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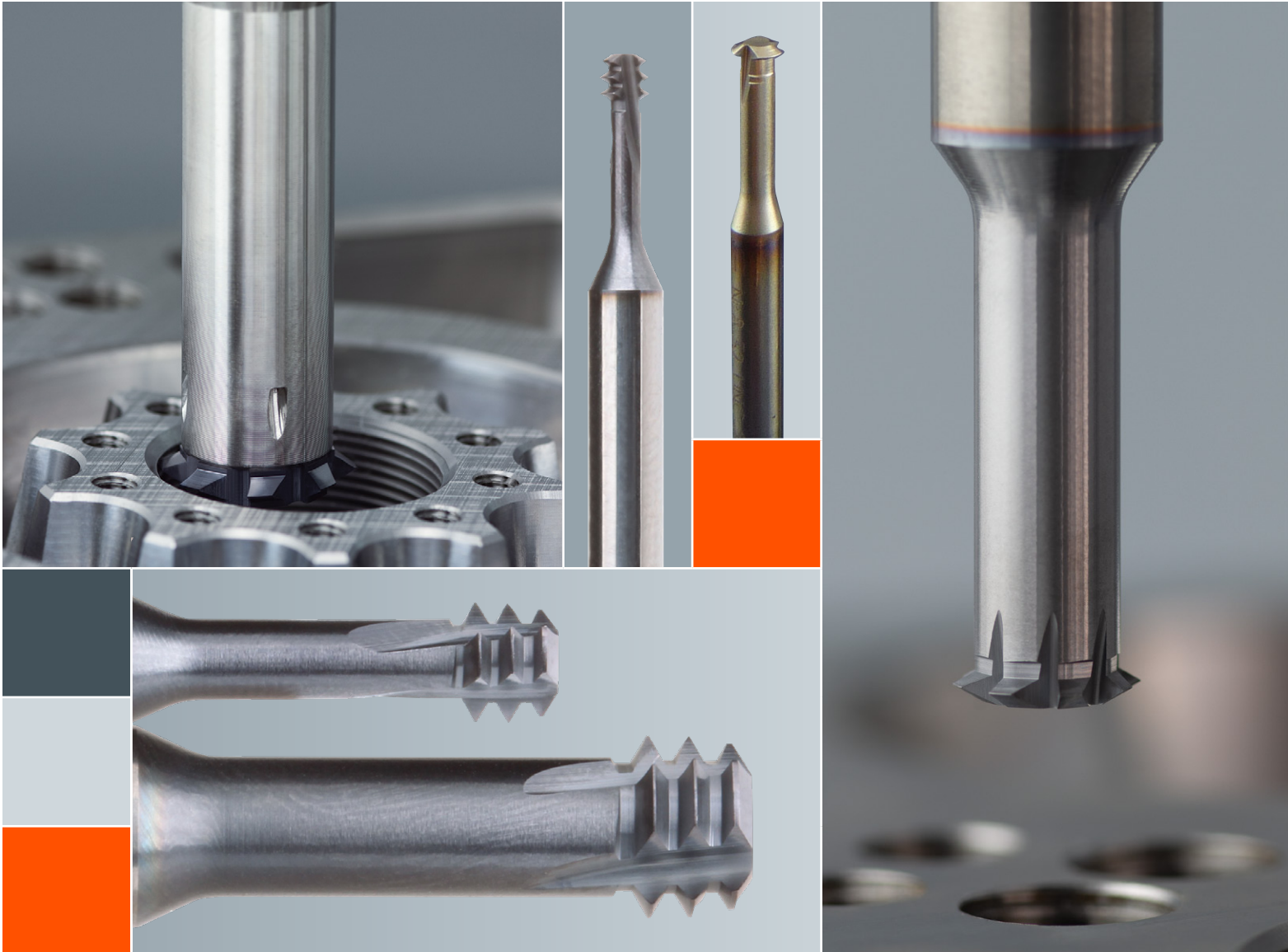
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EMUGE

NEW
ZGF Circular
Thread Milling



**LEADING SOLUTIONS IN AEROSPACE
THREAD MILLING TECHNOLOGY**



Introducing Emuge ZGF Circular Thread Milling Solutions

Emuge advanced Circular Thread Milling Technology provides innovative solutions for meeting the challenges of today's most demanding industries, such as aerospace. The ZGF program leads the way to new levels of threading performance, accuracy and reliability:

ZGF-S-CUT

Left-hand helical flute, multi-tooth design delivers **10X tool life and cycle time reductions**

ZGF-Z

Optimized tooth geometry and increased flutes for faster cutting and reduced cycle times

ZGF-CIRC-GF

Fast, easy exchangeable face insert solution for making larger threads

THREADS-ALL™

Complete line of sizes from miniature to 3/4" in 2XD and 3XD – eight standard sizes capable of producing over 100 common thread designations

Circular Thread Milling Advantages:

- Unprecedented tool life and cycle time reduction in difficult materials
- High process security, reliability and control
- Produce threads with excellent form, finish and dimensional accuracy
- Attain optimal positional accuracy
- One tool for right and left-hand threads and for through or blind holes
- Achieve full bottom threading and precise depth control



ZGF-S-CUT



ZGF-Z



ZGF-CIRC-GF



THREADS-ALL

ZGF-S-CUT

Helical Flute

Multi-Tooth Thread Mills

The Emuge ZGF-S-CUT line of premium sub-micro grain carbide thread mills is ideal in demanding materials and industries such as aerospace where nickel alloys, titanium and stainless steel are the norm. A unique design enables three tooth pitches to simultaneously rough and finish-cut threads, **dramatically increasing tool life and reducing cycle times.**

- Left-hand helix flute design with left-hand spindle rotation greatly enhances stability and performance
- First tooth acts as a rougher, while the second and third teeth finish full thread profile
- **10X higher tool life and cycle time reductions than conventional tools!**
- TiAlN T46 coating resists heat and wear, extending tool life
- Full bottoming threads within 1 pitch
- One tool easily makes STI threads for both through and blind holes
- Internal coolant tools starting at 1/4" size



ZGF-S-CUT - 2XD - UNC and UNF

		Thread Size		Cutter Dia. in	Cut Length in	OAL in	Shank Dia. mm	No. Flutes	EDP No.
		UNC	UNF						
		#2 - 56		0.067	0.181	1.535	3	3	GF26A729.5001
		#4 - 40		0.085	0.234	1.535	3	3	GF26A729.5003
		#6 - 32		0.106	0.287	1.535	3	3	GF26A729.5005
		#10 - 24		0.146	0.398	1.653	4	3	GF26A729.5007
			#10-32	0.154	0.392	1.653	4	4	GF26A729.5041
Internal Coolant	1/4 - 20			0.195	0.520	2.165	6	3	GF26A729.5009
		1/4-28		0.207	0.516	2.165	6	5	GF26A729.5043
	5/16 - 18			0.248	0.648	2.283	8	4	GF26A729.5010
		5/16 - 24 & 3/8 - 24		0.260	0.642	2.283	8	5	GF26A729.5044
	3/8 - 16			0.303	0.656	2.440	8	4	GF26A729.5011
		7/16 - 20 & 1/2 - 20		0.376	0.896	2.913	10	6	GF26A729.5046

ZGF-S-CUT - METRIC / METRIC FINE

		Thread Size	Cutter Dia. mm	Cut Length mm	OAL mm	Shank Dia. mm	No. Flutes	EDP No.
		M3 x 0.5	2.40	6.20	39	3	4	GF26A729.0030
		M3.5 x 0.6	2.78	7.30	39	3	4	GF26A729.0035
		M4 x 0.7	3.15	8.30	42	4	4	GF26A729.0040
Internal Coolant	M5 x 0.8	4.04	10.30	52	6	4	4	GF26A729.0050
	M6 x 1.0	4.80	12.43	55	6	4	4	GF26A729.0060
	M8 x 1.25	6.50	16.70	60	8	4	4	GF26A729.0080
	M10 x 1.5	8.20	20.70	70	10	5	5	GF26A729.0100
	M12 x 1.75	9.90	24.90	74	10	5	5	GF26A729.0112
	M14 x 2.0	11.60	29.00	80	12	5	5	GF26A729.0114
	M16 x 2.0	13.60	33.00	85	14	6	6	GF26A729.0116

ZGF-Z

Thread Mills

Emuge ZGF-Z premium sub-micro grain carbide thread mills are ideal for threading in difficult materials such as Inconel, titanium and stainless steel. An optimized geometry and multiple flutes in ZGF thread mills enable faster cutting and reduced cycle times.

- Optimized tooth geometry and multiple flutes for maximum performance
- Corrected thread profile for different thread sizes and pitches
- **Longer tool life and substantial cycle time reductions compared to conventional tools!**
- TiCN coated for extended tool life
- Full bottoming threads within 1 pitch
- One tool easily makes STI threads for both through and blind holes
- Internal coolant tools starting at M8 size



ZGF-Z - 2XD - METRIC*

	Thread Sizes	Cutter Dia. mm	Cut Length mm	OAL mm	Shank Dia. mm	No. Flutes	EDP No.
	M1.6	1.18	3.38	39	3	5	GF293746.0016
	M2	1.52	4.20	39	3	6	GF293746.0020
	M2.5	1.96	5.23	39	3	6	GF293746.0025
	M3	2.40	6.25	39	3	6	GF293746.0030
	M4	3.15	8.35	41	4	6	GF293746.0040
	M5	4.04	10.40	51	6	7	GF293746.0050
	M6	4.80	12.50	53	6	7	GF293746.0060
Internal Coolant	M8	6.50	16.63	58	8	7	GF293746.0080
	M10	8.20	20.75	67	10	8	GF293746.0100
	M12	9.90	24.88	70	10	8	GF293746.0112

ZGF-CIRC-GF

Exchangeable Face Insert Thread Milling System for Making Larger Threads

Circular thread milling bar/bodies with exchangeable face inserts provide an excellent modular solution for milling larger thread dimensions. Face inserts incorporate the ZGF program tooth design/geometry, for maximum tool life and performance.

- Rigid, anti-vibration body design allows for a length-to-diameter ratio to 2XD and greater
- PVD coated insert application range
- Micro-grain carbide face inserts with TiAlN-T4 coating are ideal for stainless steels, titanium, nickel alloys, cast iron, hard high alloy steel > 25 Rc, mold and tool steels
- Low radial cutting pressure ensures true-to-gage threads
- Fast and easy setup, programming and maintenance
- Innovative internal coolant supply exits radially at the insert cutting edge for optimized cooling, chip evacuation and thread quality
- Face inserts are rigidly affixed in a solid steel precision pocket, securely fastened with a Torx locking screw



EXCHANGEABLE FACE INSERTS

Insert Size	Cutter Dia. mm	Thread Pitch Range		No. Flutes	EDP No.
		TPI	mm		
A	9.9	13-24	1 - 1.75	6	GF653109.9512
B	11.6	12-24	1 - 2.0	7	GF653209.9512
C	15.9	10-16	1.5 - 2.5	8	GF653309.9514
D	19.9	8-16	1.5 - 3.0	8	GF653409.9514

ZGF-CIRC-GF BODIES

Bar Size	Cutter Dia. mm	Minimum Thread Dia.	Maximum Depth mm	OAL mm	Shank Dia. mm	No. Flutes	EDP No.
A	9.9	1/2" - M12	24	68	10	1	GZ38100A
B	11.6	5/8" - M16	32	71.5	10	1	GZ38100B
C	15.9	7/8" - M20	40	88	14	1	GZ38100C
D	19.9	1" - M24	48	99	16	1	GZ38100D

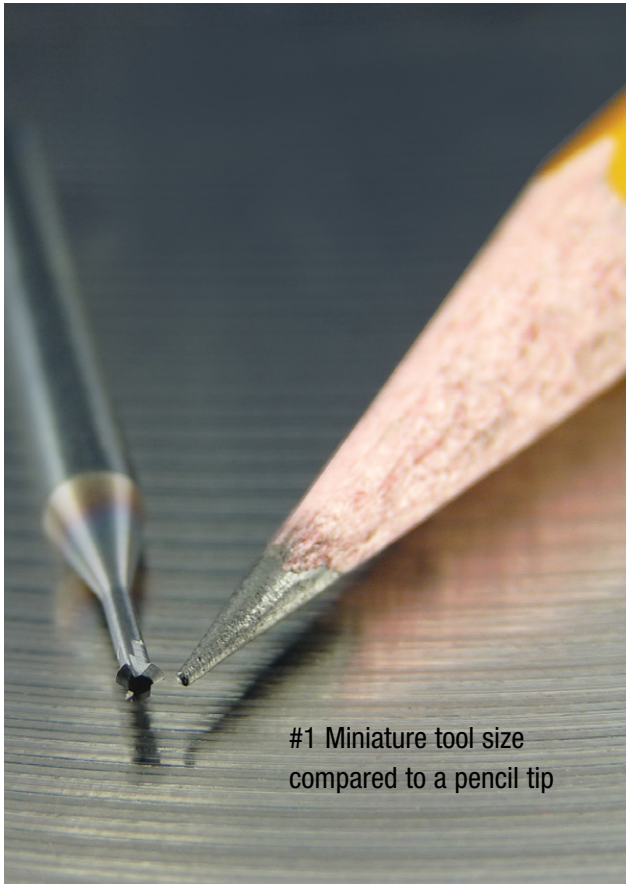
THREADS-ALL™

A Complete Line of 2XD Solid Carbide Thread Mills, Plus 3XD Sizes for Maximum Reach

Miniature size thread mills provide a high-quality, dependable threading solution for a variety of difficult materials.

Standard sizes provide manufacturers a ready tooling solution which allows for quick adaptation to a variety of threading requirements in a wide range of materials.

- TiCN coated for extended tool life
- **Requiring only 8 stock standard tool sizes,**
#10 • 1/4 • 5/16 • 3/8 • 7/16 • 1/2 • 5/8 • 3/4,
it is now possible to produce 100+ commonly produced screw thread designations
- In addition, Threads-All tools provide **total control over pitch diameter limits** including 2B • 3B • 3BG • and all oversize variants



#1 Miniature tool size compared to a pencil tip

ZGF-I - 2XD - TiCN COATED

	Tool Size	Thread Size								Cutter Dia.	Cut Length	No. Flutes	Overall Length	Shank Dia.	Shank Type	EDP No.	
		UNC	UNF	STI UNC	STI UNF	UNEF	UNJC	UNJF	M								MJ
MINIATURE SIZES	0	-	0-80	-	-	-	-	0-80	1.6 x .35	1.6 x .35	0.045	0.125	1	1 5/8"	1/8"	HA	GFS13706.5033 •
	1	1-64	1-72	-	-	-	1-64	1-72	2 x .4	2 x .4	0.056	0.146	3	1 5/8"	1/8"	HA	GFS23706.5000 •
	2	2-56	2-64	1-64	-	-	2-56	2-64	2.5 x .45	2.5 x .45	0.064	0.172	3	1 5/8"	1/8"	HA	GFS23706.5001 •
	4	4-40	4-48	2-56	-	-	4-40	4-48	-	-	0.081	0.224	3	1 5/8"	1/8"	HA	GFS23706.5003 •
	STI 4	-	-	4-40	4-48	-	-	-	-	-	0.117	0.295	3	1 5/8"	1/8"	HA	GFS23706.5611 •
	5	5-40	5-44	-	-	-	5-40	5-44	3 x .5	3 x .5	0.095	0.250	3	1 5/8"	1/8"	HA	GFS23706.5004 •
	6	6-32	6-40	-	-	-	6-32	6-40	-	-	0.100	0.276	3	1 5/8"	1/8"	HA	GFS23706.5005 •
	STI 6	-	-	6-32	6-40	-	-	-	5 x .8	5 x .8	0.143	0.364	3	2 1/2"	1/4"	HB	GFS23106.5613 •
	8	8-32	8-36	-	-	-	8-32	8-36	4 x .7	4 x .7	0.124	0.328	3	1 5/8"	1/8"	HA	GFS23706.5006 •
STI 8	-	-	8-32	8-36	1/4-32	-	-	-	-	0.167	0.415	3	2 1/2"	1/4"	HB	GFS23106.5614 •	
STANDARD SIZES	10	10-24	10-32	10-24	10-32	-	10-24	10-32	-	-	0.136	0.380	3	2 1/2"	1/4"	HB	GFS23106.5007 •
	1/4	1/4-20	1/4-28	1/4-20	1/4-28	5/16-32	1/4-20	1/4-28	6 x 1	6 x 1	0.185	0.500	3	2 1/2"	1/4"	HB	GFS23106.5009 •
	5/16	5/16-18	5/16-24	5/16-18	5/16-24	3/8-32	5/16-18	5/16-24	8 x 1.25	8 x 1.25	0.242	0.625	4	2 1/2"	1/4"	HB	GFS33106.5010 ▲
	3/8	3/8-16	3/8-24	3/8-16	3/8-24	7/16-28	3/8-16	3/8-24	10 x 1.5	10 x 1.5	0.301	0.750	5	2 1/2"	5/16"	HB	GFS33106.5011 ▲
	7/16	7/16-14	7/16-20	7/16-14	7/16-20	1/2-28	7/16-14	7/16-20	12 x 1.75	12 x 1.75	0.354	0.875	5	3"	3/8"	HB	GFS33106.5012 ▲
	1/2	1/2-13	1/2-20	1/2-13	1/2-20	5/8-24	1/2-13	1/2-20	14 x 2	14 x 2	0.407	1.00	5	3 3/4"	1/2"	HB	GFS33106.5013 ▲
	5/8	5/8-11	5/8-18	5/8-11	5/8-18	3/4-20	5/8-11	5/8-18	16 x 2	16 x 2	0.512	1.25	5	3 3/4"	1/2"	HB	GFS33106.5015 ▲
	3/4	3/4-10	3/4-16	3/4-10	3/4-16	7/8-20	3/4-10	3/4-16	20 x 2.5	20 x 2.5	0.630	1.50	6	4 1/4"	5/8"	HB	GFS33106.5016 ▲

• With external flood coolant only ▲ With external flood coolant or axial internal coolant hole (MINIATURE SIZES EXTERNAL COOLANT ONLY)
Shank Types: HA-Straight shank without clamping flat, HB-Straight shank with Weldon clamping flat



BOTH 2XD AND 3XD THREADS-ALL™ TOOLS PROVIDE:

- Easy machining of difficult materials
- One tool for through and blind holes
- Pitch diameter can be easily controlled
- Full bottom threading to within 1 pitch
- STI threads can be easily produced
- Produces excellent thread finish and gaging

ZGF-I - 3XD - TiCN COATED

	Tool Size	Thread Size					Cutter Dia.	Cut Length	No. Flutes	Overall Length	Shank Dia.	Shank Type	EDP No.
		UNC	UNF	STI UNC	STI UNF	M							
MINIATURE SIZES	2	2-56	2-64	2-56	2-64	M 2.2	0.067	0.258	3	1.625	1/8"	HA	GFS83706.5001 •
	4	4-40	4-48	4-40	4-48	M 3	0.085	0.336	3	1.625	1/8"	HA	GFS83706.5003 •
	6	6-32	6-40	6-32	6-40	M 3.5	0.106	0.414	3	1.625	1/8"	HA	GFS83706.5005 •
	8	8-32	8-36	8-32	8-36	-	0.132	0.492	3	1.750	3/16"	HA	GFS83706.5006 •
STANDARD SIZES	10	10-24	-	10-24	-	M 5	0.146	0.570	3	1.875	3/16"	HA	GFS83706.5007 •
		-	10-32	-	10-32	-	0.154	0.570	4	1.875	3/16"	HA	GFS83706.5041 •
	1/4	1/4-20	-	1/4-20	-	M 6	0.195	0.750	4	2.375	1/4"	HB	GFS83106.5009 •
		-	1/4-28	-	1/4-28	-	0.207	0.750	4	2.375	1/4"	HB	GFS83106.5043 •
	5/16	5/16-18	-	5/16-18	-	M 8	0.248	0.937	4	2.563	5/16"	HB	GFS83106.5010 ▲
		-	5/16-24	-	5/16-24	-	0.260	0.937	5	2.563	5/16"	HB	GFS83106.5044 ▲
	3/8	3/8-16	-	3/8-16	-	M 10	0.303	1.125	5	2.750	5/16"	HB	GFS83106.5011 ▲
		-	3/8-24	-	3/8-24	-	0.323	1.125	5	2.875	3/8"	HB	GFS83106.5045 ▲
	7/16	7/16-14	-	7/16-14	-	M 12	0.354	1.312	5	3.125	3/8"	HB	GFS83106.5012 ▲
		-	7/16-20	-	7/16-20	-	0.376	1.312	5	3.060	3/8"	HB	GFS83106.5046 ▲
	1/2	1/2-13	1/2-20	1/2-13	1/2-20	-	0.409	1.500	5	3.625	1/2"	HB	GFS83106.5013 ▲
	5/8	5/8-11	5/8-18	5/8-11	5/8-18	M 16	0.514	1.875	5	4.125	5/8"	HB	GFS83106.5015 ▲
3/4	3/4-10	3/4-16	3/4-10	3/4-16	-	0.630	2.250	6	4.500	5/8"	HB	GFS83106.5016 ▲	

• With external flood coolant only ▲ With external flood coolant or axial internal coolant hole (MINIATURE SIZES EXTERNAL COOLANT ONLY)

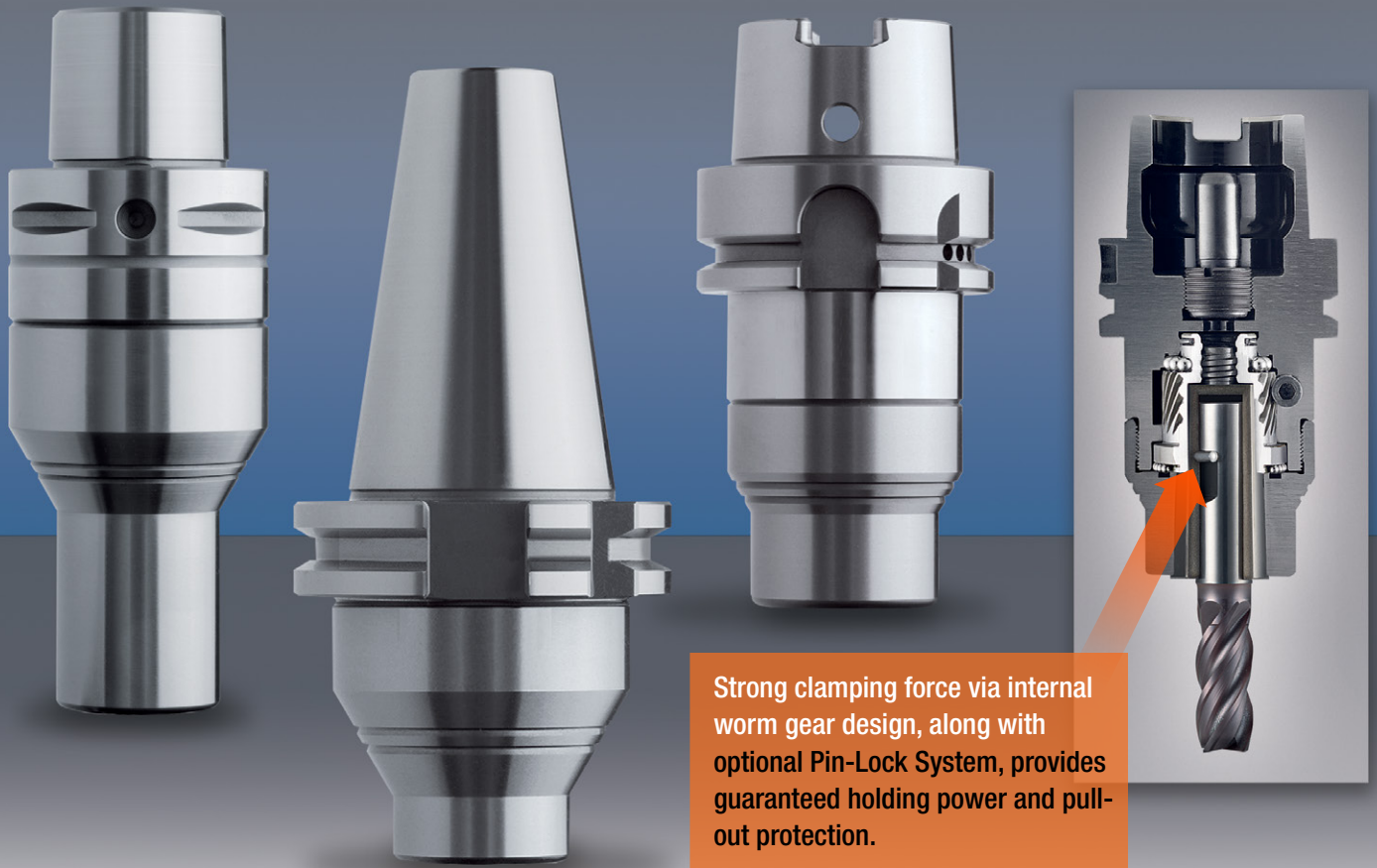
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