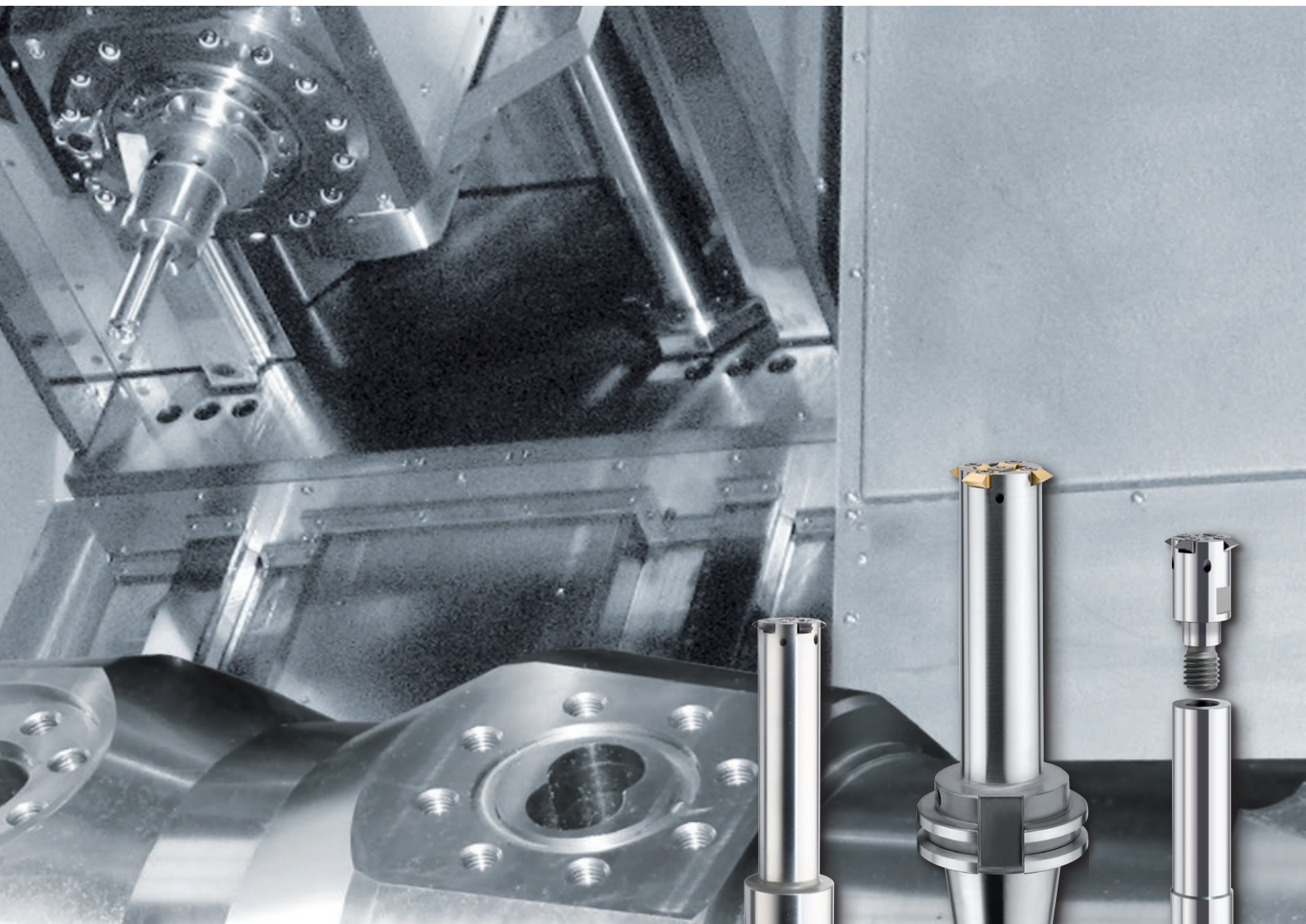
 Per filettature profonde. Stabile, con gambo in metallo duro antivibrante e inserti intercambiabili



Bauteil:	Turbinenläufer		
Werkstoff:	34CrNiMo6		
Festigkeit:	1100 N/mm ²		
Maschine:			
Werkzeugaufnahme:	Hydrodehnspannfutter		
Schmierung:	Emulsion		
Gewinde	M30	M56	
Gewindetiefe:	49 mm	130 mm	
Gewindeart:	Sackloch	Sackloch	
Werkzeug:	NORIS-NES	NORIS-NES TS	NORIS-NES TS Modular
Kat. Nr.	F501	F701	F70K
Bezeichnung	FK24-60.32	FK24-60.32	FK33-145.25
Wirkdurchmesser:	23,85 mm	23,85 mm	32,85 mm
Zähnezahl:	3	5	5
Schnittwerte:			
Schnittgeschwindigkeit [Vc]:	275 m/min	275 m/min	275 m/min
Drehzahl [n]:	3670 min ⁻¹	3670 min ⁻¹	2665 min ⁻¹
Vorschub:	fz = 0,10 mm Vf = 1101 mm/min	fz = 0,10 mm Vf = 1835 mm/min	fz = 0,10 mm Vf = 1332 mm/min
Fräsverfahren:	Gleichlauf	Gleichlauf	Gleichlauf
Bearbeitungszeit [th]:	79,6 sec.	47,8 sec.	214 sec.



Workpiece:	
Material	
Tensile strength	
Machine	
Tool holder	
Lubrication	
Thread size	M
Thread depth	49
Thread type	Blind
Tool	NORIS-NES
Cat. No.	F501
Description	FK24-60.32
Effective diameter	23,85 mm
Number of teeth	3
Feeds and speeds	
Cutting speed [Vc]:	275 m/min
RPM [n]:	3670 min ⁻¹
Feed	fz = 0,10 mm Vf = 1101 mm/min
Milling methode	Climb milling
Cutting time [th]:	79,6 sec.



Einsatzbeispiel und Zeitvergleich Application example and time comparison Esempio di applicazione e comparazione dei tempi



Turbine rotor	
34CrNiMo6	
1100 N/mm ²	
Hydraulic chuck	
Emulsion	
30	M56
mm	130 mm
hole	Blind hole
NORIS-NES TS	NORIS-NES TS Modular
F701	F70K
FK24-60.32	FK33-145.25
23,85 mm	32,85 mm
5	5
275 m/min	275 m/min
3670 min ⁻¹	2665 min ⁻¹
fz = 0,10 mm	fz = 0,10 mm
Vf = 1835 mm/min	Vf = 1332 mm/min
Climb milling	Climb milling
47,8 sec.	214 sec.



Componente:	Rotore di una turbina		
Materiale	34CrNiMo6		
Forza	1100 N/mm ²		
Macchina			
Attacco Utensile	Mandrini idraulici		
Lubrificazione	Emulsione		
Grandezza Filetto	M30	M56	
Profondità del filetto	49 mm	130 mm	
Tipo di Filetto	Fori ciechi	Fori ciechi	
Utensile	NORIS-NES	NORIS-NES TS	NORIS-NES TS Modular
Cat. Nr.	F501	F701	F70K
Designazione	FK24-60.32	FK24-60.32	FK33-145.25
Diametro attivo	23,85 mm	23,85 mm	32,85 mm
Numero di denti (z)	3	5	5
Valori di impiego			
Velocità di taglio (Vc)	275 m/min	275 m/min	275 m/min
Velocità di rotazione (n)	3670 min ⁻¹	3670 min ⁻¹	2665 min ⁻¹
Avanzamento	fz = 0,10 mm Vf = 1101 mm/min	fz = 0,10 mm Vf = 1835 mm/min	fz = 0,10 mm Vf = 1332 mm/min
Procedimenti di fresatura	Fresatura concorde	Fresatura concorde	Fresatura concorde
Tempo di truciatura (th)	79,6 sec.	47,8 sec.	214 sec.

Das richtige Werkzeug für Ihr Gewinde

The right tool for your thread

L'utensile giusto per il tuo filetto



			FK16,5/18	FK20,5/22			FK24			FK27		FK29,5	FK33			FK40,5	FK53	FK67	FK92
			NES	NES	TS	Mod	NES	TS	Mod	TS	TS Mod	NES	NES	TS	TS Mod	NES	NES	NES	NES
15 max. [mm]			60	50	50	80	90	60	100	90	120	95	115	115	145	145	195	260	360
D	P																		
[mm]	[mm]																		
20,000	1,500	★																	
20,000	2,000	★																	
20,000	2,500	★																	
20,955	1,814	★																	
22,000	1,500	★																	
22,000	2,000	★																	
22,000	2,500	★																	
22,225	2,822	★																	
22,225	1,814	★																	
22,911	1,814	●			★														
24,000	1,500	●	●	★	●														
24,000	2,000	●	●	★	●														
24,000	3,000	★																	
25,000	1,500	●	●	★	●														
25,400	3,175	●		★															
25,400	2,117	●	●	★	●														
26,000	1,500	●	●	★	●														
26,441	1,814	●	●	★	●														
27,000	1,500	●	●	★	●	●			●										
27,000	2,000	●	●	★	●														
27,000	3,000	●	●	★	●														
28,000	1,500	●	●	★	●	●			●										
28,575	3,629	●	●	★	●														
28,575	2,117	●	●	★	●														
30,000	1,000					★			★										
30,000	1,500	●	●	★	●	●			●										
30,000	2,000	●	●	★	●	●			●										
30,000	3,500	●	●	●	●	●	★		●										
30,201	1,814	●	●	★	●														
31,750	3,629	●	●	●	●	●	★		●										
31,750	2,117	●	●	★	●	●			●										
32,000	1,500	●	●	★	●	●			●										
33,000	1,500	●	●	★	●	●			●			●							
33,000	2,000	●	●	★	●	●			●			●							
33,000	3,500	●	●	●	●	●	★		●	●	●								
33,249	2,309					★			★										
34,000	1,500	●	●	★	●	●			●						●				
34,925	4,233					●	★		●	●	●								
34,925	2,117	●	●	★	●	●			●						●				
35,000	1,500	●	●	★	●	●			●						●				
36,000	1,500	●	●	★	●	●			●						●				
36,000	2,000	●	●	★	●	●			●						●				
36,000	3,000	●	●	●	●	●	★		●	●	●				●				
36,000	4,000					●	★		●	●	●				●				
37,897	2,309					★			★						●	●			
38,000	1,500	●	●	★	●	●			●						●				
38,100	4,233					●	★		●	●	●				●				
38,100	2,117	●	●	★	●	●			●						●				
39,000	2,000	●	●	★	●	●			●						●				
39,000	3,000	●	●	●	●	●	★		●	●	●			●	●				
39,000	4,000					●	★		●	●	●			●	●				
40,000	1,500	●	●	★	●	●			●						●				
40,000	2,000	●	●	★	●	●			●						●				
40,000	3,000	●	●	●	●	●	★		●	●	●			●					
41,910	2,309					★			★						●				
42,000	1,500	●	●	★	●	●			●						●				
42,000	2,000	●	●	★	●	●			●						●				
42,000	3,000	●	●	●	●	●	★		●	●	●			●	●				
42,000	4,500						★			●	●				●	●			
44,450	5,080														●				
45,000	1,500	●	●	★	●	●			●						●				



Beispiel: für M48 mit einer Gewindetiefe von 130 mm, empfehlen wir FK33 oder FK40,5 mit l5 = 145 mm. Der Halter FK33-145 ist das schnellste Werkzeug für diese Anwendung.



Example: for M48 with a thread depth of 130 mm, we recommend FK33 or FK40,5 with l5 = 145 mm. The FK33-145 is the fastest tool for this operation.



Ad esempio: per un M48 con una profondità del filetto di 130 mm, si consiglia di FK33 o FK40,5 a l5 = 145 mm. La fresa FK33-145 è lo strumento più veloce per questa applicazione.

						FK16,5/18	FK20,5/22				FK24			FK27		FK29,5	FK33			FK40,5	FK53	FK67	FK92
						NES	NES	TS	Mod	NES	TS	Mod	TS	TS Mod	NES	NES	TS	TS Mod	NES	NES	NES	NES	
l5 max. [mm]						60	50	50	80	90	60	100	90	120	95	115	115	145	145	195	260	360	
						D	P																
M	MF	UNC	UNF	G	[mm]	[mm]																	
M 45	M 45x2				45,000	2,000	●	●	★	●	●	●	●	●	●	●	●	●	●				
	M 45x3				45,000	3,000	●	●	●	●	●	★	●	●	●	●	●	●	●	●			
					45,000	4,500					●	★		●	●	●	●	●	●	●			
				G 1 1/2	47,803	2,309				★		★			●	●			●				
M 48	M 48x1,5				48,000	1,500	●	●	★	●	●		●		●	●	●		●				
	M 48x2				48,000	2,000	●	●	★	●	●		●		●	●	●		●				
	M 48x3				48,000	3,000	●	●	●	●	●	★	●	●	●	●	●	●	●	●			
					48,000	5,000										●	★	★	●				
M 50	M 50x1,5				50,000	1,500	●	●	★	●	●		●		●	●	●		●				
	M 50x2				50,000	2,000	●	●	★	●	●		●		●	●	●		●				
	M 50x3				50,000	3,000	●	●	●	●	●	★	●	●	●	●	●	●	●	●			
		2"			50,800	5,645								●	●	●	★	★	●				
M 52	M 52x1,5				52,000	1,500	●	●	★	●	●		●		●	●	●		●				
	M 52x2				52,000	2,000	●	●	★	●	●		●		●	●	●		●				
	M 52x3				52,000	3,000	●	●	●	●	●	★	●	●	●	●	●	●	●	●			
				G 1 3/4	52,000	5,000				★		★			●	●	★	★	●				
M 56	M 56x2				53,746	2,309	●	●	★	●	●		●		●	●	●		●				
	M 56x3				56,000	2,000	●	●	●	●	●	★	●	●	●	●	●	●	●	●			
	M 56x4				56,000	3,000	●	●	●	●	●	★	●	●	●	●	●	●	●	●			
					56,000	4,000				●	★	●	●	●	●	●	●	●	●	●			
M 60		2 1/4			56,000	5,500										●	★	★	●				
				G 2"	57,150	5,645										●	★	★	●				
	M 60x4				59,614	2,309				★		★			●	●			●	●			
					60,000	4,000				●	★	●	●	●	●	●	●	●	●	●			
M 64		2 1/2			60,000	5,500										●	★	★	●				
	M 64x3				63,500	6,350										●	★	★	●				
	M 64x4				64,000	3,000	●	●	●	●	★	●	●	●	●	●	●	●	●	●			
					64,000	4,000				●	★	●	●	●	●	●	●	●	●	●			
M 68					64,000	6,000									●	●			★	●			
	M 68x4				65,710	2,309				★		★			●	●			●	●			
					68,000	4,000				●	★	●	●	●	●	●	●	●	●	●			
					68,000	6,000											●	●	★	●			
M 72		2 3/4			69,850	6,350													★	●			
	M 72x3				72,000	3,000	●	●	●	●	★	●	●	●	●	●	●	●	●	●			
	M 72x4				72,000	4,000				●	★	●	●	●	●	●	●	●	●	●			
	M 72x6				72,000	6,000													★	●			
M 76					75,184	2,309				★		★			●	●			●	●		●	
	M 76x3				76,000	3,000	●	●	●	●	★	●	●	●	●	●	●	●	●	●		●	
	M 76x4				76,000	4,000				●	★	●	●	●	●	●	●	●	●	●		●	
	M 76x6				76,000	6,000													★	●			
M 80		3"			76,200	6,350													★	●			
	M 80x2				80,000	2,000	●	●	★	●	●		●		●	●			●	●		●	
	M 80x4				80,000	4,000				●	★	●	●	●	●	●	●	●	●	●		●	
	M 80x6				80,000	6,000													●	●		★	
M 85					81,534	2,309				★		★			●	●			●	●			
				G 2 3/4	82,550	6,350										●	●			●		★	
	M 85x4				85,000	4,000				●	★	●	●	●	●	●	●	●	●	●		★	
	M 85x6				85,000	6,000													●	●		★	
M 90					87,884	2,309				★		★			●	●			●	●		★	
				G 3"	88,900	6,350										●	●			●		★	
	M 90x4				90,000	4,000				●	★	●	●	●	●	●	●	●	●	●		★	
	M 90x6				90,000	6,000													●	●		★	
M 95	M 95x4				95,000	4,000				●	★	●	●	●	●	●	●	●	●	●		★	
	M 95x6				95,000	6,000													●	●		★	
					95,250	6,350													●	●		★	
	M 100x4				100,000	4,000				●	★	●	●	●	●	●	●	●	●	●		★	
M 100	M 100x6				100,000	6,000													●	●		★	
					100,330	2,309				★		★			●	●			●	●		★	
					101,600	6,350													●	●		★	
				G 3 1/2	113,030	2,309				★		★			●	●			●	●		★	
M 110					110,000	6,000													●	●		★	
	M 110x6			G 4"	110,000	6,000													●	●		★	

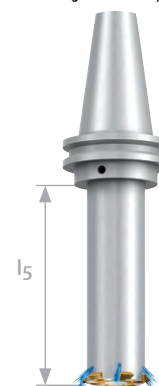
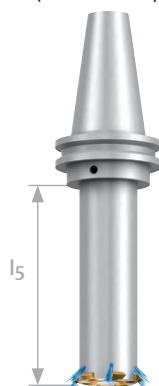
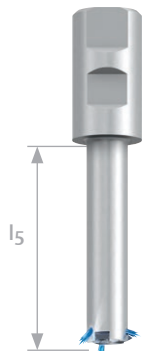
Übersicht Gewindefräshalter

Holder overview

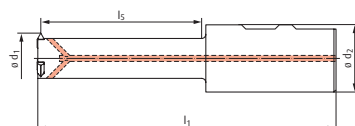
Gamma



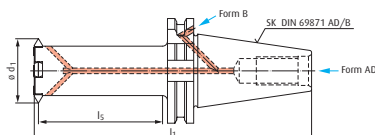
NES



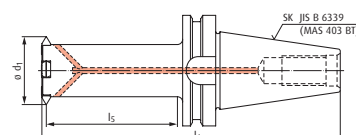
Ø	l ₅	Ø d ₂	l ₁	Art. Nr. Article no. Articolo n.	z	Platte Insert Inserti	Ø d ₂	l ₁	Art. Nr. Article no. Articolo n.	z	Platte Insert Inserti	Ø d ₂	l ₁	Art. Nr. Article no. Articolo n.	z	Platte Insert Inserti
FK 16,5/18	45	20	100	F501F0003	2	F521/F522										
	60	20	114	F501F0005	2	F521/F522										
FK 20,5/22	50	16	100	F501F0019	3	F521/F522										
	80															
FK 24	60	32	124	F501AANAA	3	F510										
	80	25	140	F501F0011	3	F510										
	80	32	144	F501AARAA	3	F510										
	90	32	154	F501AA8AA	3	F510										
	100															
FK 27	90															
	120															
FK 29,5	95	32	159	F501E0841	3	F510										
FK 33	95	25	155	F501F0012	3	F511										
	95	32	159	F501AAPAA	3	F511										
	115	32	179	F501F0007	3	F511										
	145															
FK 40,5	110	32	173	F501F0013	4	F512	SK40	212	F505AADAA	4	F512	BT40	217	F505F0029	4	F512
	110						SK50	245	F505AADAC	4	F512	BT50	264	F505AADAF	4	F512
	145	32	208	F501F0010	4	F512	SK40	247	F505AAWAA	4	F512	BT40	252	F505F0028	4	F512
	145						SK50	280	F505AAWAB	4	F512	BT50	299	F505F0025	4	F512
FK 53	150						SK50	286	F505AAEAB	4	F513	BT40	258	F505F0041	4	F513
	150											BT50	305	F505F0031	4	F513
	195						SK50	331	F505F0007	4	F513	BT40	303	F505F0032	4	F513
	195											BT50	350	F505F0026	4	F513
FK 67	170						SK50	308	F505AACAA	7	F513	BT50	327	F505F0042	7	F513
	260						SK50	398	F505E5553	7	F513	BT50	417	F505F0034	7	F513
FK 92	204						SK50	341	F505AA2AA	7	F514					
	360						SK50	497	F505F0008	7	F514					



mit Zylinderschaft DIN 1835 B
with straight shank acc. DIN 1835 B
con gambo cilindrico secondo DIN 1835 B



mit Steilkegel DIN 69871 AD/B
with ISO taper acc. DIN 69871 AD/B
con gambo conico ISO secondo DIN 69871 AD/B



mit Steilkegel JIS B 6339 (MAS 403 BT)
with ISO taper acc. JIS B 6339 (MAS 403 BT)
con gambo conico ISO secondo JIS B 6339 (MAS 403 BT)

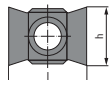
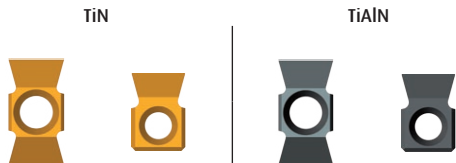
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																45	FK 16,5/18
																60	
					16	100	F701F0016	4	F521/F522							50	FK 20,5/22
										20	133	F50KF0001	FM0HF0001	3	F521/F522	80	
					32	123	F701F0015	5	F710							60	FK 24
																80	
																80	
																90	
										20	152	F50KF0010	FM0HF0009	3	F510	100	FK 27
					32	153	F701F0003	5	F750							90	
										25	178	F70KF0001	FM0HF0008	5	F750	120	FK 29,5
																95	
																95	FK 33
																95	
					32	179	F701F0001	5	F711							115	
										25	200	F70KF0005	FM0HF0010	5	F711	145	FK 40,5
																110	
HSK63A	209	F508F0007	4	F512												110	
																145	
																145	FK 53
																150	
HSK63A	261	F508F0008	4	F513												150	
																195	
																195	FK 67
HSK100A	347	F508F0009	7	F513												170	
																260	FK 92
HSK100A	448	F508F0010	7	F514												204	
																360	
mit Hegel-Hohlschaft DIN 69893 A with hollow taper shank acc. DIN 69893 A con gambo cono-cavo DIN 69893 A					mit Zylinderschaft DIN 1835 B with straight shank acc. DIN 1835 B con gambo cilindrico secondo DIN 1835 B					mit Zylinderschaft DIN 6535 HA with straight shank acc. DIN 6535 HA con gambo cilindrico secondo DIN 6535 HA							

Wendeschneidplatten und Zubehör

Inserts and accessories

Inserti e accessori



Gewindefräsplatte • Thread mill											
	Kat. Nr. Cat. no. Cat. Nr.	D ₁ [mm]									
					l	h	b	M / MF [mm]	UN [1/"]	Art. Nr. Article no. Articolo n.	Art. Nr. Article no. Articolo n.
FK 16,5/18	F521	16,50	●		7	5	3,18	1,5 - 3	16 - 9	F521F0002	F521F0004
	F522	18,00	●		7,8	5	3,18	2,5 - 3,5	10 - 7	F522F0001	F522F0002
FK 20,5/22	F521	20,50	●		7	5	3,18	1,5 - 3	16 - 9	F521F0002	F521F0004
	F522	22,00	●		7,8	5	3,18	2,5 - 3,5	10 - 7	F522F0001	F522F0002
FK 24	F510	23,85		●	9,52	6,35	3,3	1,0 - 2,5	24 - 10		F510F0012
	F510	23,85		●	9,52	6,35	3,3	1,5 - 2,5	16 - 10	F510AAAAA	F510F0003
	F510	23,85		●	9,52	6,35	3,3	2,5 - 4,0	10 - 6	F510AABAA	F510F0004
	F710	23,85	●		9,52	5	3,3	2,5 - 4,5	10 - 6		F710F0001
FK 27	F750	27,00		●	9,52	5	3,3	2,5 - 4,5	10 - 6		F750F0002
FK 29,5	F510	29,27		●	9,52	6,35	3,3	1,0 - 2,5	24 - 10		F510F0012
	F510	29,27		●	9,52	6,35	3,3	1,5 - 2,5	16 - 10	F510AAAAA	F510F0003
	F510	29,27		●	9,52	6,35	3,3	2,5 - 4,0	10 - 6	F510AABAA	F510F0004
FK 33	F511	32,85		●	13,5	8,5	3,97	1,5 - 2,5	16 - 10	F511AAAAA	F511F0001
	F511	32,85		●	13,5	8,5	3,97	2,5 - 5,5	10 - 4,5	F511AABAA	F511F0002
	F711	32,85	●		10	7	3,97	2,5 - 5,5	10 - 4,5		F711F0001
FK 40,5	F512	40,25		●	15,5	9,5	5	1,5 - 3,0	16 - 9	F512AAAAA	F512F0001
	F512	40,25		●	15,5	9,5	5	3,0 - 6,0	9 - 4	F512AABAA	F512F0002
FK 53	F513	52,55		●	19	12,5	6	1,5 - 3,0	16 - 9	F513AAAAA	F513F0001
	F513	52,55		●	19	12,5	6	3,0 - 6,0	9 - 4	F513AABAA	F513F0002
FK 67	F513	66,55		●	19	12,5	6	1,5 - 3,0	16 - 9	F513AAAAA	F513F0001
	F513	66,55		●	19	12,5	6	3,0 - 6,0	9 - 4	F513AABAA	F513F0002
FK 92	F514	92		●	28,58	14,3	9,5	6,0 - 8,0	4	F514AAAAA	F514F0005

ing insert • Inserti filettati			Zubehör • Accessories • Accessorio				

Schnittwerte

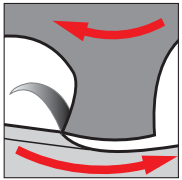
Feeds and speeds

Parametri di taglio

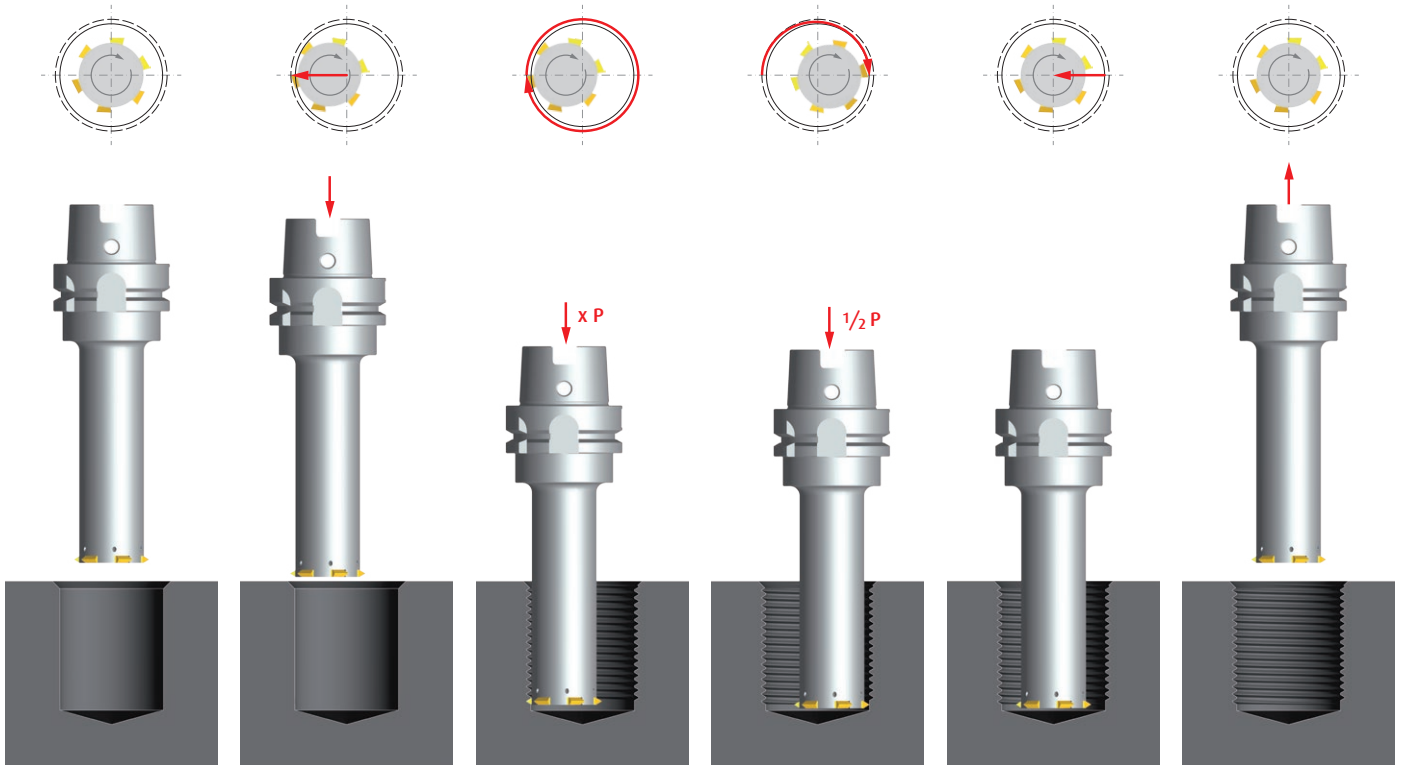


A	Stahlwerkstoffe	Steel materials	Acciai	
1.1	Kaltfließpressstähle	Cold-extrusion steels	Accia estrusi freddo	< 400 N/mm ²
1.2	Automatenstähle, Baustähle	Free-machining steels, construction steels	Accia alta velocità, Acciai da costruzione	< 600 N/mm ²
1.3	Baustähle, legierte Stähle	Construction steels, alloyed steels	Acciai da costruzione, Acciai legati	< 850 N/mm ²
1.4	Einsatz-, Vergütungs-, Kaltarbeitsstähle	Heat-treat. steels, cold working steels	Accia da bonifica, Acciai per lavorazioni a freddo	< 1100 N/mm ²
1.5	Vergütungs-, Nitrier-, Warmarbeitsstähle	Heat-treat. steels, hot working steels	Accia da bonifica, Acciai per lavorazioni a caldo	< 1400 N/mm ²
R	Nichtrostende Stähle	Corrosion and acid proof steels	Acciai inox e resistenti agli acidi	
1.1	Rost- /Säurebeständige Stähle	Corrosion and acid proof steels	Acciai inox e resistenti agli acidi	< 850 N/mm ²
1.2	Rost- /Säurebeständige Stähle	Corrosion and acid proof steels	Acciai inox e resistenti agli acidi	< 1100 N/mm ²
1.3	Rost- /Säurebeständige Stähle	Corrosion and acid proof steels	Acciai inox e resistenti agli acidi	< 1400 N/mm ²
F	Gusswerkstoffe	Cast materials	Ghise	
1.1	Gusseisen	Cast iron	Ghise	< 400 N/mm ²
1.2	Gusseisen mit Kugelgraphit	Cast iron with nodular graphite	Ghise con grafite nodulare	< 1000 N/mm ²
1.3	Gusseisen mit Vermikulargraphit	Cast iron with vermicular graphite	Ghise con grafite vermicolare	< 500 N/mm ²
2.1	Temperguss	Malleable cast iron	Ghise malleabili	< 800 N/mm ²
3.1	Hartguss bis 400 HB	Hard castings up to 400 HB	Ghise in conchiglia fino a 400 HB	< 1400 N/mm ²
N	NE-Metalle	Non ferrous materials	Materiali non ferrosi	
1.1	Alu-Knetlegierungen	Aluminium wrought alloys	Leghe malleabili di alluminio	< 350 N/mm ²
1.2	Alu-Knetlegierungen	Aluminium wrought alloys	Leghe malleabili di alluminio	< 600 N/mm ²
1.3	Alu-Guss-Legierungen (langsp.)	Aluminium cast alloys (long-chipping)	Leghe fuse di alluminio (truciolo lungo)	< 5% Si
1.4	Alu-Guss-Legierungen	Aluminium cast alloys	Leghe fuse di alluminio	5% - 12% Si
1.5	Alu-Guss-Legierungen (kurzsp.)	Aluminium cast alloys (short-chipping)	Leghe fuse di alluminio con (truciolo corto)	> 12% Si
2.1	Reinkupfer	Pure copper	Rame puro	< 500 N/mm ²
2.2	Kupfer-Zink-Leg. (Messing) (langsp.)	Copper-zinc alloys (brass) (long-chip.)	Leghe rame-zinco (ottone) (truciolo lungo)	< 600 N/mm ²
2.3	Kupfer-Zink-Leg. (Messing) (kurzsp.)	Copper-zinc alloys (brass) (short-chip.)	Leghe rame-zinco (ottone) (truciolo corto)	< 600 N/mm ²
2.4	Kupfer-Alu/Kupfer-Nickel-Leg. (langsp.)	Copper-alum./Copper-nickel-alloys (long-chip.)	Rame-alluminio/-nickel (truciolo lungo)	< 880 N/mm ²
2.5	Kupfer-Alu/Kupfer-Nickel-Leg. (kurzsp.)	Copper-alum./Copper-nickel-alloys (short-chip.)	Rame-alluminio/-nickel (truciolo corto)	< 880 N/mm ²
2.6	Kupfer-Zinn-Leg. (Bronze) (langsp.)	Copper-tin alloys (bronze) (long-chip.)	Leghe rame-stagno (bronzo) (truciolo lungo)	< 800 N/mm ²
2.7	Kupfer-Zinn-Leg. (Bronze) (kurzsp.)	Copper-tin alloys (bronze) (short-chip.)	Leghe rame-stagno (bronzo) (truciolo corto)	< 500 N/mm ²
3.1	Magnesium-Legierungen	Magnesium wrought alloys	Leghe malleabili di magnesio	< 600 N/mm ²
3.2	Zink-Legierungen	Zinc alloys	Leghe zinco	
4.1	Duroplaste (kurzsp.)	Duroplastics (short-chipping)	Mat. Plastiche termoindurenti (truciolo corto)	
4.2	Thermoplaste (langsp.)	Thermoplastics (long-chipping)	Resine termoplastiche (truciolo lungo)	
4.3	Faserverstärkte Kunststoffe	Fibre-reinforced synthetics	Resine epossidiche	
S	Schwer zerspanbare Werkstoffe	Difficult machinable materials	Materiali con elevata resistenza	
1.1	Nickel- /Kobalt- /Eisen-Leg.	Nickel- /Cobalt- /Iron - alloys	Leghe nickel/cobalto/ferro	< 850 N/mm ²
1.2	Nickel- /Kobalt- /Eisen-Leg.	Nickel- /Cobalt- /Iron - alloys	Leghe nickel/cobalto/ferro	< 1100 N/mm ²
1.3	Nickel- /Kobalt- /Eisen-Leg.	Nickel- /Cobalt- /Iron - alloys	Leghe nickel/cobalto/ferro	< 1600 N/mm ²
2.1	Reintitan, Titanlegierungen	Pure titanium, Titanium alloys	Titanio puro, Leghe di titanio	< 900 N/mm ²
2.2	Titanlegierungen	Titanium alloys	Leghe di titanio	< 1400 N/mm ²
H	Gehärtete Stähle	Hardened steels	Acciai temprati	
1.1	Gehärtete Stähle	Hardened steels	Acciai temprati	44 HRC – 55 HRC
1.2	Gehärtete Stähle	Hardened steels	Acciai temprati	> 55 HRC – 60 HRC
1.3	Gehärtete Stähle	Hardened steels	Acciai temprati	> 60 HRC – 63 HRC
1.4	Gehärtete Stähle	Hardened steels	Acciai temprati	> 63 HRC – 66 HRC

fz [mm]	 TiN Vc [m/min]	 TiAlN Vc [m/min]
0,150 - 0,250	300 - 350	350 - 400
0,150 - 0,250	250 - 300	300 - 350
0,100 - 0,200	200 - 250	250 - 300
0,100 - 0,200	150 - 200	200 - 250
0,060 - 0,120	100 - 150	150 - 200
0,080 - 0,120	80 - 120	120 - 140
0,060 - 0,100	60 - 100	80 - 120
0,040 - 0,080	50 - 80	60 - 100
0,150 - 0,250	300 - 350	350 - 400
0,100 - 0,200	200 - 250	250 - 300
0,100 - 0,200	200 - 250	250 - 300
0,150 - 0,250	250 - 300	300 - 350
0,060 - 0,120	100 - 150	150 - 200
0,150 - 0,250	300 - 350	350 - 400
0,150 - 0,250	300 - 350	350 - 400
0,150 - 0,250	300 - 350	350 - 400
0,150 - 0,250	250 - 300	300 - 350
0,100 - 0,200	200 - 250	250 - 300
0,150 - 0,250	300 - 350	350 - 400
0,150 - 0,250	300 - 350	350 - 400
0,150 - 0,250	250 - 300	300 - 350
0,150 - 0,250	250 - 300	300 - 350
0,150 - 0,250	300 - 350	350 - 400
0,150 - 0,250	300 - 350	350 - 400
0,150 - 0,250	250 - 300	300 - 350
0,150 - 0,250	250 - 300	300 - 350
0,150 - 0,250	300 - 350	350 - 400
0,150 - 0,250	300 - 350	350 - 400
0,100 - 0,200	150 - 200	200 - 250
0,060 - 0,100		80 - 120
0,040 - 0,080		60 - 100
0,040 - 0,080		50 - 80
0,060 - 0,100		80 - 120
0,040 - 0,080		50 - 80
0,020 - 0,040		40 - 60



Gegenlaufräsen Conventional milling Fresatura discorde



Positionieren	Positionierung auf Startposition (Außendurchmesser)	Zirkulares Gewindefräsen auf Gewindetiefe	Ausfahren im Halbkreis auf Kerndurchmesser	Positionierung auf Mitte	Ausfahren	
Positioning	Moving sideways to starting position (major dia.)	Thread milling	Run-out loop (semicircle)	Moving to the centre	Returning to positioning level	
Posizionamento	Fresare il filetto	Fresatura del filetto	Estendere (semicerchio)	Posizionamento al centro	Ritorno al posizionamento iniziale	

Vorschub • Feed • Avanzamento

$vf_k [mm] = fz \cdot z \cdot n$

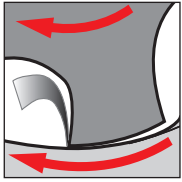
[F_k]

Vorschub Kontur
Contour feed
Avanzamento di contorno

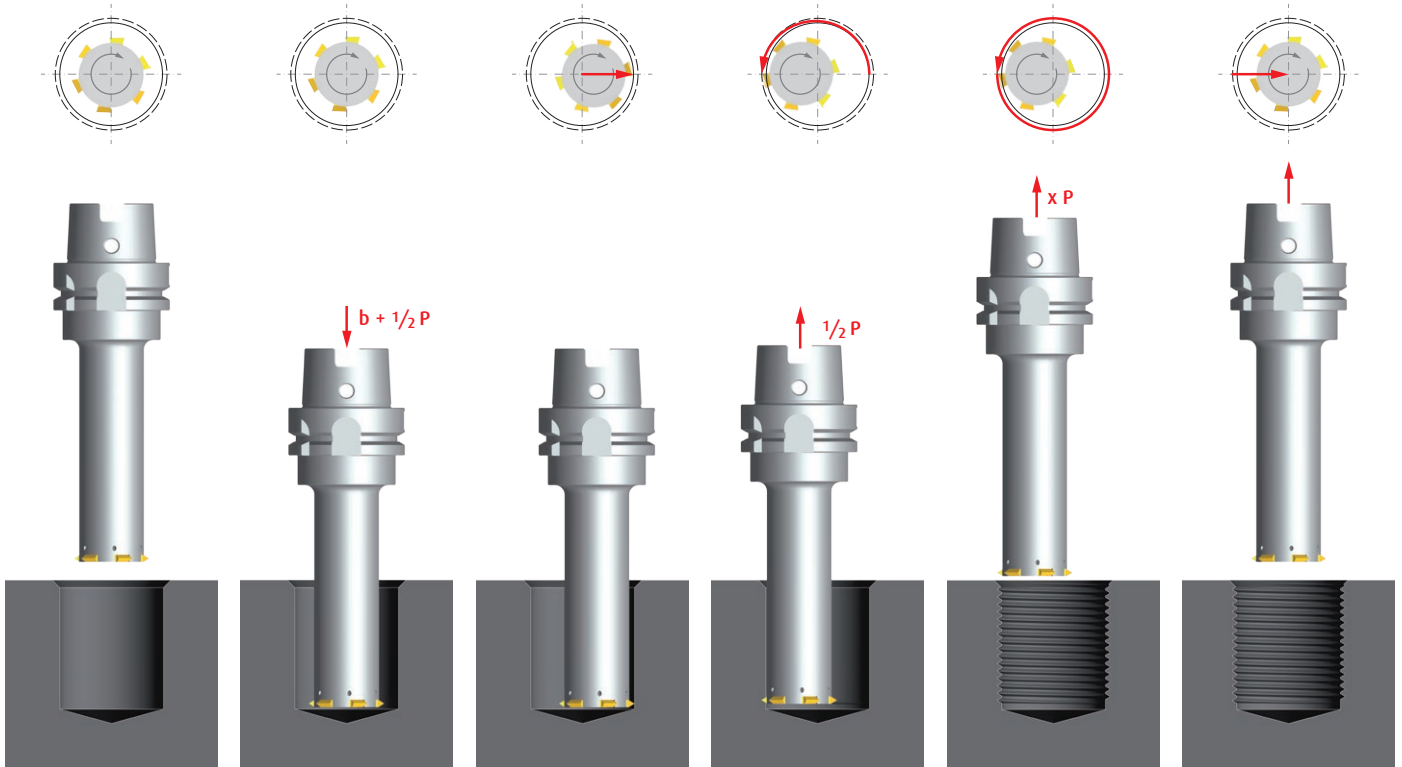
[F_m]

Vorschub Mittelpunktsbahn
Center point feed
Avanzamento dal centro

$vf_m [mm] = \frac{fz \cdot z \cdot n \cdot (D-d_1)}{D}$



Gleichlaufräsen Climb milling Fresatura concorde



	Positionieren	Positionierung auf Startposition	Anfahren des Kerndurchmessers	Anfahren des Außendurchmessers im Halbkreis	Zirkulares Gewindefräsen	Ausfahren
	Positioning	Moving to starting position	Moving sideways to minor diameter	Run-in loop (semicircle)	Thread milling	Returning to positioning level
	Posizionamento	Posizionamento di partenza	Avanzamento per fresare il filetto	Interpolazione circolare (semicerchio)	Fresatura del filetto	Ritorno al posizionamento iniziale

Drehzahl • Speed (RPM) • Velocità di rotazione

$$n \text{ [min}^{-1}\text{]} = \frac{V_c \cdot 1000}{\pi \cdot d_1}$$

Zerspanzeit • Cutting time • Tempo di truciatura

$$t_h \text{ [min]} = \frac{(b/P + 1,5 \cdot P) \cdot d_1 \cdot \pi}{v_{f_k}}$$



n [min ⁻¹]	Drehzahl	Speed (RPM)	Velocità di rotazione
V _c [m/mm]	Schnittgeschwindigkeit	Cutting speed	Velocità di taglio
v _{f_k} [mm]	Vorschub Kontur	Contour feed	Avanzamento di contorno
v _{f_m} [mm]	Vorschub Mittelpunkt	Center point feed	Avanzamento dal centro
f _z [mm]	Vorschub pro Zahn	Feed per tooth	Avanzamento per dente
z	Zähnezahl	Number of teeth	Numero di denti
D [mm]	Nenndurchmesser	Nominal diameter	Diametro nominale
D _i [mm]	Kerndurchmesser	Minor diameter	Diametro del foro maschino
d _i [mm]	Wirkdurchmesser	Tool diameter	Diametro attivo
t _h [min]	Zerspanzeit	Cutting time	Tempo di truciatura
b [mm]	Gewindetiefe	Thread depth	Altezza del filetto



OUR PRECISION IS YOUR SUCCESS



REIME NORIS GmbH

GEWINDETECHNOLOGIE · THREADING TECHNOLOGY

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Sitz der GmbH ist Feucht
Registergericht Nürnberg,
HRB 18451
Geschäftsführer:
Martin Bieber

Legal seat of the limited company
is Feucht, register court Nürnberg,
HRB 18451
Managing director:
Martin Bieber

Le siège social de la société à
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tribunal du Registre de Nürnberg,
HRB 18451
Gérant: Martin Bieber

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limitata è Feucht, ufficio di registro
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Amministratore del.:
Martin Bieber

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