EMUGE

AHB
TOOLING & MACHINERY, INC.

COMPLETE METALWORKING SOLUTIONS

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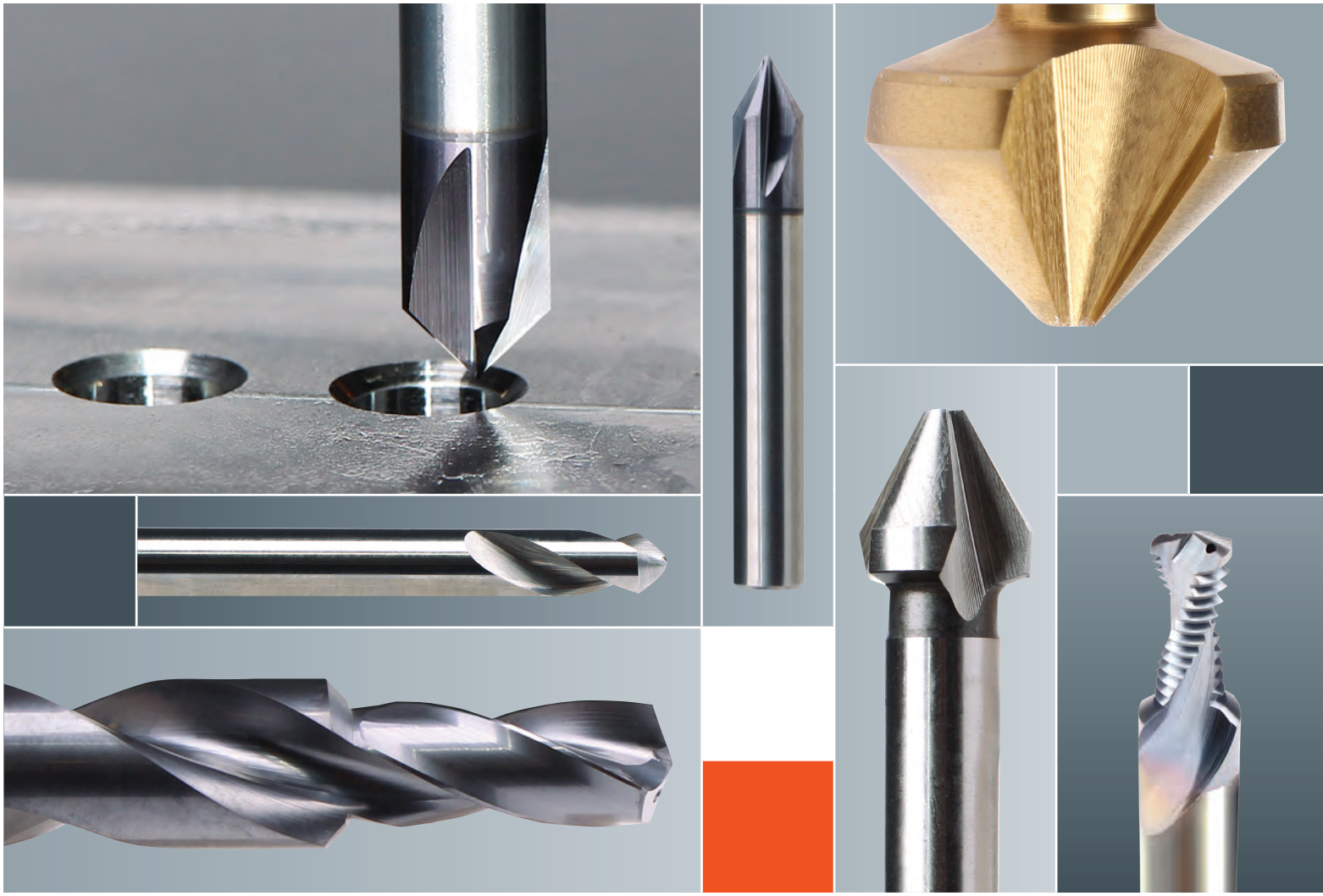


LEADING SOLUTIONS FOR
CHAMFERED / THREADED HOLES

Plus Our NEW Quick Delivery Step Drill Program

From standard stocked tools to our Quick Delivery Program – a full range of solutions.

The typical internal thread will require a defined chamfer at the entrance to the hole, or at least a chamfer for deburring purposes. Chamfering, or adding a bevel to the hole, is beneficial to starting the tap.

Since threading often produces starting burrs, these burrs can be minimized by specifying a 45° countersink or chamfer which is .015" minimum larger than the major diameter on the internal threads.

A countersink is the most basic tool used to create a chamfer on a threaded hole. HSS countersinks are an inexpensive solution for non-critical dimensions or short run operations. Carbide chamfer mills are another easy solution, with the added benefit that chamfer mills can be used for linear chamfering operations in addition to radial threaded hole chamfers.

NC Spot drills are commonly used as countersinking tools when other options are not available. NC Spot drills are designed to be employed as starter drills for critical location holes and are not the first choice for creating threaded hole chamfers, but they are an option.

Emuge offers a complete range of chamfering tools to produce internal threaded parts. In addition, Emuge provides tooling that combines chamfering operations with drilling or threading operations, thus saving time, reducing tooling and more importantly, providing the most accurate chamfer location possible.

Options:

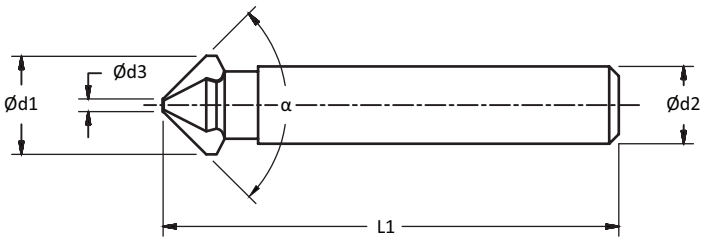
- **HSS Countersinks**
- **Chamfer Mills**
- **NC Spot / Chamfer Drills**
- **EF Drill-C / Chamfer Step Drills**
- **GSF Chamfer Thread Mills**
- **BGF Drill / Chamfer Thread Mills**

	 HSS Countersinks	 Chamfer Mills	 NC Spot / Chamfer Drills	 EF Drill-C / Chamfer Step Drills	 GSF Chamfer Thread Mills	 BGF Drill / Chamfer Thread Mills
Page	4	5	6-7	8-9	10	11
Create center spot for hole starting			●			
Chamfering pre-drilled holes	●	●				
Deburring and Countersinking	●	●	●	●	●	●
Drilling				●		●
Chamfering		●	●	●	●	●
Threading					●	●
Application	Deburr and countersink tap drilled holes in almost all materials	Chamfer / Deburr existing hole	Spot drill and / or create chamfer angle	Drill and Chamfer in one step. Provides optimal hole accuracy	Chamfer and thread mill steps done all in one milling operation	Drill, chamfer and thread mill steps done all in one milling operation

HSS Countersinks

Designed for deburring and countersinking tap drilled holes in almost all materials.

- Fully ground high speed steel flutes
- Radial and axial relieved flutes
- Bright finished for materials up to 1,000 N/mm²
- TiN coated for materials up to 1,200 N/mm²
- Available with TiN coating for additional tool life in any application
- 90° (EDP No. 7560) and 60° (EDP No. 7550) included chamfer angle designs.



HSS COUNTERSINK - TiN Coated

Dia. (d1) (mm)	Dia. (d3) (mm)	Angle α	No. Flutes	Shank (d2) (mm)	OAL (L1) (mm)	EDP#
6.0	1.5	90°	3	5.0	45.0	**7560T.09006**
8.0	2.0	90°	3	6.0	50.0	**7560T.09008**
12.4	2.8	90°	3	8.0	56.0	**7560T.090124**
15.0	3.2	90°	3	10.0	60.0	**7560T.09015**
20.5	3.5	90°	3	10.0	63.0	**7560T.090205**
25.0	3.8	90°	3	10.0	67.0	**7560T.09025**
6.3	1.6	60°	3	5.0	45.0	**7550T.060063**
8.0	2.0	60°	3	6.0	50.0	**7550T.06008**
12.5	3.2	60°	3	8.0	56.0	**7550T.060125**
16.0	4.0	60°	3	10.0	63.0	**7550T.06016**
20.0	5.0	60°	3	10.0	67.0	**7550T.06020**
25.0	6.3	60°	3	10.0	71.0	**7550T.06025**

HSS COUNTERSINK - Bright Finish

Dia. (d1) (mm)	Dia. (d3) (mm)	Angle α	No. Flutes	Shank (d2) (mm)	OAL (L1) (mm)	EDP#
6.0	1.5	90°	3	5.0	45.0	**7560.09006**
8.0	2.0	90°	3	6.0	50.0	**7560.09008**
12.4	2.8	90°	3	8.0	56.0	**7560.090124**
15.0	3.2	90°	3	10.0	60.0	**7560.09015**
20.5	3.5	90°	3	10.0	63.0	**7560.090205**
25.0	3.8	90°	3	10.0	67.0	**7560.09025**
6.3	1.6	60°	3	5.0	45.0	**7550.060063**
8.0	2.0	60°	3	6.0	50.0	**7550.06008**
12.5	3.2	60°	3	8.0	56.0	**7550.060125**
16.0	4.0	60°	3	10.0	63.0	**7550.06016**
20.0	5.0	60°	3	10.0	67.0	**7550.06020**
25.0	6.3	60°	3	10.0	71.0	**7550.06025**

Chamfer Mills

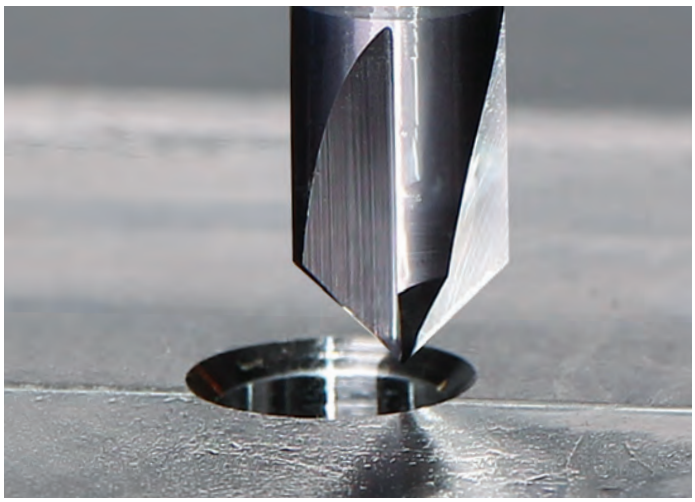
Carbide chamfer mills can be used as a deburring, chamfering or countersinking tool.

For optimum performance this style tool is used in a milling pass and not as a plunging tool. Available in 60° or 90° point options, these tools have straight cylindrical shanks ground to an h6 tolerance.

- Multi-functional tool
- Suitable for a wide variety of materials
- Premium sub-micro grain carbide
- TiAlN coated for wear and heat resistance
- For chamfering edges and threaded hole chamfers

CHAMFER MILL - TiAlN Coated

Dia. (in)	Point Angle	Shank ø (in)	OAL (in)	No. Flutes	EDP No.
1/8	60°	0.125	2.0	4	**1715A.060125**
1/4	60°	0.250	2.5	4	**1715A.060250**
3/8	60°	0.375	3.0	4	**1715A.060375**
1/2	60°	0.500	3.0	4	**1715A.060500**
5/8	60°	0.625	4.0	4	**1715A.060625**
1/8	90°	0.125	2.0	4	**1715A.090125**
1/4	90°	0.250	2.5	4	**1715A.090250**
3/8	90°	0.375	3.0	4	**1715A.090375**
1/2	90°	0.500	3.0	4	**1715A.090500**
5/8	90°	0.625	4.0	4	**1715A.090625**

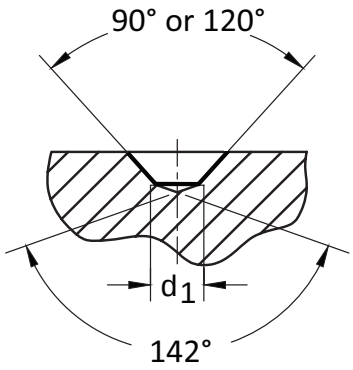


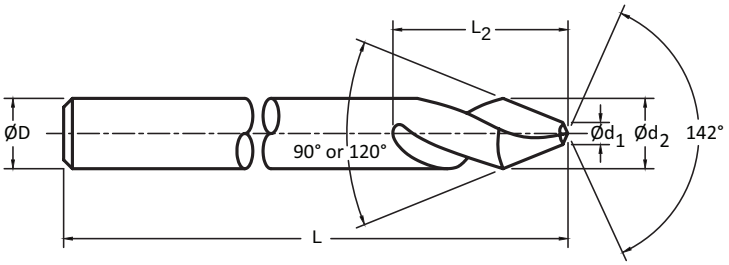
NC Spot / Chamfer Drills

Typically used to create a center spot for a more accurate, finished hole.

Emuge spot / chamfer drills are designed with a double angle that allows easy drill starts and perfect 90° or 120° degree chamfer angles. Extensive testing has shown superior cutting action at the tip angle with a 142° angle which is well suited for a wide range of materials. This double angle eliminates tip breakage that is sometimes associated with 90° or 120° spot drills.

- Double tip angle with short chisel edge reduces axial force requirement
- 142° entry point angle creates better chip flow
- Secondary 90° or 120° angle creates desired chamfer





90°/142° NC Spot / Chamfer Drill - Bright Finish

Dia. (d2) (in)	Dia. (d1) (in)	OAL (L) (in)	Flute (L2) (in)	EDP No.
1/8	0.034	2.00	0.75	**EFUT3100.0317**
1/4	0.068	2.50	0.75	**EFUT3100.0635**
3/8	0.101	3.00	1.00	**EFUT3100.0952**
1/2	0.135	3.00	1.00	**EFUT3100.1270**
5/8	0.169	4.00	1.25	**EFUT3100.1587**
3/4	0.203	4.00	1.75	**EFUT3100.1905**

Dia. (d2) (mm)	Dia. (d1) (mm)	OAL (L) (in)	Flute (L2) (in)	EDP No.
3.0	0.81	2.00	0.50	**EFUT3100.0300**
4.0	1.08	2.25	0.75	**EFUT3100.0400**
5.0	1.35	2.25	0.75	**EFUT3100.0500**
6.0	1.62	2.25	0.75	**EFUT3100.0600**
8.0	2.16	2.75	1.00	**EFUT3100.0800**
10.0	2.70	2.88	1.00	**EFUT3100.1000**
12.0	3.25	2.92	1.00	**EFUT3100.1200**
16.0	4.33	4.00	1.00	**EFUT3100.1600**

120°/142° NC Spot / Chamfer Drill - Bright Finish

Dia. (d2) (in)	Dia. (d1) (in)	OAL (L) (in)	Flute (L2) (in)	EDP No.
1/8	0.029	2.00	0.75	**EFUT3200.0317**
1/4	0.059	2.50	0.75	**EFUT3200.0635**
3/8	0.089	3.00	1.00	**EFUT3200.0952**
1/2	0.118	3.00	1.00	**EFUT3200.1270**
5/8	0.148	4.00	1.25	**EFUT3200.1587**
3/4	0.177	4.00	1.75	**EFUT3200.1905**

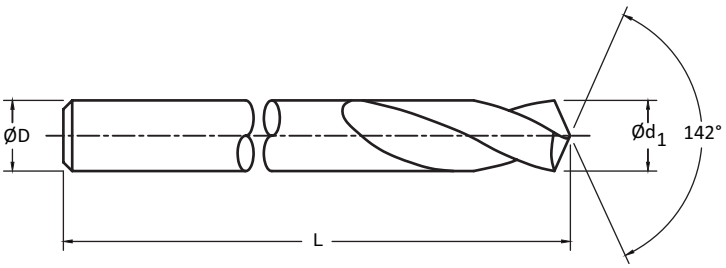
Dia. (d2) (mm)	Dia. (d1) (mm)	OAL (L) (in)	Flute (L2) (in)	EDP No.
3.0	0.71	2.00	0.50	**EFUT3200.0300**
4.0	0.95	2.25	0.75	**EFUT3200.0400**
5.0	1.18	2.25	0.75	**EFUT3200.0500**
6.0	1.42	2.25	0.75	**EFUT3200.0600**
8.0	1.89	2.75	1.00	**EFUT3200.0800**
10.0	2.36	2.88	1.00	**EFUT3200.1000**
12.0	2.84	2.92	1.00	**EFUT3200.1200**
16.0	3.78	4.00	1.00	**EFUT3200.1600**

142° NC Spot Drills

NC spot drills are used to guide the secondary drill for a more accurate finished hole location.

Emuge spot drills are designed to create a precision spot location for a 135° or 140° point angle carbide drill. These tools are TiAlN-T14 coated for additional heat and wear resistance.

- Single angle 142° point design
- Pre-drill for 135° or 140° point carbide drill
- Premium sub-micro grain carbide substrate
- Tightly held point dimension tolerances
- Cylindrical shanks are ground to h6 tolerances
- PVD applied TiAlN-T14 coating for heat and wear resistance



142° NC Spot Drill - TiAlN-T14 Coated

Dia. (in)	OAL (L) (in)	Flute (in)	EDP No.
1/8	2.00	0.75	**EFUT3300.0317**
1/4	2.50	0.75	**EFUT3300.0635**
3/8	3.00	1.00	**EFUT3300.0952**
1/2	3.00	1.00	**EFUT3300.1270**
5/8	4.00	1.25	**EFUT3300.1587**
3/4	4.00	1.75	**EFUT3300.1905**

Dia. (mm)	OAL (L) (in)	Flute (in)	EDP No.
3.0	2.00	0.50	**EFUT3300.0300**
4.0	2.25	0.75	**EFUT3300.0400**
5.0	2.25	0.75	**EFUT3300.0500**
6.0	2.25	0.75	**EFUT3300.0600**
8.0	2.75	1.00	**EFUT3300.0800**
10.0	2.88	1.00	**EFUT3300.1000**
12.0	2.92	1.00	**EFUT3300.1200**
16.0	4.00	1.00	**EFUT3300.1600**

EF Drill-C / Chamfer Step Drills

Drill and Chamfer in One Operation

The EF Drill-C is a high-penetration rate carbide drill that will cut a wide range of materials and provide the most accurate hole-to-chamfer location while also providing the most optimal hole preparation for tapping or thread milling.

Step drills are sometimes seen as a solution only for mass production due to the long lead-times associated with traditional special tooling designs. **However, Emuge's EF Drill-C Program offers the industry's largest stocked standard offering of cut and form tap diameter step drills along with a Quick Delivery Program for non-stocked lengths.**

EF Drills are not modified standard drills. All EF Drills are made with double margin design on the minor diameter for the roundest threaded hole size and the web construction is adjusted for each diameter for maximum chip evacuation efficiency.

Whether for mass production or short run production, EF Drills will produce tap drill holes faster and more accurately, save time and increase your threaded part quality.

Size ranges:

- Emuge stocks a wide range of carbide drill / chamfer step drills from 2.8 mm to 15.5 mm minor diameter
- UNC / UNF (No. 6-32 to 5/8-11) threaded holes
- M / MF (M3 to M18) threaded holes
- Full range of sizes in 2XD and 3.5XD lengths
- Tools are coolant-thru, 4 margin design with TiAlN-T14 coating
- Save time – one tool handles two operations in a wide range of materials
- 90° chamfer style
- Cut or Form thread diameters

Tool Selection Process:

Step 1. Check with Emuge for stock standard options or visit **www.emuge.com/products/drills/ef-c-drills** and check selection on-line.

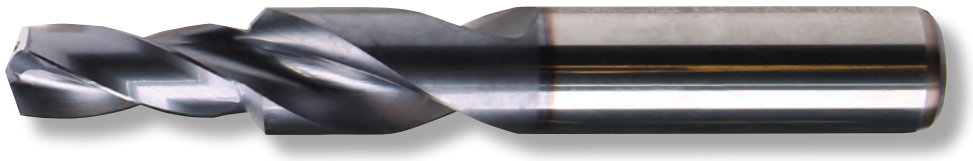
Step 2. Select the tap size / cut or roll form tapping.

Step 3. Select the step length for the threaded hole depth.

Step 4. Select the correct part number.

How to Order:

Visit emuge.com/products/drills/ef-c-drills to view the complete EF Drill-C offering available from stock in real-time. This innovative feature allows you to see which sizes and step lengths are currently in Emuge's inventory and also the sizes that are **available in 4 weeks or less.** Inventory changes weekly and this tool selection process allows you to find the best drill size and length for your application.



Screen view of Selection Tool on website.

GSF Thread Mills

With Chamfering Step

Another way to eliminate an extra chamfer operation is to combine the threading and chamfering tool. This is accomplished with carbide thread mill designs that offer a chamfering geometry. The GSF style carbide thread mill is available in a wide range of styles and thread combinations and allows the user to **create a thread and hole chamfer in the same milling operation.**

- TiCN coated for additional wear resistance
- Axial coolant-fed for maximum chip evacuation
- HB / Weldon flat shank design

GSF THREAD MILL 2XD - TiCN Coated

	Thread Size	OAL (mm)	Flute Length (mm)	No. Flutes	EDP No.
INCH	#12 - 24	62	11.1	3	GF332106.5008
	1/4 - 20	62	13.3	3	GF332106.5009
	5/16 - 18	74	16.2	3	GF332106.5010
	3/8 - 16	80	19.9	3	GF332106.5011
	7/16 - 14	80	22.7	3	GF332106.5012
	1/2 - 13	90	26.4	4	GF332106.5013
	9/16 - 12	100	30.7	4	GF332106.5014
	5/8 - 11	102	33.5	4	GF332106.5015
	3/4 - 10	110	39.4	5	GF332106.5016
	#10 - 32	55	9.9	3	GF332106.5041
	#12 - 28	62	11.4	3	GF332106.5042
	1/4 - 28	62	13.2	3	GF332106.5043
	5/16 - 24	74	16.4	3	GF332106.5044
	3/8 - 24	80	19.6	3	GF332106.5045
	7/16 - 20	80	22.3	3	GF332106.5046
	1/2 - 20	90	26.1	4	GF332106.5047
	9/16 - 18	100	29.0	4	GF332106.5048
	5/8 - 18	102	33.2	4	GF332106.5049
	3/4 - 16	110	39.0	5	GF332106.5050

	Thread Size	OAL (mm)	Flute Length (mm)	No. Flutes	EDP No.
METRIC	M5 x 0.8	55	10.8	3	GF332106.0050
	M6 x 1.0	62	12.5	3	GF332106.0060
	M8 x 1.25	74	16.9	3	GF332106.0080
	M10 x 1.5	80	20.3	3	GF332106.0100
	M12 x 1.75	90	25.4	4	GF332106.0112
	M14 x 2.0	100	29	4	GF332106.0114
	M16 x 2.0	102	33	4	GF332106.0116
	M6 x 0.75	62	12.4	3	GF332106.0229
	M8 x 1.0	74	16.5	3	GF332106.0251
	M10 x 1.0	80	20.5	3	GF332106.0276
	M10 x 1.25	80	20.7	3	GF332106.0277
	M12 x 1.0	90	24.5	4	GF332106.0301
	M12 x 1.25	90	24.4	4	GF332106.0302
	M12 x 1.5	90	24.8	4	GF332106.0303
	M14 x 1.5	100	29.3	4	GF332106.0331
	M16 x 1.5	102	32.3	4	GF332106.0359

BGF Thread Mills

With Drill and Countersinking Geometry

Only one tool can offer the ability to **drill, chamfer and thread in a single operation** and that is Emuge's original BGF coolant-fed carbide thread mill. This innovative tool combines three tools into one. Designed for aluminum and short chipping materials such as cast iron, the BGF thread mill is the most effective tool available.

- Axial coolant-fed for maximum chip evacuation
- 2 flute construction
- HB / Weldon flat shank design

BGF THREAD MILL 2XD - TiCN Coated

	Thread Size	OAL (mm)	Flute Length (mm)	EDP No.
INCH	#12 - 12	62	10.66	GF432206.5008
	1/4 - 20	62	12.80	GF432206.5009
	5/16 - 18	74	15.63	GF432206.5010
	3/8 - 16	79	19.16	GF432206.5011
	7/16 - 14	79	21.89	GF432206.5012
	1/2 - 13	89	25.52	GF432206.5013
	9/16 - 12	102	27.66	GF432206.5014
	5/8 - 11	102	30.14	GF432206.5015
	3/4 - 10	115	38.26	GF432206.5016
	#10 - 32	55	9.63	GF432206.5041
	#12 - 28	62	10.99	GF432206.5042
	1/4 - 28	62	12.79	GF432206.5043
	5/16 - 24	74	15.98	GF432206.5044
	3/8 - 24	79	19.16	GF432206.5045
	7/16 - 20	79	21.72	GF432206.5046
	1/2 - 20	89	25.55	GF432206.5047
	9/16 - 18	102	28.37	GF432206.5048
	5/8 - 18	102	31.21	GF432206.5049
	3/4 - 16	115	38.31	GF432206.5050

	Thread Size	OAL (mm)	Flute Length (mm)	EDP No.
METRIC	M4 x 0.7	49	7.74	GF432206.0040
	M5 x 0.8	55	9.65	GF432206.0050
	M6 x 1.0	62	12.06	GF432206.0060
	M8 x 1.25	74	15.08	GF432206.0080
	M10 x 1.5	79	19.59	GF432206.0100
	M12 x 1.75	89	22.86	GF432206.0112
	M14 x 2.0	102	28.12	GF432206.0114
	M16 x 2.0	102	32.13	GF432206.0116
	M4 x 0.5	49	8.05	GF432206.0210
	M5 x 0.5	55	10.06	GF432206.0218
	M6 x 0.75	62	12.07	GF432206.0229
	M8 x 1.0	74	16.09	GF432206.0251
	M10 x 1.0	79	20.11	GF432206.0276
	M10 x 1.25	79	20.11	GF432206.0277
	M12 x 1.0	89	24.14	GF432206.0301
	M12 x 1.25	89	23.88	GF432206.0302
	M12 x 1.5	89	24.12	GF432206.0303
	M14 x 1.5	102	27.14	GF432206.0331
	M16 x 1.5	102	31.65	GF432206.0359

EMUGE

Convenient NEW EF Drill-C Tool Program
Carbide step drill / chamfer tools,
many sizes available from stock or order customized lengths in less than 4 weeks!

Scan code for emuge.com/products/drills/ef-c-drills
Emuge's simple, fast, online selection tool.

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Emuge Corp. has been the product technology and performance leader in their field for nearly 100 years. Emuge manufactures an extensive line of taps, drills, thread mills, end mills, toolholders, clamping devices and other rotary cutting tools, over 10,000 items sold through distributors worldwide.