



Online Information

www.heule.com/en/chamfering-tool/defa

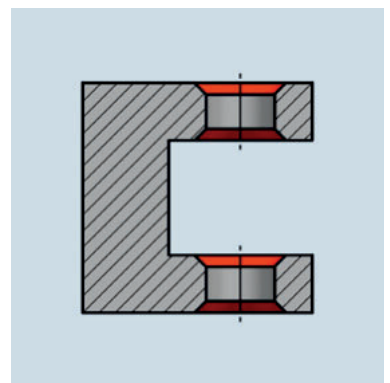
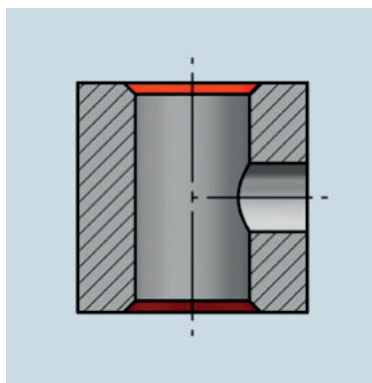


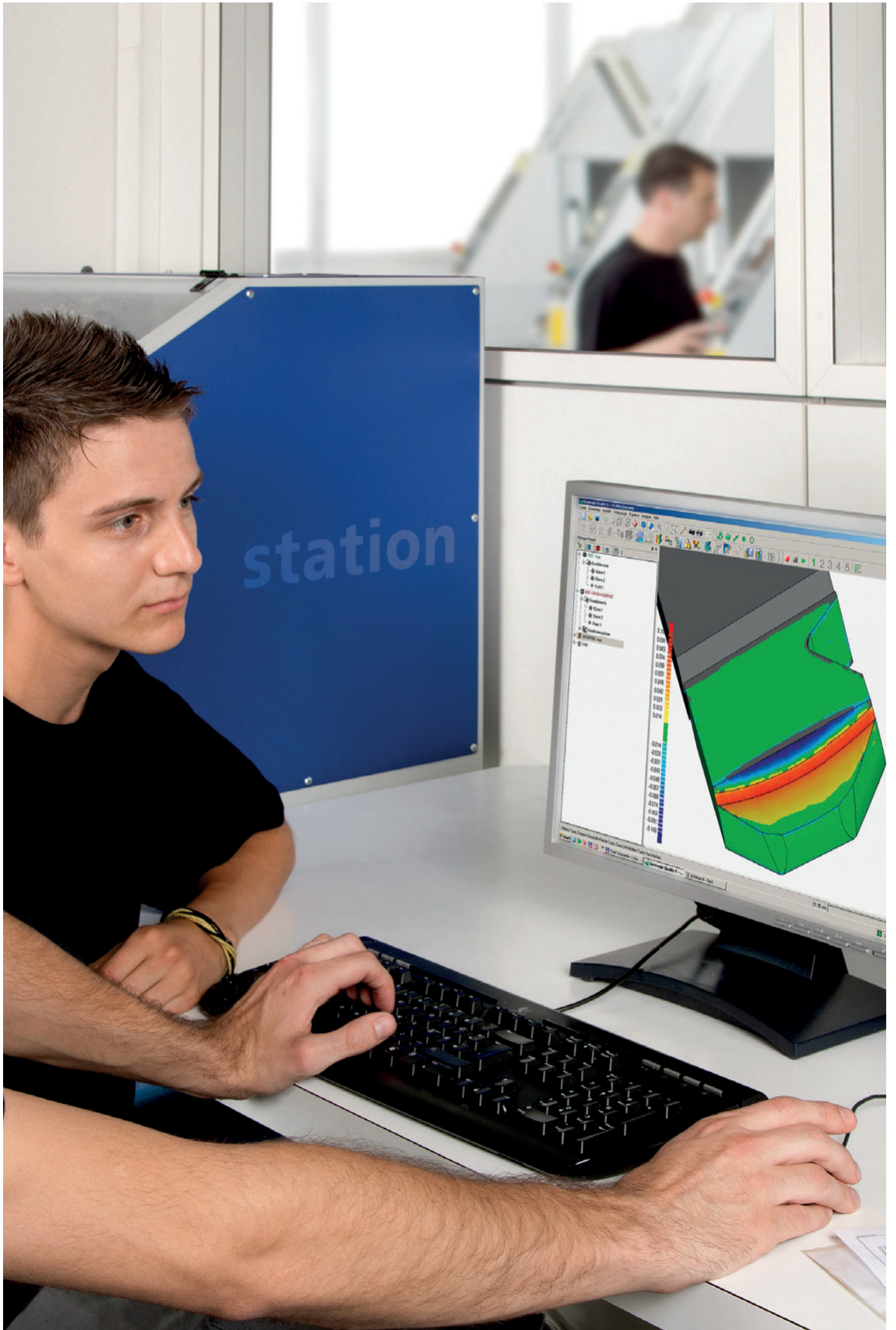
DEFA

Table of Contents	
Characteristics and Advantages	141
Tool Description	142
Function Principle	142
Process Steps Description	143
Product Selection	
Range Summary	144
Tool Part Numbers DEFA	145
DEFA Chamfering Tools 4-6	146
DEFA Chamfering Tools 6-10	148
DEFA Chamfering Tools 9-24	150
Technical Information	
Cutting Data DEFA	152
Programming Information DEFA	153
Setting the Blade Force	154
Setting the Chamfer Size	154
Blade Change	156
Spare Parts	157
Blade Dimensions	158
Comparison DF / DR Blade Geometries	160
Dimensions of Shanks and End Plugs	161

DEFA

Precision chamfering of tough materials,
front and back in one operation.





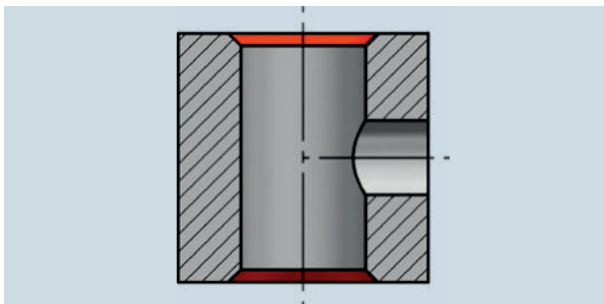
DEFA – Chamfering with high dimensional accuracy



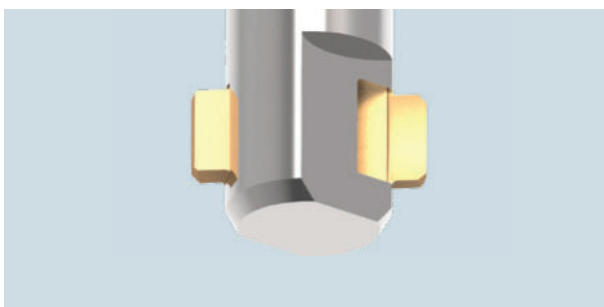
Adjustable precision chamfering of interrupted bore edges, front and back in *ONE OPERATION*.

DEFA allows the chamfering of asymmetric interrupted bore edges – front and back in one single pass. Without stopping or reversing the spindle, the double bladed tool creates predefined chamfers. The chamfer diameter can be adjusted on the tool. The DEFA is distinguished by the secondary burr-free bore edges even when used for hard-to-machine materials involving large burrs.

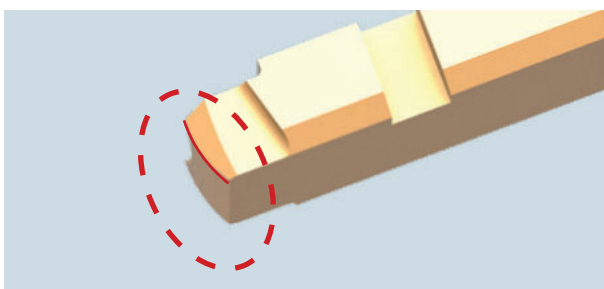
Characteristics and Advantages



- Front and back or back-only chamfering of interrupted bore edges in one single pass.
- Dual cutting system for machining bores for precise chamfer diameters and high-grade chamfer surfaces.

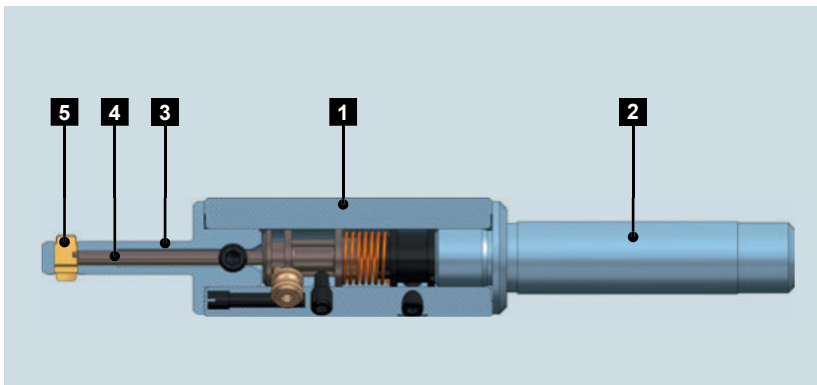


- Chamfer diameter can be continuously adjusted directly on the tool, depending on the bore dimension.
- Exchangeable carbide blades with material-specific coating.



- No damage to the bore surface or the thread during penetration due to the spherical shape.

Tool Description



- 1** Control system
- 2** Shank
- 3** Blade housing
- 4** Blade control
- 5** Blade

The DEFA chamfering tool is distinguished by its two blades featuring a special geometry. Inside the blade housing, they are held by a preloaded control bolt allowing them to deflect. The two blades are

rigidly interconnected. By turning the set screw the blade diameter can be adjusted synchronously and steplessly to preset the chamfer size.

Function Principle

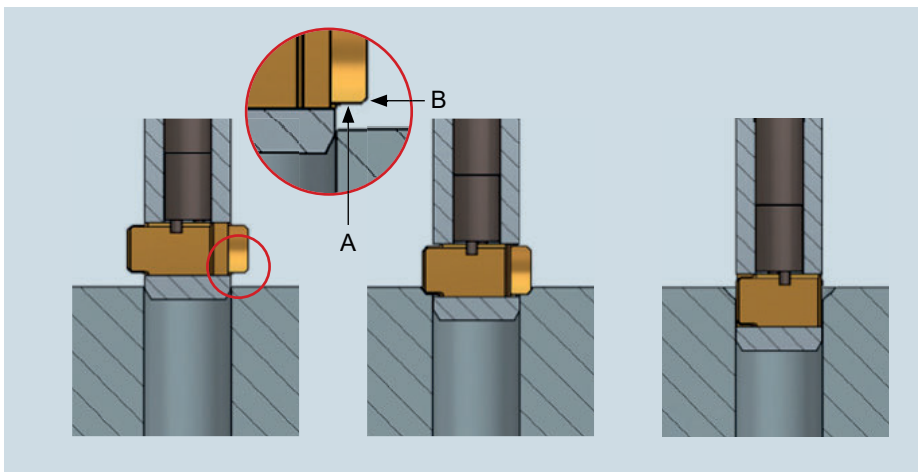


Fig. 1: Function principle DEFA tool

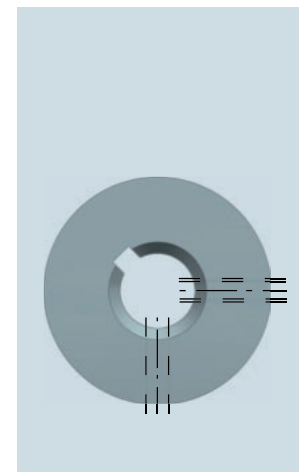


Fig. 2: Top view of workpiece with longitudinal groove and cross bores into main bore

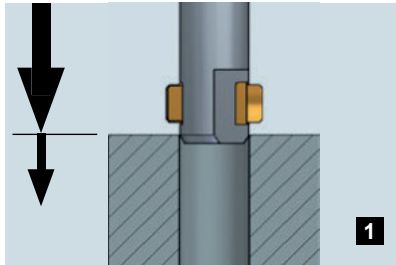
The DEFA chamfering tool is specially designed to chamfer a range of sizes on both the front and back of the bore regardless of burr size.

The cutting edges (A, fig. 1) remove burrs of any size along the plane of the workpiece surface, front and back. As the angular non-cutting definition surface of the blades (B, fig. 1) touches the workpiece material, the blades are simultaneously retracted radially into the blade housing, creating the predetermined chamfer diameter.

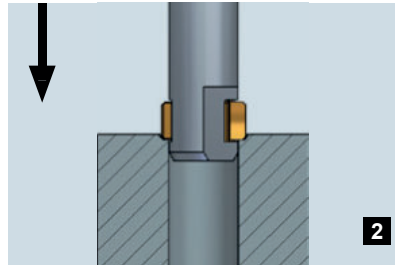
In the bore, the rounded surface geometry on the end of the blades prevents any damage to the bore surface.

Since the two blades are rigidly interconnected, it is possible to machine bores with a longitudinal slot or cross hole. Additionally, this feature allows the traversing of the bore without spindle stop. (see fig. 2).

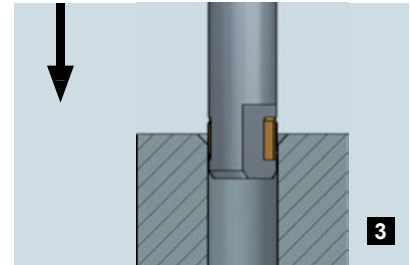
Process Steps Description



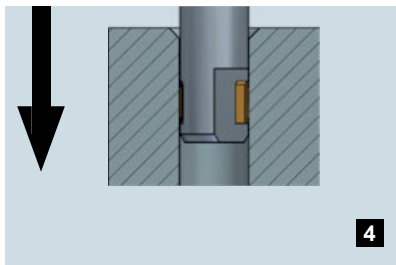
Chamfering is carried out from the same side as the previous boring.



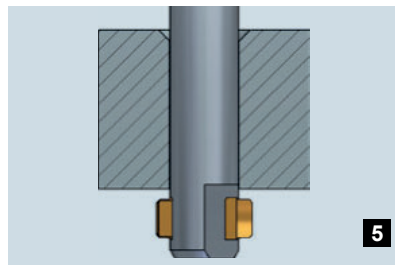
First, the DEFA blades completely remove the burr. Then they meet the workpiece surface.



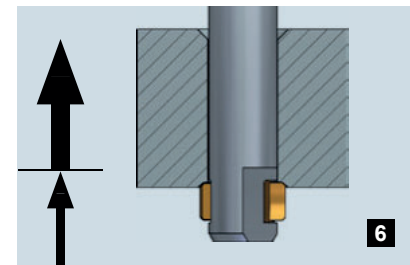
While the chamfer is being cut, the blades retract automatically and synchronously back into the blade housing.



When the blades are retracted, the DEFA tool moves through the bore with the spindle rotating. The control system automatically reduces the radial blade force to minimum.



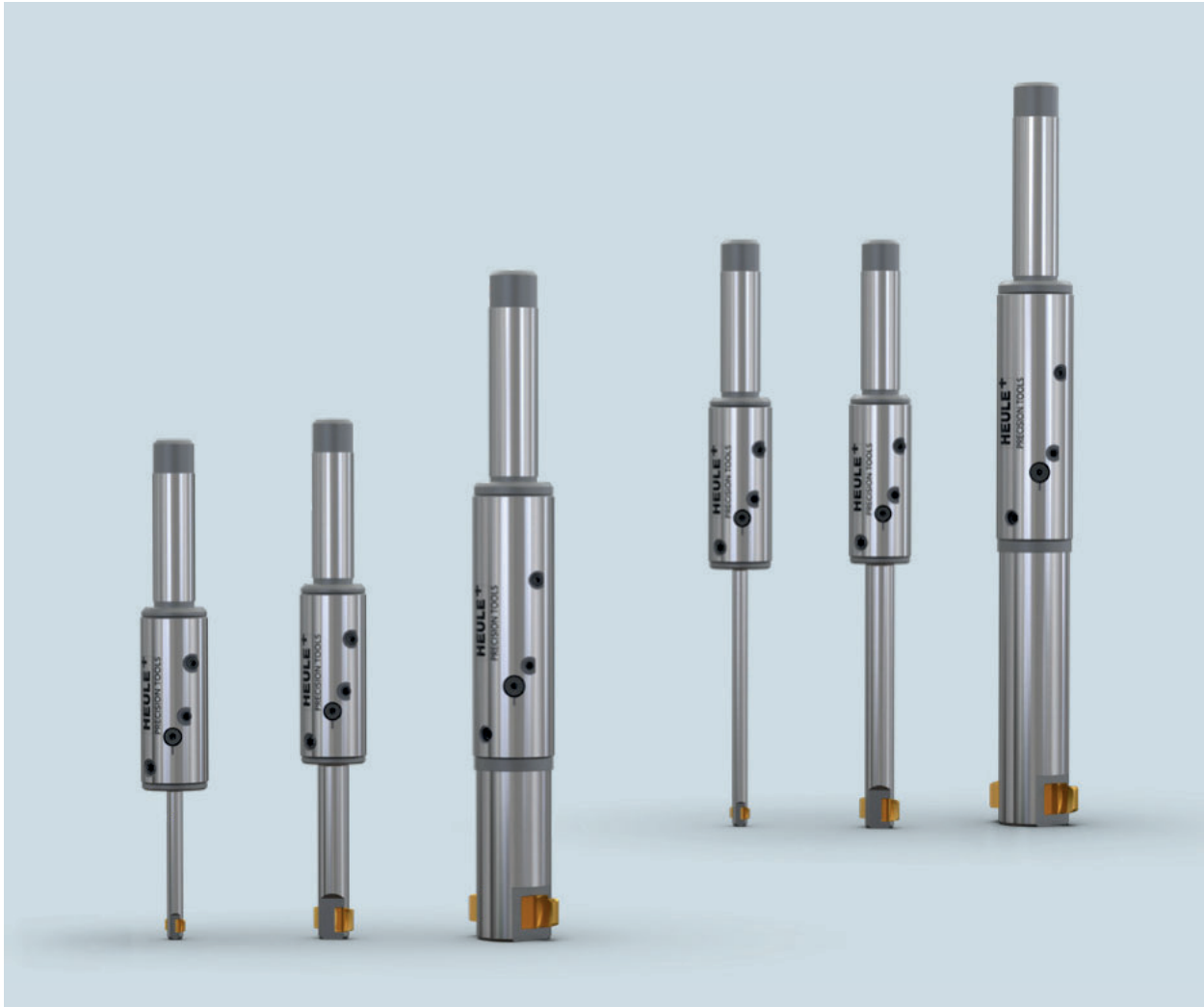
When moving out of the bore, the blades return to their initial position and are interlocked.



The back bore edge is now deburred and chamfered by backward feed. Once the chamfer is completed, the tool can exit in rapid traverse.

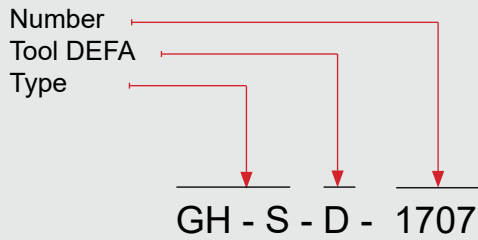
DEFA Range Summary

The DEFA range consists of three tool series. Within these series there are diverse diameter options that cover a small bore diameter range.

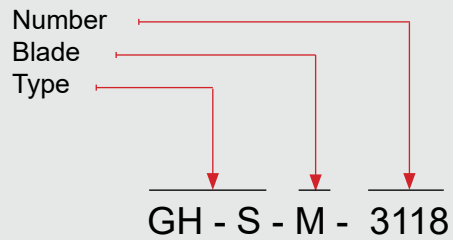


Bore	Chamfer Capacity	Tool Series
Ø4.0 – Ø6.6 mm	0.1 – 0.6 mm	DEFA 4 - 6
Ø6.0 – Ø10.1 mm	0.1 – 0.85 mm	DEFA 6 - 10
Ø9.0 – Ø23.9 mm	0.1 – 2.0 mm	DEFA 9 - 24

Part No.:
Tool without Blade



Part No.:
Blade



Tool designation

This is the descriptive tool name in contrast to the non-descriptive part number.

Bore range

Defines the application range of the tool with reference to the bore diameter.

Note: Do not reference below minimum values.

Chamfer range

Shows the range of possible chamfer diameters.

Blade housing LN

The blade housing determines the working length of the tool. It is chosen as short as possible, depending on the bore depth (stability reasons) and as long as needed.

Ordering information

For a tool ready for operation you always need:

- Tool without blade, without shank
- Blades
- Shank

Order Example 1

Requirements:

Chamfer 0.5x45°, Ø20.0 mm on front and back bore edge

Bore-Ø: Ø19.0 mm
Material: Grey cast
Working length: 30.0 mm
Adaption: cylind. shank Ø12.0 mm

Selection:

Tool: DEFA 17-21/30
Part No. GH-S-D-1697
Blades: DEFA 17-21 carbide 90°
Part No. GH-S-M-3918
Shank: cylindrical Ø12.0 mm
Part No. GH-S-S-0013

Order Example 2

Requirements:

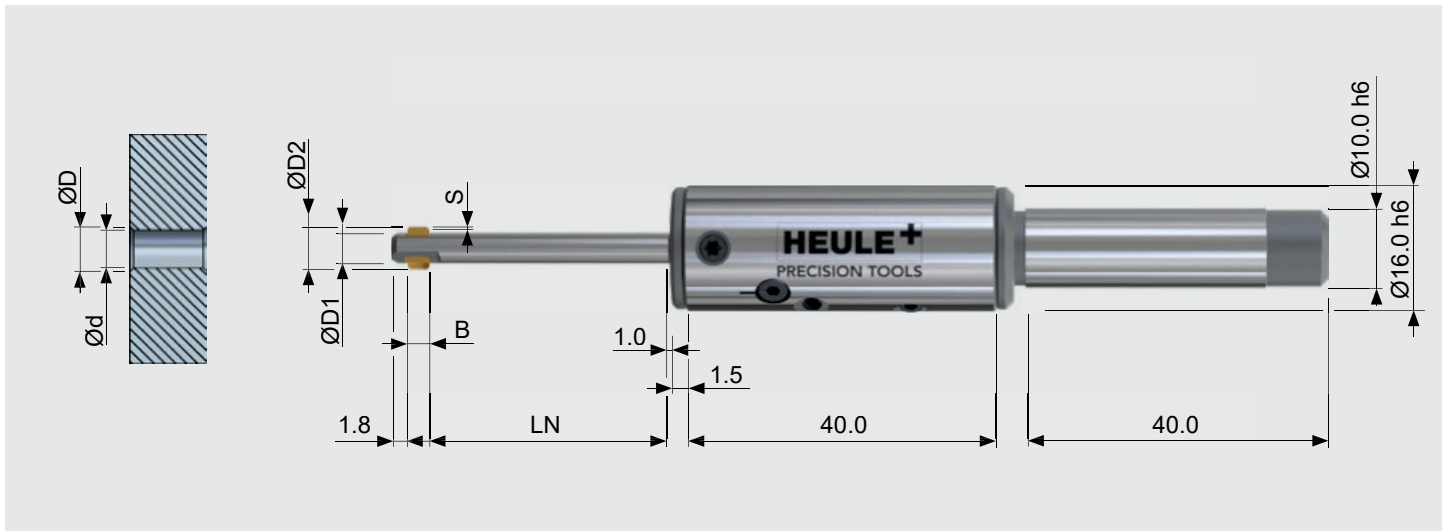
Chamfer 1.5x45°, Ø22.0 mm on front and back bore edge

Bore-Ø: Ø19.0 mm
Material: Grey cast
Working length: 30.0 mm
Adaption: cylind. shank Ø12.0 mm

Selection:

Tool: DEFA 19-24/30
Part No. GH-S-D-1698
Blades: DEFA 19-24 carbide 90°
Part No. GH-S-M-3919
Shank: cylindrical Ø12.0 mm
Part No. GH-S-S-0013

DEFA Chamfering Tools 4 - 6



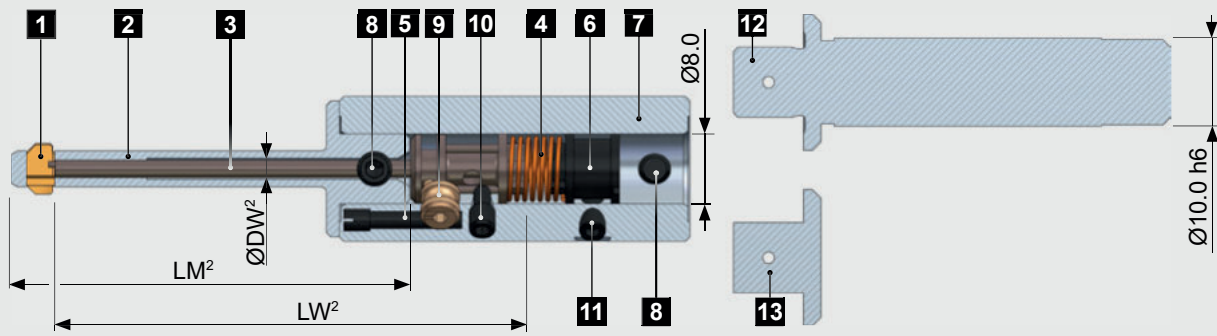
Tool Table

Tool designation	Bore range Ø d ¹⁾	Chamfer range Ø D	Blade housing ØD1	max. ØD2	B	S	LN	Tool without Blade		
								Part No. without Shank	Part No. with Shank Ø10	Part No. with End plug
4.0 - 4.8/30	4.0 - 4.6	4.4 - 4.8	3.8	5.4	3.2	0.3	30.0	GH-S-D-5200	-5220	-5240
60.0							GH-S-D-5201	-5221	-5241	
4.2 - 5.2/30	4.2 - 5.0	4.6 - 5.2	4.1	5.8	3.2	0.3	30.0	GH-S-D-5202	-5222	-5242
60.0							GH-S-D-5203	-5223	-5243	
4.6 - 5.8/30	4.6 - 5.6	5.0 - 5.8	4.5	6.4	3.2	0.3	30.0	GH-S-D-5204	-5224	-5244
60.0							GH-S-D-5205	-5225	-5245	
5.0 - 6.4/30	5.0 - 6.2	5.4 - 6.4	4.8	7.0	3.2	0.3	30.0	GH-S-D-5206	-5226	-5246
60.0							GH-S-D-5207	-5227	-5247	
5.5 - 6.8/30	5.5 - 6.6	5.9 - 6.8	5.3	7.4	3.2	0.3	30.0	GH-S-D-5208	-5228	-5248
60.0							GH-S-D-5209	-5229	-5249	

¹⁾ Shall not be less.

ORDERING INFORMATION

In case the tool body serves for clamping, an end plug is required (please see also page 161).



Spare Parts

Pos.	Description	Part No.
1	Blade	see below
2	Blade housing	see page 157
3	Blade control	see page 157
4	Torsion spring 4-6	GH-S-T-0001
5	Positioning screw 4-6	GH-S-X-0001
6	Gear wheel 4-6	GH-S-C-0001
7	Tool body 4-6	GH-S-G-0217
8	Clamping screw M4x0.5x5.0	GH-H-S-0201
9	Eccentric cam 4-6	GH-S-E-0001
10	Set screw 4-6	GH-H-S-1126
11	Tension screw 4-6	GH-H-S-0101
12	Shank cylindric Ø10.0 h6	GH-S-S-0001
13	End plug Ø8.0	GH-S-S-0090

Blades DF Geometry 90°

DEFA	Part No.	backwards cutting only
	forward and backwards cutting	Coating T ¹
4.0 - 4.8	GH-S-M-3902*	GH-S-M-4902
4.2 - 5.2	GH-S-M-3903*	GH-S-M-4903
4.6 - 5.8	GH-S-M-3904*	GH-S-M-4904
5.0 - 6.4	GH-S-M-3905*	GH-S-M-4905
5.5 - 6.8	GH-S-M-3906*	GH-S-M-4906

¹⁾ **Standard items** / Please enquire about stock or delivery times for all non-standard blades.

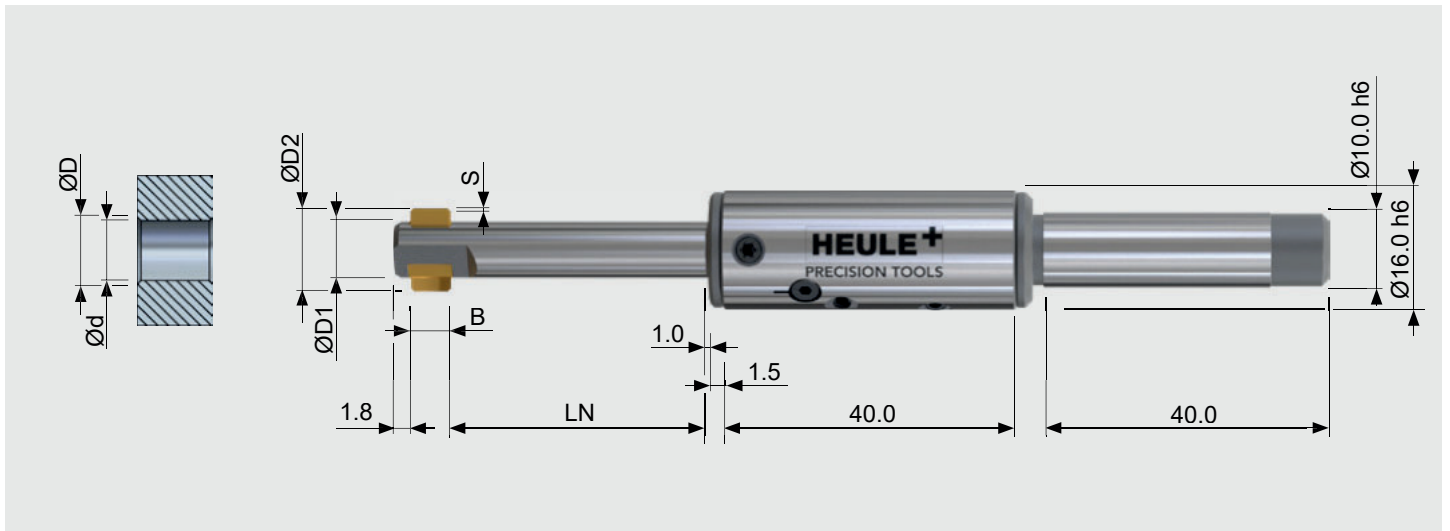
¹⁾ Standard coating

²⁾ The data for these dimensions are listed on page 157ff.

ORDERING INFORMATION

Blades with a different chamfer angle or coatings for materials with increased requirements (i.e. titanium, Inconel) are available on request.

DEFA Chamfering Tools 6 - 10



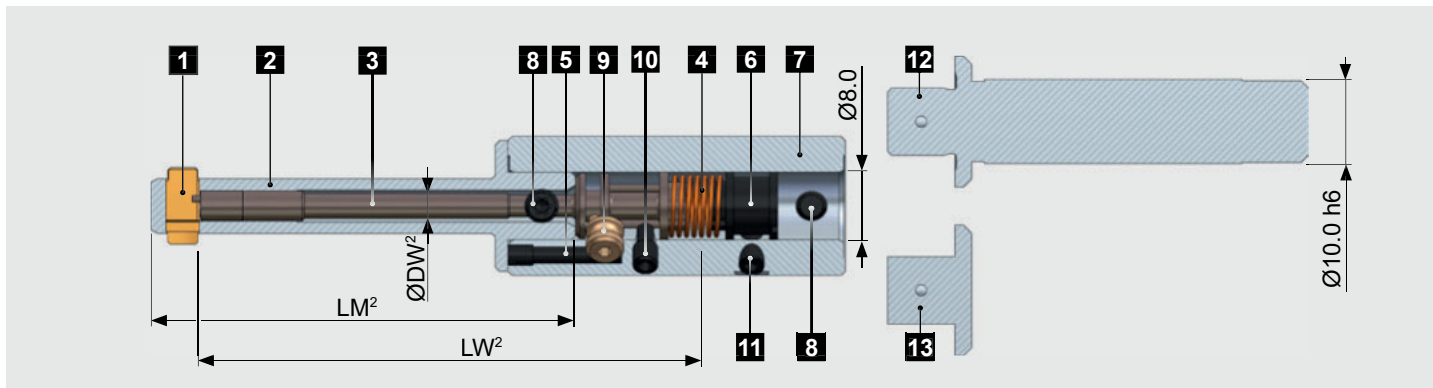
Tool Table

Tool designation	Bore range Ød ¹	Chamfer range ØD	Blade housing ØD1	max. ØD2	B	S	LN	Tool without Blade		
								Part No. without Shank	Part No. with Shank	Part No. with End plug
6.0 - 7.0/34	6.0 - 6.5	6.2 - 6.8	5.8	7.4	4.0	0.3	34.0	GH-S-D-5210	-5230	-5250
6.0 - 7.0/60							60.0	GH-S-D-5211	-5231	-5251
6.5 - 7.5/34	6.3 - 7.3	6.5 - 7.6	5.8	8.2	4.0	0.3	34.0	GH-S-D-5212	-5232	-5252
6.5 - 7.5/60							60.0	GH-S-D-5213	-5233	-5253
7.0 - 8.0/34	6.8 - 8.2	7.0 - 8.5	6.5	9.1	4.0	0.3	34.0	GH-S-D-5214	-5234	-5254
7.0 - 8.0/60							60.0	GH-S-D-5215	-5235	-5255
8.0 - 9.5/34	7.7 - 9.3	8.1 - 9.6	7.5	10.4	6.0	0.4	34.0	GH-S-D-5216	-5236	-5256
8.0 - 9.5/60							60.0	GH-S-D-5217	-5237	-5257
8.5 - 10.0/34	8.2 - 10.1	8.9 - 10.4	7.5	11.2	6.0	0.4	34.0	GH-S-D-5218	-5238	-5258
8.5 - 10.0/60							60.0	GH-S-D-5219	-5239	-5259

¹⁾ Shall not be less.

ORDERING INFORMATION

In case the tool body serves for clamping, an end plug is required (please see also page 161).



Spare Parts

Pos.	Description	Part No.
1	Blade	see below
2	Blade housing	see page 157
3	Blade control	see page 157
4	Torsion spring 6-10	GH-S-T-0001
5	Positioning screw 6-10	GH-S-X-0001
6	Gear wheel 6-10	GH-S-C-0001
7	Tool body 6-10	GH-S-G-0217
8	Clamping screw M4x0.5x5.0	GH-H-S-0201
9	Exccentric cam 6-10	GH-S-E-0001
10	Set screw 6-10	GH-H-S-1126
11	Tension screw 6-10	GH-H-S-0101
12	Shank cylindric Ø10.0 h6	GH-S-S-0001
13	End plug Ø8.0	GH-S-S-0090

Blades DF Geometry 90°

	Part No. forward and backward cutting	backward cutting only
DEFA	Coating T ¹	Coating T ¹
6.0 - 7.0	GH-S-M-3907*	GH-S-M-4907
6.5 - 7.5	GH-S-M-3908*	GH-S-M-4908
7.0 - 8.0	GH-S-M-3909*	GH-S-M-4909
8.0 - 9.5	GH-S-M-3910*	GH-S-M-4910
8.5 - 10.0	GH-S-M-3911*	GH-S-M-4911

¹ Standard items / Please enquire about stock or delivery times for all non-standard blades.

¹ Standard coating

² The data for these dimensions are listed on page 157ff.

ORDERING INFORMATION

Blades with a different chamfer angle or coatings for materials with increased requirements (i.e. titanium, Inconel) are available on request.

DEFA Chamfering Tools 9 - 24



Tool Table

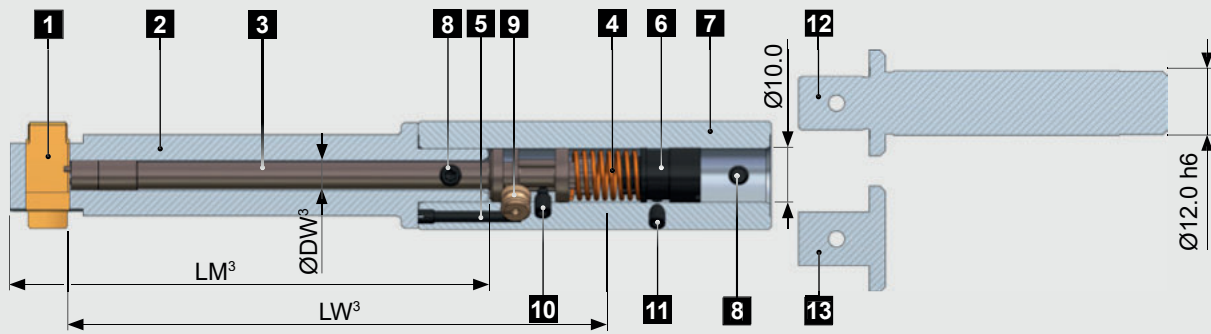
Tool designation	Bore range Ød ¹	Chamfer range ØD	Blade housing ØD1	max. ØD2	B	S	LN	Tool without Blade		
								Part No. without Shank	Part No. with Shank Ø12	Part No. with End plug
9.0 - 12.0/30	9.0-11.7	10.2-11.4	8.8	12.2	6.0	0.4	30.0	GH-S-D-1707	-1747	-5260
9.0 - 12.0/60		11.1-12.0 ²		12.8 ²						
10.0 - 13.0/30	9.7-12.7	11.0-12.4	9.5	13.2	6.0	0.4	30.0	GH-S-D-1709	-1749	-5262
10.0 - 13.0/60		12.1-13.0 ²		13.8 ²						
12.0 - 14.0/30	11.2-14.3	12.0-13.8	11.0	14.8	8.0	0.5	30.0	GH-S-D-1711	-1751	-5264
12.0 - 14.0/60		13.4-14.6 ²		15.6 ²						
13.0 - 16.0/30	12.2-15.9	13.5-15.4	11.0	16.4	8.0	0.5	30.0	GH-S-D-1713	-1753	-5266
13.0 - 16.0/60		15.0-16.2 ²		17.2 ²						
14.0 - 17.0/30	13.2-17.3	15.1-16.6	13.0	17.6	8.0	0.5	30.0	GH-S-D-1695	-1788	-5268
14.0 - 17.0/60		16.4-17.6 ²		18.6 ²						
16.0 - 19.0/30	15.2-18.7	16.7-18.2	15.0	19.2	8.0	0.5	30.0	GH-S-D-1696	-1789	-5270
16.0 - 19.0/60		17.8-19.0 ²		20.0 ²						
17.0 - 21.0/30	16.7-21.5	18.2-20.4	16.5	22.4	8.0	1.0	30.0	GH-S-D-1697	-1790	-5272
17.0 - 21.0/60		19.6-21.8 ²		23.8 ²						
19.0 - 24.0/30	18.7-23.9	20.6-22.8	18.5	24.8	8.0	1.0	30.0	GH-S-D-1698	-1791	-5274
19.0 - 24.0/60		22.0-24.2 ²		26.2 ²						

¹) Shall not be less.

²) Extended chamfer range: This chamfer range can be attained by using the set screw GH-H-S-0302. For tool order add the extension "-EF" to the tool part number (Order example: GH-S-D-1707-EF). Consultation with HEULE required.

ORDERING INFORMATION

In case the tool body serves for clamping, an end plug is required (please see page 161).



Spare Parts

Pos.	Description	Part No.
1	Blade	see below
2	Blade housing	see page 157
3	Blade control	see page 157
4	Torsion spring 9-28	GH-S-T-0006
5	Positioning screw 9-28	GH-S-X-0006
6	Gear wheel 9-28	GH-S-C-0008
7	Tool body 9-19 Tool body 17-24	GH-S-G-0011 GH-S-G-0013
8	Clamping screw M4x0.5x5.0	GH-H-S-0201
9	Eccentric cam 9-25	GH-S-E-0003
10	Set screw 9-28 Set screw extended chamfer Ø ¹	GH-H-S-0325 GH-H-S-0302
11	Tension screw 9-25	GH-H-S-0102
12	Shank cylindric Ø12.0 h6	GH-S-S-0013
13	End plug Ø10.0	GH-S-S-0092

¹⁾ Extended chamfer range: This chamfer range can be attained by using the set screw GH-H-S-0302. For tool order add the extension "-EF" to the tool part number (Order example: GH-S-D-1707-EF).

Blades DF Geometry 90°

DEFA	Part No.	
	forward and backward cutting	backward cutting only
	Coating T ²	Coating T ²
9.0 - 12.0	GH-S-M-3912*	GH-S-M-4912
10.0 - 13.0	GH-S-M-3913*	GH-S-M-4913
12.0 - 14.0	GH-S-M-3914*	GH-S-M-4914
13.0 - 16.0	GH-S-M-3915*	GH-S-M-4915
14.0 - 17.0	GH-S-M-3916*	GH-S-M-4916
16.0 - 19.0	GH-S-M-3917*	GH-S-M-4917
17.0 - 21.0	GH-S-M-3918*	GH-S-M-4918
19.0 - 24.0	GH-S-M-3919*	GH-S-M-4919

¹⁾ **Standard items** / Please enquire about stock or delivery times for all non-standard blades.

²⁾ Standard coating

³⁾ The data for these dimensions are listed on page 157.

ORDERING INFORMATION

Blades with a different chamfer angle or coatings for materials with increased requirements (i.e. titanium, Inconel) are available on request.

Technical Data and Settings

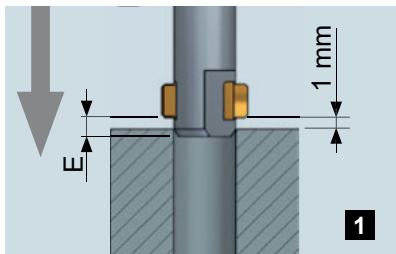
Cutting Data DEFA

Material	Condition	Tensile strength N/mm ²	Hardness HB	DF Geometry		DR Geometry	
				Cutting speed (m/min)	Feed (mm/rev)	Cutting speed (m/min)	Feed (mm/rev)
Unalloyed steel		<500	<150	40-70	0.02-0.06	40-70	0.05-0.1
Cast steel		500 - 850	150 - 250	40-70	0.02-0.06	40-70	0.05-0.1
Grey cast iron		<500	<150	50-90	0.02-0.06	50-90	0.05-0.1
Ductile cast iron		300 - 800	90 - 240	40-70	0.02-0.06	40-70	0.05-0.1
Low alloy steel	annealed	<850	<250	40-70	0.02-0.06	40-70	0.05-0.1
	tempered	850 - 1000	250 - 300	30-50	0.02-0.06	30-50	0.05-0.1
	tempered	>1000 - 1200	>300 - 350	20-40	0.02-0.04	20-40	0.05-0.06
High alloy steel	annealed	<850	<250	20-50	0.02-0.06	20-50	0.05-0.1
	tempered	850 - 1100	250 - 320	15-30	0.02-0.04	15-30	0.02-0.06
Stainless steel	ferritic	450 - 650	130 - 190	15-30	0.02-0.06	15-30	0.05-0.1
	austenitic	650 - 900	190 - 270	10-20	0.02-0.04	10-20	0.05-0.06
	martensitic	500 - 700	150 - 200	15-30	0.02-0.04	15-30	0.02-0.06
Special alloy (Inconel, titanium)		<1200	<350	10-20	0.02-0.04	10-20	0.02-0.06
Wrought or cast aluminium alloys ¹							
Copper alloy	Brass ¹						
	Bronze short-chipping ¹						
	Bronze long-chipping ¹						

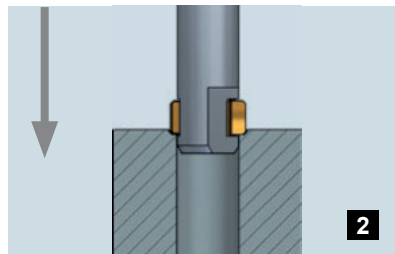
¹ DEFA is primarily designed for use with materials which are difficult to machine and is only partially suitable for soft materials. Workpieces with an interrupted cut are an exception. Please consult HEULE for advice on soft materials.

WARNING NOTICE

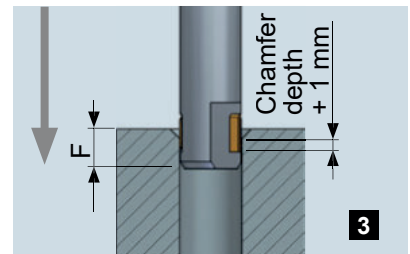
All listed cutting data are standard values only! The cutting values depend on the amount of slope of the uneven bore edge. (i.e. high slope ► low cutting value). The feed also depends on the sloping ratio. In case of hard to machine materials or uneven bore edges, we recommend to apply cutting speeds that are at the lower end of the range for uneven bore edges.



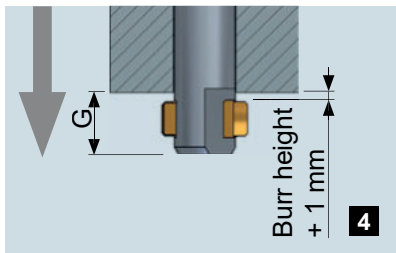
It is not necessary to change the sense of rotation nor to stop the spindle during the whole process. First, rapid traverse of the tool blade above the top material surface of bore or burr.



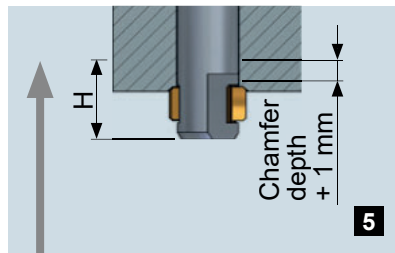
First, the burr of the front bore edge is being removed in working feed. Then, continue in working feed to apply the requested chamfer.



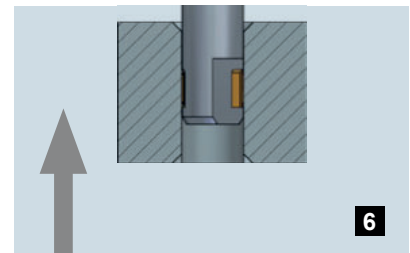
Continue in working feed 1.0 mm farther than the chamfer until the blade is fully retracted.



In rapid traverse and without stopping the spindle, you can travel through the hole without damaging its surface. Travel with the blade 1.0 mm behind the back bore edge and possible burrs.



In back working feed the backward chamfer is executed. Proceed with the blade 1.0 mm farther than the planned chamfering depth.

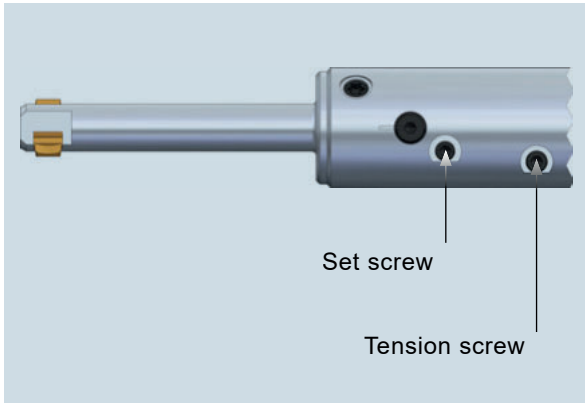


Once the blades are fully retracted, exit in rapid traverse to the next bore.

Dimension Table to Programming Information

Tool	E	F	G	H
DEFA 4-6	0.8	3.4	6.0	3.4
DEFA 6-10	0.8	1.8+(0.5B)	1.8+B+1.0	1.8+(0.5B)
DEFA 9-24	2.0	3.0+(0.5B)	3.0+B+1.0	1.8+(0.5B)

Setting the Blade Force



The radial force that acts on the blades has to be strong enough for the blades to fully extend to the set D2 diameter under working conditions (dirt, coolant, etc.). Important: The blade force does not define the chamfer diameter.

Increase blade force:
Turn tension screw clockwise

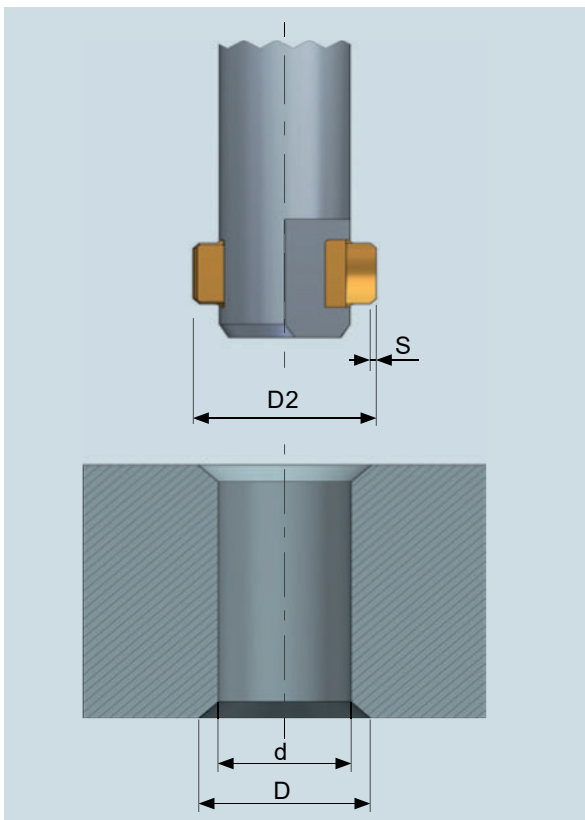
Reduce blade force:
Turn tension screw counter-clockwise

Blade force standard value: 8-12 N
Dependencies such as material, requirements on the chamfer have to be considered. A test bore is recommended.

NOTE

The blade force does not determine the size of the chamfer!

Setting the Chamfer Size



The desired chamfer diameter **D** is set by means of the blade diameter setting **D2**. The maximum D2 (dimensions see tool tables on pages 116-120) must not be exceeded.

D2 = Blade diameter setting
D = Chamfer diameter
s = Definition surface width (see pages 128f.)

$$D2 \approx D + 2s$$

Proceeding:

- Turn set screw with hexagonal wrench until the desired blade diameter setting D2 is obtained (remove the red sealant).
Increase D2 = Turn set screw counter-clockwise
Reduce D2 = Turn set screw clockwise
- Re-seal the set screw.

If the chamfer diameter D varies slightly from the desired diameter, the blade diameter setting can be adjusted accordingly.

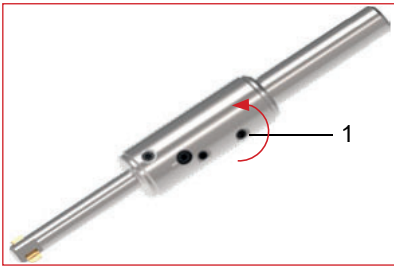
NOTE

Please pay attention to the bore hole (d) tolerance (+0.1 mm). Bores with larger tolerance can cause problems (tool is rubbing in the bore, reduced counterbore diameter).

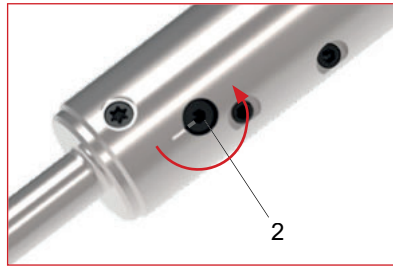
Furthermore, mind the tool collision diameter (counterbore diameter + 2.0 mm) when you move the tool to the tool storage. Reason: The blade can fold out of the blade housing by its own weight.

PRECISION TOOLS

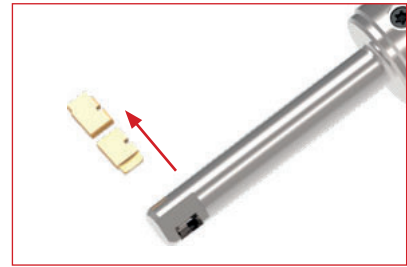
PRECISION TOOLS



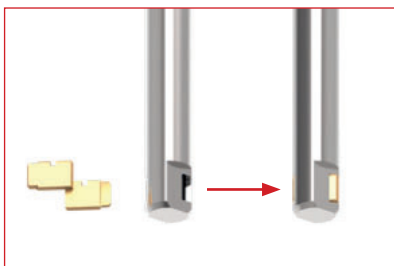
Continue to turn the tension screw counter-clockwise until it is possible to press the blades together **easily** by hand. **Only change the blades when they are slack, i.e. when they are not under tension.**



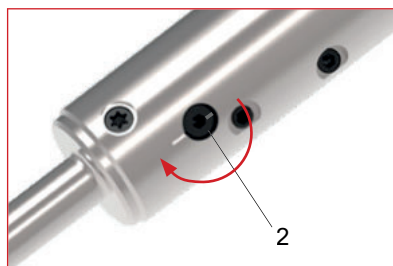
Turn the eccentric cam 180° until the notch is facing opposite of the index.



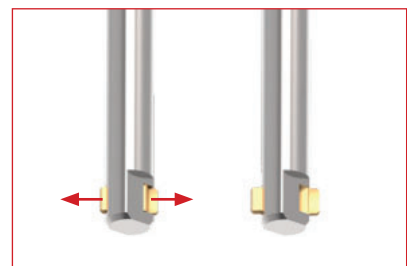
Remove blades from blade housing (by pushing).



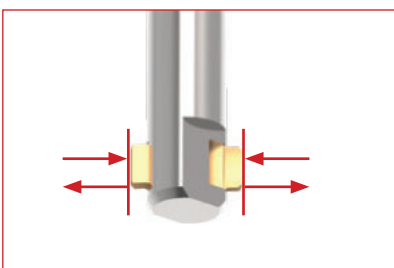
Insert the replacement blades as a pair, cleaned and so that they are approximately flush with the outside diameter of the blade housing.



Turn the eccentric cam (2) back to the left until a **slight** resistance is noticed. Finally, both markings are next to each other.



Move the inserted blades outwards (arrow) until they engage automatically.



Check: Press both blades with thumb and index finger together. Both blades must move synchronously.



Continue to turn tension screw (1) clockwise until the desired blade force is attained. The previously set chamfer size remains the same before and after changing the blades. For reference values for the blade force please refer to page 154.

Spare Parts

Blade Housing and Blade Control

Tool Ref.	DEFA 4-6 Blade housing with ØD1				DEFA 4-6 Blade control		
	ØD1	LN	LM	Part No.	ØDW	LW	Part No.
4.0 - 4.8/30	3.8	30.0	45.5	GH-S-N-0102	2.0	53.6	GH-S-W-0003
4.0 - 4.8/60	3.8	60.0	75.5	GH-S-N-0132	2.0	83.7	GH-S-W-0027
4.2 - 5.2/30	4.1	30.0	45.5	GH-S-N-0151	2.0	53.6	GH-S-W-0003
4.2 - 5.2/60	4.1	60.0	75.5	GH-S-N-0152	2.0	83.7	GH-S-W-0027
4.6 - 5.8/30	4.5	30.0	45.5	GH-S-N-0154	2.0	53.6	GH-S-W-0003
4.6 - 5.8/60	4.5	60.0	75.5	GH-S-N-0155	2.0	83.7	GH-S-W-0027
5.0 - 6.4/30	4.8	30.0	45.5	GH-S-N-0107	2.0	53.6	GH-S-W-0003
5.0 - 6.4/60	4.8	60.0	75.5	GH-S-N-0134	2.0	83.7	GH-S-W-0027
5.5 - 6.8/30	5.3	30.0	45.5	GH-S-N-0109	2.0	53.6	GH-S-W-0003
5.5 - 6.8/60	5.3	60.0	75.5	GH-S-N-0135	2.0	83.7	GH-S-W-0027

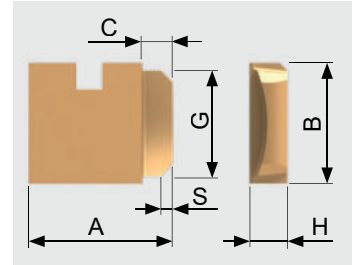
Tool Ref.	DEFA 6-10 Blade housing with ØD1				DEFA 6-10 Blade control		
	ØD1	LN	LM	Part No.	ØDW	LW	Part No.
6.0 - 7.0/34	5.8	34.0	50.3	GH-S-N-0011	3.6	57.4	GH-S-W-0505
6.0 - 7.0/60	5.8	60.0	76.3	GH-S-N-0036	3.6	83.4	GH-S-W-0528
6.5 - 7.5/34	5.8	34.0	50.3	GH-S-N-0111	3.6	57.4	GH-S-W-0505
6.5 - 7.5/60	5.8	60.0	76.3	GH-S-N-0136	3.6	83.4	GH-S-W-0528
7.0 - 8.0/34	6.5	34.0	50.3	GH-S-N-0013	3.6	57.4	GH-S-W-0505
7.0 - 8.0/60	6.5	60.0	76.3	GH-S-N-0137	3.6	83.4	GH-S-W-0528
8.0 - 9.5/34	7.5	34.0	52.3	GH-S-N-0117	3.6	57.4	GH-S-W-0505
8.0 - 9.5/60	7.5	60.0	78.3	GH-S-N-0138	3.6	83.4	GH-S-W-0528
8.5 - 10.0/34	7.5	34.0	52.3	GH-S-N-0084	3.6	57.4	GH-S-W-0505
8.5 - 10.0/60	7.5	60.0	78.3	GH-S-N-0085	3.6	83.4	GH-S-W-0528

Tool Ref.	DEFA 9-24 Blade housing with ØD1				DEFA 9-24 Blade control		
	ØD1	LN	LM	Part No.	ØDW	LW	Part No.
9.0 - 12.0/30	8.8	30.0	56.0	GH-S-N-0074	4.5	65.8	GH-S-W-0508
9.0 - 12.0/60	8.8	60.0	86.0	GH-S-N-0075	4.5	95.8	GH-S-W-0509
10.0 - 13.0/30	9.5	30.0	56.0	GH-S-N-0120	4.5	65.8	GH-S-W-0508
10.0 - 13.0/60	9.5	60.0	86.0	GH-S-N-0121	4.5	95.8	GH-S-W-0509
12.0 - 14.0/30	11.0	30.0	58.0	GH-S-N-0022	5.5	65.8	GH-S-W-0511
12.0 - 14.0/60	11.0	60.0	88.0	GH-S-N-0023	5.5	95.8	GH-S-W-0512
13.0 - 16.0/30	11.0	30.0	58.0	GH-S-N-0122	5.5	65.8	GH-S-W-0511
13.0 - 16.0/60	11.0	60.0	88.0	GH-S-N-0123	5.5	95.8	GH-S-W-0512
14.0 - 17.0/30	13.0	30.0	58.0	GH-S-N-0124	5.5	65.8	GH-S-W-0511
14.0 - 17.0/60	13.0	60.0	88.0	GH-S-N-0125	5.5	95.8	GH-S-W-0512
16.0 - 19.0/30	15.0	30.0	58.0	GH-S-N-0126	5.5	65.8	GH-S-W-0511
16.0 - 19.0/60	15.0	60.0	88.0	GH-S-N-0127	5.5	95.8	GH-S-W-0512
17.0 - 21.0/30	16.5	30.0	58.0	GH-S-N-0128	8.0	65.8	GH-S-W-0520
17.0 - 21.0/60	16.5	60.0	88.0	GH-S-N-0129	8.0	95.8	GH-S-W-0521
19.0 - 24.0/30	18.5	30.0	58.0	GH-S-N-0130	8.0	65.8	GH-S-W-0520
19.0 - 24.0/60	18.5	60.0	88.0	GH-S-N-0131	8.0	95.8	GH-S-W-0521

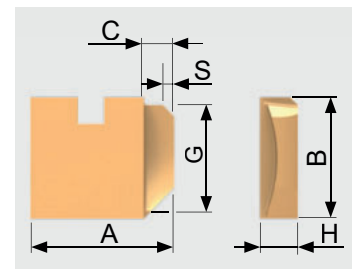
Blade Dimensions

Dimension Table

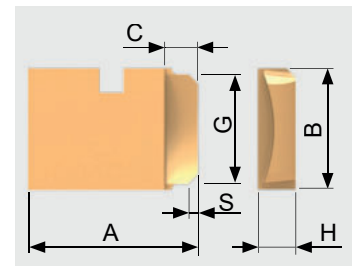
DEFA 4-6 90°, forward and backward cutting							
Designation	S	A	Ø Chamfer min.-max.	C	G	B	H
4.0 - 4.8	0.3	3.80	4.4 - 4.8	0.8	2.8	3.2	1.0
4.2 - 5.2	0.3	3.95	4.6 - 5.2	1.0	2.8	3.2	1.0
4.6 - 5.8	0.3	4.35	5.0 - 5.8	1.1	2.8	3.2	1.0
5.0 - 6.4	0.3	4.80	5.4 - 6.4	1.2	2.8	3.2	1.0
5.5 - 6.8	0.3	5.00	5.9 - 6.8	1.2	2.8	3.2	1.0



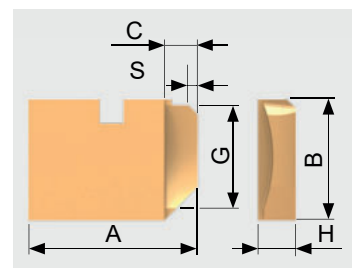
DEFA 4-6 90°, backward cutting only							
Designation	S	A	Ø Chamfer min.-max.	C	G	B	H
4.0 - 4.8	0.3	3.80	4.4 - 4.8	0.8	3.0	3.2	1.0
4.2 - 5.2	0.3	3.95	4.6 - 5.2	1.0	3.0	3.2	1.0
4.6 - 5.8	0.3	4.35	5.0 - 5.8	1.1	3.0	3.2	1.0
5.0 - 6.4	0.3	4.80	5.4 - 6.4	1.2	3.0	3.2	1.0
5.5 - 6.8	0.3	5.00	5.9 - 6.8	1.2	3.0	3.2	1.0



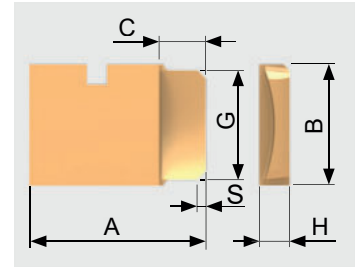
DEFA 6-10 90°, forward and backward cutting							
Designation	S	A	Ø Chamfer min.-max.	C	G	B	H
6.0 - 7.0	0.3	5.60	6.2 - 6.8	1.1	3.6	4.0	1.25
6.5 - 7.5	0.3	6.00	6.5 - 7.6	1.4	3.6	4.0	1.25
7.0 - 8.0	0.3	6.45	7.0 - 8.5	1.5	3.6	4.0	1.25
8.0 - 9.5	0.4	7.05	8.1 - 9.6	1.8	5.4	6.0	1.50
8.5 - 10.0	0.4	7.45	8.9 - 10.4	2.0	5.4	6.0	1.50



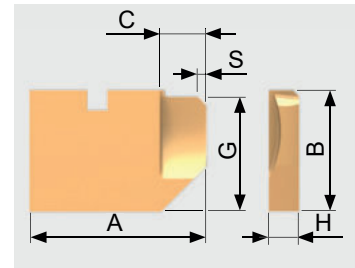
DEFA 6-10 90°, backward cutting only							
Designation	S	A	Ø Chamfer min.-max.	C	G	B	H
6.0 - 7.0	0.3	5.60	6.2 - 6.8	1.1	3.8	4.0	1.25
6.5 - 7.5	0.3	6.00	6.5 - 7.6	1.4	3.8	4.0	1.25
7.0 - 8.0	0.3	6.45	7.0 - 8.5	1.5	3.8	4.0	1.25
8.0 - 9.5	0.4	7.05	8.1 - 9.6	1.8	5.7	6.0	1.50
8.5 - 10.0	0.4	7.45	8.9 - 10.4	2.0	5.7	6.0	1.50



DEFA 9-24 90°, forward and backward cutting							
Designation	S	A	Ø Chamfer min.-max.	C	G	B	H
9.0 - 12.0	0.4	8.75	10.2 - 12.0 ¹⁾	2.3	5.4	6.0	1.5
10.0 - 13.0	0.4	9.25	11.0 - 13.0 ¹⁾	2.5	5.4	6.0	1.5
12.0 - 14.0	0.5	10.70	12.0 - 14.6 ¹⁾	2.6	7.2	8.0	2.0
13.0 - 16.0	0.5	11.50	13.5 - 16.2 ¹⁾	3.0	7.2	8.0	2.0
14.0 - 17.0	0.5	12.20	15.1 - 17.6 ¹⁾	3.4	7.2	8.0	3.0
16.0 - 19.0	0.5	12.90	16.7 - 19.0 ¹⁾	3.4	7.2	8.0	3.0
17.0 - 21.0	1.0	15.90	18.2 - 21.8 ¹⁾	4.3	7.2	8.0	4.0
19.0 - 24.0	1.0	17.10	20.6 - 24.2 ¹⁾	4.5	7.2	8.0	4.0



DEFA 9-24 90°, backward cutting only							
Designation	S	A	Ø Chamfer min.-max.	C	G	B	H
9.0 - 12.0	0.4	8.75	10.2 - 12.0 ¹⁾	2.3	5.7	6.0	1.5
10.0 - 13.0	0.4	9.25	11.0 - 13.0 ¹⁾	2.5	5.7	6.0	1.5
12.0 - 14.0	0.5	10.70	12.0 - 14.6 ¹⁾	2.6	7.6	8.0	2.0
13.0 - 16.0	0.5	11.50	13.5 - 16.2 ¹⁾	3.0	7.6	8.0	2.0
14.0 - 17.0	0.5	12.20	15.1 - 17.6 ¹⁾	3.4	7.6	8.0	3.0
16.0 - 19.0	0.5	12.90	16.7 - 19.0 ¹⁾	3.4	7.6	8.0	3.0
17.0 - 21.0	1.0	15.90	18.2 - 21.8 ¹⁾	4.3	7.6	8.0	4.0
19.0 - 24.0	1.0	17.10	20.6 - 24.2 ¹⁾	4.5	7.6	8.0	4.0



¹⁾ Extended chamfer range

NOTE

In case the desired result cannot be reached with the blades listed above, please contact your HEULE Sales Representative.

Blades with DF Geometry



Forward and backward cutting



Backward cutting only

Blades with DF geometry are mainly used when a defined, toleranced or consistent chamfer size is required. It is also recommended for use on hard materials or on materials with excessive burr formation.

This blade type is responsive to the condition of the machine such as clamping of workpiece and tool as well as a stable machine spindle etc.

If no front chamfer is required, a **back cutting only blade has to be used.**

The feed rate for blades with DF geometry is from 0.03 mm to 0.1 mm/rev. The upper value should not be exceeded as blade breakage may result.

Blades with DR Geometry



Forward and backward cutting



Backward cutting only

Blades with DR Geometry¹ are mainly used when a defined, toleranced chamfer with extremely high requirements is needed. They are favoured when it comes to very tough materials or materials with strong burr formation.

All these blades will be specified according to the application with the support of the design department. Also the cutting data must be defined individually for every new application.

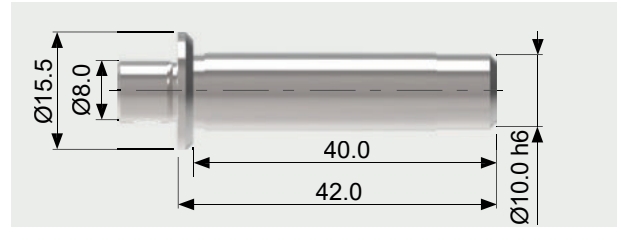
Furthermore, after a first tool/blade trial an additional correction loop must be taken into account. The test results will be analyzed. The corrective actions flow into the development of the customer-specific DR blades.

¹⁾ These special blades are not listed in the catalogue. Please send us your request.

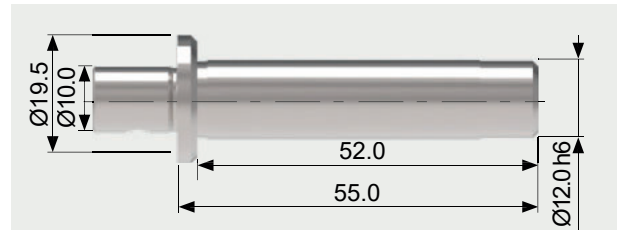
Dimensions of Shanks and End Plugs

Dimension Table

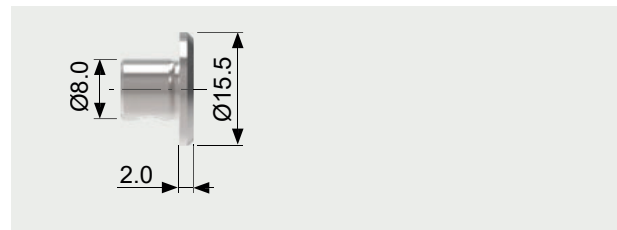
DEFA 4-6 / 6-10	
Shank type	Part No.
Cylindrical Ø10	GH-S-S-0001



DEFA 9-24	
Shank type	Part No.
Cylindrical Ø12	GH-S-S-0013



DEFA 4-6 / 6-10	
Shank type	Part No.
End plug Ø8	GH-S-S-0090



DEFA 9-24	
Shank type	Part No.
End plug Ø10	GH-S-S-0092

