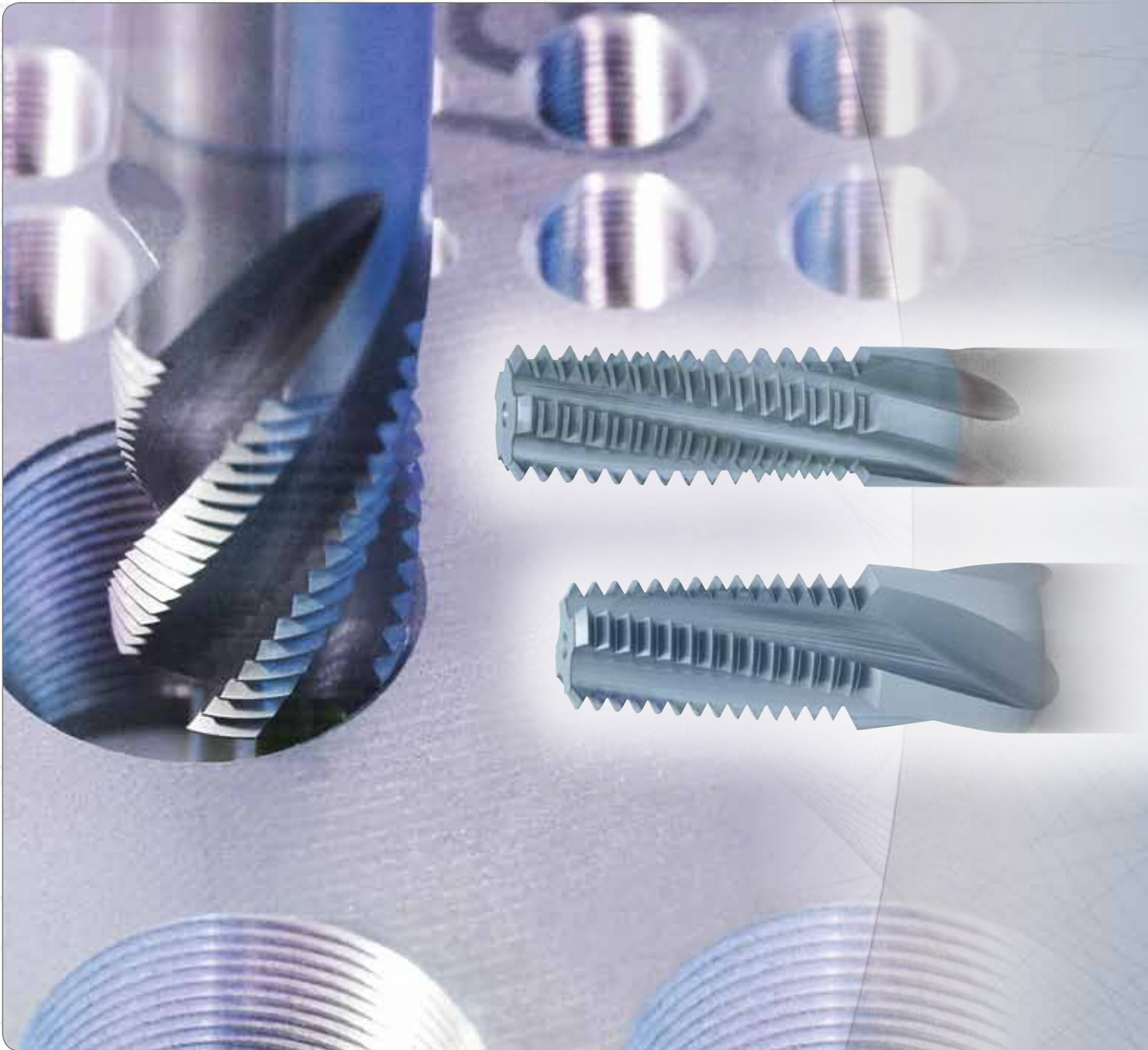
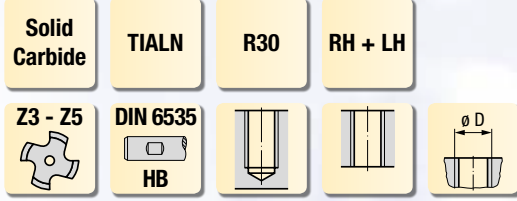


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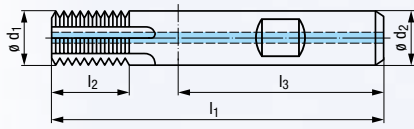
Thread Milling Technology



Engineering Excellence



For internal threads



M **ISO Metric coarse thread DIN 13**

ϕD mm	P mm	ϕd_1 mm	l_1	l_2	l_3	ϕd_2	teeth	Article no.	GFE-VHM R15-1KZ-HB TIALN-T4
M 5	0.8	4.0	55	10.8	36	6	3	GF835117.0050	•
6	1.0	4.8	55	12.5	36	6	3	GF835117.0060	•
8	1.25	5.9	63	16.8	36	6	3	GF835117.0080	•
10	1.5	7.9	70	20.2	36	8	3	GF835117.0100	•
12	1.75	9.9	80	25.3	40	10	4	GF835117.0112	•
14	2.0	11.6	90	28.9	45	12	4	GF835117.0114	•
16	2.0	11.9	90	32.9	45	12	4	GF835117.0116	•

MF **ISO Metric fine thread DIN 13**

ϕD mm	P mm	ϕd_1 mm	l_1	l_2	l_3	ϕd_2	teeth	Article no.	GFE-VHM R15-1KZ-HB TIALN-T4
M 5 x	0.5	4.3	55	10.2	36	6	3	GF835117.0218	•
6 x	0.75	5.0	55	12.3	36	6	3	GF835117.0229	•
8 x	0.75	5.9	63	16.8	36	6	3	GF835117.0250	•
8 x	1.0	5.9	63	16.4	36	6	3	GF835117.0251	•
10 x	1.0	7.9	70	20.5	36	8	3	GF835117.0276	•
12 x	1.0	9.9	80	24.5	40	10	4	GF835117.0301	•
12 x	1.5	9.9	80	24.7	40	10	4	GF835117.0303	•
14 x	1.5	9.9	80	29.2	40	10	4	GF835117.0331	•
16 x	1.5	11.9	90	32.2	45	12	4	GF835117.0359	•

UNC **Unified coarse thread ASME B1.1**

ϕD inch	P tpi	ϕd_1 mm	l_1	l_2	l_3	ϕd_2	teeth	Article no.	GFE-VHM R15-1KZ-HB TIALN-T4
1/4	20	4.7	62	14.6	36	8	3	GF895117.5009	•
5/16	18	6.1	74	17.6	40	10	3	GF895117.5010	•
3/8	16	7.6	80	21.4	45	12	3	GF895117.5011	•
7/16	14	8.8	90	24.4	45	14	3	GF895117.5012	•
1/2	13	10.1	90	26.9	45	14	4	GF895117.5013	•
9/16	12	11.4	100	31.2	48	16	4	GF895117.5014	•
5/8	11	12.7	100	34.1	48	16	4	GF895117.5015	•
3/4	10	15.2	110	42.5	50	20	5	GF895117.5016	•
7/8	9	18.8	115	50.1	50	20	5	GF895117.5017	•
1"	8	19.9	115	50.0	50	20	5	GF895117.5018	•

UNF **Unified fine thread ASME B1.1**

ϕD mm	P tpi	ϕd_1 mm	l_1	l_2	l_3	ϕd_2	teeth	Article no.	GSFE-VHM R15-1KZ-HB TIALN-T4
1/4	28	4.7	62	14.0	36	8	3	GF895117.5043	•
5/16	24	6.1	74	17.4	40	10	3	GF895117.5044	•
3/8	24	7.6	80	21.7	45	12	3	GF895117.5045	•
7/16	20	8.8	90	24.7	45	14	3	GF895117.5046	•
1/2	20	10.1	90	27.6	45	14	4	GF895117.5047	•
9/16	18	11.4	100	32.1	48	16	4	GF895117.5048	•
5/8	18	12.7	100	34.9	48	16	4	GF895117.5049	•
3/4	16	15.2	110	42.5	50	20	5	GF895117.5050	•

Large cutting diameter
through state-of-the-art grinding, a high profile correction ratio can be precisely ground to enlarge the cutter diameter providing improved rigidity to prevent deflection.

Precision ground profile
with corrected form, guarantees true conformity of major, minor and pitch diameter, flank angles, and crest root tolerance (for internal threads only).

Precision ground shank with clamping flat
provides simple and secure tool holding solution to optimize cutter performance and thread quality. Shank diameters are ground to standard inch dimensions.

2xD Thread length
Advanced tool design and precision grinding allow for full thread up to 2xD. Extended length of engagement expands the range of applications.

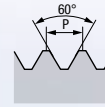
Precise relief angles over full land width
Precision ground clearance angles over the full land width optimizes cutter performance, overall tool life and thread quality.

Multiple spiral flutes
Helical flute design, with equal symmetrical spacing and constant rake angle optimizes cutting performance and thread quality.

Precision ground flute
shape promotes efficient chip development and maximum chip space to prevent edge chipping and breakage.



NPT

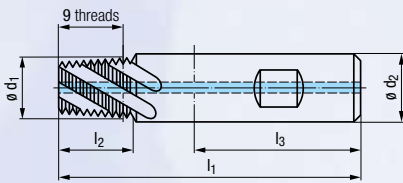


American tapered pipe thread,
ANSI/ASME B1.20.1, taper 1:16
for threads **with dryseal material**

Solid Carbide	TIALN	R15	RH + LH
Z3 - Z5	DIN 6535		

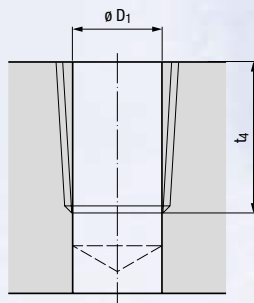
Nom. size D	P tpi	l ₁	l ₂	l ₃	ø d ₁	ø d ₂	teeth	Article no.	GSFE-KEG-VHM R15-1KZ-HA TIAIN-T4
1/8	27	74	10.80	40	7.65	10	3	GF885117.5764	•
1/4	18	90	16.51	45	10.15	14	3	GF885117.5765	•
3/8	18	100	15.23	48	12.90	16	4	GF885117.5766	•
1/2	14	110	19.46	50	16.12	20	5	GF885117.5767	•
3/4	14	110	19.44	50	19.62	20	5	GF885117.5768	•

For internal tapered threads



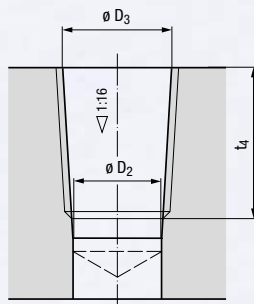
EMUGE NPT thread milling cutters are suited for the hole forms a) and b).

a) Drill cylindrically without using a reamer



Nominal size D	P tpi	ø D ₁	t ₄
1/8	27	8.5	8.3
1/4	18	11	12.15
3/8	18	14.4	12.45
1/2	14	17.8	16.3
3/4	14	23.15	16.3

b) Drill cylindrically and prepare tapered hole with reamer



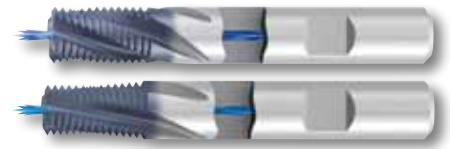
Nominal size D	P tpi	ø D ₂	ø D ₃ (+0.05)	t ₄
1/8	27	8.3	8.74	8.3
1/4	18	10.75	11.36	12.15
3/8	18	14.15	14.80	12.45
1/2	14	17.45	18.32	16.3
3/4	14	22.8	23.67	16.3

Please note:

The cutting values listed in the respective columns are standard values which have to be adjusted to individual work conditions (material, lubrication, machine etc.).

The suitability is marked as follows:

- Thread milling cutter is very suitable
- Thread milling cutter is suitable



Range of application – material			Material examples	Material numbers	Cutting speed v_c in m/min		Feed per tooth f_z in mm	
					coated		$\phi d_1 \leq 8$ mm	$\phi d_1 > 8$ mm
P	Steel materials							
	1.1	Cold-extrusion steels. Construction steels. Free-cutting steels, etc.	≤ 600 N/mm ²	Cq15	1.1132	80 - 250	0.04 - 0.07	0.05 - 0.15
				S235JR (St37-2)	1.0037			
				10SPb20	1.0722			
	2.1	Construction steels. Cementation steels. Steel castings, etc.	≤ 800 N/mm ²	E360 (Si70-2)	1.0070	60 - 150	0.04 - 0.07	0.05 - 0.15
				16MnCr5	1.7131			
				GS-25CrMo4	1.7218			
	3.1	Cementation steels. Heat-treatable steels. Cold work steels, etc.	≤ 1000 N/mm ²	20MoCr3	1.7320	40 - 120	0.03 - 0.05	0.04 - 0.12
				42CrMo4	1.7225			
				102Cr6	1.2067			
	4.1	Heat-treatable steels. Cold work steels. Nitriding steels, etc.	≤ 1200 N/mm ²	50CrMo4	1.7228	40 - 120	0.02 - 0.05	0.04 - 0.12
				X45NiCrMo4	1.2767			
				31CrMo12	1.8515			
	5.1	High-alloyed steels. Cold work steels. Hot work steels, etc.	≤ 1400 N/mm ²	X38CrMoV5-3	1.2367	40 - 120	0.02 - 0.05	0.04 - 0.12
				X100CrMoV8-1-1	1.2990			
X40CrMoV5-1				1.2344				
M	Stainless steel materials							
	1.1	Ferritic, martensitic	≤ 950 N/mm ²	X2CrTi12	1.4512	40 - 120	0.03 - 0.05	0.04 - 0.12
	2.1	Austenitic	≤ 950 N/mm ²	X6CrNiMoTi17-12-2	1.4571	40 - 120	0.03 - 0.05	0.04 - 0.12
	3.1	Austenitic-ferritic (Duplex)	≤ 1100 N/mm ²	X2CrNiMo22-5-3	1.4462	30 - 80	0.02 - 0.05	0.04 - 0.10
	4.1	Austenitic-ferritic heat-resistant (Super Duplex)	≤ 1250 N/mm ²	X2CrNiMoN25-7-4	1.4410	30 - 60	0.02 - 0.04	0.03 - 0.08
K	Cast materials							
	1.1	Cast iron with lamellar graphite (GJL)	100-250 N/mm ²	EN-GJL-200 (GG20)	EN-JL-1030	100 - 200	0.04 - 0.07	0.05 - 0.15
			250-450 N/mm ²	EN-GJL-300 (GG30)	EN-JL-1050	100 - 200	0.04 - 0.07	0.05 - 0.15
	2.1	Cast iron with nodular graphite (GJS)	350-500 N/mm ²	EN-GJS-400-15 (GGG40)	EN-JS-1030	80 - 200	0.04 - 0.07	0.05 - 0.15
			500-900 N/mm ²	EN-GJS-700-2 (GGG70)	EN-JS-1070	80 - 200	0.04 - 0.07	0.05 - 0.15
	3.1	Cast iron with vermicular graphite (GJV)	300-400 N/mm ²	GJV 300		80 - 200	0.04 - 0.07	0.05 - 0.15
			400-500 N/mm ²	GJV 450		80 - 200	0.04 - 0.07	0.05 - 0.15
	4.1	Malleable cast iron (GTMW, GTMB)	250-500 N/mm ²	EN-GJMW-350-4 (GTW-35)	EN-JM-1010	80 - 200	0.04 - 0.07	0.05 - 0.15
			500-800 N/mm ²	EN-GJMB-450-6 (GTS-45)	EN-JM-1140	80 - 200	0.04 - 0.07	0.05 - 0.15
	N	Non ferrous materials						
Aluminium alloys								
1.1		Aluminium wrought alloys	≤ 200 N/mm ²	EN AW-AlMn1	EN AW-3103	150 - 400	0.05 - 0.08	0.07 - 0.20
			≤ 350 N/mm ²	EN AW-AlMgSi	EN AW-6060	150 - 400	0.05 - 0.08	0.07 - 0.20
1.3		Aluminium cast alloys	≤ 550 N/mm ²	EN AW-AlZn5Mg3Cu	EN AW-7022	150 - 400	0.05 - 0.08	0.07 - 0.20
			Si $\leq 7\%$	EN AC-AlMg5	EN AC-51300	150 - 400	0.05 - 0.08	0.07 - 0.20
1.5		Aluminium cast alloys	7% < Si $\leq 12\%$	EN AC-AISi9Cu3	EN AC-46500	150 - 400	0.05 - 0.08	0.07 - 0.20
			12% < Si $\leq 17\%$	GD-AISi17Cu4FeMg		100 - 200	0.05 - 0.08	0.07 - 0.20
Copper alloys								
2.1		Pure copper. low-alloyed copper	≤ 400 N/mm ²	E-Cu 57	EN CW 004 A	150 - 400	0.05 - 0.08	0.07 - 0.20
2.2		Copper-zinc alloys (brass. long-chipping)	≤ 550 N/mm ²	CuZn37 (Ms63)	EN CW 508 L	150 - 400	0.05 - 0.08	0.07 - 0.20
2.3		Copper-zinc alloys (brass. short-chipping)	≤ 550 N/mm ²	CuZn36Pb3 (Ms58)	EN CW 603 N	150 - 400	0.05 - 0.08	0.07 - 0.20
2.4		Copper-aluminium alloys (alu bronze. long-chipping)	≤ 800 N/mm ²	CuAl10Ni5Fe4	EN CW 307 G	100 - 250	0.04 - 0.07	0.05 - 0.15
2.5		Copper-tin alloys (tin bronze. long-chipping)	≤ 700 N/mm ²	CuSn8P	EN CW 459 K	100 - 250	0.04 - 0.07	0.05 - 0.15
2.6		Copper-tin alloys (tin bronze. short-chipping)	≤ 400 N/mm ²	CuSn7 ZnPb (Rg7)	2.1090	100 - 250	0.04 - 0.07	0.05 - 0.15
2.7		Special copper alloys	≤ 600 N/mm ²	(Ampco 8)		40 - 80	0.02 - 0.05	0.04 - 0.15
			≤ 1400 N/mm ²	(Ampco 45)		30 - 60	0.02 - 0.05	0.04 - 0.15
Magnesium alloys								
3.1		Magnesium wrought alloys	≤ 500 N/mm ²	MgAl6Zn	3.5612	150 - 400	0.05 - 0.08	0.07 - 0.20
3.2		Magnesium cast alloys	≤ 500 N/mm ²	EN-MCMgAl9Zn1	EN-MC21120	150 - 400	0.05 - 0.08	0.07 - 0.20
Synthetics								
4.1	Duroplastics (short-chipping)		Bakelit. Pertinax		100 - 400	0.05 - 0.10	0.08 - 0.25	
4.2	Thermoplastics (long-chipping)		PMMA. POM. PVC		100 - 400	0.05 - 0.10	0.08 - 0.25	
4.3	Fibre-reinforced synthetics (fibre content $\leq 30\%$)		GFK. CFK. AFK		80 - 120	0.05 - 0.10	0.08 - 0.25	
4.4	Fibre-reinforced synthetics (fibre content > 30%)		GFK. CFK. AFK		80 - 120	0.05 - 0.10	0.08 - 0.25	
Special materials								
5.1	Graphite		C 8000		100 - 200	0.04 - 0.07	0.08 - 0.25	
5.2	Tungsten-copper alloys		W-Cu 80/20		30 - 60	0.02 - 0.04	0.03 - 0.08	
5.3	Composite materials		Hylite. Alucobond					
S	Special materials							
	Titanium alloys							
	1.1	Pure titanium	≤ 450 N/mm ²	Ti1	3.7025	30 - 80	0.03 - 0.05	0.04 - 0.10
	1.2	Titanium alloys	≤ 900 N/mm ²	TiAl6V4	3.7165	30 - 80	0.03 - 0.05	0.04 - 0.10
			≤ 1250 N/mm ²	TiAl4Mo4Sn2	3.7185	30 - 60	0.02 - 0.04	0.03 - 0.08
	Nickel alloys, cobalt alloys and iron alloys							
	2.1	Pure nickel	≤ 600 N/mm ²	Ni 99.6	2.4060	30 - 60	0.02 - 0.04	0.03 - 0.08
	2.2	Nickel-base alloys	≤ 1000 N/mm ²	Monel 400	2.4360	30 - 60	0.02 - 0.04	0.03 - 0.08
			≤ 1600 N/mm ²	Inconel 718	2.4668	30 - 40	0.02 - 0.04	0.03 - 0.08
	2.4	Cobalt-base alloys	≤ 1000 N/mm ²	Udimet 605		30 - 60	0.02 - 0.04	0.03 - 0.08
≤ 1600 N/mm ²			Haynes 25	2.4964	30 - 40	0.02 - 0.04	0.03 - 0.08	
2.6	Iron-base alloys	≤ 1500 N/mm ²	Incoloy 800	1.4958	30 - 40	0.02 - 0.04	0.03 - 0.08	
H	Hard materials							
	1.1	High strength steels. hardened steels. hard castings	44 - 50 HRC	Weldox 1100		30 - 60	0.015 - 0.04	0.03 - 0.08
			50 - 55 HRC	Hardox 550		30 - 60	0.015 - 0.04	0.03 - 0.08
			55 - 60 HRC	Armox 600T				
			60 - 63 HRC	Ferro-Titanit				
			63 - 66 HRC	HSSE				

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