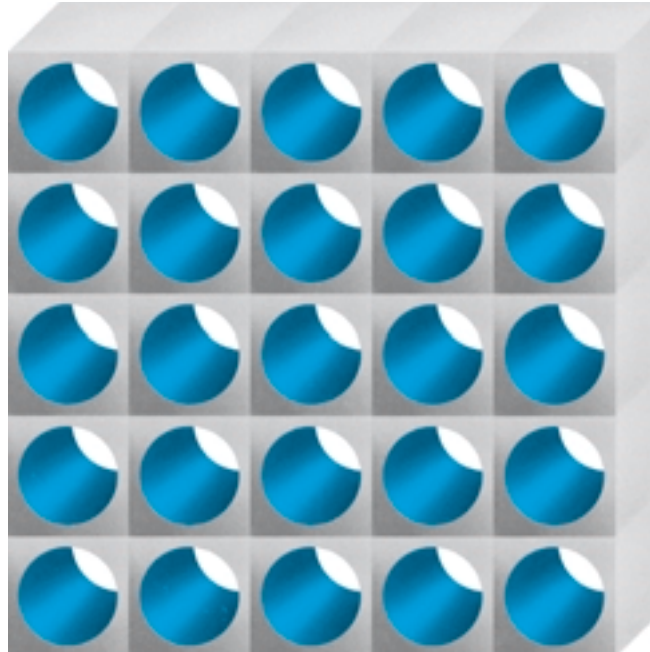


JEL Precision Tools
... the turn of quality!



Catalogue
B₁

Thread Milling Tools
Drill and Thread
Milling Tools



Publication of this catalogue renders all earlier editions of the catalogue invalid.

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❶ to ❸ = price group symbols (see price list), delivery ex warehouse.

○ = symbol for: price on enquiry and delivery at short notice

All measurements are given in millimetres (mm), unless otherwise specified.

You will find the terms and conditions of delivery and payment in our price list.

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Catalogue
B₁

Catalogue A₁	Thread Taps and Dies in HSS-E
Catalogue A₂	Thread Taps in Solid Carbide
Catalogue A₃	Thread Formers in HSS-E and Solid Carbide
Catalogue A₃₋₂	Thread Formers with Carbide Pressure Pads Basic Frames in HSS-E
Catalogue B₁	Thread Milling Tools, Drill and Thread Milling Tools with Chamfering Part in Solid Carbide
Catalogue B₂	Thread Milling Tools, Drill and Thread Milling Tools without Chamfering Part in Solid Carbide for Use in the JEL "VABOS" Tool System
Catalogue B₃	"TIMUS" Thread Milling System
Catalogue B₄	"VABOS" Thread Milling System
Catalogue B₅	Thread Milling Tools in Cermet
Catalogue B₆	Thread Milling Tools with solid carbide disposable tips
Catalogue C+D	Twist Drills, Step Drills in Solid Carbide, Chamfer Tool and Reamer in Solid Carbide



sets the standard . . .

. . . with a modern company

The hallmarks of JEL are the consistently high quality of its products and the performance, competence and responsible attitude of its management and staff. The production and commercial divisions alike work with the most modern methods and machines. The result is that JEL is a modern company in every respect - one which you can trust.

JEL . . . the turn of quality

. . . with technological know-how

Built up on the basis of many years of experience, and with the use of ultra-modern methods of development and production, JEL is now one of the leading manufacturers of precision tools. We make this know-how available to our business partners through our product range and through solutions which we can offer to customer-specific problems.

. . . with optimal products

The highest level of precision is an indispensable requirement. This is why quality at JEL starts right back in the development and design phases, continuing on through production to the finished tool. Quality is a basic principle at JEL. That is what makes JEL's precision tools recognised leaders with the quality and long service lifetimes of which we are justifiably proud. However, a range of this sort imposes obligations as well: these include the provision of a quality consultancy and a first-class, reliable customer service.

How to find the information you want

1. Contents

This Catalogue B₁ gives you information about technical details of the JEL thread milling tools and drill and thread milling tools.

If you cannot find a particular item of information in the JEL catalogue, please telephone or write to us - we shall be glad to answer your questions.

2. How the Catalogue is Organised

Catalogue B₁ is divided into 4 groups:

Part 1

Technology and use of thread milling tools

Parts 2–4

Recommendations for use

Recommendations for use are given before each product group. This recommendation is intended to show you the selection of tools in relation to the thread depth and the material to be machined. Following this, you will find important information on the use of the tools. The individual tools are shown in the sequence of thread types: M, MF, UNC, UNF, G and R_p.

Information and constructional dimensions

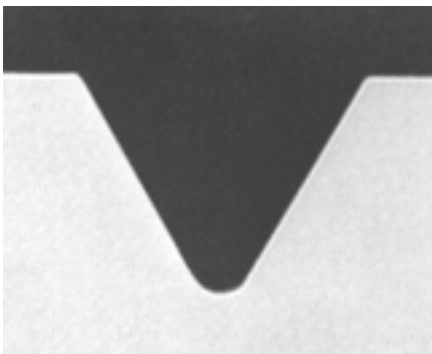
- the “MGF” thread milling tools with rear chamfering tool
 - the “UMGF” thread milling tool with rear and front chamfering tool
- the “BGF” drill and thread milling tool with rear chamfering tool
 - the “UBGF” drill and thread milling tool with rear and front chamfering tool
- the “Tomill” thread milling tool in the 2/3 concept for internal threads
 - Tomill SR without chamfering tool
 - Tomill GS with chamfering tool
 - Tomill GP with chamfering tool and plain milling tool
- the “Tomill SR” thread milling tool for external threads

Technology and Use of Thread Milling Tools and of the Drill and Thread Milling Tool

Using thread milling tools and drill and thread milling tools not only enables you to achieve major time savings, but also to implement enormous improvements in thread production on CNC machining centres.

A new feature is that threads can be produced in the range between 2 mm and 12 mm. This has been made possible by the use of computers, which quickly and accurately calculate the corrections as they occur.

The simulation of the milling process with the use of the different milling tool diameters is helpful for thread milling to standards in these small diameter ranges.



The correction of the flank angles makes it possible to achieve a precise workpiece thread.

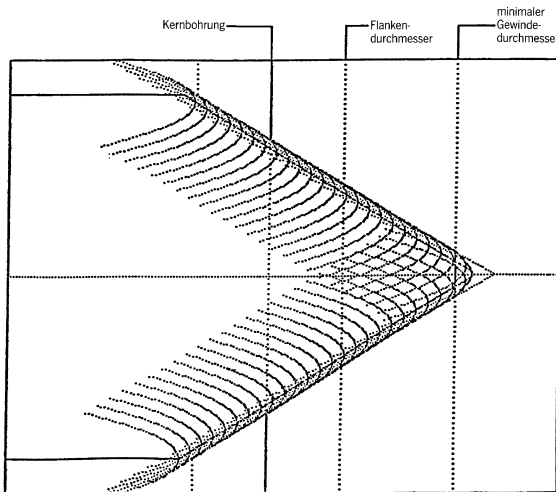


Illustration
Simulation of the thread milling process

The fact that one tool can be used to mill as well as to chamfer - and the fact that the drill and thread milling tool can even be used for drilling, chamfering and thread milling - mean that significantly shorter machining times can be expected.

Unlike this type of thread milling in small diameter ranges, thread milling of larger internal diameters using the circular technique has already been known for a long time. However, the rule which always applied here was: tool diameter = ~ 2/3 workpiece diameter. This restrictive rule was necessary in order to be able to use thread milling tools which were not profile-corrected.

The mathematical approach to the calculation is shown in the following illustrations.

Beschreibung der Herstellfläche:

$$r_B = \begin{pmatrix} (R_{Bz} - s \cdot \cos \alpha_B) \cdot \cos \varphi + e \\ (R_{Bz} - s \cdot \cos \alpha_B) \cdot \sin \varphi \\ s \cdot \sin \alpha_B \end{pmatrix} \quad r_B = \begin{pmatrix} \sin \alpha_B \cdot \cos \varphi \\ \sin \alpha_B \cdot \sin \varphi \\ \cos \alpha_B \end{pmatrix}$$

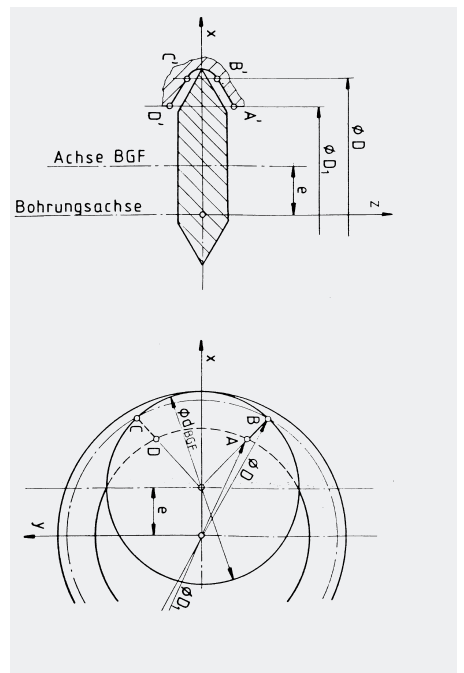
Geschwindigkeit eines Punktes:

$$v = \omega \times r_B + \frac{p}{2\pi} \cdot \omega = \begin{pmatrix} -(R_{Bz} - s \cdot \cos \alpha_B) \cdot \sin \varphi \\ (R_{Bz} - s \cdot \cos \alpha_B) \cdot \cos \varphi + e \\ p/2\pi \end{pmatrix}$$

Nebenbedingung für die Berührlinie:

$$v \cdot r_B = 0 \quad \text{d.h.} \quad v \perp r_B$$

⇒ Berührlinie



The JEL range offers you the right tool for every thread milling task:

- the “MGF” thread milling tool, with rear chamfering tool for the 2-16 mm diameter range, with corrected profile, in solid carbide, plain and coated.

the “UMGF” thread milling tool with rear and front chamfering tool, for the 2-16 mm diameter range, with corrected profile, in solid carbide, plain and coated.

- the “BGF” drill and thread milling tool with rear chamfering tool, for the 3-16 mm diameter range, with corrected profile, in solid carbide, plain and coated.

the “UBGF” drill and thread milling tool with rear and front chamfering tool, for the 3-16 mm diameter range, with corrected profile, in solid carbide, plain and coated

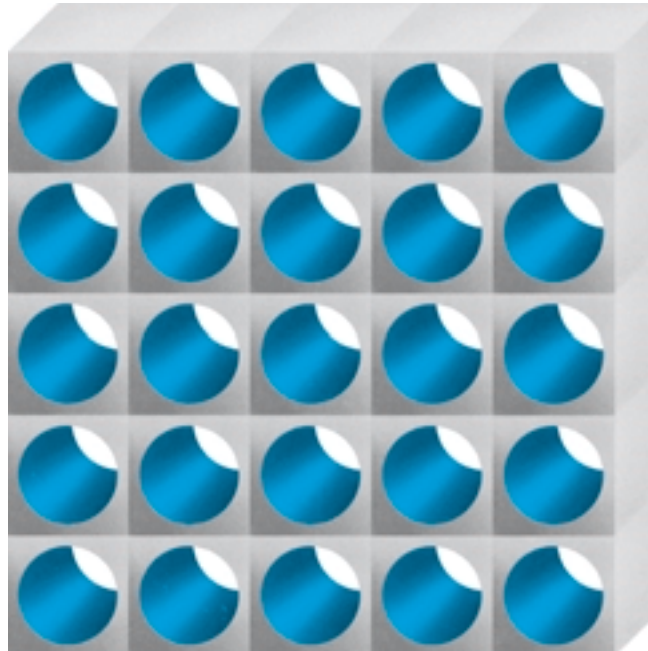
- the “Tomill” thread milling tool in the “2/3 concept” for larger thread diameters, in solid carbide, plain and coated.
“without chamfering tool”
“with chamfering tool”
“with chamfering tool and front tool”

Here are the major advantages of thread milling as compared with thread tapping (the combined tools will be dealt with in detail at a later stage):

- significantly shorter main time thanks to high cutting speeds
- outstanding workpiece surface thanks to variation of the cutting parameters
- exact pitch, no widening of the thread
- shorter milling chips (no chip problems as in the case of thread taps)
- variable thread dimensions (6H, 6G or M10, M12 x 1.5 to (for example) M20 x 1.5)
- one tool for blind holes and through holes
- one tool for right- and left-hand threads
- fewer tool positions
- no chip residues in the root
- low cutting pressure when machining thin-walled parts
- precise thread depth
- core diameter and thread are exactly concentric
- no problems removing broken tools from the workpiece

You will find full details about the use of the thread milling tools in the preface to the individual product groups.

“MGF” and “UMGF” Thread Milling Tools



The JEL “MGF” thread milling tool,
with rear chamfering tool,
for the 2-16 mm diameter range,
with corrected profile,
in solid carbide,
plain and coated.

The JEL “UMGF” thread milling tool,
with rear and front chamfering tool,
for the 3-16 mm diameter range,
with corrected profile,
in solid carbide,
plain and coated.



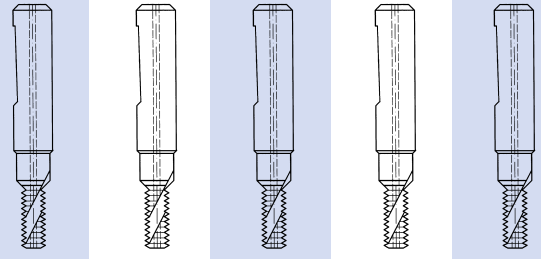
Recommendations for Use

“MGF” Thread Milling Tool
with rear chamfering tool
Thread length : 2 x D, 1.5 x D and
2,5 x D

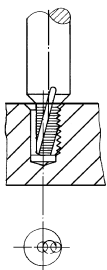
“UMGF” Thread Milling Tool
with rear and front chamfering tool
Variable thread length :
max. ab. 2,0 x D and 2,5 x D

Solid Carbide
plain and coated

Tool Presentation to
DIN 6535 HE



Type	MGF 970	MGF 992 [®]	MGF 993 [®]	MGF 981	MGF 973 [®]	
Thread reach	2 x D ^①	2 x D	2 x D	1,5 x D ^①	1,5 x D	
Lateral effective cutting angle	27°	27°	27°	27°	27°	
Slot shape	narrow clamping slots					
Thread	background profile corrected					
Total length (DIN)	1897	1897	1897	1897	1897	
Shank diameter (DIN)	6535 HE	6535 HE	6535 HE	6535 HE	6535 HE	
Material	solid carbide	solid carbide	solid carbide	solid carbide	solid carbide	
Surface	plain	TiCN	TiAlN	plain	TiCN	
Main Material Groups	Material Sub-Groups	Hardness (HB)	Strength (N/mm ²)			
1. Steel	1.1 Magnetic soft iron	≤ 120	≤ 400	●	●	●
	1.2 Constructional steel, case hardened steel	≤ 200	≤ 700	●	●	●
	1.3 Carbon steel	≤ 250	≤ 850	●	●	●
	1.4 Alloyed steel	≤ 250	≤ 850	●	●	●
	1.5 Alloyed heat treated steel	> 250, ≤ 350	> 850, ≤ 1200	●	●	●
	1.6 Alloyed heat treated steel	> 350	> 1200	●	●	●
2. Stainless steel	2.1 Stainless steel, sulphuretted	≤ 250	≤ 850	●	●	●
	2.2 Austenitic	≤ 250	≤ 850	●	●	●
	2.3 Ferritic, ferritic and austenitic, martensitic	≤ 300	≤ 1000	●	●	●
3. Cast iron	3.1 Gray cast iron	≤ 150	≤ 500	●	●	●
	3.2 Heat treated gray cast iron	> 150, ≤ 300	> 500, ≤ 1000	●	●	●
	3.3 Spherulitic graphite iron	≤ 200	≤ 700	●	●	●
	3.4 Heat treated spherulitic graphite iron	> 200, ≤ 300	> 700, ≤ 1000	●	●	●
	3.5 Annealed cast iron	≤ 200	≤ 700	●	●	●
	3.6 Heat treated annealed cast iron	> 200, ≤ 300	> 700, < 1000	●	●	●
4. Titanium	4.1 Pure titanium	≤ 200	≤ 700	●	●	●
	4.2 Titanium alloys	≤ 270	≤ 900	●	●	●
	4.3 Titanium alloys	> 270, ≤ 300	> 900, ≤ 1250	●	●	●
5. Nickel	5.1 Pure nickel	≤ 150	≤ 500	●	●	●
	5.2 Nickel alloys, temperature resistant	< 270	≤ 900	●	●	●
	5.3 Nickel alloys, high temperature resistant	> 270, ≤ 350	> 900, ≤ 1200	● ^②	● ^②	● ^②
6. Copper	6.1 Unalloyed copper	≤ 100	≤ 350	●	●	●
	6.2 Short-chipping brass, bronze, gunmetal	≤ 200	≤ 700	●	●	●
	6.3 Long-chipping brass	≤ 200	≤ 700	●	●	●
	6.4 Cu-Al-Fe alloy (Ampco)	≤ 470	≤ 1500	●	●	●
7. Aluminium/Magnesium	7.1 Al, Mg, unalloyed	≤ 100	≤ 350	●	●	●
	7.2 Al ductile alloys, breaking elongation (A) < 14%	≤ 180	≤ 600	●	●	●
	7.3 Al ductile alloys, breaking elongation (A ₅) ≥ 14 %	≤ 180	≤ 600	●	●	●
	7.4 Al cast alloy, Si < 10%	< 180	≤ 600	●	●	●
	7.5 Al cast alloy, Si ≥ 10% Mg alloy, AL whisker	≤ 180	≤ 600	●	●	●
8. Plastics	8.1 Thermoplastics			▲	●	●
	8.2 Duroplastics			●	●	●
	8.3 Fibre-reinforced plastics			●	●	●
9. Hard materials	9.1 Cermets, Ferrotic, etc.	≤ 550	≤ 1700	▲	▲	▲



Geometry data and technology data for the use of tools are contained in the CNC programme which is supplied with the goods.

● = very well suited
▲ = well suited

① for conical threads (NPT/NPTF): thread length corresponds to specified standard length

② special version with special programme

③ when the recommendation is the same, the coated tool allows higher tool life quantities

The “MGF” and “UMGF” Thread Milling Tools: thread milling and counterboring in the 2-16 mm diameter range

Using JEL thread milling tools not only enables you to achieve major time savings, but also to implement enormous improvements in thread production on CNC machining centres - particularly since one tool can be used for counterboring and thread milling in the 2-16 mm diameter range.

The machining sequence with an “MGF” thread milling tool, for upcut milling:

- ① Approach
- ② Counterbore
- ③ Withdraw
- ④ Radial setting to nominal thread diameter - positioning loop -
- ⑤ Forward advance around the pitch with simultaneous circulation of the tool around the central axis of the thread
- ⑥ Radial movement back to the bore centre. - Retraction loop -
- ⑦ Reverse stroke from the finished thread bore.

More accurate! More flexible! More cost-effective! The advantages.

The JEL “MGF” and “UMGF” thread milling tools have enormous advantages over conventional thread tapping:

1. Shorter main time thanks to high cutting speed and advance.
2. Use of standard tools to produce the core diameter, since the chamfering tool is on the thread milling tool.
3. Higher thread quality with the same use parameters.
4. No chip problems because short milling chips are produced.
5. Outstanding workpiece surface thanks to variation of the cutting parameters.
6. It is easier to machine materials which are difficult to cut.
7. No different tools for blind holes and through holes.
8. The desired thread dimension is produced by selecting the eccentricity, “e”.
9. Flexible use, since a wide range of diameters can be machined within the same pitch.
10. One tool for right and left-hand threads.
11. No chip root residues in the root.
12. No problems with chamfering lengths (thread depth = bore depth).
13. Core diameter and thread are exactly concentric.
14. Low cutting pressure when machining thin-walled parts.
15. Saving on tool positions.

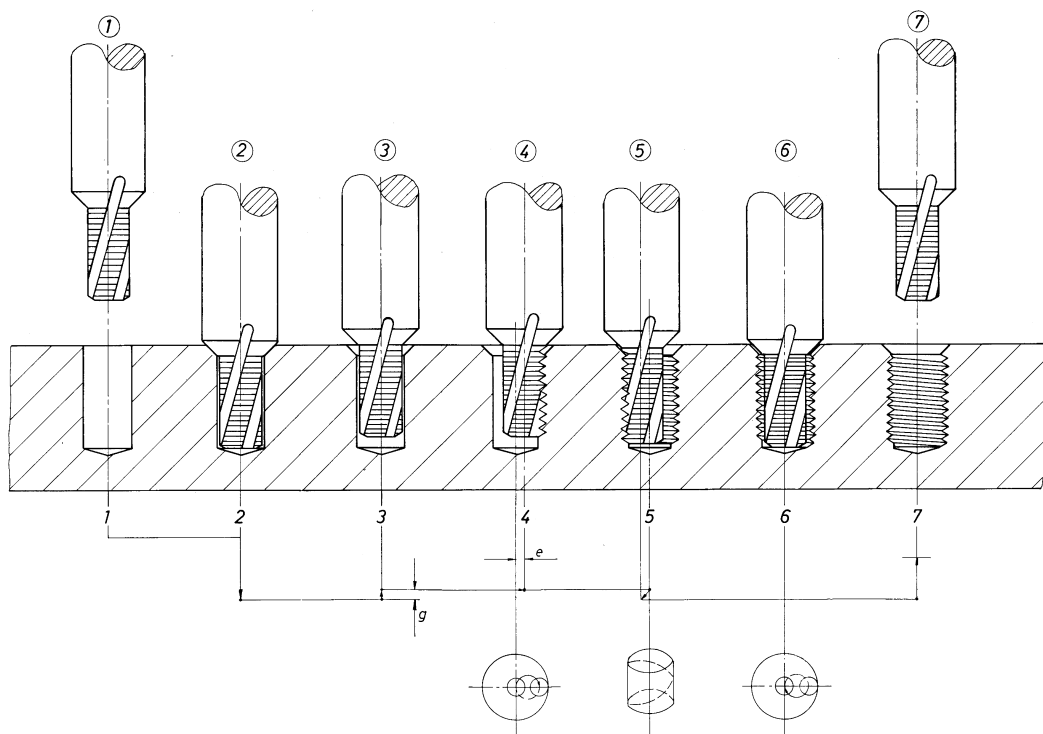


Illustration
Schematic sequence of work for chamfering and upcut milling
with the “MGF” thread milling tool

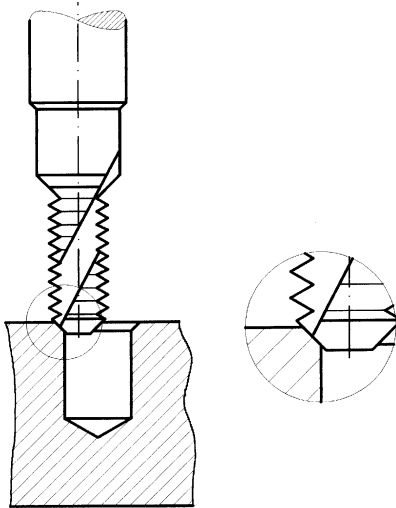


Illustration
 Creating the chamfer by circular movement of the
 "UMGF" thread milling tool

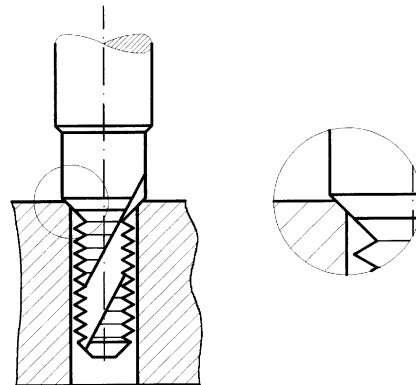


Illustration
 Creating the chamfer by centric movement of the
 "UMGF" thread milling tool

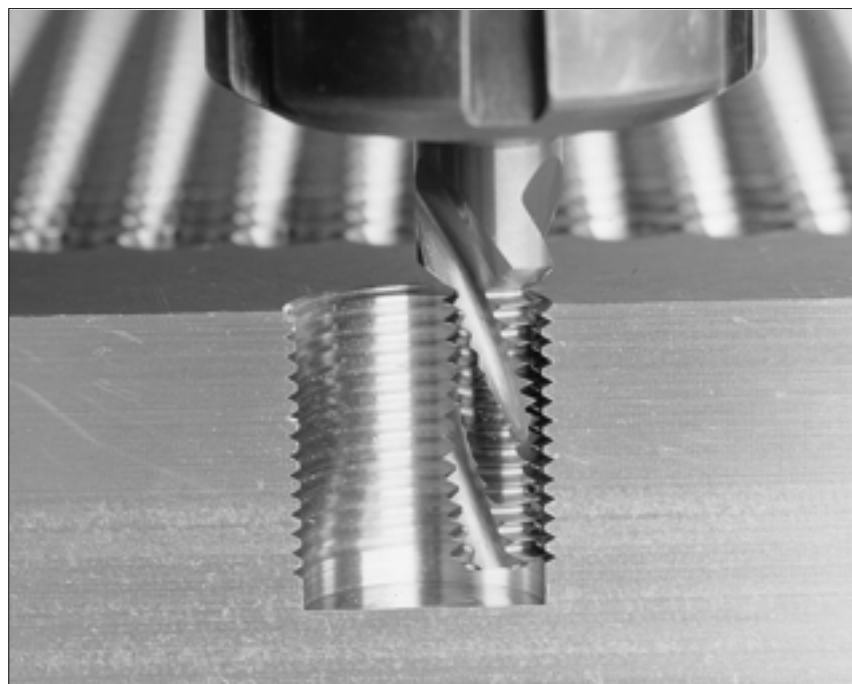


Illustration
 Circular milling of inner threads with the JEL "MGF" thread milling tool cuts down
 production times and increases the surface quality.

JEL's "MGF" and "UMGF" thread milling tools* feature a higher core cross-section and narrow, geometrically optimised clamping slots. Between M 2 and M 16, the milling tools have three to five spiral flutes.

These characteristics lead to good chip formation and low cutting pressure during thread milling.

Long tool life is guaranteed thanks to the solid carbide varieties which are used, as well as the coating.

Comprehensive tests have yielded outstanding values for the roundness and pitch precision of the thread which is produced.

5 series of types with 3 different surfaces for different applications

Type	Thread Reach	Coating	Shank Form DIN 6535	Order Number
MGF 970	2 x D	plain	HE	80.970
MGF 992	2 x D	TiCN	HE	80.992
MGF 993	2 x D	TiAlN	HE	80.993
MGF 981	1.5 x D	plain	HE	80.981
MGF 973	1.5 x D	TiCN	HE	80.973
MGF 976	1.5 x D	TiAlN	HE	80.976
MGF 990	2.5 x D	plain	HE	80.990
MGF 975	2.5 x D	TiCN	HE	80.995
MGF 998	2.5 x D	TiAlN	HE	80.998
UMGF 670	var. ab. 2.0 x D	plain	HE	80.670
UMGF 692	var. ab. 2.0 x D	TiCN	HE	80.692
UMGF 693	var. ab. 2.0 x D	TiAlN	HE	80.693
UMGF 690	var. ab. 2.5 x D	plain	HE	80.690
UMGF 695	var. ab. 2.5 x D	TiCN	HE	80.695
UMGF 698	var. ab. 2.5 x D	TiAlN	HE	80.698

*"MGF" stands for a German phrase meaning „thread milling tool with maximal possible thread diameter“.

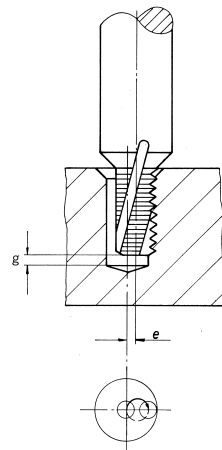
"UMGF" is the abbreviation for a German phrase meaning „universal thread milling tool with maximal possible thread diameter“.



Illustration
"MGF" M10 thread milling tool with rear chamfering tool

Thanks to the variation of the parameters during thread milling, it is possible to influence the quality of the thread which is produced and the tool life quantity which can be achieved. Extensive long-term tests have shown that upcut milling yields a far higher tool life quantity as opposed to cut-down milling. Thanks to a "Z" movement on the inward and outward loop (which we recommend in every case), a clean thread is produced in accordance with the standards. (See the illustration for an example of a programme).

Geometry data and technology data for the use of tools are contained in the CNC programme which is supplied with the goods. For example, this also includes the return transverse dimension "g"; the value must not fall below this limit, otherwise the chamfering will be destroyed during the milling (see the illustration).



A CNC programme for a current control system in DIN language is attached to every “MGF” or “UMGF” thread milling tool.

An example from practice.

A CNC example for chamfering and thread milling, M8, with a thread depth of 16 mm and upcut milling in Gk Al Si 10 Mg with an “MGF” thread milling tool.

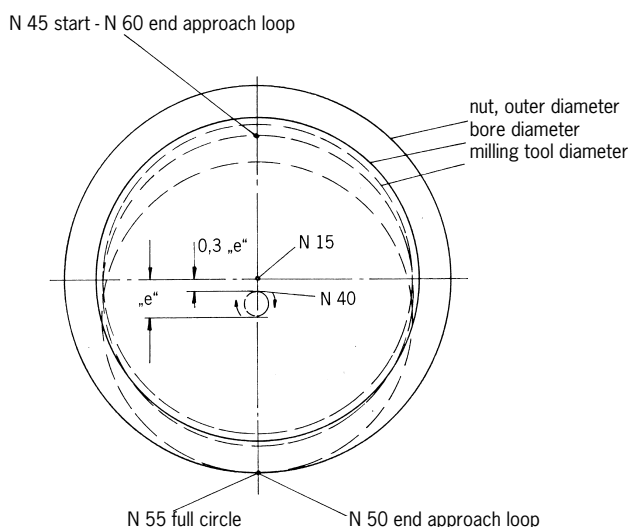


Illustration
Graphic representation of the machining procedure

CNC - PROGRAMM JEL PRAEZISIONSWERKZEUGE
 Joh. u. Ernst Link GmbH + Co.KG
 Ruppmanstr. 32
 70565 Stuttgart

Telefon: 0711-78891-0
 Telefax: 0711-78891-37
 Datum: 31.10.1996

Programm zum Senken und Gewindefraesen
 fr: JEL/VE

Werkzeug: JEL Mini M6
 Typ: 80991/TiN
 Fraeserradius D1=2.300mm
 Exzentrizitaet=0.700 mm

Werkstueckmaterial: 7.5 Al-Gussleg., Mg-Leg.
 G-AlSi 10 Mg

Gewinde: M6

Programmierung: Sinumerik 3M4B
 Fraeseraussenbahn
 Inkrementalbemessung
 Fraesen im Gegenlauf

Gesamtzeit 2.43sec

Schnittwerte:
 Vc=200 m/min, n=13600 U/min
 f(Senken)=0.300 mm/U F(Senken)=4080 mm/min
 fz(Fraesen)=0.070 mm/Zahn F(Fraesen)=2856 mm/min

 A c h t u n g: Bei Steuerungen, die den V o r s c h u b auf die
 Mittelpunktbahn beziehen, muessen die Klammerwerte verwendet werden.

```

N10 G0 G53 G40 G80 G90 D0 Z0
N15 T1 M6
N20 G54 X0 Y0
N25 Z1 D1 S13600 M3
S E N K E N
N35 G0 Z-12.392 M8
N40 G1 Z-13.242 F4080
F R A E S E N I M G E G E N L A U F
N50 G0 Z-11.242
N55 G1 G91 X0 Y-0.210 F2856 (F275)
N60 G42 X0 Y2.300
N65 G02 X0 Y-5.090 I0 J-2.545 Z-0.150
N70 G02 X0 Y0 I0 J3.000 Z-1.000 (F666)
N75 G02 X0 Y5.090 I0 J2.545 Z-0.150 F7140 (F687)
N80 G0 G40 Y-2.300
N85 G1 Y0.210
N90 G0 G53 G40 G80 G90 D0 Z0 M95
N95 M30
    
```

Programm ist urheberrechtlich geschuetzt. Unbefugte Weitergabe ist verboten und wird strafrechtlich verfolgt! 4712

Illustration
CNC programme for an “MGF” thread milling tool

Recommended Standard Values for Cutting Speed and Feed:

	Aluminium Alloys	Gray Cast Iron	Unalloyed Steels	Stainless Steels	Spherulitic Graphite Iron	Titanium Alloys
Milling-Cutting Speed v (m/min)	100–300	50–100	50–100	25–75	50–100	20–60
Milling feed ≤ M6 fz (mm/tooth)	0.03–0.07	0.02–0.04	0.02–0.04	0.01–0.02	0.03–0.04	0.01–0.02
≤ M12	0.05–0.07	0.05–0.07	0.04–0.06	0.02–0.03	0.05–0.07	0.02–0.04

If no command is available in the CNC programme for the “Outside Milling Tool Path Speed” this parameter is calculated using the following formula:

$$F_{\text{outside milling tool}} = n \cdot z \cdot f_z$$

$$F_{\text{midpoint path}} = \frac{n \cdot z \cdot f_z \cdot 2_e}{AD_M}$$

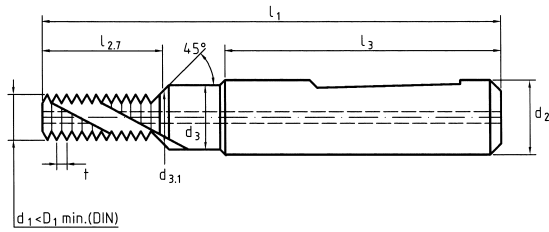
F = path speed (mm/min)
 n = number of revolutions (r.p.m.)
 z = number of teeth
 fz = milling feed (mm/tooth)
 e = eccentricity (mm)
 AD_M = outside diameter of the nut (mm)



**"MGF" Thread Milling Tool
with rear chamfering tool
for DIN 13 metrical ISO Thread**

From shank diameters of 8 mm upwards, the "MGF" thread milling tools are supplied with a central internal coolant bore. On request, we can supply thread milling tools for fixed thread reaches, for screwed joints to DIN 3852.

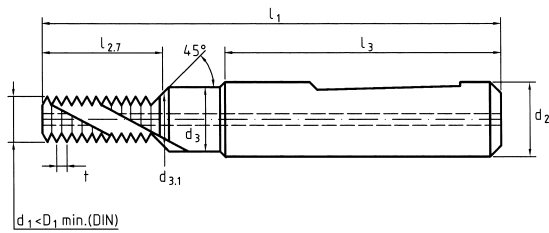
Thread Reach $\approx 2 \times$ Nominal Diameter



M			
Type	MGF 970	MGF 992	MGF 993
Order number	80.970	80.992	80.993
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiCN	TiAlN

Nom.- \varnothing	t	l_1	Bore \varnothing	$l_{2.7}$	l_3	d_2	d_3	$d_{3.1}$	Z			
M 2	0.4	49	1.6	4.6	36	6	2.5	2.3	2	①		
M 3	0.5	49	2.5	6.7	36	6	3.4	3.3	3	①		
M 4	0.7	49	3.3	8.6	36	6	4.5	4.3	3	①		
M 5	0.8	55	4.2	10.6	36	6	5.5	5.3	3	①	③	○
M 6	1.0	62	5.0	13.2	36	8	6.6	6.3	3	①	③	○
M 8	1.25	74	6.8	17.8	40	10	9.0	8.3	3	①	③	○
M 10	1.5	79	8.5	21.4	45	12	11.0	10.3	3	①	③	○
M 12	1.75	89	10.2	26.7	45	14	13.5	12.3	3	①	③	○
M 14	2.0	102	12.0	30.5	48	16	15.5	14.3	4	①	③	○
M 16	2.0	102	14.0	34.5	48	18	17.5	16.3	4	①	③	○

Thread Reach $\approx 1.5 \times$ Nominal Diameter



M			
Type	MGF 981	MGF 973	MGF 976
Order number	80.981	80.973	80.976
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiCN	TiAlN

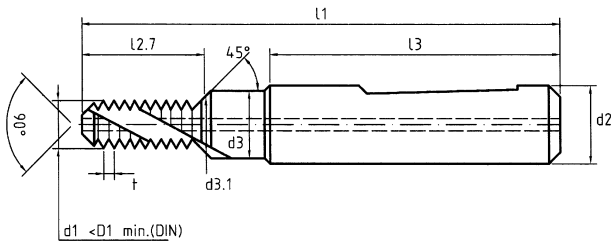
Nom.- \varnothing	t	l_1	Bore \varnothing	$l_{2.7}$	l_3	d_2	d_3	$d_{3.1}$	Z			
M 2	0.4	48	1.6	3.4	36	6	2.5	2.3	2	①		
M 3	0.5	48	2.5	5.2	36	6	3.4	3.3	3	①		
M 4	0.7	47	3.3	6.5	36	6	4.5	4.3	3	①		
M 5	0.8	52	4.2	8.2	36	6	5.5	5.3	3	①	③	○
M 6	1.0	59	5.0	10.2	36	8	6.6	6.3	3	①	③	○
M 8	1.25	70	6.8	14.1	40	10	9.0	8.3	3	①	③	○
M 10	1.5	74	8.5	16.9	45	12	11.0	10.3	3	①	③	○
M 12	1.75	82	10.2	19.7	45	14	13.5	12.3	3	①	③	○
M 14	2.0	96	12.0	24.5	48	16	15.5	14.3	4	①	③	○
M 16	2.0	92	14.0	28.5	48	18	17.5	16.3	4	①	③	○



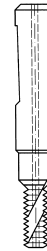
From shank diameters of 8 mm upwards, the "UMGF" thread milling tools are supplied with a central internal coolant bore.

"UMGF" Thread Milling Tool
with rear and front chamfering tool
for DIN 13 metrical ISO Thread

Variable Thread Reach max. ab. 2,0 x D



M



Type	UMGF 670	UMGF 692	UMGF 693
Order number	80.670	80.692	80.693
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiCN	TiAlN

Nom.-∅	t	l ₁	Bore ∅	l _{2.7}	l ₃	d ₂	d ₃	d _{3.1}	Z			
M 2	0.4	49	1.6	4.6	36	6	2.5	2.3	2			
M 3	0.5	49	2.5	6.7	36	6	3.4	3.3	3			
M 4	0.7	49	3.3	8.6	36	6	4.5	4.3	3			
M 5	0.8	55	4.2	10.6	36	6	5.5	5.3	3	○	○	○
M 6	1.0	62	5.0	13.2	36	8	6.6	6.3	3	①	③	○
M 8	1.25	74	6.8	17.8	40	10	9.0	8.3	3	①	③	○
M 10	1.5	79	8.5	21.4	45	12	11.0	10.3	3	①	③	○
M 12	1.75	89	10.2	26.7	45	14	13.5	12.3	3	①	③	○
M 14	2.0	102	12.0	30.5	48	16	15.5	14.3	4	○	○	○
M 16	2.0	102	14.0	34.5	48	18	17.5	16.3	4	○	○	○

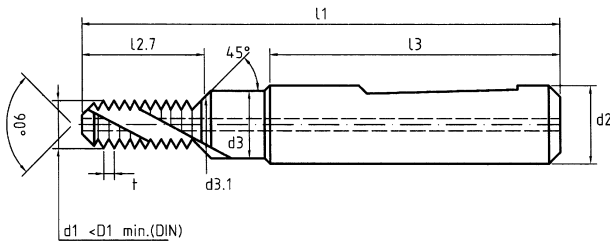
①-③ = symbols for the price group, supplied ex warehouse ○ = symbol: price and delivery on request



From shank diameters of 8 mm upwards, the "UMGF" thread milling tools are supplied with a central internal coolant bore.

"UMGF" Thread Milling Tool
with rear and front chamfering tool
for DIN 13 metrical ISO Thread

Variable Thread Reach max. ab. 2,5 x D



M



Type	UMGF 690	UMGF 695	UMGF 698
Order number	80.690	80.695	80.698
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiCN	TiAlN

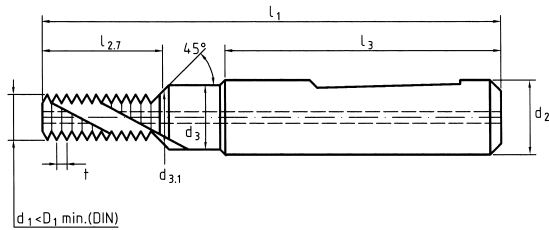
Nom.-Ø	t	l ₁	Bore Ø	l _{2.7}	l ₃	d ₂	d ₃	d _{3.1}	Z			
M 2	0.4	49	1.6	5,3	36	6	2.5	2.3	2			
M 3	0.5	49	2.5	8,1	36	6	3.4	3.3	3			
M 4	0.7	55	3.3	10,7	36	6	4.5	4.3	3	○	○	○
M 5	0.8	55	4.2	13,0	36	6	5.5	5.3	3	○	○	○
M 6	1.0	62	5.0	16,2	36	8	6.6	6.3	3	①	③	○
M 8	1.25	74	6.8	21,6	40	10	9.0	8.3	3	①	③	○
M 10	1.5	79	8.5	27,4	45	12	11.0	10.3	3	①	③	○
M 12	1.75	89	10.2	31,9	45	14	13.5	12.3	3	①	③	○
M 14	2.0	102	12.0	38,5	48	16	15.5	14.3	4	○	○	○
M 16	2.0	102	14.0	42,5	48	18	17.5	16.3	4	○	○	○



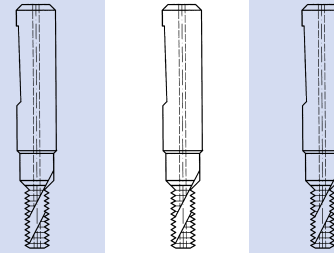
**"MGF" Thread Milling Tool
with rear chamfering tool
for DIN 13 metrical fine ISO Thread**

From shank diameters of 8 mm upwards, the "MGF" thread milling tools are supplied with a central internal coolant bore. On request, we can supply thread milling tools for fixed thread reaches, for screwed joints to DIN 3852.

Thread Reach $\approx 2 \times$ Nominal Diameter



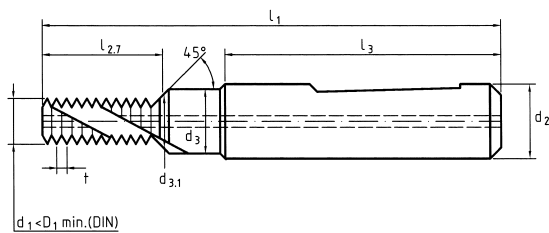
MF



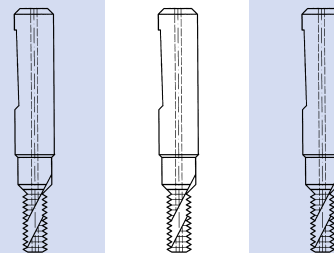
Type	MGF 970	MGF 992	MGF 993
Order number	80.970	80.992	80.993
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiCN	TiAlN

Nom.- \varnothing	t	l_1	Bore \varnothing	$l_{2.7}$	l_3	d_2	d_3	$d_{3.1}$	Z			
M 4 x 0,5	0,5	49	3,5	8,8	36	6	4,5	4,3	3			
M 5 x 0,5	0,5	55	4,5	10,8	36	6	5,5	5,3	3	①		
M 6 x 0,75	0,75	62	5,2	13,1	36	8	6,6	6,3	3	①		
M 8 x 1	1	74	7,0	17,4	40	10	9,0	8,3	3	①	③	○
M 10 x 1	1	79	9,0	21,5	45	12	11,0	10,3	3	①	③	○
M 12 x 1	1	88	11,0	25,6	45	14	13,5	12,3	3	①		
M 12 x 1,5	1,5	88	10,5	26,0	45	14	13,5	12,3	3	①	③	○
M 14 x 1,5	1,5	102	12,5	30,6	48	16	15,5	14,3	4	①	③	○
M 16 x 1,5	1,5	102	14,5	33,6	48	18	17,5	16,3	4	①	③	○

Thread Reach $\approx 1.5 \times$ Nominal Diameter



MF



Type	MGF 981	MGF 973	MGF 976
Order number	80.981	80.973	80.976
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiCN	TiAlN

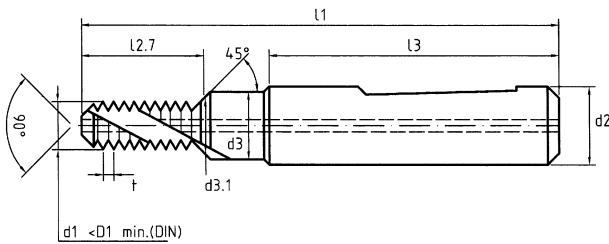
Nom.- \varnothing	t	l_1	Bore \varnothing	$l_{2.7}$	l_3	d_2	d_3	$d_{3.1}$	Z			
M 4 x 0,5	0,5	47	3,5	6,8	36	6	4,5	4,3	3			
M 5 x 0,5	0,5	53	4,5	8,8	36	6	5,5	5,3	3			
M 6 x 0,75	0,75	59	5,2	10,1	36	8	6,6	6,3	3			
M 8 x 1	1	70	7,0	13,4	40	10	9,0	8,3	3	①	③	○
M 10 x 1	1	74	9,0	16,5	45	12	11,0	10,3	3	①	③	○
M 12 x 1	1	82	11,0	19,6	45	14	13,5	12,3	3	①		
M 12 x 1,5	1,5	82	10,5	20,0	45	14	13,5	12,3	3	①	③	○
M 14 x 1,5	1,5	94	12,5	23,1	48	16	15,5	14,3	4	①	③	○
M 16 x 1,5	1,5	94	14,5	26,1	48	18	17,5	16,3	4	①	③	○



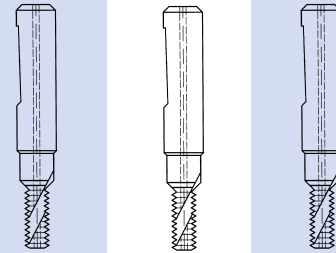
From shank diameters of 8 mm upwards, the "UMGF" thread milling tools are supplied with a central internal coolant bore.

"UMGF" Thread Milling Tool
with rear and front chamfering tool
for DIN 13 metrical fine ISO Thread

Variable Thread Reach max. ab. 2,0 x D



MF



Type	UMGF 670	UMGF 692	UMGF 693
Order number	80.670	80.692	80.693
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiCN	TiAlN

Nom.-∅	t	l ₁	Bore ∅	l _{2.7}	l ₃	d ₂	d ₃	d _{3.1}	Z			
M 4 x 0,5	0,5	49	3,5	8,8	36	6	4,5	4,3	3			
M 5 x 0,5	0,5	55	4,5	10,8	36	6	5,5	5,3	3			
M 6 x 0,75	0,75	62	5,2	13,1	36	8	6,6	6,3	3			
M 8 x 1	1	74	7,0	17,4	40	10	9,0	8,3	3	①	③	○
M 10 x 1	1	79	9,0	21,5	45	12	11,0	10,3	3	①	③	○
M 12 x 1	1	88	11,0	25,6	45	14	13,5	12,3	3	○	○	○
M 12 x 1,5	1,5	88	10,5	26,0	45	14	13,5	12,3	3	①	③	○
M 14 x 1,5	1,5	102	12,5	30,6	48	16	15,5	14,3	4	①	③	○
M 16 x 1,5	1,5	101	14,5	33,6	48	18	17,5	16,3	4	①	③	○

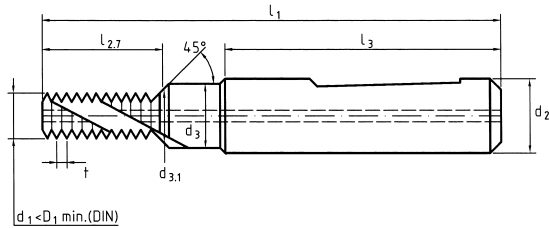
①-③ = symbols for the price group, supplied ex warehouse ○ = symbol: price and delivery on request



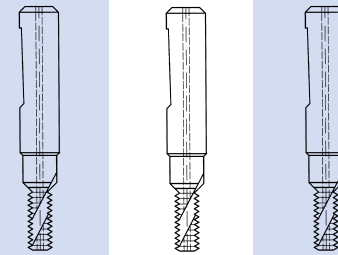
**"MGF" Thread Milling Tool
with rear chamfering tool
for UNC Thread ANSI B 1.1**

From shank diameters of 8 mm upwards, the "MGF" thread milling tools are supplied with a central internal coolant bore. On request, we can supply thread milling tools for fixed thread reaches, for screwed joints to DIN 3852.

Thread Reach $\approx 2 \times$ Nominal Diameter



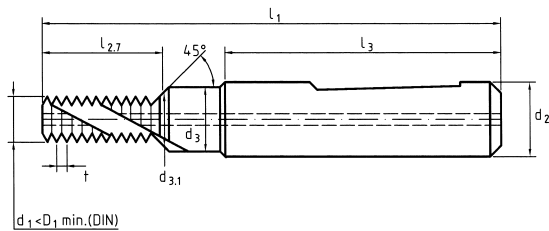
UNC



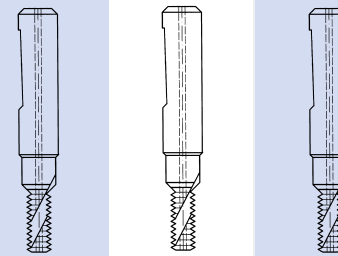
Type	MGF 970	MGF 992	MGF 993
Order number	80.970	80.992	80.993
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiCN	TiAlN

UNC Nom.-Ø	t thr./"	l ₁	Bore Ø	l _{2.7}	l ₃	d ₂	d ₃	d _{3.1}	Z			
Nr. 10	24	55	3,8	10,8	36	6	5,5	5,1	3			
Nr. 12	24	61	4,5	11,8	36	8	6,6	5,8	3			
1/4"	20	62	5,2	15,5	36	8	7,8	6,7	3	①	③	○
5/16"	18	73	6,5	17,2	40	10	9,0	8,2	3	①	③	○
3/8"	16	79	8,0	21,0	45	12	11,0	9,8	3	①	③	○
7/16"	14	86	9,3	23,9	45	14	13,5	11,4	3			
1/2"	13	88	10,8	27,9	45	14	13,5	13,0	3	①	③	○
9/16"	12	100	12,3	32,3	48	16	15,5	14,6	4			
5/8"	11	101	13,5	35,1	48	18	17,5	16,2	4			

Thread Reach $\approx 1.5 \times$ Nominal Diameter



UNC



Type	MGF 981	MGF 973	MGF 976
Order number	80.981	80.973	80.976
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiCN	TiAlN

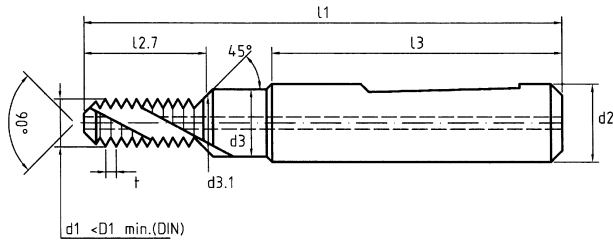
UNC Nom.-Ø	t thr./"	l ₁	Bore Ø	l _{2.7}	l ₃	d ₂	d ₃	d _{3.1}	Z			
Nr. 10	24	53	3,8	8,7	36	6	5,5	5,1	3			
Nr. 12	24	59	4,5	9,7	36	8	6,6	5,8	3			
1/4"	20	58	5,2	11,7	36	8	7,8	6,7	3	①	③	○
5/16"	18	69	6,5	13,0	40	10	9,0	8,2	3	①	③	○
3/8"	16	74	8,0	16,2	45	12	11,0	9,8	3	①	③	○
7/16"	14	81	9,3	18,5	45	14	13,5	11,4	3			
1/2"	13	82	10,8	22,0	45	14	13,5	13,0	3	①	③	○
9/16"	12	95	12,3	23,8	48	16	15,5	14,6	4			
5/8"	11	92	13,5	25,9	48	18	17,5	16,2	4			



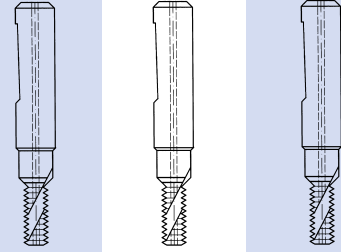
From shank diameters of 8 mm upwards, the "UMGF" thread milling tools are supplied with a central internal coolant bore.

"UMGF" Thread Milling Tool
with rear and front chamfering tool
for UNC Thread ANSI B 1.1

Variable Thread Reach max. ab. 2,0 x D



UNC



Type	UMGF 670	UMGF 692	UMGF 693
Order number	80.670	80.692	80.693
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiCN	TiAlN

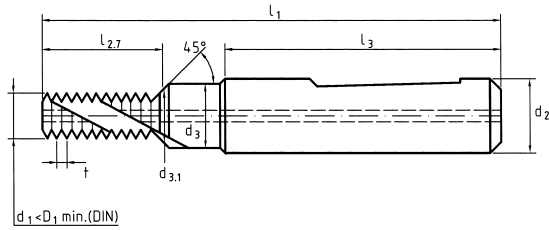
UNC Nom.-Ø	t thr./"	l ₁	Bore Ø	l _{2.7}	l ₃	d ₂	d ₃	d _{3.1}	Z
Nr. 10	24	55	3,8	10,8	36	6	5,5	5,1	3
Nr. 12	24	61	4,5	11,8	36	8	6,6	5,8	3
1/4"	20	62	5,2	15,5	36	8	7,8	6,7	3
5/16"	18	73	6,5	17,2	40	10	9,0	8,2	3
3/8"	16	79	8,0	21,0	45	12	11,0	9,8	3
7/16"	14	86	9,3	23,9	45	14	13,5	11,4	3
1/2"	13	88	10,8	27,9	45	14	13,5	13,0	3
9/16"	12	100	12,3	32,3	48	16	15,5	14,6	4
5/8"	11	101	13,5	35,1	48	18	17,5	16,2	4



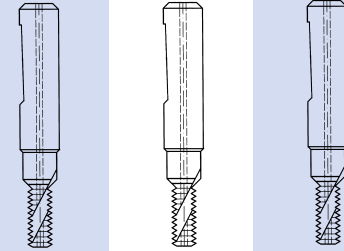
**"MGF" Thread Milling Tool
with rear chamfering tool
for UNF Thread ANSI B 1.1**

From shank diameters of 8 mm upwards, the "MGF" thread milling tools are supplied with a central internal coolant bore. On request, we can supply thread milling tools for fixed thread reaches, for screwed joints to DIN 3852.

Thread Reach $\approx 2 \times$ Nominal Diameter



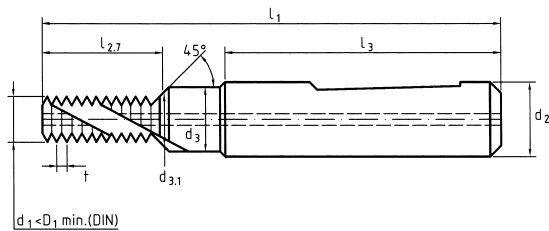
UNF



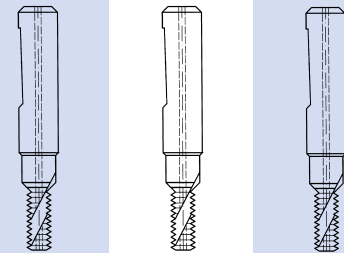
Type	MGF 970	MGF 992	MGF 993
Order number	80.970	80.992	80.993
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiCN	TiAlN

UNF Nom.- \varnothing	t thr./"	l ₁	Bore \varnothing	l _{2,7}	l ₃	d ₂	d ₃	d _{3,1}	Z			
Nr. 10	32	55	4,0	10,5	36	6	5,5	5,1	3			
Nr. 12	28	61	4,6	12,0	36	8	6,6	5,8	3			
1/4"	28	62	5,5	14,0	36	8	7,8	6,7	3	①	③	○
5/16"	24	73	6,8	17,3	40	10	9,0	8,2	3	①	③	○
3/8"	24	78	8,5	20,5	45	12	11,0	9,8	3	①	③	○
7/16"	20	86	9,8	23,2	45	14	13,5	11,4	3	①	③	○
1/2"	20	89	11,5	27,4	45	14	13,5	13,0	3	①	③	○
9/16"	18	102	12,8	30,3	48	16	15,5	14,6	4			
5/8"	18	102	14,5	34,5	48	18	17,5	16,2	4			

Thread Reach $\approx 1.5 \times$ Nominal Diameter



UNF



Type	MGF 981	MGF 973	MGF 976
Order number	80.981	80.973	80.976
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiCN	TiAlN

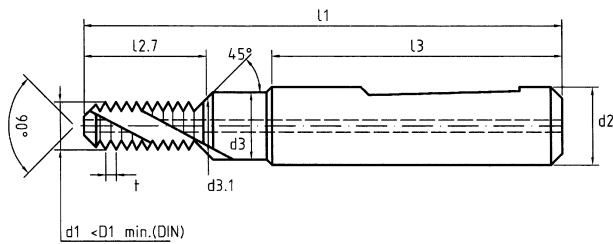
UNF Nom.- \varnothing	t thr./"	l ₁	Bore \varnothing	l _{2,7}	l ₃	d ₂	d ₃	d _{3,1}	Z			
Nr. 10	32	52	4,0	8,1	36	6	5,5	5,1	3			
Nr. 12	28	58	4,6	9,3	36	8	6,6	5,8	3			
1/4"	28	60	5,5	11,3	36	8	7,8	6,7	3	①	③	○
5/16"	24	69	6,8	13,0	40	10	9,0	8,2	3	①	③	○
3/8"	24	74	8,5	16,2	45	12	11,0	9,8	3	①	③	○
7/16"	20	81	9,8	18,1	45	14	13,5	11,4	3	①	③	○
1/2"	20	83	11,5	22,3	45	14	13,5	13,0	3	①	③	○
9/16"	18	95	12,8	23,3	48	16	15,5	14,6	4			
5/8"	18	95	14,5	26,0	48	18	17,5	16,2	4			



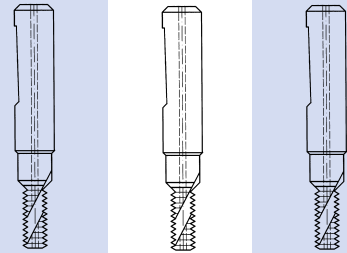
From shank diameters of 8 mm upwards, the "UMGF" thread milling tools are supplied with a central internal coolant bore.

"UMGF" Thread Milling Tool
with rear and front chamfering tool
for UNF Thread ANSI B 1.1

Variable Thread Reach max. ab. 2,0 x D



UNF



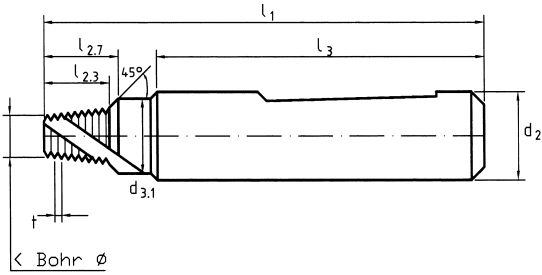
Type	UMGF 670	UMGF 692	UMGF 693
Order number	80.670	80.692	80.693
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiCN	TiAlN

UNF Nom.-Ø	t thr./"	l ₁	Bore Ø	l _{2.7}	l ₃	d ₂	d ₃	d _{3.1}	Z			
Nr. 10	32	55	4,0	10,5	36	6	5,5	5,1	3			
Nr. 12	28	61	4,6	12,0	36	8	6,6	5,8	3			
1/4"	28	62	5,5	14,0	36	8	7,8	6,7	3	○	○	○
5/16"	24	73	6,8	17,3	40	10	9,0	8,2	3	○	○	○
3/8"	24	78	8,5	20,5	45	12	11,0	9,8	3	○	○	○
7/16"	20	86	9,8	23,2	45	14	13,5	11,4	3	○	○	○
1/2"	20	89	11,5	27,4	45	14	13,5	13,0	3	○	○	○
9/16"	18	102	12,8	30,3	48	16	15,5	14,6	4			
5/8"	18	102	14,5	34,5	48	18	17,5	16,2	4			

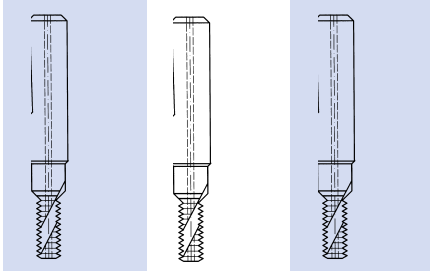


“MGF” Thread Milling Tool
with rear chamfering tool
for NPT Thread ANSI B 2.1

Thread Reach = nom length



NPT



Type	MGF 970	MGF 973	MGF 976
Order number	80.970	80.973	80.976
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiCN	TiAlN

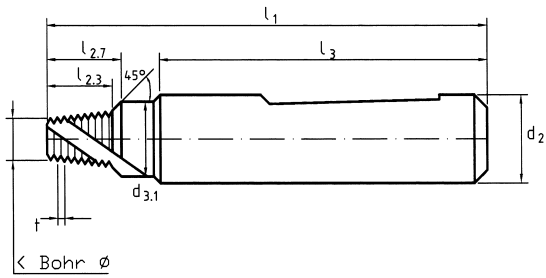
Nom.-Ø	t	l ₁	Bore Ø	l _{2.7}	l _{2.3}	l ₃	d ₂	d _{3.1}	Z			
1/16"	27	64	6,0	10,4	8,9	40	10	8,7	3	①		
1/8"	27	70	8,4	10,4	8,9	45	12	11,1	3	①	③	○
1/4"	18	81	10,8	15,4	13,4	48	16	14,5	4	①	③	○
3/8"	18	81	14,2	15,4	13,4	48	18	17,9	4	①	③	○

for Thread 1/2 – 14 NPT and larger use JEL Thread milling cutter „Tomill GS“

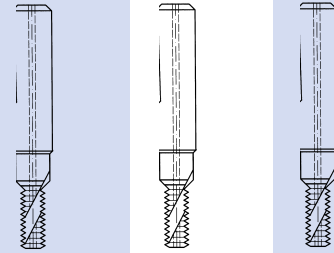


“MGF” Thread Milling Tool
with rear chamfering tool
for NPTF Thread ANSI B 2.1

Thread Reach = nom length



NPT



Type	MGF 970	MGF 973	MGF 976
Order number	80.970	80.973	80.976
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiCN	TiAlN

Nom.-Ø	t	l ₁	Bore Ø	l _{2.7}	l _{2.3}	l ₃	d ₂	d _{3.1}	Z			
1/16"	27	64	6,0	10,4	8,9	40	10	8,7	3			
1/8"	27	70	8,4	10,4	8,9	45	12	11,1	3	①	③	○
1/4"	18	81	10,8	15,4	13,4	48	16	14,5	4	①	③	○
3/8"	18	81	14,2	15,4	13,4	48	18	17,9	4	①	③	○

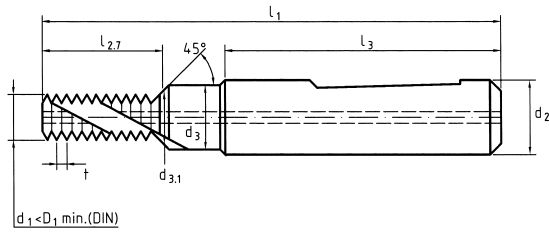
for Thread 1/2 – 14 NPT and larger use JEL Thread milling cutter „Tomill GS“



"MGF" Thread Milling Tool
with rear chamfering tool
for Whitworth Pipe Thread DIN ISO 228 and DIN 2999

From shank diameters of 8 mm upwards, the "MGF" thread milling tools are supplied with a central internal coolant bore. On request, we can supply thread milling tools for fixed thread reaches, for screwed joints to DIN 3852.

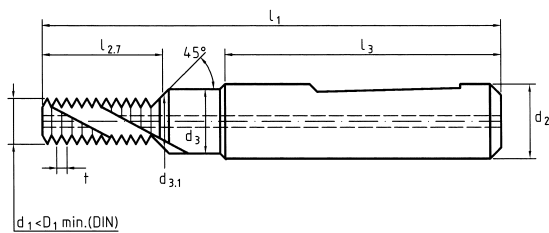
Thread Reach $\approx 2 \times$ Nominal Diameter



G			
Type	MGF 970	MGF 992	MGF 993
Order number	80.970	80.992	80.993
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiCN	TiAlN

Nom.- \varnothing	t thr./"	l ₁	Bore \varnothing	l _{2.7}	l ₃	d ₂	d ₃	d _{3.1}	Z			
G 1/16	28	73	6,7	16,7	40	10	9,0	8,0	3			
G 1/8	28	79	8,7	21,3	45	12	11,0	10,0	3	①	③	○
G 1/4	19	100	11,8	28,5	48	16	15,5	13,5	4	①	③	○
G 3/8	19	112	15,2	35,2	50	20	19,9	17,0	4	①		
G 1/2	14	127	19,0	44,1	56	25	24,0	21,3	5			

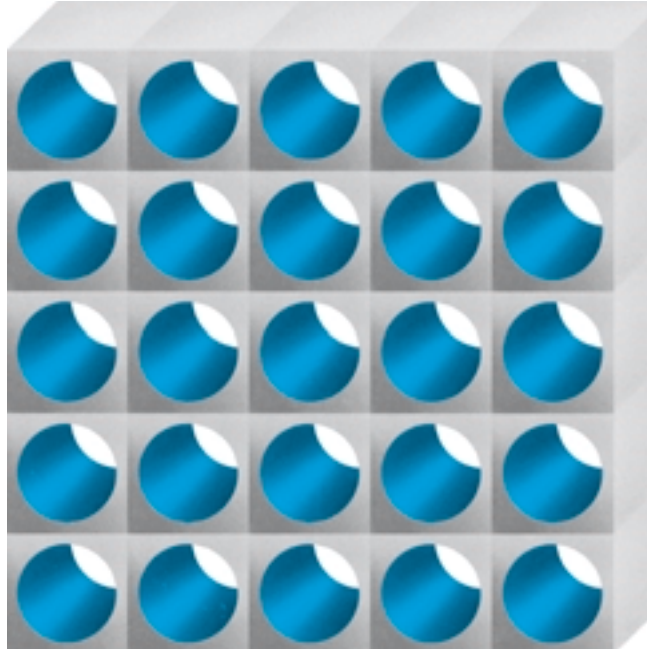
Thread Reach $\approx 1.5 \times$ Nominal Diameter



G			
Type	MGF 981	MGF 973	MGF 976
Order number	80.981	80.973	80.976
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiCN	TiAlN

Nom.- \varnothing	t thr./"	l ₁	Bore \varnothing	l _{2.7}	l ₃	d ₂	d ₃	d _{3.1}	Z			
G 1/16	28	69	6,7	13,0	40	10	9,0	8,0	3			
G 1/8	28	74	8,7	16,8	45	12	11,0	10,0	3	①	③	○
G 1/4	19	93	11,8	21,8	48	16	15,5	13,5	4	①	③	○
G 3/8	19	94	15,2	27,2	50	20	19,9	17,0	4	①		
G 1/2	14	118	19,0	35,0	56	25	24,0	21,3	5			

“BGF” and “UBGF” Drill and Thread Milling Tools



The JEL “BGF” thread milling tool, page 2.2
with rear chamfering tool,
for the 3-16 mm diameter range,
with corrected profile,
in solid carbide,
plain and coated.

The JEL “UBGF” thread milling tool, page 2.21
with rear and front chamfering tool,
for the 3-16 mm diameter range,
with corrected profile,
in solid carbide,
plain and coated.

**Now you only need one tool:
drilling, chamfering and thread milling
in one working operation**

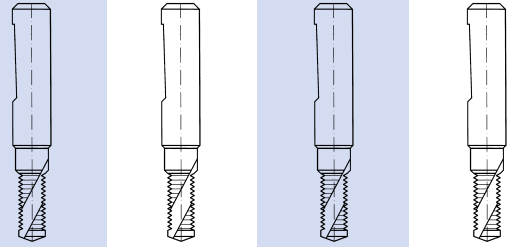


Recommendations for Use

“BGF” Drill and Thread Milling Tool
with rear chamfering tool
Thread reach: 2 x D and 1.5 x D
and 2,5 x D

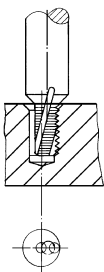
Solid Carbide
plain and coated

Tool Presentation to
DIN 6535 HE



Type	BGF 901	BGF 906/908	BGF 910	BGF 938/937
Thread reach	~ 2 x D	~ 2 x D	~ 1.5 x D	~ 1.5 x D
Bearing length	~ 1,8 x D	~ 1,8 x D	~ 1.3 x D	~ 1.3 x D
Point grinding	Helical grinding			
Point angle	140°	140°	140°	140°
Lateral effective cutting angle	27°	27°	27°	27°
Slot shape	narrow clamping slots			
Thread	back-ground profile, corrected			
Total length (DIN)	1897	1897	1897	1897
Shank diameter (DIN)	6535 HE	6535 HE/HA	6535 HE	6535 HE
Material	solid carbide	solid carbide	solid carbide	solid carbide
Surface	plain	TiN/TiAlN	plain	TiN/TiAlN

Main Material Groups	Material Sub-Groups	Hardness (HB)	Strength (N/mm ²)				
1. Steel	1.1 Magnetic soft iron	≤ 120	≤ 400				
	1.2 Constructional steel, case hardened steel	≤ 200	≤ 700				
	1.3 Carbon steel	≤ 250	≤ 850				
	1.4 Alloyed steel	≤ 250	≤ 850				
	1.5 Alloyed heat treated steel	> 250, ≤ 350	> 850, ≤ 1200				
	1.6 Alloyed heat treated steel	> 350	> 1200				
2. Stainless steel	2.1 Stainless steel, sulphuretted	≤ 250	≤ 850				
	2.2 Austenitic	≤ 250	≤ 850				
	2.3 Ferritic, ferritic and austenitic, martensitic	≤ 300	≤ 1000				
3. Cast iron	3.1 Gray cast iron	≤ 150	≤ 500	▲	●	▲	●
	3.2 Heat treated gray cast iron	> 150, ≤ 300	> 500, ≤ 1000	▲	●	▲	●
	3.3 Spherulitic graphite iron	≤ 200	≤ 700				
	3.4 Heat treated spherulitic graphite iron	> 200, ≤ 300	> 700, ≤ 1000				
	3.5 Annealed cast iron	≤ 200	≤ 700				
	3.6 Heat treated annealed cast iron	> 200, ≤ 300	> 700, < 1000				
4. Titanium	4.1 Pure titanium	≤ 200	≤ 700				
	4.2 Titanium alloys	≤ 270	≤ 900				
	4.3 Titanium alloys	> 270, ≤ 300	> 900, ≤ 1250				
5. Nickel	5.1 Pure nickel	≤ 150	≤ 500				
	5.2 Nickel alloys, temperature resistant	< 270	≤ 900				
	5.3 Nickel alloys, high temperature resistant	> 270, ≤ 350	> 900, ≤ 1200				
6. Copper	6.1 Unalloyed copper	≤ 100	≤ 350		▲ ^⑧		▲
	6.2 Short-chipping brass, bronze, gunmetal	≤ 200	≤ 700	● ^⑧		▲ ^⑧	
	6.3 Long-chipping brass	≤ 200	≤ 700	▲	●	▲	●
	6.4 Cu-Al-Fe alloy (Ampco)	≤ 470	≤ 1500				
7. Aluminium/ Magnesium	7.1 Al, Mg, unalloyed	≤ 100	≤ 350		▲ ^⑧		▲ ^⑧
	7.2 Al ductile alloys, breaking elongation (A ₅) <14 %	≤ 180	≤ 600	● ^⑧	● ^⑧	●	●
	7.3 Al ductile alloys, breaking elongation (A ₅) ≥14 %	≤ 180	≤ 600	● ^⑧	● ^⑧	●	●
	7.4 Al cast alloy, Si <10 %	< 180	≤ 600	●	●	●	●
	7.5 Al cast alloy, Si ≥10 % Mg alloy, Al whisker	≤ 180	≤ 600	▲	●	▲	●
8. Plastics	8.1 Thermoplastics			●	▲	●	▲
	8.2 Duroplastics			▲	●	▲	●
	8.3 Fibre-reinforced plastics				●		●
9. Hard materials	9.1 Cermets, Ferrotic, etc.	≤ 550	≤ 1700				



Geometry data and technology data for the use of tools are contained in the CNC programme which is supplied with the goods.

● = very well suited
▲ = well suited

① M12 use type 80.906

⑧ special programme: clear chips several times

⑨ modified tool with special cutting geometry: when the recommendation is the same, the coated tool allows higher tool life quantities.

“BGF” Drill and Thread Milling Tool Drilling, Chamfering and Thread Milling in One Operation

CNC technology makes it possible to use one combined drilling and thread milling tool to produce the bore, the chamfer and the inner thread in one work operation - and all in the interesting diameter range from 3 mm to 16 mm.

The machining sequence with a “BGF” thread milling tool, for upcut milling:

- ① Approach
- ② Drill and chamfer
- ③ Withdraw
- ④ Radial setting to nominal thread diameter - positioning loop -
- ⑤ Forward advance around the pitch with simultaneous circulation of the tool around the central axis of the thread
- ⑥ Radial movement back to the bore centre. - Retraction loop -
- ⑦ Reverse stroke from the finished thread bore.

Faster! More accurate! More cost-effective! The advantages.

The JEL drill and thread milling tool has enormous advantages over conventional drilling and thread tapping:

1. Main time is reduced by up to 50% thanks to high cutting speed and advance.
2. Saving on tool change times and tool changing.
3. Outstanding workpiece surface thanks to variation of the cutting parameters.
4. The desired thread dimension is produced by selecting the eccentricity, “e”.
5. No chip problems because short milling chips are produced.
6. No different tools for blind holes and through holes.
7. It is easier to machine materials which are difficult to cut.

8. A bush undercut is produced in the thread root.
9. No chip residues in the root.
10. Precise thread depth.
11. Low cutting pressure when machining thin-walled parts.

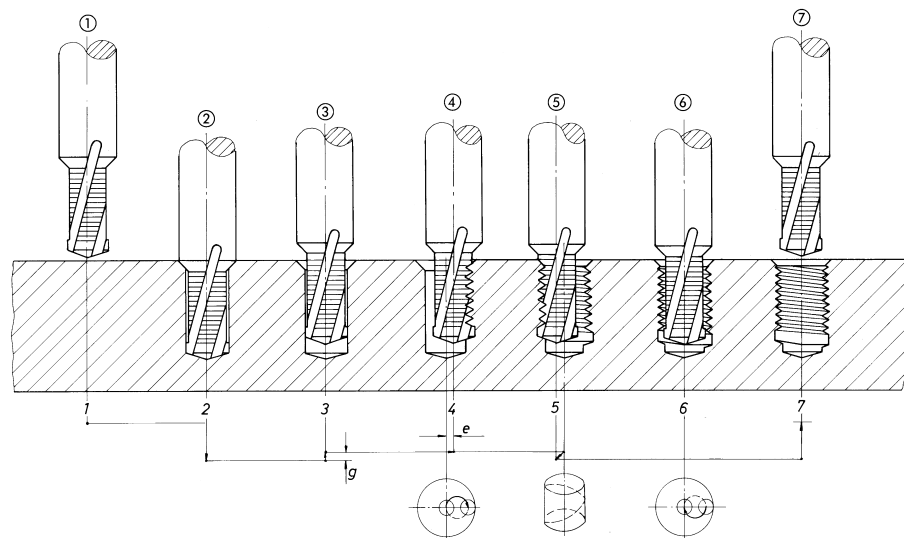


Illustration 1
Schematic sequence of work for upcut milling
with the “BGF” drill and thread milling tool

6 series of types for different materials with different surfaces for different applications

Type	Thread Reach (Thread Length)	Coating	Shank Form DIN 6535	Order Number
BGF 901	2 x D	plain	HE	80.901
BGF 906	2 x D	TiN	HE	80.906
BGF 908	2 x D	TiAlN	HE	80.906
BGF 941 ^①	2 x D	plain	HE	80.941
BGF 935 ^①	2 x D	TiN	HE	80.935
BGF 940 ^①	2 x D	TiAlN	HE	80.940
BGF 910	1.5 x D	plain	HE	80.910
BGF 938	1.5 x D	TiN	HE	80.938
BGF 937	1.5 x D	TiAlN	HE	80.937
BGF 911	1.5 x D	plain	HE	80.911
BGF 939	1.5 x D	TiN	HE	80.939
BGF 900	1.5 x D	TiAlN	HE	80.900
BGF 902	2.5 x D	plain	HE	80.902
BGF 918	2.5 x D	TiN	HE	80.918
BGF 961 ^①	2.5 x D	plain	HE	80.961
BGF 956 ^①	2.5 x D	TiN	HE	80.956

^① Types 941, 935, 940, 961 and 956 have Y-cooling bores.

Comprehensive tests have yielded outstanding values for the roundness and pitch precision of the thread which is produced.

The correction of the flank angles makes it possible to achieve a precise workpiece thread.

Nut thread : M 10
 Milling tool flank diameter : 7.07 mm
 Profile width at nominal diameter : 0.02 mm

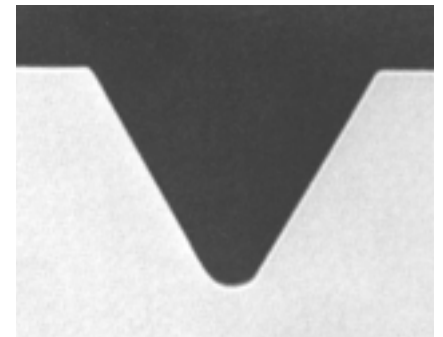


Illustration
M 10 thread profile

The hallmarks of the JEL drill and thread milling tools are a higher core cross section, two narrow geometrically optimised clamping slots and a special drilling tip. These characteristics result in good chip formation and low cutting pressures for drilling and chamfering as well as for thread milling.

Long tool life is guaranteed thanks to the solid carbide varieties which are used, with extra-fine grain quality, as well as the coating.

On request, we can also manufacture drill and thread milling tools for other thread lengths, and for other thread types and sizes.



Illustration
Sectional view of a thread produced with a drill and thread milling tool.

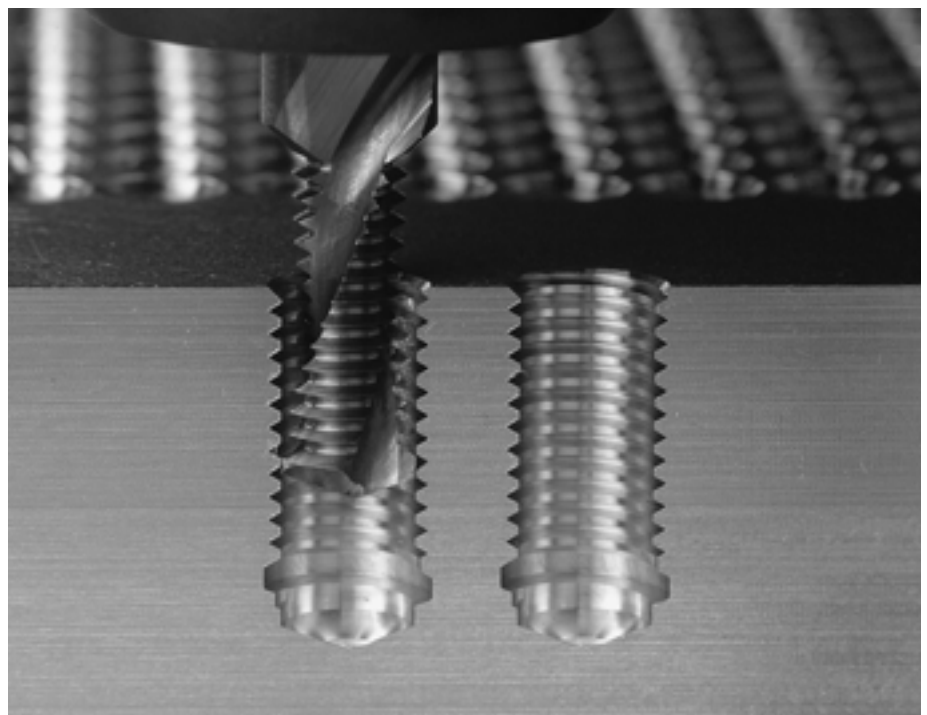


Illustration
Drill and thread milling with the "BGF" thread milling tool increases the surface quality and reduces the ancillary times.

Thanks to the variation of the parameters during thread milling, it is possible to influence the quality of the thread which is produced and the tool life quantity which can be achieved. Upcut milling yields a far higher tool life quantity as opposed to cut-down milling. Moreover, thanks to an additional "Z" movement on the inward and outward loop (which we recommend

in every case), and/or with a cut-down milling operation which directly follows the upcut milling, perfect and absolutely burr-free threads can be achieved. For a large number of quality requirements, programming with a "Z"-movement on the inward and outward loop is adequate (as shown in the schematic sequence). Burr-free superthreads can be achieved by the

following sequence: upcut/cut-down milling with "Z"-movement on the inward and outward loop. This machining sequence is shown in our programming example (Illustration 10). It should be emphatically stressed that both processes produce threads which conform to the standards.



These illustrations show the mathematical approach.

Beschreibung der Herstellfläche:

$$r_B = \begin{pmatrix} (R_B - s \cdot \cos \alpha_B) \cdot \cos \varphi + e \\ (R_B - s \cdot \cos \alpha_B) \cdot \sin \varphi \\ s \cdot \sin \alpha_B \end{pmatrix} \quad n_B = \begin{pmatrix} \sin \alpha_B \cdot \cos \varphi \\ \sin \alpha_B \cdot \sin \varphi \\ \cos \alpha_B \end{pmatrix}$$

Geschwindigkeit eines Punktes:

$$v = \omega \times r_B + \frac{p}{2\pi} \cdot \omega = \begin{pmatrix} -(R_B - s \cdot \cos \alpha_B) \cdot \sin \varphi \\ (R_B - s \cdot \cos \alpha_B) \cdot \cos \varphi + e \\ \frac{p}{2\pi} \end{pmatrix}$$

Nebenbedingung für die Berührlinie:

$$v \cdot n_B = 0 \quad \text{d.h.} \quad v \perp n_B$$

⇒ Berührlinie

Geometry data and technology data for the use of tools are contained in the CNC programme which is supplied with the goods. For example, this also includes the return traverse dimension "g"; the value must not fall below this limit, otherwise the chamfering will be destroyed during the milling (see the illustration).

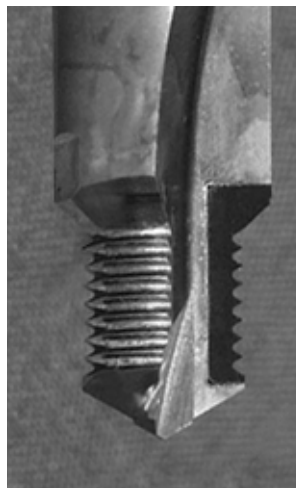
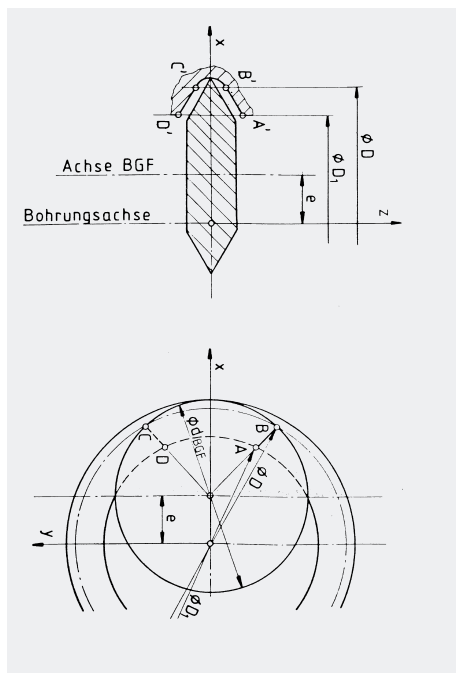
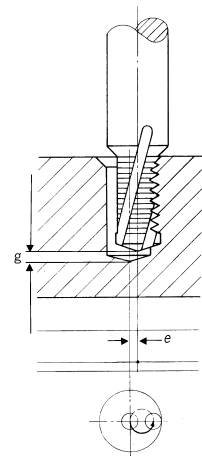


Illustration
Special tool



A CNC programme for a current control system in DIN language is attached to every “BGF” drill and thread milling tool.

An example from practice.

A CNC example of drilling, chamfering and thread milling, M8, with a thread reach of 16 mm, using a drill and thread milling tool.

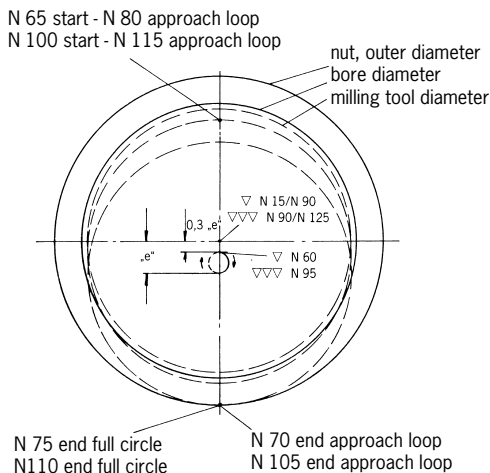


Illustration
Graphic representation of the machining procedure

```

CNC - PROGRAMM JEL PRAEZISIONSWERKZEUGE
Joh. u. Ernst Link GmbH + Co.KG          Telefon: 0711-78891-0
Ruppmannstr. 32                        Telefax: 0711-78891-37
70565 Stuttgart                          Datum: 31.10.1996

Programm zum Bohren, Senken und Gewindefraesen
fr: JEL/VE

Werkzeug:                               Werkstueckmaterial:   Gewinde:
JEL Thriller M8                          7.5 Al-Gussleg., Mg-Leg.  M8
Typ: 80906/TIN                            G-ALSi 10 Mg

Fraeserradius D1=3.170mm
Exzentrizitaet=0.830 mm

Programmierung: Sinumerik 3M4B           Gesamtzeit 4.82sec
Fraeseraussenbahn                         *****
Inkrementalbemessung
Fraesen im Gegenlauf

Schnittwerte:
Vc=200 m/min,                             n=9400 U/min
f(Bohren)=0.300 mm/U                       F(Bohren)=2820 mm/min
Fz(Fraesen)=0.070 mm/Zahn                  F(Fraesen)=1316 mm/min

*****
A c h t u n g: Bei Steuerungen, die den V o r s c h u b auf die
Mittelpunktsbahn beziehen, muessen die Klammerwerte verwendet werden.
*****

N10 G0 G53 G40 G80 G90 D0 Z0              Programm-Nr.:4711
N15 T1 M6                                  Zeichn.-Nr.: 00000
N20 G54 X0 Y0                              Artikel-Nr.: 80906010020
N25 Z1 D1 S9400 M3
B O H R E N
N35 G1 Z-1.00 F940 M8
N40 G1 Z-14.710 F2820
N45 G0 Z0
N50 G0 Z-13.710
N55 G1 Z-18.160
N60 G0 Z0
F R A E S E N I M G E G E N L A U F
N70 G0 Z-15.705
N75 G1 G91 X0 Y-0.249 F1316 (F110)
N80 G42 X0 Y3.170
N85 G02 X0 Y-6.921 I0 J-3.461 Z-0.188
N90 G02 X0 Y0 I0 J4.000 Z-1.250 (F273)
N95 G02 X0 Y6.921 I0 J3.461 Z-0.188 F3290 (F276)
N100 G0 G40 Y-3.170
N105 G1 Y0.249
N110 G0 G53 G40 G80 G90 D0 Z0 M95
N115 M30

VR _____ Programm ist urheberrechtlich geschuetzt. Unbefugte Weiter-
gabe ist verboten und wird strafrechtlich verfolgt! 4711
    
```

Illustration
CNC programme for a “BGF” drill and thread milling tool

Recommended Standard Values for Cutting Speed and Feed:

	Aluminium Alloys	Gray Cast Iron	Spherulitic Graphite Iron
Drilling-Cutting Speed v (m/min)	100–160	50–100	50–100
Drilling feed ≤ M6 f (mm/rev.)	0.10–0.20	0.10–0.20	0.10–0.20
≤ M12	0.12–0.35	0.10–0.30	0.10–0.20
Milling-Cutting Speed v (m/min)	100–300	50–100	50–100
Milling feed ≤ M6 f _z (mm/tooth)	0.03–0.07	0.02–0.04	0.03–0.05
≤ M12	0.05–0.07	0.05–0.07	0.05–0.08

If no command is available in the CNC programme for the “Outside Milling Tool Path Speed” this parameter is calculated using the following formula:

$$F_{\text{Outside milling tool}} = n \cdot z \cdot f_z$$

$$F_{\text{Midpoint path}} = \frac{n \cdot z \cdot f_z \cdot 2e}{AD_M}$$

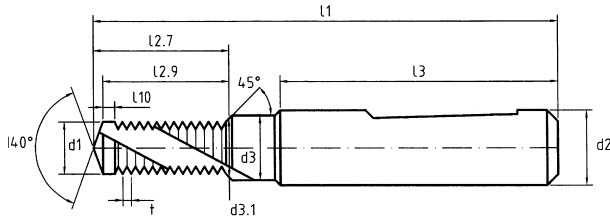
- F = path speed (mm/min)
- n = number of revolutions (r.p.m.)
- Z = number of teeth
- f_z = milling feed (mm/tooth)
- e = eccentricity (mm)
- AD_M = outside diameter of the nut (mm)



**“BGF” Drill and Thread Milling Tool
with rear chamfering tool
for DIN 13 metrical ISO Thread**

On request, we can supply drill and thread milling tools for other thread reaches, for screwed joints to DIN 3852.
Tool with index $\text{\textcircled{1}}$ can also be supplied with smooth cylinder shank to DIN 6535 HA.
Order number 88.901 instead of order number 80.901, order number 88.906 instead of order number 80.906.

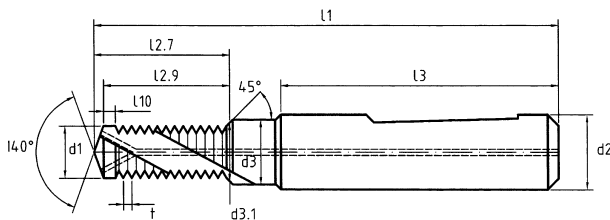
Thread Reach $\approx 2 \times$ Nominal Diameter



M			
Type	BGF 901	BGF 906	BGF 908
Order number	80.901	80.906	80.908
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiN	TiAlN

Nom.- \varnothing	t	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}			
M 3	0.5	49	7.3	6.9	36	0.5	2.50	6	3.4	3.3	①	②	○
M 4	0.7	49	9.4	8.9	36	0.7	3.30	6	4.5	4.3	①	②	○
M 5	0.8	55	11.6	10.9	36	0.8	4.20	6	5.5	5.3	①	②	○
M 6	1.0	62	14.5	13.7	36	1.0	5.00	8	6.6	6.3	① ^①	② ^①	○
M 8	1.25	74	18.2	17.2	40	1.25	6.75	10	9.0	8.3	① ^①	② ^①	○
M 10	1.5	79	23.4	22.1	45	1.5	8.50	12	11.0	10.3	① ^①	② ^①	○
M 12	1.75	89	27.1	25.5	45	1.5	10.25	14	13.5	12.3	① ^①	② ^①	○
M 14	2.0	102	32.8	31.0	48	1.5	12.00	16	15.5	14.3	①		
M 16	2.0	102	37.1	35.0	48	1.5	14.00	18	17.5	16.3	①		

Thread Reach $\approx 2 \times$ Nominal Diameter



M			
Type	BGF 941	BGF 935	BGF 940
Order number	80.941	80.935	80.940
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiN	TiAlN

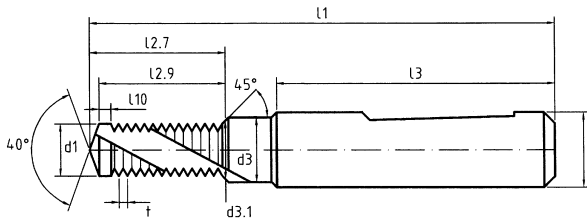
Nom.- \varnothing	t	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}			
M 3	0.5	49	7.3	6.9	36	0.5	2.50	6	3.4	3.3	with Y-cooling bores	⑤	○
M 4	0.7	49	9.4	8.9	36	0.7	3.30	6	4.5	4.3	with Y-cooling bores	⑤	○
M 5	0.8	55	11.6	10.9	36	0.8	4.20	6	5.5	5.3	with Y-cooling bores	⑤	○
M 6	1.0	62	14.5	13.7	36	1.0	5.00	8	6.6	6.3	with Y-cooling bores	⑤	○
M 8	1.25	74	18.2	17.2	40	1.25	6.75	10	9.0	8.3	with Y-cooling bores	⑤	○
M 10	1.5	79	23.4	22.1	45	1.5	8.50	12	11.0	10.3	with Y-cooling bores	⑤	○
M 12	1.75	89	27.1	25.5	45	1.5	10.25	14	13.5	12.3	with Y-cooling bores	⑤	○
M 14	2.0	102	32.8	31.0	48	1.5	12.00	16	15.5	14.3			
M 16	2.0	102	37.1	35.0	48	1.5	14.00	18	17.5	16.3			



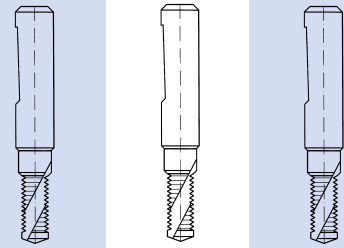
On request, we can supply drill and thread milling tools for other thread reaches, for screwed joints to DIN 3852. We can supply internal coolant supply on request.

“BGF” Drill and Thread Milling Tool with rear chamfering tool for DIN 13 metrical ISO Thread

Thread Reach $\approx 1.5 \times$ Nominal Diameter



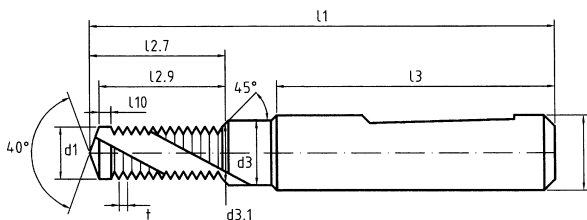
M



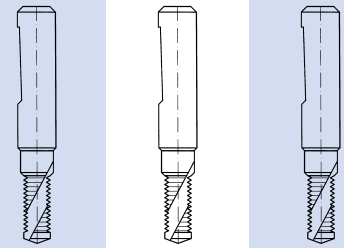
Type	BGF 910	BGF 938	BGF 937
Order number	80.910	80.938	80.937
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiN	TiAlN

Nom.- \varnothing	t	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}			
M 3	0.5	48	5.8	5.4	36	0.5	2.50	6	3.4	3.3			
M 4	0.7	47	7.3	6.8	36	0.7	3.30	6	4.5	4.3	①	②	○
M 5	0.8	53	9.2	8.5	36	0.8	4.20	6	5.5	5.3	①	②	○
M 6	1.0	59	11.5	10.2	36	1.0	5.00	8	6.6	6.3	①	②	○
M 8	1.25	70	14.4	13.4	40	1.25	6.75	10	9.0	8.3	①	②	○
M 10	1.5	75	18.9	17.6	45	1.5	8.50	12	11.0	10.3	①	②	○
M 12	1.75	84	21.8	20.2	45	1.5	10.25	14	13.5	12.3	①		
M 14	2.0	94	24.8	23.0	48	1.5	12.00	16	15.5	14.3			
M 16	2.0	94	29.1	27.0	48	1.5	14.00	18	17.5	16.3			

Thread Reach $\approx 1.5 \times$ Nominal Diameter



M



Type	BGF 911	BGF 939	BGF 900
Order number	80.911	80.939	80.900
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiN	TiAlN

Nom.- \varnothing	t	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}			
M 3	0.5	48	5.8	5.4	36	0.5	2.50	6	3.4	3.3			
M 4	0.7	47	7.3	6.8	36	0.7	3.30	6	4.5	4.3			
M 5	0.8	53	9.2	8.5	36	0.8	4.20	6	5.5	5.3	①		
M 6	1.0	59	11.5	10.2	36	1.0	5.00	8	6.6	6.3	①	②	○
M 8	1.25	70	14.4	13.4	40	1.25	6.75	10	9.0	8.3	①	②	○
M 10	1.5	75	18.9	17.6	45	1.5	8.50	12	11.0	10.3	①	②	○
M 12	1.75	84	21.8	20.2	45	1.5	10.25	14	13.5	12.3	①		
M 14	2.0	94	24.8	23.0	48	1.5	12.00	16	15.5	14.3			
M 16	2.0	94	29.1	27.0	48	1.5	14.00	18	17.5	16.3			

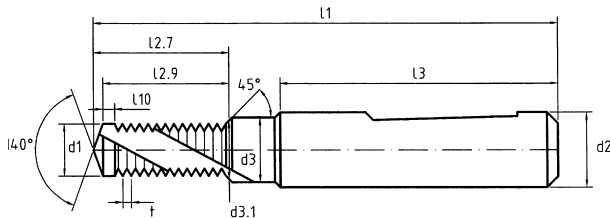
①-⑧ = symbols for the price group, supplied ex warehouse ○ = symbol: price and delivery on request





**“BGF” Drill and Thread Milling Tool
with rear chamfering tool
for DIN 13 metrical ISO Thread**

On request, we can supply drill and thread milling tools for other thread reaches, for screwed joints to DIN 3852.
Tool with index Ⓞ can also be supplied with smooth cylinder shank to DIN 6535 HA.
Order number 88.901 instead of order number 80.901, order number 88.906 instead of order number 80.906.

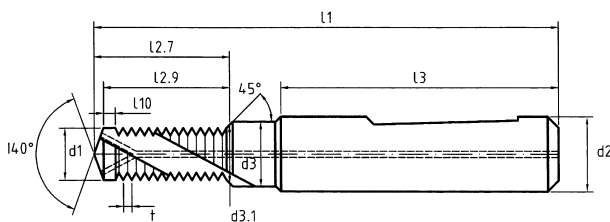
Thread Reach $\approx 2,5 \times$ Nominal





		M	
			
Type		BGF 902	BGF 918
Order number		80.902	80.918
Shank diameter		DIN 6535 Form HE	DIN 6535 Form HE
Material		Solid carbide	Solid carbide
Surface		plain	TiN

Nom.- \varnothing	t	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}		
M 6	1.0	62	16,8	15,8	36	1.0	5.00	8	6.6	6.3	①Ⓞ	②Ⓞ
M 8	1.25	74	22,3	21,0	40	1.25	6.75	10	9.0	8.3	①Ⓞ	②Ⓞ
M 10	1.5	79	26,7	25,1	45	1.5	8.50	12	11.0	10.3	①Ⓞ	②Ⓞ
M 12	1.75	89	32,8	30,9	45	1.5	10.25	14	13.5	12.3	①Ⓞ	②Ⓞ

Thread Reach $\approx 2,5 \times$ Nominal Diameter



		M	
			
Type		BGF 961	BGF 956
Order number		80.961	80.956
Shank diameter		DIN 6535 Form HE	DIN 6535 Form HE
Material		Solid carbide	Solid carbide
Surface		plain	TiN

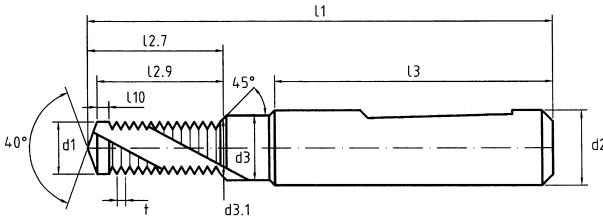
Nom.- \varnothing	t	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}		
M 6	1.0	62	16,8	15,8	36	1.0	5.00	8	6.6	6.3	⑤	⑦
M 8	1.25	74	22,3	21,0	40	1.25	6.75	10	9.0	8.3	⑤	⑦
M 10	1.5	79	26,7	25,1	45	1.5	8.50	12	11.0	10.3	⑤	⑦
M 12	1.75	89	32,8	30,9	45	1.5	10.25	14	13.5	12.3	⑤	⑦



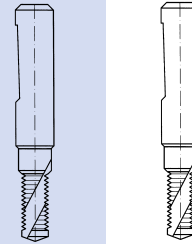
“BGF” Drill and Thread Milling Tool
with rear chamfering tool
for EG-ISO metrical Thread DIN 8140 Sect.2

On request, we can supply drill and thread milling tools for other thread reaches, for screwed joints to DIN 3852.
Tool with index © can also be supplied with smooth cylinder shank to DIN 6535 HA.
Order number 88.901 instead of order number 80.901, order number 88.906 instead of order number 80.906.

Thread Reach $\approx 2 \times$ Nominal Diameter



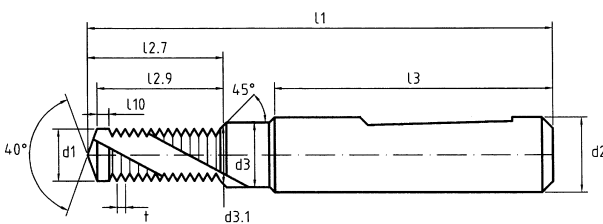
EG



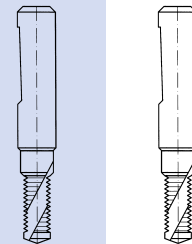
Type	BGF 901	BGF 906
Order number	80.901	80.906
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide
Surface	plain	TiN

Nom.- \varnothing	t	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}		
M 6	1.0	73	16,8	15,8	40	1.0	6,30	10	9,0	7,6	①	②
M 8	1.25	78	22,3	21,0	45	1.25	8,37	12	11,0	9,9	①	②
M 10	1.5	88	26,7	25,1	45	1.5	10,45	14	13,5	12,3	①	②
M 12	1.75	102	32,8	30,9	45	1.5	12,52	16	15,5	14,6	①	②

Thread Reach $\approx 2 \times$ Nominal Diameter



EG



Type	BGF 941	BGF 935
Order number	80.941	80.935
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide
Surface	plain	TiN

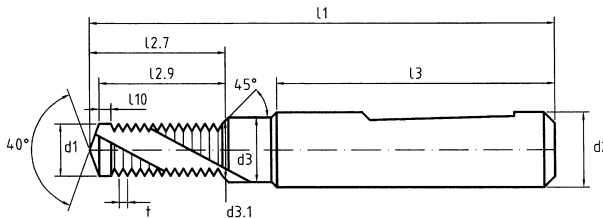
Nom.- \varnothing	t	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}		
M 6	1.0	73	16,8	15,8	40	1.0	6,30	10	9,0	7,6	⑤	⑦
M 8	1.25	78	22,3	21,0	45	1.25	8,37	12	11,0	9,9	⑤	⑦
M 10	1.5	88	26,7	25,1	45	1.5	10,45	14	13,5	12,3	⑤	⑦
M 12	1.75	102	32,8	30,9	45	1.5	12,52	16	15,5	14,6	⑤	⑦



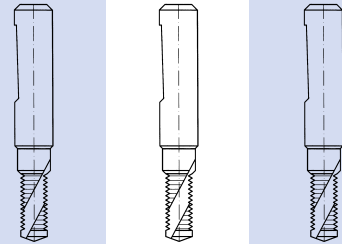
On request, we can supply drill and thread milling tools for other thread reaches, for screwed joints to DIN 3852. We can supply internal coolant supply on request.

“BGF” Drill and Thread Milling Tool with rear chamfering tool for DIN 13 metrical fine ISO Thread

Thread Reach $\approx 1.5 \times$ Nominal Diameter



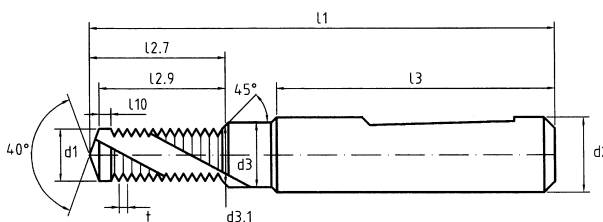
MF



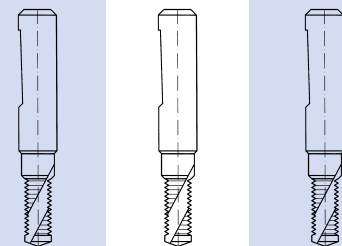
Type	BGF 910	BGF 938	BGF 937
Order number	80.910	80.938	80.937
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiN	TiAlN

Nom.- \varnothing	t	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}			
M 4 x 0,5	0,5	49	7,5	6,9	36	0,5	3,50	6	4,5	4,3			
M 5 x 0,5	0,5	55	9,1	8,4	36	0,5	4,50	6	5,5	5,3			
M 6 x 0,75	0,75	62	11,1	10,3	36	0,75	5,25	8	6,6	6,3			
M 8 x 1	1	70	14,8	13,7	40	1,0	7,00	10	9,0	8,3	①		
M 10 x 1	1	74	18,1	16,7	45	1,0	9,00	12	11,0	10,3	①		
M 12 x 1	1	83	20,4	18,7	45	1,0	11,00	14	13,5	12,3	①		
M 12 x 1,5	1,5	83	22,2	20,6	45	1,5	10,50	14	13,5	12,3	①		
M 14 x 1,5	1,5	96	25,5	23,6	48	1,5	12,50	16	15,5	14,3			
M 16 x 1,5	1,5	95	28,8	26,6	48	1,5	14,50	18	17,5	16,3			

Thread Reach $\approx 1.5 \times$ Nominal Diameter



MF



Type	BGF 911	BGF 939	BGF 900
Order number	80.911	80.939	80.900
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiN	TiAlN

Nom.- \varnothing	t	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}			
M 4 x 0,5	0,5	49	7,5	6,9	36	0,5	3,50	6	4,5	4,3			
M 5 x 0,5	0,5	55	9,1	8,4	36	0,5	4,50	6	5,5	5,3			
M 6 x 0,75	0,75	62	11,1	10,3	36	0,75	5,25	8	6,6	6,3			
M 8 x 1	1	70	14,8	13,7	40	1,0	7,00	10	9,0	8,3	①		
M 10 x 1	1	74	18,1	16,7	45	1,0	9,00	12	11,0	10,3	①		
M 12 x 1	1	83	20,4	18,7	45	1,0	11,00	14	13,5	12,3	①		
M 12 x 1,5	1,5	83	22,2	20,6	45	1,5	10,50	14	13,5	12,3	①		
M 14 x 1,5	1,5	96	25,5	23,6	48	1,5	12,50	16	15,5	14,3			
M 16 x 1,5	1,5	95	28,8	26,6	48	1,5	14,50	18	17,5	16,3			

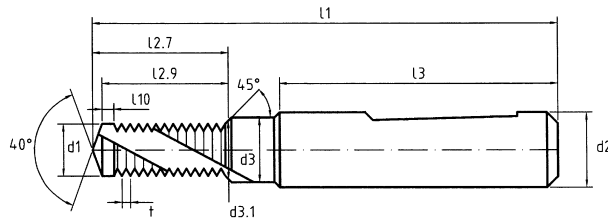
①-⑧ = symbols for the price group, supplied ex warehouse ○ = symbol: price and delivery on request



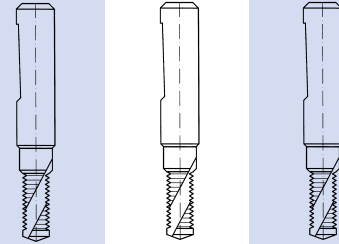
On request, we can supply drill and thread milling tools for other thread reaches, for screwed joints to DIN 3852. We can supply internal coolant supply on request.

“BGF” Drill and Thread Milling Tool with rear chamfering tool for UNC Thread ANSI B 1.1

Thread Reach $\approx 1.5 \times$ Nominal Diameter



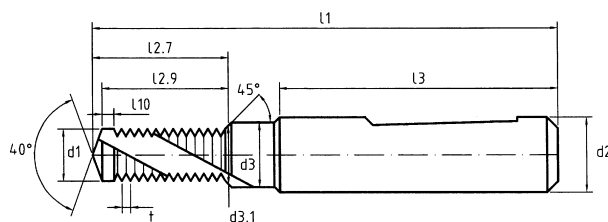
UNC



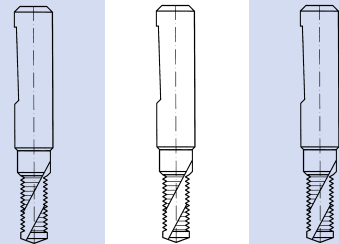
Type	BGF 910	BGF 938	BGF 937
Order number	80.910	80.938	80.937
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiN	TiAlN

UNC Nom.- \varnothing	t thr./"	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}
Nr. 10	24	53	9,8	9,2	36	1,1	3,77	6	5,5	5,1
Nr. 12	24	59	9,9	9,2	36	1,1	4,43	8	6,6	5,8
1/4"	20	58	11,9	11,1	36	1,3	5,08	8	7,8	6,7
5/16"	18	70	14,8	13,8	40	1,4	6,53	10	9,0	8,2
3/8"	16	74	18,2	17,0	45	1,5	7,94	12	11,0	9,8
7/16"	14	84	20,6	19,2	45	1,5	9,30	14	13,5	11,4
1/2"	13	81	22,3	20,7	45	1,5	10,75	14	13,5	13,0
9/16"	12	96	26,2	24,3	48	1,5	12,08	16	15,5	14,6
5/8"	11	95	28,5	26,4	48	1,5	13,57	18	17,5	16,2

Thread Reach $\approx 1.5 \times$ Nominal Diameter



UNC



Type	BGF 911	BGF 939	BGF 900
Order number	80.911	80.939	80.900
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiN	TiAlN

UNC Nom.- \varnothing	t thr./"	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}
Nr. 10	24	53	9,8	9,2	36	1,1	3,77	6	5,5	5,1
Nr. 12	24	59	9,9	9,2	36	1,1	4,43	8	6,6	5,8
1/4"	20	58	11,9	11,1	36	1,3	5,08	8	7,8	6,7
5/16"	18	70	14,8	13,8	40	1,4	6,53	10	9,0	8,2
3/8"	16	74	18,2	17,0	45	1,5	7,94	12	11,0	9,8
7/16"	14	84	20,6	19,2	45	1,5	9,30	14	13,5	11,4
1/2"	13	81	22,3	20,7	45	1,5	10,75	14	13,5	13,0
9/16"	12	96	26,2	24,3	48	1,5	12,08	16	15,5	14,6
5/8"	11	95	28,5	26,4	48	1,5	13,57	18	17,5	16,2

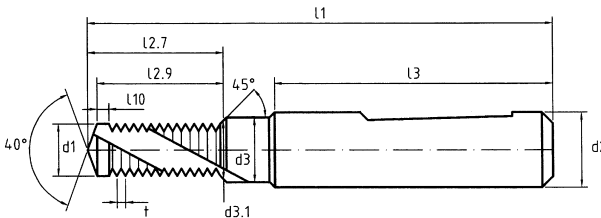
①⑧ = symbols for the price group, supplied ex warehouse ○ = symbol: price and delivery on request



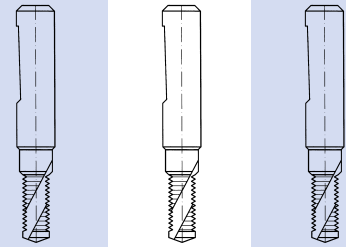
On request, we can supply drill and thread milling tools for other thread reaches, for screwed joints to DIN 3852. We can supply internal coolant supply on request.

“BGF” Drill and Thread Milling Tool with rear chamfering tool for UNF Thread ANSI B 1.1

Thread Reach $\approx 1.5 \times$ Nominal Diameter



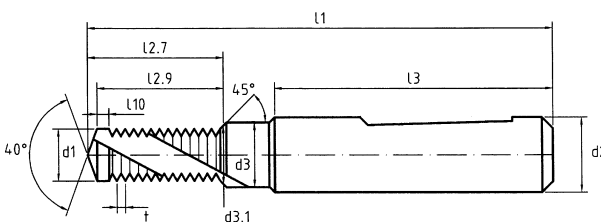
UNF



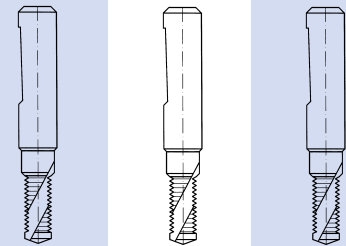
Type	BGF 910	BGF 938	BGF 937
Order number	80.910	80.938	80.937
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiN	TiAlN

UNF Nom.- \varnothing	t thr./"	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}
Nr. 10	32	55	9,2	8,6	36	0,8	4,03	6	5,5	5,1
Nr. 12	28	59	10,5	9,8	36	0,9	4,58	8	6,6	5,8
1/4"	28	58	11,5	10,7	36	0,9	5,44	8	7,8	6,7
5/16"	24	70	14,5	13,5	40	1,1	6,88	10	9,0	8,2
3/8"	24	75	17,0	15,7	45	1,1	8,47	12	11,0	9,8
7/16"	20	84	20,3	18,8	45	1,3	9,84	14	13,5	11,4
1/2"	20	83	21,8	20,0	45	1,3	11,43	14	13,5	13,0
9/16"	18	95	25,7	23,7	48	1,4	12,88	16	15,5	14,6
5/8"	18	94	27,4	25,2	48	1,4	14,46	18	17,5	16,2

Thread Reach $\approx 1.5 \times$ Nominal Diameter



UNF



Type	BGF 911	BGF 939	BGF 900
Order number	80.911	80.939	80.900
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiN	TiAlN

UNF Nom.- \varnothing	t thr./"	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}
Nr. 10	32	55	9,2	8,6	36	0,8	4,03	6	5,5	5,1
Nr. 12	28	59	10,5	9,8	36	0,9	4,58	8	6,6	5,8
1/4"	28	58	11,5	10,7	36	0,9	5,44	8	7,8	6,7
5/16"	24	70	14,5	13,5	40	1,1	6,88	10	9,0	8,2
3/8"	24	75	17,0	15,7	45	1,1	8,47	12	11,0	9,8
7/16"	20	84	20,3	18,8	45	1,3	9,84	14	13,5	11,4
1/2"	20	83	21,8	20,0	45	1,3	11,43	14	13,5	13,0
9/16"	18	95	25,7	23,7	48	1,4	12,88	16	15,5	14,6
5/8"	18	94	27,4	25,2	48	1,4	14,46	18	17,5	16,2

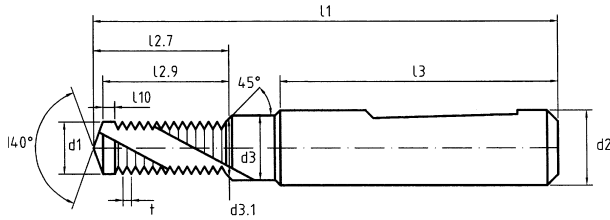
①⑧ = symbols for the price group, supplied ex warehouse ○ = symbol: price and delivery on request



“BGF” Drill and Thread Milling Tool
with rear chamfering tool
for Whitworth Pipe Thread DIN ISO 228 and DIN 2999

On request, we can supply drill and thread milling tools for other thread reaches, for screwed joints to DIN 3852. We can supply internal coolant supply on request.

Thread Reach $\approx 2 \times$ Nominal Diameter

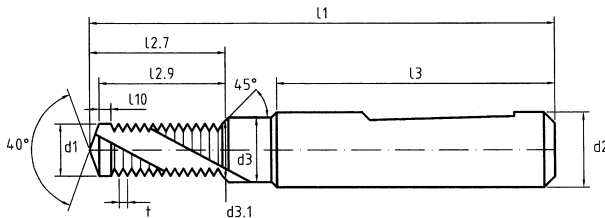


G Rp				
	Type	BGF 901	BGF 906	BGF 908
	Order number	80.901	80.906	80.908
	Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
	Material	Solid carbide	Solid carbide	Solid carbide
	Surface	plain	TiN	TiAlN

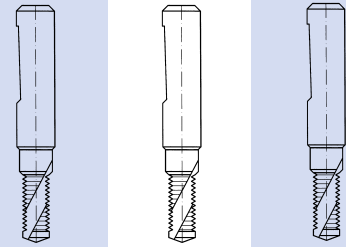
Nom.- \varnothing	t thr. ^m	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}			
G 1/16	28	74	17,1	16,1	40	0,9	6,68	10	9,0	8,0	① ②		
G 1/8	28	79	22,0	20,7	45	0,9	8,69	12	11,0	10,0			
G 1/4	19	102	29,4	27,6	48	1,3	11,65	16	15,5	13,5			
G 3/8	19	102	36,7	34,4	48	1,3	15,13	18	17,5	17,0			
Rp 1/16	28	74	17,1	16,1	40	0,9	6,56	10	9,0	8,0			
Rp 1/8	28	79	22,0	20,7	45	0,9	8,56	12	11,0	10,0			
Rp 1/4	19	102	29,4	27,6	48	1,3	11,46	16	15,5	13,5			
Rp 3/8	19	102	36,7	34,4	48	1,3	14,96	18	17,5	17,0			

**“BGF” Drill and Thread Milling Tool
with rear chamfering tool
for Whitworth Pipe Thread DIN ISO 228 and DIN 2999**

Thread Reach $\approx 1.5 \times$ Nominal Diameter



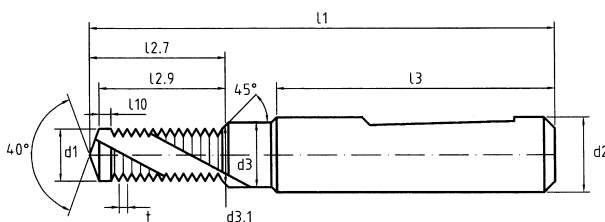
**G
Rp**



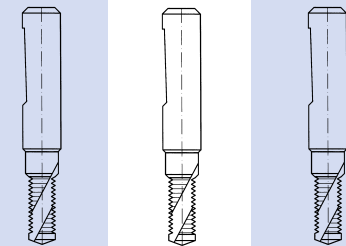
Type	BGF 910	BGF 938	BGF 937
Order number	80.910	80.938	80.937
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiN	TiAlN

Nom.- \varnothing	t thr./"	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}
G 1/16	28	70	13,5	12,5	40	0,9	6,68	10	9,0	8,0
G 1/8	28	74	16,6	15,3	45	0,9	8,69	12	11,0	10,0
G 1/4	19	95	22,7	20,9	48	1,3	11,65	16	15,5	13,5
G 3/8	19	94	28,6	26,3	48	1,3	15,13	18	17,5	17,0
Rp 1/16	28	70	13,5	12,5	40	0,9	6,56	10	9,0	8,0
Rp 1/8	28	74	16,6	15,3	45	0,9	8,56	12	11,0	10,0
Rp 1/4	19	95	22,7	20,9	48	1,3	11,46	16	15,5	13,5
Rp 3/8	19	94	28,6	26,3	48	1,3	14,96	18	17,5	17,0

Thread Reach $\approx 1.5 \times$ Nominal Diameter



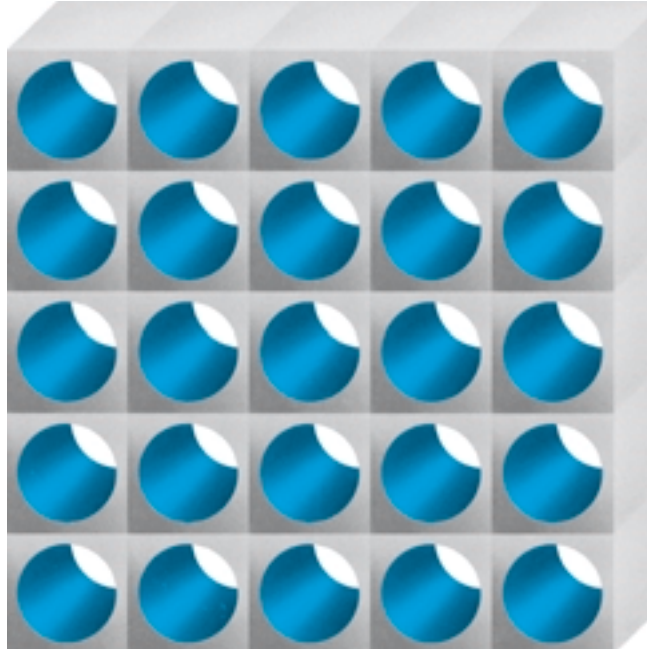
**G
Rp**



Type	BGF 911	BGF 939	BGF 900
Order number	80.911	80.939	80.900
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiN	TiAlN

Nom.- \varnothing	t thr./"	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}
G 1/16	28	70	13,5	12,5	40	0,9	6,68	10	9,0	8,0
G 1/8	28	74	16,6	15,3	45	0,9	8,69	12	11,0	10,0
G 1/4	19	95	22,7	20,9	48	1,3	11,65	16	15,5	13,5
G 3/8	19	94	28,6	26,3	48	1,3	15,13	18	17,5	17,0
Rp 1/16	28	70	13,5	12,5	40	0,9	6,56	10	9,0	8,0
Rp 1/8	28	74	16,6	15,3	45	0,9	8,56	12	11,0	10,0
Rp 1/4	19	95	22,7	20,9	48	1,3	11,46	16	15,5	13,5
Rp 3/8	19	94	28,6	26,3	48	1,3	14,96	18	17,5	17,0

The “UBGF” Drill and Thread Milling Tool



The “UBGF” Drill and Thread Milling Tool
with rear and front chamfering tool,
for the 3-16 mm diameter range,
with corrected profile,
in solid carbide,
plain and coated.

**Now you only need one tool:
drilling, chamfering and thread milling
in one working operation**

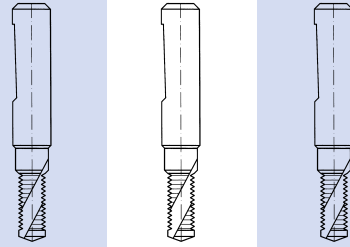


Recommendations for Use

“UBGF” Drill and Thread Milling Tool
with rear and front chamfering
tools
Variable thread reach

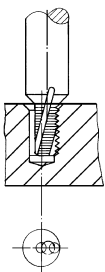
Solid Carbide
plain and coated

Tool Presentation to
DIN 6535 HE



Type	UBGF 601	UBGF 606	UBGF 608
Thread reach	variable	variable	variable
Bearing length	variable	variable	variable
Point grinding		Helical grinding	
Point angle	140°/90°	140°/90°	140°/90°
Lateral effective cutting angle	27°	27°	27°
Slot shape	narrow clamping slots		
Thread	back-ground profile, corrected		
Total length (DIN)	1897	1897	1897
Shank diameter (DIN)	6535 HE	6535 HE	6535 HE
Material	solid carbide	solid carbide	solid carbide
Surface	plain	TiN	TiAlN

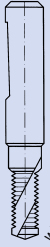
Main Material Groups	Material Sub-Groups	Hardness (HB)	Strength (N/mm ²)			
1. Steel	1.1 Magnetic soft iron	≤ 120	≤ 400			
	1.2 Constructional steel, case hardened steel	≤ 200	≤ 700			
	1.3 Carbon steel	≤ 250	≤ 850			
	1.4 Alloyed steel	≤ 250	≤ 850			
	1.5 Alloyed heat treated steel	> 250, ≤ 350	> 850, ≤ 1200			
	1.6 Alloyed heat treated steel	> 350	> 1200			
2. Stainless steel	2.1 Stainless steel, sulphuretted	≤ 250	≤ 850			
	2.2 Austenitic	≤ 250	≤ 850			
	2.3 Ferritic, ferritic and austenitic, martensitic	≤ 300	≤ 1000			
3. Cast iron	3.1 Gray cast iron	≤ 150	≤ 500	▲	●	●
	3.2 Heat treated gray cast iron	> 150, ≤ 300	> 500, ≤ 1000	▲	●	●
	3.3 Spherulitic graphite iron	≤ 200	≤ 700			
	3.4 Heat treated spherulitic graphite iron	> 200, ≤ 300	> 700, ≤ 1000			
	3.5 Annealed cast iron	≤ 200	≤ 700			
	3.6 Heat treated annealed cast iron	> 200, ≤ 300	> 700, < 1000			
4. Titanium	4.1 Pure titanium	≤ 200	≤ 700			
	4.2 Titanium alloys	≤ 270	≤ 900			
	4.3 Titanium alloys	> 270, ≤ 300	> 900, ≤ 1250			
5. Nickel	5.1 Pure nickel	≤ 150	≤ 500			
	5.2 Nickel alloys, temperature resistant	< 270	≤ 900			
	5.3 Nickel alloys, high temperature resistant	> 270, ≤ 350	> 900, ≤ 1200			
6. Copper	6.1 Unalloyed copper	≤ 100	≤ 350		▲ [®]	▲ [®]
	6.2 Short-chipping brass, bronze, gunmetal	≤ 200	≤ 700	● [®]		
	6.3 Long-chipping brass	≤ 200	≤ 700	▲	●	●
	6.4 Cu-Al-Fe alloy (Ampco)	≤ 470	≤ 1500			
7. Aluminium/ Magnesium	7.1 Al, Mg unalloyed	≤ 100	≤ 350		▲ [®]	▲ [®]
	7.2 Al ductile alloys, breaking elongation (A ₅) <14 %	≤ 180	≤ 600	● [®]	● [®]	● [®]
	7.3 Al ductile alloys, breaking elongation (A ₅) ≥14 %	≤ 180	≤ 600	● [®]	● [®]	● [®]
	7.4 Al cast alloy, Si <10 %	< 180	≤ 600	▲	●	●
	7.5 Al cast alloy, Si ≥ 10 % Mg alloy, Al whisker	≤ 180	≤ 600	▲	●	●
8. Plastics	8.1 Thermoplastics			●	▲	▲
	8.2 Duroplastics			▲	●	●
	8.3 Fibre-reinforced plastics				●	●
9. Hard materials	9.1 Cermet, Ferrotic, etc.	≤ 550	≤ 1700			



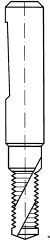
Geometry data and technology data for the use of tools are contained in the CNC programme which is supplied with the goods.

● = very well suited
▲ = well suited

® special programme: clear chips several times
® modified tool with special cutting geometry: when the recommendation is the same, the coated tool allows higher tool life quantities.



With Y cooling bores



With Y cooling bores



With Y cooling bores

UBGF 641

variable

variable

140°/90°

27°

narrow clamping slots

back-ground profile, corrected

1897

6535 HE

solid carbide

plain

UBGF 635

variable

variable

helical grinding

140°/90°

27°

narrow clamping slots

back-ground profile, corrected

1897

6535 HE

solid carbide

TiN

UBGF 640

variable

variable

140°/90°

27°

narrow clamping slots

back-ground profile, corrected

1897

6535 HE

solid carbide

TiAlN



“UBGF” Drill and Thread Milling Tool Drilling, Chamfering and Thread Milling in One Work Operation

Unlike the machining sequence with the “BGF” drill and thread milling tool, where the thread reach which is produced is pre-specified at $2 \times D$ or at $1.5 \times D$, the “UBGF” drill and thread milling tool makes it possible to achieve variable thread reaches up to a maximum of $2 \times D$.

The machining sequence when manufacturing thread reaches $< 2 \times D$ is:

- ① Approach
- ② Drill
- ③ Chamfer with the front chamfering tool
- ④ Radial withdrawal to the bore centre
- ⑤ Move into the thread milling position
- ⑥ Radial adjustment to the nominal thread diameter. - Positioning loop -
- ⑦ Forward advance around the pitch with simultaneous circulation of the tool around the central axis of the thread
- ⑧ Radial movement back to the bore centre. - Retraction loop -
- ⑨ Reverse stroke from the finished thread bore.

For the manufacture of thread reaches $= 2 \times D$, the machining sequence is as follows (see presentation on page 2.4):

- ① Approach
- ② Drill and chamfer
- ③ Withdraw
- ④ Radial setting to nominal thread diameter - positioning loop -
- ⑤ Forward advance around the pitch with simultaneous circulation of the tool around the central axis of the thread
- ⑥ Radial movement back to the bore centre. - Retraction loop -
- ⑦ Reverse stroke from the finished thread bore.

**Faster! More accurate!
More cost-effective!**

The JEL drill and thread milling tool has enormous advantages over conventional drilling and thread tapping, which are shown on page 2.4.

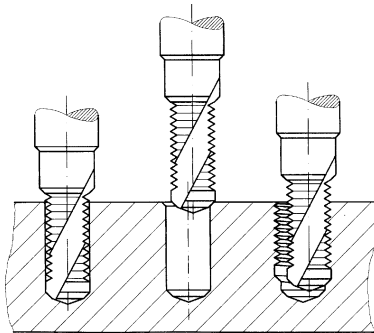


Illustration
Schematic sequence of work for the production of thread reaches $< 2 \times D$

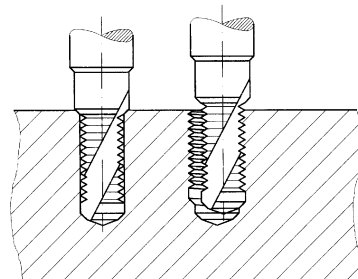


Illustration
Schematic sequence of work for the production of thread reaches $= 2 \times D$

2 series of types for different materials with different surfaces for different applications:

Type	Max. Thread Reach (Thread Length)	Coating	Shank Form DIN 6535	Order Number
UBGF 601	2 x D	plain	HE	80.601
UBGF 606	2 x D	TiN	HE	80.606
UBGF 608	2 x D	TiAlN	HE	80.608
UBGF 641 ^①	2 x D	plain	HE	80.641
UBGF 635 ^①	2 x D	TiN	HE	80.635
UBGF 640 ^①	2 x D	TiAlN	HE	80.640

^① Types 641, 635 and 640 have Y-cooling bores.

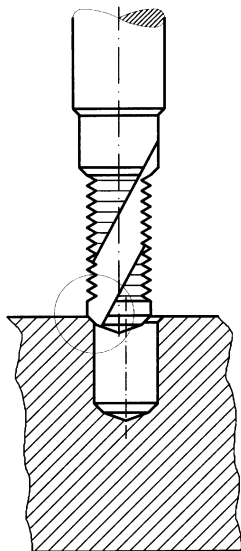


Illustration
Circular chamfering

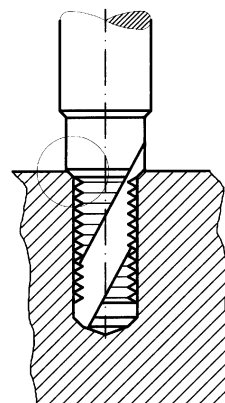
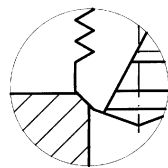
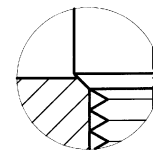


Illustration
Centric chamfering



The hallmarks of the JEL drill and thread milling tools are a higher core cross section, two narrow geometrically optimised clamping slots and a special drilling tip. These characteristics result in good chip formation and low cutting pressures for drilling and chamfering as well as for thread milling.

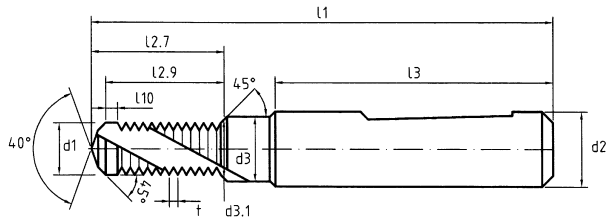
Long tool life is guaranteed thanks to the solid carbide varieties which are used, with extra-fine grain quality, as well as the coating.



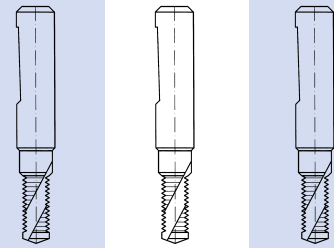
“UBGF” Drill and Thread Milling Tool
with rear and front chamfering tools
for metrical ISO Thread

Tool with index ① can also be supplied with
smooth cylinder shank to DIN 6535 HA. Order
number 88.601 instead of order number
80.601, order number 88.606 instead of order
number 80.606.

Variable Thread Reach up to a Max. of 2 x D



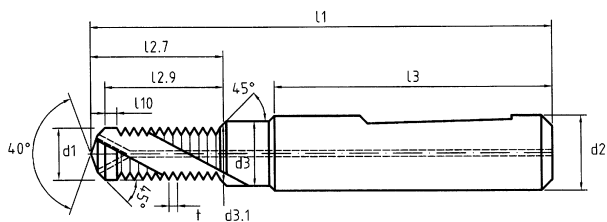
M



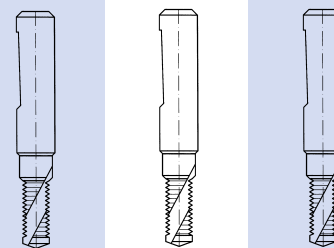
Type	UBGF 601	UBGF 606	UBGF 608
Order number	80.601	80.606	80.608
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiN	TiAlN

Nom.-Ø	t	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}			
M 3	0.5	49	7.3	6.9	36	0.5	2.50	6	3.4	3.3	①	②	○
M 4	0.7	49	9.4	8.9	36	0.7	3.30	6	4.5	4.3	①	②	○
M 5	0.8	55	11.6	10.9	36	0.8	4.20	6	5.5	5.3	①	②	○
M 6	1.0	62	14.5	13.7	36	1.0	5.00	8	6.6	6.3	①①	②①	○
M 8	1.25	74	18.2	17.2	40	1.25	6.75	10	9.0	8.3	①①	②①	○
M 10	1.5	79	23.4	22.1	45	1.5	8.50	12	11.0	10.3	①①	②①	○
M 12	1.75	89	27.1	25.5	45	1.5	10.25	14	13.5	12.3	①①	②①	○
M 14	2.0	102	32.8	31.0	48	1.5	12.00	16	15.5	14.3	①		
M 16	2.0	102	37.1	35.0	48	1.5	14.00	18	17.5	16.3	①		

Variable Thread Reach up to a Max. of 2 x D



M



Type	UBGF 641	UBGF 635	UBGF 640
Order number	80.641	80.635	80.640
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiN	TiAlN

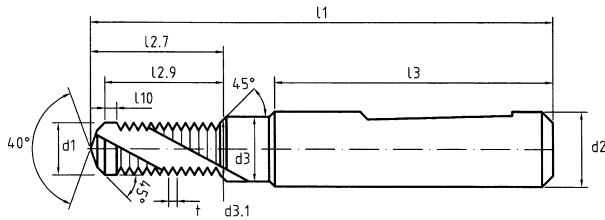
Nom.-Ø	t	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}			
M 3	0.5	49	7.3	6.9	36	0.5	2.50	6	3.4	3.3	With Y-cooling bores		
M 4	0.7	49	9.4	8.9	36	0.7	3.30	6	4.5	4.3		With Y-cooling bores	
M 5	0.8	55	11.6	10.9	36	0.8	4.20	6	5.5	5.3			With Y-cooling bores
M 6	1.0	62	14.5	13.7	36	1.0	5.00	8	6.6	6.3	⑤	⑦	○
M 8	1.25	74	18.2	17.2	40	1.25	6.75	10	9.0	8.3	⑤	⑦	○
M 10	1.5	79	23.4	22.1	45	1.5	8.50	12	11.0	10.3	⑤	⑦	○
M 12	1.75	89	27.1	25.5	45	1.5	10.25	14	13.5	12.3	⑤	⑦	○
M 14	2.0	102	32.8	31.0	48	1.5	12.00	16	15.5	14.3			
M 16	2.0	102	37.1	35.0	48	1.5	14.00	18	17.5	16.3			



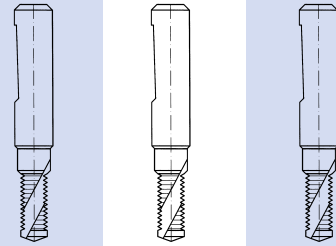
“UBGF” Drill and Thread Milling Tool
with rear and front chamfering tools
for DIN 13 metrical fine ISO Thread

Tool with index ① can also be supplied with
smooth cylinder shank to DIN 6535 HA. Order
number 88.601 instead of order number 80.601,
order number 88.606 instead of order number
80.606.

Variable Thread Reach up to a Max. of 2 x D



MF



Type	UBGF601	UBGF 606	UBGF 608
Order number	80.601	80.606	80.608
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	blank	TiN	TiAlN

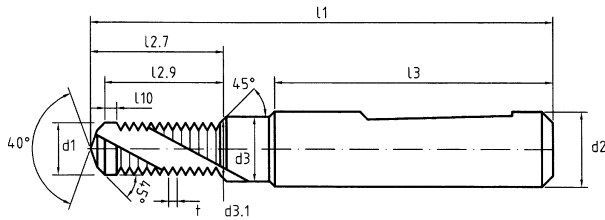
Nom.-Ø	t	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}			
M 4 x 0,5	0,5	49	9,5	8,9	36	0,5	3,50	6	4,5	4,3			
M 5 x 0,5	0,5	55	11,6	10,9	36	0,5	4,50	6	5,5	5,3			
M 6 x 0,75	0,75	62	14,1	13,3	36	0,75	5,25	8	6,6	6,3			
M 8 x 1	1	74	18,8	17,7	40	1,0	7,00	10	9,0	8,3	①	②	○
M 10 x 1	1	79	23,1	21,7	45	1,0	9,00	12	11,0	10,3	①	②	○
M 12 x 1	1	89	26,4	24,7	45	1,0	11,00	14	13,5	12,3	①	②	○
M 12 x 1,5	1,5	89	28,2	26,6	45	1,5	10,50	14	13,5	12,3	①	②	○
M 14 x 1,5	1,5	102	31,5	29,6	48	1,5	12,50	16	15,5	14,3	①		
M 16 x 1,5	1,5	102	36,3	34,1	48	1,5	14,50	18	17,5	16,3			



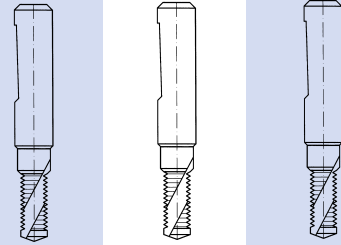
**“UBGF” Drill and Thread Milling Tool
with rear and front chamfering tools
for UNF Thread ANSI B 1.1**

Tool with index ① can also be supplied with smooth cylinder shank to DIN 6535 HA. Order number 88.601 instead of order number 80.601, order number 88.606 instead of order number 80.606.

Variable Thread Reach up to a Max. of 2 x D



UNF



Type	UBGF 601	UBGF 606	UBGF 608
Order number	80.601	80.606	80.608
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiN	TiAlN

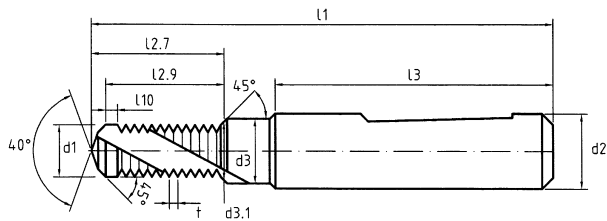
UNF Nom.-Ø	t thr./"	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}			
Nr. 10	32	55	11,6	11,0	36	0,8	4,03	6	5,5	5,1			
Nr. 12	28	62	13,2	12,5	36	0,9	4,58	8	6,6	5,8			
1/4"	28	62	15,2	14,4	36	0,9	5,44	8	7,8	6,7	①		
5/16"	24	74	18,8	17,7	40	1,1	6,88	10	9,0	8,2	①		
3/8"	24	79	21,2	19,9	45	1,1	8,47	12	11,0	9,8	①		
7/16"	20	89	25,4	23,9	45	1,3	9,84	14	13,5	11,4	①		
1/2"	20	89	28,2	26,4	45	1,3	11,43	14	13,5	13,0	①		
9/16"	18	102	32,8	30,8	48	1,4	12,88	16	15,5	14,6			
5/8"	18	102	35,8	33,6	48	1,4	14,46	18	17,5	16,2			



“UBGF” Drill and Thread Milling Tool
with rear and front chamfering tools
for Whitworth Pipe Thread DIN ISO 228 and DIN 2999

Tool with index ① can also be supplied with smooth cylinder shank to DIN 6535 HA. Order number 88.601 instead of order number 80.601, order number 88.606 instead of order number 80.606.

Variable Thread Reach up to a Max. of 2 x D



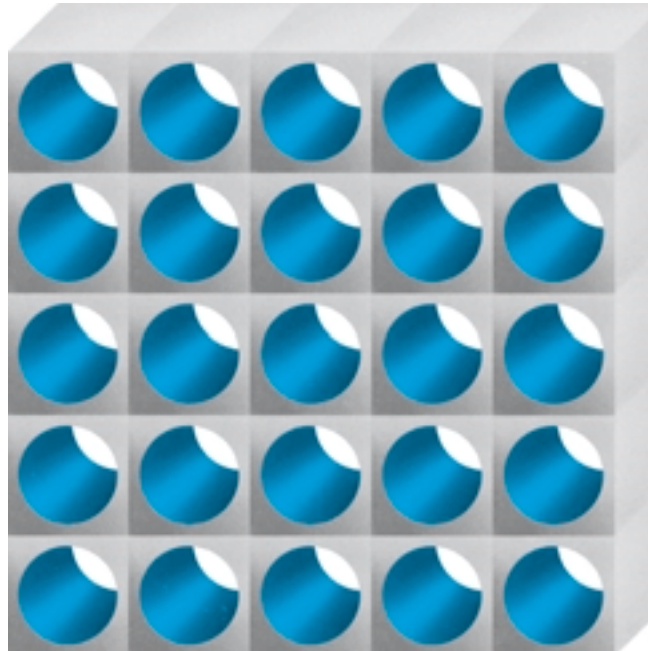
G
Rp



Type	UBGF 601	UBGF 606	UBGF 608
Order number	80.601	80.606	80.608
Shank diameter	DIN 6535 Form HE	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide	Solid carbide
Surface	plain	TiN	TiAlN

Nom.-Ø	t thr./"	l ₁	l _{2.7}	l _{2.9}	l ₃	l ₁₀	d ₁	d ₂	d ₃	d _{3.1}			
G 1/16	28	74	17,1	16,1	40	0,9	6,68	10	9,0	8,0	① ②		
G 1/8	28	79	22,0	20,7	45	0,9	8,69	12	11,0	10,0			
G 1/4	19	102	29,4	27,6	48	1,3	11,65	16	15,5	13,5			
G 3/8	19	102	36,7	34,4	48	1,3	15,13	18	17,5	17,0			
Rp 1/16	28	74	17,1	16,1	40	0,9	6,56	10	9,0	8,0			
Rp 1/8	28	79	22,0	20,7	45	0,9	8,56	12	11,0	10,0			
Rp 1/4	19	102	29,4	27,6	48	1,3	11,46	16	15,5	13,5			
Rp 3/8	19	102	36,7	34,4	48	1,3	14,96	18	17,5	17,0			

“Tomill” Thread Milling Tools



JEL “Tomill” Thread Milling Tools in the “2/3” concept for **internal thread** milling of larger diameters in solid carbide, plain and coated.

3 variants for different application purposes:

“Tomill SR”

for **thread milling as far as the root**
“without chamfering tool”

“Tomill GS”

for **chamfering and thread milling**
“with front chamfering tool”

“Tomill GP”

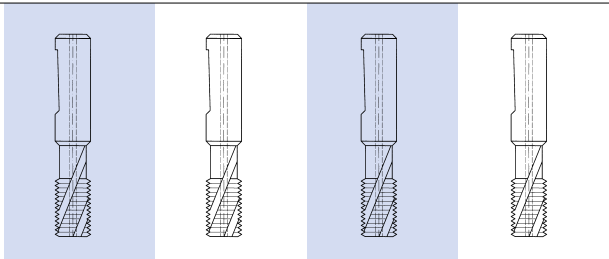
for **chamfering, plain milling and thread milling**
“with front chamfering tool and integral front plain cutter”

JEL’s “Tomill SR” Thread Milling Tool

for **external thread milling** of larger diameters
in solid carbide, plain and coated.

“Tomill” Thread Milling Tools

Solid Carbide
plain and coated



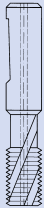
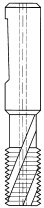
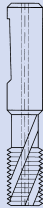
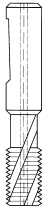
Type	Tomill SR	Tomill SR	Tomill GS	Tomill GS
Order number	80.802	80.842 [®]	80.872	80.875 [®]
Application	Internal thread milling in the 2/3 concept		Chamfering and internal thread milling in the 2/3 concept	
Lateral effective cutting angle	15°	15°	15°	15°
Slot shape	optimised	optimised	optimised	optimised
Thread	back-ground profile	back-ground profile	back-ground profile	back-ground profile
Shank diameter (DIN)	6535 HE	6535 HE	6535 HE	6535 HE
Material	solid carbide	solid carbide	solid carbide	solid carbide
Surface	plain	TiCN	plain	TiCN

Main Material Groups	Material Sub-Groups	Hardness (HB)	Strength (N/mm ²)	Tomill SR (plain)	Tomill SR (TiCN)	Tomill GS (plain)	Tomill GS (TiCN)
1. Steel	1.1 Magnetic soft iron	≤ 120	≤ 400		●		●
	1.2 Constructional steel, case hardened steel	≤ 200	≤ 700		●		●
	1.3 Carbon steel	≤ 250	≤ 850		●		●
	1.4 Alloyed steel	≤ 250	≤ 850		●		●
	1.5 Alloyed heat treated steel	> 250, ≤ 350	> 850, ≤ 1200		●		●
	1.6 Alloyed heat treated steel	> 350	> 1200		●		●
2. Stainless Steel	2.1 Stainless steel, sulphuretted	≤ 250	≤ 850		●		●
	2.2 Austenitic	≤ 250	≤ 850		●		●
	2.3 Ferritic, ferritic and austenitic, martensitic	≤ 300	≤ 1000		●		●
3. Cast iron	3.1 Gray cast iron	≤ 150	≤ 500	●	●	●	●
	3.2 Heat treated gray cast iron	> 150, ≤ 300	> 500, ≤ 1000	▲	●	▲	●
	3.3 Spherulitic graphite iron	≤ 200	≤ 700	●	●	●	●
	3.4 Heat treated spherulitic graphite iron	> 200, ≤ 300	> 700, ≤ 1000	▲	●	▲	●
	3.5 Annealed cast iron	≤ 200	≤ 700	●	●	●	●
	3.6 Heat treated annealed cast iron	> 200, ≤ 300	> 700, < 1000	▲	●	▲	●
4. Titanium	4.1 Pure titanium	≤ 200	≤ 700	▲	● ^①	▲	● ^①
	4.2 Titanium alloys	≤ 270	≤ 900	▲	● ^①	▲	● ^①
	4.3 Titanium alloys	> 270, ≤ 300	> 900, ≤ 1250	▲	● ^①	▲	● ^①
5. Nickel	5.1 Pure nickel	≤ 150	≤ 500	▲	●	▲	●
	5.2 Nickel alloys, temperature resistant	< 270	≤ 900	▲	●	▲	●
	5.3 Nickel alloys, high temperature resistant	> 270, ≤ 350	> 900, ≤ 1200		▲		▲ ^②
6. Copper	6.1 Unalloyed copper	≤ 100	≤ 350	●	●	●	●
	6.2 Short-chipping brass, bronze, gunmetal	≤ 200	≤ 700	●	●	●	●
	6.3 Long-chipping brass	≤ 200	≤ 700	●	●	●	●
	6.4 Cu-Al-Fe alloy (Ampco)	≤ 470	≤ 1500	▲	●	▲	●
7. Aluminium/Magnesium	7.1 Al, Mg, unalloyed	≤ 100	≤ 350	●	●	●	●
	7.2 Al ductile alloys, breaking elongation (A ₅) <14 %	≤ 180	≤ 600	●	●	●	●
	7.3 Al ductile alloys, breaking elongation (A ₅) ≥14 %	≤ 180	≤ 600	●	●	●	●
	7.4 Al cast alloy, Si <10 %	< 180	≤ 600	●	●	●	●
	7.5 Al cast alloy, Si ≥ 10 % Mg alloy, Al whisker	≤ 180	≤ 600	▲	●	▲	●
8. Plastics	8.1 Thermoplastics			●	●	●	●
	8.2 Duroplastics			▲	●	▲	●
	8.3 Fibre-reinforced plastics			▲	●	▲	●
9. Hard materials	9.1 Cermets, Ferrotic etc.	≤ 550	≤ 1700		▲ ^②		▲ ^②

● = very well suited
▲ = well suited

① special programme
② special design
® when the recommendation is the same, the coated tool allows higher tool life quantities.

For dry machining and at speeds > 150 m/min, we also recommend our types Tomill SR No. 80.854, Tomill GS No. 80.874 and Tomill GP No. 80.884. These tools are coated in TiAlN.

							
Tomill GP 80.882	Tomill GP 80.885 [®]	Tomill SR 80.819	Tomill SR 80.845 [®]				
Chamfering, plain milling and internal thread milling in the 2/3 concept		External thread milling					
15°	15°	15°	15°				
optimised	optimised	optimised	optimised				
back-ground profile	back-ground profile	back-ground profile	back-ground profile				
6535 HE	6535 HE	6535 HE	6535 HE				
solid carbide	solid carbide	solid carbide	solid carbide				
plain	TiCN	plain	TiCN				
	●		●				
	●		●				
	●		●				
	●		●				
	●		●				
	●		●				
	●		●				
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●	●	●	●				
▲	●	▲	●				
▲	●	▲	●				
	▲ ^②		▲ ^②				



“Tomill” Thread Milling Tools in Solid Carbide Rational Thread Milling on CNC Machining Centres

JEL's “Tomill” thread milling tools in solid carbide make it possible to produce the majority of common threads. In order to achieve threads which conform to the standards, it is important that the **milling tool diameter is approximately 2/3 of the nut thread that is to be machined**. In all cases, this will avoid distortions in the profile of the thread that is produced. In this instance the phrase we use is “thread milling tools in the 2/3 concept”. For smaller threads, where this combination of milling tool and nut diameters cannot be implemented, please use our “MGF” thread milling tools. For reasons of cost-effectiveness, our JEL “Tomill” thread milling tools should be specifically used where larger diameters are involved.

JEL's “Tomill” thread milling tools are manufactured in solid carbide, in plain and coated versions. The helical slot angle is ~ 15° to the right. This makes for extremely comfortable working. The structural dimensions correspond to the JEL standard, and the shank is manufactured to standard DIN 6535, Form HE.

The advantages of JEL's “Tomill” thread milling tools

- outstanding workpiece surface thanks to variation of the cutting parameters
- exact pitch, no widening of the thread
- shorter milling chips (no chip problems as in the case of thread taps)
- variable thread dimensions (6H, 6G or M 18 x 1.5, M20 x 1.5 and M24 x 1.5)
- one tool for blind holes and through holes
- one tool for right- and left-handed threads
- fewer tool positions
- no chip root residues in the root
- low cutting pressure when machining thin-walled parts
- precise thread depth
- core diameter and thread are exactly concentric
- no problems removing broken tools from the workpiece
- higher workpiece quality in the same time as compared with the XAM disposable tip milling tool, or shorter machining time per tooth with the same feed (because of the larger number of cutters)

Advantageous uses of JEL's “Tomill” thread milling tools:

- thread milling “right into the root” with types 80.802 or 80.842
- chamfering “and” thread milling in one clamping operation with types 80.872 or 80.875
- chamfering “and” plain milling “and” thread milling in one clamping operation with types 80.882 or 80.885
- thread milling of external threads “right into the root” with types 80.819 or 80.845
- all thread milling tools have a central coolant supply



JEL's “Tomill SR” Type 80.802 thread milling tool

Using the “Tomill” thread milling tools

The full thread depth should be reached after about 10% to 25% of the thread circumference. Final machining is performed by one whole revolution. The feed rate should be 0.10-0.30 mm per tooth: the lower value applies to high pitch and the higher value applies to low pitch.

Guidance values for cutting speeds with the “Tomill” VHM thread milling tool

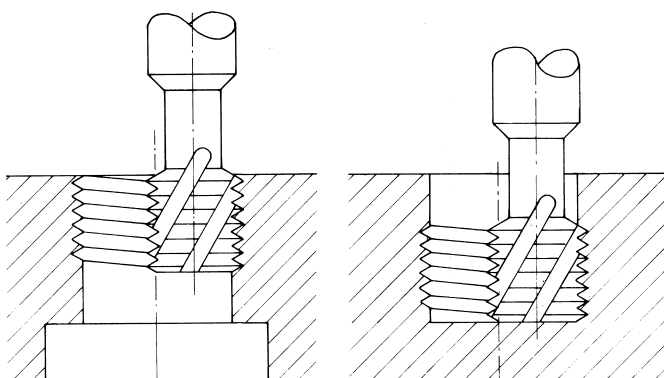
Materials to be machined	Cutting speed, m/min
Unalloyed and low-alloyed steels < 500 N/mm ²	120–200
Steels with good chipping characteristics < 900 N/mm ²	100–160
Steels > 900 N/mm ²	80–140
Rust- and acid-resistant steels	100–160
Gray cast iron	100–160
Aluminium alloys	150–300

All combinations of threads can be manufactured.

Since the thread milling tool is designed for right-hand cutting, the direction of rotation is to the right as a basic rule.

All thread combinations can be produced by changing the axial feed direction and with upcut or cut-down milling.

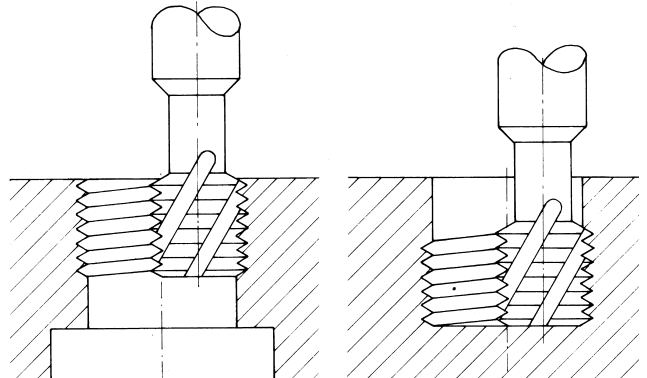
Internal right-handed thread



Through hole, upcut

Blind hole, cut-down

Internal left-handed thread



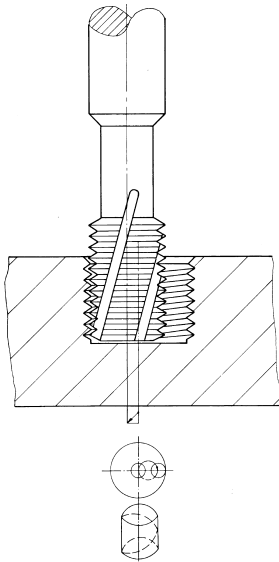
Through hole, cut-down

Blind hole, upcut

The “Tomill” Range from JEL

3 tool types to machine internal threads*, in solid carbide and plain or coated with TiCN in each case, all with a central coolant bore.

“Tomill SR” for thread milling right into the root. This thread milling tool has no chamfering tool.

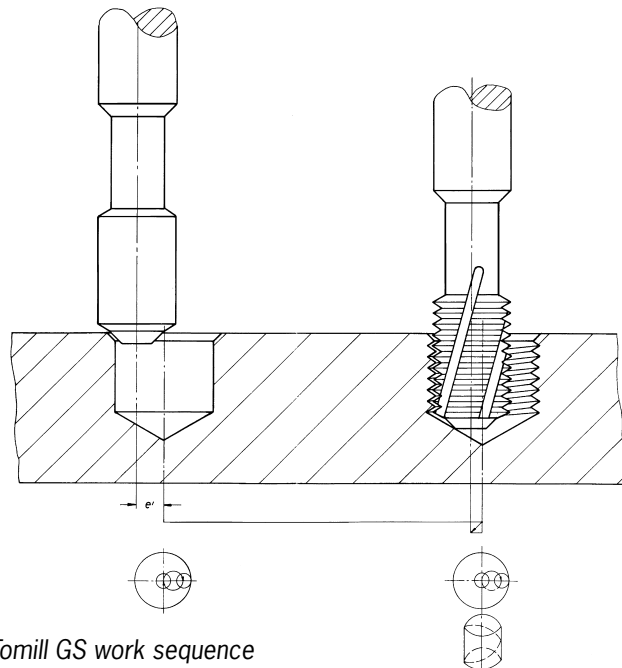


Work sequence with Tomill SR

“Tomill GS” for chamfering and thread milling in one clamping operation. You save one tool change. An important point: in every case, the design of the front chamfering component of the thread milling tool guarantees that the thread runout is shorter than the thread runout of a thread produced with a Form E thread tap (1.5-2.0 turns). We offer this tool primarily for producing larger NPT and NPTF threads.



Tomill GS

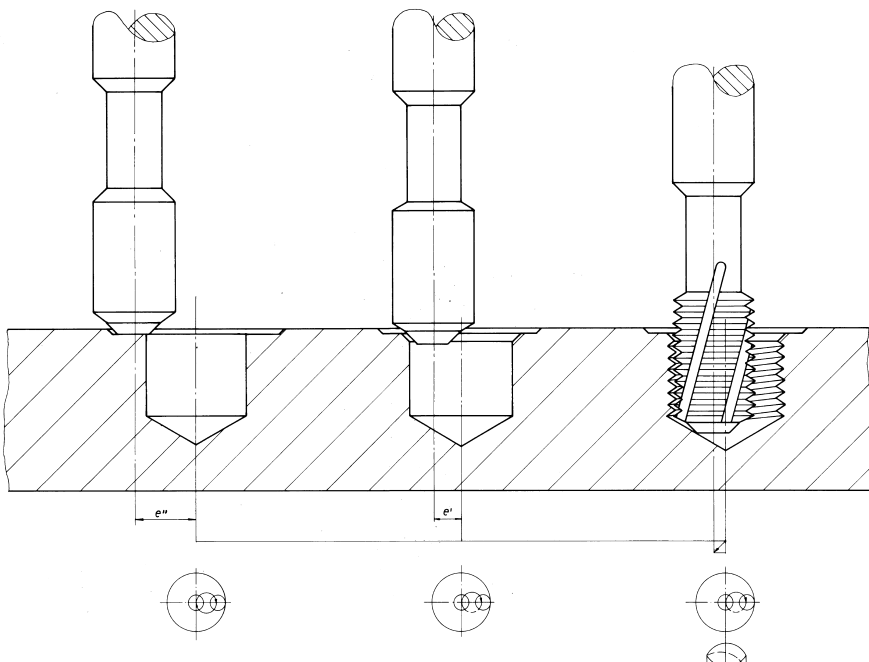


Tomill GS work sequence

*For machining external threads, use our Tomill SR type thread milling tool with order numbers 80.819 or 80845

“Tomill GP” for chamfering, plain milling and thread milling in one clamping operation. By using this tool, the machining time is tremendously reduced. Here too, a thread runout is guaranteed which is smaller than one produced with a thread tap (Form E = 1.5-2.0 turns). What is

more, plain-milled areas usually offer better surface values than plain-chamfered areas. Despite the front chamfering tool and milling cutters, it is possible to resink with a longer workpiece thread, since both are on a smaller diameter.



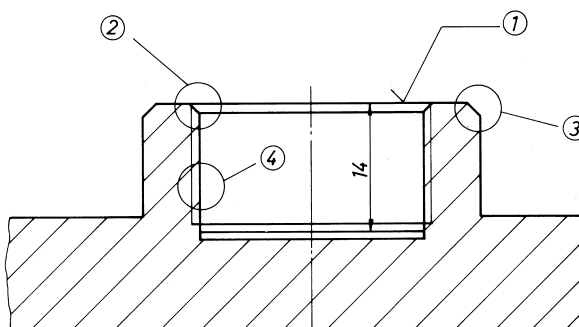
Tomill GP work sequence

Functional example:

Cast lug in AlZnMgCu 1.5 material

Tool: Tomill GP No. 80.882,
20 mm diameter, status 1.91

Use data: $n = 4973 \text{ min}^{-1}$
 $V_c = 250 \text{ m/min}$
 $f_z = 0.2$
 $f = 4863 \text{ mm/min}$

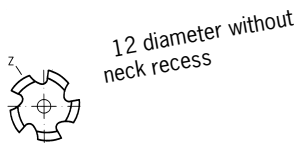
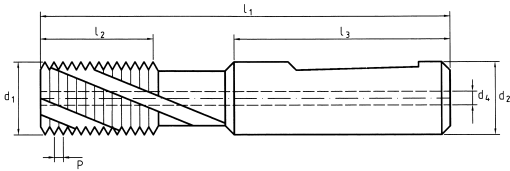


- | | |
|---|---------|
| 1. Plain milling, 38 mm diameter, chip depth 0.3 mm | 2,8 sec |
| 2. Chamfering (internal) 1 x 45° | 2.4 sec |
| 3. Bezzelling (external) 1 x 45° | 2.6 sec |
| 4. Thread milling M 32 x 1.5 | 3.6 sec |

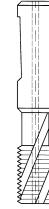
Total time 11.4 sec

“Tomill SR” Thread Milling Tool
for DIN 13 metrical ISO Thread

Internal thread milling without chamfering



M



Type	Tomill SR	Tomill SR
Order Number	80.802	80.842
Shank Diameter	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide
Surface		TiCN

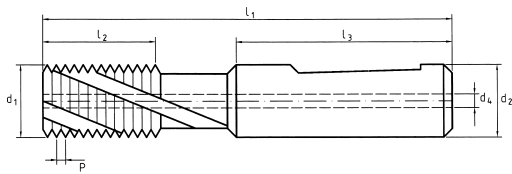
$d_1 \times l_2 \text{ nom.} \times t$	$d_{\text{min nut}}$	l_1	l_2	$\frac{l_2}{p}$	l_3	d_2	Z		
10 x 10 x 1	15,0	63	10	7	40	10	4		
10 x 10 x 1,5	15,0	63	10	10	40	10	4		
10 x 16 x 1	15,0	70	16	16	40	10	4	②	④
10 x 16 x 1,5	15,0	70	16	11	45	10	4	①	③
12 x 12 x 1	18,0	70	12	12	45	12	4		
12 x 12 x 1,5	18,0	70	12	8	45	12	4		
12 x 20 x 1	18,0	80	20	20	45	12	4	②	④
12 x 20 x 1,5	18,0	80	19,5	13	45	12	4	①	③
16 x 16 x 1	24,0	80	16	16	48	16	5	②	④
16 x 16 x 1,5	24,0	80	16,5	11	48	16	5	①	③
16 x 16 x 2	24,0	80	16	8	48	16	5	②	④
16 x 25 x 1	24,0	90	25	25	48	16	5	②	④
16 x 25 x 1,5	24,0	90	25,5	17	48	16	5	①	③
16 x 25 x 2	24,0	90	24	12	48	16	5	②	④
20 x 20 x 1	30,0	92	20	20	50	20	5	②	④
20 x 20 x 1,5	30,0	92	19,5	13	50	20	5	①	③
20 x 20 x 2	30,0	92	20	10	50	20	5	②	④
20 x 20 x 3	30,0	92	21	7	50	20	5	②	④
20 x 32 x 1	30,0	105	32	32	50	20	5	②	④
20 x 32 x 1,5	30,0	105	33	22	50	20	5	①	③
20 x 32 x 2	30,0	105	32	16	50	20	5	②	④
20 x 32 x 3	30,0	105	33	11	50	20	5	②	④

For thread diameters ($d_{\text{min nut}}$) which are smaller than the thread diameters s_{min} shown on this page, please use our “MGF” or „MKG“ thread milling tools.

①-③ = symbols for the price group, supplied ex warehouse ○ = symbol: price and delivery on request

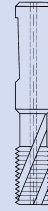
“Tomill SR” Thread Milling Tool
for UN Thread ANSI B 1.1

Internal thread milling without chamfering



≤ 12 diameter without neck recess

UN



Type	Tomill SR	Tomill SR
Order Number	80.802	80.842
Shank Diameter	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide
Surface		TiCN

$d_1 \times l_2 \text{ nom.} \times p$ ①	d_{\min} nut	l_1	l_2	$\frac{l_2}{p}$	l_3	d_2	Z		
10 x 10 x 24	15,0	63	9,53	9	40	10	4		
10 x 16 x 24	15,0	70	15,88	15	40	10	4		
12 x 12 x 24	18,0	70	11,64	11	45	12	4		
12 x 12 x 20	18,0	70	11,43	9	45	12	4		
12 x 12 x 18	18,0	70	11,29	8	45	12	4		
12 x 12 x 16	18,0	70	11,11	7	45	12	4		
12 x 20 x 24	18,0	80	20,11	19	45	12	4		
12 x 20 x 20	18,0	80	20,32	16	45	12	4		
12 x 20 x 18	18,0	80	19,76	14	45	12	4		
12 x 20 x 16	18,0	80	19,05	12	45	12	4		
16 x 16 x 24	24,0	80	15,88	15	48	16	5	①	○
16 x 16 x 20	24,0	80	16,51	13	48	16	5	①	○
16 x 16 x 18	24,0	80	15,52	11	48	16	5		
16 x 16 x 16	24,0	80	15,88	10	48	16	5		
16 x 16 x 14	24,0	80	16,33	9	48	16	5		
16 x 16 x 12	24,0	80	14,82	7	48	16	5	①	○
16 x 25 x 24	24,0	90	25,40	24	48	16	5	①	○
16 x 25 x 20	24,0	90	25,40	20	48	16	5	①	○
16 x 25 x 18	24,0	90	25,40	18	48	16	5		
16 x 25 x 16	24,0	90	23,81	15	48	16	5		
16 x 25 x 14	24,0	90	25,40	14	48	16	5	①	○
16 x 25 x 12	24,0	90	25,40	12	48	16	5	①	○
20 x 20 x 24	30,0	92	20,11	19	50	20	5	①	○
20 x 20 x 20	30,0	92	20,32	16	50	20	5	①	○
20 x 20 x 18	30,0	92	19,76	14	50	20	5		
20 x 20 x 16	30,0	92	19,05	12	50	20	5		
20 x 20 x 14	30,0	92	19,96	11	50	20	5		
20 x 20 x 12	30,0	92	19,05	9	50	20	5	①	○
20 x 20 x 8	30,0	92	19,05	6	50	20	5	①	○
20 x 32 x 24	30,0	105	31,75	30	50	20	5		
20 x 32 x 20	30,0	105	31,75	25	50	20	5	①	○
20 x 32 x 18	30,0	105	31,04	22	50	20	5		
20 x 32 x 16	30,0	105	31,75	20	50	20	5		
20 x 32 x 14	30,0	105	32,65	18	50	20	5		
20 x 32 x 12	30,0	105	31,75	15	50	20	5	①	○
20 x 32 x 8	30,0	105	31,75	10	50	20	5	①	○

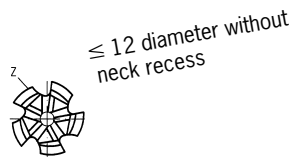
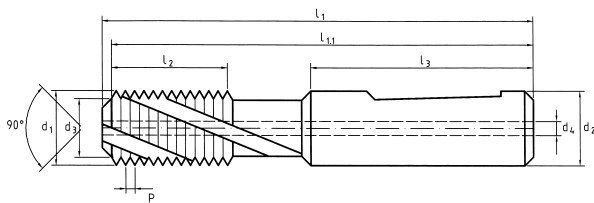
① p = thread/”

For thread diameters (d_{\min} nut) which are smaller than the thread diameters s_{\min} shown on this page, please use our “MGF” or “MKG” thread milling tools.

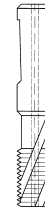
①-③ = symbols for the price group, supplied ex warehouse ○ = symbol: price and delivery on request

“Tomill GP” Thread Milling Tool
for UN Thread ANSI B 1.1

Chamfering, plain milling and internal thread milling
with one tool



UN



Type	Tomill GP	Tomill GP
Order Number	80.882	80.885
Shank Diameter	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide
Surface		TiCN

$d_1 \times l_2 \text{ nom.} \times p$ ①	d_{\min} nut	l_1	$l_{1.1}$	l_2	$\frac{l_2}{p}$	l_3	d_2	Z		
10 x 10 x 24	15,0	63	62,1	8,47	8	40	10	4	Use JEL's thread milling tools: “MGF” with chamfering tool or “MKG” without chamfering tool	
10 x 16 x 24	15,0	70	69,1	14,82	14	40	10	4		
12 x 12 x 24	18,0	70	68,7	9,53	9	45	12	4		
12 x 12 x 20	18,0	70	68,7	8,89	7	45	12	4		
12 x 12 x 18	18,0	70	68,7	9,88	7	45	12	4		
12 x 12 x 16	18,0	70	68,7	9,53	6	45	12	4		
12 x 20 x 24	18,0	80	78,7	17,99	17	45	12	4		
12 x 20 x 20	18,0	80	78,7	17,78	14	45	12	4		
12 x 20 x 18	18,0	80	78,7	18,34	13	45	12	4		
12 x 20 x 16	18,0	80	78,7	17,46	11	45	12	4		
16 x 16 x 24	24,0	80	78,3	13,76	13	48	16	5		
16 x 16 x 20	24,0	80	78,3	13,97	11	48	16	5		
16 x 16 x 18	24,0	80	78,3	12,70	9	48	16	5		
16 x 16 x 16	24,0	80	78,3	12,70	8	48	16	5		
16 x 16 x 14	24,0	80	78,3	14,51	8	48	16	5		
16 x 16 x 12	24,0	80	78,3	12,70	6	48	16	5		
16 x 25 x 24	24,0	90	88,3	23,28	22	48	16	5	○	○
16 x 25 x 20	24,0	90	88,3	22,86	18	48	16	5	○	○
16 x 25 x 18	24,0	90	88,3	22,58	16	48	16	5		
16 x 25 x 16	24,0	90	88,3	20,64	13	48	16	5		
16 x 25 x 14	24,0	90	88,3	23,59	13	48	16	5	○	○
16 x 25 x 12	24,0	90	88,3	23,28	11	48	16	5		
20 x 20 x 24	30,0	92	90,7	17,99	17	50	20	5		
20 x 20 x 20	30,0	92	90,7	17,78	14	50	20	5		
20 x 20 x 18	30,0	92	90,7	18,34	13	50	20	5		
20 x 20 x 16	30,0	92	89,5	15,88	10	50	20	5		
20 x 20 x 14	30,0	92	89,5	16,33	9	50	20	5		
20 x 20 x 12	30,0	92	89,5	14,82	7	50	20	5		
20 x 20 x 8	30,0	92	89,5	15,88	5	50	20	5		
20 x 32 x 24	30,0	105	103,7	29,63	28	50	20	5	○	○
20 x 32 x 20	30,0	105	103,7	29,21	23	50	20	5		
20 x 32 x 18	30,0	105	103,7	29,63	21	50	20	5		
20 x 32 x 16	30,0	105	102,5	28,58	18	50	20	5		
20 x 32 x 14	30,0	105	102,5	29,03	16	50	20	5		
20 x 32 x 12	30,0	105	102,5	27,52	13	50	20	5	○	○
20 x 32 x 8	30,0	105	102,5	28,58	9	50	20	5	○	○

① p = thread/”

For thread diameters (d_{\min} nut) which are smaller than the thread diameters $_{\min}$ shown on this page, please use our “MGF” or „MKG“ thread milling tools.

“Tomill GS” Thread Milling Tool
for NPT Thread ANSI B 2.1

Chamfering and internal thread milling
with one tool

							<p>NPT</p>			
									Type	Tomill GS
							Order Number	80.872	80.875	
							Shank Diameter	DIN 6535 Form HE	DIN 6535 Form HE	
							Material	Solid carbide	Solid carbide	
							Surface		TiCN	
$d_1 \times l_2 \text{ nom.} \times p$ ^①	d_{\min} nut	l_1	l_2	l_3	d_2	Z				
12,5 x 18,3 x 14	1/2 – 14	90		48	16	5	①	③		
19,0 x 22,2 x 11 1/2	1 – 11 1/2	92		50	20	5	①	③		

“Tomill GS” Thread Milling Tool
for NPTF Thread ANSI B 2.1

Chamfering and internal thread milling
with one tool

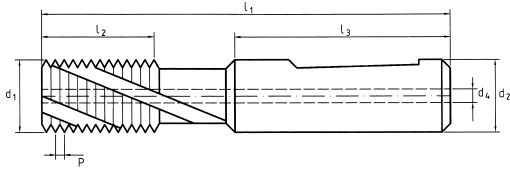
							<p>NPT</p>			
									Type	Tomill GS
							Order Number	80.872	80.875	
							Shank Diameter	DIN 6535 Form HE	DIN 6535 Form HE	
							Material	Solid carbide	Solid carbide	
							Surface		TiCN	
$d_1 \times l_2 \text{ nom.} \times p$ ^①	d_{\min} nut	l_1	l_2	l_3	d_2	Z				
12,5 x 18,3 x 14	1/2 – 14	90		48	16	5	①	③		
19,0 x 22,2 x 11 1/2	1 – 11 1/2	92		50	20	5	①	③		

① p = thread/”

for thread 3/8 – 18 NPT/NPTF und smaller, please use our “MGF” or „MKG“ thread milling tools.

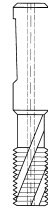
“Tomill SR” Thread Milling Tool
for DIN 13 metrical ISO Thread

External thread milling without chamfering



≤ 12 diameter without neck recess

M



Type	Tomill SR	Tomill SR
Order Number	80.819	80.845
Shank Diameter	DIN 6535 Form HE	DIN 6535 Form HE
Material	Solid carbide	Solid carbide
Surface		TiCN

d ₁ x l ₂ nom. x p	d _{min} nut	l ₁	l ₂	l ₂ /p	l ₃	d ₂	Z		
10 x 10 x 1	15,0	63	10	10	40	10	4		
10 x 16 x 1	15,0	70	16	16	40	10	4		
12 x 12 x 1	18,0	70	12	12	45	12	4		
12 x 12 x 1,25	18,0	70	12,5	10	45	12	4		
12 x 12 x 1,5	18,0	70	12	8	45	12	4		
12 x 20 x 1	18,0	80	20	20	45	12	4		
12 x 20 x 1,25	18,0	80	20	16	45	12	4		
12 x 20 x 1,5	18,0	80	19,5	13	45	12	4		
16 x 16 x 1	24,0	80	16	16	48	16	5		
16 x 16 x 1,25	24,0	80	16,25	13	48	16	5		
16 x 16 x 1,5	24,0	80	16,5	11	48	16	5		
16 x 16 x 2	24,0	80	16	8	48	16	5		
16 x 25 x 1	24,0	90	25	25	48	16	5		
16 x 25 x 1,25	24,0	90	25	20	48	16	5	③	○
16 x 25 x 1,5	24,0	90	25,5	17	48	16	5		
16 x 25 x 2	24,0	90	24	12	48	16	5		
20 x 20 x 1	30,0	92	20	20	50	20	5		
20 x 20 x 1,25	30,0	92	20	16	50	20	5		
20 x 20 x 1,5	30,0	92	19,5	13	50	20	5		
20 x 20 x 2	30,0	92	20	10	50	20	5		
20 x 20 x 3	30,0	92	21	7	50	20	5		
20 x 32 x 1	30,0	105	32	32	50	20	5		
20 x 32 x 1,25	30,0	105	32,5	26	50	20	5		
20 x 32 x 1,5	30,0	105	33	22	50	20	5	③	○
20 x 32 x 2	30,0	105	32	16	50	20	5		
20 x 32 x 3	30,0	105	33	11	50	20	5		

①-⑧ = symbols for the price group, supplied ex warehouse ○ = symbol: price and delivery on request

JEL Precision Tools

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