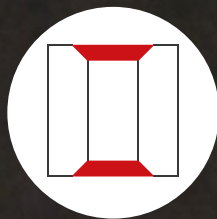


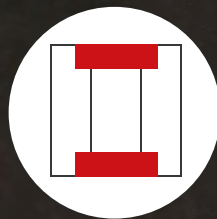
Efficiently machine the back edge of the bore



Deburring



Chamfering



Counterboring



Drilling
combined

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NOTE:

This printed catalogue shows the status at the time of printing and is subject to technical changes. Any subsequent additions or corrections can only be viewed on the website.

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AT HOME IN SWITZERLAND – INDEPENDENT AND AGILE

HEULE Precision Tools is an independent Swiss family business. Since 1961, we have been manufacturing exclusively at our headquarters in Balgach, near Lake Constance at the border between Germany, Austria and Switzerland.



SUSTAINABILITY FOR OUR FUTURE

HEULE's sustainable mindset is evident in multiple dimensions and not just in climate protection. HEULE has been involved in apprentice training for decades, thus ensuring the next generation of employees. HEULE also builds long-term partnerships based on mutual trust in its work with customers. HEULE has always focussed on the economical use of resources. The head office, built in 2007, emits almost ZERO CO₂ for heating and air conditioning.



OUR FOCUS: REDUCING YOUR UNIT COSTS

Our reliable solutions for back bore machining benefit you in multiple ways. First of all, they guarantee maximum process reliability, and second, they eliminate the need for time-consuming work steps such as manual processing, re-clamping, reworking or external operations. The goal is to produce finished parts on the machine. Simple programming and handling also contribute to cost-effectiveness and peace of mind.

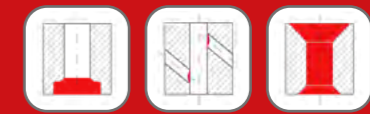


WORLDWIDE AVAILABILITY

Our global partner network guarantees you competent consulting and support on site. Our teams of experts will be happy to help you find customised product solutions for your needs. We are also there to assist you with help and advice after commissioning.



The HEULE solutions at a glance



Individual solutions

Does the standard not fit your needs? We would be happy to advise you on application-specific solutions. We either adapt the dimensions of an existing tool system, for example, or we develop a customised solution.

Good to know!
If the standard does not fit, a customised solution often works!

Deburring



Deburring: Removing burrs and/or breaking edges without defined forms or dimensions.



DL2 COFA COFA Cassette COFA-X

Chamfering



Chamfering: Creating a defined angled break on the edge of a bore



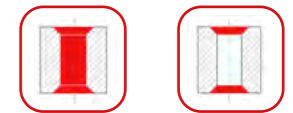
SNAP SNAP Cassette DEFA GH-K

Counterboring



BSF SOLO

Drilling combined



VEX SNAP18 Module

	DL2	COFA	COFA Cassette	COFA-X	SNAP	SNAP Cassette	DEFA	GH-K	BSF	SOLO	VEX	SNAP18 Module
Page in the general catalogue	54	14	40	46	64	94	102	120	126	178	188	214
Bore diameter min.	1.0	2.0	10.0	5.0	2.0	12.6	4.0	3.0	6.5	6.0	5.0	18.0
Bore diameter max.	2.1	26.0	∞	26.0	35.0	∞	23.9	45.0	21.0	49.0	17.0	∞
Working length in mm	3.0–10.0	15.0–70.0	∞	15.0–70.0	10.0–75.0	∞	30.0–60.0	-	40.0–70.0	10.0–150.0	2xd	∞
Machining the front of the bore	•	•	•	•	•	•	•	•		•	•	•
Machining the back of the bore	•	•	•	•	•	•	•		•	•	•	•
Machining angled and uneven bore edges	slightly uneven	up to 30°	up to 30°	•								
Deburring profile / form	Radius-form deburr / edge break				Chamfer 45°	Chamfer 45°	Chamfer 45°	Chamfer 30/45°			Chamfer 45°	Chamfer 45°
Spotfacing / counterboring									•	•		
Use on large burrs					•	•	•	•	•	•	•	•
Use with demanding workpiece materials	•	•	•	•	•	•	•	•	•	•	•	•
Install in holder or combination tool			•			•						•

• = recommended

Tool recommendations

● = recommended
● = possible

Application	Deburring				Chamfering				Counterboring		Drilling combined	
	DL2	COFA	COFA Cassette	COFA-X	SNAP	SNAP Cassette	DEFA	GH-K	BSF	SOLO	VEX	SNAP18 Module
Page in the general catalogue	54	14	40	46	64	94	102	120	126	178	188	214
Deburring or chamfered edge according to ISO13715 – Edges with undefined form for bore diameter >2.0 mm, e.g. see dimensioning of outer edge according to ISO13715		●	●		●	●	●				●	●
Chamfered edge acc. to ISO13715 – edges with undefined form for bore Ø <2.0 mm		●										
Chamfered edge in pipe		●	●	●							●	
Chamfered edge on uneven surface			●	●								
Deburring on cross bores (bore Ø >5.0 mm)				●								
Chamfer 45° acc. to ISO21204 – edge with defined specification (e.g. 1x45°)					●	●	●	●			●	●
Bore diameter >30.0 mm				●		●						●
Groove in bore (interrupted cut)							●			●		
Large chamfer 60°/45° Countersink up to 20.0 mm deep								●				
Spotfacing and back spotfacing										●		
Back spotfacing									●	●		
Back spotfacing with interrupted cut									●	●		
Front and/or back counterboring									●	●		
Combined drilling and chamfering											●	●

DEFA is suitable for large burr formation or interrupted cuts.

Bore ratio 1:1

DEFA is the choice for large burr formation, interrupted cuts or adjustable chamfer size.

backwards only

> diameter 18.0 mm

Great support on the way to the optimum solution!

CONSULTING AND SUPPORT

HEULE is more than just a tool supplier. Our strength lies in the competent support we provide to the customer on their way to finding the optimum solution. We offer a comprehensive service package along with the tool.

	Design stage	Sample part	Pre-series	Serial production	
Consulting during the Design Stage	☑				We offer our expertise right from the design stage of the workpiece. The requirements for the deburring solution can often be simplified by making design adjustments to the workpiece. In many cases, this enables the use of standard tools rather than custom developments.
Technical Consulting		☑	☑	☑	Our experienced specialists analyse your technical challenges, prepare cost-per-part analyses and cycle time calculations and advise you on the best solutions. Upstream process steps (e.g. drilling) are also analysed if necessary. If desired, we can organise product or technology training courses at your premises or at HEULE.
Individual Solutions		☑			Does the standard not fit your needs? We would be happy to advise you on application-specific solutions. We either adapt the dimensions of an existing tool system, for example, or we develop a custom solution.
Testing at the HEULE Test Centre		☑	☑		For new developments or challenging applications, we conduct tests at our test centre in Switzerland. The customer's original workpiece is machined using the proposed tool solution. The customer is more than welcome to participate in the tests in person.
Test Tool			☑	☑	If you want to make sure that the tool you have in mind meets your requirements, HEULE will be happy to provide a test tool along with support.

	Design stage	Prototype	Pre-series	Serial production	
Supervised Tests at the Customer's Plant		☑	☑	☑	Once a tool solution has been found for the application, test tools can be put into operation at the customer's plant. Depending on the complexity of the application, this step is overseen by HEULE specialists.
Programming Support			☑	☑	If you would like support in programming the CNC machine, you are welcome to get in touch with HEULE. We are also happy to provide on-site support.
On-site Commissioning			☑	☑	For technically demanding applications or valuable workpieces, HEULE is happy to be on-site at the plant to ensure successful commissioning and optimisation of the process.
After Sales Service				☑	Even after the start of series production, HEULE is on hand should unexpected challenges arise or should there be a need for optimisation. Thanks to our global sales network, we can respond quickly and provide support in your local language.



INDIVIDUAL

Good to know

PRODUCT CATEGORIES AND AVAILABILITY

HEULE distinguishes between three categories of products. As an innovative problem solver, this enables us to find the right tool concept for you – either as a standard solution or as an individually optimised concept just for you.

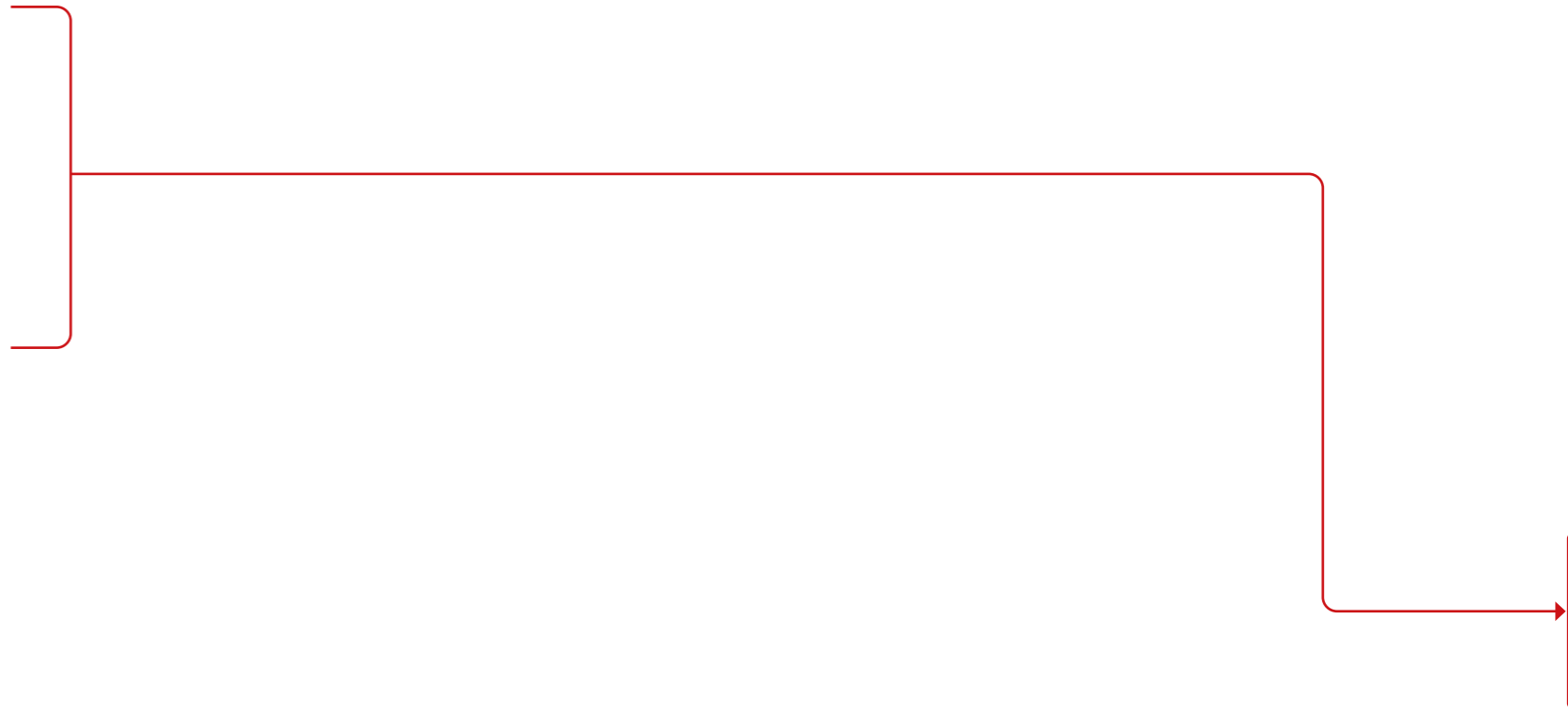
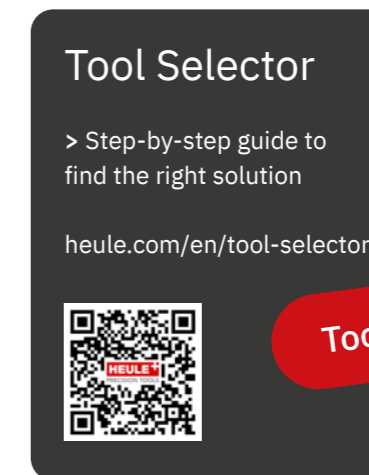
Category	Your benefit	Quotation	Delivery time
STANDARD	<p>Solutions with a standardised range. The most common dimensions are kept in stock to ensure the best possible availability.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Standard tool fully meets requirements • Tool for upcoming concept testing 	Quote within 24 hours	<p>from stock</p> <p>Products highlighted in green in the tables</p> <p>Other standard range:</p> <p>1 to 6 weeks</p>
SEMI-STANDARD	<p>A solution optimised for your requirements, based either on one of our standard products or an existing tool system, which is always customised (e.g. SOLO, COFA-X).</p> <p>Example:</p> <ul style="list-style-type: none"> • Tool with longer working length • Blades with optimised service life 	Quote and tool drawing usually within 48 hours	approx. 6 weeks from drawing approval
SPECIAL	<p>Custom and application-specific tool concept. This means that the tool is designed for you individually.</p> <p>Example:</p> <ul style="list-style-type: none"> • Combined tool concept that increases efficiency thanks to multiple operations in one tool 	Quote after feasibility check	approx. 12 weeks from drawing approval

Find a solution fast

THE TOOL SELECTOR WILL GUIDE YOU THE WAY

The HEULE Tool Selector is the quickest and easiest way to find the right tool. Send your search result along with your application data to your HEULE contact person. They will check the application and offer you options if required.

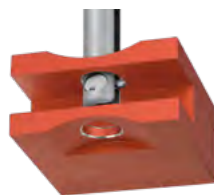
If your search produces no suitable results, please contact HEULE with your application data. We also develop customised solutions and are happy to advise you.



COFA

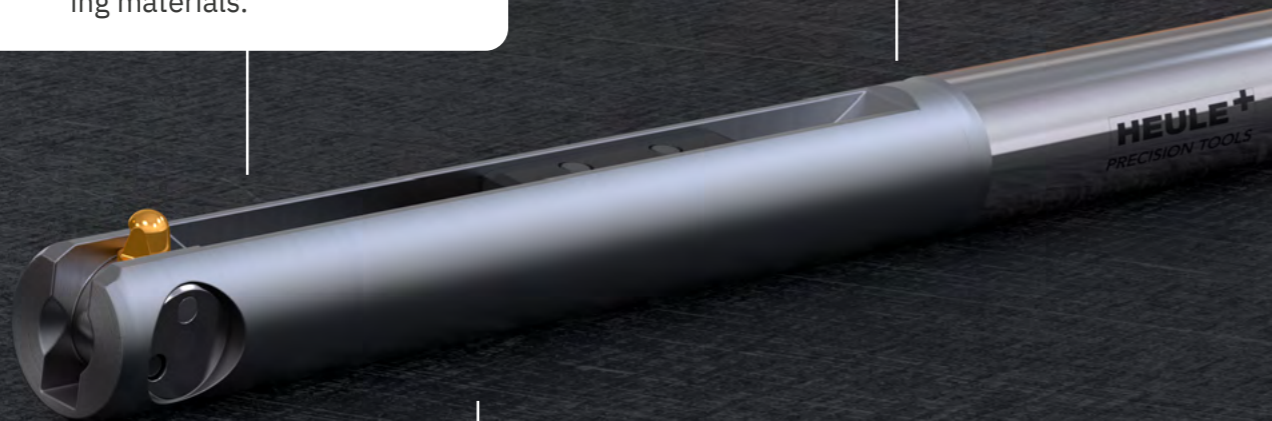
A stroke of genius for deburring even and uneven bore edges. Proven a thousand times over.

The advantages – Your benefit



Inaccessible bore edges are reliably machined without turning the workpiece, even when working with challenging materials.

The carbide blades are coated in accordance with material requirements and guarantee a long service life.



Uniform deburring of bore edges regardless of the height of the machining plane. This is particularly important for cast parts and parts with tolerance deviations.



The tool follows uneven edges and uneven bore edges sloped up to 30° and ensures clean deburring.



THE RANGE

Standard version

Cassette tools

For installation in holder/combination tools for machining large bore diameters

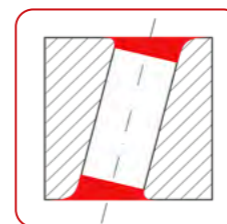
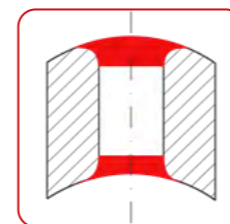
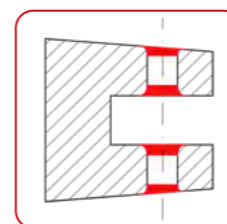
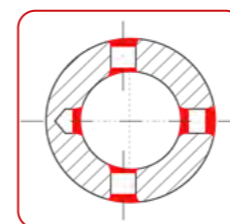
Bore Ø range mm	Max. deburring size mm	Working length mm	Series	Catalogue page	Bore Ø range mm	Deburring capacity max. mm	Series	Catalogue page
Ø2.0–3.1	0.10	15.3	COFA C2	22	-	-	-	-
Ø3.0–4.1	0.15	20.8	COFA C3	24	-	-	-	-
Ø4.0–5.0	0.25	28.0	COFA 4M	26	-	-	-	-
Ø5.0–6.0	0.35	32.6	COFA 5M	28	-	-	-	-
Ø6.0–8.4	0.70	48.0	COFA C6	30	-	-	-	-
Ø8.0–12.4	0.90	61.0	COFA C8	32	> Ø10.0	0.70	C6 Cas.	40
Ø12.0–26.0	1.40	70.0	COFA C12	34	> Ø14.0	0.90	C8 Cas.	40
					> Ø20.0	1.40	C12 Cas.	40

For deburring cross bores: see X-BORES on page 222. COFA-X: see page 46.

For **thread series**: Page 38.

If the required tool is not included in the standard range above, our **INDIVIDUAL** range often has a possible solution. If required, we can also develop custom solutions that are fully tailored to your application.

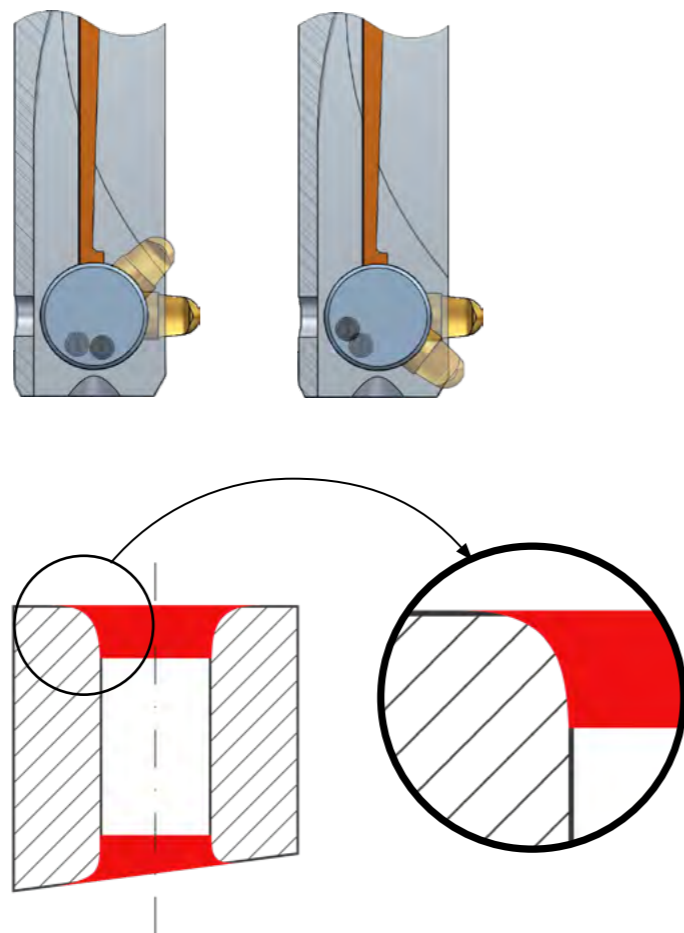
FIELD OF APPLICATION



OPERATING PRINCIPLE

The COFA blade is spring-loaded in the tool body. This means that the cutting edge also follows uneven bore edges. The cutting edge removes the burr along with the burr root without creating a secondary burr. The blade pivots into the tool body as it enters the bore.

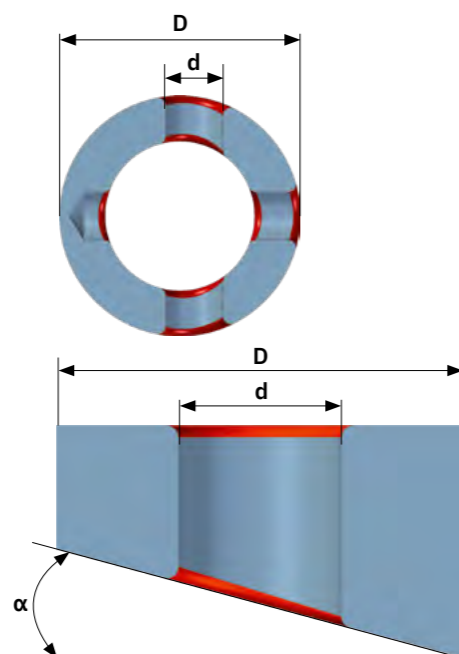
The result is a bore edge deburred with a radius form.



MAXIMUM UNEVENNESS

COFA is designed for machining uneven bore edges. The standard blade can reliably deburr uneven edges up to $\alpha \leq 18^\circ$. This corresponds to a diameter ratio (d:D) of 0.5.

The range also includes blades with a clearance angle of up to 30° for greater unevenness. For larger irregularities, tools and blades from the INDIVIDUAL range, e.g. COFA-X, are used.



Calculation of cant angle

With the HEULE Tool Selector, you can easily calculate the angle of unevenness and at the same time determine the correct tool and blade.

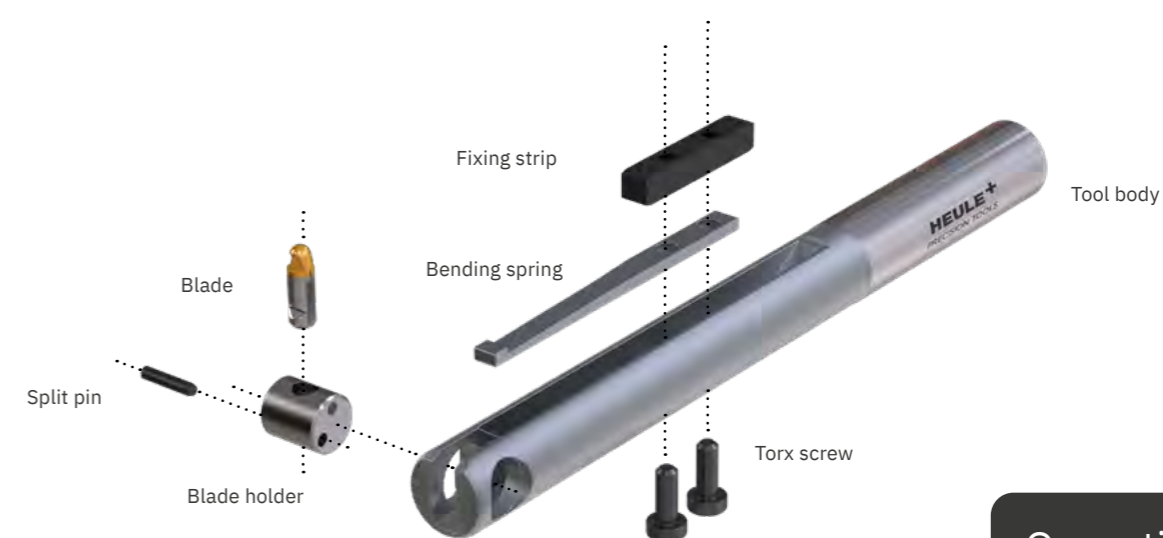
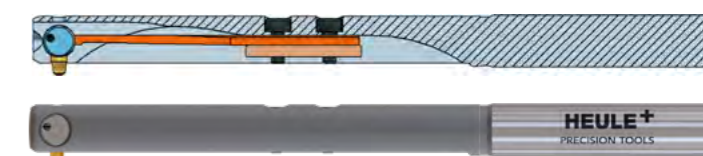
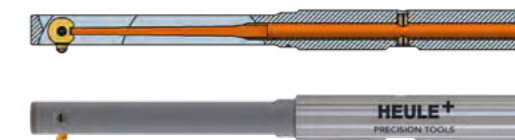
www.heule.com/en/tool-selector/cofa



TOOL DESIGN

Simple, robust, reliable. The COFA tool family is made up of two types. In the **COFA C2/C3** and **4M/5M**, the blade is held directly in the tool body by a split pin.

With the **COFA C6** to **C12**, a separate blade is retained and guided by a solid blade holder.



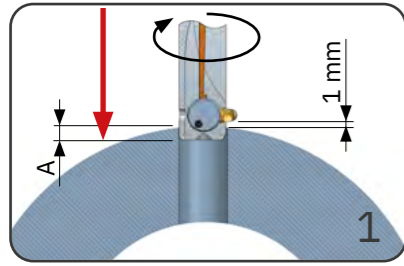
Operating instructions

- > Blade change
- > Spring change

heule.com > Service > Media & download centre

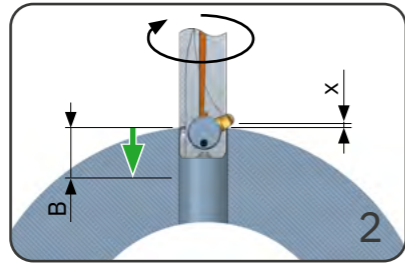


COFA PROCESS STEPS



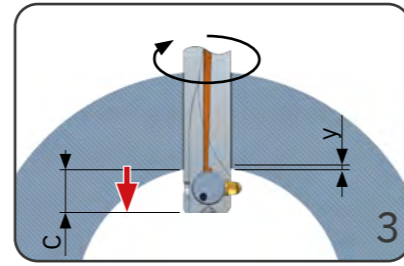
- Rapid traverse to pos. **A** or 1.0 mm distance
- Spindle rotation clockwise
- External coolant on

Example
G0 Z+15.6
S800 M3
M8



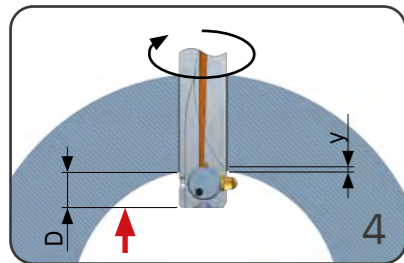
- Working feed to **B + x**

G1 Z+8.5¹⁾ F160
¹⁾8.5=17.5-8.0-1.0



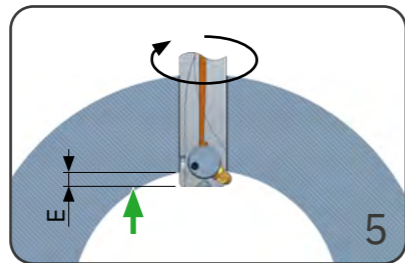
- Rapid traverse to **C + y** (blade fold-out position)
- Dwell time 1 sec.

G0 Z+1.25²⁾
G4 X1
²⁾1.25=11.0-8.1-1.65



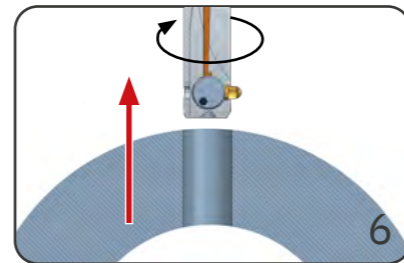
- Rapid traverse to **D + y**

G0 Z+3.25³⁾
³⁾3.25=11.0-6.1-1.65



- Working feed to **E**

G1 Z+11.0⁴⁾
⁴⁾11.0=11.0-0.0



- Rapid traverse out of the workpiece (outer edge + 2.0 mm)

G0 Z+19.50

PROGRAMMING DIMENSION TABLE

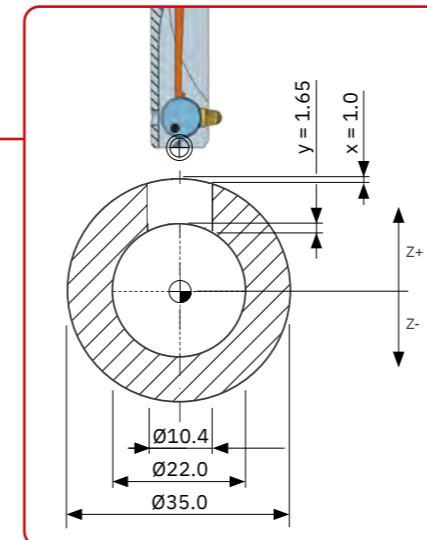
Tool	A	B	C	D	E
COFA C2	1.7	4.5	4.5	4.3	1.5
COFA C3	2.5	6.0	6.0	5.5	2.0
COFA 4M	2.0	5.5	5.5	5.3	1.8
COFA 5M	2.8	7.0	6.9	6.4	2.2
COFA C6 Medium	1.1	6.3	6.5	4.9	-0.3
COFA C6 Large	1.1	6.8	6.8	4.9	-0.8
COFA C8 Medium	1.9	8.0	8.1	6.1	0
COFA C8 Large	1.9	8.8	8.5	6.1	-0.4
COFA C12 Medium	3.4	11.6	11.6	8.6	0.4
COFA C12 Large	3.4	13.0	12.5	8.6	-1.0

Important!



Watch out for uneven edges! If the bore edges are uneven, the unevenness must be taken into account in traverse distances. In the case of very uneven edges, we recommend traversing out of the bore when the spindle is stopped after machining has been completed.

APPLICATION AND PROGRAMMING EXAMPLE



Application data

Workpiece: Outside Ø 35.0 mm / inside Ø 22.0 mm
Bore Ø: Ø10.4 mm
Material: P3 / steel C45
Machining: both bore edges
Unevenness y: Angle 15.9°

Tool and blade selection

Tool: COFA C8/10.4/H
Blade: C8-M-0006-T, medium, forward and backward cutting
Deburring Ø: 11.6 mm max.
Outside Ø: Ø D2 = 13.2 mm (note interfering edge / inside Ø)

Cutting data

Cutting speed V_c : 20–60 m/min.
Tool working feed: 0.1–0.3 mm/rev

CUTTING DATA

Description	Tensile str. RM /MPA	Hardness		Spring	C2–C3			COFA4M–C12		
		(HB)	(HRC)		VC	FZ	B*	VC	FZ	B*
P0 Low-carbon steel, long-chipping, C <0.25%	<530	<125	–	H	20–60	0.05–0.15	A	20–60	0.1–0.3	T
P1 Low-carbon steel, short-chipping, C <0.25%	<530	<125	–	H	20–60	0.05–0.15	A	20–60	0.1–0.3	T
P2 Steel with carbon content C >0.25%	>530	<220	<25	H	20–60	0.05–0.15	A	20–60	0.1–0.3	T
P3 Alloy steel and tool steel, C >0.25%	600–850	<330	<35	H	20–60	0.05–0.15	A	20–60	0.1–0.3	T
P4 Alloy steel and tool steel, C >0.25%	850–1400	340–450	35–48	S	20–40	0.05–0.15	A	20–40	0.1–0.3	T
P5 Ferritic, martensitic and stainless PH steel	600–900	<330	<35	S	15–30	0.05–0.15	A	15–30	0.1–0.3	T
P6 High-strength ferritic, martensitic and PH stainless steel	900–1350	350–450	35–48	Z	15–30	0.05–0.15	A	15–30	0.1–0.3	T
M1 Austenitic stainless steel	<600	130–200	–	Z	10–20	0.05–0.15	A	10–20	0.1–0.3	T
M2 High-strength austenitic stainless steel	600–800	150–230	<25	Z1	10–20	0.05–0.15	A	10–20	0.1–0.3	T
M3 Duplex stainless steel	<800	135–275	<30	Z1	15–30	0.05–0.15	A	15–30	0.1–0.3	T
K1 Cast iron	125–500	120–290	<32	H	30–80	0.05–0.15	A	30–80	0.1–0.3	T
K2 Ductile cast iron up to medium strength	<600	130–260	<28	H	30–80	0.05–0.15	A	30–80	0.1–0.3	T
K3 High-strength cast iron and bainitic cast iron	>600	180–350	<43	H	30–80	0.05–0.15	D	30–80	0.1–0.3	T
N1 Wrought aluminium alloys	–	–	–	W	30–70	0.05–0.15	D	30–70	0.1–0.3	D
N2 Aluminium alloys with low Si content	–	–	–	W	30–70	0.05–0.15	D	30–70	0.1–0.3	D
N3 Aluminium alloys with high Si content	–	–	–	W	30–70	0.05–0.15	D	30–70	0.1–0.3	D
N4 Copper, brass and zinc base	–	–	–	W	30–70	0.05–0.15	D	30–70	0.1–0.3	D
S1 Iron-based heat-resistant alloys	500–1200	160–260	25–48	Z	15–30	0.05–0.15	A	15–30	0.1–0.3	T
S2 Cobalt-based heat-resistant alloys	1000–1450	250–450	25–48	Z	10–20	0.05–0.15	A	10–20	0.1–0.3	T
S3 Nickel-based heat-resistant alloys	600–1700	160–450	<48	Z	10–20	0.05–0.15	A	10–20	0.1–0.3	T
S4 Titanium and titanium alloys	900–1600	300–400	33–48	Z	10–20	0.05–0.15	A	10–20	0.1–0.3	T

* coating for blades



The cutting data listed are guide values! They depend on the amount of the unevenness of the bore edges (e.g. high slope > low cutting value). For materials that are difficult to machine or uneven bore edges, we recommend applying cutting speeds that are at the lower end of the range.

Selecting the correct COFA tool

TOOL SELECTOR TOOL TABLES

The HEULE Tool Selector is the **quickest and easiest way to find the right tool.**

Send your search result along with your application data to your HEULE representative. They will check the application and offer you options if required.

If your search produces no results, please contact HEULE with your application data anyway. We also develop customised solutions and are happy to advise you.

The right tool is primarily determined by the bore diameter to be machined. This table also shows the deburring diameter and the tool diameter.

The tool tables cover the standard range. The tool part numbers highlighted in green are available from stock.

In addition, COFA offers a selection of various blades and spring strengths to effectively cover the requirements based on the bore geometry, burr thickness and workpiece material.

If the standard does not fit your needs, please do not hesitate to contact your HEULE representative for advice, either using the enquiry form (www.heule.com > contact) or by telephone.

Tool Selector

> Step-by-step guide to find the right solution

heule.com/en/tool-selector/cofa



Tool Selector

Still have questions?

> HEULE Consulting and Support

heule.com/en/contact



CONFIGURING COFA TOOLS

1. Select tool **incl.** standard blade



Select the appropriate tool for the bore diameter and desired deburring size from the tool table.

Example: C6/8.0

Optional

2. Spring customisation



If the standard spring H is not suitable for your material, select a suitable spring from the cutting data table on page 19 and adjust the tool part number.

Example: C8/8.0/S

Optional

3. Blade customisation



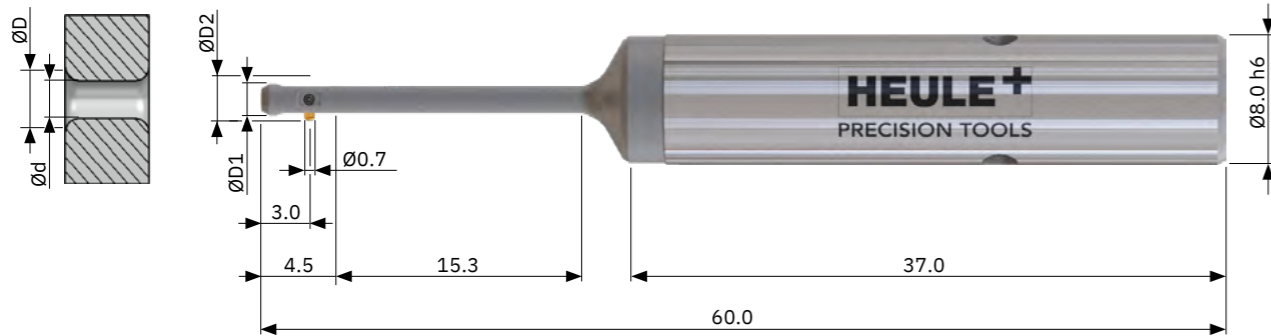
If the standard blade is not suitable or you are not ordering any blades, add "OM" to the tool part number.

Example: C8/8.0/S-OM

Select the appropriate blade from the blade table and order it with the tool.

Example: C6-M-0006-D

COFA C2 $\varnothing 2.0$ mm to 3.1 mm



Tool

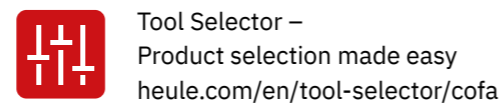
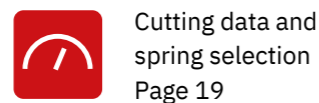
Standard tool **with** C2-M-0006-A blade pre-mounted

- If you do not require a blade or require a different blade, order the tool with the suffix "-OM" (e.g.: C2/2.0/H-OM) and the blade separately.
- The Tool Selector calculates the blade clearance angle required for bore edges that are uneven.
- With spring type H for steel grades according to Cutting Data Table S. 19
- With cylindrical shank

Your bore \varnothing d	max. deburring \varnothing D	Working length	Tool \varnothing D1	Maximum \varnothing D2	Tool Part no.
2.0	2.2	15.3	1.95	2.7	C2/2.0/H
2.1	2.3	15.3	2.05	2.8	C2/2.1/H
2.2	2.4	15.3	2.15	2.9	C2/2.2/H
2.3	2.5	15.3	2.25	3.0	C2/2.3/H
2.4	2.6	15.3	2.35	3.1	C2/2.4/H
2.5	2.7	15.3	2.45	3.2	C2/2.5/H
2.6	2.8	15.3	2.55	3.3	C2/2.6/H
2.7	2.9	15.3	2.65	3.4	C2/2.7/H
2.8	3.0	15.3	2.75	3.5	C2/2.8/H
2.9	3.1	15.3	2.85	3.6	C2/2.9/H
3.0	3.2	15.3	2.95	3.7	C2/3.0/H
3.1	3.3	15.3	3.05	3.8	C2/3.1/H



Parts in stock highlighted in green



COFA C2 $\varnothing 2.0$ mm to 3.1 mm

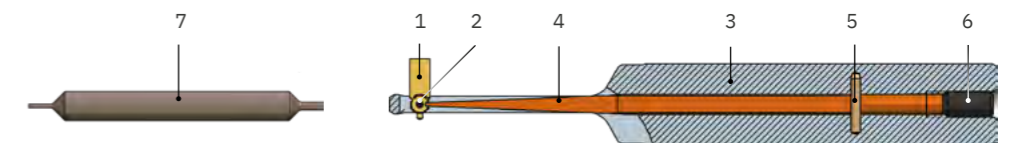
Blades

Clearance angle	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating A for steel, titanium, Inconel	Coating D for aluminium	Coating A for steel, titanium, Inconel	Coating D for aluminium
10°	C2-M-0007-A	C2-M-0007-D	C2-M-0017-A	C2-M-0017-D
20°	C2-M-0006-A	C2-M-0006-D	C2-M-0016-A	C2-M-0016-D
25°	C2-M-0008-A	C2-M-0008-D	C2-M-0018-A	C2-M-0018-D
30°	C2-M-0009-A	C2-M-0009-D	C2-M-0019-A	C2-M-0019-D

Bending spring

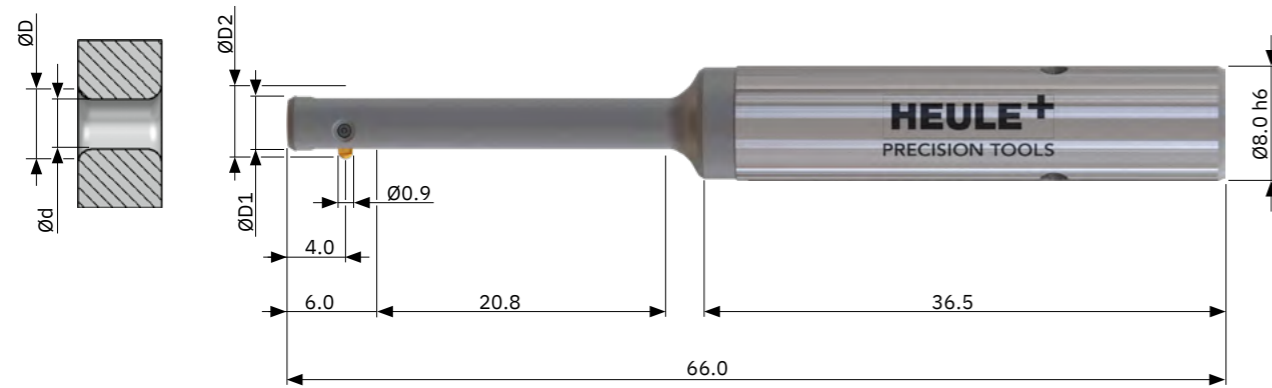
Index	Spring load	Part no.	Application
W2	soft (softer than W1)	C2-E-0011	In the cutting data table on page 19 you will find the spring loads suitable for the various workpiece materials.
W1	soft (softer than W)	C2-E-0012	
W	soft	C2-E-0013	
H	hard	C2-E-0014	
S	very hard	C2-E-0015	
Z	extra hard	C2-E-0016	
Z1	extra hard (harder than Z)	C2-E-0017	

Spare parts



Item	Description	Part no.
1	COFA C2 blade	see above
2	Split pin diameter 0.7x1.7	C2-E-0002
3	Tool body	upon request
4	Bending spring	see above
5	Cylinder pin diameter 1.0m6x6	GH-H-S-1017
6	Threaded pin M2.5x5	GH-H-S-0135
7	Assembly pin	C2-V-0001
	Allen key for item 6	GH-H-S-2106

COFA C3 $\varnothing 3.0$ mm to 4.1 mm



Tool


Standard tool **with** C3-M-0006-A blade pre-mounted


- If you do not require a blade or require a different blade, order the tool with the suffix "-OM" (e.g.: C3/3.0/H-OM) and the blade separately.
- The Tool Selector calculates the blade clearance angle required for bore edges that are uneven.
- With spring type H for steel grades according to Cutting Data Table S. 19
- With cylindrical shank

Your bore \varnothing d	max. deburring \varnothing D	Working length	Tool \varnothing D1	Maximum \varnothing D2	Tool Part no.
3.0	3.3	20.8	2.95	4.0	C3/3.0/H
3.1	3.4	20.8	3.05	4.1	C3/3.1/H
3.2	3.5	20.8	3.15	4.2	C3/3.2/H
3.3	3.6	20.8	3.25	4.3	C3/3.3/H
3.4	3.7	20.8	3.35	4.4	C3/3.4/H
3.5	3.8	20.8	3.45	4.5	C3/3.5/H
3.6	3.9	20.8	3.55	4.6	C3/3.6/H
3.7	4.0	20.8	3.65	4.7	C3/3.7/H
3.8	4.1	20.8	3.75	4.8	C3/3.8/H
3.9	4.2	20.8	3.85	4.9	C3/3.9/H
4.0	4.3	20.8	3.95	5.0	C3/4.0/H
4.1	4.4	20.8	4.05	5.1	C3/4.1/H

 Parts in stock highlighted in green

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Page 19

 Cutting data and
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Page 19

 Tool Selector –
Product selection made easy
heule.com/en/tool-selector/cofa

COFA C3 $\varnothing 3.0$ mm to 4.1 mm

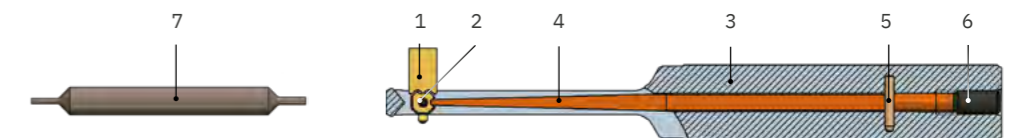
Blades

Clearance angle	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating A for steel, titanium, Inconel	Coating D for aluminium	Coating A for steel, titanium, Inconel	Coating D for aluminium
10°	C3-M-0007-A	C3-M-0007-D	C3-M-0017-A	C3-M-0017-D
20°	C3-M-0006-A	C3-M-0006-D	C3-M-0016-A	C3-M-0016-D
25°	C3-M-0008-A	C3-M-0008-D	C3-M-0018-A	C3-M-0018-D
30°	C3-M-0009-A	C3-M-0009-D	C3-M-0019-A	C3-M-0019-D

Bending spring

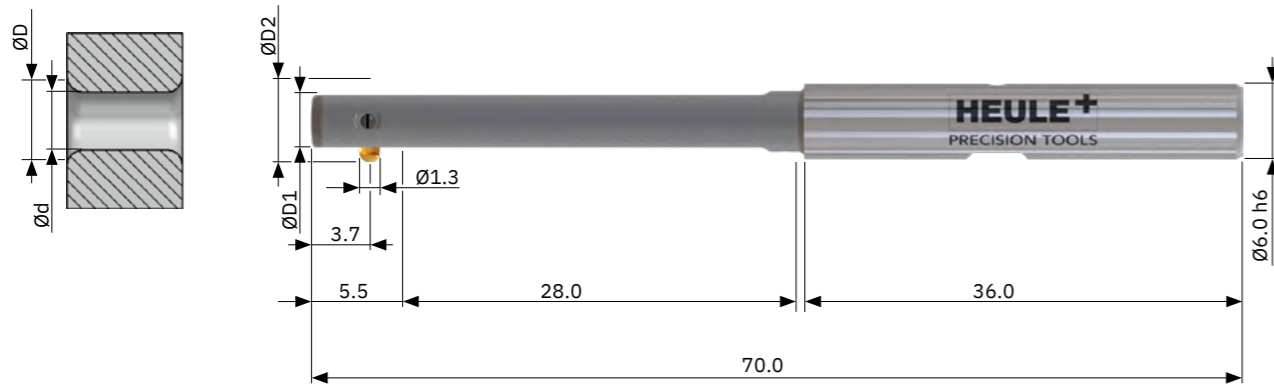
Index	Spring load	Part no.	Application
W2	soft (softer than W1)	C3-E-0011	In the cutting data table on page 19 you will find the spring loads suitable for the various workpiece materials.
W1	soft (softer than W)	C3-E-0012	
W	soft	C3-E-0013	
H	hard	C3-E-0014	
S	very hard	C3-E-0015	
Z	extra hard	C3-E-0016	
Z1	extra hard (harder than Z)	C3-E-0017	

Spare parts



Item	Description	Part no.
1	COFA C3 blade	see above
2	Split pin diameter 1.0x2.7	C3-E-0002
3	Tool body	upon request
4	Bending spring	see above
5	Cylinder pin diameter 1.0m6x6	GH-H-S-1017
6	Threaded pin M2.5x5	GH-H-S-0135
7	Assembly pin	C3-V-0001
	Allen key for item 6	GH-H-S-2106

COFA4M $\varnothing 4.0$ mm to 5.1 mm




Tool

Standard tool **with** GH-C-M-0504 blade pre-mounted

- If you do not require a blade or require a different blade, order the tool with the suffix "-OM" (e.g.: COFA4M/4.0/H-OM) and the blade separately.
- The Tool Selector calculates the blade clearance angle required for bore edges that are uneven.
- With spring type H for steel grades according to Cutting Data Table S. 19
- With cylindrical shank

Your bore \varnothing d	max. deburring \varnothing D	Working length	Tool \varnothing D1	Maximum \varnothing D2	Tool Part no.
4.0–4.1	4.5	28.0	3.9	5.2	COFA4M/4.0/H
4.1–4.2	4.6	28.0	4.0	5.3	COFA4M/4.1/H
4.2–4.3	4.7	28.0	4.1	5.4	COFA4M/4.2/H
4.3–4.4	4.8	28.0	4.2	5.5	COFA4M/4.3/H
4.4–4.5	4.9	28.0	4.3	5.6	COFA4M/4.4/H
4.5–4.6	5.0	28.0	4.4	5.7	COFA4M/4.5/H
4.6–4.7	5.1	28.0	4.5	5.8	COFA4M/4.6/H
4.7–4.8	5.2	28.0	4.6	5.9	COFA4M/4.7/H
4.8–4.9	5.3	28.0	4.7	6.0	COFA4M/4.8/H
4.9–5.0	5.4	28.0	4.8	6.1	COFA4M/4.9/H
5.0–5.1	5.5	28.0	4.9	6.2	COFA4M/5.0/H

 Parts in stock highlighted in green

COFA4M $\varnothing 4.0$ mm to 5.1 mm

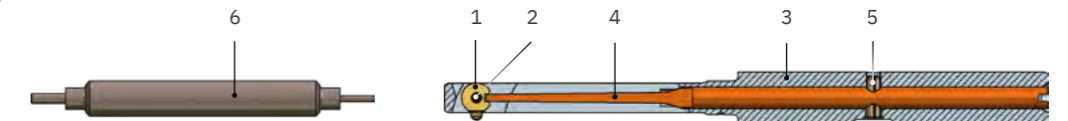
Blades

Clearance angle	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating T for steel, titanium, Inconel	Coating D for aluminium	Coating T for steel, titanium, Inconel	Coating D for aluminium
10°	GH-C-M-0704	GH-C-M-0784	GH-C-M-0814	GH-C-M-0894
20°	GH-C-M-0504	GH-C-M-0584	GH-C-M-0914	GH-C-M-0994
25°	GH-C-M-0161	–	GH-C-M-0181	–
30°	GH-C-M-0148	–	GH-C-M-0182	–

Bending spring

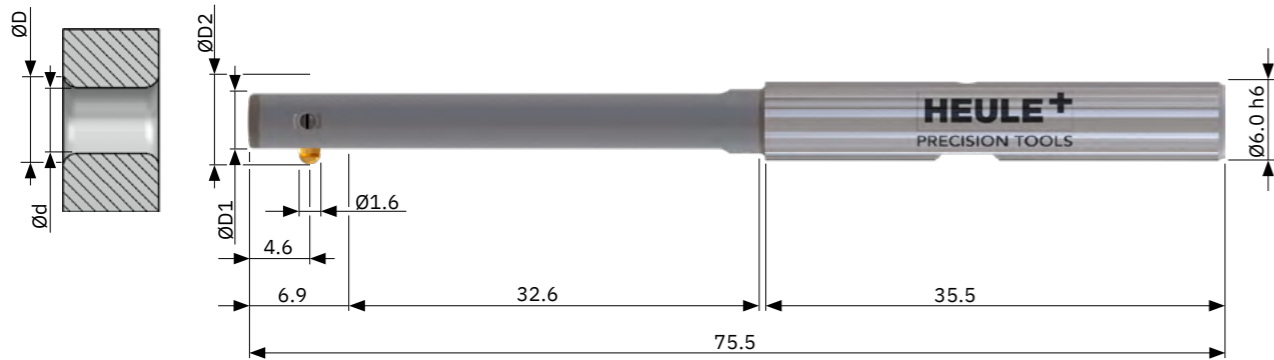
Index	Spring load	Part no.	Application
W2	soft (softer than W1)	GH-C-E-0341	In the cutting data table on page 19 you will find the spring loads suitable for the various workpiece materials.
W1	soft (softer than W)	GH-C-E-0340	
W	soft	GH-C-E-0342	
H	hard	GH-C-E-0343	
S	very hard	GH-C-E-0344	
Z	extra hard	GH-C-E-0345	
Z1	extra hard (harder than Z)	GH-C-E-0346	
Z2	extra hard (harder than Z1)	GH-C-E-0347	
Z3	extra hard (harder than Z2)	GH-C-E-0348	

Spare parts



Item	Description	Part no.
1	COFA 4M blade	see above
2	Split pin diameter 1.0x3.8	GH-C-E-0819
3	Tool body	upon request
4	Bending spring	see above
5	Roll pin diameter 1.5x5.0	GH-H-S-0902
6	Assembly pin	GH-C-V-0206

COFA5M $\varnothing 5.0$ mm to 6.1 mm



Tool

Standard tool **with** GH-C-M-0505 blade pre-mounted

- If you do not require a blade or require a different blade, order the tool with the suffix "-OM" (e.g.: COFA5M/5.0/H-OM) and the blade separately.
- The Tool Selector calculates the blade clearance angle required for bore edges that are uneven.
- With spring type H for steel grades according to Cutting Data Table S. 19
- With cylindrical shank

Your bore \varnothing d	max. deburring \varnothing D	Working length	Tool \varnothing D1	Maximum \varnothing D2	Tool Part no.
5.0–5.1	5.7	32.6	4.9	6.6	COFA5M/5.0/H
5.1–5.2	5.8	32.6	5.0	6.7	COFA5M/5.1/H
5.2–5.3	5.9	32.6	5.1	6.8	COFA5M/5.2/H
5.3–5.4	6.0	32.6	5.2	6.9	COFA5M/5.3/H
5.4–5.5	6.1	32.6	5.3	7.0	COFA5M/5.4/H
5.5–5.6	6.2	32.6	5.4	7.1	COFA5M/5.5/H
5.6–5.7	6.3	32.6	5.5	7.2	COFA5M/5.6/H
5.7–5.8	6.4	32.6	5.6	7.3	COFA5M/5.7/H
5.8–5.9	6.5	32.6	5.7	7.4	COFA5M/5.8/H
5.9–5.0	6.6	32.6	5.8	7.5	COFA5M/5.9/H
6.0–6.1	6.7	32.6	5.9	7.6	COFA5M/6.0/H

Parts in stock highlighted in green

COFA5M $\varnothing 5.0$ mm to 6.1 mm

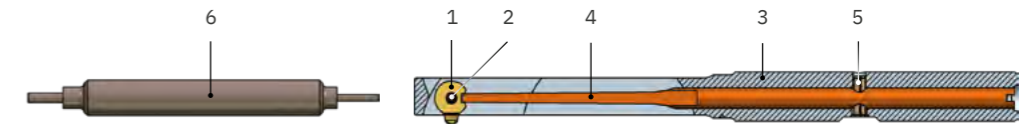
Blades

Clearance angle	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating T for steel, titanium, Inconel	Coating D for aluminium	Coating T for steel, titanium, Inconel	Coating D for aluminium
10°	GH-C-M-0705	GH-C-M-0785	GH-C-M-0815	GH-C-M-0895
20°	GH-C-M-0505	GH-C-M-0585	GH-C-M-0915	GH-C-M-0995
25°	GH-C-M-0163	–	GH-C-M-0183	–
30°	GH-C-M-0150	–	GH-C-M-0184	–

Bending spring

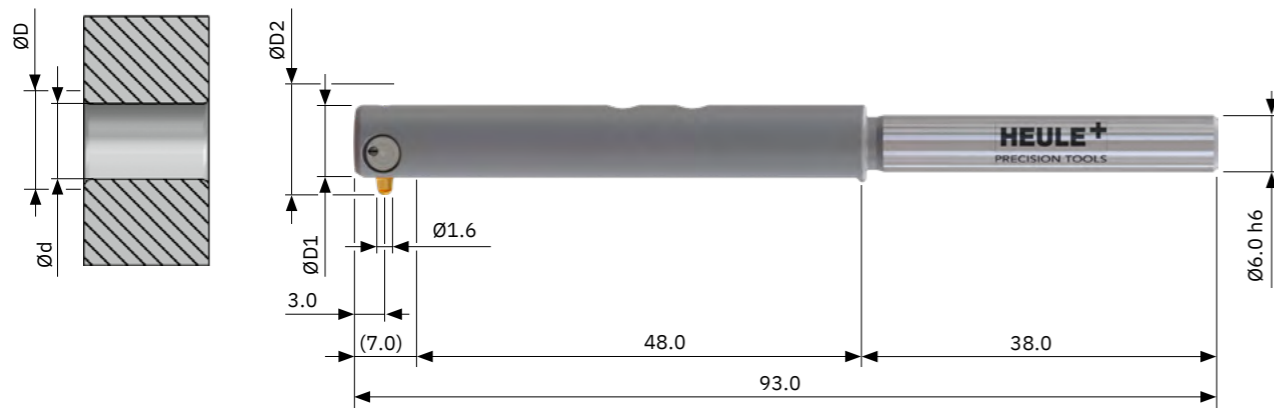
Index	Spring load	Part no.	Application
W2	soft (softer than W1)	GH-C-E-0351	In the cutting data table on page 19 you will find the spring loads suitable for the various workpiece materials.
W1	soft (softer than W)	GH-C-E-0350	
W	soft	GH-C-E-0352	
H	hard	GH-C-E-0353	
S	very hard	GH-C-E-0354	
Z	extra hard	GH-C-E-0355	
Z1	extra hard (harder than Z)	GH-C-E-0356	
Z2	extra hard (harder than Z1)	GH-C-E-0357	
Z3	extra hard (harder than Z2)	GH-C-E-0358	

Spare parts



Item	Description	Part no.
1	COFA 5M blade	see above
2	Split pin diameter 1.2x4.8	GH-C-E-0820
3	Tool body	upon request
4	Bending spring	see above
5	Roll pin diameter 1.5x5.0	GH-H-S-0902
6	Assembly pin	GH-C-V-0211

COFA C6 $\varnothing 6.0$ mm to 8.4 mm




Tool


Standard tool **with** C6-M-0006-T blade pre-mounted


- If you do not require a blade or require a different blade, order the tool with the suffix "-OM" (e.g.: C6/6.0/H-OM) and the blade separately.
- The Tool Selector calculates the blade clearance angle required for bore edges that are uneven.
- With spring type H for steel grades according to Cutting Data Table S. 19
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"

Your bore \varnothing d	max. deburring \varnothing D Medium/Large	Working length NL	Tool \varnothing D1	Maximum \varnothing D2 Medium/Large	Tool Part no.
6.0	7.0 / 7.4	48.0	5.8	8.3 / 8.7	C6/6.0/H
6.2	7.2 / 7.6	48.0	6.0	8.5 / 8.9	C6/6.2/H
6.4	7.4 / 7.8	48.0	6.2	8.7 / 9.1	C6/6.4/H
6.6	7.6 / 8.0	48.0	6.4	8.9 / 9.3	C6/6.6/H
6.8	7.8 / 8.2	48.0	6.6	9.1 / 9.5	C6/6.8/H
7.0	8.0 / 8.4	48.0	6.8	9.3 / 9.7	C6/7.0/H
7.2	8.2 / 8.6	48.0	7.0	9.5 / 9.9	C6/7.2/H
7.4	8.4 / 8.8	48.0	7.2	9.7 / 10.1	C6/7.4/H
7.6	8.6 / 9.0	48.0	7.4	9.9 / 10.3	C6/7.6/H
7.8	8.8 / 9.2	48.0	7.6	10.1 / 10.5	C6/7.8/H
8.0	9.0 / 9.4	48.0	7.8	10.3 / 10.7	C6/8.0/H
8.2	9.2 / 9.6	48.0	8.0	10.5 / 10.9	C6/8.2/H
8.4	9.4 / 9.8	48.0	8.2	10.7 / 11.1	C6/8.4/H

 Parts in stock highlighted in green

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 Tool Selector –
Product selection made easy
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COFA C6 $\varnothing 6.0$ mm to 8.4 mm

Blades

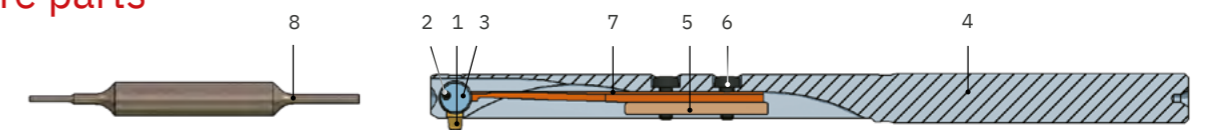
Clearance angle	Medium Part no. forward and backward cutting		Medium Part no. backward cutting only	
	Coating T for steel, titanium, Inconel	Coating D for aluminium	Coating T for steel, titanium, Inconel	Coating D for aluminium
10°	C6-M-0007-T	C6-M-0007-D	C6-M-0027-T	C6-M-0027-D
20°	C6-M-0006-T	C6-M-0006-D	C6-M-0026-T	C6-M-0026-D
25°	C6-M-0008-T	C6-M-0008-D	C6-M-0028-T	C6-M-0028-D
30°	C6-M-0009-T	C6-M-0009-D	C6-M-0029-T	C6-M-0029-D

Clearance angle	Large Part no. forward and backward cutting		Large Part no. backward cutting only	
	Coating T for steel, titanium, Inconel	Coating D for aluminium	Coating T for steel, titanium, Inconel	Coating D for aluminium
10°	C6-M-0002-T	C6-M-0002-D	C6-M-0022-T	C6-M-0022-D
20°	C6-M-0001-T	C6-M-0001-D	C6-M-0021-T	C6-M-0021-D
25°	C6-M-0003-T	C6-M-0003-D	C6-M-0023-T	C6-M-0023-D
30°	C6-M-0004-T	C6-M-0004-D	C6-M-0024-T	C6-M-0024-D

Bending spring

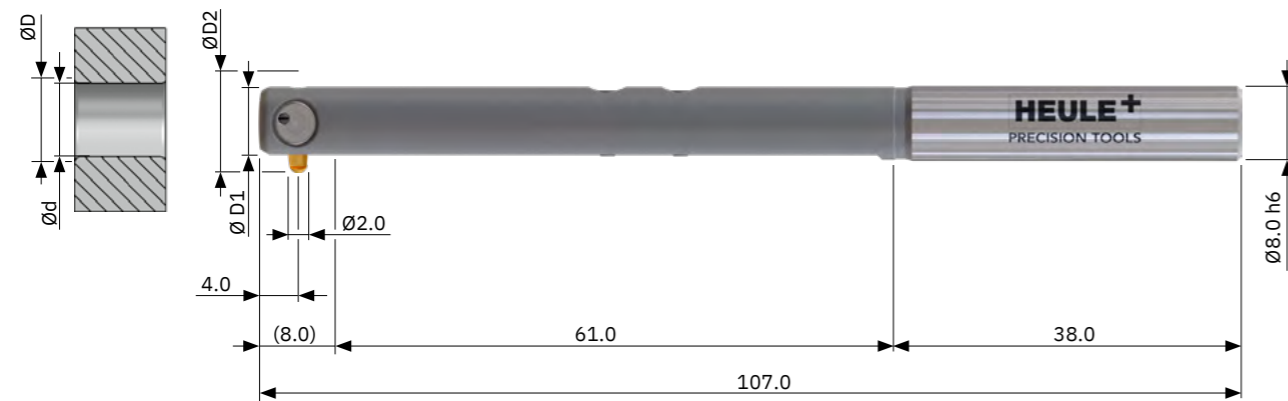
Index	Spring load	Part no.	Application
W2	soft (softer than W1)	C6-E-0006	In the cutting data table on page 19 you will find the spring loads suitable for the various workpiece materials.
W1	soft (softer than W)	C6-E-0007	
W	soft	C6-E-0008	
H	hard	C6-E-0009	
S	very hard	C6-E-0010	
Z	extra hard	C6-E-0011	
Z1	extra hard (harder than Z)	C6-E-0012	
Z2	extra hard (harder than Z1)	C6-E-0013	
Z3	extra hard (harder than Z2)	C6-E-0014	

Spare parts



Item	Description	Part no.
1	COFA C6 blade	see above
2	Roll pin diameter 1.0x8.0	C6-E-0003
3	Blade holder	C6-E-0001
4	Tool body	upon request
5	Fixing strip	GH-C-E-0812
6	Torx screw T5 / Allen key	GH-H-S-0803 / GH-H-S-2020
7	Bending spring	see above
8	Assembly pin	C6-V-0006

COFA C8 $\varnothing 8.0$ mm to 12.4 mm



Tool

Standard tool **with** C8-M-0006-T blade pre-mounted

- If you do not require a blade or require a different blade, order the tool with the suffix "-OM" (e.g.: C8/8.0/H-OM) and the blade separately.
- The Tool Selector calculates the blade clearance angle required for bore edges that are uneven.
- With spring type H for steel grades according to Cutting Data Table S. 19
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"

Your bore \varnothing d	max. deburring \varnothing D Medium/Large	Working length NL	Tool \varnothing D1	Maximum \varnothing D2 Medium/Large	Tool Part no.
8.0	9.2 / 9.8	61.0	7.8	10.8 / 11.4	C8/8.0/H
8.2	9.4 / 10.0	61.0	8.0	11.0 / 11.6	C8/8.2/H
8.4	9.6 / 10.2	61.0	8.2	11.2 / 11.8	C8/8.4/H
8.6	9.8 / 10.4	61.0	8.4	11.4 / 12.0	C8/8.6/H
8.8	10.0 / 10.6	61.0	8.6	11.6 / 12.2	C8/8.8/H
9.0	10.2 / 10.8	61.0	8.8	11.8 / 12.4	C8/9.0/H
9.2	10.4 / 11.0	61.0	9.0	12.0 / 12.6	C8/9.2/H
9.4	10.6 / 11.2	61.0	9.2	12.2 / 12.8	C8/9.4/H
9.6	10.8 / 11.4	61.0	9.4	12.4 / 13.0	C8/9.6/H
9.8	11.0 / 11.6	61.0	9.6	12.6 / 13.2	C8/9.8/H
10.0	11.2 / 11.8	61.0	9.8	12.8 / 13.4	C8/10.0/H
10.2	11.4 / 12.0	61.0	10.0	13.0 / 13.6	C8/10.2/H
10.4	11.6 / 12.2	61.0	10.2	13.2 / 13.8	C8/10.4/H
10.6	11.8 / 12.4	61.0	10.4	13.4 / 14.0	C8/10.6/H
10.8	12.0 / 12.6	61.0	10.6	13.6 / 14.2	C8/10.8/H
11.0	12.2 / 12.8	61.0	10.8	13.8 / 14.4	C8/11.0/H
11.2	12.4 / 13.0	61.0	11.0	14.0 / 14.6	C8/11.2/H
11.4	12.6 / 13.2	61.0	11.2	14.2 / 14.8	C8/11.4/H
11.6	12.8 / 13.4	61.0	11.4	14.4 / 15.0	C8/11.6/H
11.8	13.0 / 13.6	61.0	11.6	14.6 / 15.2	C8/11.8/H
12.0	13.2 / 13.8	61.0	11.8	14.8 / 15.4	C8/12.0/H
12.2	13.4 / 14.0	61.0	12.0	15.0 / 15.6	C8/12.2/H
12.4	13.6 / 14.2	61.0	12.2	15.2 / 15.8	C8/12.4/H

Parts in stock highlighted in green

COFA C8 $\varnothing 8.0$ mm to 12.4 mm

Blades

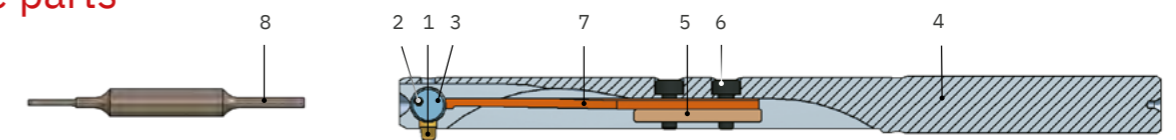
Clearance angle	Medium Part no. forward and backward cutting		Medium Part no. backward cutting only	
	Coating T for steel, titanium, Inconel	Coating D for aluminium	Coating T for steel, titanium, Inconel	Coating D for aluminium
10°	C8-M-0007-T	C8-M-0007-D	C8-M-0027-T	C8-M-0027-D
20°	C8-M-0006-T	C8-M-0006-D	C8-M-0026-T	C8-M-0026-D
25°	C8-M-0008-T	C8-M-0008-D	C8-M-0028-T	C8-M-0028-D
30°	C8-M-0009-T	C8-M-0009-D	C8-M-0029-T	C8-M-0029-D

Clearance angle	Large Part no. forward and backward cutting		Large Part no. backward cutting only	
	Coating T for steel, titanium, Inconel	Coating D for aluminium	Coating T for steel, titanium, Inconel	Coating D for aluminium
10°	C8-M-0002-T	C8-M-0002-D	C8-M-0022-T	C8-M-0022-D
20°	C8-M-0001-T	C8-M-0001-D	C8-M-0021-T	C8-M-0021-D
25°	C8-M-0003-T	C8-M-0003-D	C8-M-0023-T	C8-M-0023-D
30°	C8-M-0004-T	C8-M-0004-D	C8-M-0024-T	C8-M-0024-D

Bending spring

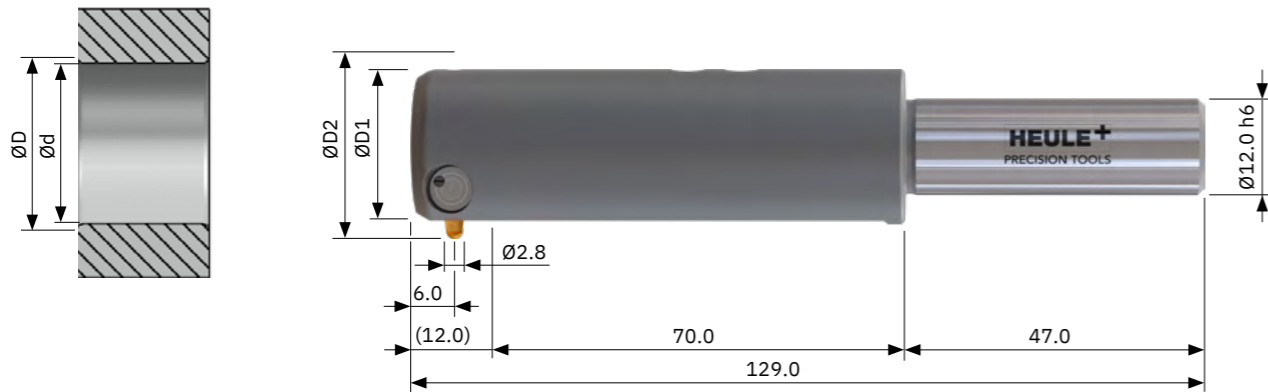
Index	Spring load	Part no.	Application
W2	soft (softer than W1)	C8-E-0006	In the cutting data table on page 19 you will find the spring loads suitable for the various workpiece materials.
W1	soft (softer than W)	C8-E-0007	
W	soft	C8-E-0008	
H	hard	C8-E-0009	
S	very hard	C8-E-0010	
Z	extra hard	C8-E-0011	
Z1	extra hard (harder than Z)	C8-E-0012	
Z2	extra hard (harder than Z1)	C8-E-0013	
Z3	extra hard (harder than Z2)	C8-E-0014	

Spare parts



Item	Description	Part no.
1	COFA C8 blade	see above
2	Split pin diameter 1.2x10.0	C8-E-0003
3	Blade holder	C8-E-0001
4	Tool body	upon request
5	Terminal strip	GH-C-E-0808
6	Cylinder screw M2x5.0 / Allen key	GH-H-S-0517 / GH-H-S-2105
7	Bending spring	see above
8	Assembly pin	C8-V-0005

COFA C12 $\varnothing 12.0$ mm to 19.5 mm



Tool

Standard tool **with** C12-M-0006-T blade pre-mounted

- If you do not require a blade or require a different blade, order the tool with the suffix "-OM" (e.g.: C12/12.0/H-OM) and the blade separately.
- The Tool Selector calculates the blade clearance angle required for bore edges that are uneven.
- With spring type H for steel grades according to Cutting Data Table S. 19
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"

Your bore \varnothing d	max. deburring \varnothing D Medium/Large	Working length NL	Tool \varnothing D1	Maximum \varnothing D2 Medium/Large	Tool Part no.
12.0	13.6 / 14.8	70.0	11.8	15.7 / 17.0	C12/12.0/H
12.5	14.1 / 15.3	70.0	12.3	16.2 / 17.5	C12/12.5/H
13.0	14.6 / 15.8	70.0	12.8	16.7 / 18.0	C12/13.0/H
13.5	15.1 / 16.3	70.0	13.3	17.2 / 18.5	C12/13.5/H
14.0	15.6 / 16.8	70.0	13.8	17.7 / 19.0	C12/14.0/H
14.5	16.1 / 17.3	70.0	14.3	18.2 / 19.5	C12/14.5/H
15.0	16.6 / 17.8	70.0	14.8	18.7 / 20.0	C12/15.0/H
15.5	17.1 / 18.3	70.0	15.3	19.2 / 20.5	C12/15.5/H
16.0	17.6 / 18.8	70.0	15.8	19.7 / 21.0	C12/16.0/H
16.5	18.1 / 19.3	70.0	16.3	20.2 / 21.5	C12/16.5/H
17.0	18.6 / 19.8	70.0	16.8	20.7 / 22.0	C12/17.0/H
17.5	19.1 / 20.3	70.0	17.3	21.2 / 22.5	C12/17.5/H
18.0	19.6 / 20.8	70.0	17.8	21.7 / 23.0	C12/18.0/H
18.5	20.1 / 21.3	70.0	18.3	22.2 / 23.5	C12/18.5/H
19.0	20.6 / 21.8	70.0	18.8	22.7 / 24.0	C12/19.0/H
19.5	21.1 / 22.3	70.0	19.3	23.2 / 24.5	C12/19.5/H

Parts in stock highlighted in green

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Cutting data and
spring selection
Page 19

Tool Selector –
Product selection made easy
heule.com/en/tool-selector/cofa

COFA C12 $\varnothing 12.0$ mm to 19.5 mm

Blades

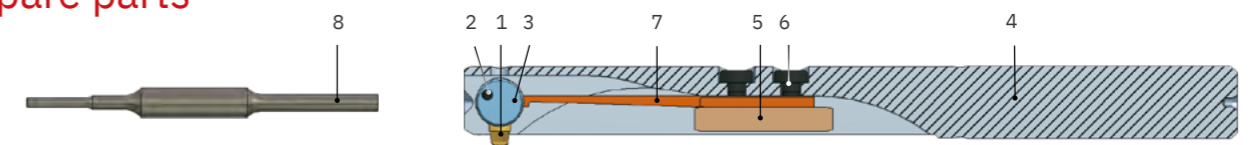
Clearance angle	Medium Part no. forward and backward cutting		Medium Part no. backward cutting only	
	Coating T for steel, titanium, Inconel	Coating D for aluminium	Coating T for steel, titanium, Inconel	Coating D for aluminium
10°	C12-M-0007-T	C12-M-0007-D	C12-M-0027-T	C12-M-0027-D
20°	C12-M-0006-T	C12-M-0006-D	C12-M-0026-T	C12-M-0026-D
25°	C12-M-0008-T	C12-M-0008-D	C12-M-0028-T	C12-M-0028-D
30°	C12-M-0009-T	C12-M-0009-D	C12-M-0029-T	C12-M-0029-D

Clearance angle	Large Part no. forward and backward cutting		Large Part no. backward cutting only	
	Coating T for steel, titanium, Inconel	Coating D for aluminium	Coating T for steel, titanium, Inconel	Coating D for aluminium
10°	C12-M-0002-T	C12-M-0002-D	C12-M-0022-T	C12-M-0022-D
20°	C12-M-0001-T	C12-M-0001-D	C12-M-0021-T	C12-M-0021-D
25°	C12-M-0003-T	C12-M-0003-D	C12-M-0023-T	C12-M-0023-D
30°	C12-M-0004-T	C12-M-0004-D	C12-M-0024-T	C12-M-0024-D

Bending spring

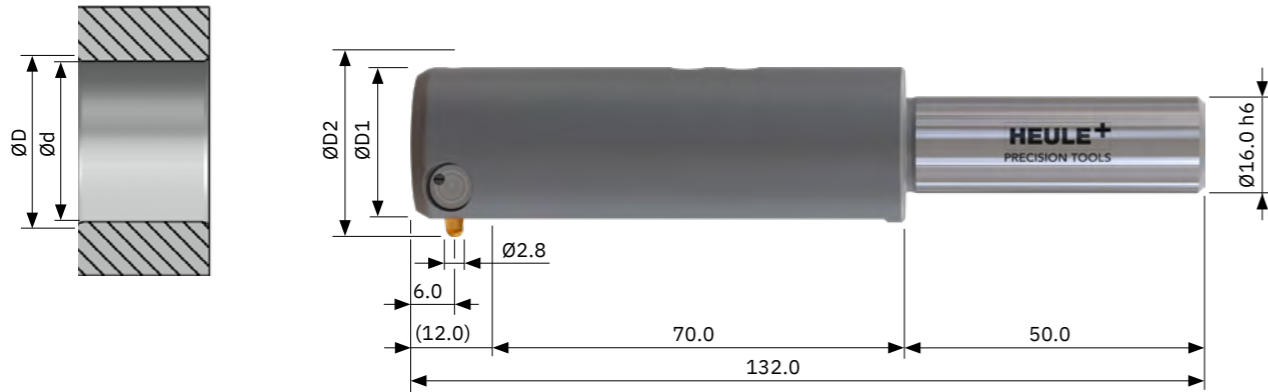
Index	Spring load	Part no.	Application
W2	soft (softer than W1)	C12-E-0006	In the cutting data table on page 19 you will find the spring loads suitable for the various workpiece materials.
W1	soft (softer than W)	C12-E-0007	
W	soft	C12-E-0008	
H	hard	C12-E-0009	
S	very hard	C12-E-0010	
Z	extra hard	C12-E-0011	
Z1	extra hard (harder than Z)	C12-E-0012	
Z2	extra hard (harder than Z1)	C12-E-0013	
Z3	extra hard (harder than Z2)	C12-E-0014	

Spare parts



Item	Description	Part no.
1	COFA C12 blade	see above
2	Split pin diameter 1.8x15.0	C12-E-0003
3	Blade holder	C12-E-0001
4	Tool body	upon request
5	Terminal strip	GH-C-E-0800
6	Cylinder screw M3x8.0 / Allen key	GH-H-S-0530 / GH-H-S-2102
7	Bending spring	see above
8	Assembly pin	C12-V-0005

COFA C12 $\varnothing 20.0$ mm to 26.0 mm



Tool

Standard tool **with** C12-M-0006-T blade pre-mounted

- If you do not require a blade or require a different blade, order the tool with the suffix "-OM" (e.g.: C12/20.0/H-OM) and the blade separately.
- The Tool Selector calculates the blade clearance angle required for bore edges that are uneven.
- With spring type H for steel grades according to Cutting Data Table S. 19
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"

Your bore \varnothing d	max. deburring \varnothing D Medium/Large	Working length NL	Tool \varnothing D1	Maximum \varnothing D2 Medium/Large	Tool Part no.
20.0	21.6 / 22.8	70.0	19.8	23.7 / 25.0	C12/20.0/H
20.5	22.1 / 23.3	70.0	20.3	24.2 / 25.5	C12/20.5/H
21.0	22.6 / 23.8	70.0	20.8	24.7 / 26.0	C12/21.0/H
21.5	23.1 / 24.3	70.0	21.3	25.2 / 26.5	C12/21.5/H
22.0	23.6 / 24.8	70.0	21.8	25.7 / 27.0	C12/22.0/H
22.5	24.1 / 25.3	70.0	22.3	26.2 / 27.5	C12/22.5/H
23.0	24.6 / 25.8	70.0	22.8	26.7 / 28.0	C12/23.0/H
23.5	25.1 / 26.3	70.0	23.3	27.2 / 28.5	C12/23.5/H
24.0	25.6 / 26.8	70.0	23.8	27.7 / 29.0	C12/24.0/H
24.5	26.1 / 27.3	70.0	24.3	28.2 / 29.5	C12/24.5/H
25.0	26.6 / 27.8	70.0	24.8	28.7 / 30.0	C12/25.0/H
25.5	27.1 / 28.3	70.0	25.3	29.2 / 30.5	C12/25.5/H
26.0	27.6 / 28.8	70.0	25.8	29.7 / 31.0	C12/26.0/H
>26.0	see cassette solutions page 40				

Parts in stock highlighted in green

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Product selection made easy
heule.com/en/tool-selector/cofa

COFA C12 $\varnothing 20.0$ mm to 26.0 mm

Blades

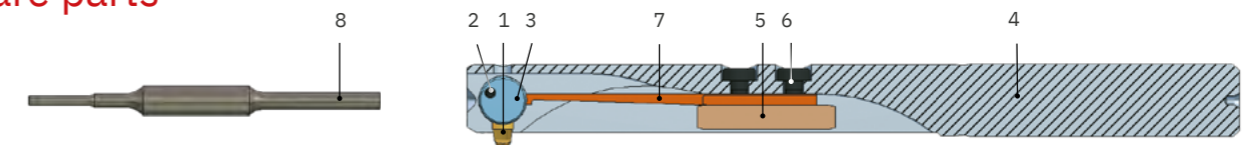
Clearance angle	Medium Part no. forward and backward cutting		Medium Part no. backward cutting only	
	Coating T for steel, titanium, Inconel	Coating D for aluminium	Coating T for steel, titanium, Inconel	Coating D for aluminium
10°	C12-M-0007-T	C12-M-0007-D	C12-M-0027-T	C12-M-0027-D
20°	C12-M-0006-T	C12-M-0006-D	C12-M-0026-T	C12-M-0026-D
25°	C12-M-0008-T	C12-M-0008-D	C12-M-0028-T	C12-M-0028-D
30°	C12-M-0009-T	C12-M-0009-D	C12-M-0029-T	C12-M-0029-D

Clearance angle	Large Part no. forward and backward cutting		Large Part no. backward cutting only	
	Coating T for steel, titanium, Inconel	Coating D for aluminium	Coating T for steel, titanium, Inconel	Coating D for aluminium
10°	C12-M-0002-T	C12-M-0002-D	C12-M-0022-T	C12-M-0022-D
20°	C12-M-0001-T	C12-M-0001-D	C12-M-0021-T	C12-M-0021-D
25°	C12-M-0003-T	C12-M-0003-D	C12-M-0023-T	C12-M-0023-D
30°	C12-M-0004-T	C12-M-0004-D	C12-M-0024-T	C12-M-0024-D

Bending spring

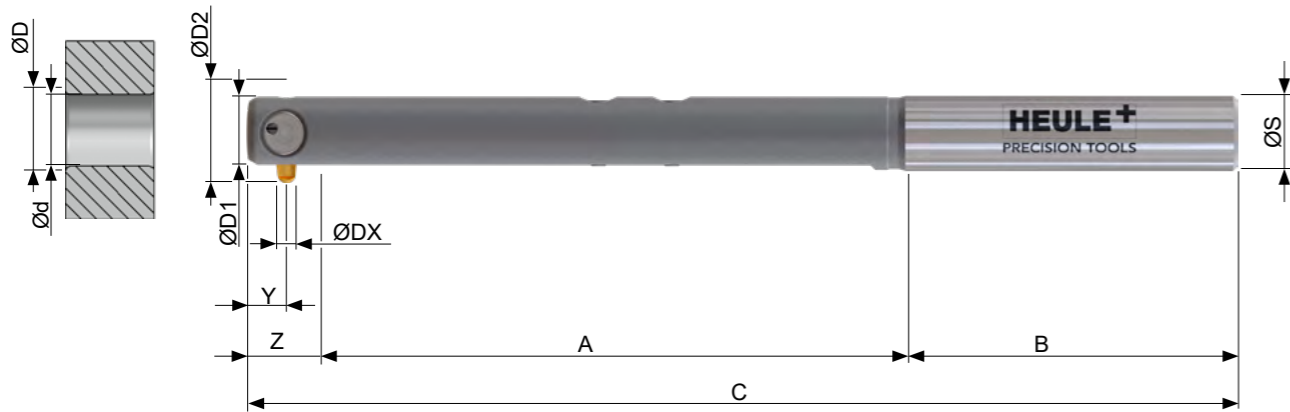
Index	Spring load	Part no.	Application
W2	soft (softer than W1)	C12-E-0006	In the cutting data table on page 19 you will find the spring strengths suitable for the various workpiece materials.
W1	soft (softer than W)	C12-E-0007	
W	soft	C12-E-0008	
H	hard	C12-E-0009	
S	very hard	C12-E-0010	
Z	extra hard	C12-E-0011	
Z1	extra hard (harder than Z)	C12-E-0012	
Z2	extra hard (harder than Z1)	C12-E-0013	
Z3	extra hard (harder than Z2)	C12-E-0014	

Spare parts



Item	Description	Part no.
1	COFA C12 blade	see above
2	Split pin diameter 1.8x15.0	C12-E-0003
3	Blade holder	C12-E-0001
4	Tool body	upon request
5	Terminal strip	GH-C-E-0800
6	Cylinder screw M3x8.0 / Allen key	GH-H-S-0530 / GH-H-S-2102
7	Bending spring	see above
8	Assembly pin	C12-V-0005

COFA thread series M8 to M20




Tool

The COFA thread series tool is specially designed for deburring threaded holes and is used after drilling the hole and before tapping. The deburring dimensions correspond to DIN 13-1 (ISO 68). The tools are only recommended for applications with uneven edges to a limited extent, because they impact the deburring diameter.

Tools with:

- Standard blade, forward and backward cutting, conditionally suitable for high-strength materials
If you do not require a blade or require a different blade, order the tool with the suffix "-OM"
(e.g: C6/M8/H-OM) and the blade separately.
- Standard spring type H for steel grades according to Cutting Data Table S. 19
- Cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"

Thread size	Bore Ø d	Deburring Ø D max.	Tool Ø D1	Maximum Ø D2	Shank Ø S	Tool Part no.
M8	6.8	8.2	6.5	9.5	6.0 h6	C6/M8/H
M10	8.5	10.4	8.2	12.0	8.0 h6	C8/M10/H
M12	10.2	12.1	9.9	13.7	8.0 h6	C8/M12/H
M16	14.0	16.6	13.7	18.8	12.0 h6	C12/M16/H
M20	17.5	20.3	17.1	22.5	12.0 h6	C12/M20/H

 Parts in stock highlighted in green

Dimension table

Thread size	A	B	C	Ø DX	Y	Z
M8	48.2	38.0	93.0	1.6	3.0	6.8
M10	61.0	38.0	107.5	2.0	4.0	8.5
M12	61.0	38.0	107.5	2.0	4.0	8.5
M16	69.2	47.0	128.7	2.8	6.0	12.5
M20	69.2	47.0	128.7	2.8	6.0	12.5

COFA thread series M8 to M20

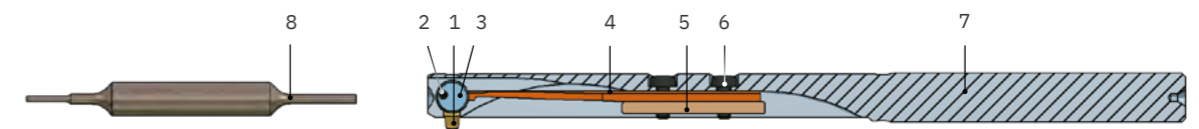
Blades

	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating T for steel, titanium, Inconel	Coating D for aluminium	Coating T for steel, titanium, Inconel	Coating D for aluminium
M8	C6-M-0001-T	C6-M-0001-D	C6-M-0021-T	C6-M-0021-D
M10	C8-M-0001-T	C8-M-0001-D	C8-M-0021-T	C8-M-0021-D
M12	C8-M-0001-T	C8-M-0001-D	C8-M-0021-T	C8-M-0021-D
M16	C12-M-0001-T	C12-M-0001-D	C12-M-0021-T	C12-M-0021-D
M20	C12-M-0001-T	C12-M-0001-D	C12-M-0021-T	C12-M-0021-D

Bending spring

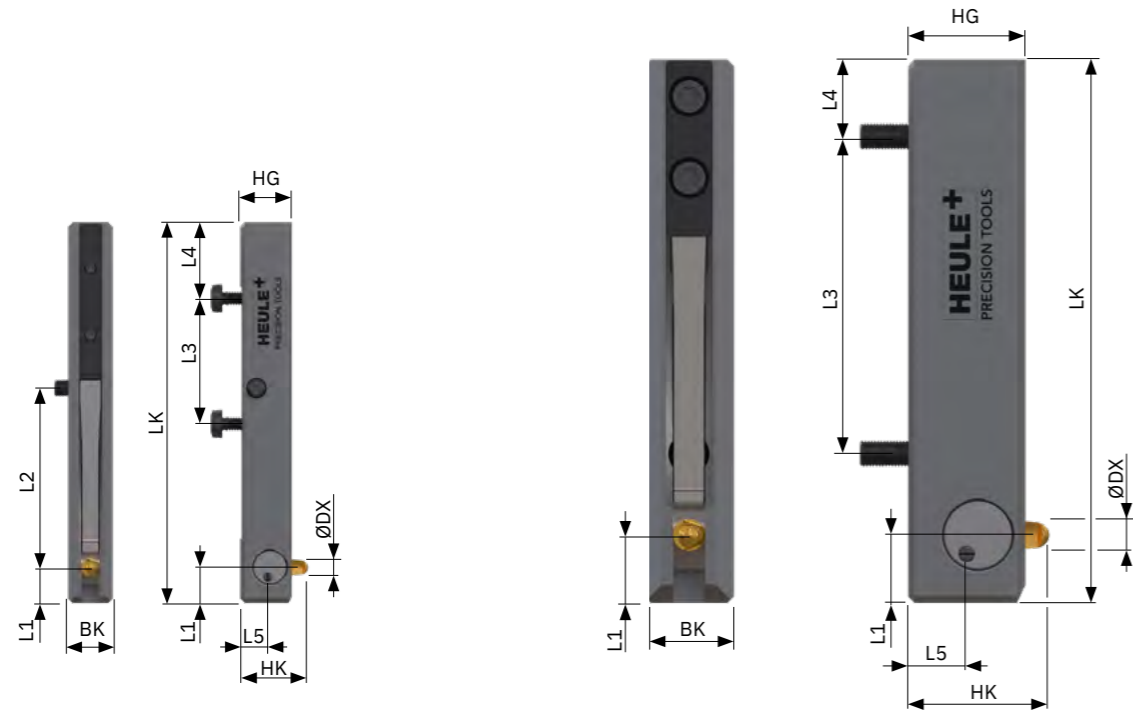
Index	Spring load	Part no.			Application
		M8	M10/M12	M16/M20	
W2	soft (softer than W1)	C6-E-0006	C8-E-0006	C12-E-0006	In the cutting data table on page 19 you will find the spring loads suitable for the various work piece materials.
W1	soft (softer than W)	C6-E-0007	C8-E-0007	C12-E-0007	
W	soft	C6-E-0008	C8-E-0008	C12-E-0008	
H	hard	C6-E-0009	C8-E-0009	C12-E-0009	
S	very hard	C6-E-0010	C8-E-0010	C12-E-0010	
Z	extra hard	C6-E-0011	C8-E-0011	C12-E-0011	
Z1	extra hard (harder than Z)	C6-E-0012	C8-E-0012	C12-E-0012	
Z2	extra hard (harder than Z1)	C6-E-0013	C8-E-0013	C12-E-0013	
Z3	extra hard (harder than Z2)	C6-E-0014	C8-E-0014	C12-E-0014	

Spare parts



Item	Description	M8	M10/M12	M16/M20
1	Blade	see above	see above	see above
2	Split pin	C6-E-0003	C8-E-0003	C12-E-0003
3	Blade holder	C6-E-0001	C8-E-0001	C12-E-0001
4	Bending spring	see above	see above	see above
5	Terminal strip	GH-C-E-0812	GH-C-E-0808	GH-C-E-0800
6	Cylinder screw Allen key	GH-H-S-0803 GH-H-S-2006	GH-H-S-0517 GH-H-S-2105	GH-H-S-0530 GH-H-S-2102
7	Tool body	C6-G-0030	Ø8.4: C8-G-0030 Ø10.1: C8-G-0031	Ø13.9: C12-G-0031 Ø17.3: C12-G-0032
8	Assembly pin	C6-V-0006	C8-V-0005	C12-V-0005

COFA cassette systems C6, C8 and C12



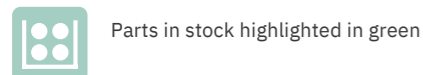
Tool

The COFA cassette is used for installation in combination tools and cassette holders. The required cassette holder can be ordered from HEULE or manufactured by the customer according to the specifications on page 42.

Standard tool **without** blades

- The blades must always be ordered separately.
- With standard spring type H for steel grades according to Cutting Data Table S. 19

Cassette size	from bore Ø d	Deburring size max.	Tool w/o blade Part no.
C6	10.0	0.7	C6-O-0900/H
C8	14.0	0.9	C8-O-0900/H
C12	20.0	1.4	C12-O-0900/H



Dimensions	BK	HG	LK	Blade		ØDX	L1	L2	L3	L4	L5
				M	L						
C6	5.0	5.8	42.5	7.6	7.8	Ø1.6	4.0	20.0	14.0	8.5	3.3
C8	8.0	8.5	51.5	10.6	11.0	Ø2.0	4.0	-	29.6	9.5	5.2
C12	10.0	13.0	60.0	15.6	16.2	Ø2.8	7.5	-	35.0	8.5	7.7

COFA cassette systems C6, C8 and C12

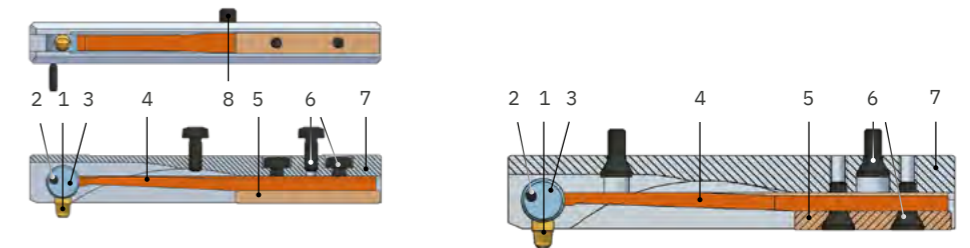
Blades

	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating T for steel, titanium, Inconel	Coating D for aluminium	Coating T for steel, titanium, Inconel	Coating D for aluminium
C6	see page 31	see page 31	see page 31	see page 31
C8	see page 33	see page 33	see page 33	see page 33
C12	see page 35	see page 35	see page 35	see page 35

Bending spring

Index	Spring load	Part no.			Application
		C6	C8	C12	
W2	soft (softer than W1)	C6-E-0006	C8-E-0006	C12-E-0006	In the cutting data table on page 19 you will find the spring loads suitable for the various workpiece materials.
W1	soft (softer than W)	C6-E-0007	C8-E-0007	C12-E-0007	
W	soft	C6-E-0008	C8-E-0008	C12-E-0008	
H	hard	C6-E-0009	C8-E-0009	C12-E-0009	
S	very hard	C6-E-0010	C8-E-0010	C12-E-0010	
Z	extra hard	C6-E-0011	C8-E-0011	C12-E-0011	
Z1	extra hard (harder than Z)	C6-E-0012	C8-E-0012	C12-E-0012	
Z2	extra hard (harder than Z1)	C6-E-0013	C8-E-0013	C12-E-0013	
Z3	extra hard (harder than Z2)	C6-E-0014	C8-E-0014	C12-E-0014	

Spare parts

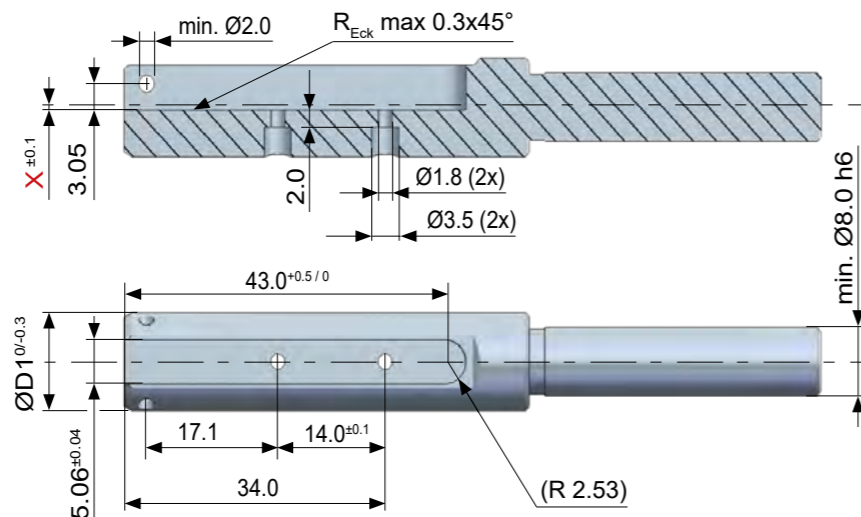


Item	Description	C6	C8	C12
1	COFA blade	see above	see above	see above
2	Split pin	C6-E-0003	C8-E-0003	C12-E-0003
3	Blade holder	C6-E-0001	C8-E-0001	C12-E-0001
4	Bending spring	see above	see above	see above
5	Terminal strip	GH-C-E-0812	C8-E-0800	C12-E-0800
6	Cylinder screw	GH-H-S-0803	GH-H-S-0050	GH-H-S-0012
7	Tool body	C6-G-0900	C8-G-0900	C12-G-0900
8	Set screw M2x2	GH-H-S-0137	-	-
	Assembly pin	C6-V-0006	C8-V-0005	C12-V-0005

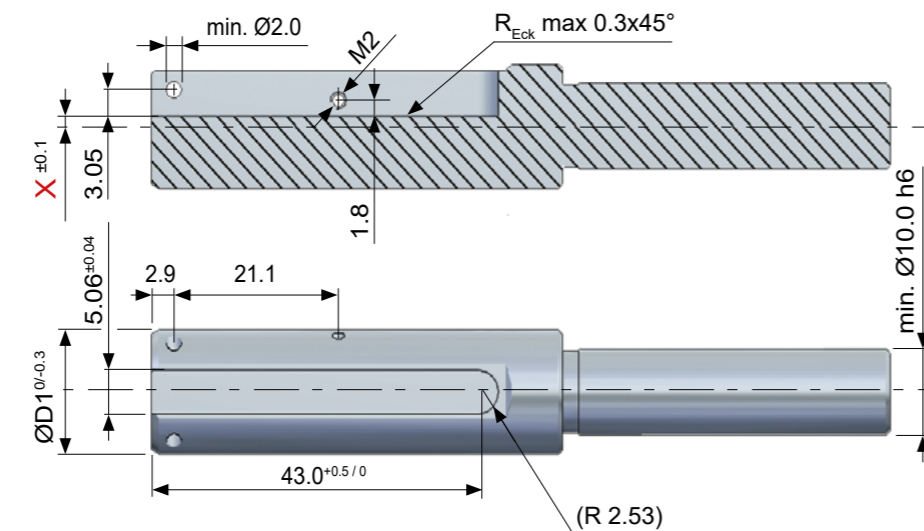
COFA cassette systems C6 and C8/C12

INSTALLATION INSTRUCTIONS

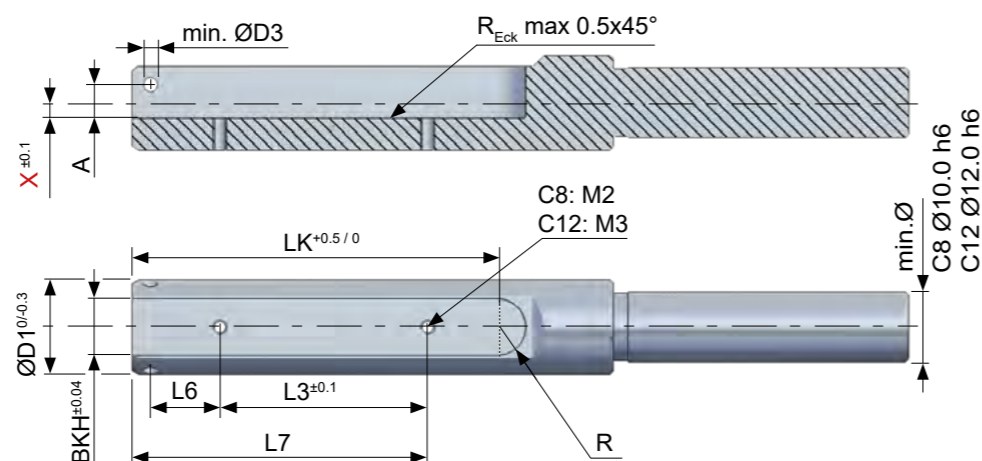
C6
Ø10.0–14.99



C6
>Ø15.0



C8
C12



COFA cassette systems C6 and C8/C12

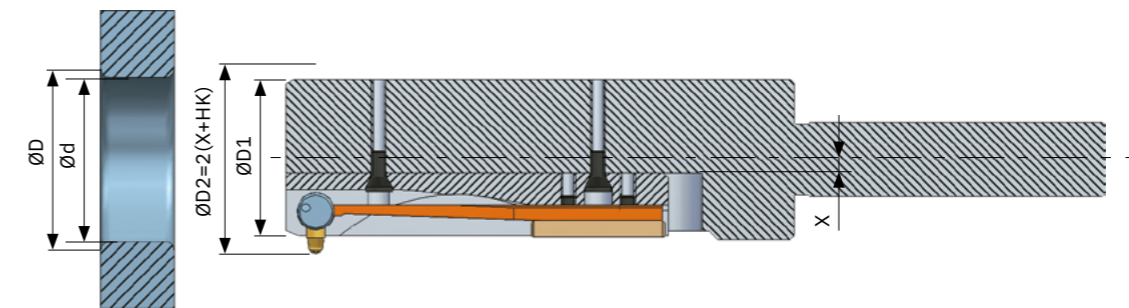
Limits

	C6		C8		C12	
from bore Ø	Ø10.0		Ø14.0		Ø20.0	
Blades	Medium	Large	Medium	Large	Medium	Large
max. Ø D	Ød + 1.0	Ød + 1.4	Ød + 1.2	Ød + 1.8	Ød + 1.6	Ød + 2.8
max. Ø D1	Ød - 0.5		Ød - 0.5		Ød - 0.5	

Cassette holder dimension table

	BKH	LK	D3	L3	L6	L7	X	A	R	
C6	see drawings page 42							Must be calculated for each application. See formula below	4.70	4.03
C8	8.06	52.0	2.0	29.6	9.85	42.1				
C12	10.06	61.0	3.0	35.0	11.1	51.5				

Calculating dimension X



Formula for calculating dimension X

$$\text{C6: } X = \text{Ø} d / 2 - 6.3 + \text{adjustment}^*$$

$$\text{C8: } X = \text{Ø} d / 2 - 9.2 + \text{adjustment}^*$$

$$\text{C12: } X = \text{Ø} d / 2 - 13.7 + \text{adjustment}^*$$

* Adjustment for desired deburring size: TARGET minus ACTUAL

Calculation example for cassette system C6

Given:

Bore diameter: 12.5 mm / deburring diameter D: 13.7 mm

→ required deburring size $(13.7 - 12.5) / 2 = 0.6$ mm (= TARGET)

→ L-blade deburring size: 0.7 mm (= ACTUAL)

Desired X

$$X = \text{Ø} d / 2 - 6.3 + (\text{correction for blade deburring size})$$

$$X = (12.5 \text{ mm} / 2) - 6.3 \text{ mm} + (\text{TARGET} - \text{ACTUAL})$$

$$X = 6.25 \text{ mm} - 6.3 \text{ mm} + (0.6 \text{ mm} - 0.7 \text{ mm})$$

$$X = -0.05 \text{ mm} + (-0.1 \text{ mm})$$

X = -0.15 mm

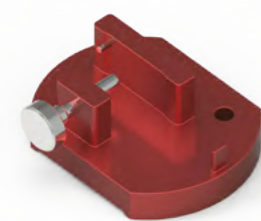
COFA Assembly Aid for Blade Change



Type	Part no.
COFA C2 / C3	C3-V-0002



Type	Part no.
COFA4M / COFA5M	GH-C-V-0541



Type	Part no.
COFA C6	C6-V-0008
COFA C8	C8-V-0007
COFA C12	C12-V-0018

COFA FAQ

Question	Causes	Remedy
Highly irregular deburring	• Cutting speed too high	• Reduce cutting speed considerably, leave working feed unchanged
	• Ratio of cross bore to bore diameter (d:D) is greater than 0.5	• Ratio is too high for the tool, solution with COFA not possible. Alternatively, check machining with COFA-X
	• Selected tool too large	• Use a tool with a smaller diameter (e.g. instead of C12/diameter 15.0 >C12/diameter 14.5)
Vibration, chatter marks	• Cutting speed too high	• Reduce cutting speed
	• Working feed too low	• Increase working feed
	• Spring too soft	• Install harder spring (spring index), existing tool can be converted
Deburr too large	• Tool/blade used is too large	• Use a tool with a smaller diameter (e.g. instead of C12/diameter 15.0 >C12/diameter 14.5) or a smaller blade if applicable
Deburr incomplete	• Spring too soft	• Install harder spring (spring index), existing tool can be converted
	• Clearance angle on blade too small	• Alternative blade
Secondary burr formation	• Spring too hard	• Install softer spring
No deburring	• Tool dirty, blade cannot move freely	• Clean tool
	• Blade worn out	• Replace blade
No deburring on the back of the bore	• Dimension C too short for the blade to fold out due to burr height	• Increase dimension C by burr height
	• Switchover time of the machine from rapid traverse forwards to rapid traverse backwards too fast or distance too short for the blade to fold out	• Provide a short dwell time or increase dimension C if space is available

COFA-X

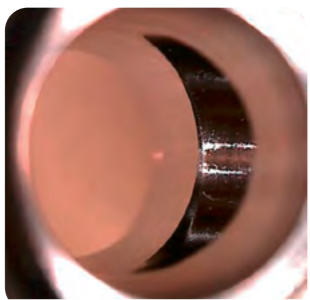
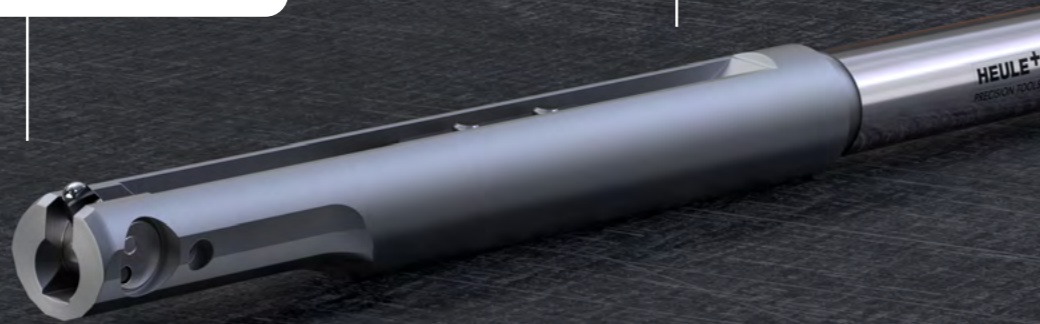
Mechanical, process-reliable deburring of cross bores with a bore ratio up to 1:1.

The advantages – Your benefit



The edges of cross bores with almost identical diameters are very uneven. Nevertheless COFA-X removes the burrs reliably and completely.

The use of carbide blades with coatings based on the workpiece material guarantees a long service life.



The defined cutting process ensures a fully broken edge. The edge is burr-free.



The simple, mechanical operating principle massively increases process reliability with regard to deburring and reduces process costs at the same time.

THE RANGE

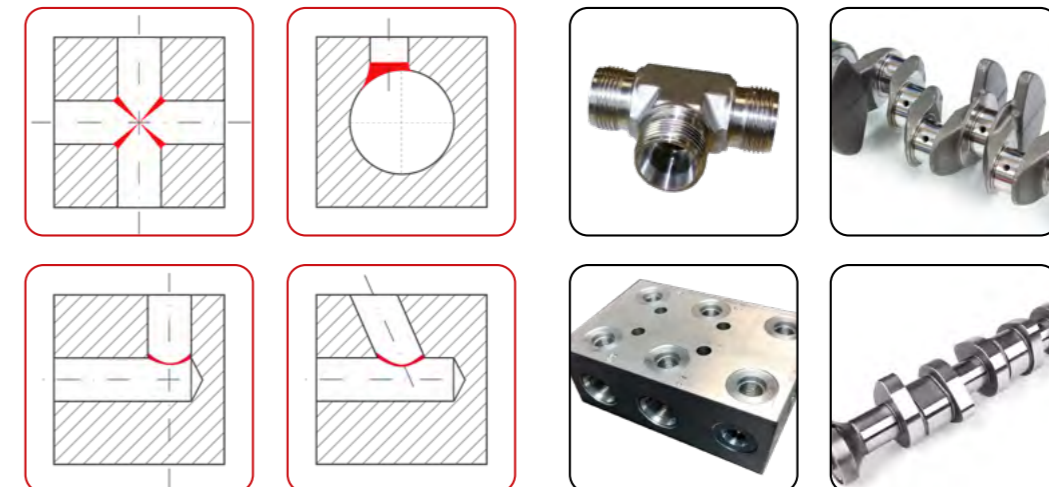
The reliable and economical deburring of cross bores is a major challenge. COFA-X solves this problem by combining its strengths with the capabilities of a modern CNC machine. The field of application for COFA-X starts from a bore diameter of 5.0 mm.

COFA-X does not have a standardised product range. Every COFA-X tool is manufactured as part of our **INDIVIDUAL** range of solutions designed specifically for the application. For a quote, please send us the data and information about your application using the checklist. We will be happy to help you.

CHECKLIST FOR FEASIBILITY CHECK

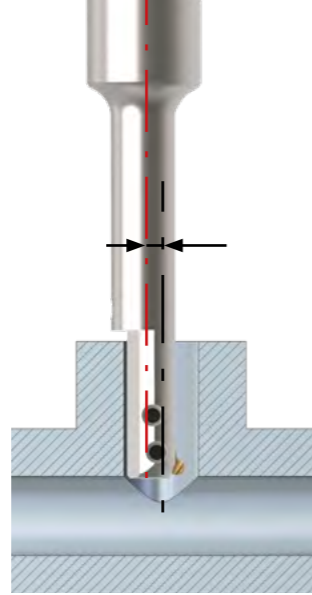
- Main bore diameter including tolerance
- Cross bore diameter including tolerance
- Bore depth
- Workpiece 3D model (STEP, DXF)
- Material
- Penetration angle
- Eccentricity
- Cycle time
- Machine (type, external cooling, compressed air)
- Production volume per year
- Current solution
- Special requirements

FIELD OF APPLICATION



OPERATING PRINCIPLE

Tool function: COFA-X works the same way as the COFA tool system. The difference is the pre-tensioned spring and the relieved front of the tool body. The relief is necessary in order to move the blade, which can only move in one direction due to the pretension, eccentrically into the bore. Eccentricity, in turn, requires the capabilities of a CNC machine.



Blade function: The blades are designed either for forward or reverse machining only and are always pre-tensioned by the spring. The spring returns the blade to its neutral position. The blade position varies according to the machining direction.

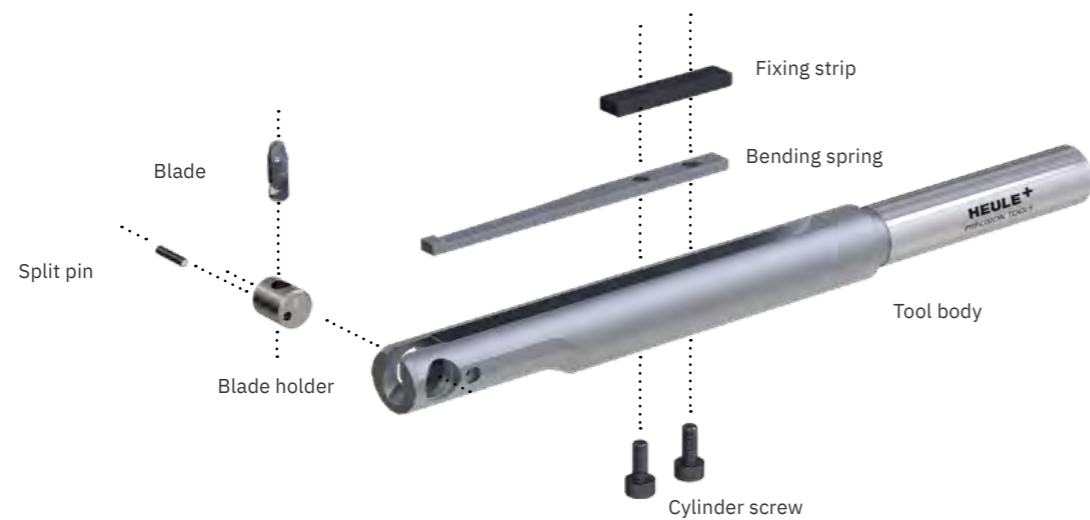


Neutral position of blade for machining in reverse




Neutral position of blade for forward machining

TOOL DESIGN



COFA-X CUTTING DATA


	Description	Tensile strength RM (MPa)	Hardness (HB)	Hardn. (HRC)	Spring	Cutting speed (VC)	Working feed (FZ)
P0	Low-carbon steel, long-chipping, C <0.25%	<530	<125	-	S	20-30	0.05-0.15
P1	Low-carbon steel, short-chipping, C <0.25%	<530	<125	-	S	20-30	0.05-0.15
P2	Steel with carbon content C >0.25%	>530	<220	<25	S	20-30	0.05-0.15
P3	Alloy steel and tool steel, C >0.25%	600-850	<330	<35	S	20-30	0.05-0.15
P4	Alloy steel and tool steel, C >0.25%	850-1400	340-450	35-48	Z	10-20	0.05-0.1
P5	Ferritic, martensitic and stainless PH steel	600-900	<330	<35	Z	10-20	0.05-0.1
P6	High-strength ferritic, martensitic and PH stainless steel	900-1350	350-450	35-48	Z1	10-20	0.05-0.1
M1	Austenitic stainless steel	<600	130-200	-	Z1	20-30	0.05-0.15
M2	High-strength austenitic stainless steel	600-800	150-230	<25	Z1	10-20	0.05-0.1
M3	Duplex stainless steel	<800	135-275	<30	Z1	10-20	0.05-0.1
K1	Cast iron	125-500	120-290	<32	S	20-30	0.05-0.15
K2	Ductile cast iron with up to medium strength	<600	130-260	<28	S	20-30	0.05-0.15
K3	High-strength cast iron and bainitic cast iron	>600	180-350	<43	S	20-30	0.05-0.15
N1	Wrought aluminium alloys	-	-	-	H	20-40	0.1-0.2
N2	Aluminium alloys with low Si content	-	-	-	H	20-40	0.1-0.2
N3	Aluminium alloys with high Si content	-	-	-	H	20-40	0.1-0.2
N4	Copper, brass and zinc base	-	-	-	H	20-40	0.1-0.2
S1	Iron-based heat-resistant alloys	500-1200	160-260	25-48	Z1	10-20	0.05-0.1
S2	Cobalt-based heat-resistant alloys	1000-1450	250-450	25-48	Z1	10-20	0.05-0.1
S3	Nickel-based heat-resistant alloys	600-1700	160-450	<48	Z1	10-20	0.05-0.1
S4	Titanium and titanium alloys	900-1600	300-400	33-48	Z1	10-20	0.05-0.1

 The cutting data listed are guidelines! They depend on the amount of the unevenness of the bore edges (e.g. high slope > low cutting value). For materials that are difficult to machine or uneven bore edges, we recommend applying cutting speeds that are at the lower end of the range.

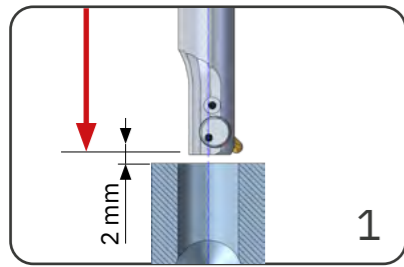
Operating instructions

- > Blade change
- > Spring change

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COFA-X PROCESS STEPS

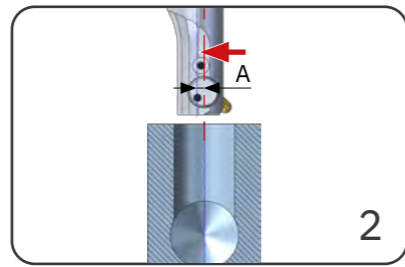


- Spindle stop
- Approach by rapidly traversing with offset 0 spindle orientation²⁾ (=M19).

```
M5
G0 X0 Y0 M19
G0 Z+27.01)
```

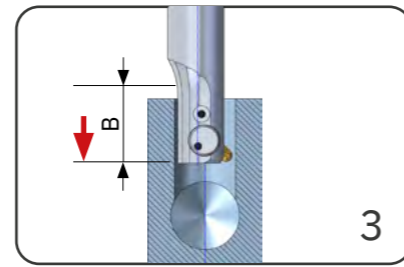
¹⁾ 27.0=50.0/2+2.0

²⁾ Spindle orientation: The position of the cutting edge must be aligned in advance so that it can be moved in the offset direction.



- Offset value **A** (value depends on the tool, see customer drawing)

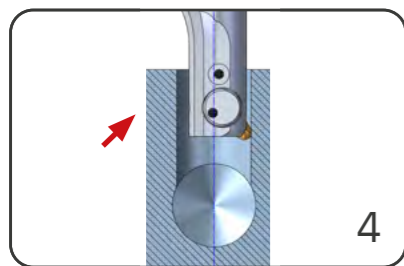
```
G0 Y+1.12
```



- Rapid feed to max. **B** (value depends on the tool, see customer drawing)

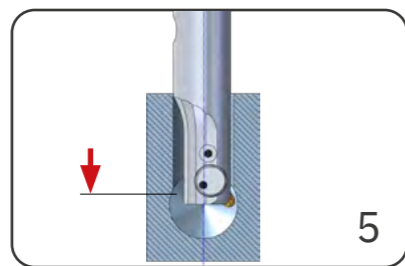
```
G0 Z+10.03)
```

³⁾ 10.0=50.0/2-15.0(=B)



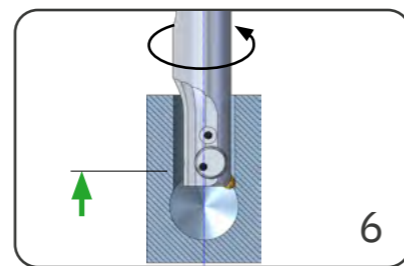
- Offset value 0 (centre of bore axis, bore edge is lightly touched)

```
G1 Y+0.0 Z+11.12
```



- Rapid feed to the starting position

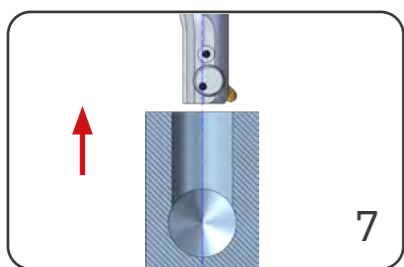
```
G0 Z+0.0
```



- Spindle rotation anti-clockwise
- External coolant on
- Working feed

```
S800 M4
M8
G1 Z+7.04) F80
```

⁴⁾ 7.0=5.0+2.0



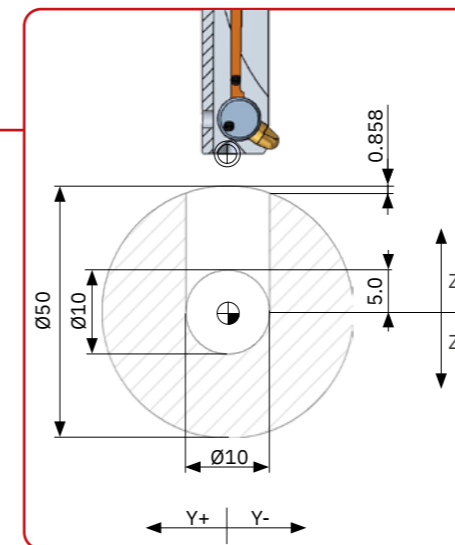
- Spindle stop!
- Rapid feed out of the workpiece

```
M5
G0 Z+27.0
```

Important:
COFA-X works in the **anti-clockwise direction**, meaning the spindle must be programmed to rotate anti-clockwise.



APPLICATION AND PROGRAMMING EXAMPLE



Application data

Material: St50-1 (P3)
Bore Ø: Ø10.0 mm
Workpiece: Ø50.0 mm
Machining: rear bore edge only

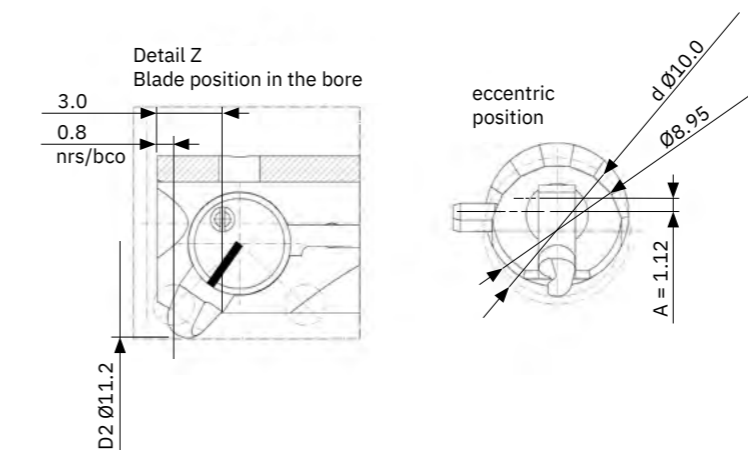
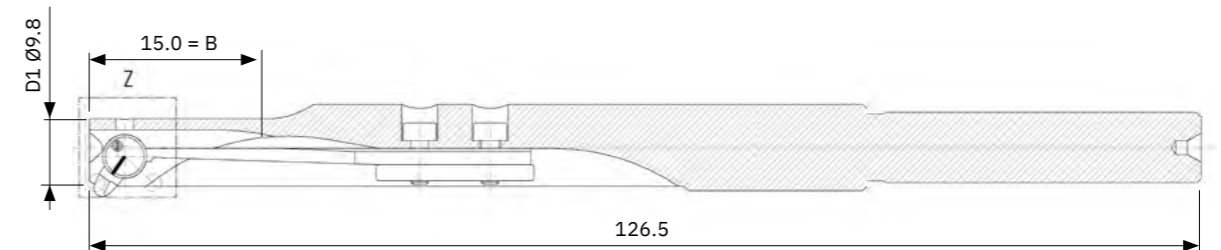
Tool and blade selection

Tool: COFA-X
Blade: backward cutting only
left-hand cutting

Cutting data

Cutting speed V_c : 20–30 m/min.
Tool working feed: 0.05–0.15 mm/rev

TOOL FOR APPLICATION EXAMPLE



Attention!

Each COFA-X is application-specific, i.e. specifically designed for the individual deburring task. When programming, do not use the values from the programming/tool example above, but use the values from your own tool drawing.

COFA-X FAQ

Question	Causes	Remedy
No or incomplete deburring	Incorrect direction of rotation – standard COFA-X blades are left-hand cutting (M4)	Observe direction of rotation and correct to left-hand cutting (M4)
	Bore diameter too large	Drill bore according to specifications – COFA-X requires a bore tolerance of +0.1/0.
	Bending spring too soft	Install a harder bending spring if the tool concept permits (modular)
	Blade worn, worn out	Change blade
	Cutting speed too high	Reduce cutting speed
	Working feed rate too high	Reduce working feed rate
	Incorrect starting position for deburring	Check traverse ranges
	Burr height	Reduce the burr height by drilling until burr-free or reduce the service life of the drill
Vibration, chatter marks	Cutting speed too high	Reduce cutting speed
	Working feed rate too high	Reduce working feed rate
Deburring too small	Burr height	Reduce the burr height by drilling until burr-free or reduce the service life of the drill
	Bending spring too soft	Install a harder bending spring if the tool concept permits (modular)
	Cutting parameters too high	Reduce the cutting parameters according to the specifications or carry out the deburring process twice
Deburring too large	Bending spring too hard	Install a softer bending spring if the tool concept allows it (modular)
Secondary burr	Bending spring too hard	Install a softer bending spring if the tool concept allows it (modular)
Short service life	Poorly clamped workpiece or tool (vibration)	Ensure that workpiece and tool are more firmly clamped
	Burr height	Reduce the burr height by drilling without burrs or reduce the service life of the drill
Blade or spring breakage	Tool and blade incorrectly positioned in the tool holder	Mount the tool correctly in the tool holder (Weldon)

Question	Causes	Remedy
Blade or spring breakage (continued)	Blade coordinates programmed incorrectly – blade orientation does not match the machining edge	Correct the programming, check traverse ranges
	Cutting parameters too high	Reduce cutting parameters according to specifications
Converting standard COFA to COFA-X	Conversion not possible	The standard COFA is designed for the bore diameter and therefore does not allow an offset value.
Inserting a standard COFA blade into a COFA-X tool	Standard COFA blades do not work in a COFA-X.	Standard COFA cutting geometry does not match the preloaded position of the blade (30° blade, left-hand cutting)
Possible use of COFA-X in a standard lathe	Spindle orientation (tool blade orientated to the alignment of the X-axis) and eccentric entry into the bore required	COFA-X requires the application-specific blade to be aligned with the bore edge as well as an offset in the X-axis for entry or exit - similar to a turning tool for the undercut

DL2

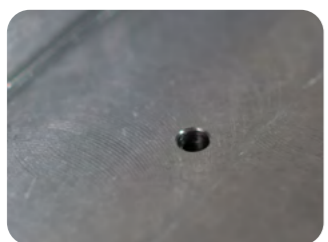
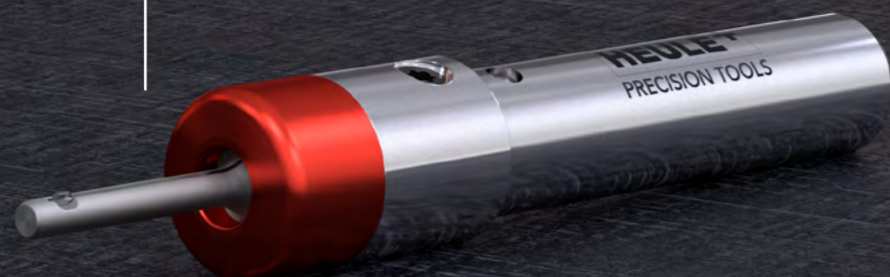
Impressive process reliability and deburring quality in mini bores from a diameter of 1.0 mm.

The advantages – Your benefit

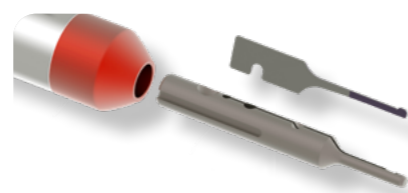


Highly economical when processing flat and slightly uneven bore edges forwards and backwards in a single operation.

Safe handling. DL2 boasts a simple design, quick blade change and robustness.



The defined cutting process with a coated carbide blade ensures a fully broken edge – meaning the edge is burr-free.



Safe processing. The blade housing gives the blade maximum stability and guidance. The coolant supply through the tool flows directly to the cutting edge of the carbide blade.

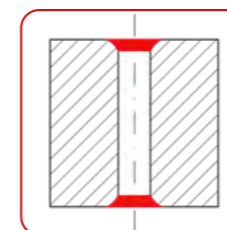
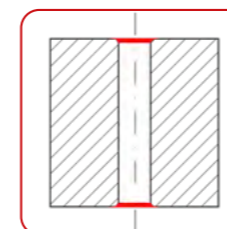


THE RANGE

Bore Ø range mm	Max. deburring size mm	Max. working length mm
Ø1.00–1.05	0.10	3.00
Ø1.10–1.35	0.1–0.15	4.00
Ø1.40–1.45	0.1–0.15	5.00
Ø1.50–1.60	0.1–0.15	6.00
Ø1.65–1.70	0.1–0.15	7.00
Ø1.75–1.80	0.1–0.15	8.00
Ø1.85–1.90	0.1–0.15	9.00
Ø1.95–2.10	0.1–0.15	10.00

If the required tool is not included in the standard range above, the **INDIVIDUAL** range can offer you a possible solution. If required, we can also develop custom solutions that are fully tailored to your application.

FIELD OF APPLICATION



Tool Selector

> Step-by-step guide to find the right solution

heule.com/en/tool-selector/dl2



Tool Selector

OPERATING PRINCIPLE

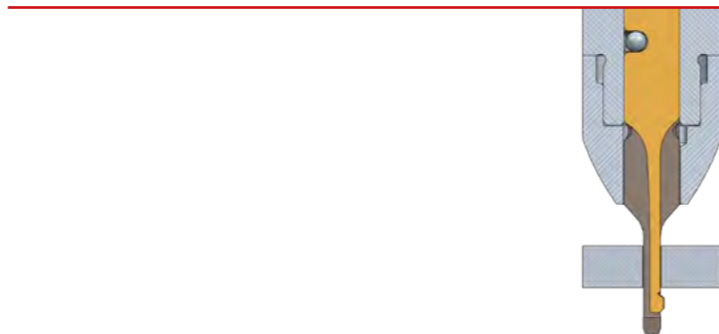
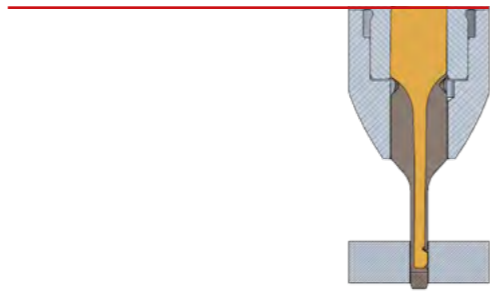
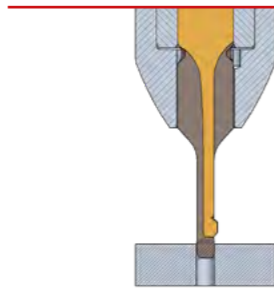
Due to its size, the DL2 blade performs the function of the spring and the blade simultaneously. Due to the rigid alignment of the blade, the operating principle is different from that of other HEULE tool systems. The blade has been designed in such a way that it can be used in confined spaces without compromising on functionality.

The blade produces the desired deburr in working feed. Upon completion of deburring, the blade automatically retracts into the blade housing without external activation. The specially designed sliding section of the blade prevents the bores from being damaged.

The spring-loaded blade automatically returns to its neutral position when it exits the bore.

Integrated cooling

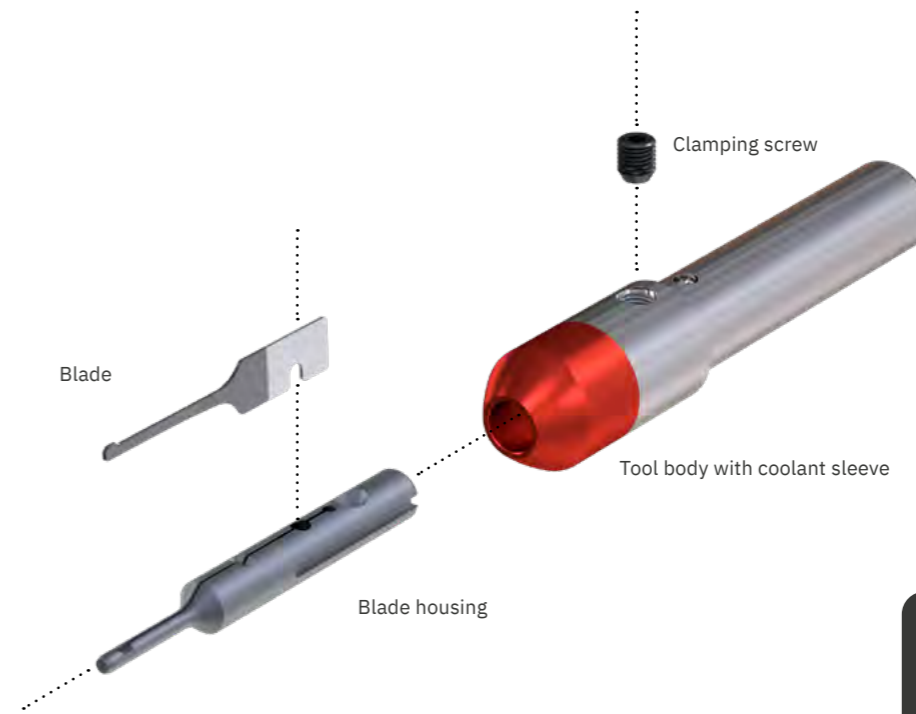
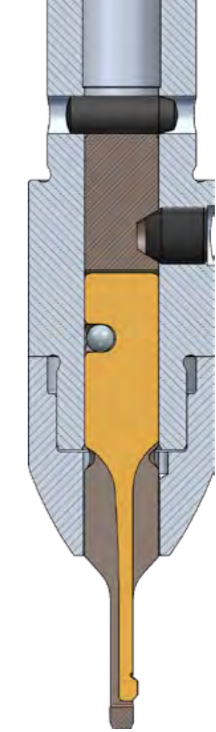
The technical challenge with deburring tools of this size is cooling the cutting edge. With the DL2, the coolant is supplied through the tool and cools and rinses the carbide blade directly – an important factor for process reliability in series production and for blade life.



TOOL DESIGN

The DL2 tool has a very simple and robust design, comprising only four components in its entire construction. The advantages of this design become obvious when changing the blade. Despite the extremely delicate dimensions of the cutting edge, the blade is easy to replace without tweezers or a magnifying glass.

The tool body and blade housing form the heart of this mini tool. The coolant sleeve guides the coolant into the blade window and ensures that the cutting edge is flushed at all times. The smaller the tool, the more important cooling is for reliable operation and a long blade life.



Operating instructions

> Blade change

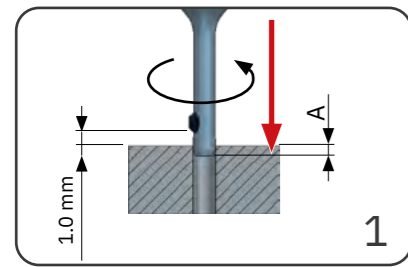
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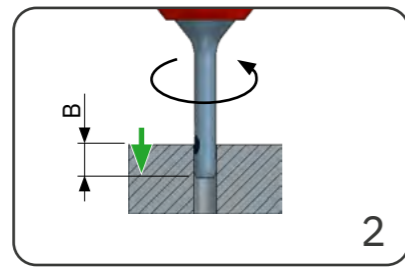
DL2 PROCESS STEPS



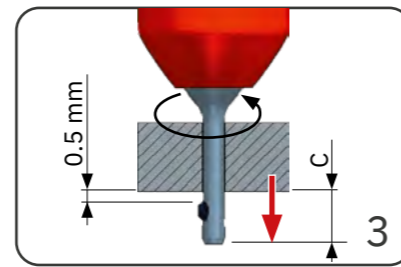
Important! The DL2 works in the anti-clockwise direction (left-hand cut).



- Rapid feed to position A or 1.0 mm distance
- Spindle turning **anti-clockwise**
- Internal coolant on



- Working feed to position **B**



- Rapid feed to position **C** or 0.5 mm distance

Example
G0 Z-0.5¹⁾
S7500 M4
M88

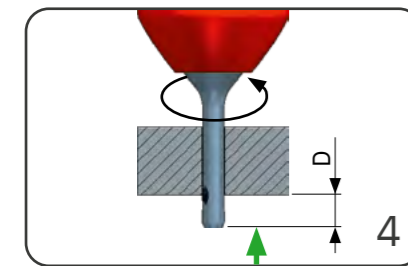
¹⁾0.5=1.5-1.0

G1 Z-2.15²⁾ F75

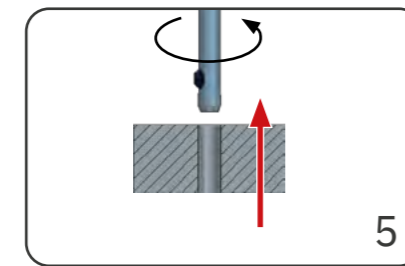
²⁾2.15=2.8-((2.8-1.5)/2)

G0 Z-8.3³⁾

³⁾8.3=5.0+2.8+0.5



- Working feed to position **D**



- Rapid feed out of the workpiece

G1 Z-7.15⁴⁾

⁴⁾7.15=5.0+2.8-((2.8-1.5)/2)

G0 Z+2.0

DIMENSION TABLE PROGRAMMING

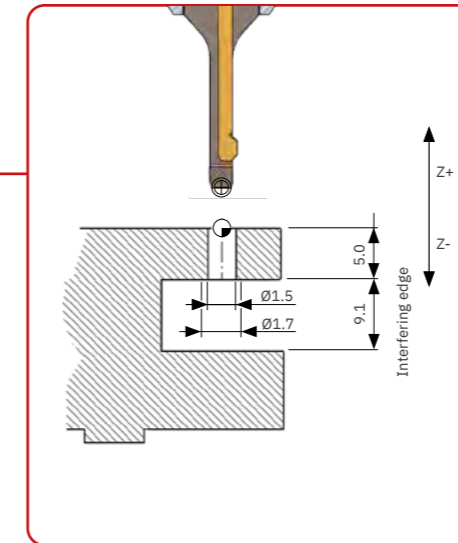
Tool	A	B	C	D
DL2	0.5 mm	2.15 mm	3.3 mm	2.15 mm



IMPORTANT!
Observe max. working length

Bore Ø range	max. working length
1.00–1.05 mm	3.00 mm
1.10–1.35 mm	4.00 mm
1.40–1.45 mm	5.00 mm
1.50–1.60 mm	6.00 mm
1.65–1.70 mm	7.00 mm
1.75–1.80 mm	8.00 mm
1.85–1.90 mm	9.00 mm
1.95–2.10 mm	10.00 mm

APPLICATION AND PROGRAMMING EXAMPLE



Application data

Material: Steel C45
Bore diameter: Ø1.5 mm
Deburr diameter: Ø1.7 mm
Burr height max. 0.1 mm
Workpiece depth: 5.0 mm
Machining: both bore edges

Tool and blade selection

Tool: DL2/1.5/06
Tool diameter: 1.45 mm
Blade: DL2-M-0164-A (HM, Latuma coated)

Cutting data

Cutting speed V_c : 30–50 m/min.
Tool working feed: 0.005–0.015 mm/rev

CUTTING DATA

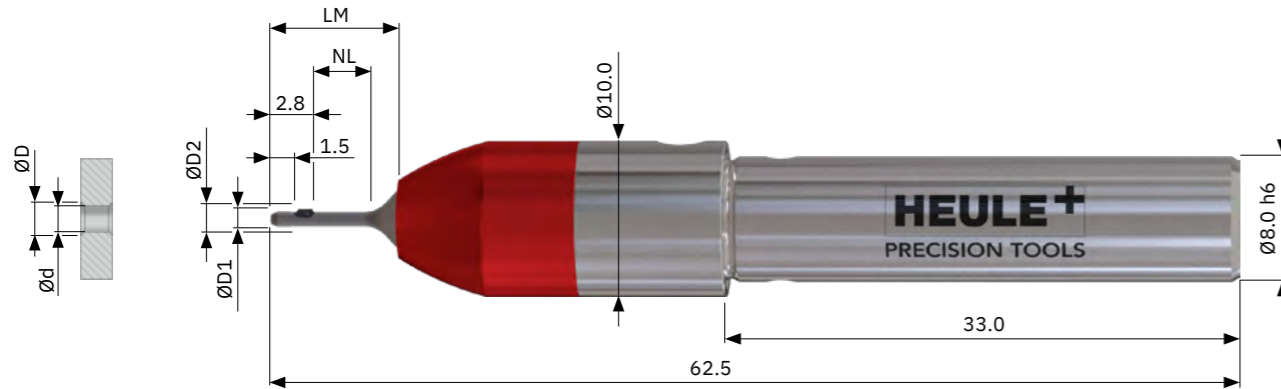
Description	Tensile str. RM (MPa)	Hardness (HB)	Hardn. (HRC)	DL2		
				VC	FZ	B*
P0 Low-carbon steel, long-chipping, C <0.25%	<530	<125	–	30–50	0.005–0.015	A
P1 Low-carbon steel, short-chipping, C <0.25%	<530	<125	–	30–50	0.005–0.015	A
P2 Steel with carbon content C >0.25%	>530	<220	<25	30–50	0.005–0.015	A
P3 Alloy steel and tool steel, C >0.25%	600–850	<330	<35	30–50	0.005–0.015	A
P4 Alloy steel and tool steel, C >0.25%	850–1400	340–450	35–48	25–45	0.005–0.015	A
P5 Ferritic, martensitic and stainless PH steel	600–900	<330	<35	20–40	0.005–0.015	A
P6 High-strength ferritic, martensitic and PH stainless steel	900–1350	350–450	35–48	20–40	0.005–0.015	A
M1 Austenitic stainless steel	<600	130–200	–	15–30	0.005–0.015	A
M2 High-strength austenitic stainless steel	600–800	150–230	<25	15–30	0.005–0.015	A
M3 Duplex stainless steel	<800	135–275	<30	15–30	0.005–0.015	A
K1 Cast iron	125–500	120–290	<32	40–60	0.005–0.015	A
K2 Ductile cast iron with up to medium strength	<600	130–260	<28	40–60	0.005–0.015	A
K3 High-strength cast iron and bainitic cast iron	>600	180–350	<43	40–60	0.005–0.015	D
N1 Wrought aluminium alloys	–	–	–	60–80	0.005–0.015	D
N2 Aluminium alloys with low Si content	–	–	–	60–80	0.005–0.015	D
N3 Aluminium alloys with high Si content	–	–	–	60–80	0.005–0.015	D
N4 Copper, brass and zinc base	–	–	–	50–60	0.005–0.015	D
S1 Iron-based heat-resistant alloys	500–1200	160–260	25–48	20–40	0.005–0.015	A
S2 Cobalt-based heat-resistant alloys	1000–1450	250–450	25–48	10–15	0.005–0.015	A
S3 Nickel-based heat-resistant alloys	600–1700	160–450	<48	10–15	0.005–0.015	A
S4 Titanium and titanium alloys	900–1600	300–400	33–48	10–15	0.005–0.015	A

* coating for blades



The cutting data listed are guide values!
For materials that are difficult to machine or slightly uneven bore edges, we recommend applying cutting speeds that are at the lower end of the range.

DL2 $\varnothing 1.0$ mm to 2.1 mm



Tool

Standard tool **without** blades

- The blades must always be ordered separately.
- Different blades can be used for each bore diameter, thus achieving different deburr diameters. However, a blade is only designed for a defined deburr diameter. The achievable deburr diameter may vary slightly depending on the material, blade force, cutting parameters and application.
- With cylindrical shank

Bore \varnothing d	Deburring \varnothing D	Working length max.	Length of LM blade housing	Tool \varnothing D1	Max. \varnothing D2	Tool Part no.
1.00	1.20	3.00	8.30	0.95	1.35	DL2/1.00/03
1.05	1.25	3.00	8.30	1.00	1.40	DL2/1.05/03
1.10	1.30	4.00	9.30	1.05	1.55	DL2/1.10/04
1.15	1.35	4.00	9.30	1.10	1.60	DL2/1.15/04
1.20	1.40 / 1.45	4.00	9.30	1.15	1.65	DL2/1.20/04
1.25	1.45 / 1.50 / 1.55	4.00	9.30	1.20	1.70	DL2/1.25/04
1.30	1.50 / 1.55 / 1.60	4.00	9.30	1.25	1.75	DL2/1.30/04
1.35	1.55 / 1.60 / 1.65	4.00	9.30	1.30	1.80	DL2/1.35/04
1.40	1.60 / 1.65 / 1.70	5.00	10.30	1.35	1.85	DL2/1.40/05
1.45	1.65 / 1.70 / 1.75	5.00	10.30	1.40	1.90	DL2/1.45/05
1.50	1.70 / 1.75 / 1.80	6.00	11.30	1.45	1.95	DL2/1.50/06
1.55	1.75 / 1.80 / 1.85	6.00	11.30	1.50	2.00	DL2/1.55/06
1.60	1.80 / 1.85 / 1.90	6.00	11.30	1.55	2.05	DL2/1.60/06
1.65	1.85 / 1.90 / 1.95	7.00	12.30	1.60	2.10	DL2/1.65/07
1.70	1.90 / 1.95 / 2.00	7.00	12.30	1.65	2.15	DL2/1.70/07
1.75	1.95 / 2.00 / 2.05	8.00	13.30	1.70	2.20	DL2/1.75/08
1.80	2.00 / 2.05 / 2.10	8.00	13.30	1.75	2.25	DL2/1.80/08
1.85	2.05 / 2.10 / 2.15	9.00	13.30	1.80	2.30	DL2/1.85/09
1.90	2.10 / 2.15 / 2.20	9.00	13.30	1.85	2.35	DL2/1.90/09
1.95	2.15 / 2.20 / 2.25	10.00	13.30	1.90	2.40	DL2/1.95/10
2.00	2.20 / 2.25 / 2.30	10.00	13.30	1.95	2.45	DL2/2.00/10
2.05	2.25 / 2.30	10.00	13.30	2.00	2.50	DL2/2.05/10
2.10	2.30	10.00	13.30	2.05	2.55	DL2/2.10/10



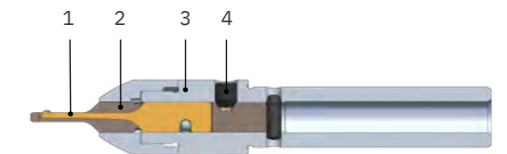
Parts in stock highlighted in green

DL2 $\varnothing 1.0$ mm to 2.1 mm

Blades

Deburr. \varnothing max.	Part no. forward and backward cutting		Part no. backward cutting only		Part Designation
	Coating A Steel, titanium, Inconel	Coating D for aluminium	Coating A Steel, titanium, Inconel	Coating D for aluminium	
1.20	DL2-M-0104-A	DL2-M-0104-D	DL2-M-0101-A	DL2-M-0101-D	DL2 Blade 1.00
1.25	DL2-M-0110-A	DL2-M-0110-D	DL2-M-0107-A	DL2-M-0107-D	DL2 Blade 1.05
1.30	DL2-M-0116-A	DL2-M-0116-D	DL2-M-0113-A	DL2-M-0113-D	DL2 Blade 1.10
1.35	DL2-M-0122-A	DL2-M-0122-D	DL2-M-0119-A	DL2-M-0119-D	DL2 Blade 1.15
1.40	DL2-M-0128-A	DL2-M-0128-D	DL2-M-0125-A	DL2-M-0125-D	DL2 Blade 1.20
1.45	DL2-M-0134-A	DL2-M-0134-D	DL2-M-0131-A	DL2-M-0131-D	DL2 Blade 1.25
1.50	DL2-M-0140-A	DL2-M-0140-D	DL2-M-0137-A	DL2-M-0137-D	DL2 Blade 1.30
1.55	DL2-M-0146-A	DL2-M-0146-D	DL2-M-0143-A	DL2-M-0143-D	DL2 Blade 1.35
1.60	DL2-M-0152-A	DL2-M-0152-D	DL2-M-0149-A	DL2-M-0149-D	DL2 Blade 1.40
1.65	DL2-M-0158-A	DL2-M-0158-D	DL2-M-0155-A	DL2-M-0155-D	DL2 Blade 1.45
1.70	DL2-M-0164-A	DL2-M-0164-D	DL2-M-0161-A	DL2-M-0161-D	DL2 Blade 1.50
1.75	DL2-M-0170-A	DL2-M-0170-D	DL2-M-0167-A	DL2-M-0167-D	DL2 Blade 1.55
1.80	DL2-M-0176-A	DL2-M-0176-D	DL2-M-0173-A	DL2-M-0173-D	DL2 Blade 1.60
1.85	DL2-M-0182-A	DL2-M-0182-D	DL2-M-0179-A	DL2-M-0179-D	DL2 Blade 1.65
1.90	DL2-M-0188-A	DL2-M-0188-D	DL2-M-0185-A	DL2-M-0185-D	DL2 Blade 1.70
1.95	DL2-M-0194-A	DL2-M-0194-D	DL2-M-0191-A	DL2-M-0191-D	DL2 Blade 1.75
2.00	DL2-M-0200-A	DL2-M-0200-D	DL2-M-0197-A	DL2-M-0197-D	DL2 Blade 1.80
2.05	DL2-M-0206-A	DL2-M-0206-D	DL2-M-0203-A	DL2-M-0203-D	DL2 Blade 1.85
2.10	DL2-M-0212-A	DL2-M-0212-D	DL2-M-0209-A	DL2-M-0209-D	DL2 Blade 1.90
2.15	DL2-M-0218-A	DL2-M-0218-D	DL2-M-0215-A	DL2-M-0215-D	DL2 Blade 1.95
2.20	DL2-M-0224-A	DL2-M-0224-D	DL2-M-0221-A	DL2-M-0221-D	DL2 Blade 2.00
2.25	DL2-M-0230-A	DL2-M-0230-D	DL2-M-0227-A	DL2-M-0227-D	DL2 Blade 2.05
2.30	DL2-M-0236-A	DL2-M-0236-D	DL2-M-0233-A	DL2-M-0233-D	DL2 Blade 2.10

Spare parts



Item	Description	Part no.
1	Blade	see above
2	Blade housing	see page 62
3	Tool body	see page 62
4	Clamping screw Allen key	GH-H-S-1125 GH-H-S-2021

DL2 spare parts

	Blade housing	Tool body
Bore Ø	Part no.	Part no.
1.00	DL2-N-0102	DL2-G-0103
1.05	DL2-N-0112	DL2-G-0103
1.10	DL2-N-0123	DL2-G-0104
1.15	DL2-N-0133	DL2-G-0104
1.20	DL2-N-0143	DL2-G-0104
1.25	DL2-N-0153	DL2-G-0104
1.30	DL2-N-0163	DL2-G-0104
1.35	DL2-N-0174	DL2-G-0104
1.40	DL2-N-0184	DL2-G-0105
1.45	DL2-N-0194	DL2-G-0105
1.50	DL2-N-0205	DL2-G-0106
1.55	DL2-N-0215	DL2-G-0106
1.60	DL2-N-0225	DL2-G-0106
1.65	DL2-N-0236	DL2-G-0107
1.70	DL2-N-0246	DL2-G-0107
1.75	DL2-N-0257	DL2-G-0108
1.80	DL2-N-0267	DL2-G-0108
1.85	DL2-N-0278	DL2-G-0109
1.90	DL2-N-0288	DL2-G-0109
1.95	DL2-N-0299	DL2-G-0110
2.00	DL2-N-0309	DL2-G-0110
2.05	DL2-N-0319	DL2-G-0110
2.10	DL2-N-0329	DL2-G-0110

DL2 FAQ

Question	Causes	Remedy
Burr is not cut away cleanly or deburr too small	<ul style="list-style-type: none"> Blade selected too small Working feed rate too high Burr too large 	<ul style="list-style-type: none"> Select blade for larger deburr Ø Reduce working feed rate Minimise burr size from drilling
No deburring	Blade worn, worn out	Replace blade
	Excessive burr formation	Replace or sharpen the drill
	Wrong direction of rotation	DL2 runs anti-clockwise (M4)
Forward and backward deburring size not the same	Working feed rate forwards and backwards different	Select the same working feed rate forwards and backwards if possible
	Different burr formations front and back	On the side with under-deburring: reduce working feed rate. On the side with over-deburring: increase working feed rate
Deburring with chatter marks	Poorly set workpiece or tool	Ensure that workpiece and tool are firmly clamped
	Tool in unstable condition	Increase tool feed rate
	Cutting speed too high	Reduce cutting speed
Inconsistent deburring size	Different working feed rate	Select consistent working feed rate
	Tool in unstable condition	Increase working feed rate
Poor service life	Poorly clamped workpiece or tool (vibration)	Ensure that workpiece and tool are rigidly clamped
	Insufficient machine stability (spindle play, etc.)	Improve machine stability or guide with special tool in the bore
	Incorrect blade coating	Select correct coating

SNAP

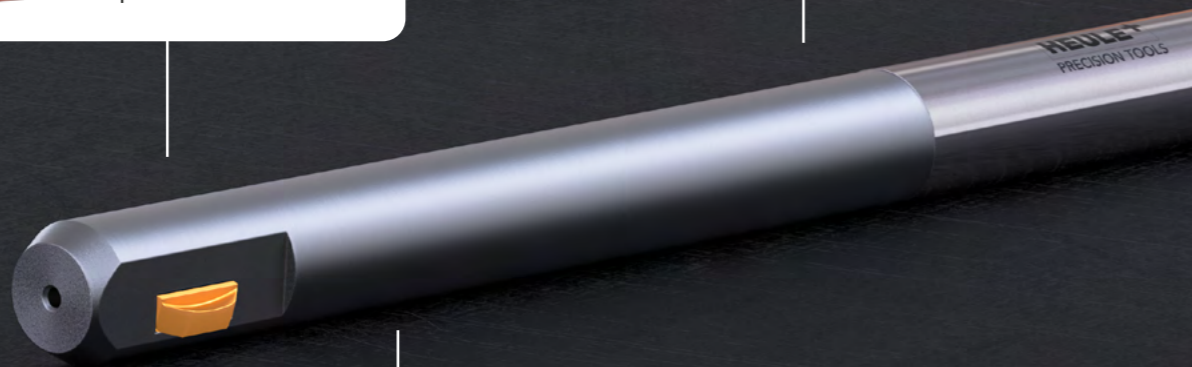
With SNAP, chamfering couldn't be simpler or safer. This productivity champion is in a league of its own.

The advantages – Your benefit

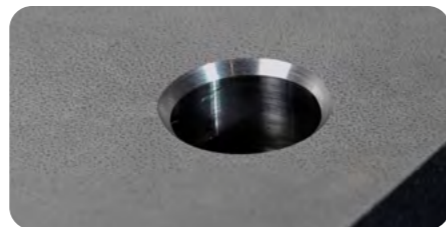


SNAP reliably removes burrs and chamfers hard to reach bore edges without turning the workpiece or stopping the spindle.

The mechanical, spring-controlled operating principle and the robust design ensure a reliable and safe process.



SNAP is specially designed for CNC operation with large batch sizes. It is characterised by extremely quick and easy blade changes that can be carried out directly on the machine.



Regardless of the height of the surface to be machined, SNAP always produces a consistent chamfer.



THE RANGE

Standard version

Bore Ø range mm	Chamfering capacity max. mm	Series	Catalogue page
Ø2.0–2.9	0.2–0.3	SNAP2	74
Ø3.0–3.9	0.3–0.5	SNAP3	76
Ø4.0–5.0	0.6–0.75	SNAP4	78
Ø5.0–10.0	1.00	SNAP5	80
Ø8.0–12.0	0.5–0.75	SNAP8	82
Ø12.0–20.0	1.00	SNAP12	84
Ø25.0–35.0	1.50	SNAP20	86

Cassette tools

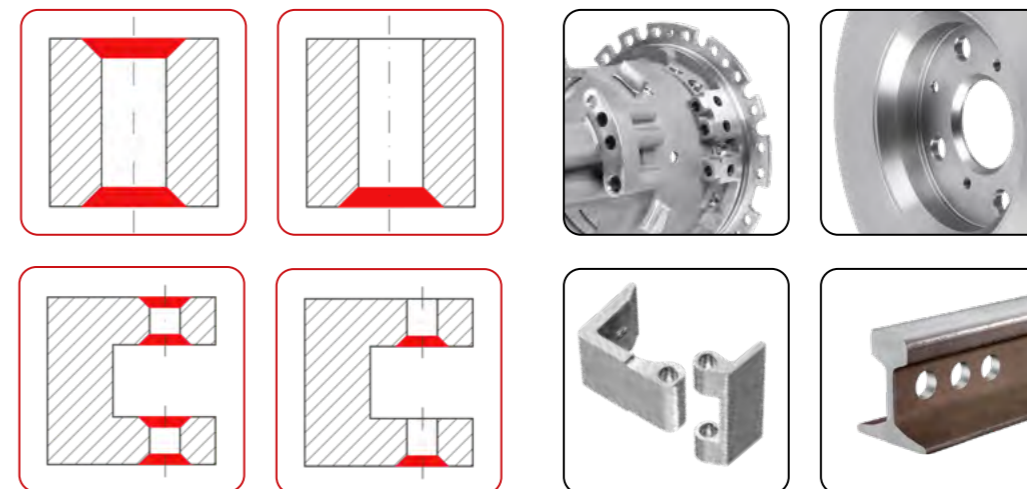
For installation in holder/combination tools for machining large bore diameters

Bore Ø range mm	Chamfering capacity max. mm	Series	Catalogue page
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
> Ø12.6	1.50	SNAP5/12.6	94
> Ø25.0	1.50	SNAP20/25.0	94
> Ø35.0	1.50	SNAP20/35.0	94

For **thread series**: see page 90.

If the required tool is not included in the standard range above, our **INDIVIDUAL** range often has a possible solution. If required, we can also develop custom solutions that are fully tailored to your application.

FIELD OF APPLICATION



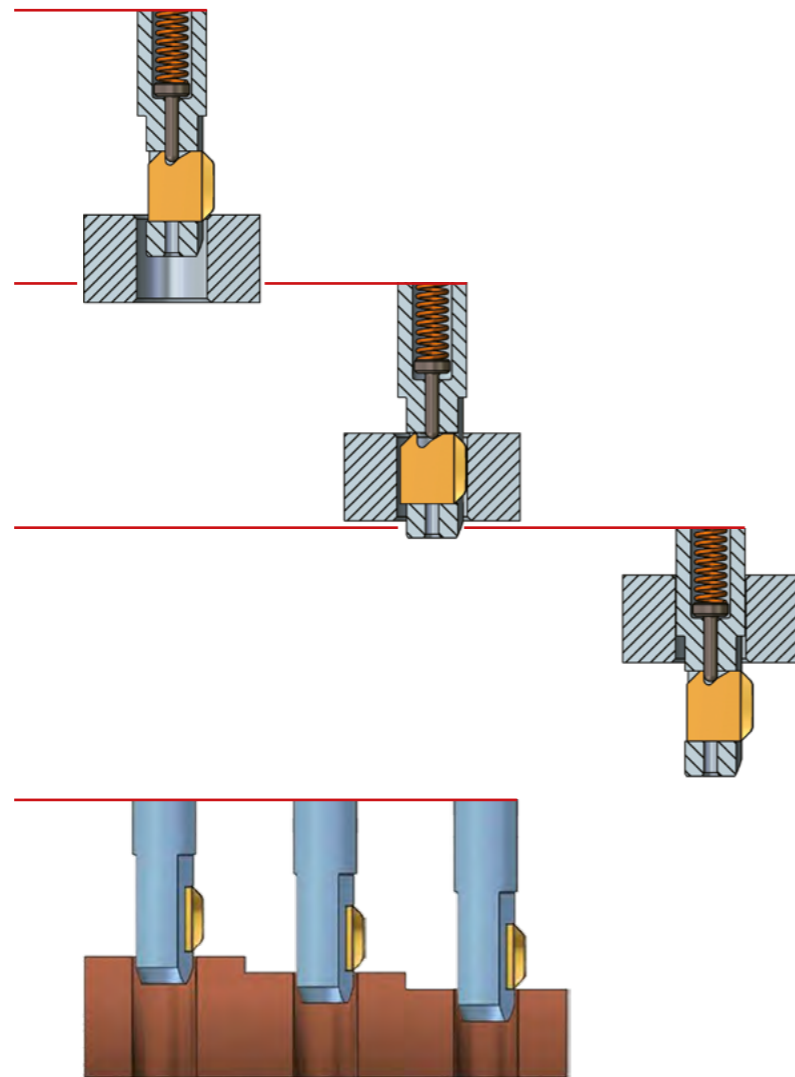
OPERATING PRINCIPLE

The SNAP chamfering blade is kept movable by a spring-loaded control bolt in the tool body. The specially ground SNAP blade, which cuts forwards and backwards or backward cutting only, produces the desired chamfer in the working feed.

Upon reaching the defined chamfer size, the blade retracts into the tool body. The chamfer size and angle are geometrically defined by the blade and can only be changed by using a different SNAP blade.

A specially designed sliding section of the blade prevents the bore from being damaged. When exiting the bore, the spring-loaded control bolt returns the blade to its neutral position to machine the edge of the bore.

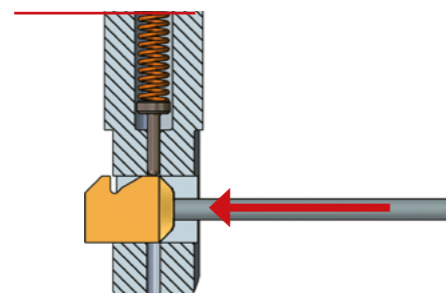
Compensation of height differences
 SNAP automatically compensates for possible height differences in the components to be machined, e.g. cast parts. The blade only begins to retract or cut on contact with the workpiece. This means that the chamfer size remains constant.



BLADE CHANGE

The coated carbide blades can be replaced by hand in a matter of seconds.

A blunt object can be used as an optional aid.

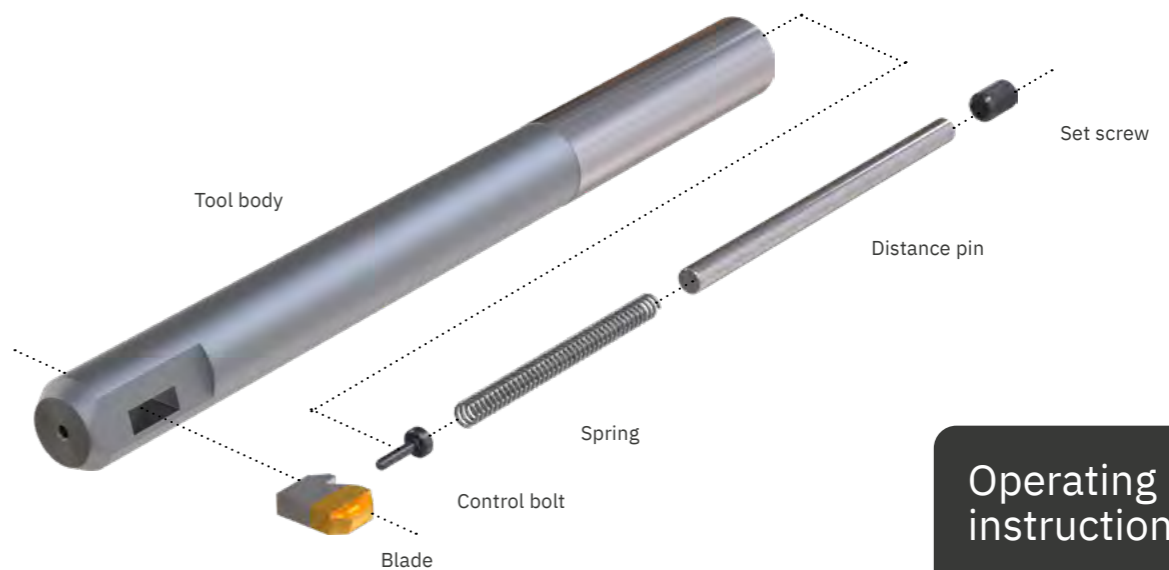
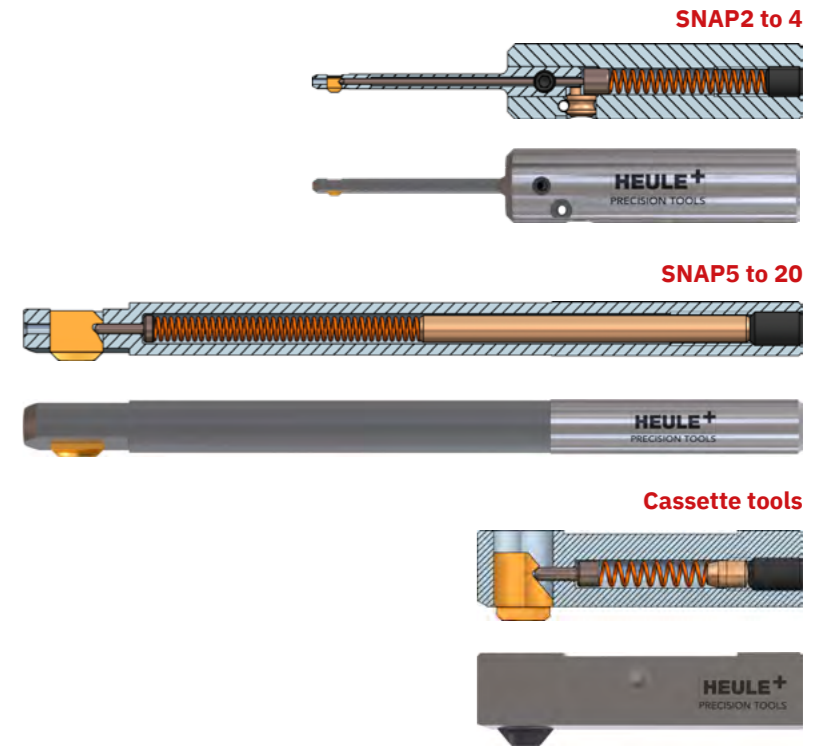


TOOL DESIGN

SNAP is HEULE's answer to the demand for ever simpler and more flexible manufacturing solutions.

The SNAP tool family is made up of 3 groups of tools. These are SNAP2, 3 and 4, SNAP5 to 20 and the cassette tools.

The tool body for SNAP2 to 4 consists of a tool body and blade housing, while the tool body for SNAP5 to 20 is designed as one piece. The cassette tools have the same operating principle as SNAP5 to 20, but in a compact design, making it ideal for installation in a tool holder.

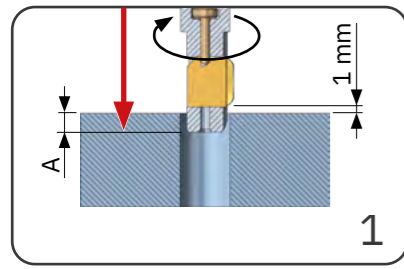


Operating instructions

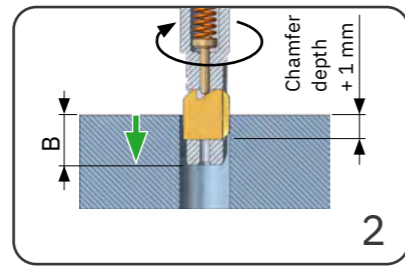
> Blade change

heule.com > Service > Media & download centre

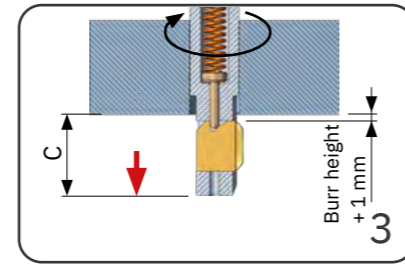
SNAP PROCESS STEPS



- Rapid feed to position **A** or 1.0 mm distance
- Spindle rotation clockwise
- External coolant on



- Working feed to position **B** or chamfer depth + 1.0 mm

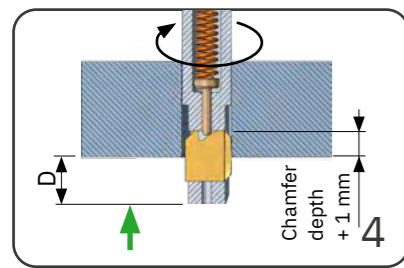


- Rapid feed to position **C** or burr height + 1.0 mm
- Dwell time 1 sec.

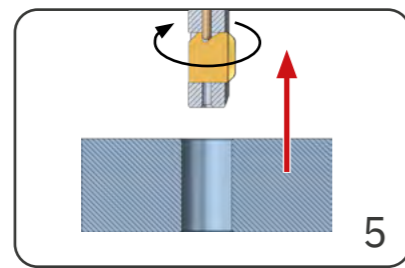
Example
G0 Z-3.0
S1100 M3
M8

G1 Z-8.0 F165

G0 Z-29.5¹⁾
¹⁾ 29.5=16.5+13.0



- Working feed to position **D** or chamfer depth + 1 mm



- Rapid traverse out of the workpiece

G1 Z-24.5²⁾

G0 Z+2.0

²⁾ 24.5=16.5+8.0

DIMENSION TABLE FOR PROGRAMMING

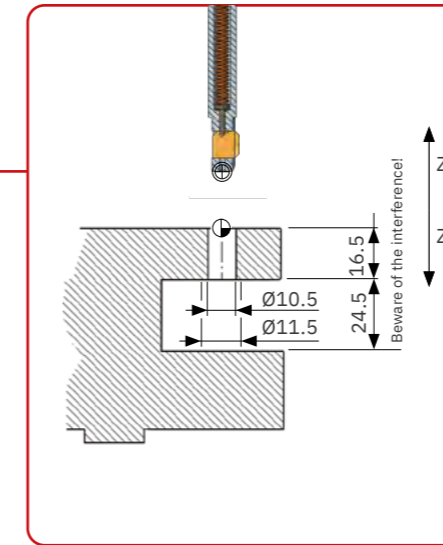
	A mm	B mm	C mm	D mm
SNAP2	1.0	3.0	5.0	3.0
SNAP3	1.0	3.5	6.0	3.5
SNAP4	1.0	4.0	7.0	4.0
SNAP5	2.0	6.0	9.5	6.0
SNAP8	3.0	8.0	13.0	8.0
SNAP12	5.5	10.5	15.5	10.5
SNAP20	6.0	12.0	18.0	12.0



The cutting data listed are guide values! For materials that are difficult to machine or uneven bore edges, we recommend applying cutting speeds that are at the lower end of the range.

When using DR blades in the event of a malfunction, always evacuate the tool from the workpiece with the spindle rotating.

APPLICATION AND PROGRAMMING EXAMPLE



Application data

Workpiece height: 16.5 mm
Bore Ø: Ø10.5 mm
Chamfer Ø: Ø11.5 mm
Material: P3 / steel C45
Machining: both bore edges

Tool and blade selection

Tool: SNAP8/10.5
Blade: GH-Q-M-03726, forward and backward cutting
Tool Ø D2: Ø12.1 mm (note interfering edge)
Working length: 68.0 mm (note interfering edge)

Cutting data

Cutting speed V_c : 30–50 m/min.
Tool working feed: 0.1–0.2 mm/rev

SNAP2–20 GS CUTTING DATA¹⁾


Description	Tensile str. RM (MPa)*	Hardness (HB)	Hardn. (HRC)	SNAP 2/3/4/5 GS geometry			SNAP 8/12/20 GS geometry		
				VC	FZ	B*	VC	FZ	B*
P0 Low-carbon steel, long-chipping, C <0.25%	<530	<125	–	40–60	0.02–0.1	A	40–60	0.1–0.3	T
P1 Low-carbon steel, short-chipping, C <0.25%	<530	<125	–	40–60	0.02–0.1	A	40–60	0.1–0.3	T
P2 Steel with carbon content C >0.25%	>530	<220	<25	40–60	0.02–0.1	A	40–60	0.1–0.3	T
P3 Alloy steel and tool steel, C >0.25%	600–850	<330	<35	30–50	0.02–0.1	A	30–50	0.1–0.2	T
P4 Alloy steel and tool steel, C >0.25%	850–1400	340–450	35–48	30–50	0.02–0.1	A	30–50	0.1–0.2	A
P5 Ferritic, martensitic and stainless PH steel	600–900	<330	<35	20–40	0.02–0.05	A	20–40	0.05–0.15	A
P6 High-strength ferritic, martensitic and PH stainless steel	900–1350	350–450	35–48	20–40	0.02–0.05	A	20–40	0.05–0.15	A
M1 Austenitic stainless steel	<600	130–200	–	10–20	0.02–0.05	A	10–20	0.05–0.15	A
M2 High-strength austenitic stainless steel	600–800	150–230	<25	10–20	0.02–0.05	A	10–20	0.05–0.15	A
M3 Duplex stainless steel	<800	135–275	<30	10–20	0.02–0.05	A	10–20	0.05–0.15	A
K1 Cast iron	125–500	120–290	<32	50–90	0.02–0.1	A	50–90	0.1–0.3	T
K2 Ductile cast iron with up to medium strength	<600	130–260	<28	40–60	0.02–0.1	A	40–60	0.1–0.3	T
K3 High-strength cast iron and bainitic cast iron	>600	180–350	<43	40–60	0.02–0.1	A	40–60	0.1–0.3	T
N1 Wrought aluminium alloys	–	–	–	70–120	0.05–0.15	D	70–120	0.1–0.3	T
N2 Aluminium alloys with low Si content	–	–	–	70–120	0.05–0.15	D	70–120	0.1–0.3	T
N3 Aluminium alloys with high Si content	–	–	–	70–120	0.05–0.15	D	70–120	0.1–0.3	T
N4 Copper, brass and zinc base	–	–	–	30–70	0.02–0.05	D	30–70	0.05–0.15	T
S1 Iron-based heat-resistant alloys	500–1200	160–260	25–48	8–15	0.02–0.05	A	8–15	0.02–0.1	A
S2 Cobalt-based heat-resistant alloys	1000–1450	250–450	25–48	8–15	0.02–0.05	A	8–15	0.02–0.1	A
S3 Nickel-based heat-resistant alloys	600–1700	160–450	<48	8–15	0.02–0.05	A	8–15	0.02–0.1	A
S4 Titanium and titanium alloys	900–1600	300–400	33–48	8–15	0.02–0.05	A	8–15	0.02–0.1	A

¹⁾ For cutting data for DF and DR blade geometry, see following page
* coating for blades

SNAP5-20 DF/DR CUTTING DATA

	Description	Tensile str. RM (MPa)*	Hardness (HB)	Hardn. (HRC)	SNAP5-20 DF DF geometry			SNAP5-20 DR DR geometry		
					VC	FZ	B*	VC	FZ	B*
P0	Low-carbon steel, long-chipping, C <0.25%	<530	<125	-	40-60	0.02-0.06	A	40-60	0.05-0.1	A
P1	Low-carbon steel, short-chipping, C <0.25%	<530	<125	-	40-60	0.02-0.06	A	40-60	0.05-0.1	A
P2	Steel with carbon content C >0.25%	>530	<220	<25	40-60	0.02-0.06	A	40-60	0.05-0.1	A
P3	Alloy steel and tool steel, C >0.25%	600-850	<330	<35	30-50	0.02-0.06	A	30-50	0.05-0.1	A
P4	Alloy steel and tool steel, C >0.25%	850-1400	340-450	35-48	30-50	0.02-0.06	A	30-50	0.05-0.1	A
P5	Ferritic, martensitic and stainless PH steel	600-900	<330	<35	20-40	0.02-0.06	A	20-40	0.05-0.08	A
P6	High-strength ferritic, martensitic and PH stainless steel	900-1350	350-450	35-48	20-40	0.02-0.06	A	20-40	0.05-0.08	A
M1	Austenitic stainless steel	<600	130-200	-	10-20	0.02-0.06	A	10-20	0.05-0.08	A
M2	High-strength austenitic stainless steel	600-800	150-230	<25	10-20	0.02-0.06	A	10-20	0.05-0.08	A
M3	Duplex stainless steel	<800	135-275	<30	10-20	0.02-0.06	A	10-20	0.05-0.08	A
K1	Cast iron	125-500	120-290	<32	50-90	0.02-0.06	A	50-90	0.05-0.1	A
K2	Ductile cast iron with up to medium strength	<600	130-260	<28	40-60	0.02-0.06	A	40-60	0.05-0.1	A
K3	High-strength cast iron and bainitic cast iron	>600	180-350	<43	40-60	0.02-0.06	A	40-60	0.05-0.1	A
N1	Wrought aluminium alloys	-	-	-	70-120	0.02-0.08	D	70-120	0.05-0.2	D
N2	Aluminium alloys with low Si content	-	-	-	70-120	0.02-0.08	D	70-120	0.05-0.2	D
N3	Aluminium alloys with high Si content	-	-	-	70-120	0.02-0.08	D	70-120	0.05-0.2	D
N4	Copper, brass and zinc base	-	-	-	30-70	0.02-0.08	D	30-70	0.05-0.15	D
S1	Iron-based heat-resistant alloys	500-1200	160-260	25-48	8-15	0.02-0.05	A	8-15	0.02-0.06	A
S2	Cobalt-based heat-resistant alloys	1000-1450	250-450	25-48	8-15	0.02-0.05	A	8-15	0.02-0.06	A
S3	Nickel-based heat-resistant alloys	600-1700	160-450	<48	8-15	0.02-0.05	A	8-15	0.02-0.06	A
S4	Titanium and titanium alloys	900-1600	300-400	33-48	8-15	0.02-0.05	A	8-15	0.02-0.06	A

* coating for blades



The cutting data listed are guide values! For materials that are difficult to machine or slightly uneven bore edges, we recommend applying cutting speeds that are at the lower end of the range.

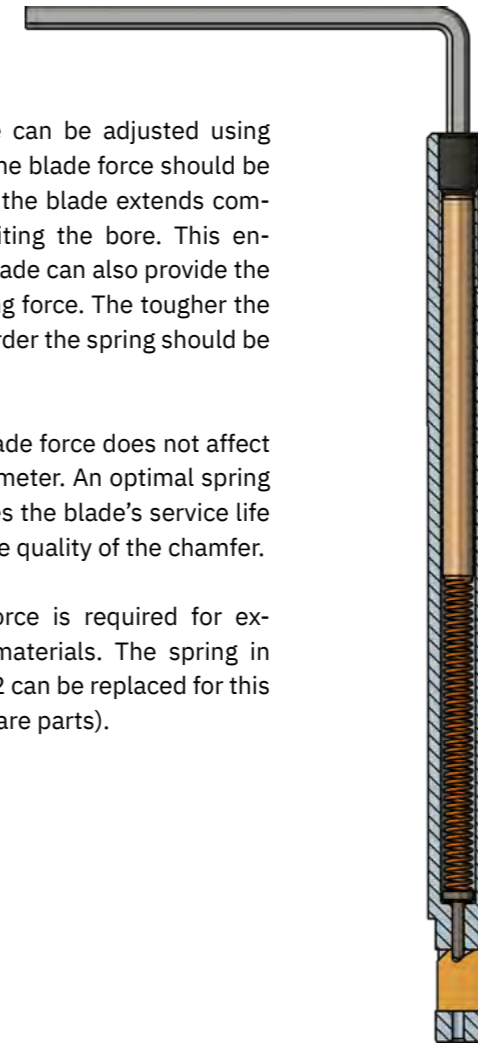
When using DR blades in the event of a malfunction, always evacuate the tool from the workpiece with the spindle rotating.

SETTING THE BLADE FORCE

The blade force can be adjusted using the set screw. The blade force should be set so high that the blade extends completely after exiting the bore. This ensures that the blade can also provide the necessary cutting force. The tougher the material, the harder the spring should be set.


However, the blade force does not affect the chamfer diameter. An optimal spring tension increases the blade's service life and improves the quality of the chamfer.

A high blade force is required for extremely tough materials. The spring in SNAP5, 8 and 12 can be replaced for this purpose (see spare parts).



How it works:
Clockwise rotation increases the spring load (tough steel, Inconel, titanium).

Anti-clockwise rotation reduces the spring load (aluminium).

Important! 

The blade force does not define the chamfer diameter. This is essentially determined by the blade selected. Each blade produces a specific chamfer diameter.

BLADE FORCE SETTING TABLE

Tool	Thread size of set screw	Standard setting Number of revolutions	max. screw-in depth	
			mm	Number of revolutions
SNAP2/3/4	M3	4	6.0	12
SNAP5	M3	4	6.0	12
SNAP5 thread	M3	4	14.0	28
SNAP8	M5	4	11.0	13
SNAP12	M5	4	11.0	13
SNAP20	M5	4	11.0	13

Selecting the correct SNAP tool

TOOL SELECTOR TOOL TABLES

The HEULE Tool Selector is the **quickest and easiest way to find the right tool.**

Send your search results along with your application data to your HEULE representative, who will check the application and offer you options if required.

If your search produces no results, please contact HEULE with your application data anyway. We also develop customised solutions and are happy to advise you.

The correct tool is primarily determined by the bore diameter to be machined. This table also shows the possible chamfer diameters, working lengths and tool diameters.

The tool tables cover the standard range. The tool part numbers highlighted in green are available from stock.

SNAP also offers various blade coatings to meet the requirements based on the type of material.

If the standard does not fit your needs, please do not hesitate to contact your HEULE representative for advice, either using the enquiry form (www.heule.com > contact) or by telephone.

CONFIGURING SNAP TOOLS

1. Select tool



Select the appropriate tool for the bore diameter from the tool table. Note the different working lengths for SNAP2 to SNAP4.

2. Select blade



Select the appropriate blade for the required chamfer diameter from the blade table. Please refer to the cutting data table on page 69 for the correct blade coating.

Tool Selector

> Step-by-step guide to find the right solution

heule.com/en/tool-selector/snap



Tool Selector 

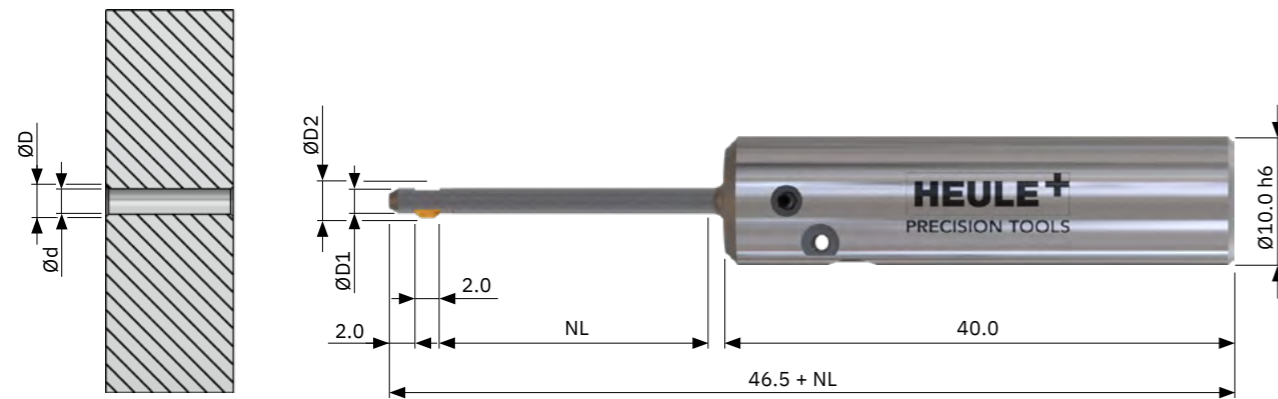
Still have questions?

> HEULE Consulting and Support

heule.com/en/contact



SNAP2 $\varnothing 2.0$ mm to 2.9 mm




Tool

Standard tool **without** blade

- The blades must always be ordered separately.
- Different blade options are available for each bore diameter, thus offering various chamfer diameters. However, a blade is only designed for a defined chamfer diameter. The achievable chamfer diameter may vary slightly depending on the material, blade force, cutting parameters and application.
- With cylindrical shank

Bore \varnothing d	Chamfer \varnothing D	Tool \varnothing D1	Max. \varnothing D2	Part no. NL = 10.0 mm	Part no. NL = 20.0 mm
2.0	2.4	1.95	$\varnothing D + 0.2$ Beware of the possible interference!	SNAP2/2.0/10	SNAP2/2.0/20
2.1	2.4 / 2.6	2.05		SNAP2/2.1/10	SNAP2/2.1/20
2.2	2.4 / 2.6 / 2.8	2.15		SNAP2/2.2/10	SNAP2/2.2/20
2.3	2.6 / 2.8	2.25		SNAP2/2.3/10	SNAP2/2.3/20
2.4	2.6 / 2.8 / 3.0	2.35		SNAP2/2.4/10	SNAP2/2.4/20
2.5	2.8 / 3.0	2.45		SNAP2/2.5/10	SNAP2/2.5/20
2.6	2.8 / 3.0 / 3.2	2.55		SNAP2/2.6/10	SNAP2/2.6/20
2.7	3.0 / 3.2	2.65		SNAP2/2.7/10	SNAP2/2.7/20
2.8	3.0 / 3.2 / 3.4	2.75		SNAP2/2.8/10	SNAP2/2.8/20
2.9	3.2 / 3.4	2.85		SNAP2/2.9/10	SNAP2/2.9/20

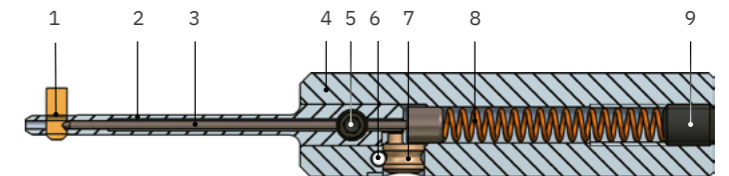
 Parts in stock highlighted in green

SNAP2 $\varnothing 2.0$ mm to 2.9 mm

Blade GS geometry 90°

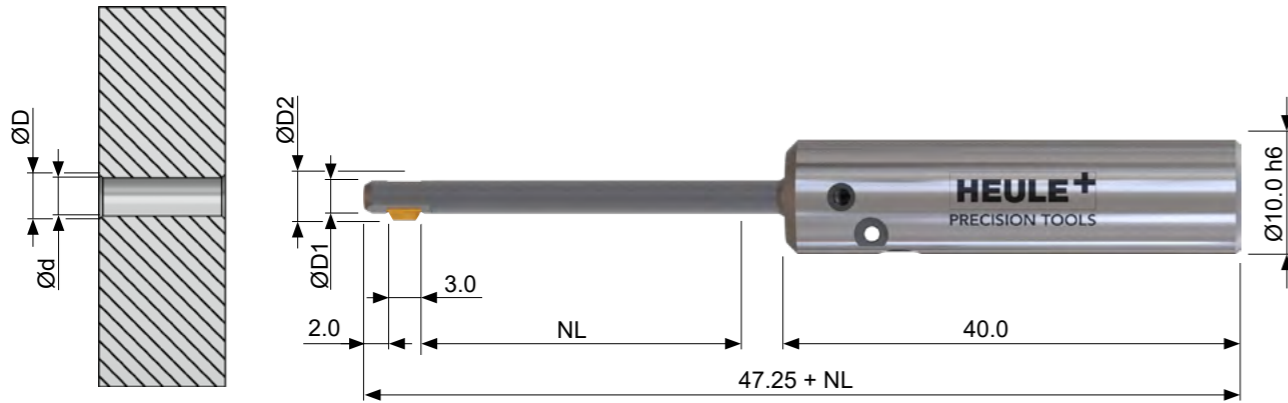
max. chamfer \varnothing	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating A for steel, titanium, Inconel	Coating D for aluminium	Coating A for steel, titanium, Inconel	Coating D for aluminium
2.4	GH-Q-M-40031	GH-Q-M-40032	GH-Q-M-40631	GH-Q-M-40632
2.6	GH-Q-M-40051	GH-Q-M-40052	GH-Q-M-40651	GH-Q-M-40652
2.8	GH-Q-M-40071	GH-Q-M-40072	GH-Q-M-40671	GH-Q-M-40672
3.0	GH-Q-M-40091	GH-Q-M-40092	GH-Q-M-40691	GH-Q-M-40692
3.2	GH-Q-M-40111	GH-Q-M-40112	GH-Q-M-40711	GH-Q-M-40712
3.4	GH-Q-M-40131	GH-Q-M-40132	GH-Q-M-40731	GH-Q-M-40732

Spare parts



Item	Description	Part no.
1	Blade	see above
2	Blade housing	see page 98
3	Control bolt	GH-Q-E-0236 (NL: 10.0 mm) GH-Q-E-0237 (NL: 20.0 mm)
4	Tool body SNAP2–4 diameter 10.0 h6	GH-Q-G-5024
	Tool body assembly SNAP2–4 diameter 10.0 h6 incl. eccentric GH-S-E-0031 incl. roll pin GH-C-E-0811	GH-Q-G-5025
5	Clamping screw M3x3.3	GH-H-S-1075
6	Roll pin SNAP2–4	GH-C-E-0811
7	Eccentric SNAP2–4	GH-S-E-0031
8	Pressure spring $\varnothing 3.2 \times \varnothing 0.45 \times 23.0$	GH-H-F-0047
9	Set screw M4x5.0 DIN913 Allen key SW1.5 for item 9	GH-H-S-0134 GH-H-S-2101

SNAP3 Ø3.0 mm to 3.9 mm




Tool

Standard tool **without** blade


- The blades must always be ordered separately.
- Different blade options are available for each bore diameter, thus offering various chamfer diameters. However, a blade is only designed for a defined chamfer diameter. The achievable chamfer diameter may vary slightly depending on the material, blade force, cutting parameters and application.
- With cylindrical shank

Bore Ø d	Chamfer Ø D	Tool Ø D1	Max. Ø D2	Part no. NL = 10.0 mm	Part no. NL = 20.0 mm	Part no. NL = 30.0 mm
3.0	3.3 / 3.6	2.9	Beware of the possible interference! ØD + 0.3	SNAP3/3.0/10	SNAP3/3.0/20	SNAP3/3.0/30
3.1	3.6 / 3.9	3.0		SNAP3/3.1/10	SNAP3/3.1/20	SNAP3/3.1/30
3.2	3.6 / 3.9/4.2	3.1		SNAP3/3.2/10	SNAP3/3.2/20	SNAP3/3.2/30
3.3	3.9 / 4.2	3.2		SNAP3/3.3/10	SNAP3/3.3/20	SNAP3/3.3/30
3.4	3.9 / 4.2	3.3		SNAP3/3.4/10	SNAP3/3.4/20	SNAP3/3.4/30
3.5	3.9 / 4.2/4.5	3.4		SNAP3/3.5/10	SNAP3/3.5/20	SNAP3/3.5/30
3.6	4.2 / 4.5	3.5		SNAP3/3.6/10	SNAP3/3.6/20	SNAP3/3.6/30
3.7	4.2 / 4.5	3.6		SNAP3/3.7/10	SNAP3/3.7/20	SNAP3/3.7/30
3.8	4.2 / 4.5 4.8	3.7		SNAP3/3.8/10	SNAP3/3.8/20	SNAP3/3.8/30
3.9	4.5 / 4.8	3.8		SNAP3/3.9/10	SNAP3/3.9/20	SNAP3/3.9/30

 Parts in stock highlighted in green

 Programming
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 Cutting data
Page 69

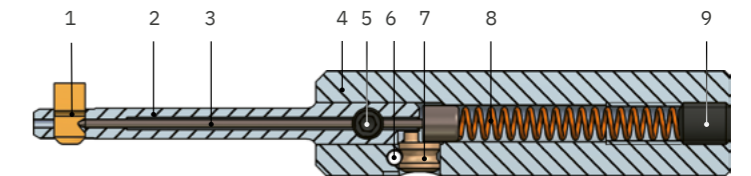
 Tool Selector –
Product selection made easy
heule.com/en/tool-selector/snap

SNAP3 Ø3.0 mm to 3.9 mm

Blade GS geometry 90°

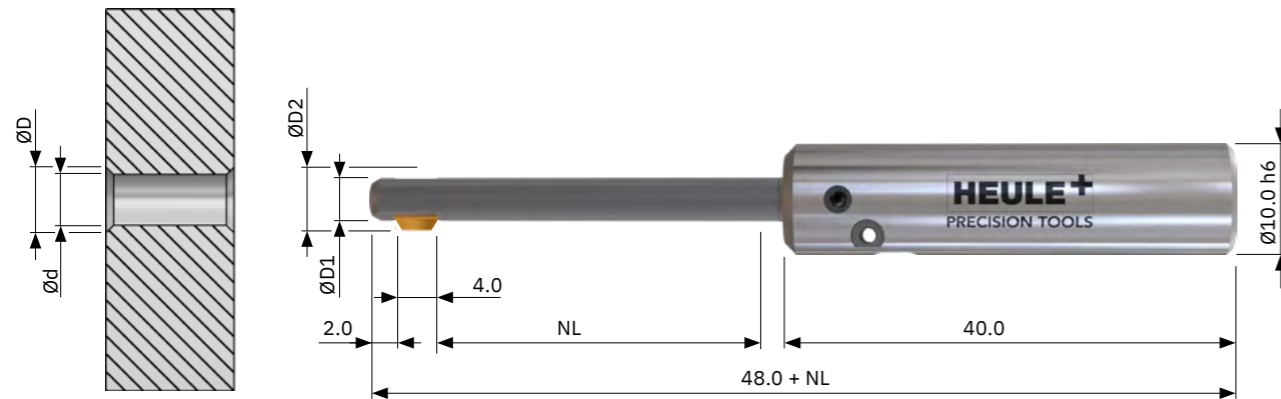
max. chamfer Ø	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating A for steel, titanium, Inconel	Coating D for aluminium	Coating A for steel, titanium, Inconel	Coating D for aluminium
3.3	GH-Q-M-40171	GH-Q-M-40172	GH-Q-M-40771	GH-Q-M-40772
3.6	GH-Q-M-40201	GH-Q-M-40202	GH-Q-M-40801	GH-Q-M-40802
3.9	GH-Q-M-40231	GH-Q-M-40232	GH-Q-M-40831	GH-Q-M-40832
4.2	GH-Q-M-40261	GH-Q-M-40262	GH-Q-M-40861	GH-Q-M-40862
4.5	GH-Q-M-40291	GH-Q-M-40292	GH-Q-M-40891	GH-Q-M-40892
4.8	GH-Q-M-40321	GH-Q-M-40322	GH-Q-M-40921	GH-Q-M-40922

Spare parts



Item	Description	Part no.
1	Blade	see above
2	Blade housing	see page 98
3	Control bolt	GH-Q-E-0236 (NL: 10.0 mm) GH-Q-E-0237 (NL: 20.0 mm) GH-Q-E-0238 (NL: 30.0 mm)
4	Tool body SNAP2–4 diameter 10.0 h6	GH-Q-G-5024
	Tool body assembly SNAP2–4 diameter 10.0 h6 incl. eccentric GH-S-E-0031 incl. roll pin GH-C-E-0811	GH-Q-G-5025
5	Clamping screw M3x3.3	GH-H-S-1075
6	Roll pin SNAP2–4	GH-C-E-0811
7	Eccentric SNAP2–4	GH-S-E-0031
8	Pressure spring Ø3.2xØ0.45x23.0	GH-H-F-0047
9	Set screw M4x5.0 DIN913 Allen key SW1.5 for item 9	GH-H-S-0134 GH-H-S-2101

SNAP4 Ø4.0 mm to 5.0 mm



Tool

Standard tool **without** blade

- The blades must always be ordered separately.
- Different blade options are available for each bore diameter, thus offering various chamfer diameters. However, a blade is only designed for a defined chamfer diameter. The achievable chamfer diameter may vary slightly depending on the material, blade force, cutting parameters and application.
- With cylindrical shank

Bore Ø d	Chamfer Ø D	Tool Ø D1	Max. Ø D2	Part no. NL = 10.0 mm	Part no. NL = 20.0 mm	Part no. NL = 30.0 mm
4.0	4.4 / 4.8 / 5.2	3.9	Beware of the possible interference! ØD + 0.4	SNAP4/4.0/10	SNAP4/4.0/20	SNAP4/4.0/30
4.1	4.8 / 5.2 / 5.6	4.0		SNAP4/4.1/10	SNAP4/4.1/20	SNAP4/4.1/30
4.2	4.8 / 5.2 / 5.6	4.1		SNAP4/4.2/10	SNAP4/4.2/20	SNAP4/4.2/30
4.3	4.8 / 5.2 / 5.6	4.2		SNAP4/4.3/10	SNAP4/4.3/20	SNAP4/4.3/30
4.4	4.8 / 5.2 / 5.6	4.3		SNAP4/4.4/10	SNAP4/4.4/20	SNAP4/4.4/30
4.5	5.2 / 5.6 / 6.0	4.4		SNAP4/4.5/10	SNAP4/4.5/20	SNAP4/4.5/30
4.6	5.2 / 5.6 / 6.0	4.5		SNAP4/4.6/10	SNAP4/4.6/20	SNAP4/4.6/30
4.7	5.2 / 5.6 / 6.0	4.6		SNAP4/4.7/10	SNAP4/4.7/20	SNAP4/4.7/30
4.8	5.2 / 5.6 / 6.0	4.7		SNAP4/4.8/10	SNAP4/4.8/20	SNAP4/4.8/30
4.9	5.6 / 6.0 / 6.4	4.8		SNAP4/4.9/10	SNAP4/4.9/20	SNAP4/4.9/30
5.0	5.6 / 6.0 / 6.4	4.9		SNAP4/5.0/10	SNAP4/5.0/20	SNAP4/5.0/30

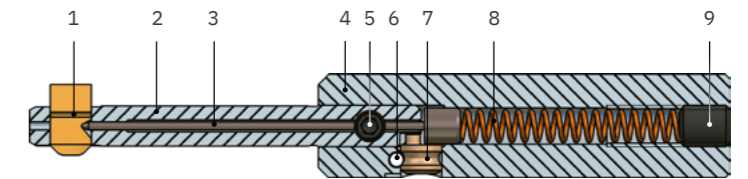
Parts in stock highlighted in green

SNAP4 Ø4.0 mm to 5.0 mm

Blade GS geometry 90°

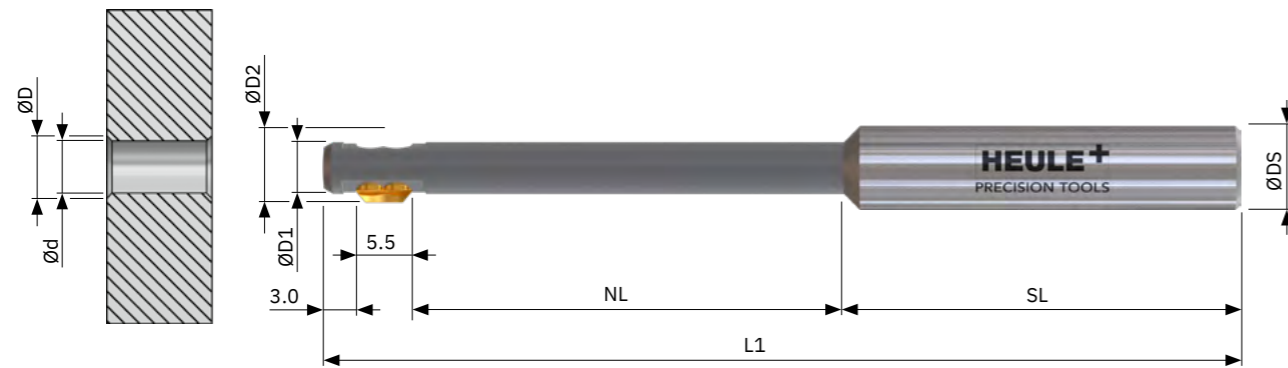
max. chamfer Ø	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating A for steel, titanium, Inconel	Coating D for aluminium	Coating A for steel, titanium, Inconel	Coating D for aluminium
4.4	GH-Q-M-40381	GH-Q-M-40382	GH-Q-M-40981	GH-Q-M-40982
4.8	GH-Q-M-40421	GH-Q-M-40422	GH-Q-M-41021	GH-Q-M-41022
5.2	GH-Q-M-40461	GH-Q-M-40462	GH-Q-M-41061	GH-Q-M-41062
5.6	GH-Q-M-40501	GH-Q-M-40502	GH-Q-M-41101	GH-Q-M-41102
6.0	GH-Q-M-40541	GH-Q-M-40542	GH-Q-M-41141	GH-Q-M-41142
6.4	GH-Q-M-40581	GH-Q-M-40582	GH-Q-M-41181	GH-Q-M-41182

Spare parts



Item	Description	Part no.
1	Blade	see above
2	Blade housing	see page 98
3	Control bolt	GH-Q-E-0236 (NL: 10.0 mm) GH-Q-E-0237 (NL: 20.0 mm) GH-Q-E-0238 (NL: 30.0 mm)
4	Tool body SNAP2–4 diameter 10.0 h6	GH-Q-G-5024
	Tool body assembly SNAP2–4 diameter 10.0 h6 incl. eccentric GH-S-E-0031 incl. roll pin GH-C-E-0811	GH-Q-G-5025
5	Clamping screw M3x3.3	GH-H-S-1075
6	Roll pin SNAP2–4	GH-C-E-0811
7	Eccentric SNAP2–4	GH-S-E-0031
8	Pressure spring Ø3.2xØ0.45x23.0	GH-H-F-0047
9	Set screw M4x5.0 DIN913	GH-H-S-0134
	Allen key SW1.5 for item 9	GH-H-S-2101

SNAP5 \varnothing 5.0 mm to 10.0 mm



Tool

Standard tool **without** blade

- The blades must always be ordered separately.
- Different blade options are available for each bore diameter, thus offering various chamfer diameters. However, a blade is only designed for a defined chamfer diameter. The achievable chamfer diameter may vary slightly depending on the material, blade force, cutting parameters and application.
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"

Bore \varnothing d	Chamfer \varnothing D	Tool \varnothing D1	Max. \varnothing D2	Tool length L1	Working L. NL	Shank L. SL	Shank \varnothing DS	Part no. w/o blade
5.0-5.5	5.5 / 6.0 / 6.5 / 7.0	4.9	Beware of the possible interference! $\varnothing D + 0.6$	88.0	40.0	38.0	8.0 h6	SNAP5/5.0
5.5-6.0	6.0 / 6.5 / 7.0 / 7.5	5.4		88.0	40.0	38.0	8.0 h6	SNAP5/5.5
6.0-6.5	6.5 / 7.0 / 7.5 / 8.0	5.9		88.0	40.0	38.0	8.0 h6	SNAP5/6.0
6.5-7.0	7.0 / 7.5 / 8.0 / 8.5	6.4		88.0	40.0	38.0	8.0 h6	SNAP5/6.5
7.0-7.5	7.5 / 8.0 / 8.5 / 9.0	6.9		88.0	40.0	38.0	8.0 h6	SNAP5/7.0
7.5-8.0	8.0 / 8.5 / 9.0 / 9.5	7.4		88.0	40.0	38.0	8.0 h6	SNAP5/7.5
8.0-8.5	8.5 / 9.0 / 9.5 / 10.0	7.8		98.0	50.0	38.0	10.0 h6	SNAP5/8.0
8.5-9.0	9.0 / 9.5 / 10.0 / 10.5	8.3		98.0	50.0	38.0	10.0 h6	SNAP5/8.5
9.0-9.5	9.5 / 10.0 / 10.5 / 11.0	8.8		98.0	50.0	38.0	10.0 h6	SNAP5/9.0
9.5-10.0	10.0 / 10.5 / 11.0 / 11.5	9.3		98.0	50.0	38.0	10.0 h6	SNAP5/9.5
10.0-10.5	10.5 / 11.0 / 11.5 / 12.0	9.8	107.0	50.0	47.0	12.0 h6	SNAP5/10.0	

Parts in stock highlighted in green

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Tool Selector –
Product selection made easy
heule.com/en/tool-selector/snap

SNAP5 \varnothing 5.0 mm to 10.0 mm

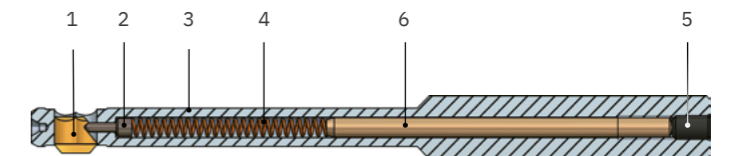
Blade GS geometry 90°

max. chamfer \varnothing	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating A for steel, titanium, Inconel	Coating D for aluminium	Coating A for steel, titanium, Inconel	Coating D for aluminium
5.5	GH-Q-M-30204	GH-Q-M-30404	GH-Q-M-31204	GH-Q-M-31404
6.0	GH-Q-M-30205	GH-Q-M-30405	GH-Q-M-31205	GH-Q-M-31405
6.5	GH-Q-M-30206	GH-Q-M-30406	GH-Q-M-31206	GH-Q-M-31406
7.0	GH-Q-M-30207	GH-Q-M-30407	GH-Q-M-31207	GH-Q-M-31407
7.5	GH-Q-M-30208	GH-Q-M-30408	GH-Q-M-31208	GH-Q-M-31408
8.0	GH-Q-M-30209	GH-Q-M-30409	GH-Q-M-31209	GH-Q-M-31409
8.5	GH-Q-M-30210	GH-Q-M-30410	GH-Q-M-31210	GH-Q-M-31410
9.0	GH-Q-M-30211	GH-Q-M-30411	GH-Q-M-31211	GH-Q-M-31411
9.5	GH-Q-M-30212	GH-Q-M-30412	GH-Q-M-31212	GH-Q-M-31412
10.0	GH-Q-M-30213	GH-Q-M-30413	GH-Q-M-31213	GH-Q-M-31413
10.5	GH-Q-M-30214	GH-Q-M-30414	GH-Q-M-31214	GH-Q-M-31414
11.0	GH-Q-M-30215	GH-Q-M-30415	GH-Q-M-31215	GH-Q-M-31415
11.5	GH-Q-M-30216	GH-Q-M-30416	GH-Q-M-31216	GH-Q-M-31416
12.0	GH-Q-M-30217	GH-Q-M-30417	GH-Q-M-31217	GH-Q-M-31417

The blades on the SNAP5 tools and the thread series tools are not interchangeable!



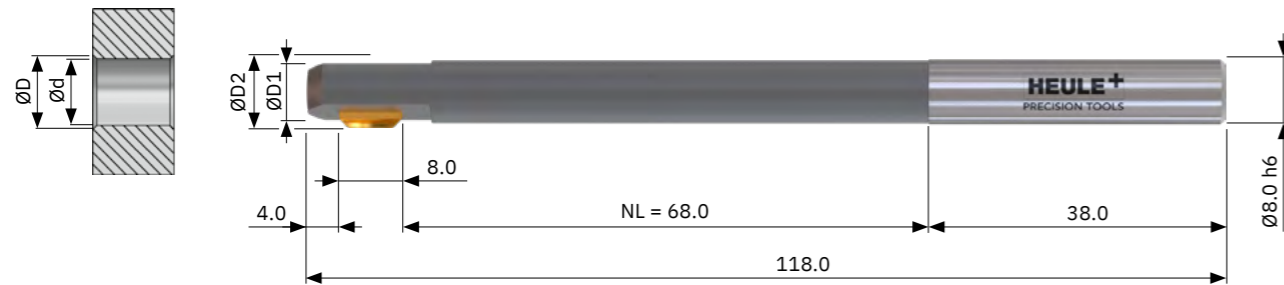
Spare parts



Item	Description	Part no.
1	Blade	see above
2	Control bolt diameter 1.2	GH-Q-E-0008
3	Tool body	see page 99
4	Pressure spring \varnothing 2.35 x \varnothing 0.35 x 30.0 Hard pressure spring \varnothing 2.5 x \varnothing 0.5 x 32.0	GH-H-F-0019 GH-H-F-0041
5	Set screw M3x5.0 DIN913 Allen key SW1.5	GH-H-S-0127 GH-H-S-2101
6	SNAP distance pin diameter 2.5 x 45.0 SNAP distance pin diameter 2.5 x 55.0 SNAP distance pin diameter 2.5 x 65.0	GH-Q-E-0041 GH-Q-E-0068 GH-Q-E-0067

Not included as standard, please order separately. See page 71 for more information on spring force.

SNAP8 $\varnothing 8.0$ mm to 12.0 mm




Tool

Standard tool **without** blade


- The blades must always be ordered separately.
- Different blade options are available for each bore diameter, thus offering various chamfer diameters. However, a blade is only designed for a defined chamfer diameter. The achievable chamfer diameter may vary slightly depending on the material, blade force, cutting parameters and application.
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"

Bore \varnothing d	Chamfer \varnothing D	Tool \varnothing D1	Max. \varnothing D2	Tool length	Working L. NL	Part no. without blade
8.0–8.5	8.5 / 9.0	7.8	Beware of the possible interference! $\varnothing D + 0.6$	118.0	68.0	SNAP8/8.0
8.5–9.0	9.0 / 9.5 / 10.0	8.3		118.0	68.0	SNAP8/8.5
9.0–9.5	9.5 / 10.0 / 10.5	8.8		118.0	68.0	SNAP8/9.0
9.5–10.0	10.0 / 10.5 / 11.0	9.3		118.0	68.0	SNAP8/9.5
10.0–10.5	10.5 / 11.0 / 11.5	9.8		118.0	68.0	SNAP8/10.0
10.5–11.0	11.0 / 11.5 / 12.0	10.3		118.0	68.0	SNAP8/10.5
11.0–11.5	11.5 / 12.0 / 12.5	10.8		118.0	68.0	SNAP8/11.0
11.5–12.0	12.0 / 12.5 / 13.0	11.3		118.0	68.0	SNAP8/11.5
12.0–12.5	12.5 / 13.0 / 13.5	11.8		118.0	68.0	SNAP8/12.0

 Parts in stock highlighted in green

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 Tool Selector –
Product selection made easy
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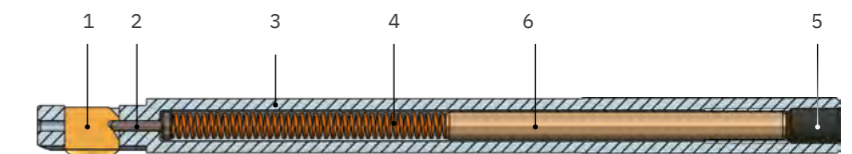
SNAP8 $\varnothing 8.0$ mm to 12.0 mm

Blade GS¹⁾ geometry 90°

max. chamfer \varnothing	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating T standard coating	Coating A for higher requirements	Coating T standard coating	Coating A for higher requirements
8.5	GH-Q-M-03720	GH-Q-M-03820	GH-Q-M-05720	GH-Q-M-05820
9.0	GH-Q-M-03721	GH-Q-M-03821	GH-Q-M-05721	GH-Q-M-05821
9.5	GH-Q-M-03722	GH-Q-M-03822	GH-Q-M-05722	GH-Q-M-05822
10.0	GH-Q-M-03723	GH-Q-M-03823	GH-Q-M-05723	GH-Q-M-05823
10.5	GH-Q-M-03724	GH-Q-M-03824	GH-Q-M-05724	GH-Q-M-05824
11.0	GH-Q-M-03725	GH-Q-M-03825	GH-Q-M-05725	GH-Q-M-05825
11.5	GH-Q-M-03726	GH-Q-M-03826	GH-Q-M-05726	GH-Q-M-05826
12.0	GH-Q-M-03727	GH-Q-M-03827	GH-Q-M-05727	GH-Q-M-05827
12.5	GH-Q-M-03728	GH-Q-M-03828	GH-Q-M-05728	GH-Q-M-05828
13.0	GH-Q-M-03729	GH-Q-M-03829	GH-Q-M-05729	GH-Q-M-05829
13.5	GH-Q-M-03730	GH-Q-M-03830	GH-Q-M-05730	GH-Q-M-05830

¹⁾ For blade selection with DF geometry, see page 88

Spare parts



Item	Description	Part no.
1	Blade	see above
2	Control bolt diameter 1.5	GH-Q-E-0002
3	Tool body	see page 99
4	Pressure spring $\varnothing 3.7 \times \varnothing 0.5 \times 48.0$ Hard pressure spring $\varnothing 4.3 \times \varnothing 0.6 \times 52.0$	GH-H-F-0007 GH-H-F-0011
5	Set screw M5 x 8.0 DIN913 Allen key SW2.5	GH-H-S-0119 GH-H-S-2100
6	SNAP distance pin diameter 4 x 50.0	GH-Q-E-0028

Not included as standard, please order separately. See page 71 for more information on spring force.

SNAP12 $\varnothing 12.0$ mm to 20.0 mm



Tool

Standard tool **without** blade

- The blades must always be ordered separately.
- Different blade options are available for each bore diameter, thus offering various diameters. However, a blade is only designed for a defined chamfer diameter. The achievable chamfer diameter may vary slightly depending on the material, blade force, cutting parameters and application.
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"

Bore \varnothing d	Chamfer \varnothing D	Tool \varnothing D1	Max. \varnothing D2	Tool length	Working L. NL	Part no. without blade
12.0–13.5	12.5 / 13.0 / 13.5 / 14.0	11.8	Beware of the possible interference! $\varnothing D + 0.8$	140.0	78.5	SNAP12/12.0
12.5–14.0	13.0 / 13.5 / 14.0 / 14.5	12.3		140.0	78.5	SNAP12/12.5
13.0–14.5	13.5 / 14.0 / 14.5 / 15.0	12.8		140.0	78.5	SNAP12/13.0
13.5–15.0	14.0 / 14.5 / 15.0 / 15.5	13.3		140.0	78.5	SNAP12/13.5
14.0–15.5	14.5 / 15.0 / 15.5 / 16.0	13.8		140.0	78.5	SNAP12/14.0
14.5–16.0	15.0 / 15.5 / 16.0 / 16.5	14.3		140.0	78.5	SNAP12/14.5
15.0–16.5	15.5 / 16.0 / 16.5 / 17.0	14.8		140.0	78.5	SNAP12/15.0
15.5–17.0	16.0 / 16.5 / 17.0 / 17.5	15.3		140.0	78.5	SNAP12/15.5
16.0–17.5	16.5 / 17.0 / 17.5 / 18.0	15.8		140.0	78.5	SNAP12/16.0
16.5–18.0	17.0 / 17.5 / 18.0 / 18.5	16.3		140.0	78.5	SNAP12/16.5
17.0–18.5	17.5 / 18.0 / 18.5 / 19.0	16.8		140.0	78.5	SNAP12/17.0
17.5–19.0	18.0 / 18.5 / 19.0 / 19.5	17.3		140.0	78.5	SNAP12/17.5
18.0–19.5	18.5 / 19.0 / 19.5 / 20.0	17.8		140.0	78.5	SNAP12/18.0
18.5–20.0	19.0 / 19.5 / 20.0 / 20.5	18.3		140.0	78.5	SNAP12/18.5
19.0–20.5	19.5 / 20.0 / 20.5 / 21.0	18.8		140.0	78.5	SNAP12/19.0
19.5–21.0	20.0 / 20.5 / 21.0 / 21.5	19.3		140.0	78.5	SNAP12/19.5
20.0–21.5	20.5 / 21.0 / 21.5 / 22.0	19.8		140.0	78.5	SNAP12/20.0

Parts in stock highlighted in green

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Tool Selector –
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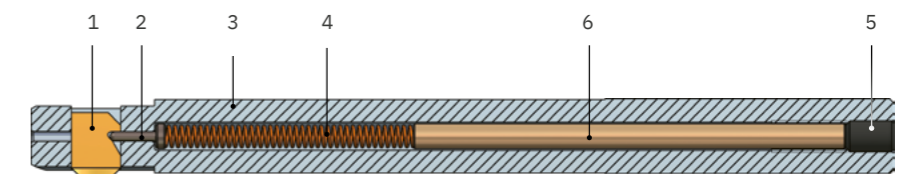
SNAP12 $\varnothing 12.0$ mm to 20.0 mm

Blade GS¹⁾ geometry 90°

max. chamfer \varnothing	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating T standard coating	Coating A for higher requirements	Coating T standard coating	Coating A for higher requirements
12.5	GH-Q-M-03740	GH-Q-M-03840	GH-Q-M-05740	GH-Q-M-05840
13.0	GH-Q-M-03741	GH-Q-M-03841	GH-Q-M-05741	GH-Q-M-05841
13.5	GH-Q-M-03742	GH-Q-M-03842	GH-Q-M-05742	GH-Q-M-05842
14.0	GH-Q-M-03743	GH-Q-M-03843	GH-Q-M-05743	GH-Q-M-05843
14.5	GH-Q-M-03744	GH-Q-M-03844	GH-Q-M-05744	GH-Q-M-05844
15.0	GH-Q-M-03745	GH-Q-M-03845	GH-Q-M-05745	GH-Q-M-05845
15.5	GH-Q-M-03746	GH-Q-M-03846	GH-Q-M-05746	GH-Q-M-05846
16.0	GH-Q-M-03747	GH-Q-M-03847	GH-Q-M-05747	GH-Q-M-05847
16.5	GH-Q-M-03748	GH-Q-M-03848	GH-Q-M-05748	GH-Q-M-05848
17.0	GH-Q-M-03749	GH-Q-M-03849	GH-Q-M-05749	GH-Q-M-05849
17.5	GH-Q-M-03750	GH-Q-M-03850	GH-Q-M-05750	GH-Q-M-05850
18.0	GH-Q-M-03751	GH-Q-M-03851	GH-Q-M-05751	GH-Q-M-05851
18.5	GH-Q-M-03752	GH-Q-M-03852	GH-Q-M-05752	GH-Q-M-05852
19.0	GH-Q-M-03753	GH-Q-M-03853	GH-Q-M-05753	GH-Q-M-05853
19.5	GH-Q-M-03754	GH-Q-M-03854	GH-Q-M-05754	GH-Q-M-05854
20.0	GH-Q-M-03755	GH-Q-M-03855	GH-Q-M-05755	GH-Q-M-05855
20.5	GH-Q-M-03756	GH-Q-M-03856	GH-Q-M-05756	GH-Q-M-05856
21.0	GH-Q-M-03757	GH-Q-M-03857	GH-Q-M-05757	GH-Q-M-05857
21.5	GH-Q-M-03758	GH-Q-M-03858	GH-Q-M-05758	GH-Q-M-05858
22.0	GH-Q-M-03759	GH-Q-M-03859	GH-Q-M-05759	GH-Q-M-05859

¹⁾ For blade selection with DF geometry, see page 88

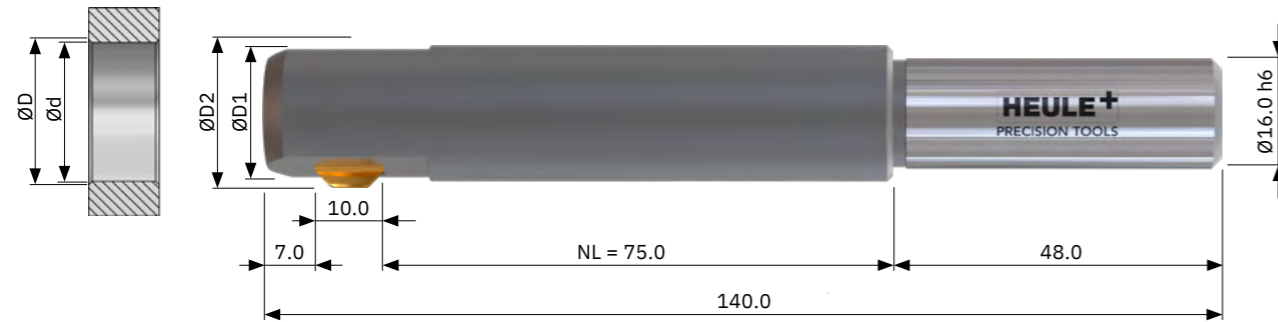
Spare parts



Item	Description	Part no.
1	Blade	see above
2	Control bolt diameter 1.5	GH-Q-E-0002
3	Tool body	see page 99
4	Pressure spring $\varnothing 3.7 \times \varnothing 0.5 \times 48.0$ Hard pressure spring $\varnothing 4.3 \times \varnothing 0.6 \times 52.0$	GH-H-F-0007 GH-H-F-0011
5	Set screw M5 x 8.0 DIN913 Allen key SW2.5	GH-H-S-0119 GH-H-S-2100
6	SNAP distance pin diameter 4 x 70.0	GH-Q-E-0032

Not included as standard, please order separately. See page 71 for more information on spring force.

SNAP20 $\varnothing 20.0$ mm to 35.0 mm



Tool

Standard tool **without** blade

- The blades must always be ordered separately.
- Different blade options are available for each bore diameter, thus offering various chamfer diameters. However, a blade is only designed for a defined chamfer diameter. The achievable chamfer diameter may vary slightly depending on the material, blade force, cutting parameters and application.
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"

Bore \varnothing d	Chamfer \varnothing D	Tool \varnothing D1	Max. \varnothing D2	Tool length	Working L. NL	Part no. without blade
20.0–22.5	21.0 / 22.0 / 23.0	19.8	Beware of the possible interference! $\varnothing D + 1.0$	140.0	75.0	SNAP20/20.0
21.0–23.5	22.0 / 23.0 / 24.0	20.8		140.0	75.0	SNAP20/21.0
22.0–24.5	23.0 / 24.0 / 25.0	21.8		140.0	75.0	SNAP20/22.0
23.0–25.5	24.0 / 25.0 / 26.0	22.8		140.0	75.0	SNAP20/23.0
24.0–26.5	25.0 / 26.0 / 27.0	23.8		140.0	75.0	SNAP20/24.0
25.0–27.5	26.0 / 27.0 / 28.0	24.8		140.0	75.0	SNAP20/25.0
26.0–28.5	27.0 / 28.0 / 29.0	25.8		140.0	75.0	SNAP20/26.0
27.0–29.5	28.0 / 29.0 / 30.0	26.8		140.0	75.0	SNAP20/27.0
28.0–30.5	29.0 / 30.0 / 31.0	27.8		140.0	75.0	SNAP20/28.0
29.0–31.5	30.0 / 31.0 / 32.0	28.8		140.0	75.0	SNAP20/29.0
30.0–32.5	31.0 / 32.0 / 33.0	29.8		140.0	75.0	SNAP20/30.0
31.0–33.5	32.0 / 33.0 / 34.0	30.8		140.0	75.0	SNAP20/31.0
32.0–34.5	33.0 / 34.0 / 35.0	31.8		140.0	75.0	SNAP20/32.0
33.0–35.5	34.0 / 35.0 / 36.0	32.8		140.0	75.0	SNAP20/33.0
34.0–36.5	35.0 / 36.0 / 37.0	33.8		140.0	75.0	SNAP20/34.0
35.0–37.5	36.0 / 37.0 / 38.0	34.8		140.0	75.0	SNAP20/35.0

Parts in stock highlighted in green

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Tool Selector –
Product selection made easy
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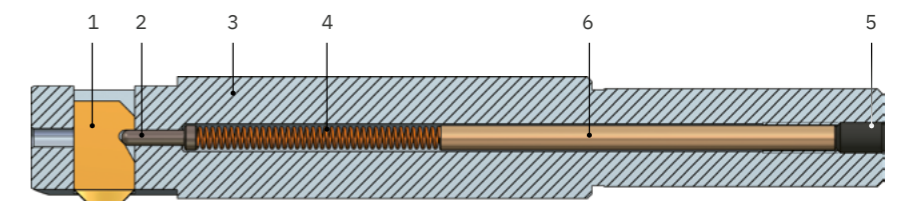
SNAP20 $\varnothing 20.0$ mm to 35.0 mm

Blade GS¹⁾ geometry 90°

max. chamfer \varnothing	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating T standard coating	Coating A for higher requirements	Coating T standard coating	Coating A for higher requirements
21.0	GH-Q-M-03770	GH-Q-M-03870	GH-Q-M-05770	GH-Q-M-05870
22.0	GH-Q-M-03771	GH-Q-M-03871	GH-Q-M-05771	GH-Q-M-05871
23.0	GH-Q-M-03772	GH-Q-M-03872	GH-Q-M-05772	GH-Q-M-05872
24.0	GH-Q-M-03773	GH-Q-M-03873	GH-Q-M-05773	GH-Q-M-05873
25.0	GH-Q-M-03774	GH-Q-M-03874	GH-Q-M-05774	GH-Q-M-05874
26.0	GH-Q-M-03775	GH-Q-M-03875	GH-Q-M-05775	GH-Q-M-05875
27.0	GH-Q-M-03776	GH-Q-M-03876	GH-Q-M-05776	GH-Q-M-05876
28.0	GH-Q-M-03777	GH-Q-M-03877	GH-Q-M-05777	GH-Q-M-05877
29.0	GH-Q-M-03778	GH-Q-M-03878	GH-Q-M-05778	GH-Q-M-05878
30.0	GH-Q-M-03779	GH-Q-M-03879	GH-Q-M-05779	GH-Q-M-05879
31.0	GH-Q-M-03780	GH-Q-M-03880	GH-Q-M-05780	GH-Q-M-05880
32.0	GH-Q-M-03781	GH-Q-M-03881	GH-Q-M-05781	GH-Q-M-05881
33.0	GH-Q-M-03782	GH-Q-M-03882	GH-Q-M-05782	GH-Q-M-05882
34.0	GH-Q-M-03783	GH-Q-M-03883	GH-Q-M-05783	GH-Q-M-05883
35.0	GH-Q-M-03784	GH-Q-M-03884	GH-Q-M-05784	GH-Q-M-05884
36.0	GH-Q-M-03785	GH-Q-M-03885	GH-Q-M-05785	GH-Q-M-05885
37.0	GH-Q-M-03786	GH-Q-M-03886	GH-Q-M-05786	GH-Q-M-05886
38.0	GH-Q-M-03787	GH-Q-M-03887	GH-Q-M-05787	GH-Q-M-05887

¹⁾ For blade selection with DF geometry, see page 88.

Spare parts



Item	Description	Part no.
1	Blade	see above
2	Control bolt diameter 2.5	GH-Q-E-0003
3	Tool body	see page 99
4	Pressure spring $\varnothing 4.3 \times \varnothing 0.6 \times 52.0$	GH-H-F-0011
5	Set screw M5 x 8.0 DIN913 Allen key SW2.5	GH-H-S-0119 GH-H-S-2100
6	SNAP distance pin diameter 4 x 65.0	GH-Q-E-0031

SNAP blades with DF geometry

FOR DEFINED CHAMFERS

Operating conditions

- Use with hard materials or materials with large burr formation.
- Higher machine requirements: stable machine spindle and rigid workpiece setup
- If no chamfer is required on the front edge, it is essential to use a blade that only cuts backwards.
- The recommended maximum values for the working feed rate with the DF blade must not be exceeded.
- The chamfer diameters listed are the maximum values theoretically achievable.

SNAP8 blade DF geometry 90°

chamfer Ø max. / mm	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating T standard coating	Coating A for higher requirements	Coating T standard coating	Coating A for higher requirements
8.5	GH-Q-M-03120	GH-Q-M-03220	GH-Q-M-05120	GH-Q-M-05220
9.0	GH-Q-M-03121	GH-Q-M-03221	GH-Q-M-05121	GH-Q-M-05221
9.5	GH-Q-M-03122	GH-Q-M-03222	GH-Q-M-05122	GH-Q-M-05222
10.0	GH-Q-M-03123	GH-Q-M-03223	GH-Q-M-05123	GH-Q-M-05223
10.5	GH-Q-M-03124	GH-Q-M-03224	GH-Q-M-05124	GH-Q-M-05224
11.0	GH-Q-M-03125	GH-Q-M-03225	GH-Q-M-05125	GH-Q-M-05225
11.5	GH-Q-M-03126	GH-Q-M-03226	GH-Q-M-05126	GH-Q-M-05226
12.0	GH-Q-M-03127	GH-Q-M-03227	GH-Q-M-05127	GH-Q-M-05227
12.5	GH-Q-M-03128	GH-Q-M-03228	GH-Q-M-05128	GH-Q-M-05228
13.0	GH-Q-M-03129	GH-Q-M-03229	GH-Q-M-05129	GH-Q-M-05229
13.5	GH-Q-M-03130	GH-Q-M-03230	GH-Q-M-05130	GH-Q-M-05230

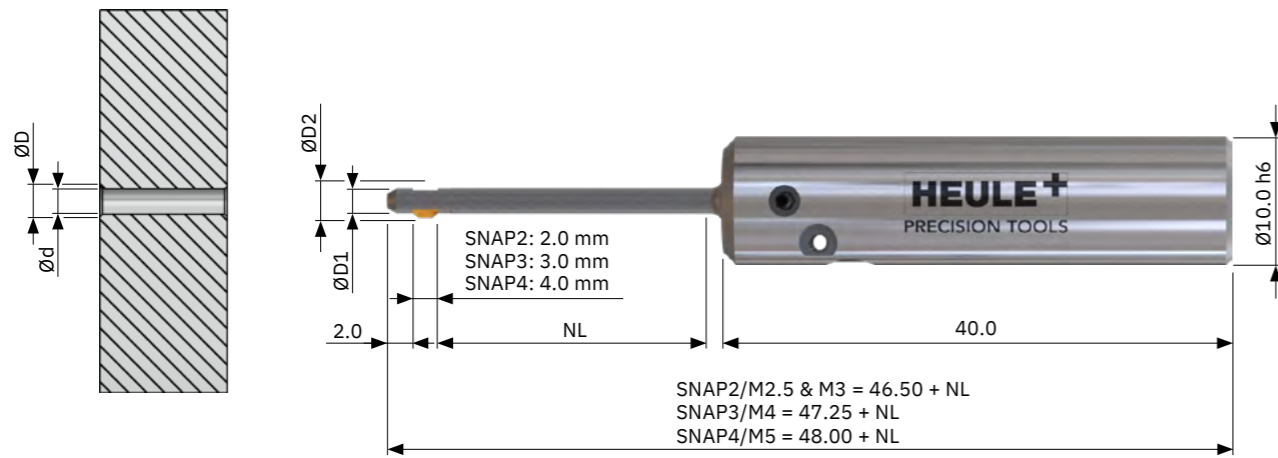
SNAP12 blade DF geometry 90°

chamfer Ø max. / mm	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating T standard coating	Coating A for higher requirements	Coating T standard coating	Coating A for higher requirements
12.5	GH-Q-M-03140	GH-Q-M-03240	GH-Q-M-05140	GH-Q-M-05240
13.0	GH-Q-M-03141	GH-Q-M-03241	GH-Q-M-05141	GH-Q-M-05241
13.5	GH-Q-M-03142	GH-Q-M-03242	GH-Q-M-05142	GH-Q-M-05242
14.0	GH-Q-M-03143	GH-Q-M-03243	GH-Q-M-05143	GH-Q-M-05243
14.5	GH-Q-M-03144	GH-Q-M-03244	GH-Q-M-05144	GH-Q-M-05244
15.0	GH-Q-M-03145	GH-Q-M-03245	GH-Q-M-05145	GH-Q-M-05245
15.5	GH-Q-M-03146	GH-Q-M-03246	GH-Q-M-05146	GH-Q-M-05246
16.0	GH-Q-M-03147	GH-Q-M-03247	GH-Q-M-05147	GH-Q-M-05247
16.5	GH-Q-M-03148	GH-Q-M-03248	GH-Q-M-05148	GH-Q-M-05248
17.0	GH-Q-M-03149	GH-Q-M-03249	GH-Q-M-05149	GH-Q-M-05249
17.5	GH-Q-M-03150	GH-Q-M-03250	GH-Q-M-05150	GH-Q-M-05250
18.0	GH-Q-M-03151	GH-Q-M-03251	GH-Q-M-05151	GH-Q-M-05251
18.5	GH-Q-M-03152	GH-Q-M-03252	GH-Q-M-05152	GH-Q-M-05252
19.0	GH-Q-M-03153	GH-Q-M-03253	GH-Q-M-05153	GH-Q-M-05253
19.5	GH-Q-M-03154	GH-Q-M-03254	GH-Q-M-05154	GH-Q-M-05254
20.0	GH-Q-M-03155	GH-Q-M-03255	GH-Q-M-05155	GH-Q-M-05255
20.5	GH-Q-M-03156	GH-Q-M-03256	GH-Q-M-05156	GH-Q-M-05256
21.0	GH-Q-M-03157	GH-Q-M-03257	GH-Q-M-05157	GH-Q-M-05257
21.5	GH-Q-M-03158	GH-Q-M-03258	GH-Q-M-05158	GH-Q-M-05258
22.0	GH-Q-M-03159	GH-Q-M-03259	GH-Q-M-05159	GH-Q-M-05259

SNAP20 blade DF geometry 90°

21.0	GH-Q-M-03170	GH-Q-M-03270	GH-Q-M-05170	GH-Q-M-05270
22.0	GH-Q-M-03171	GH-Q-M-03271	GH-Q-M-05171	GH-Q-M-05271
23.0	GH-Q-M-03172	GH-Q-M-03272	GH-Q-M-05172	GH-Q-M-05272
24.0	GH-Q-M-03173	GH-Q-M-03273	GH-Q-M-05173	GH-Q-M-05273
25.0	GH-Q-M-03174	GH-Q-M-03274	GH-Q-M-05174	GH-Q-M-05274
26.0	GH-Q-M-03175	GH-Q-M-03275	GH-Q-M-05175	GH-Q-M-05275
27.0	GH-Q-M-03176	GH-Q-M-03276	GH-Q-M-05176	GH-Q-M-05276
28.0	GH-Q-M-03177	GH-Q-M-03277	GH-Q-M-05177	GH-Q-M-05277
29.0	GH-Q-M-03178	GH-Q-M-03278	GH-Q-M-05178	GH-Q-M-05278
30.0	GH-Q-M-03179	GH-Q-M-03279	GH-Q-M-05179	GH-Q-M-05279
31.0	GH-Q-M-03180	GH-Q-M-03280	GH-Q-M-05180	GH-Q-M-05280
32.0	GH-Q-M-03181	GH-Q-M-03281	GH-Q-M-05181	GH-Q-M-05281
33.0	GH-Q-M-03182	GH-Q-M-03282	GH-Q-M-05182	GH-Q-M-05282
34.0	GH-Q-M-03183	GH-Q-M-03283	GH-Q-M-05183	GH-Q-M-05283
35.0	GH-Q-M-03184	GH-Q-M-03284	GH-Q-M-05184	GH-Q-M-05284
36.0	GH-Q-M-03185	GH-Q-M-03285	GH-Q-M-05185	GH-Q-M-05285
37.0	GH-Q-M-03186	GH-Q-M-03286	GH-Q-M-05186	GH-Q-M-05286
38.0	GH-Q-M-03187	GH-Q-M-03287	GH-Q-M-05187	GH-Q-M-05287

SNAP thread series tool M2.5 / M3 / M4 / M5




Tool

Standard tool **without** blade

- The blades must always be ordered separately.
- Different blade options are available for each bore diameter thus offering various chamfer diameters. However, a blade is only designed for a defined chamfer diameter. The achievable chamfer diameter may vary slightly depending on the material, blade force, cutting parameters and application.

Bore Ø d mm	Thread	max. chamfer ØD	Tool Ø D1	Max. Ø D2	Part no. NL = 10.0 mm	Part no. NL = 20.0 mm	Part no. NL = 30.0 mm
2.05	M2.5	2.8	2.0	3.0	SNAP2/M2.5/10	SNAP2/M2.5/20	-
2.5	M3	3.4	2.45	3.6	SNAP2/M3/10	SNAP2/M3/20	-
3.3	M4	4.5	3.2	4.8	SNAP3/M4/10	SNAP3/M4/20	SNAP3/M4/30
4.2	M5	5.6	4.1	6.0	SNAP4/M5/10	SNAP4/M5/20	SNAP4/M5/30

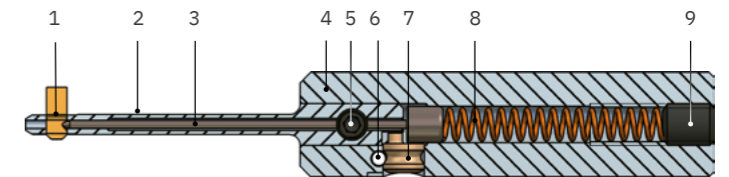
 Parts in stock highlighted in green

SNAP thread series tool M2.5 / M3 / M4 / M5

Blade GS geometry 90°

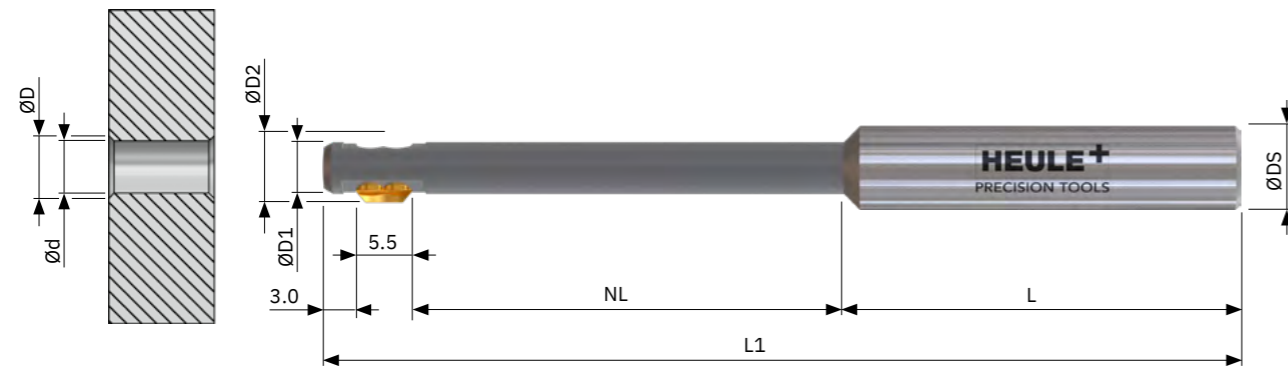
max. chamfer Ø	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating A for steel, titanium, Inconel	Coating D for aluminium	Coating A for steel, titanium, Inconel	Coating D for aluminium
2.8	GH-Q-M-41501	GH-Q-M-41502	GH-Q-M-41601	GH-Q-M-41602
3.4	GH-Q-M-41511	GH-Q-M-41512	GH-Q-M-41611	GH-Q-M-41612
4.5	GH-Q-M-41521	GH-Q-M-41522	GH-Q-M-41621	GH-Q-M-41622
5.6	GH-Q-M-41531	GH-Q-M-41532	GH-Q-M-41631	GH-Q-M-41632

Spare parts



Item	Description	Part no. NL 10.0	Part no. NL 20.0	Part no. NL 30.0
1	Blade	see above		
2	Blade housing SNAP2/M2.5/etc. Blade housing SNAP2/M3/etc. Blade housing SNAP3/M4/etc. Blade housing SNAP4/M5/etc.	GH-Q-N-0015 GH-Q-N-0016 GH-Q-N-0035 GH-Q-N-0055	GH-Q-N-0075 GH-Q-N-0076 GH-Q-N-0095 GH-Q-N-0115	GH-Q-N-0155 GH-Q-N-0175
3	Control bolt SNAP2/M2.5/etc. Control bolt SNAP2/M3/etc. Control bolt SNAP3/M4/etc. Control bolt SNAP4/M5/etc.	GH-Q-E-0254 GH-Q-E-0236 GH-Q-E-0236 GH-Q-E-0236	GH-Q-E-0256 GH-Q-E-0237 GH-Q-E-0237 GH-Q-E-0237	GH-Q-E-0238 GH-Q-E-0238
4	Tool body Tool body assembly SNAP2-4 diameter 10.0 h6 incl. eccentric GH-S-E-0031 incl. roll pin GH-C-E-0811	GH-Q-G-5024 GH-Q-G-5025	GH-Q-G-5024 GH-Q-G-5025	GH-Q-G-5024 GH-Q-G-5025
5	Clamping screw M3x3.3	GH-H-S-1075	GH-H-S-1075	GH-H-S-1075
6	Roll pin SNAP2-4	GH-C-E-0811	GH-C-E-0811	GH-C-E-0811
7	Eccentric SNAP2-4	GH-S-E-0031	GH-S-E-0031	GH-S-E-0031
8	Pressure spring Ø3.2xØ0.45x23.0	GH-H-F-0047	GH-H-F-0047	GH-H-F-0047
9	Set screw M4x5.0 DIN913 Allen key SW1.5	GH-H-S-0134 GH-H-S-2101	GH-H-S-0134 GH-H-S-2101	GH-H-S-0134 GH-H-S-2101

SNAP thread series tool M6 / M8 / M10 / M12 / M14



Tool

Standard tool **without** blade

- The blades must always be ordered separately.
- Different blade options are available, thus offering various chamfer diameters. However, a blade is only designed for a defined chamfer diameter. The achievable chamfer diameter may vary slightly depending on the material, blade force, cutting parameters and application.
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"

Bore Ø d / mm	Thread	max. chamfer ØD	Tool Ø D1	Max. Ø D2	Tool L. L1	Working L. NL	Shank L. L	Shank Ø DS	Part no.
5.0	M6	6.5	4.9	7.3	88.0	40.0	38.0	8.0 h6	SNAP5/M6
6.8	M8	8.5	6.7	9.3	88.0	40.0	38.0	8.0 h6	SNAP5/M8
8.5	M10	10.5	8.3	11.3	100.0	50.0	40.0	10.0 h6	SNAP5/M10
10.2	M12	12.5	10.0	13.1	100.0	50.0	40.0	10.0 h6	SNAP5/M12
12.0	M14	14.5	11.8	15.1	100.0	50.0	40.0	10.0 h6	SNAP5/M14

Parts in stock highlighted in green

The blades on the thread series tools and the SNAP5 tools are not interchangeable!



SNAP thread series tool M6 / M8 / M10 / M12 / M14

Blade DRA geometry 90°

Geometry for soft materials e.g. aluminium, brass, low-alloy steels

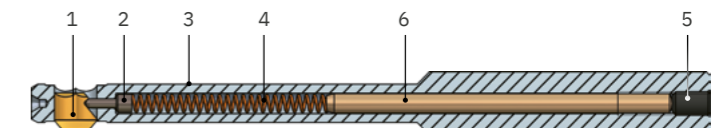
max. chamfer Ø	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating A for standard materials	Coating D for aluminium	Coating A for standard materials	Coating D for aluminium
6.5 mm	GH-Q-M-34032	GH-Q-M-34033	GH-Q-M-34532	GH-Q-M-34533
8.5 mm	GH-Q-M-34072	GH-Q-M-34073	GH-Q-M-34572	GH-Q-M-34573
10.5 mm	GH-Q-M-34112	GH-Q-M-34113	GH-Q-M-34612	GH-Q-M-34613
12.5 mm	GH-Q-M-34152	GH-Q-M-34153	GH-Q-M-34652	GH-Q-M-34653
14.5 mm	GH-Q-M-34192	GH-Q-M-34193	GH-Q-M-34692	GH-Q-M-34693

Blade DRB geometry 90°

Geometry for high-strength alloys, e.g. high-alloy steels

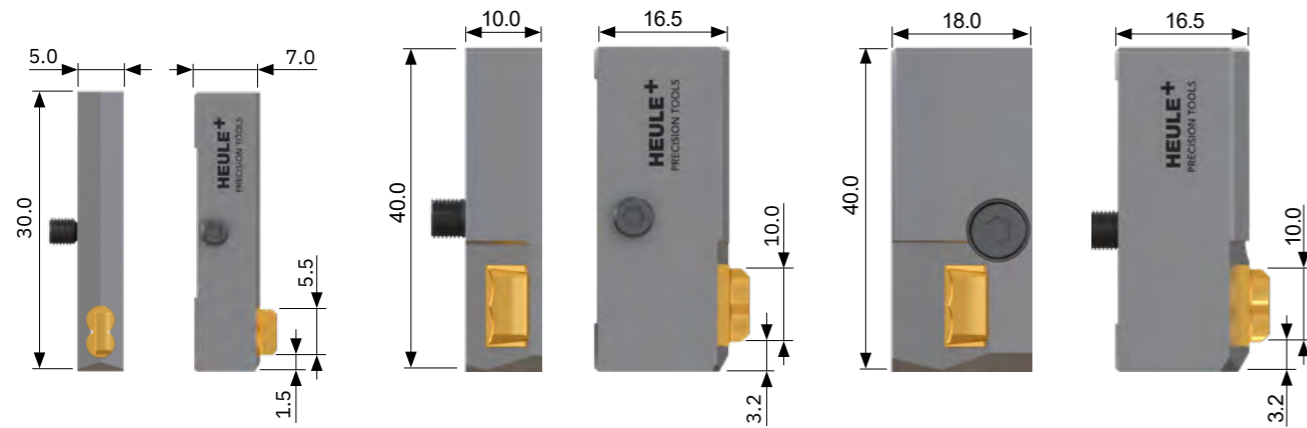
max. chamfer Ø	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating A for very hard and tough materials		Coating A for very hard and tough materials	
6.5 mm	GH-Q-M-34042		GH-Q-M-34542	
8.5 mm	GH-Q-M-34082		GH-Q-M-34582	
10.5 mm	GH-Q-M-34122		GH-Q-M-34622	
12.5 mm	GH-Q-M-34162		GH-Q-M-34662	
14.5 mm	GH-Q-M-34202		GH-Q-M-34702	

Spare parts



Item	Description	Part no.
1	Blade	see above
2	Control bolt diameter 1.5	GH-Q-E-0015
3	Tool body SNAP5/M6 Tool body SNAP5/M8 Tool body SNAP5/M10 Tool body SNAP5/M12 Tool body SNAP5/M14	GH-Q-G-5003 GH-Q-G-5018 GH-Q-G-5010 GH-Q-G-5019 GH-Q-G-5017
4	Pressure spring Ø2.35xØ0.35x30.0	GH-H-F-0019
5	Set screw M3x5.0 DIN913 Allen key SW1.5	GH-H-S-0127 GH-H-S-2101
6	Distance pin Ø 2.5x36.0 (M6/M8) Distance pin Ø 2.5x50.0 (M10/M12/M14)	GH-Q-E-0049 GH-Q-E-0042

SNAP cassette systems



SNAP5 >Ø12.6

SNAP20 >Ø25.0

SNAP20 >Ø35.0


Tool

The SNAP cassette is used for installation in combination tools and tools for large bore diameters. The required cassette holder can be ordered from HEULE or manufactured by the customer according to the specifications on the following pages.

Standard tool **without** blade

- The blades must always be ordered separately.

Bore diameter range d	Cassette type	Part no.
>Ø12.6 mm	SNAP5/12.6	GH-Q-O-1430
>Ø25.0 mm	SNAP20/25.0	GH-Q-O-1130
>Ø35.0 mm	SNAP20/35.0	GH-Q-O-1030

 Parts in stock highlighted in green

SNAP cassette systems

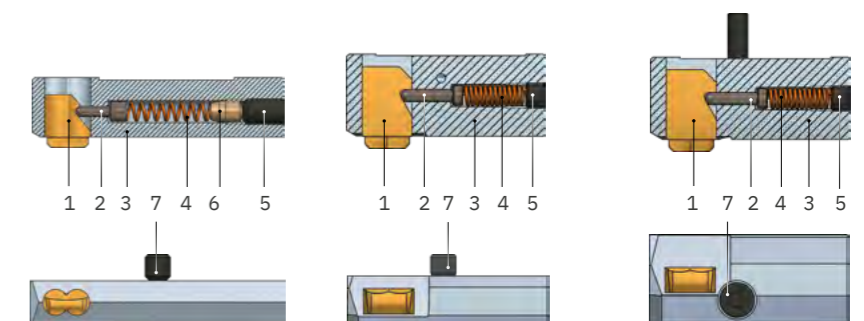
SNAP5 cassette blade with DF geometry 90°

Chamfering capacity	Bore Ø mm	Part no. forward and backward cutting		Part no. backward cutting only	
		Coating A for steel, titanium, Inconel	Coating for aluminium	Coating A for steel, titanium, Inconel	Coating for aluminium
	12.6–19.9	by request	by request	by request	by request
0.5 mm	20.0–90.0	GH-Q-M-30780	GH-Q-M-30980	GH-Q-M-31780	GH-Q-M-31980
1.0 mm		GH-Q-M-30781	GH-Q-M-30981	GH-Q-M-31781	GH-Q-M-31981
1.5 mm		GH-Q-M-30782	GH-Q-M-30982	GH-Q-M-31782	GH-Q-M-31982
0.5 mm	90.0–150.0	GH-Q-M-30783	GH-Q-M-30983	GH-Q-M-31783	GH-Q-M-31983
1.0 mm		GH-Q-M-30784	GH-Q-M-30984	GH-Q-M-31784	GH-Q-M-31984
1.5 mm		GH-Q-M-30785	GH-Q-M-30985	GH-Q-M-31785	GH-Q-M-31985

SNAP20 cassette blade with DF geometry 90°

Chamfering capacity	Bore Ø mm	Part no. forward and backward cutting		Part no. backward cutting only	
		Coating A higher requirements	Coating T standard coating	Coating A higher requirements	Coating T standard coating
0.5 mm	>20.0	GH-Q-M-01902	GH-Q-M-01901	GH-Q-M-01922	GH-Q-M-01921
1.0 mm		GH-Q-M-01905	GH-Q-M-01904	GH-Q-M-01925	GH-Q-M-01924
1.5 mm		GH-Q-M-01908	GH-Q-M-01907	GH-Q-M-01928	GH-Q-M-01927

Spare parts

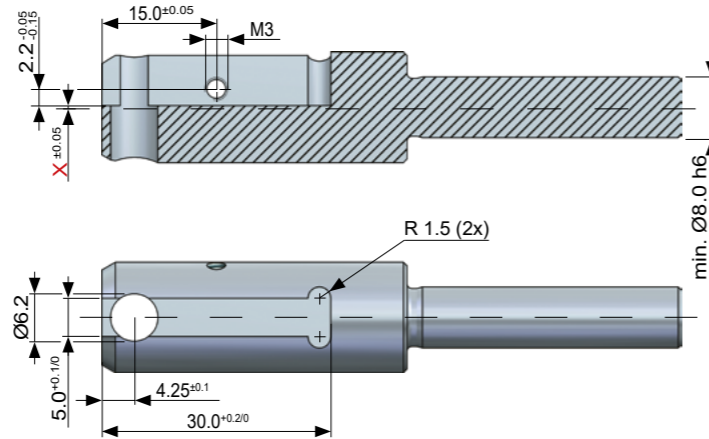


Item	Description	SNAP5/12.6	SNAP20/20.0	SNAP20/35
1	SNAP blade	see above	see above	see above
2	Control bolt	GH-Q-E-0008	GH-Q-E-0003	GH-Q-E-0003
3	Cassette tool body	GH-Q-G-1382	GH-Q-G-1123	GH-Q-G-1034
4	Pressure spring	GH-H-F-0027	GH-H-F-0012	GH-H-F-0012
5	Set screw	GH-H-S-0127	GH-H-S-0120	GH-H-S-0120
6	Distance pin	GH-Q-E-0046	-	-
7	Set screw	GH-H-S-0355	GH-H-S-0202	GH-H-S-0502
	Allen key	GH-H-S-2101	GH-H-S-2100	GH-H-S-2100

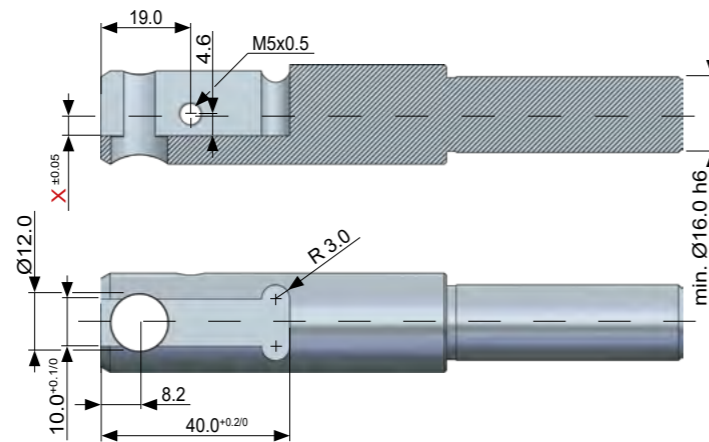
SNAP cassette systems

INSTALLATION INSTRUCTIONS

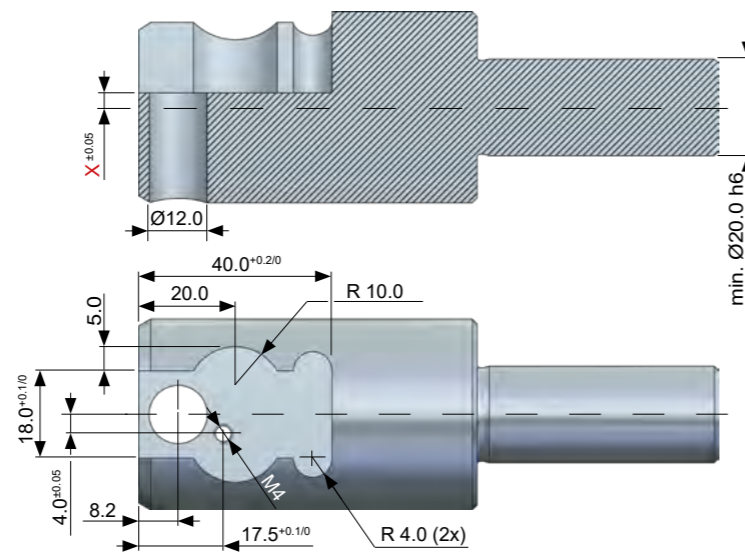
SNAP5 cassette
for diameter >12.6 mm



SNAP20 cassette
for diameter > 25.0 mm



SNAP20 cassette
for diameter >35.0 mm

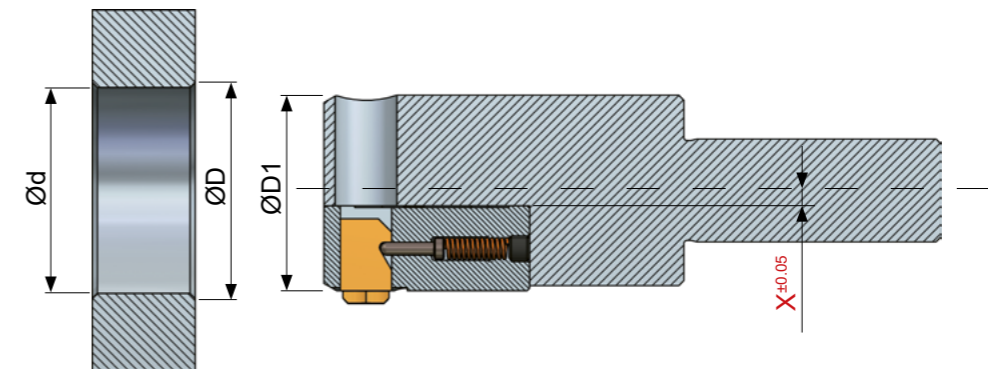


SNAP cassette systems

Limits

	SNAP5	SNAP20	SNAP20
bore Ø	>Ø12.6 mm	>Ø25.0 mm	>Ø35.0 mm
max. ØD	Ød + 3.0 mm	Ød + 3.0 mm	Ød + 3.0 mm
max. ØD1	Ød - 1.0 mm	Ød - 2.0 mm	Ød - 4.0 mm

Calculating dimension X



Formula for calculating dimension X

$$\text{SNAP5 } >12.6: X = (\text{Ø } d/2) - 7.3 + \text{correction}^*$$

$$\text{SNAP20 } > 25.0: X = (\text{Ø } d/2) - 17.0 + \text{correction}^*$$

$$\text{SNAP20 } > 35.0: X = (\text{Ø } d/2) - 17.0 + \text{correction}^*$$

*) Correction for desired chamfering size: Blade TARGET minus ACTUAL

Calculation example for SNAP5 cassette

Given:

Bore Ø: 23.0 mm / chamfer diameter D: 24.5 mm

→ required chamfer. capacity $(24.5-23.0)/2 = 0.75 \text{ mm}$ (= TARGET)

→ Blade chamfering capacity: 1.0 mm (= ACTUAL)

Desired dimension X

$$X = \text{Ø } d / 2 - 7.3 + (\text{correction for blade chamfering size})$$

$$X = (23.0 \text{ mm} / 2) - 7.3 \text{ mm} + (\text{TARGET} - \text{ACTUAL})$$

$$X = 11.5 \text{ mm} - 7.3 \text{ mm} + (0.75 \text{ mm} - 1.0 \text{ mm})$$

$$X = 4.2 \text{ mm} + (-0.25 \text{ mm})$$

$$\mathbf{X = 3.95 \text{ mm}}$$

In the tables below you will find the blade housings and tool bodies that are not listed in the tables under the product itself. For all other items, please refer to the tables next to the product.

BLADE HOUSING

Tool	Tool ØD1	Part no. Working length NL 10.0	Part no. Working length NL 20.0	Part no. Working length NL 30.0
SNAP2/2.0/...	1.95	GH-Q-N-0001	GH-Q-N-0061	-
SNAP2/2.1/...	2.05	GH-Q-N-0002	GH-Q-N-0062	-
SNAP2/2.2/...	2.15	GH-Q-N-0003	GH-Q-N-0063	-
SNAP2/2.3/...	2.25	GH-Q-N-0004	GH-Q-N-0064	-
SNAP2/2.4/...	2.35	GH-Q-N-0005	GH-Q-N-0065	-
SNAP2/2.5/...	2.45	GH-Q-N-0006	GH-Q-N-0066	-
SNAP2/2.6/...	2.55	GH-Q-N-0007	GH-Q-N-0067	-
SNAP2/2.7/...	2.65	GH-Q-N-0008	GH-Q-N-0068	-
SNAP2/2.8/...	2.75	GH-Q-N-0009	GH-Q-N-0069	-
SNAP2/2.9/...	2.85	GH-Q-N-0010	GH-Q-N-0070	-
SNAP3/3.0/...	2.9	GH-Q-N-0021	GH-Q-N-0081	GH-Q-N-0141
SNAP3/3.1/...	3.0	GH-Q-N-0022	GH-Q-N-0082	GH-Q-N-0142
SNAP3/3.2/...	3.1	GH-Q-N-0023	GH-Q-N-0083	GH-Q-N-0143
SNAP3/3.3/...	3.2	GH-Q-N-0024	GH-Q-N-0084	GH-Q-N-0144
SNAP3/3.4/...	3.3	GH-Q-N-0025	GH-Q-N-0085	GH-Q-N-0145
SNAP3/3.5/...	3.4	GH-Q-N-0026	GH-Q-N-0086	GH-Q-N-0146
SNAP3/3.6/...	3.5	GH-Q-N-0027	GH-Q-N-0087	GH-Q-N-0147
SNAP3/3.7/...	3.6	GH-Q-N-0028	GH-Q-N-0088	GH-Q-N-0148
SNAP3/3.8/...	3.7	GH-Q-N-0029	GH-Q-N-0089	GH-Q-N-0149
SNAP3/3.9/...	3.8	GH-Q-N-0030	GH-Q-N-0090	GH-Q-N-0150
SNAP4/4.0/...	3.9	GH-Q-N-0041	GH-Q-N-0101	GH-Q-N-0161
SNAP4/4.1/...	4.0	GH-Q-N-0042	GH-Q-N-0102	GH-Q-N-0162
SNAP4/4.2/...	4.1	GH-Q-N-0043	GH-Q-N-0103	GH-Q-N-0163
SNAP4/4.3/...	4.2	GH-Q-N-0044	GH-Q-N-0104	GH-Q-N-0164
SNAP4/4.4/...	4.3	GH-Q-N-0045	GH-Q-N-0105	GH-Q-N-0165
SNAP4/4.5/...	4.4	GH-Q-N-0046	GH-Q-N-0106	GH-Q-N-0166
SNAP4/4.6/...	4.5	GH-Q-N-0047	GH-Q-N-0107	GH-Q-N-0167
SNAP4/4.7/...	4.6	GH-Q-N-0048	GH-Q-N-0108	GH-Q-N-0168
SNAP4/4.8/...	4.7	GH-Q-N-0049	GH-Q-N-0109	GH-Q-N-0169
SNAP4/4.9/...	4.8	GH-Q-N-0050	GH-Q-N-0110	GH-Q-N-0170
SNAP4/5.0/...	4.9	GH-Q-N-0051	GH-Q-N-0111	GH-Q-N-0171

TOOL BODY

Tool	Tool ØD1	Part no.	Tool	Tool ØD1	Part no.
SNAP5/5.0	4.9	GH-Q-G-1271	SNAP20/20.0	19.8	GH-Q-G-0270
SNAP5/5.5	5.4	GH-Q-G-1272	SNAP20/21.0	20.8	GH-Q-G-0271
SNAP5/6.0	5.9	GH-Q-G-1273	SNAP20/22.0	21.8	GH-Q-G-0272
SNAP5/6.5	6.4	GH-Q-G-1274	SNAP20/23.0	22.8	GH-Q-G-0273
SNAP5/7.0	6.9	GH-Q-G-1275	SNAP20/24.0	23.8	GH-Q-G-0274
SNAP5/7.5	7.4	GH-Q-G-1276	SNAP20/25.0	24.8	GH-Q-G-0275
SNAP5/8.0	7.8	GH-Q-G-1277	SNAP20/26.0	25.8	GH-Q-G-0276
SNAP5/8.5	8.3	GH-Q-G-1389	SNAP20/27.0	26.8	GH-Q-G-0277
SNAP5/9.0	8.8	GH-Q-G-1384	SNAP20/28.0	27.8	GH-Q-G-0278
SNAP5/9.5	9.3	GH-Q-G-1485	SNAP20/29.0	28.8	GH-Q-G-0279
SNAP5/10.0	9.8	GH-Q-G-1486	SNAP20/30.0	29.8	GH-Q-G-0280
SNAP8/8.0	7.8	GH-Q-G-0220	SNAP20/31.0	30.8	GH-Q-G-0281
SNAP8/8.5	8.3	GH-Q-G-0221	SNAP20/32.0	31.8	GH-Q-G-0282
SNAP8/9.0	8.8	GH-Q-G-0222	SNAP20/33.0	32.8	GH-Q-G-0283
SNAP8/9.5	9.3	GH-Q-G-0223	SNAP20/34.0	33.8	GH-Q-G-0284
SNAP8/10.0	9.8	GH-Q-G-0224	SNAP20/35.0	34.8	GH-Q-G-0285
SNAP8/10.5	10.3	GH-Q-G-0225	Thread series tool		
SNAP8/11.0	10.8	GH-Q-G-0226	SNAP2/M2.5/10	2.0	GH-Q-N-0015
SNAP8/11.5	11.3	GH-Q-G-0227	SNAP2/M2.5/20	2.0	GH-Q-N-0075
SNAP8/12.0	11.8	GH-Q-G-0228	SNAP2/M3/10	2.45	GH-Q-N-0016
SNAP12/12.0	11.8	GH-Q-G-0240	SNAP2/M3/20	2.45	GH-Q-N-0076
SNAP12/12.5	12.3	GH-Q-G-0241	SNAP3/M4/10	3.2	GH-Q-N-0035
SNAP12/13.0	12.8	GH-Q-G-0242	SNAP3/M4/20	3.2	GH-Q-N-0095
SNAP12/13.5	13.3	GH-Q-G-0243	SNAP3/M4/30	3.2	GH-Q-N-0155
SNAP12/14.0	13.8	GH-Q-G-0244	SNAP4/M5/10	4.1	GH-Q-N-0055
SNAP12/14.5	14.3	GH-Q-G-0245	SNAP4/M5/20	4.1	GH-Q-N-0115
SNAP12/15.0	14.8	GH-Q-G-0246	SNAP4/M5/30	4.1	GH-Q-N-0175
SNAP12/15.5	15.3	GH-Q-G-0247	SNAP5/M6	4.9	GH-Q-G-5003
SNAP12/16.0	15.8	GH-Q-G-0248	SNAP5/M8	6.7	GH-Q-G-5018
SNAP12/16.5	16.3	GH-Q-G-0249	SNAP5/M10	8.3	GH-Q-G-5010
SNAP12/17.0	16.8	GH-Q-G-0250	SNAP5/M12	10.0	GH-Q-G-5019
SNAP12/17.5	17.3	GH-Q-G-0251	SNAP5/M14	11.8	GH-Q-G-5017
SNAP12/18.0	17.8	GH-Q-G-0252			
SNAP12/18.5	18.3	GH-Q-G-0253			
SNAP12/19.0	18.8	GH-Q-G-0254			
SNAP12/19.5	19.3	GH-Q-G-0255			
SNAP12/20.0	19.8	GH-Q-G-0256			

SNAP FAQ

Question	Causes	Remedy
Burr is not cut away cleanly or chamfer too small	<ul style="list-style-type: none"> • Blade selected too small • Working feed rate too high 	<ul style="list-style-type: none"> • Select blade for larger chamfer • Reduce working feed rate
No chamfer	• Blade force too low	• Turn the set screw clockwise to increase the blade pressure (only possible with SNAP blades with GS geometry)
	• Blade worn, worn out	• Insert new blade
	• Excessive burr formation	• Replace or sharpen the drill tool
	• Blade jams, no longer extends out of blade housing	• Cast materials should always be processed with coolant. This removes the dust from the blade window.
Forward and backward chamfer size not the same	• Working feed rate forwards and backwards different	• Select the same working feed rate forwards and backwards if possible (only for blades with GS geometry)
	• Different burr formation front and back	• On the side with the chamfer that is too small: reduce working feed rate, only possible for blades with GS geometry. On the side with the chamfer that is too large: increase working feed rate, only possible for blades with GS geometry
Chamfer with chatter marks	• Poorly set workpiece or tool	• Ensure that workpiece and tool are firmly clamped
	• Tool in unstable condition	• Increase tool feed rate, and possibly blade force
	• Cutting speed too high	• Reduce cutting speed
Inconsistent chamfer size	• Different working feed rate	• Select consistent working feed rate
	• Blade force so weak that the blade does not return to the neutral position every time	• Turn the set screw clockwise to increase the blade pressure
	• Tool in unstable condition	• Increase blade force and working feed rate
Poor service life	• Poorly clamped workpiece or tool (vibration)	• Ensure that workpiece and tool are more firmly clamped
	• Inadequate machine stability (spindle play, etc.)	• Improve machine stability or guide with special tool in the bore
	• Incorrect blade coating	• Select another coating

DEFA

Adjustable chamfering of interrupted bore edges – for high burr formation or materials that are difficult to machine.

The advantages – Your benefit

The operating principle specific to the DEFA and the special blade geometry ensure a reliable chamfer result when working with demanding materials.

The chamfering capacity is infinitely adjustable on the tool itself, depending on the bore diameter. The cutting force can also be optimised to suit the material.



Double-edged tool for chamfers with precise diameters and high-quality chamfered surfaces.



Chamfering of interrupted bore edges – forward and backward in a single operation.

THE RANGE

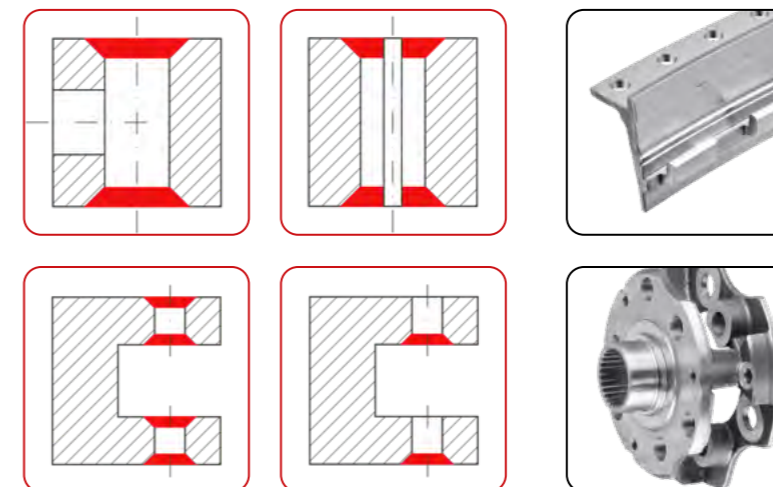


Bore Ø range mm	Max. chamfer range mm	Working length mm	Series	Catalogue Page
Ø4.0–6.6	0.1–0.6	30.0 / 60.0	DEFA 4–6	112
Ø6.0–10.1	0.1–0.85	34.0 / 60.0	DEFA 6–10	114
Ø9.0–23.9	0.1–2.0	30.0 / 60.0	DEFA 9–24	116

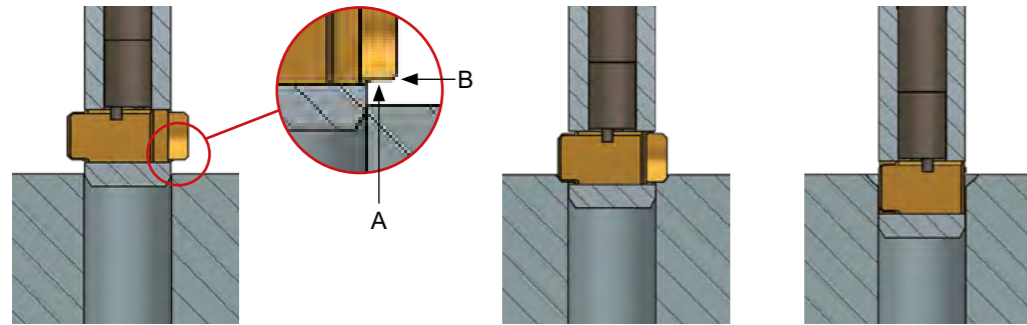
The DEFA range consists of three tool series. The tools in these series are designed to cover a range of bore diameters.

If the required tool is not included in the standard range, our **INDIVIDUAL** range often has a possible solution. If required, we can also develop custom solutions that are fully tailored to your application.

FIELD OF APPLICATION



OPERATING PRINCIPLE



The DEFA chamfering tool is particularly suitable for cutting small to large chamfers to materials with high burr formation.

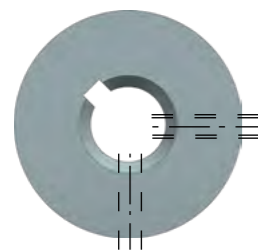
First, the cutting edges (A) remove the existing burr. As soon as the blades meet the workpiece surface, an inclined, non-cutting control surface on the blade (B) controls the cutting of the chamfer and the retraction of the blade into the tool body.

The crowned surface of the blade passes through the bore without causing any damage to the surface of the bore.

The rigid connection between the two cutting edges also allows bores with axial grooves or cross bores to be machined and to be traversed through in rotation, i.e. without stopping the spindle (see illustration below).

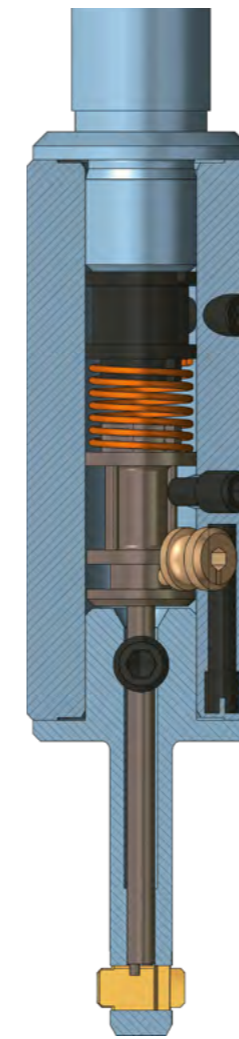
Compensation of height differences

DEFA automatically compensates for possible height differences in the components to be machined, e.g. cast parts. The blade only begins to retract or cut on contact with the workpiece. This means that the chamfer size remains constant.



Top view of workpiece with axial groove and cross bores

TOOL DESIGN



The DEFA chamfering tool is characterised by two blades with a special cutting geometry. The two blades are kept by a spring-loaded blade control in the tool body.

The two blades are rigidly connected. By turning the adjusting screw, the blade position and thus the chamfer diameter is simultaneously and continuously adjusted.

Adjusting screw



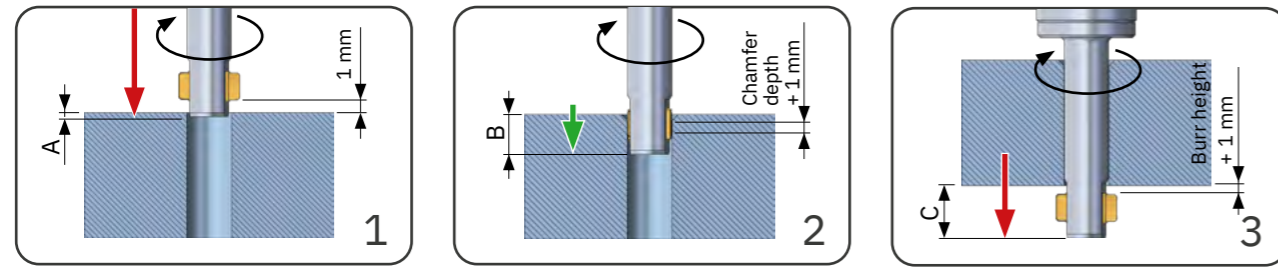
Operating instructions

- > Blade change
- > Spring change

heule.com > Service >
Media & download centre



DEFA PROCESS STEPS



- Rapid feed to position **A** or 1.0 mm distance
- Spindle rotation clockwise
- External coolant on
- Working feed to position **B** or chamfer depth + 1.0 mm
- Rapid traverse to position **C** or burr height + 1.0 mm

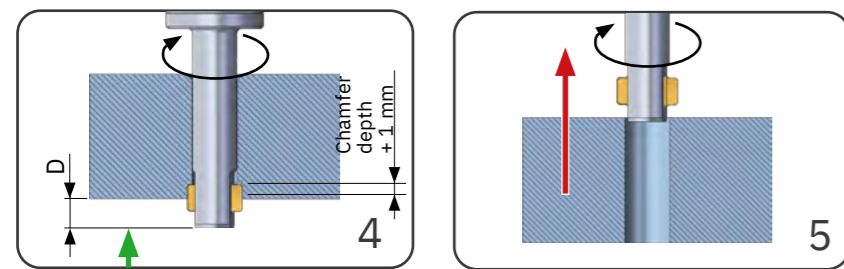
Example G0 Z-2.0
S579 M3
M8

G1 Z-6.0¹⁾ F17

G0 Z-26.5²⁾

¹⁾ 6.0=3.0+(6.0/2)

²⁾ 26.5=16.5+3.0+6.0+1.0



- Working feed to position **D** or chamfer depth + 1.0 mm
- Rapid feed out of the workpiece

G1 Z-22.5³⁾

G0 Z+2.0

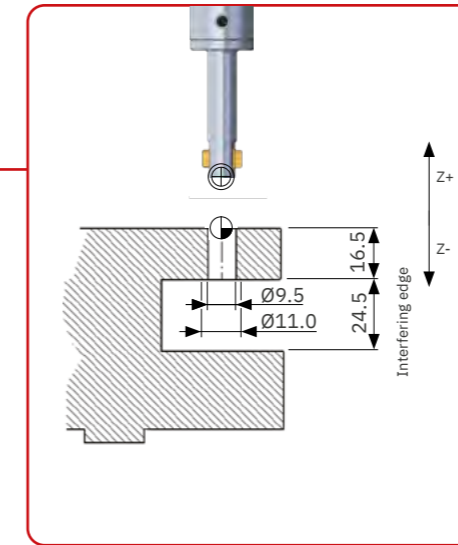
³⁾ 22.5=16.5+3.0+(6.0/2)

DIMENSION TABLE FOR PROGRAMMING

Tool	A mm	B mm	C mm	D mm
DEFA 4-6	0.8	3.4	6.0	3.4
DEFA 6-10	0.8	1.8+(0.5*K ¹⁾)	1.8+K ¹ +1.0	1.8+(0.5*K ¹)
DEFA 9-24	2.0	3.0+(0.5*K ²⁾)	3.0+K ² +1.0	3.0+(0.5*K ²)

¹⁾ Dimensions for K, see tool table page 114
²⁾ Dimensions for K, see tool table page 116

APPLICATION AND PROGRAMMING EXAMPLE



- Application data**
- Workpiece height: 16.5 mm
 - Bore diameter: Ø9.5 mm
 - Chamfer diameter: Ø11.0 mm
 - Material: Titanium
 - Machining: both bore edges
- Tool and blade selection**
- Tool: GH-S-D-1747 (DEFA 9-24)
 - Tool diameter: Ø8.8 mm
 - Chamfer diameter range: Ø10.2-11.4 mm
 - Working length: 30.0 mm (note interfering edge)
 - Blade: GH-S-M-3912 (carbide, TiN coated)
 - Setting diameter D2: D+2S = 11.0 mm + 2(0.4) = 11.8 mm
 - K: 6.0 mm (see page 116)
- Cutting data**
- Cutting speed V_c: 10-20 m/min.
 - Tool working feed: 0.02-0.04 mm/rev.

CUTTING DATA

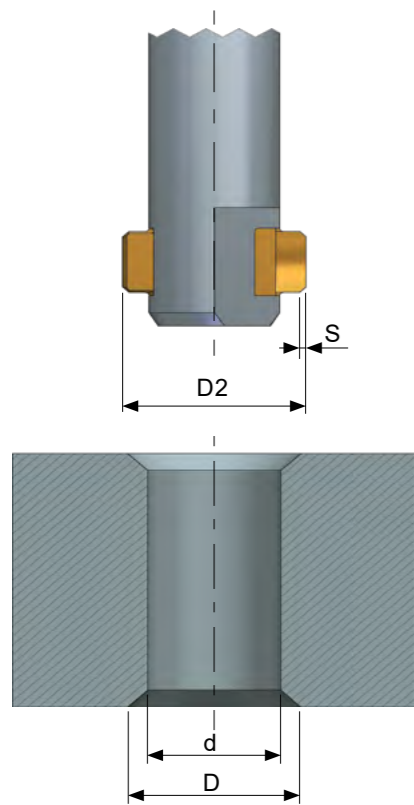
Description	Tensile str. RM (MPa)	Hardness (HB)	Hardn. (HRC)	DF geometry			DR geometry			
				VC	FZ	B*	VC	FZ	B*	
P0	Low-carbon steel, long-chipping, C <0.25%	<530	<125	-	40-70	0.02-0.06	T	40-70	0.05-0.1	A
P1	Low-carbon steel, short-chipping, C <0.25%	<530	<125	-	40-70	0.02-0.06	T	40-70	0.05-0.1	A
P2	Steel with carbon content C >0.25%	>530	<220	<25	40-70	0.02-0.06	T	40-70	0.05-0.1	A
P3	Alloy steel and tool steel, C >0.25%	600-850	<330	<35	20-50	0.02-0.06	T	20-50	0.05-0.1	A
P4	Alloy steel and tool steel, C >0.25%	850-1400	340-450	35-48	20-50	0.02-0.06	T	20-50	0.05-0.1	A
P5	Ferritic, martensitic and stainless PH steel	600-900	<330	<35	15-30	0.02-0.04	T	15-30	0.02-0.06	A
P6	High-strength ferritic, martensitic and PH stainless steel	900-1350	350-450	35-48	15-30	0.02-0.04	T	15-30	0.02-0.06	A
M1	Austenitic stainless steel	<600	130-200	-	10-20	0.02-0.04	T	10-20	0.02-0.06	A
M2	High-strength austenitic stainless steel	600-800	150-230	<25	10-20	0.02-0.04	T	10-20	0.02-0.06	A
M3	Duplex stainless steel	<800	135-275	<30	10-20	0.02-0.04	T	10-20	0.02-0.06	A
K1	Cast iron	125-500	120-290	<32	50-90	0.02-0.06	T	50-90	0.05-0.1	A
K2	Ductile cast iron with up to medium strength	<600	130-260	<28	40-70	0.02-0.06	T	40-70	0.05-0.1	A
K3	High-strength cast iron and bainitic cast iron	>600	180-350	<43	40-70	0.02-0.06	T	40-70	0.05-0.1	A
N1	Wrought aluminium alloys	-	-	-	-	-	-	-	-	-
N2	Aluminium alloys with low Si content	-	-	-	-	-	-	-	-	-
N3	Aluminium alloys with high Si content	-	-	-	-	-	-	-	-	-
N4	Copper, brass and zinc base	-	-	-	-	-	-	-	-	-
S1	Iron-based heat-resistant alloys	500-1200	160-260	25-48	10-20	0.02-0.04	T	10-20	0.02-0.06	A
S2	Cobalt-based heat-resistant alloys	1000-1450	250-450	25-48	10-20	0.02-0.04	T	10-20	0.02-0.06	A
S3	Nickel-based heat-resistant alloys	600-1700	160-450	<48	10-20	0.02-0.04	T	10-20	0.02-0.06	A
S4	Titanium and titanium alloys	900-1600	300-400	33-48	10-20	0.02-0.04	T	10-20	0.02-0.06	A

* coating for blades



The cutting data listed are guide values! For materials that are difficult to machine or uneven bore edges, we recommend applying cutting speeds that are at the lower end of the range.

SETTING THE CHAMFER DIAMETER



The desired chamfer diameter **D** is determined by the setting diameter **D2**. The maximum D2 must not be exceeded (see tool tables starting on page 112)

D2 = setting diameter
D = chamfer diameter
S = control surface width

Formula for setting chamfer diameter

$$D2 \approx D + 2S$$

Procedure

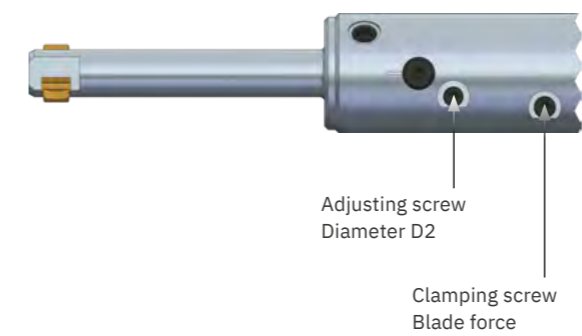
Turn the adjusting screw using an Allen key until the desired setting diameter D2 is reached. To do this, remove the red thread locker.

Increase D2 = turn adjusting screw anti-clockwise. Secure the adjusting screw again by using locking varnish.

Reduce D2 = turn adjusting screw to the right. Secure the adjusting screw again by using locking varnish.

If the chamfer diameter D deviates slightly from the desired diameter, the setting diameter D2 can be adjusted accordingly.

SETTING THE BLADE FORCE



The force acting radially on the blades should be at least high enough to ensure that the blades reliably extend to the set D2 under working conditions (dirt, coolant, etc.).

Important: The blade force does not define the chamfer size!

Procedure

Blade force guide value 8-12 N. Influencing factors such as material and chamfer requirements must be considered. A test bore is recommended.

Increase blade force = turn clamping screw clockwise

Reduce blade force = turn clamping screw anti-clockwise

Operating instructions

> Setting the chamfer \emptyset and the blade force

heule.com > Service > Media & download centre



Selecting the correct DEFA tool

TOOL SELECTOR TOOL TABLES

The HEULE Tool Selector is the **quickest and easiest way to find the right tool.**

Send your search results along with your application data to your HEULE representative. They will check the application and offer you options if required.

If your search produces no results, please contact HEULE with your application data anyway. We also develop customised solutions and are happy to advise you.

The correct tool is primarily determined by the bore diameter to be machined. This table also shows the chamfer diameter range, the working lengths and the tool diameters.

The tool tables cover the standard range. The tool part numbers highlighted in green are available from stock.

If the standard does not fit your needs, please do not hesitate to contact your HEULE representative for advice, either using the enquiry form (www.heule.com > contact) or by telephone.

CONFIGURING DEFA TOOLS

1. Select tool



Select the tool from the tool table that is suitable for the existing bore diameter and the intended chamfer diameter. The working length must also be selected. Depending on the bore depth, select the working length as short as possible or only as long as necessary (stability).

2. Select shank type



The tool can be clamped directly on the tool body or on the separate shank. If it is clamped to the tool body, an end plug is required.

3. Select blade



The blade is selected in the same way as the tool for the corresponding chamfer diameter range. Blades for a different chamfer angle or coatings for materials with increased requirements (e.g. titanium or Inconel) are available upon request.

Tool Selector

> Step-by-step guide to find the right solution

heule.com/en/tool-selector/defa



Tool Selector 

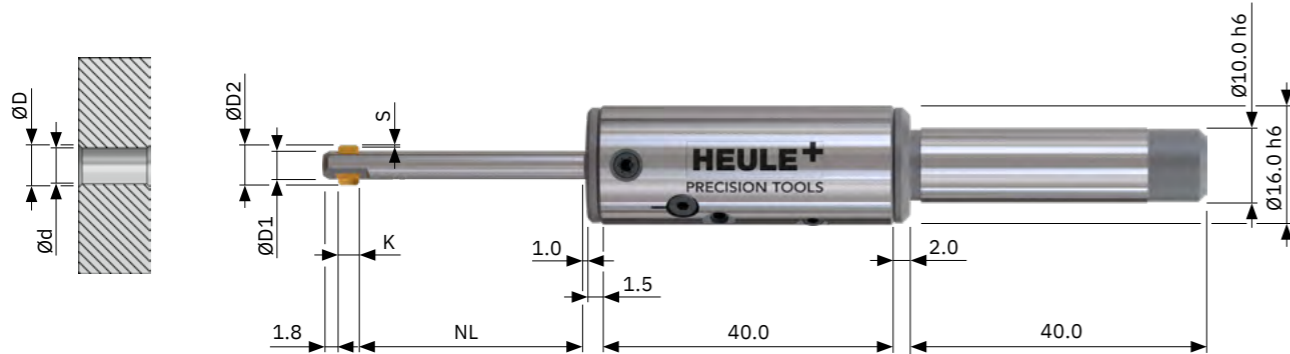
Still have questions?

> HEULE Consulting and Support

heule.com/en/contact



DEFA 4-6 $\varnothing 4.0$ mm to 6.8 mm




Tool

Standard tool **without** blades


- The blades must always be ordered separately.
- If the tool is clamped to the tool body, an end plug is required.
- Make sure the bore diameter is at least above the defined lower end of the tool range.

Bore range $\varnothing d$	Chamfer range $\varnothing D$	Working length NL	Blade housing $\varnothing D1$	Max. \varnothing $\varnothing D2$	K	S	Part no. without shank	Part no. with shank $\varnothing 10$	Part no. with end plug
4.0-4.6	4.4-4.8	30.0	3.8	5.4	3.2	0.3	GH-S-D-5200	GH-S-D-5220	GH-S-D-5240
		60.0	3.8	5.4	3.2	0.3	GH-S-D-5201	GH-S-D-5221	GH-S-D-5241
4.2-5.0	4.6-5.2	30.0	4.1	5.8	3.2	0.3	GH-S-D-5202	GH-S-D-5222	GH-S-D-5242
		60.0	4.1	5.8	3.2	0.3	GH-S-D-5203	GH-S-D-5223	GH-S-D-5243
4.6-5.6	5.0-5.8	30.0	4.5	6.4	3.2	0.3	GH-S-D-5204	GH-S-D-5224	GH-S-D-5244
		60.0	4.5	6.4	3.2	0.3	GH-S-D-5205	GH-S-D-5225	GH-S-D-5245
5.0-6.2	5.4-6.4	30.0	4.8	7.0	3.2	0.3	GH-S-D-5206	GH-S-D-5226	GH-S-D-5246
		60.0	4.8	7.0	3.2	0.3	GH-S-D-5207	GH-S-D-5227	GH-S-D-5247
5.5-6.6	5.9-6.8	30.0	5.3	7.4	3.2	0.3	GH-S-D-5208	GH-S-D-5228	GH-S-D-5248
		60.0	5.3	7.4	3.2	0.3	GH-S-D-5209	GH-S-D-5229	GH-S-D-5249

 Parts in stock highlighted in green

 Programming
Page 107

 Cutting data
Page 107

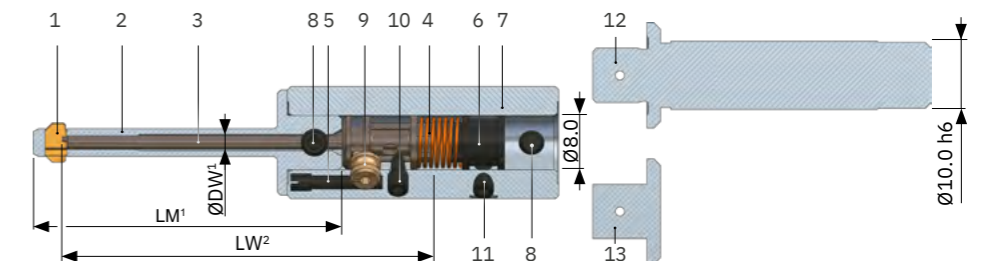
 Tool Selector –
Product selection made easy
heule.com/en/tool-selector/defa

DEFA 4-6 $\varnothing 4.0$ mm to 6.8 mm

Blade set DF geometry 90°

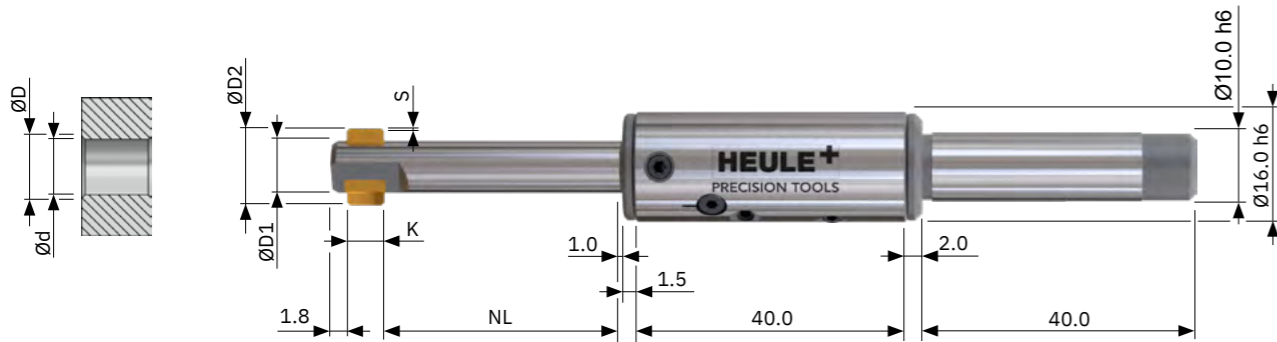
Chamfer \varnothing mm	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating T for steel	Coating for increased requirements	Coating T for steel	Coating for increased requirements
4.4-4.8	GH-S-M-3902	upon request	GH-S-M-4902	upon request
4.6-5.2	GH-S-M-3903		GH-S-M-4903	
5.0-5.8	GH-S-M-3904		GH-S-M-4904	
5.4-6.4	GH-S-M-3905		GH-S-M-4905	
5.9-6.8	GH-S-M-3906		GH-S-M-4906	

Spare parts



Item	Description	Part no.
1	Blades	see above
2	Blade housing	¹⁾ see page 118
3	Blade control	²⁾ see page 118
4	Torsion spring 4-6	GH-S-T-0001
5	Fixing screw 4-6	GH-S-X-0001
6	Clamping piece 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 4-6	GH-S-E-0001
10	Adjusting screw 4-6	GH-H-S-1126
11	Clamping screw 4-6	GH-H-S-0101
12	Shank cylindrical diameter 10.0 h6	GH-S-S-0001
13	End plug diameter 8.0	GH-S-S-0090

DEFA 6-10 $\varnothing 6.0$ mm to 10.1 mm




Tool

Standard tool **without** blades

- The blades must always be ordered separately.
- If the tool is clamped to the tool body, an end plug is required.
- Make sure the bore diameter is at least above the defined lower end of the tool range.

Bore range $\varnothing d$	Chamfer range $\varnothing D$	Working length NL	Blade housing $\varnothing D1$	Max. \varnothing $\varnothing D2$	K	S	Part no. without Shank	Part no. with shank $\varnothing 10$	Part no. with end plug
6.0-6.5	6.2-6.8	34.0	5.8	7.4	4.0	0.3	GH-S-D-5210	GH-S-D-5230	GH-S-D-5250
		60.0	5.8	7.4	4.0	0.3	GH-S-D-5211	GH-S-D-5231	GH-S-D-5251
6.3-7.3	6.5-7.6	34.0	5.8	8.2	4.0	0.3	GH-S-D-5212	GH-S-D-5232	GH-S-D-5252
		60.0	5.8	8.2	4.0	0.3	GH-S-D-5213	GH-S-D-5233	GH-S-D-5253
6.8-8.2	7.0-8.5	34.0	6.5	9.1	4.0	0.3	GH-S-D-5214	GH-S-D-5234	GH-S-D-5254
		60.0	6.5	9.1	4.0	0.3	GH-S-D-5215	GH-S-D-5235	GH-S-D-5255
7.7-9.3	8.1-9.6	34.0	7.5	10.4	6.0	0.4	GH-S-D-5216	GH-S-D-5236	GH-S-D-5256
		60.0	7.5	10.4	6.0	0.4	GH-S-D-5217	GH-S-D-5237	GH-S-D-5257
8.2-10.1	8.9-10.4	34.0	7.5	11.2	6.0	0.4	GH-S-D-5218	GH-S-D-5238	GH-S-D-5258
		60.0	7.5	11.2	6.0	0.4	GH-S-D-5219	GH-S-D-5239	GH-S-D-5259

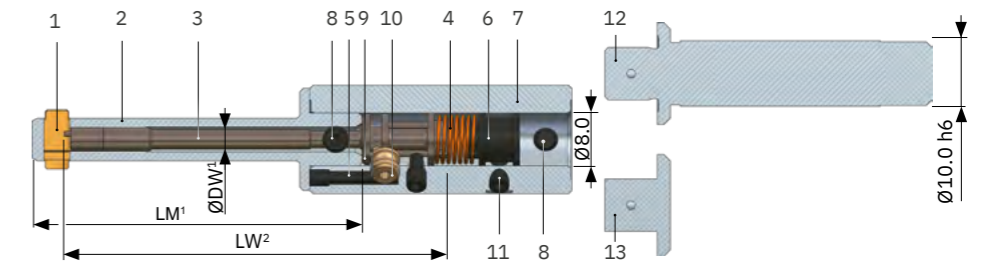
 Parts in stock highlighted in green

DEFA 6-10 $\varnothing 6.0$ mm to 10.1 mm

Blade set DF geometry 90°

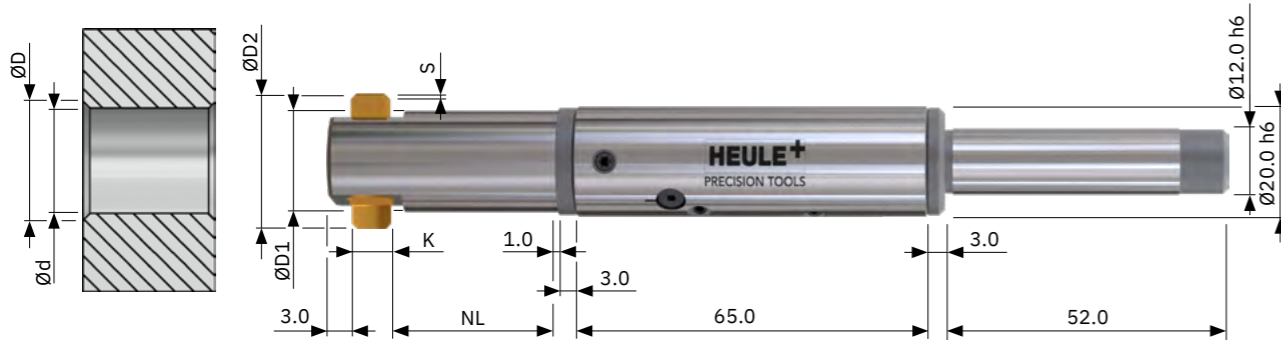
Chamfer \varnothing mm	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating T for steel	Coating for increased requirements	Coating T for steel	Coating for increased requirements
6.2-6.8	GH-S-M-3907	upon request	GH-S-M-4907	upon request
6.5-7.6	GH-S-M-3908		GH-S-M-4908	
7.0-8.5	GH-S-M-3909		GH-S-M-4909	
8.1-9.6	GH-S-M-3910		GH-S-M-4910	
8.9-10.4	GH-S-M-3911		GH-S-M-4911	

Spare parts



Item	Description	Part no.
1	Blades	see above
2	Blade housing	¹⁾ see page 118
3	Blade control	²⁾ see page 118
4	Torsion spring 6-10	GH-S-T-0001
5	Fixing screw 6-10	GH-S-X-0001
6	Clamping piece 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	Eccentric 6-10	GH-S-E-0001
10	Adjusting screw 6-10	GH-H-S-1126
11	Clamping screw 6-10	GH-H-S-0101
12	Shank cylindrical diameter 12.0 h6	GH-S-S-0001
13	End plug diameter 10.0 h6	GH-S-S-0090

DEFA 9-24 $\varnothing 9.0$ mm to 23.9 mm



Tool

Standard tool **without** blades

- The blades must always be ordered separately.
- If the tool is clamped to the tool body, an end plug is required.
- Make sure the bore diameter is at least above the defined lower end of the tool range.

Bore range $\varnothing d$	Chamfer range $\varnothing D$	Working length NL	Blade housing $\varnothing D1$	Max. \varnothing $\varnothing D2$	K	S	Part no. without Shank	Part no. with shank $\varnothing 10$	Part no. with end plug
9.0-11.7	10.2-11.4	30.0	8.8	12.2	6.0	0.4	GH-S-D-1707	GH-S-D-1747	GH-S-D-5260
	11.1-12.0 ^{EF}	60.0	8.8	12.8 ^{EF}	6.0	0.4	GH-S-D-1708	GH-S-D-1748	GH-S-D-5261
9.7-12.7	11.0-12.4	30.0	9.5	13.2	6.0	0.4	GH-S-D-1709	GH-S-D-1749	GH-S-D-5262
	12.1-13.0 ^{EF}	60.0	9.5	13.8 ^{EF}	6.0	0.4	GH-S-D-1710	GH-S-D-1750	GH-S-D-5263
11.2-14.3	12.0-13.8	30.0	11.0	14.8	8.0	0.5	GH-S-D-1711	GH-S-D-1751	GH-S-D-5264
	13.4-14.6 ^{EF}	60.0	11.0	15.6 ^{EF}	8.0	0.5	GH-S-D-1712	GH-S-D-1752	GH-S-D-5265
12.2-15.9	13.5-15.4	30.0	11.0	16.4	8.0	0.5	GH-S-D-1713	GH-S-D-1753	GH-S-D-5266
	15.0-16.2 ^{EF}	60.0	11.0	17.2 ^{EF}	8.0	0.5	GH-S-D-1714	GH-S-D-1754	GH-S-D-5267
13.2-17.3	15.1-16.6	30.0	13.0	17.6	8.0	0.5	GH-S-D-1695	GH-S-D-1788	GH-S-D-5268
	16.4-17.6 ^{EF}	60.0	13.0	18.6 ^{EF}	8.0	0.5	GH-S-D-1715	GH-S-D-1755	GH-S-D-5269
15.2-18.7	16.7-18.2	30.0	15.0	19.2	8.0	0.5	GH-S-D-1696	GH-S-D-1789	GH-S-D-5270
	17.8-19.0 ^{EF}	60.0	15.0	20.0 ^{EF}	8.0	0.5	GH-S-D-1716	GH-S-D-1756	GH-S-D-5271
16.7-21.5	18.2-20.4	30.0	16.5	22.4	8.0	1.0	GH-S-D-1697	GH-S-D-1790	GH-S-D-5272
	19.6-21.8 ^{EF}	60.0	16.5	23.8 ^{EF}	8.0	1.0	GH-S-D-1717	GH-S-D-1757	GH-S-D-5273
18.7-23.9	20.6-22.8	30.0	18.5	24.8	8.0	1.0	GH-S-D-1698	GH-S-D-1791	GH-S-D-5274
	22.0-24.2 ^{EF}	60.0	18.5	26.2 ^{EF}	8.0	1.0	GH-S-D-1718	GH-S-D-1758	GH-S-D-5275

^{EF}) Extended chamfer range possible: Part no. with "-EF" (example: GH-S-D-1747-EF for chamfer range 11.1-12.0 instead of 10.2-11.4).

Parts in stock highlighted in green

Programming Page 107

Cutting data Page 107

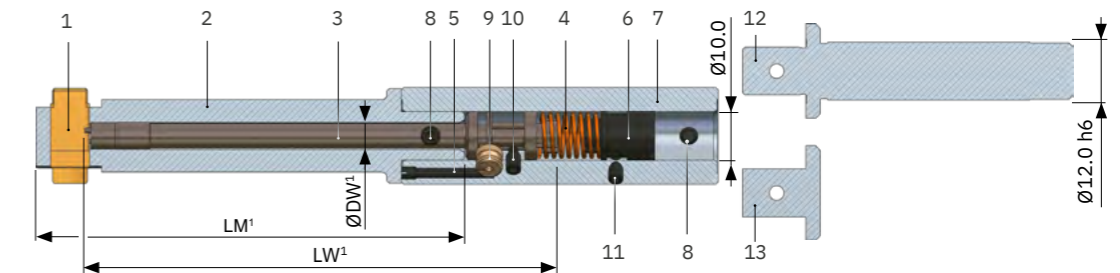
Tool Selector – Product selection made easy heule.com/en/tool-selector/defa

DEFA 9-24 $\varnothing 9.0$ mm to 23.9 mm

Blade set DF geometry 90°

Chamfer range mm	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating T for steel	Coating for increased requirements	Coating T for steel	Coating for increased requirements
10.2-11.4 / 11.1-12.0 ^{EF}	GH-S-M-3912	upon request	GH-S-M-4912	upon request
11.0-12.4 / 12.1-13.0 ^{EF}	GH-S-M-3913		GH-S-M-4913	
12.0-13.8 / 13.4-14.6 ^{EF}	GH-S-M-3914		GH-S-M-4914	
13.5-15.4 / 15.0-16.2 ^{EF}	GH-S-M-3915		GH-S-M-4915	
15.1-16.6 / 16.4-17.6 ^{EF}	GH-S-M-3916		GH-S-M-4916	
16.7-18.2 / 17.8-19.0 ^{EF}	GH-S-M-3917		GH-S-M-4917	
18.2-20.4 / 19.6-21.8 ^{EF}	GH-S-M-3918		GH-S-M-4918	
20.6-22.8 / 22.0-24.2 ^{EF}	GH-S-M-3919		GH-S-M-4919	

Spare parts



Item	Description	Part no.
1	Blades	see above
2	Blade housing	¹⁾ see page 118
3	Blade control	¹⁾ see page 118
4	Torsion spring 9-28	GH-S-T-0006
5	Fixing screw 9-28	GH-S-X-0006
6	Clamping piece 9-28	GH-S-C-0008
7	Tool body 9-19	GH-S-G-0011
	Tool body 17-24	GH-S-G-0013
8	Clamping screw M4x0.5x5.0	GH-H-S-0201
9	Eccentric 9-25	GH-S-E-0003
10	Adjusting screw 9-28	GH-H-S-0325
	Adjusting screw extended chamfer range	GH-H-S-0302
11	Clamping screw 9-25	GH-H-S-0102
12	Shank cylindrical diameter 12.0 h6	GH-S-S-0013
13	End plug diameter 10.0 h6	GH-S-S-0092

DEFA spare parts

DEFA 4-6		BLADE HOUSING			BLADE CONTROL		
Bore Ø	ØD1	NL	LM	Part no.	ØDW	LW	Part no.
4.0-4.6	3.8	30.0	45.5	GH-S-N-0102	2.0	53.6	GH-S-W-0003
		60.0	75.5	GH-S-N-0132	2.0	83.7	GH-S-W-0027
4.2-5.0	4.1	30.0	45.5	GH-S-N-0151	2.0	53.6	GH-S-W-0003
		60.0	75.5	GH-S-N-0152	2.0	83.7	GH-S-W-0027
4.6-5.6	4.5	30.0	45.5	GH-S-N-0154	2.0	53.6	GH-S-W-0003
		60.0	75.5	GH-S-N-0155	2.0	83.7	GH-S-W-0027
5.0-6.2	4.8	30.0	45.5	GH-S-N-0107	2.0	53.6	GH-S-W-0003
		60.0	75.5	GH-S-N-0134	2.0	83.7	GH-S-W-0027
5.5-6.6	5.3	30.0	45.5	GH-S-N-0109	2.0	53.6	GH-S-W-0003
		60.0	75.5	GH-S-N-0135	2.0	83.7	GH-S-W-0027

DEFA 6-10		BLADE HOUSING			BLADE CONTROL		
Bore Ø	ØD1	NL	LM	Part no.	ØDW	LW	Part no.
6.0-6.5	5.8	34.0	50.3	GH-S-N-0011	3.6	57.4	GH-S-W-0505
		60.0	76.3	GH-S-N-0036	3.6	83.4	GH-S-W-0528
6.3-7.3	5.8	34.0	50.3	GH-S-N-0111	3.6	57.4	GH-S-W-0505
		60.0	76.3	GH-S-N-0136	3.6	83.4	GH-S-W-0528
6.8-8.2	6.5	34.0	50.3	GH-S-N-0013	3.6	57.4	GH-S-W-0505
		60.0	76.3	GH-S-N-0137	3.6	83.4	GH-S-W-0528
7.7-9.3	7.5	34.0	52.3	GH-S-N-0117	3.6	57.4	GH-S-W-0505
		60.0	78.3	GH-S-N-0138	3.6	83.4	GH-S-W-0528
8.2-10.1	7.5	34.0	52.3	GH-S-N-0084	3.6	57.4	GH-S-W-0505
		60.0	78.3	GH-S-N-0085	3.6	83.4	GH-S-W-0528

DEFA 9-24		BLADE HOUSING			BLADE CONTROL		
Bore Ø	ØD1	NL	LM	Part no.	ØDW	LW	Part no.
9.0-11.7	8.8	30.0	56.0	GH-S-N-0074	4.5	65.8	GH-S-W-0508
		60.0	86.0	GH-S-N-0075	4.5	95.8	GH-S-W-0509
9.7-12.7	9.5	30.0	56.0	GH-S-N-0120	4.5	65.8	GH-S-W-0508
		60.0	86.0	GH-S-N-0121	4.5	95.8	GH-S-W-0509
11.2-14.3	11.0	30.0	58.0	GH-S-N-0022	5.5	65.8	GH-S-W-0511
		60.0	88.0	GH-S-N-0023	5.5	95.8	GH-S-W-0512
12.2-15.9	11.0	30.0	58.0	GH-S-N-0122	5.5	65.8	GH-S-W-0511
		60.0	88.0	GH-S-N-0123	5.5	95.8	GH-S-W-0512
13.2-17.3	13.0	30.0	58.0	GH-S-N-0124	5.5	65.8	GH-S-W-0511
		60.0	88.0	GH-S-N-0125	5.5	95.8	GH-S-W-0512
15.2-18.7	15.0	30.0	58.0	GH-S-N-0126	5.5	65.8	GH-S-W-0511
		60.0	88.0	GH-S-N-0127	5.5	95.8	GH-S-W-0512
16.7-21.5	16.5	30.0	58.0	GH-S-N-0128	8.0	65.8	GH-S-W-0520
		60.0	88.0	GH-S-N-0129	8.0	95.8	GH-S-W-0521
18.7-23.9	18.5	30.0	58.0	GH-S-N-0130	8.0	65.8	GH-S-W-0520
		60.0	88.0	GH-S-N-0131	8.0	95.8	GH-S-W-0521

DEFA FAQ

Question	Causes	Remedy
Chamfer diameter too small	<ul style="list-style-type: none"> D2 set too small 	<ul style="list-style-type: none"> Turn the adjusting screw anti-clockwise (see Adjusting the chamfer diameter on page 108)
Chamfer diameter too large	<ul style="list-style-type: none"> D2 set too large 	<ul style="list-style-type: none"> Turn the adjusting screw clockwise (see Adjusting the chamfer diameter on page 108)
Chamfer not even	<ul style="list-style-type: none"> Blade force too low 	<ul style="list-style-type: none"> Turn the clamping screw clockwise (see Setting the blade force page 109)
	<ul style="list-style-type: none"> Tool not centred in the bore 	<ul style="list-style-type: none"> Align tool
Chamfered surface poor	<ul style="list-style-type: none"> Working feed rate too high 	<ul style="list-style-type: none"> Reduce working feed rate
	<ul style="list-style-type: none"> Blade wear 	<ul style="list-style-type: none"> Resharpener, TiN coating or new blades
Secondary burr	<ul style="list-style-type: none"> Working feed rate too high 	<ul style="list-style-type: none"> Reduce working feed rate
	<ul style="list-style-type: none"> Blade force too strong 	<ul style="list-style-type: none"> Turn the clamping screw anti-clockwise (see Setting the blade force page 109)
	<ul style="list-style-type: none"> Tool not centred in the bore 	<ul style="list-style-type: none"> Align tool
	<ul style="list-style-type: none"> Blade wear 	<ul style="list-style-type: none"> Resharpener, TiN coating or new blades
	<ul style="list-style-type: none"> Cutting speed too low 	<ul style="list-style-type: none"> Increase cutting speed

GH-K

Chatter-free forward countersinking for extra large chamfers.

The advantages – Your benefit

Wide range of applications: Large countersink range from bore Ø3.0 to 45.0 mm.

Long service life: Tool body made of alloyed heat-treated steel in a robust and precise design with internal cooling.

Replaceable carbide blades that can be re-sharpened, with coating.



High-performance countersinking tool and circular milling cutter with three cutting edges for perfectly machined surfaces without chatter marks.



THE RANGE

Countersink angle	Min. bore Ø mm	Max. countersink Ø mm	Number of blades	Series
90°	Ø3.0	Ø25.0	3	GH-K 25
90°	Ø3.0	Ø25.0	1	GH-K 25
60°	Ø3.0	Ø25.0	3	GH-K 25
90°	Ø4.0	Ø45.0	3	GH-K 45
90°	Ø4.0	Ø45.0	1	GH-K 45
60°	Ø9.0	Ø45.0	3	GH-K 45

If the required tool is not included in the range above, the **INDIVIDUAL** range can offer a possible solution. If required, we can also develop custom solutions that are fully tailored to your application.

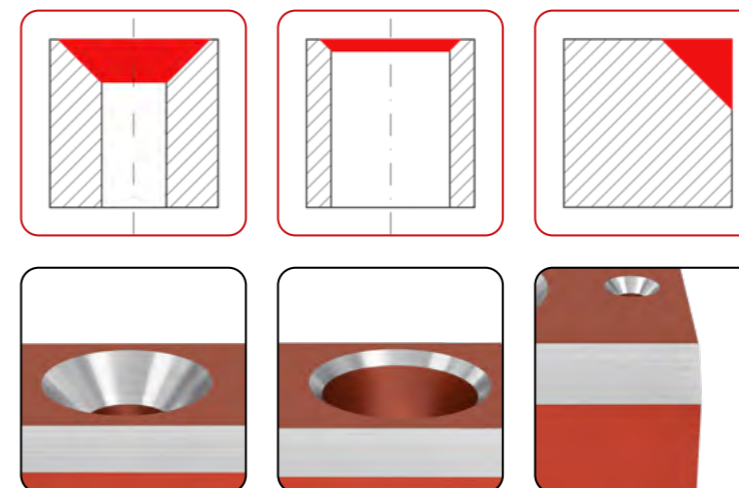
Tool Selector

> Step-by-step guide to find the right solution

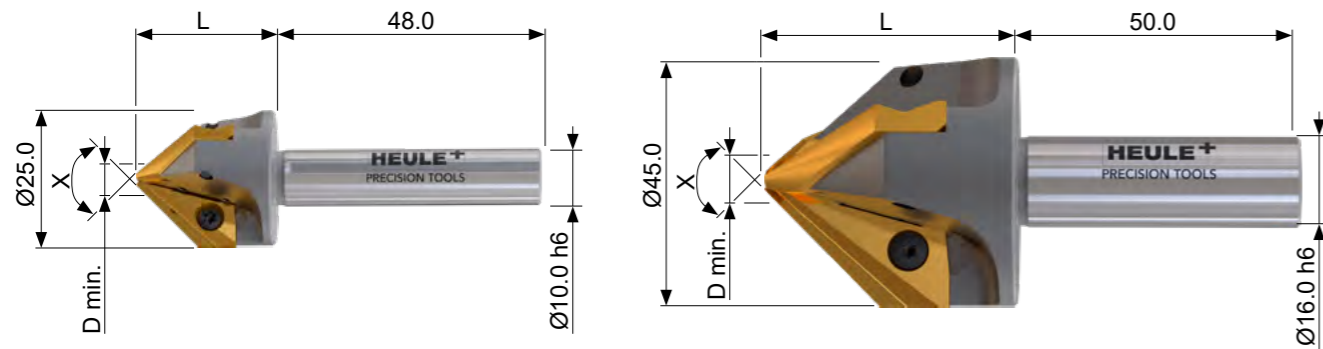
heule.com/en/tool-selector/gh-k



FIELD OF APPLICATION



GH-K 3 blades – 60° and 90°



Tool

Standard tool **without** blades

- The blades must always be ordered separately.

Series	C-sink angle X	Max. C-sink Ø mm	Min. bore Ø D min. / mm	Dimension L mm	Tool w/o blade Part no.
GH-K 25	90°	25.0	3.0	26.0	GH-K-B-0001
	60°	25.0	3.0	34.0	GH-K-B-0601
GH-K 45	90°	45.0	4.0	45.0	GH-K-B-0012
	60°	45.0	9.0	56.0	GH-K-B-0612


Blades and spare parts


C-sink angle X	Max. C-sink Ø mm	Blade set	Shim	Torx screw	Screwdriver
		Steel, titanium, Inconel Part no.	Part no.	Part no.	Part no.
60°	25.0	GH-K-M-0617	GH-K-U-0004	GH-H-S-0008	GH-H-S-2014
60°	45.0	GH-K-M-0618	GH-K-U-0005	GH-H-S-0009	GH-H-S-2016
90°	25.0	GH-K-M-0017	GH-K-U-0001	GH-H-S-0008	GH-H-S-2014
90°	45.0	GH-K-M-0018	GH-K-U-0002	GH-H-S-0009	GH-H-S-2016

Adapting the tool to different materials

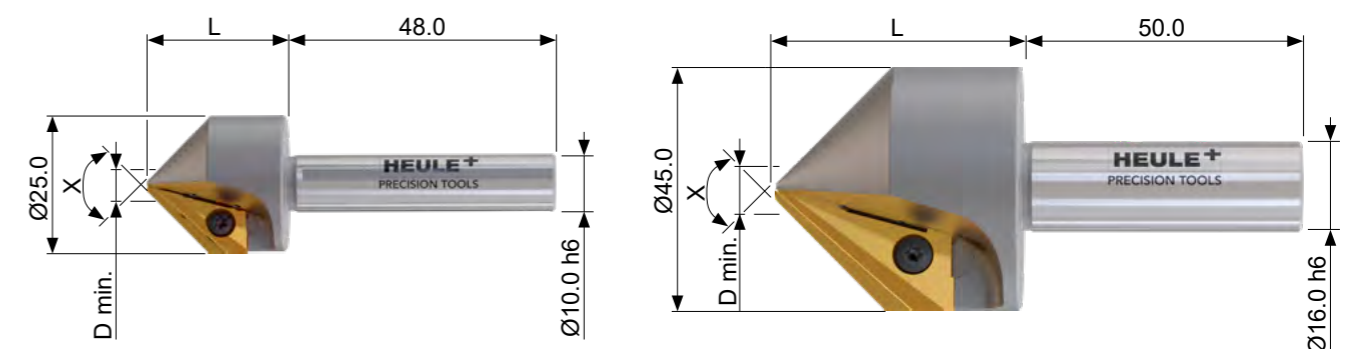
To optimise cutting geometry, 0.05 mm thick shims can be inserted between the blade and the tool body.

 Parts in stock highlighted in green

 Cutting data and re-sharpening device
Page 124

 Tool Selector –
Product selection made easy
heule.com/en/tool-selector/gh-k

GH-K 1 blade – 60° and 90°



Tool

Standard tool **without** blade

- The blades must always be ordered separately.

Series	C-sink angle X	Max. C-sink Ø mm	Min. bore Ø D min. / mm.	Dimension L mm	Tool w/o blade Part no.
GH-K 25	90°	25.0	3.0	26.0	GH-K-B-0010
GH-K 45	90°	45.0	4.0	45.0	GH-K-B-0011

Blades and spare parts

C-sink angle X	Max. C-sink Ø mm	Blades	Shim	Torx screw	Screwdriver
		Steel, titanium, Inconel Part no.	Part no.	Part no.	Part no.
90°	25.0	GH-K-M-0024	GH-K-U-0007	GH-H-S-0008	GH-H-S-2014
90°	45.0	GH-K-M-0030	GH-K-U-0008	GH-H-S-0009	GH-H-S-2016

Adapting the tool to different materials

To optimise cutting geometry, 0.05 mm thick shims can be inserted between the blade and the tool body.



Only use the single-blade tool with an automatic working feed and stable spindle as well as rigid workpiece clamping.

CUTTING DATA

	Description	Tensile str. RM (MPa)	Hardness (HB)	Hardn. (HRC)	GH-K	
					VC	FZ
P0	Low-carbon steel, long-chipping, C <0.25%	<530	<125	–	30–50	0.05 / blade
P1	Low-carbon steel, short-chipping, C <0.25%	<530	<125	–	30–50	0.05 / blade
P2	Steel with carbon content C >0.25%	>530	<220	<25	30–50	0.05 / blade
P3	Alloy steel and tool steel, C >0.25%	600–850	<330	<35	30–50	0.05 / blade
P4	Alloy steel and tool steel, C >0.25%	850–1400	340–450	35–48	15–25	0.05 / blade
P5	Ferritic, martensitic and stainless PH steel	600–900	<330	<35	15–25	0.05 / blade
P6	High-strength ferritic, martensitic and PH stainless steel	900–1350	350–450	35–48	15–25	0.05 / blade
M1	Austenitic stainless steel	<600	130–200	–	10–20	0.05 / blade
M2	High-strength austenitic stainless steel	600–800	150–230	<25	10–20	0.05 / blade
M3	Duplex stainless steel	<800	135–275	<30	20–30	0.05 / blade
K1	Cast iron	125–500	120–290	<32	30–70	0.05 / blade
K2	Ductile cast iron with up to medium strength	<600	130–260	<28	30–50	0.05 / blade
K3	High-strength cast iron and bainitic cast iron	>600	180–350	<43	30–50	0.05 / blade
N1	Wrought aluminium alloys	–	–	–	30–120	0.05 / blade
N2	Aluminium alloys with low Si content	–	–	–	30–120	0.05 / blade
N3	Aluminium alloys with high Si content	–	–	–	30–120	0.05 / blade
N4	Copper, brass and zinc base	–	–	–	30–50	0.05 / blade
S1	Iron-based heat-resistant alloys	500–1200	160–260	25–48	10–20	0.05 / blade
S2	Cobalt-based heat-resistant alloys	1000–1450	250–450	25–48	10–20	0.05 / blade
S3	Nickel-based heat-resistant alloys	600–1700	160–450	<48	10–20	0.05 / blade
S4	Titanium and titanium alloys	900–1600	300–400	33–48	10–20	0.05 / blade



The cutting data listed are guidelines! They depend on the unevenness of the bore edges (e.g. high slope > low cutting value). The working feed also depends on the sloping ratio.
For materials that are difficult to machine or uneven bore edges, we recommend using cutting speeds that are at the lower end of the range.

RE-SHARPENING FIXTURE

Series	C-sink angle	Max. C-sink Ø	Blade re-sharpening fixture	
			Part no.	
GH-K 25	90°	25.0	GH-K-V-0020	
	60°	25.0	GH-K-V-0023	
GH-K 45	90°	45.0	GH-K-V-0021	
	60°	45.0	GH-K-V-0024	

BSF

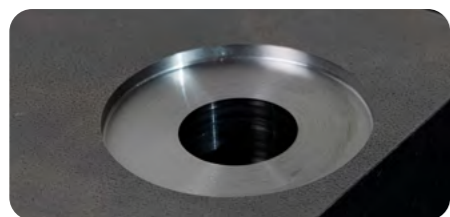
Efficient spotfacing up to 2.3 x bore diameter.
Reliable, economical and easy to use.

The advantages – Your benefit

BSF can be used on a wide variety of machines. Thanks to the modular system, BSF adapts to existing blade activation options.



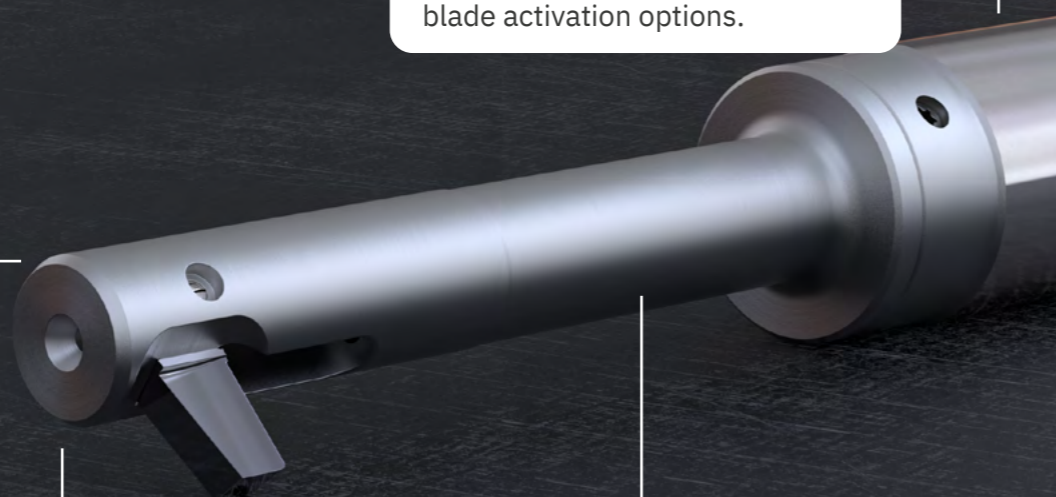
The robust tool is ready for immediate use without presets and is extremely easy to handle.



The clean counterbores up to 2.3x diameter d in demanding materials and the above-average service life of the carbide blades are impressive.



BSF machines inaccessible bores automatically and without turning the workpiece. Reliable operation thanks to integrated blade window flushing.



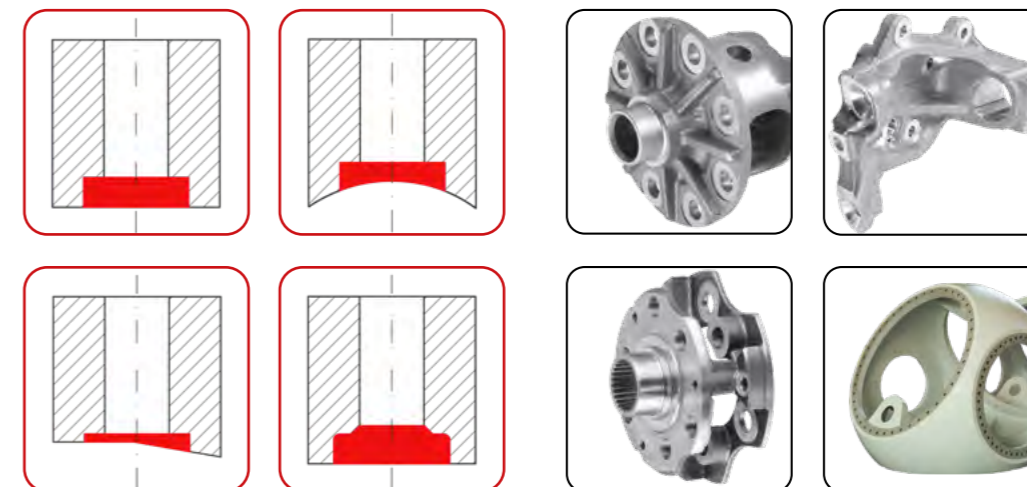
THE RANGE



Bore Ø range mm	C-bore Ø range mm	Working L. mm	Series	Catalogue Page
Ø6.5–Ø7.0	Ø9.5–Ø16.5	40.0	Series A	138
Ø7.5–Ø8.5	Ø11.0–Ø20.0	40.0	Series B	139
Ø9.0–Ø10.0	Ø13.5–Ø23.0	50.0	Series C	141
Ø10.5–Ø11.5	Ø15.5–Ø26.5	50.0	Series D	143
Ø12.0–Ø14.0	Ø18.0–Ø32.5	50.0	Series E	146
Ø14.5–Ø17.0	Ø21.5–Ø39.5	70.0	Series F	151
Ø17.5–Ø21.0	Ø26.0–Ø49.0	70.0	Series G	157

If the required tool is not included in the range above, the **INDIVIDUAL** range can offer you a possible solution. If required, we can also develop custom solutions that are fully tailored to your application. The same applies to a larger bore : counterbore ratio, a narrower production tolerance band of ± 0.1 and/or any required special counterbore form for example.

FIELD OF APPLICATION



TOOL DESIGN

The BSF tool's construction is robust, simple and therefore reliable. The blade is unfolded using centrifugal force. There are three activation possibilities for the blade: Internal coolant pressure, compressed air or manual activation ring. The

modular design enables retrofitting within the standard range. Existing tools can be retrofitted if required. For conversion kits, see page 170.



Standard BSF

Use on machines with integrated coolant. IC pressure min. 20 bar, max. 50 bar.



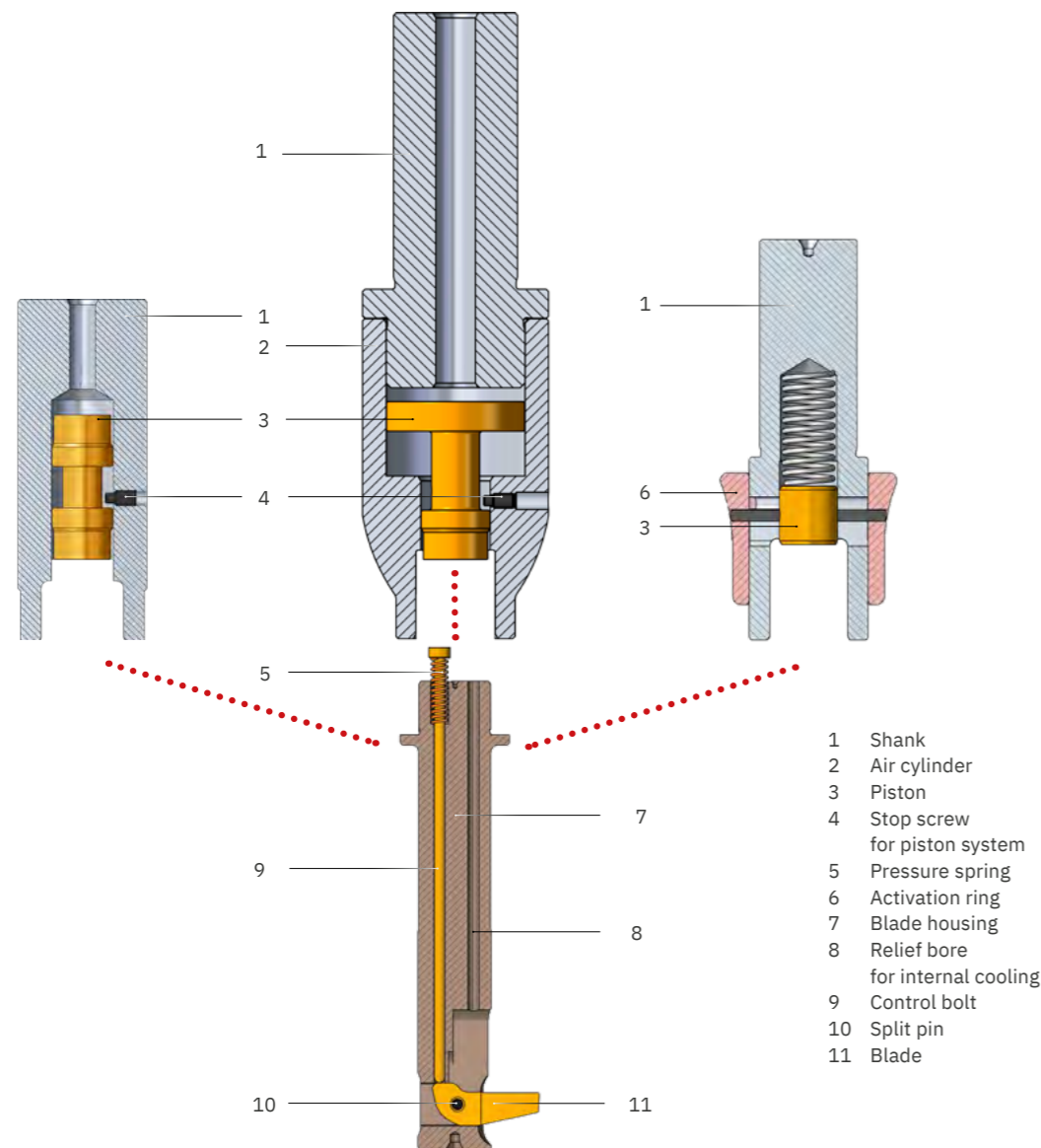
BSF Air

For use on machines that do not have integrated coolant, but do have compressed air (min. 5 bar).



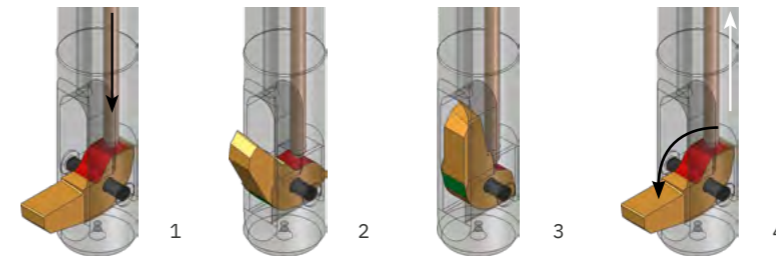
BSF Manual

Use on simple NC or manual machines that have neither compressed air nor integrated coolant.



- 1 Shank
- 2 Air cylinder
- 3 Piston
- 4 Stop screw for piston system
- 5 Pressure spring
- 6 Activation ring
- 7 Blade housing
- 8 Relief bore for internal cooling
- 9 Control bolt
- 10 Split pin
- 11 Blade

OPERATING PRINCIPLE



1 The internal coolant (IC), the air or manual actuation applies pressure on the piston. The blade is folded in by the control bolt, which presses on the back surface (red).

2 During the folding movement, the back surface rotates away and the control bolt – still under pressure – hits the stop-surface of the blade.

3 When folded in, the control bolt holds the blade in position. The blade remains in position (folded in) regardless of acceleration in the axial direction (Z-axis).

4 After switching off the coolant pressure/air pressure or manually turning the activation ring, the control bolt retracts and the blade is folded out by centrifugal force from the spindle rotation.

COUNTERBORING TOLERANCE

Bore diameter tolerance in mm	+0.1 0	+0.2 0
Counterbore diameter tolerance in mm	±0.2 ¹⁾	±0.3 ¹⁾

¹⁾ For a narrower counterbore diameter tolerance band, see page 171.



Please note the recommended value for the tolerance of the bore diameter. The larger the tolerance, the more the quality can be affected (damage to the bore, pressing, counterbore diameter becomes smaller).

Operating instructions

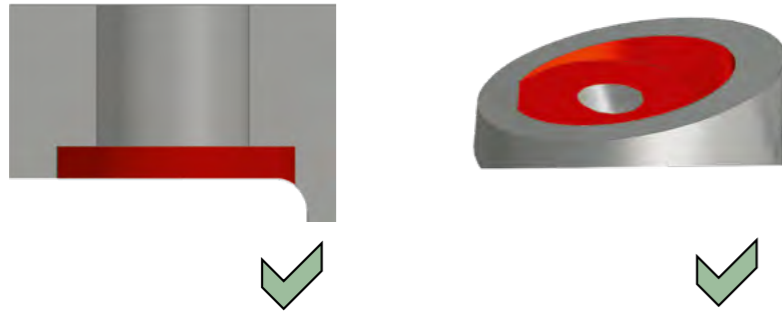
- > Blade change
- > Operating BSF Manual

heule.com > Service > Media & Download Centre



APPLICATION LIMITS

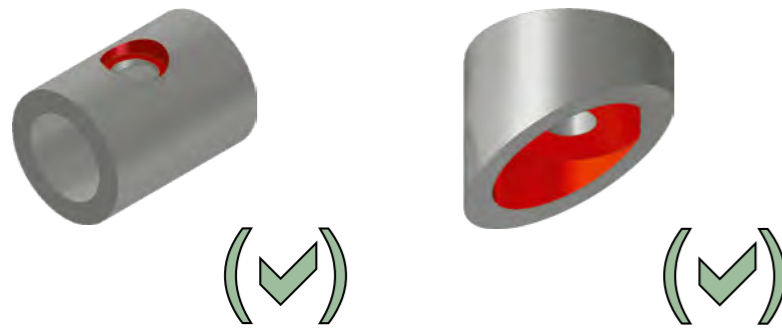
Machining possible



Surfaces or partially interrupted cuts up to a maximum pitch angle of 20° are permissible.

Important: Surface with interruption **must** be machined without internal cooling (IC) / compressed air until full cut is achieved.

Machining conditionally possible



Excessive curvatures or pitch angles can cause the blade and tool to break. Therefore, such applications are only feasible to a limited extent. The HEULE specialists are happy to advise you.

Machining not possible



Excessive pitch angles and fully interrupted cuts, such as with punching, slotting, etc., cause the blade and tool to break.

The SOLO tool system is capable of machining workpieces with a partially interrupted or completely interrupted cut (see page 178), presuming a suitable bore/counterbore ratio.

MACHINE REQUIREMENTS

	BSF Blade activation with internal coolant	BSF Air Blade activation with compressed air	BSF Manual Manual blade activation
Machine	<ul style="list-style-type: none"> Activation with coolant, internal coolant through spindle centre, at least 20 bar Operating pressure 20-50 bar. Attention: Reduce coolant pressure for soft materials! Coolant supply can be programmed on/off. Filtered coolant circuit with filter size $\leq 25 \mu\text{m}$ 	<ul style="list-style-type: none"> Activation with compressed air cooling through spindle centre, at least 5 bar Operating pressure up to 20 bar max. 	no specific machine requirements
Activation speed for unfolding the blade	up to 5000 rpm The activation speed depends on the bore diameter and counterbore ratio (see "Activation speed" table).		
Clamping workpiece	The BSF tool works in tension. This must be taken into account when clamping the workpiece. Make sure there is enough space behind the workpiece (clamping device) for chips. For long-chipping materials, feed cycles should be programmed so that you get only short chips that are easy to remove. The tool's flushing mechanism helps to remove the chips.		
Clamping system	A clamping collet seal is absolutely essential for tools with a cylindrical shank. This is recommended for those with a Weldon shank.		

CUTTING DATA

Description	Tensile str. RM (MPa)*	B*	Cutting speed	Working feed rate mm/rev					
				Series and bore diameter					
				A 6.50– 7.00	B 7.50– 8.50	C 9.00– 11.50	D 10.50– 11.50	E/F/G 12.00– 21.00	
P0	Low-carbon steel, long-chipping, C <0.25%	<530	A	40–70	0.01–0.02	0.01–0.03	0.02–0.04	0.03–0.06	0.03–0.08
P1	Low-carbon steel, short-chipping, C <0.25%	<530	A	40–70	0.01–0.02	0.01–0.03	0.02–0.04	0.03–0.06	0.03–0.08
P2	Steel with carbon content C >0.25%	>530	A	40–70	0.01–0.02	0.01–0.03	0.02–0.04	0.03–0.06	0.03–0.08
P3	Alloy steel and tool steel, C >0.25%	600–850	A	30–50	0.01–0.02	0.01–0.03	0.02–0.04	0.03–0.06	0.03–0.08
P4	Alloy steel and tool steel, C >0.25%	850–1400	A	30–50	0.01–0.02	0.01–0.03	0.02–0.04	0.03–0.06	0.03–0.08
P5	Ferritic, martensitic and stainless PH steel	600–900	A	15–30	0.01–0.02	0.01–0.03	0.02–0.04	0.03–0.06	0.03–0.08
P6	High-strength ferritic, martensitic and PH stainless steel	900–1350	A	15–30	0.01–0.02	0.01–0.03	0.02–0.04	0.03–0.06	0.03–0.08
M1	Austenitic stainless steel	<600	A	10–20	0.01–0.02	0.01–0.03	0.02–0.04	0.03–0.06	0.03–0.08
M2	High-strength austenitic stainless steel	600–800	A	10–20	0.01–0.02	0.01–0.03	0.02–0.04	0.03–0.06	0.03–0.08
M3	Duplex stainless steel	<800	A	40–70	0.01–0.02	0.01–0.03	0.02–0.04	0.03–0.06	0.03–0.08
K1	Cast iron	125–500	A	50–90	0.01–0.02	0.01–0.03	0.02–0.04	0.03–0.06	0.03–0.08
K2	Ductile cast iron with up to medium strength	<600	A	40–70	0.01–0.02	0.01–0.03	0.02–0.04	0.03–0.06	0.03–0.08
K3	High-strength cast iron and bainitic cast iron	>600	A	40–70	0.01–0.02	0.01–0.03	0.02–0.04	0.03–0.06	0.03–0.08
N1	Wrought aluminium alloys	–	D	60–120	0.02–0.03	0.02–0.04	0.02–0.05	0.02–0.08	0.05–0.10
N2	Aluminium alloys with low Si content	–	D	60–120	0.02–0.03	0.02–0.04	0.02–0.05	0.02–0.08	0.05–0.10
N3	Aluminium alloys with high Si content	–	D	60–120	0.02–0.03	0.02–0.04	0.02–0.05	0.02–0.08	0.05–0.10
N4	Copper, brass and zinc base	–	D	50–90	0.01–0.02	0.01–0.03	0.02–0.04	0.03–0.06	0.03–0.08
S1	Iron-based heat-resistant alloys	500–1200	A	10–20	0.01–0.02	0.01–0.03	0.02–0.04	0.03–0.06	0.03–0.08
S2	Cobalt-based heat-resistant alloys	1000–1450	A	10–20	0.01–0.02	0.01–0.03	0.02–0.04	0.03–0.06	0.03–0.08
S3	Nickel-based heat-resistant alloys	600–1700	A	10–20	0.01–0.02	0.01–0.03	0.02–0.04	0.03–0.06	0.03–0.08
S4	Titanium and titanium alloys	900–1600	A	10–20	0.01–0.02	0.01–0.03	0.02–0.04	0.03–0.06	0.03–0.08

* coating for blades

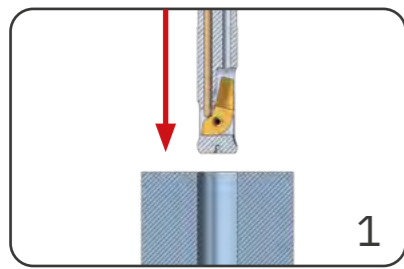


The cutting data listed are guide values! They depend on the amount of slope of the uneven surface. (e.g. high slope > low cutting value).
For materials that are difficult to machine, we recommend applying cutting speeds that are at the lower end of the range.

ACTIVATION SPEED

Counterbore ratio*	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3
* C-bore Ø : Bore Ø										
Bore diameter d										
Series A										
6.5	4500	4500	4500	3500	3500	3500	3000	3000	2500	2500
7.0	2500	2500	2500	2500	2500	2000	2000	2000	2000	2000
Series B										
7.5	4500	4500	4500	3500	3500	3000	3000	2500	2500	2500
8.0	2500	2500	2500	2500	2500	2000	2000	2000	2000	2000
8.5	2000	2000	2000	2000	2000	2000	2000	2000	1500	1500
Series C										
9.0	3500	3500	3500	3000	3000	2500	2500	2500	2500	2500
9.5	2500	2500	2500	2500	2000	2000	2000	2000	2000	2000
10.0	2000	2000	2000	2000	2000	2000	2000	2000	2000	1500
Series D										
10.5	5000	5000	5000	3500	3500	3500	3000	3000	2500	2500
11.0	3000	3000	3000	2500	2500	2500	2500	2500	2000	2000
11.5	2500	2500	2500	2000	2000	2000	2000	2000	2000	2000
Series E										
12.0	3500	3500	3500	2500	2500	2500	2500	2500	2000	2000
12.5 - 13.0	2500	2500	2500	2000	2000	2000	2000	1500	1500	1500
13.5 - 14.0	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Series F										
14.5	3500	3500	3500	2500	2500	2500	2500	2500	2500	2000
15.0 - 15.5	3000	3000	3000	2500	2500	2500	2000	2000	2000	2000
16.0 - 17.0	2000	2000	2000	1500	1500	1500	1500	1500	1500	1500
Series G										
17.5 - 18.0	3500	3500	3500	2500	2500	2500	2000	2000	2000	1500
18.5 - 19.5	2000	2000	2000	1500	1500	1500	1500	1500	1500	1500
20.0 - 21.0	1500	1500	1500	1000	1000	1000	1000	1000	1000	1000

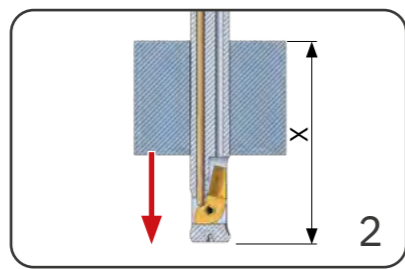
BSF PROCESS STEPS



- Rapid feed to 1.0 mm in front of the bore
- Spindle stop!
- Internal coolant on (20–50 bar)
- Dwell time 2–5 sec.

Example
G0 Z+1 M5
M88 (internal coolant on¹⁾)
G4X3

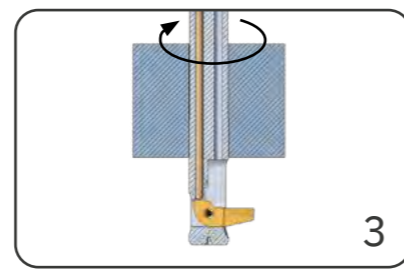
¹⁾ Machine command for internal coolant ON (M88), OFF (M89). Your machine may have different M commands for internal coolant (see manufacturer's specifications for the control unit)



- Rapid feed to position X

G0 Z-54.5²⁾

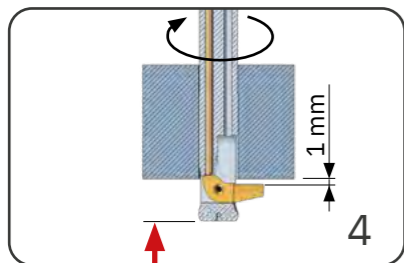
²⁾ 54.5 = 30.0 mm + swing length AL (see page 144) 22.5 mm + safety clearance 2.0 mm



- Switch off internal coolant
- Activation speed on
- Dwell time 1–2 sec³⁾

M89 (internal coolant off)
S2000 M3
G4X2

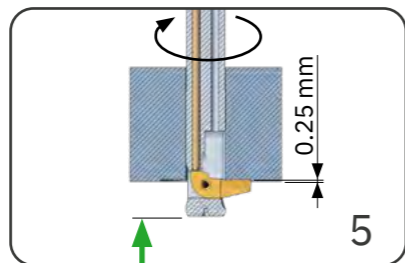
³⁾ Take into account the pressure reduction time of the internal coolant system for the machine in question



- Rapid feed up to the bore edge, observe safety clearance of 1.0 mm
- Cutting speed set
- External coolant on

G0 Z-40.6⁴⁾
S400 M3
M8

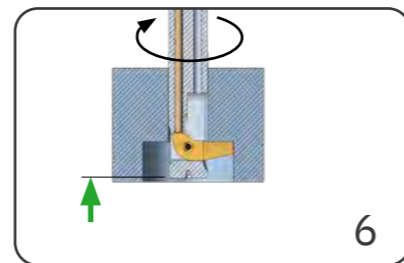
⁴⁾ 40.6 = 30.0 + 9.6 + 1.0



- Working feed until blade is fully in the cut

G1 Z-39.35⁵⁾ F20

⁵⁾ 39.35 = 30.0 + 9.6 - 0.25



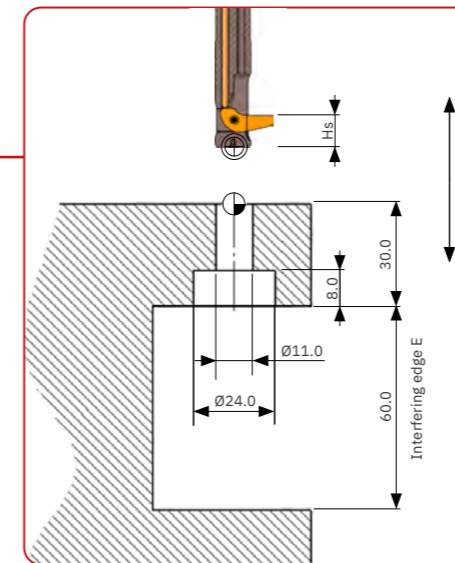
- Internal coolant on
- Working feed to counterbore depth
- Free cutting without internal coolant recommended⁷⁾

M88
G1 Z-31.6⁶⁾

⁶⁾ 31.6 = 30.0 + 9.6 - 8.0

⁷⁾ For soft materials, machine approx. 1.0 mm before counterbore depth without internal coolant

APPLICATION AND PROGRAMMING EXAMPLE



Counterbore M10 for socket head cap screw with inner hexagonal recess in accordance with DIN 974-1

Application data

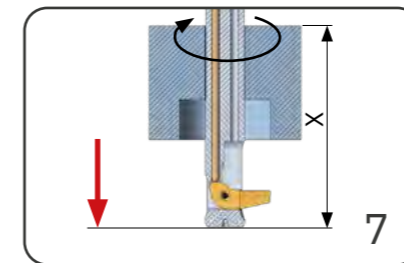
Bore Ø: Ø11.0 mm
Material: C45
Counterbore Ø: Ø24.0 mm
Counterbore depth: 8.0 mm

Tool and blade selection

Tool: BSF-D-1100/050-12.0
Blade: BSF-M-D-1A-12.0
Swing length AL: 22.5 mm
Blade height Hs: 9.6 mm

Cutting data

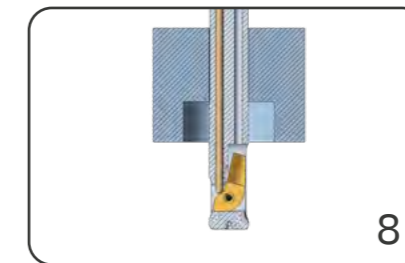
Cutting speed V_c : 30 m/min.
Tool working feed: 0.05 mm/rev
Activation speed: Counterbore ratio 24.0: 11.0 = 2.18 > 2000 rpm



- Internal coolant off
- External coolant off
- Rapid feed to position X

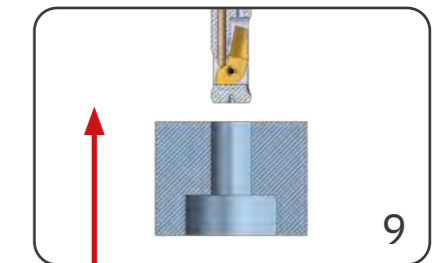
M89
M9
G0 Z-54.5⁸⁾

⁸⁾ 54.5 = 30.0 + 22.5 + 2.0



- Spindle stop!
- Internal coolant on 20–50 bar
- Dwell time 2–5 sec.

M5
M88
G4X3



- Rapid feed out of the workpiece

G0 Z1
M89

Selecting the correct BSF tool

TOOL SELECTOR TOOL TABLES

The HEULE Tool Selector is the quickest and easiest way to find the right tool.

Send the search results along with your application data to your HEULE representative. They will check the application and offer options, if required.

If your search produces no results, please contact HEULE with your application data anyway. We also develop customised solutions and are happy to advise you.

The correct tool is primarily determined by the bore diameter to be machined. This table also shows the possible counterbore diameters and the working length. The right blade can be selected accordingly.

The tool tables cover the standard range. The tool part numbers highlighted in green are available from stock.

BSF is also available with different blade coatings to meet the requirements depending on the type of material.

If the standard does not fit your needs, please do not hesitate to contact your HEULE representative for advice, either using the enquiry form (www.heule.com > contact) or by telephone.

CONFIGURING BSF TOOLS

1. Select tool



First select the bore diameter corresponding to your application in the tool table. Then select the required counterbore diameter.

2. Select activation type



Depending on the machine type, the blade can be activated manually, with internal spindle coolant or compressed air.

3. Select blade



Please refer to the tool table for the carbide blade suitable for the selected tool. The coating required for the workpiece material is also referenced in the blade part number (1A: steel, 1D: aluminium, see also the information in the cutting data table).

Tool Selector

> Get reliable help to find the right solution

heule.com/en/tool-selector/bsf



Tool Selector 

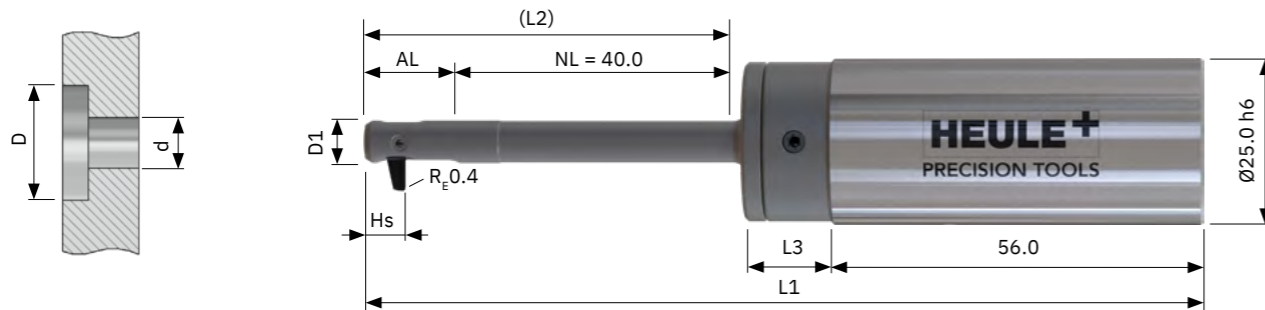
Still have questions?

> HEULE Consulting and Support

heule.com/en/contact



BSF Bore Ø 6.5 mm and Ø7.0 mm | Series A



Tools and blades

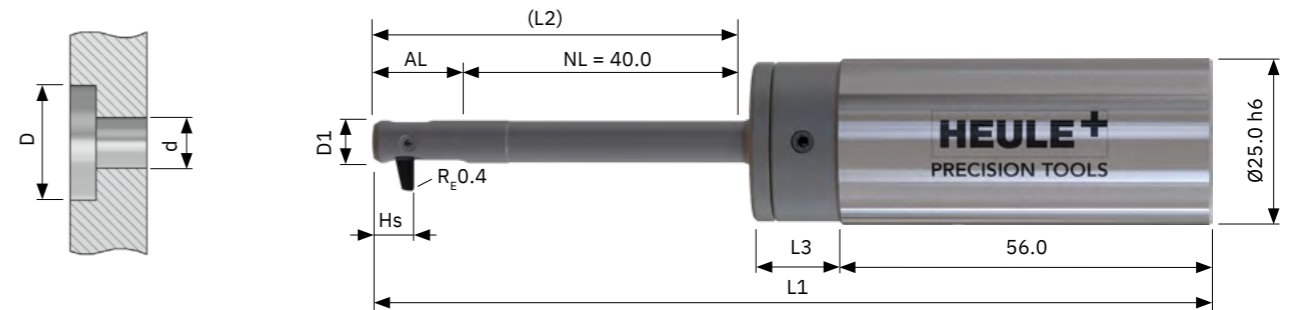
Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-A-**1D**-3.0).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.	
6.50	6.40	9.50	14.25	6.15	127.75	54.25	13.50	BSF-A-0650/040-6.5	BSF-M-A-1A-3.0	
		10.00						BSF-A-0650/040-7.0		
		10.50						BSF-A-0650/040-7.5		
		11.00						BSF-A-0650/040-6.5	BSF-M-A-1A-4.5	
		11.50						BSF-A-0650/040-7.0		
		12.00						BSF-A-0650/040-7.5		
		12.50						BSF-A-0650/040-6.5	BSF-M-A-1A-6.0	
		13.00						BSF-A-0650/040-7.0		
		13.50						BSF-A-0650/040-7.5		
	14.00						BSF-A-0650/040-6.5	BSF-M-A-1A-7.5		
	14.50						BSF-A-0650/040-7.0			
	15.00						BSF-A-0650/040-7.5			
	7.00	6.90	10.00	15.00	6.15	128.50	55.00	13.50	BSF-A-0700/040-7.0	BSF-M-A-1A-3.0
			10.50						BSF-A-0700/040-7.5	
			11.00						BSF-A-0700/040-8.0	
11.50								BSF-A-0700/040-7.0	BSF-M-A-1A-4.5	
12.00								BSF-A-0700/040-7.5		
12.50								BSF-A-0700/040-8.0		
13.00								BSF-A-0700/040-7.0	BSF-M-A-1A-6.0	
13.50								BSF-A-0700/040-7.5		
14.00								BSF-A-0700/040-8.0		
14.50							BSF-A-0700/040-7.0	BSF-M-A-1A-7.5		
15.00							BSF-A-0700/040-7.5			
15.50							BSF-A-0700/040-8.0			
16.00							BSF-A-0700/040-7.0	BSF-M-A-1A-9.0		
16.50							BSF-A-0700/040-7.5			

Parts in stock highlighted in green

BSF Bore Ø 7.5 mm and Ø8.0 mm | Series B



Tools and blades

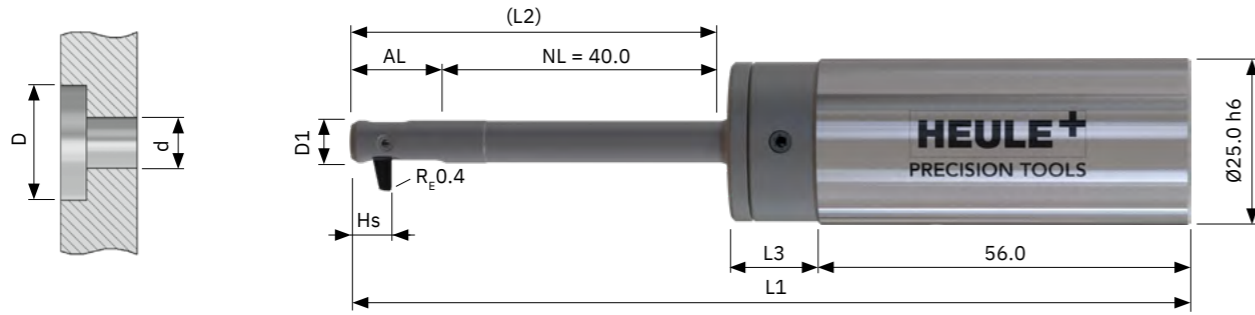
Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-B-**1D**-3.5).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.
7.50	7.40	11.00	17.00	7.55	130.50	57.00	13.50	BSF-B-0750/040-7.5	BSF-M-B-1A-3.5
		11.50						BSF-B-0750/040-8.0	
		12.00						BSF-B-0750/040-8.5	
		12.50						BSF-B-0750/040-7.5	BSF-M-B-1A-5.0
		13.00						BSF-B-0750/040-8.0	
		13.50						BSF-B-0750/040-8.5	
		14.00						BSF-B-0750/040-7.5	BSF-M-B-1A-6.5
		14.50						BSF-B-0750/040-8.0	
		15.00						BSF-B-0750/040-8.5	
	15.50						BSF-B-0750/040-7.5	BSF-M-B-1A-8.0	
	16.00						BSF-B-0750/040-8.0		
	16.50						BSF-B-0750/040-8.5		
	17.00						BSF-B-0750/040-7.5	BSF-M-B-1A-9.5	
	17.50						BSF-B-0750/040-8.0		
	8.00	7.90	11.50	17.00	7.55	130.50	57.00	13.50	BSF-B-0800/040-8.0
12.00								BSF-B-0800/040-8.5	
12.50								BSF-B-0800/040-9.0	
13.00								BSF-B-0800/040-8.0	BSF-M-B-1A-5.0
13.50								BSF-B-0800/040-8.5	
14.00								BSF-B-0800/040-9.0	
14.50								BSF-B-0800/040-8.0	BSF-M-B-1A-6.5
15.00								BSF-B-0800/040-8.5	
15.50								BSF-B-0800/040-9.0	
16.00							BSF-B-0800/040-8.0	BSF-M-B-1A-8.0	
16.50							BSF-B-0800/040-8.5		
17.00							BSF-B-0800/040-9.0		
17.50							BSF-B-0800/040-8.0	BSF-M-B-1A-9.5	
18.00							BSF-B-0800/040-8.5		
18.50							BSF-B-0800/040-9.0		

Parts in stock highlighted in green

BSF Bore Ø 8.5 mm | Series B




Tools and blades

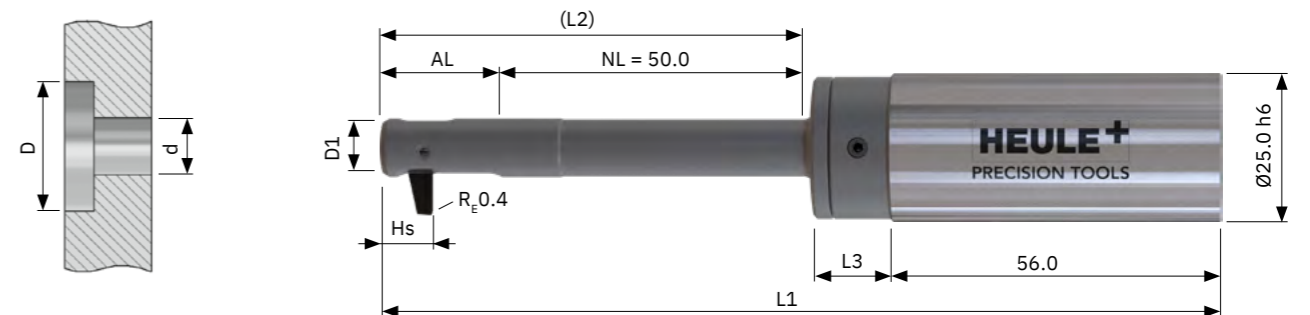
Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-B-**1D**-3.5).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.
8.50	8.40	12.00	17.75	7.55	131.25	57.75	13.50	BSF-B-0850/040-8.5	BSF-M-B-1A-3.5
		12.50						BSF-B-0850/040-9.0	
		13.00						BSF-B-0850/040-9.5	
		13.50						BSF-B-0850/040-8.5	BSF-M-B-1A-5.0
		14.00						BSF-B-0850/040-9.0	
		14.50						BSF-B-0850/040-9.5	
		15.00						BSF-B-0850/040-8.5	BSF-M-B-1A-6.5
		15.50						BSF-B-0850/040-9.0	
		16.00						BSF-B-0850/040-9.5	
		16.50						BSF-B-0850/040-8.5	BSF-M-B-1A-8.0
		17.00						BSF-B-0850/040-9.0	
		17.50						BSF-B-0850/040-9.5	
		18.00						BSF-B-0850/040-8.5	BSF-M-B-1A-9.5
		18.50						BSF-B-0850/040-9.0	
		19.00						BSF-B-0850/040-9.5	
		19.50						BSF-B-0850/040-8.5	BSF-M-B-1A-11.0
		20.00						BSF-B-0850/040-9.0	

 Parts in stock highlighted in green

BSF Bore Ø 9.0 mm and Ø9.5 mm | Series C



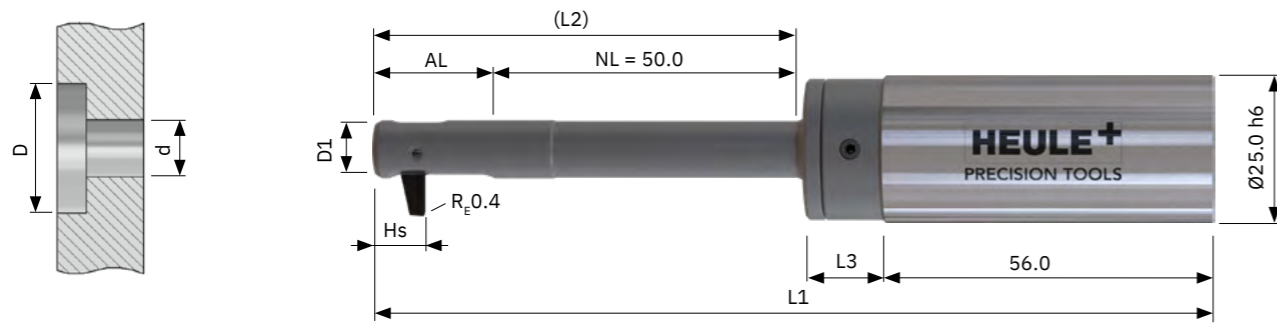
Tools and blades

Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-C-**1D**-4.0).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.		
9.00	8.90	13.50	20.25	8.55	143.75	70.25	13.50	BSF-C-0900/050-9.5	BSF-M-C-1A-4.0		
		14.00						BSF-C-0900/050-10.0			
		14.50						BSF-C-0900/050-10.5			
		15.00						BSF-C-0900/050-9.5	BSF-M-C-1A-5.5		
		15.50						BSF-C-0900/050-10.0			
		16.00						BSF-C-0900/050-10.5			
		16.50						BSF-C-0900/050-9.5	BSF-M-C-1A-7.0		
		17.00						BSF-C-0900/050-10.0			
		17.50						BSF-C-0900/050-10.5			
		18.00						BSF-C-0900/050-9.5	BSF-M-C-1A-8.5		
		18.50						BSF-C-0900/050-10.0			
		19.00						BSF-C-0900/050-10.5			
		19.50						BSF-C-0900/050-9.5	BSF-M-C-1A-10.0		
		20.00						BSF-C-0900/050-10.0			
		20.50						BSF-C-0900/050-10.5			
		21.00						BSF-C-0900/050-9.5	BSF-M-C-1A-11.5		
		9.50	9.40	14.00	20.25	8.55	143.75	70.25	13.50	BSF-C-0950/050-10.0	BSF-M-C-1A-4.0
				14.50						BSF-C-0950/050-10.5	
				15.00						BSF-C-0950/050-11.0	
				15.50						BSF-C-0950/050-10.0	BSF-M-C-1A-5.5
16.00								BSF-C-0950/050-10.5			
16.50								BSF-C-0950/050-11.0			
17.00								BSF-C-0950/050-10.0	BSF-M-C-1A-7.0		
17.50								BSF-C-0950/050-10.5			
18.00								BSF-C-0950/050-11.0			
18.50								BSF-C-0950/050-10.0	BSF-M-C-1A-8.5		
19.00								BSF-C-0950/050-10.5			
19.50								BSF-C-0950/050-11.0			
20.00						BSF-C-0950/050-10.0	BSF-M-C-1A-10.0				
20.50						BSF-C-0950/050-10.5					
21.00						BSF-C-0950/050-11.0					
21.50						BSF-C-0950/050-10.0	BSF-M-C-1A-11.5				
22.00						BSF-C-0950/050-10.5					

BSF Bore Ø 10.0 mm | Series C



Tools and blades

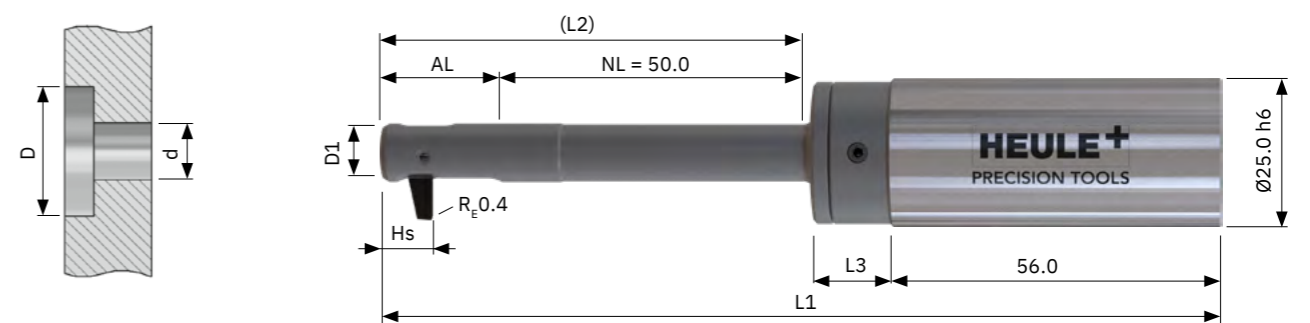
Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-C-**1D**-4.0).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.
10.00	9.90	14.50	20.25	8.55	143.75	70.25	13.50	BSF-C-1000/050-10.5	BSF-M-C-1A-4.0
		15.00						BSF-C-1000/050-11.0	
		15.50						BSF-C-1000/050-11.5	
		16.00						BSF-C-1000/050-10.5	BSF-M-C-1A-5.5
		16.50						BSF-C-1000/050-11.0	
		17.00						BSF-C-1000/050-11.5	
		17.50						BSF-C-1000/050-10.5	BSF-M-C-1A-7.0
		18.00						BSF-C-1000/050-11.0	
		18.50						BSF-C-1000/050-11.5	
		19.00						BSF-C-1000/050-10.5	BSF-M-C-1A-8.5
		19.50						BSF-C-1000/050-11.0	
		20.00						BSF-C-1000/050-11.5	
		20.50						BSF-C-1000/050-10.5	BSF-M-C-1A-10.0
		21.00						BSF-C-1000/050-11.0	
		21.50						BSF-C-1000/050-11.5	
		22.00						BSF-C-1000/050-10.5	BSF-M-C-1A-11.5
		22.50						BSF-C-1000/050-11.0	
		23.00						BSF-C-1000/050-11.5	

Parts in stock highlighted in green

BSF Bore Ø 10.5 mm | Series D



Tools and blades

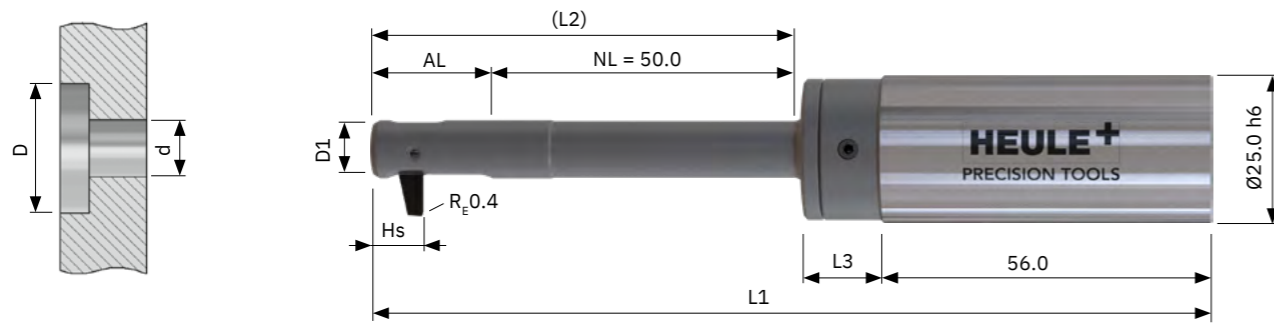
Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-D-**1D**-4.5).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.
10.50	10.40	15.50	22.50	9.60	146.00	72.50	13.50	BSF-D-1050/050-11.0	BSF-M-D-1A-4.5
		16.00						BSF-D-1050/050-11.5	
		16.50						BSF-D-1050/050-12.0	
		17.00						BSF-D-1050/050-12.5	
		17.50						BSF-D-1050/050-13.0	
		18.00						BSF-D-1050/050-11.0	BSF-M-D-1A-7.0
		18.50						BSF-D-1050/050-11.5	
		19.00						BSF-D-1050/050-12.0	
		19.50						BSF-D-1050/050-12.5	
		20.00						BSF-D-1050/050-13.0	
		20.50						BSF-D-1050/050-11.0	BSF-M-D-1A-9.5
		21.00						BSF-D-1050/050-11.5	
		21.50						BSF-D-1050/050-12.0	
		22.00						BSF-D-1050/050-12.5	
		22.50						BSF-D-1050/050-13.0	
		23.00						BSF-D-1050/050-11.0	BSF-M-D-1A-12.0
		23.50						BSF-D-1050/050-11.5	
		24.00						BSF-D-1050/050-12.0	
		24.50						BSF-D-1050/050-12.5	

Parts in stock highlighted in green

BSF Bore Ø 11.0 mm | Series D



Tools and blades

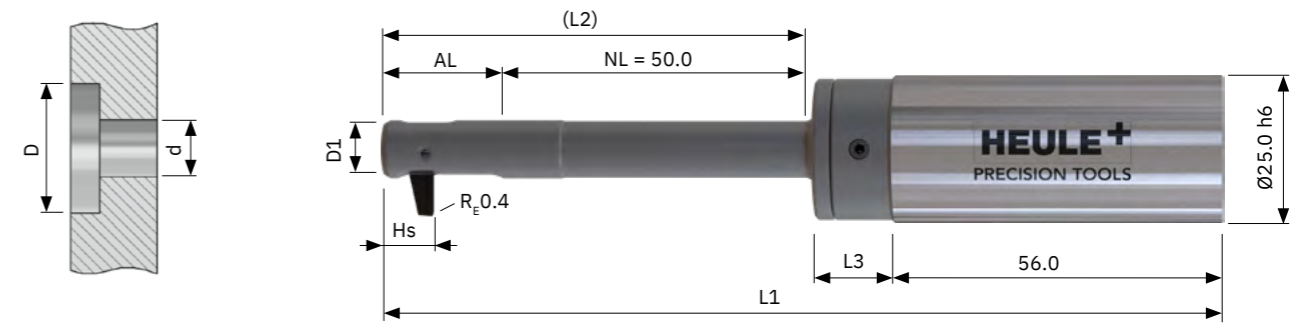
Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-D-**1D**-4.5).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.
11.00	10.90	16.00	22.50	9.60	146.00	72.50	13.50	BSF-D-1100/050-11.5	BSF-M-D-1A-4.5
		16.50						BSF-D-1100/050-12.0	
		17.00						BSF-D-1100/050-12.5	
		17.50						BSF-D-1100/050-13.0	
		18.00						BSF-D-1100/050-13.5	
		18.50						BSF-D-1100/050-11.5	
		19.00						BSF-D-1100/050-12.0	
		19.50						BSF-D-1100/050-12.5	
		20.00						BSF-D-1100/050-13.0	
		20.50						BSF-D-1100/050-13.5	
		21.00						BSF-D-1100/050-11.5	BSF-M-D-1A-9.5
		21.50						BSF-D-1100/050-12.0	
		22.00						BSF-D-1100/050-12.5	
		22.50						BSF-D-1100/050-13.0	
		23.00						BSF-D-1100/050-13.5	
		23.50						BSF-D-1100/050-11.5	BSF-M-D-1A-12.0
		24.00						BSF-D-1100/050-12.0	
		24.50						BSF-D-1100/050-12.5	
		25.00						BSF-D-1100/050-13.0	
		25.50						BSF-D-1100/050-13.5	

Parts in stock highlighted in green

BSF Bore Ø 11.5 mm | Series D



Tools and blades

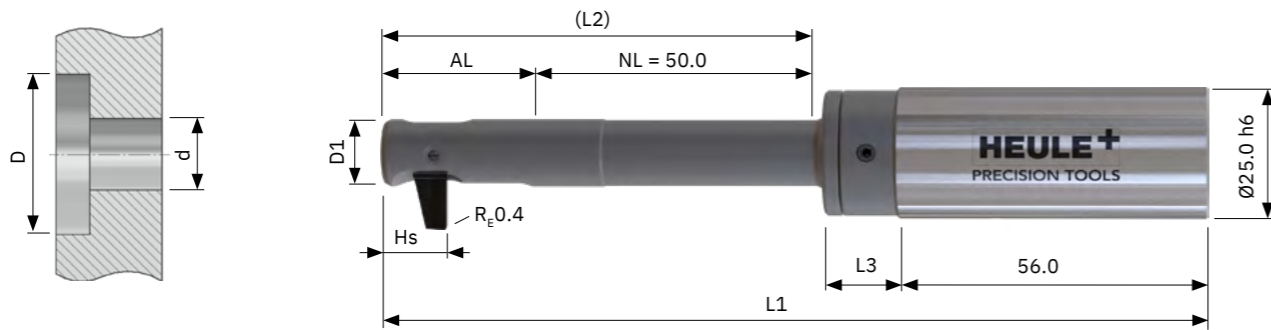
Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-D-**1D**-4.5).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.
11.50	11.40	16.50	23.75	9.60	147.25	73.75	13.50	BSF-D-1150/050-12.0	BSF-M-D-1A-4.5
		17.00						BSF-D-1150/050-12.5	
		17.50						BSF-D-1150/050-13.0	
		18.00						BSF-D-1150/050-13.5	
		18.50						BSF-D-1150/050-14.0	
		19.00						BSF-D-1150/050-12.0	
		19.50						BSF-D-1150/050-12.5	
		20.00						BSF-D-1150/050-13.0	
		20.50						BSF-D-1150/050-13.5	
		21.00						BSF-D-1150/050-14.0	
		21.50						BSF-D-1150/050-12.0	BSF-M-D-1A-9.5
		22.00						BSF-D-1150/050-12.5	
		22.50						BSF-D-1150/050-13.0	
		23.00						BSF-D-1150/050-13.5	
		23.50						BSF-D-1150/050-14.0	
		24.00						BSF-D-1150/050-12.0	BSF-M-D-1A-12.0
		24.50						BSF-D-1150/050-12.5	
		25.00						BSF-D-1150/050-13.0	
		25.50						BSF-D-1150/050-13.5	
		26.00						BSF-D-1150/050-14.0	
26.50	BSF-D-1150/050-12.0	BSF-M-D-1A-14.5							

Parts in stock highlighted in green

BSF Bore Ø 12.0 mm | Series E



Tools and blades

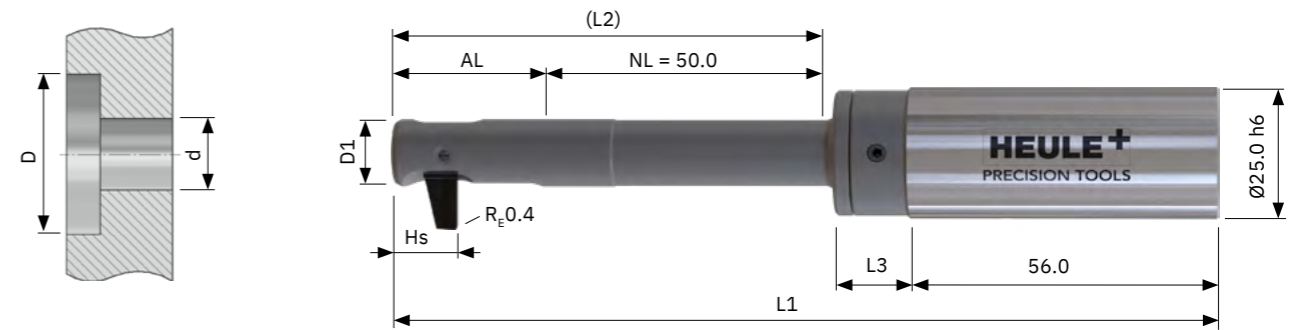
Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-E-**1D**-5.0).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.
12.00	11.90	18.00	26.75	11.40	150.25	76.75	13.50	BSF-E-1200/050-13.0	BSF-M-E-1A-5.0
		18.50						BSF-E-1200/050-13.5	
		19.00						BSF-E-1200/050-14.0	
		19.50						BSF-E-1200/050-14.5	
		20.00						BSF-E-1200/050-15.0	
		20.50						BSF-E-1200/050-13.0	
		21.00						BSF-E-1200/050-13.5	
		21.50						BSF-E-1200/050-14.0	
		22.00						BSF-E-1200/050-14.5	
		22.50						BSF-E-1200/050-15.0	
		23.00						BSF-E-1200/050-13.0	BSF-M-E-1A-10.0
		23.50						BSF-E-1200/050-13.5	
		24.00						BSF-E-1200/050-14.0	
		24.50						BSF-E-1200/050-14.5	
		25.00						BSF-E-1200/050-15.0	
		25.50						BSF-E-1200/050-13.0	
		26.00						BSF-E-1200/050-13.5	
		26.50						BSF-E-1200/050-14.0	
		27.00						BSF-E-1200/050-14.5	
		27.50						BSF-E-1200/050-15.0	
		28.00						BSF-E-1200/050-13.0	BSF-M-E-1A-15.0

Parts in stock highlighted in green

BSF Bore Ø 12.5 mm | Series E



Tools and blades

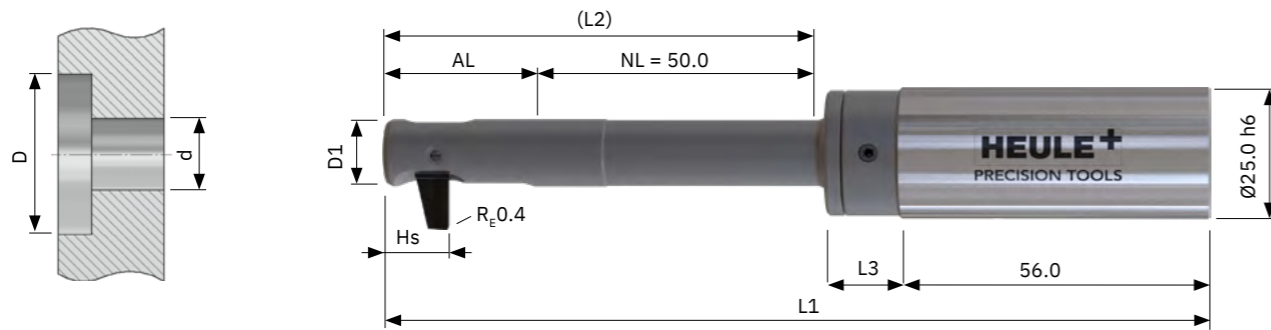
Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-E-**1D**-5.0).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.
12.50	12.40	18.50	26.75	11.40	150.25	76.75	13.50	BSF-E-1250/050-13.5	BSF-M-E-1A-5.0
		19.00						BSF-E-1250/050-14.0	
		19.50						BSF-E-1250/050-14.5	
		20.00						BSF-E-1250/050-15.0	
		20.50						BSF-E-1250/050-15.5	
		21.00						BSF-E-1250/050-13.5	
		21.50						BSF-E-1250/050-14.0	
		22.00						BSF-E-1250/050-14.5	
		22.50						BSF-E-1250/050-15.0	
		23.00						BSF-E-1250/050-15.5	
		23.50						BSF-E-1250/050-13.5	BSF-M-E-1A-10.0
		24.00						BSF-E-1250/050-14.0	
		24.50						BSF-E-1250/050-14.5	
		25.00						BSF-E-1250/050-15.0	
		25.50						BSF-E-1250/050-15.5	
		26.00						BSF-E-1250/050-13.5	
		26.50						BSF-E-1250/050-14.0	
		27.00						BSF-E-1250/050-14.5	
		27.50						BSF-E-1250/050-15.0	
		28.00						BSF-E-1250/050-15.5	
		28.50						BSF-E-1250/050-13.5	BSF-M-E-1A-15.0
		29.00						BSF-E-1250/050-14.0	

Parts in stock highlighted in green

BSF Bore Ø 13.0 mm | Series E



Tools and blades

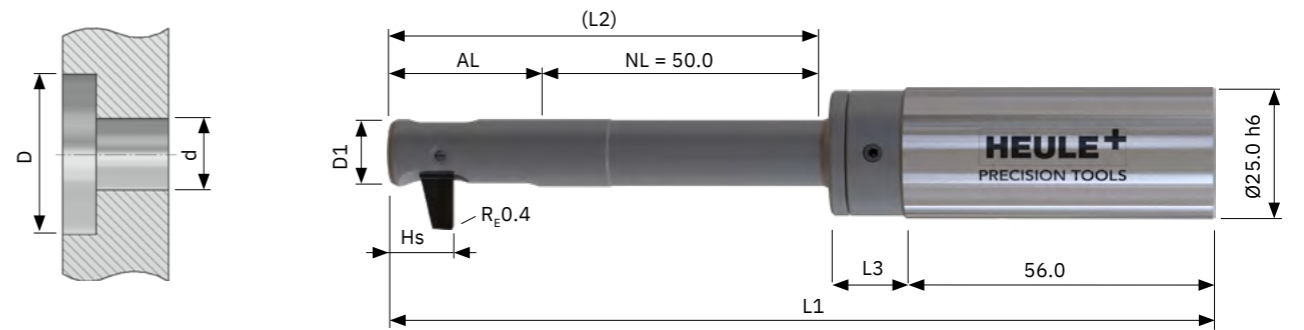
Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-E-**1D**-5.0).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.
13.00	12.90	19.00	26.75	11.40	150.25	76.75	13.50	BSF-E-1300/050-14.0	BSF-M-E-1A-5.0
		19.50						BSF-E-1300/050-14.5	
		20.00						BSF-E-1300/050-15.0	
		20.50						BSF-E-1300/050-15.5	
		21.00						BSF-E-1300/050-16.0	
		21.50						BSF-E-1300/050-14.0	
		22.00						BSF-E-1300/050-14.5	
		22.50						BSF-E-1300/050-15.0	
		23.00						BSF-E-1300/050-15.5	
		23.50						BSF-E-1300/050-16.0	
		24.00						BSF-E-1300/050-14.0	BSF-M-E-1A-10.0
		24.50						BSF-E-1300/050-14.5	
		25.00						BSF-E-1300/050-15.0	
		25.50						BSF-E-1300/050-15.5	
		26.00						BSF-E-1300/050-16.0	
		26.50						BSF-E-1300/050-14.0	
		27.00						BSF-E-1300/050-14.5	
		27.50						BSF-E-1300/050-15.0	
		28.00						BSF-E-1300/050-15.5	
		28.50						BSF-E-1300/050-16.0	
		29.00						BSF-E-1300/050-14.0	BSF-M-E-1A-15.0
		29.50						BSF-E-1300/050-14.5	
		30.00						BSF-E-1300/050-15.0	

Parts in stock highlighted in green

BSF Bore Ø 13.5 mm | Series E



Tools and blades

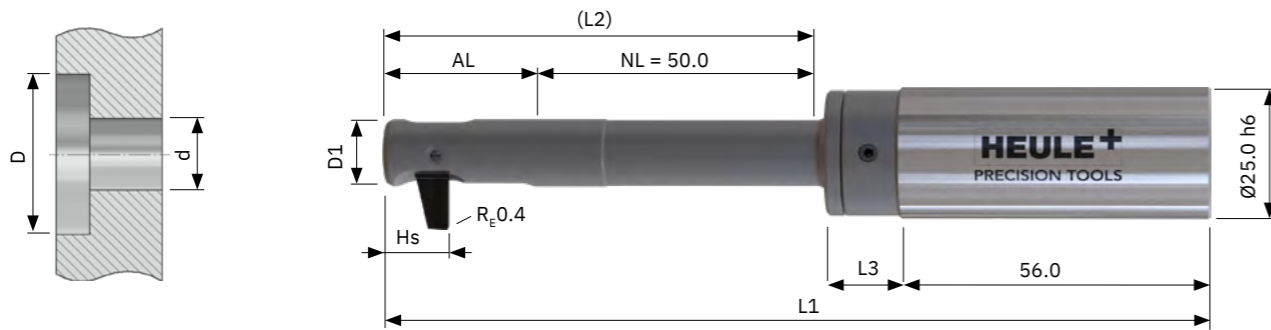
Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-E-**1D**-5.0).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.
13.50	13.40	19.50	26.75	11.40	150.25	76.75	13.50	BSF-E-1350/050-14.5	BSF-M-E-1A-5.0
		20.00						BSF-E-1350/050-15.0	
		20.50						BSF-E-1350/050-15.5	
		21.00						BSF-E-1350/050-16.0	
		21.50						BSF-E-1350/050-16.5	
		22.00						BSF-E-1350/050-14.5	
		22.50						BSF-E-1350/050-15.0	
		23.00						BSF-E-1350/050-15.5	
		23.50						BSF-E-1350/050-16.0	
		24.00						BSF-E-1350/050-16.5	
		24.50						BSF-E-1350/050-14.5	BSF-M-E-1A-10.0
		25.00						BSF-E-1350/050-15.0	
		25.50						BSF-E-1350/050-15.5	
		26.00						BSF-E-1350/050-16.0	
		26.50						BSF-E-1350/050-16.5	
		27.00						BSF-E-1350/050-14.5	
		27.50						BSF-E-1350/050-15.0	
		28.00						BSF-E-1350/050-15.5	
		28.50						BSF-E-1350/050-16.0	
		29.00						BSF-E-1350/050-16.5	
		29.50						BSF-E-1350/050-14.5	BSF-M-E-1A-15.0
		30.00						BSF-E-1350/050-15.0	
		30.50						BSF-E-1350/050-15.5	
		31.00						BSF-E-1350/050-16.0	
31.50	BSF-E-1350/050-16.5								

Parts in stock highlighted in green

BSF Bore Ø 14.0 mm | Series E



Tools and blades

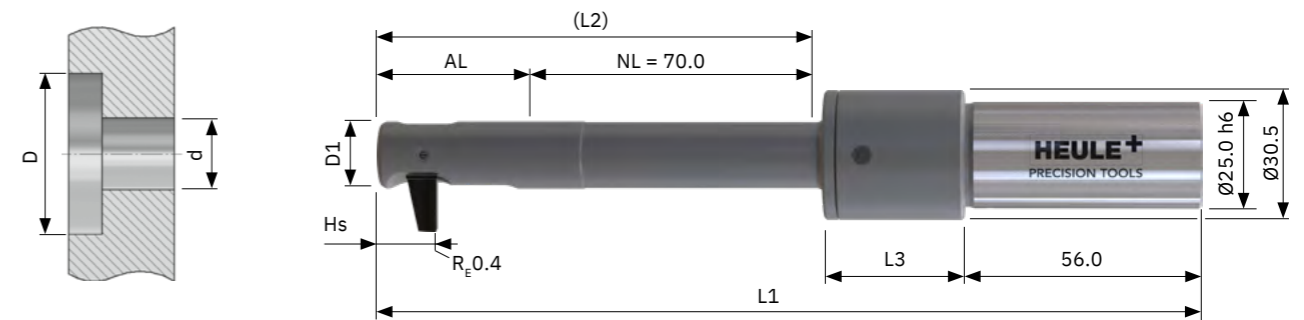
Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-E-**1D**-5.0).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.
14.00	13.90	20.00	28.00	11.40	151.50	78.00	13.50	BSF-E-1400/050-15.0	BSF-M-E-1A-5.0
		20.50						BSF-E-1400/050-15.5	
		21.00						BSF-E-1400/050-16.0	
		21.50						BSF-E-1400/050-16.5	
		22.00						BSF-E-1400/050-17.0	
		22.50						BSF-E-1400/050-15.0	BSF-M-E-1A-7.5
		23.00						BSF-E-1400/050-15.5	
		23.50						BSF-E-1400/050-16.0	
		24.00						BSF-E-1400/050-16.5	
		24.50						BSF-E-1400/050-17.0	
		25.00						BSF-E-1400/050-15.0	BSF-M-E-1A-10.0
		25.50						BSF-E-1400/050-15.5	
		26.00						BSF-E-1400/050-16.0	
		26.50						BSF-E-1400/050-16.5	
		27.00						BSF-E-1400/050-17.0	
		27.50						BSF-E-1400/050-15.0	BSF-M-E-1A-12.5
		28.00						BSF-E-1400/050-15.5	
		28.50						BSF-E-1400/050-16.0	
		29.00						BSF-E-1400/050-16.5	
		29.50						BSF-E-1400/050-17.0	
		30.00						BSF-E-1400/050-15.0	BSF-M-E-1A-15.0
		30.50						BSF-E-1400/050-15.5	
		31.00						BSF-E-1400/050-16.0	
		31.50						BSF-E-1400/050-16.5	
32.00	BSF-E-1400/050-17.0								
32.50	BSF-E-1400/050-15.0	BSF-M-E-1A-17.5							

Parts in stock highlighted in green

BSF Bore Ø 14.5 mm | Series F



Tools and blades

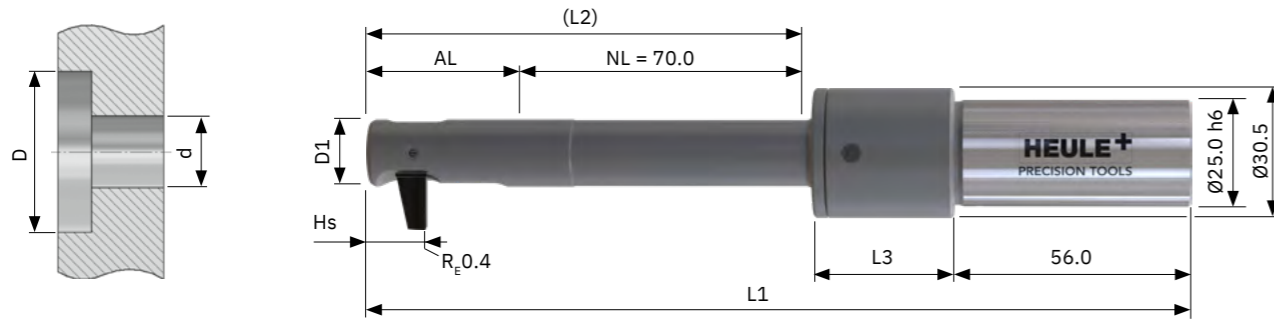
Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-F-**1D**-5.5).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.
14.50	14.40	21.50	30.75	13.40	193.75	100.75	33.00	BSF-F-1450/070-16.0	BSF-M-F-1A-5.5
		22.00						BSF-F-1450/070-16.5	
		22.50						BSF-F-1450/070-17.0	
		23.00						BSF-F-1450/070-17.5	
		23.50						BSF-F-1450/070-18.0	
		24.00						BSF-F-1450/070-18.5	BSF-M-F-1A-9.0
		24.50						BSF-F-1450/070-19.0	
		25.00						BSF-F-1450/070-16.0	
		25.50						BSF-F-1450/070-16.5	
		26.00						BSF-F-1450/070-17.0	
		26.50						BSF-F-1450/070-17.5	BSF-M-F-1A-12.5
		27.00						BSF-F-1450/070-18.0	
		27.50						BSF-F-1450/070-18.5	
		28.00						BSF-F-1450/070-19.0	
		28.50						BSF-F-1450/070-16.0	
		29.00						BSF-F-1450/070-16.5	BSF-M-F-1A-16.0
		29.50						BSF-F-1450/070-17.0	
		30.00						BSF-F-1450/070-17.5	
		30.50						BSF-F-1450/070-18.0	
		31.00						BSF-F-1450/070-18.5	
		31.50						BSF-F-1450/070-19.0	BSF-M-F-1A-16.0
		32.00						BSF-F-1450/070-16.0	
		32.50						BSF-F-1450/070-16.5	
		33.00						BSF-F-1450/070-17.0	
33.50	BSF-F-1450/070-17.5								

Parts in stock highlighted in green

BSF Bore Ø 15.0 mm | Series F




Tools and blades

Standard tool **without** blade. The blade must be ordered separately.


- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-F-**1D**-5.5).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.	
15.00	14.90	22.00	30.75	13.40	193.75	100.75	33.00	BSF-F-1500/070-16.5	BSF-M-F-1A-5.5	
		22.50						BSF-F-1500/070-17.0		
		23.00						BSF-F-1500/070-17.5		
		23.50						BSF-F-1500/070-18.0		
		24.00						BSF-F-1500/070-18.5		
		24.50						BSF-F-1500/070-19.0		
		25.00						BSF-F-1500/070-19.5		
		25.50						BSF-F-1500/070-16.5		BSF-M-F-1A-9.0
		26.00						BSF-F-1500/070-17.0		
		26.50						BSF-F-1500/070-17.5		
		27.00						BSF-F-1500/070-18.0		
		27.50						BSF-F-1500/070-18.5		
		28.00						BSF-F-1500/070-19.0		
		28.50						BSF-F-1500/070-19.5		
		29.00						BSF-F-1500/070-16.5	BSF-M-F-1A-12.5	
		29.50						BSF-F-1500/070-17.0		
		30.00						BSF-F-1500/070-17.5		
		30.50						BSF-F-1500/070-18.0		
		31.00						BSF-F-1500/070-18.5		
		31.50						BSF-F-1500/070-19.0		
		32.00						BSF-F-1500/070-19.5		
		32.50						BSF-F-1500/070-16.5	BSF-M-F-1A-16.0	
		33.00						BSF-F-1500/070-17.0		
		33.50						BSF-F-1500/070-17.5		
		34.00						BSF-F-1500/070-18.0		
		34.50						BSF-F-1500/070-18.5		

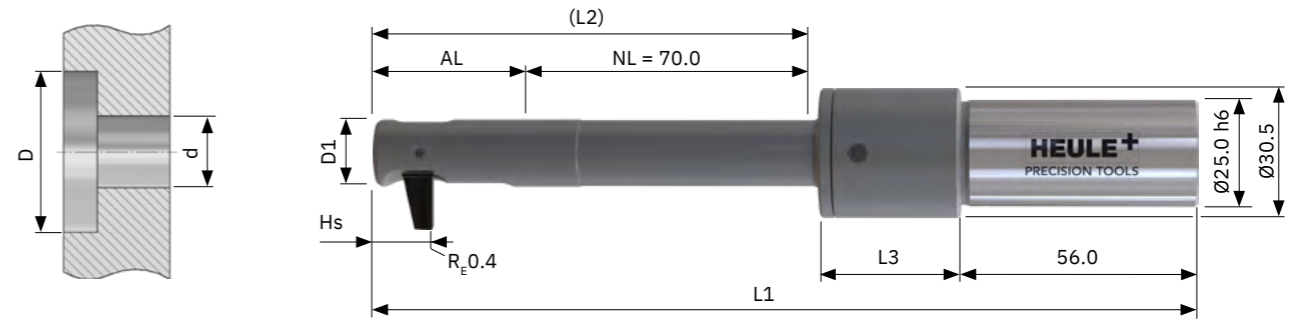
 Parts in stock highlighted in green

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BSF Bore Ø 15.5 mm | Series F





Tools and blades


Standard tool **without** blade. The blade must be ordered separately.


- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-F-**1D**-5.5).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.	
15.50	15.40	22.50	30.75	13.40	193.75	100.75	33.00	BSF-F-1550/070-17.0	BSF-M-F-1A-5.5	
		23.00						BSF-F-1550/070-17.5		
		23.50						BSF-F-1550/070-18.0		
		24.00						BSF-F-1550/070-18.5		
		24.50						BSF-F-1550/070-19.0		
		25.00						BSF-F-1550/070-19.5		
		25.50						BSF-F-1550/070-20.0		
		26.00						BSF-F-1550/070-17.0		BSF-M-F-1A-9.0
		26.50						BSF-F-1550/070-17.5		
		27.00						BSF-F-1550/070-18.0		
		27.50						BSF-F-1550/070-18.5		
		28.00						BSF-F-1550/070-19.0		
		28.50						BSF-F-1550/070-19.5		
		29.00						BSF-F-1550/070-20.0		
		29.50						BSF-F-1550/070-17.0	BSF-M-F-1A-12.5	
		30.00						BSF-F-1550/070-17.5		
		30.50						BSF-F-1550/070-18.0		
		31.00						BSF-F-1550/070-18.5		
		31.50						BSF-F-1550/070-19.0		
		32.00						BSF-F-1550/070-19.5		
		32.50						BSF-F-1550/070-20.0		
		33.00						BSF-F-1550/070-17.0	BSF-M-F-1A-16.0	
		33.50						BSF-F-1550/070-17.5		
		34.00						BSF-F-1550/070-18.0		
		34.50						BSF-F-1550/070-18.5		
		35.00						BSF-F-1550/070-19.0		
		35.50						BSF-F-1550/070-19.5		
		36.00						BSF-F-1550/070-20.0		

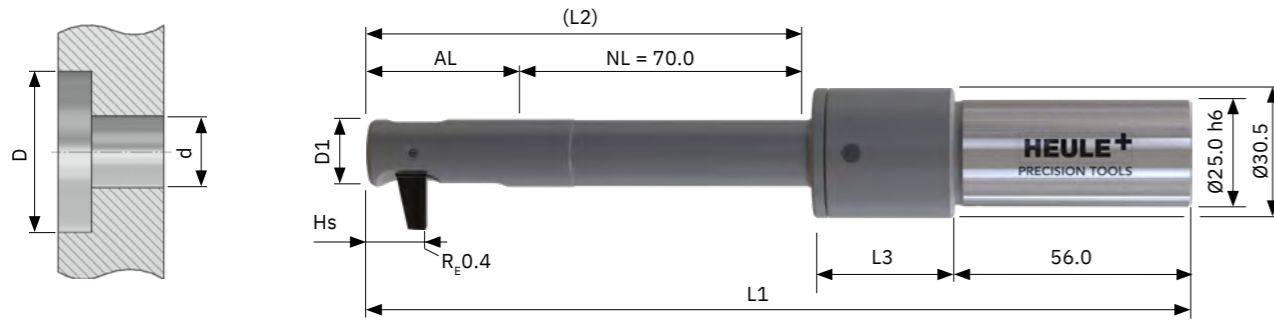
 Parts in stock highlighted in green

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BSF Bore Ø 16.0 mm | Series F




Tools and blades

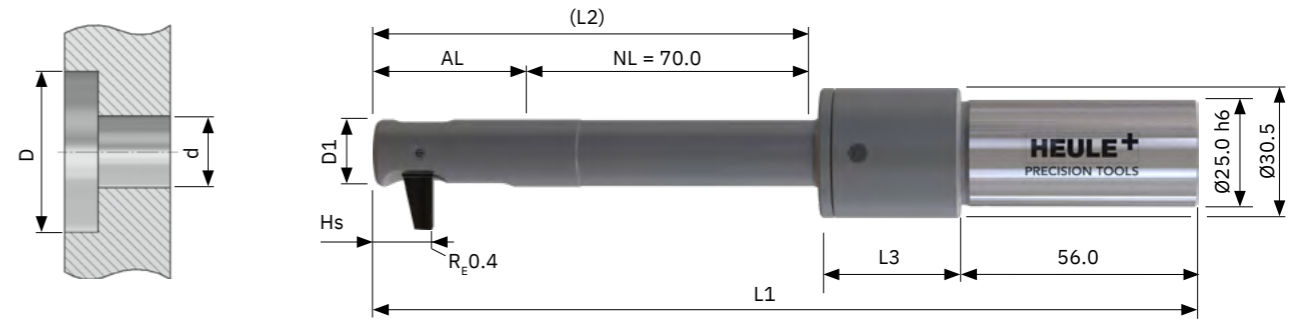
Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-F-**1D**-5.5).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.
16.00	15.90	23.00	32.50	13.40	195.50	102.50	33.00	BSF-F-1600/070-17.5	BSF-M-F-1A-5.5
		23.50						BSF-F-1600/070-18.0	
		24.00						BSF-F-1600/070-18.5	
		24.50						BSF-F-1600/070-19.0	
		25.00						BSF-F-1600/070-19.5	
		25.50						BSF-F-1600/070-20.0	
		26.00						BSF-F-1600/070-20.5	
		26.50						BSF-F-1600/070-17.5	
		27.00						BSF-F-1600/070-18.0	
		27.50						BSF-F-1600/070-18.5	
		28.00						BSF-F-1600/070-19.0	
		28.50						BSF-F-1600/070-19.5	
		29.00						BSF-F-1600/070-20.0	
		29.50						BSF-F-1600/070-20.5	
		30.00						BSF-F-1600/070-17.5	BSF-M-F-1A-12.5
		30.50						BSF-F-1600/070-18.0	
		31.00						BSF-F-1600/070-18.5	
		31.50						BSF-F-1600/070-19.0	
		32.00						BSF-F-1600/070-19.5	
		32.50						BSF-F-1600/070-20.0	
		33.00						BSF-F-1600/070-20.5	
		33.50						BSF-F-1600/070-17.5	
		34.00						BSF-F-1600/070-18.0	
		34.50						BSF-F-1600/070-18.5	
		35.00						BSF-F-1600/070-19.0	
		35.50						BSF-F-1600/070-19.5	
		36.00						BSF-F-1600/070-20.0	
		36.50						BSF-F-1600/070-20.5	
		37.00						BSF-F-1600/070-17.5	BSF-M-F-1A-19.5

 Parts in stock highlighted in green

BSF Bore Ø 16.5 mm | Series F




Tools and blades

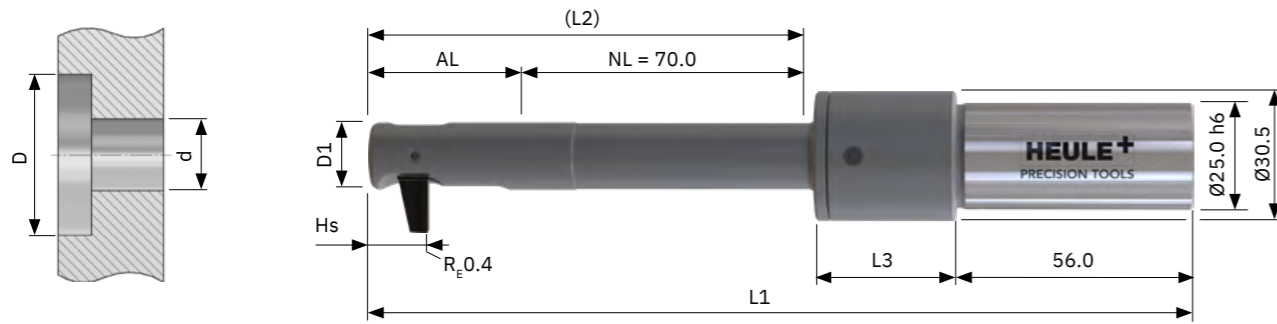
Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-F-**1D**-5.5).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.
16.50	16.40	23.50	32.50	13.40	195.50	102.50	33.00	BSF-F-1650/070-18.0	BSF-M-F-1A-5.5
		24.00						BSF-F-1650/070-18.5	
		24.50						BSF-F-1650/070-19.0	
		25.00						BSF-F-1650/070-19.5	
		25.50						BSF-F-1650/070-20.0	
		26.00						BSF-F-1650/070-20.5	
		26.50						BSF-F-1650/070-21.0	
		27.00						BSF-F-1650/070-18.0	
		27.50						BSF-F-1650/070-18.5	
		28.00						BSF-F-1650/070-19.0	
		28.50						BSF-F-1650/070-19.5	
		29.00						BSF-F-1650/070-20.0	
		29.50						BSF-F-1650/070-20.5	
		30.00						BSF-F-1650/070-21.0	
		30.50						BSF-F-1650/070-18.0	BSF-M-F-1A-12.5
		31.00						BSF-F-1650/070-18.5	
		31.50						BSF-F-1650/070-19.0	
		32.00						BSF-F-1650/070-19.5	
		32.50						BSF-F-1650/070-20.0	
		33.00						BSF-F-1650/070-20.5	
		33.50						BSF-F-1650/070-21.0	
		34.00						BSF-F-1650/070-18.0	
		34.50						BSF-F-1650/070-18.5	
		35.00						BSF-F-1650/070-19.0	
		35.50						BSF-F-1650/070-19.5	
		36.00						BSF-F-1650/070-20.0	
		36.50						BSF-F-1650/070-20.5	
		37.00						BSF-F-1650/070-21.0	
		37.50						BSF-F-1650/070-18.0	BSF-M-F-1A-19.5
		38.00						BSF-F-1650/070-18.5	

 Parts in stock highlighted in green

BSF Bore Ø 17.0 mm | Series F



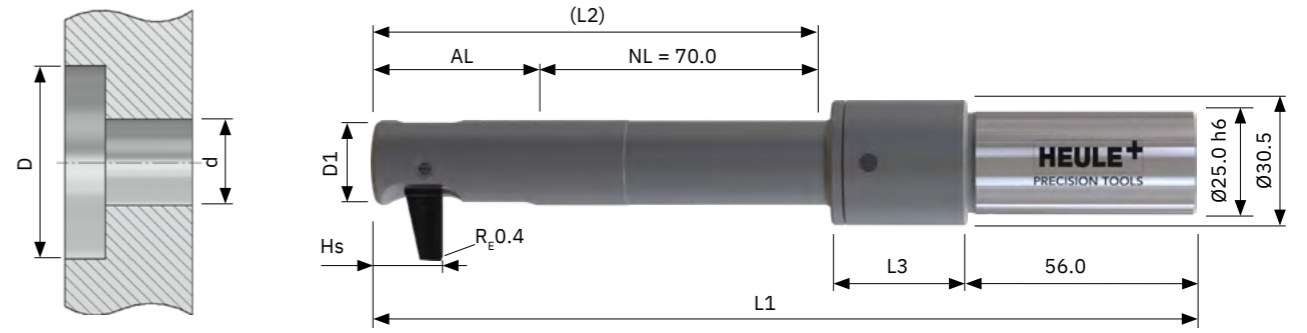
Tools and blades

Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-F-**1D**-5.5).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.	
17.00	16.90	24.00	32.50	13.40	195.50	102.50	33.00	BSF-F-1700/070-18.5	BSF-M-F-1A-5.5	
		24.50						BSF-F-1700/070-19.0		
		25.00						BSF-F-1700/070-19.5		
		25.50						BSF-F-1700/070-20.0		
		26.00						BSF-F-1700/070-20.5		
		26.50						BSF-F-1700/070-21.0		
		27.00						BSF-F-1700/070-21.5		
		27.50						BSF-F-1700/070-18.5		BSF-M-F-1A-9.0
		28.00						BSF-F-1700/070-19.0		
		28.50						BSF-F-1700/070-19.5		
		29.00						BSF-F-1700/070-20.0		
		29.50						BSF-F-1700/070-20.5		
		30.00						BSF-F-1700/070-21.0		
		30.50						BSF-F-1700/070-21.5		
		31.00						BSF-F-1700/070-18.5		BSF-M-F-1A-12.5
		31.50						BSF-F-1700/070-19.0		
		32.00						BSF-F-1700/070-19.5		
		32.50						BSF-F-1700/070-20.0		
	33.00	BSF-F-1700/070-20.5								
	33.50	BSF-F-1700/070-21.0								
	34.00	BSF-F-1700/070-21.5								
	34.50	BSF-F-1700/070-18.5	BSF-M-F-1A-16.0							
	35.00	BSF-F-1700/070-19.0								
	35.50	BSF-F-1700/070-19.5								
	36.00	BSF-F-1700/070-20.0								
	36.50	BSF-F-1700/070-20.5								
	37.00	BSF-F-1700/070-21.0								
	37.50	BSF-F-1700/070-21.5								
	38.00	BSF-F-1700/070-18.5	BSF-M-F-1A-19.5							
	38.50	BSF-F-1700/070-19.0								
	39.00	BSF-F-1700/070-19.5								
	39.50	BSF-F-1700/070-20.0								

BSF Bore Ø 17.5 mm | Series G



Tools and blades

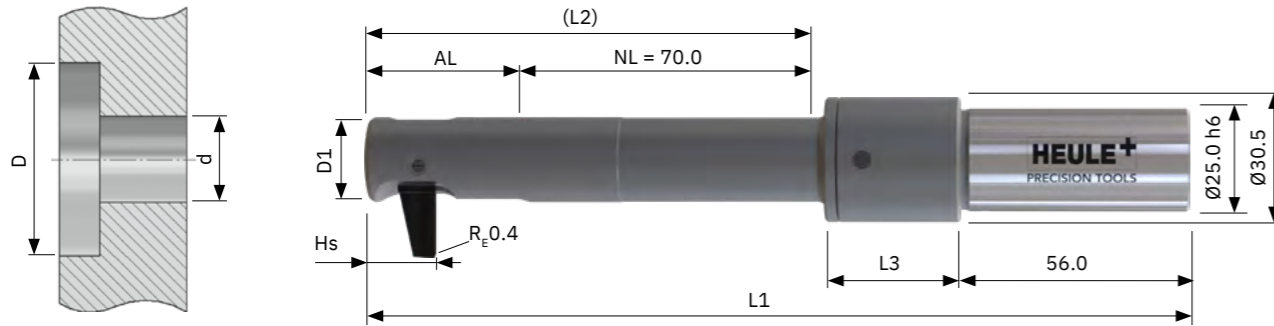
Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-G-**1D**-6.0).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.	
17.50	17.40	26.00	37.25	16.30	200.25	107.25	33.00	BSF-G-1750/070-20.0	BSF-M-G-1A-6.0	
		26.50						BSF-G-1750/070-20.5		
		27.00						BSF-G-1750/070-21.0		
		27.50						BSF-G-1750/070-21.5		
		28.00						BSF-G-1750/070-22.0		
		28.50						BSF-G-1750/070-22.5		
		29.00						BSF-G-1750/070-23.0		
		29.50						BSF-G-1750/070-23.5		
		30.00						BSF-G-1750/070-24.0		
		30.50						BSF-G-1750/070-20.0		BSF-M-G-1A-10.5
		31.00						BSF-G-1750/070-20.5		
		31.50						BSF-G-1750/070-21.0		
		32.00						BSF-G-1750/070-21.5		
		32.50						BSF-G-1750/070-22.0		
		33.00						BSF-G-1750/070-22.5		
		33.50						BSF-G-1750/070-23.0		
		34.00						BSF-G-1750/070-23.5		
		34.50						BSF-G-1750/070-24.0		
		35.00						BSF-G-1750/070-20.0	BSF-M-G-1A-15.0	
		35.50						BSF-G-1750/070-20.5		
		36.00						BSF-G-1750/070-21.0		
		36.50						BSF-G-1750/070-21.5		
		37.00						BSF-G-1750/070-22.0		
		37.50						BSF-G-1750/070-22.5		
		38.00						BSF-G-1750/070-23.0		
		38.50						BSF-G-1750/070-23.5		
		39.00						BSF-G-1750/070-24.0		
		39.50						BSF-G-1750/070-20.0	BSF-M-G-1A-19.5	
		40.00						BSF-G-1750/070-20.5		
		40.50						BSF-G-1750/070-21.0		

Parts in stock highlighted in green

BSF Bore Ø 18.0 mm | Series G




Tools and blades

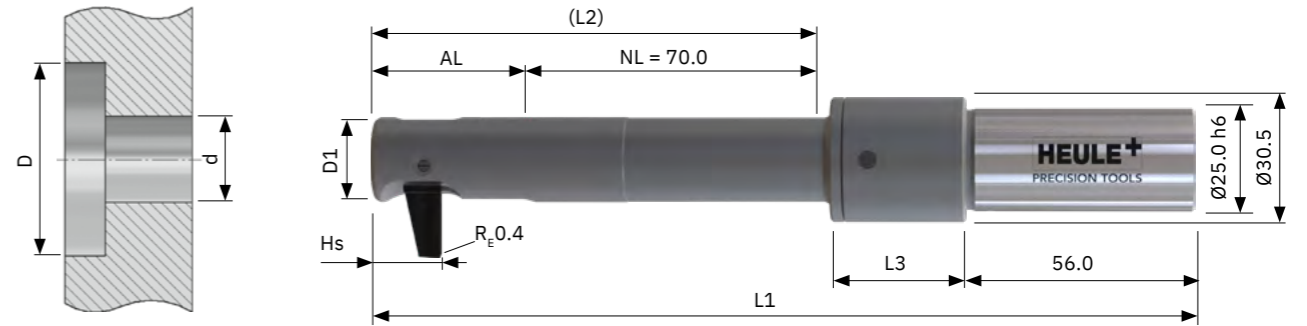
Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-G-**1D**-6.0).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.								
18.00	17.90	26.50	37.25	16.30	200.25	107.25	33.00	BSF-G-1800/070-20.5	BSF-M-G-1A-6.0								
		27.00															
		27.50															
		28.00															
		28.50															
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		35.00															
		18.50						18.40		27.00	37.25	16.30	200.25	107.25	33.00	BSF-G-1850/070-21.0	BSF-M-G-1A-6.0
										27.50							
										28.00							
										28.50							
										29.00							
										29.50							
		19.00						18.90		31.00	37.25	16.30	200.25	107.25	33.00	BSF-G-1800/070-20.5	BSF-M-G-1A-10.5
										31.50							
										32.00							
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	34.00																
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	35.00																
	35.50																
	36.00																
	36.50																
19.50	19.40	35.50	37.25	16.30	200.25	107.25	33.00	BSF-G-1800/070-20.5	BSF-M-G-1A-15.0								
		36.00															
		36.50															
		37.00															
		37.50															
		38.00															
		38.50															
		39.00															
		39.50															
		40.00															
		40.50															
		41.00															
41.50																	

 Parts in stock highlighted in green

BSF Bore Ø 18.5 mm | Series G



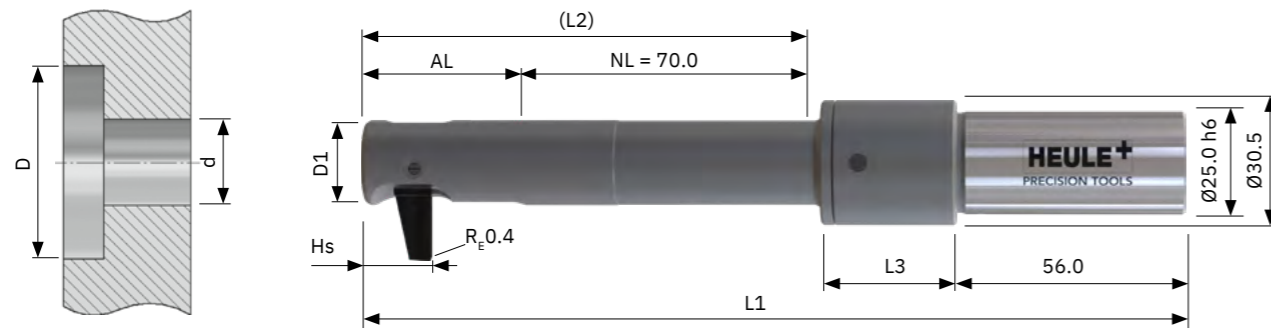
Tools and blades

Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-G-**1D**-6.0).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.									
18.50	18.40	27.00	37.25	16.30	200.25	107.25	33.00	BSF-G-1850/070-21.0	BSF-M-G-1A-6.0									
		27.50																
		28.00																
		28.50																
		29.00																
		29.50																
		30.00																
		30.50																
		31.00																
		31.50																
		32.00																
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		33.00																
		33.50																
		34.00																
		34.50																
		35.00																
		35.50																
		19.00						18.90		31.00	37.25	16.30	200.25	107.25	33.00	BSF-G-1850/070-21.0	BSF-M-G-1A-10.5	
										32.00								
										32.50								
										33.00								
										33.50								
										34.00								
		19.50						18.90		35.50	37.25	16.30	200.25	107.25	33.00	BSF-G-1850/070-21.0	BSF-M-G-1A-15.0	
										36.50								
										37.00								
										37.50								
										38.00								
										38.50								
	39.00																	
	39.50																	
	40.00																	
	20.00		19.90	40.50	37.25	16.30	200.25		107.25	33.00						BSF-G-1850/070-21.0		BSF-M-G-1A-19.5
				41.00														
				41.50														
42.00																		
42.50																		
43.00																		

BSF Bore Ø 19.0 mm | Series G



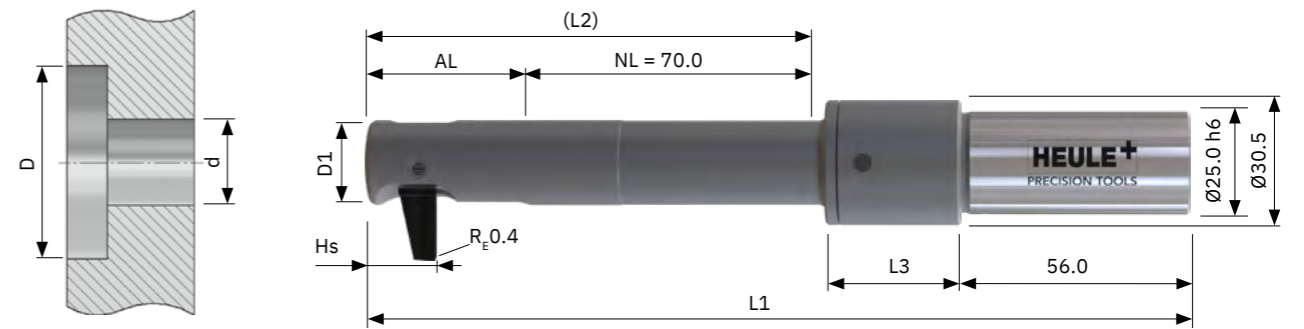
Tools and blades

Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-G-**1D**-6.0).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.	
19.00	18.90	27.50	37.25	16.30	200.25	107.25	33.00	BSF-G-1900/070-21.5	BSF-M-G-1A-6.0	
		28.00								
		28.50								
		29.00								
		29.50								
		30.00								
		30.50								
		31.00								
		31.50								
		32.00								
		32.50								
		33.00								
	19.50	19.40	28.00	37.25	16.30	200.25	107.25	33.00	BSF-G-1950/070-22.0	BSF-M-G-1A-6.0
			28.50							
			29.00							
			29.50							
			30.00							
			30.50							
			31.00							
			31.50							
			32.00							
			32.50							
			33.00							
			33.50							
	20.00	19.90	33.50	37.25	16.30	200.25	107.25	33.00	BSF-G-1950/070-23.0	BSF-M-G-1A-10.5
			34.00							
			34.50							
			35.00							
			35.50							
			36.00							
			36.50							
			37.00							
			37.50							
			38.00							
			38.50							
			39.00							
	20.50	20.40	39.00	37.25	16.30	200.25	107.25	33.00	BSF-G-1950/070-23.5	BSF-M-G-1A-10.5
			39.50							
			40.00							
			40.50							
			41.00							
			41.50							
			42.00							
			42.50							
			43.00							
			43.50							
			44.00							
			44.50							
21.00	20.90	44.00	37.25	16.30	200.25	107.25	33.00	BSF-G-1950/070-24.0	BSF-M-G-1A-15.0	
		44.50								
		45.00								
		45.50								
		46.00								
		46.50								
		47.00								
		47.50								
		48.00								
		48.50								
		49.00								
		49.50								
50.00										

BSF Bore Ø 19.5 mm | Series G



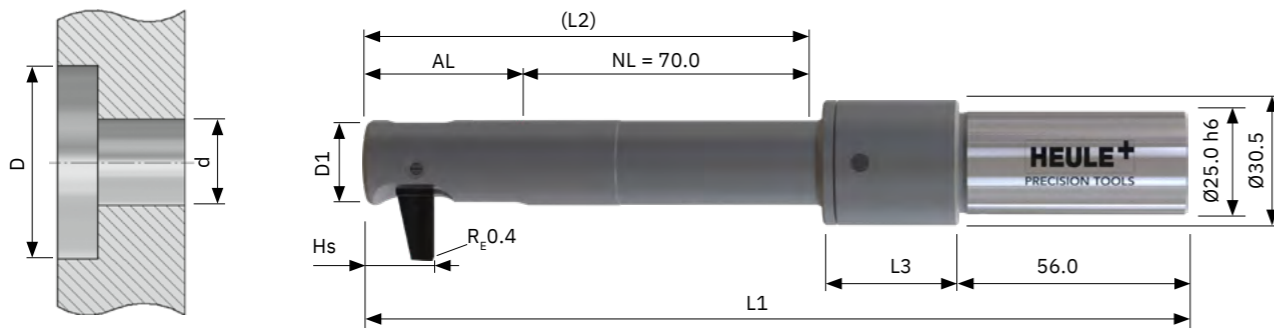
Tools and blades

Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-G-**1D**-6.0).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.	
19.50	19.40	28.00	37.25	16.30	200.25	107.25	33.00	BSF-G-1950/070-22.0	BSF-M-G-1A-6.0	
		28.50								
		29.00								
		29.50								
		30.00								
		30.50								
		31.00								
		31.50								
		32.00								
		32.50								
		33.00								
		33.50								
	20.00	19.90	33.50	37.25	16.30	200.25	107.25	33.00	BSF-G-1950/070-23.0	BSF-M-G-1A-10.5
			34.00							
			34.50							
			35.00							
			35.50							
			36.00							
			36.50							
			37.00							
			37.50							
			38.00							
			38.50							
			39.00							
	20.50	20.40	39.00	37.25	16.30	200.25	107.25	33.00	BSF-G-1950/070-23.5	BSF-M-G-1A-15.0
			39.50							
			40.00							
			40.50							
			41.00							
			41.50							
			42.00							
			42.50							
			43.00							
			43.50							
			44.00							
			44.50							
	21.00	20.90	44.00	37.25	16.30	200.25	107.25	33.00	BSF-G-1950/070-24.0	BSF-M-G-1A-19.5
			44.50							
			45.00							
			45.50							
			46.00							
			46.50							
			47.00							
			47.50							
			48.00							
			48.50							
			49.00							
			49.50							
50.00										

BSF Bore Ø 20.0 mm | Series G



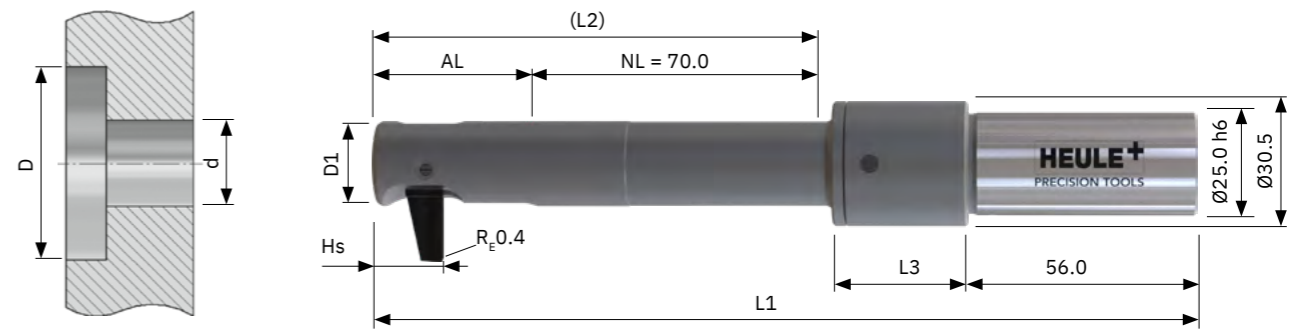
Tools and blades

Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-G-**1D**-6.0).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.
20.00	19.90	28.50	37.25	16.30	200.25	107.25	33.00	BSF-G-2000/070-22.5	BSF-M-G-1A-6.0
		29.00						BSF-G-2000/070-23.0	
		29.50						BSF-G-2000/070-23.5	
		30.00						BSF-G-2000/070-24.0	
		30.50						BSF-G-2000/070-24.5	
		31.00						BSF-G-2000/070-25.0	
		31.50						BSF-G-2000/070-25.5	
		32.00						BSF-G-2000/070-26.0	
		32.50						BSF-G-2000/070-26.5	
		33.00						BSF-G-2000/070-22.5	
		33.50						BSF-G-2000/070-23.0	
		34.00						BSF-G-2000/070-23.5	
		34.50						BSF-G-2000/070-24.0	
		35.00						BSF-G-2000/070-24.5	
		35.50						BSF-G-2000/070-25.0	
		36.00						BSF-G-2000/070-25.5	
		36.50						BSF-G-2000/070-26.0	
		37.00						BSF-G-2000/070-26.5	
		37.50						BSF-G-2000/070-22.5	BSF-M-G-1A-15.0
		38.00						BSF-G-2000/070-23.0	
		38.50						BSF-G-2000/070-23.5	
		39.00						BSF-G-2000/070-24.0	
		39.50						BSF-G-2000/070-24.5	
		40.00						BSF-G-2000/070-25.0	
		40.50						BSF-G-2000/070-25.5	
		41.00						BSF-G-2000/070-26.0	
		41.50						BSF-G-2000/070-26.5	

BSF Bore Ø 20.0 mm | Series G – continued




Tools and blades

Standard tool **without** blade. The blade must be ordered separately.


- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-G-**1D**-6.0).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.
20.00	19.90	42.00	37.25	16.30	200.25	107.25	33.00	BSF-G-2000/070-22.5	BSF-M-G-1A-19.5
		42.50						BSF-G-2000/070-23.0	
		43.00						BSF-G-2000/070-23.5	
		43.50						BSF-G-2000/070-24.0	
		44.00						BSF-G-2000/070-24.5	
		44.50						BSF-G-2000/070-25.0	
		45.00						BSF-G-2000/070-25.5	
		45.50						BSF-G-2000/070-26.0	
		46.00						BSF-G-2000/070-26.5	

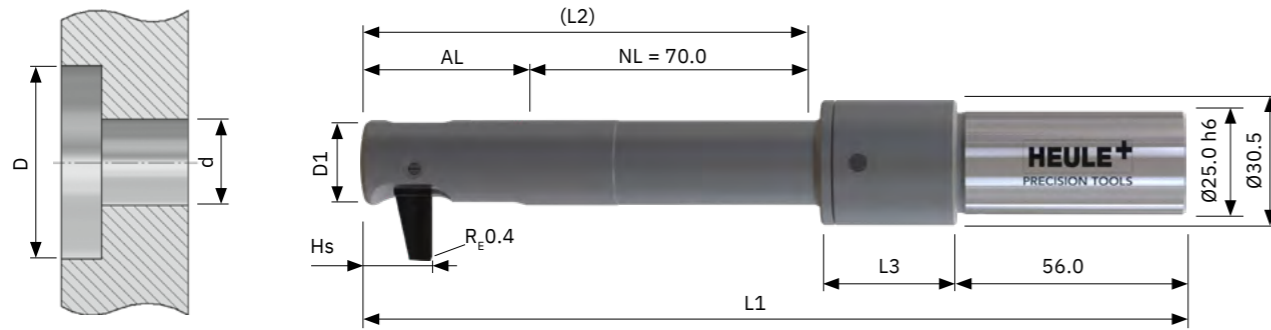
 Parts in stock highlighted in green

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 Tool Selector –
Product selection made easy
heule.com/en/tool-selector/bsf

BSF Bore Ø 20.5 mm | Series G




Tools and blades

Standard tool **without** blade. The blade must be ordered separately.


- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-G-**1D**-6.0).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.	
20.50	20.40	29.00	39.50	16.30	202.50	109.50	33.00	BSF-G-2050/070-23.0	BSF-M-G-1A-6.0	
		29.50						BSF-G-2050/070-23.5		
		30.00						BSF-G-2050/070-24.0		
		30.50						BSF-G-2050/070-24.5		
		31.00						BSF-G-2050/070-25.0		
		31.50						BSF-G-2050/070-25.5		
		32.00						BSF-G-2050/070-26.0		
		32.50						BSF-G-2050/070-26.5		
		33.00						BSF-G-2050/070-27.0		
		33.50						BSF-G-2050/070-23.0		BSF-M-G-1A-10.5
		34.00						BSF-G-2050/070-23.5		
		34.50						BSF-G-2050/070-24.0		
		35.00						BSF-G-2050/070-24.5		
		35.50						BSF-G-2050/070-25.0		
		36.00						BSF-G-2050/070-25.5		
		36.50						BSF-G-2050/070-26.0		
		37.00						BSF-G-2050/070-26.5		
		37.50						BSF-G-2050/070-27.0		
		38.00						BSF-G-2050/070-23.0	BSF-M-G-1A-15.0	
		38.50						BSF-G-2050/070-23.5		
		39.00						BSF-G-2050/070-24.0		
		39.50						BSF-G-2050/070-24.5		
		40.00						BSF-G-2050/070-25.0		
		40.50						BSF-G-2050/070-25.5		
		41.00						BSF-G-2050/070-26.0		
		41.50						BSF-G-2050/070-26.5		
		42.00						BSF-G-2050/070-27.0		

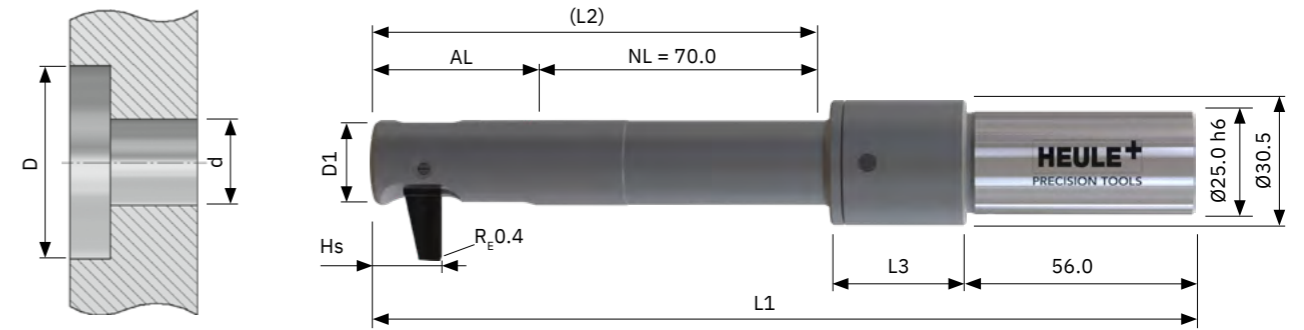
 Parts in stock highlighted in green

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 Tool Selector –
Product selection made easy
heule.com/en/tool-selector/bsf

BSF Bore Ø 20.5 mm | Series G – continued




Tools and blades

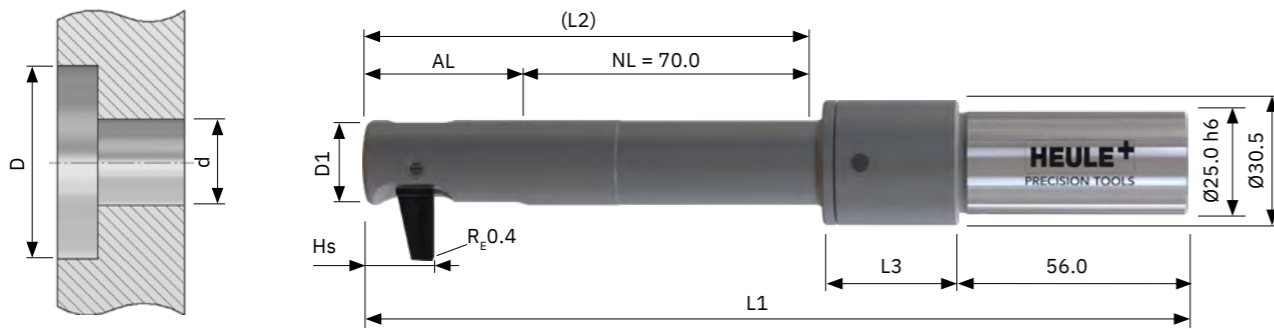
Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-G-**1D**-19.5).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.	
20.50	20.40	42.50	39.50	16.30	202.50	109.50	33.00	BSF-G-2050/070-23.0	BSF-M-G-1A-19.5	
		43.00						BSF-G-2050/070-23.5		
		43.50						BSF-G-2050/070-24.0		
		44.00						BSF-G-2050/070-24.5		
		44.50						BSF-G-2050/070-25.0		
		45.00						BSF-G-2050/070-25.5		
		45.50						BSF-G-2050/070-26.0		
		46.00						BSF-G-2050/070-26.5		
		46.50						BSF-G-2050/070-27.0		
		47.00						BSF-G-2050/070-23.0		BSF-M-G-1A-24.0
		47.50						BSF-G-2050/070-23.5		

 Parts in stock highlighted in green

BSF Bore Ø 21.0 mm | Series G




Tools and blades

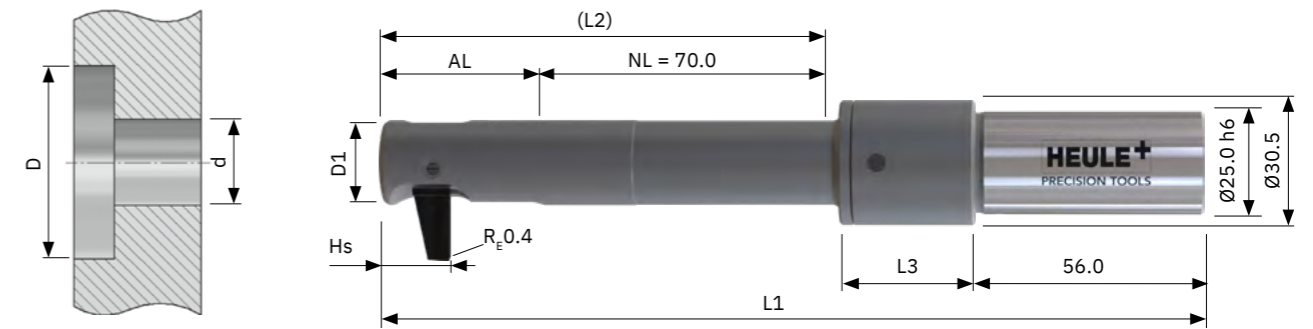
Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-G-**1D**-6.0).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.
21.00	20.90	29.50	39.50	16.30	202.50	109.50	33.00	BSF-G-2100/070-23.5	BSF-M-G-1A-6.0
		30.00						BSF-G-2100/070-24.0	
		30.50						BSF-G-2100/070-24.5	
		31.00						BSF-G-2100/070-25.0	
		31.50						BSF-G-2100/070-25.5	
		32.00						BSF-G-2100/070-26.0	
		32.50						BSF-G-2100/070-26.5	
		33.00						BSF-G-2100/070-27.0	
		33.50						BSF-G-2100/070-27.5	
		34.00						BSF-G-2100/070-23.5	
		34.50						BSF-G-2100/070-24.0	
		35.00						BSF-G-2100/070-24.5	
		35.50						BSF-G-2100/070-25.0	
		36.00						BSF-G-2100/070-25.5	
		36.50						BSF-G-2100/070-26.0	
		37.00						BSF-G-2100/070-26.5	
		37.50						BSF-G-2100/070-27.0	
		38.00						BSF-G-2100/070-27.5	
		38.50						BSF-G-2100/070-23.5	BSF-M-G-1A-15.0
		39.00						BSF-G-2100/070-24.0	
		39.50						BSF-G-2100/070-24.5	
		40.00						BSF-G-2100/070-25.0	
		40.50						BSF-G-2100/070-25.5	
		41.00						BSF-G-2100/070-26.0	
		41.50						BSF-G-2100/070-26.5	
		42.00						BSF-G-2100/070-27.0	
		42.50						BSF-G-2100/070-27.5	

 Parts in stock highlighted in green

BSF bore Ø 21.0 mm | Series G – continued




Tools and blades

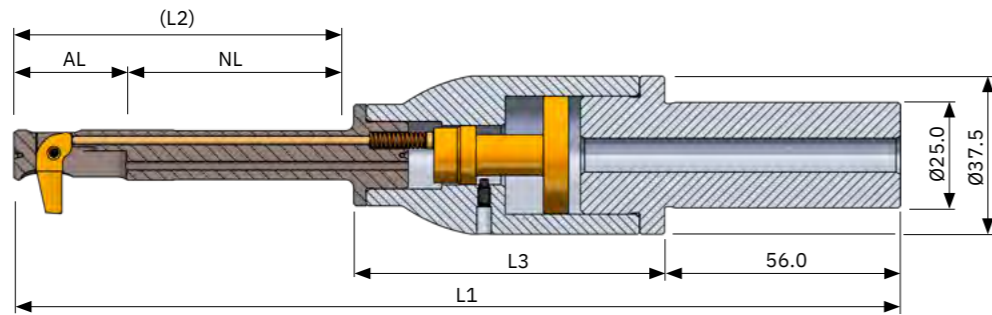
Standard tool **without** blade. The blade must be ordered separately.

- Activation with internal coolant. For BSF Air, add A to the part no. (**BSFA-**) and M for BSF Manual (**BSFM-**).
- With cylindrical shank. Optional, but not from stock: Weldon > suffix "-HB", Whistle Notch > suffix "-HE"
- Standard blade coating "1A" for steel alloys. For aluminium, change part no. to "1D" (e.g: BSF-M-G-**1D**-19.5).

Bore Ø d mm	Tool Ø D1 mm	C-bore Ø D mm	AL mm	HS mm	L1 mm	L2 mm	L3 mm	Tool Part no.	Blade Part no.
21.00	20.90	43.00	39.50	16.30	202.50	109.50	33.00	BSF-G-2100/070-23.5	BSF-M-G-1A-19.5
		43.50						BSF-G-2100/070-24.0	
		44.00						BSF-G-2100/070-24.5	
		44.50						BSF-G-2100/070-25.0	
		45.00						BSF-G-2100/070-25.5	
		45.50						BSF-G-2100/070-26.0	
		46.00						BSF-G-2100/070-26.5	
		46.50						BSF-G-2100/070-27.0	
		47.00						BSF-G-2100/070-27.5	
		47.50						BSF-G-2100/070-23.5	
		48.00						BSF-G-2100/070-24.0	
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		49.00						BSF-G-2100/070-25.0	

 Parts in stock highlighted in green

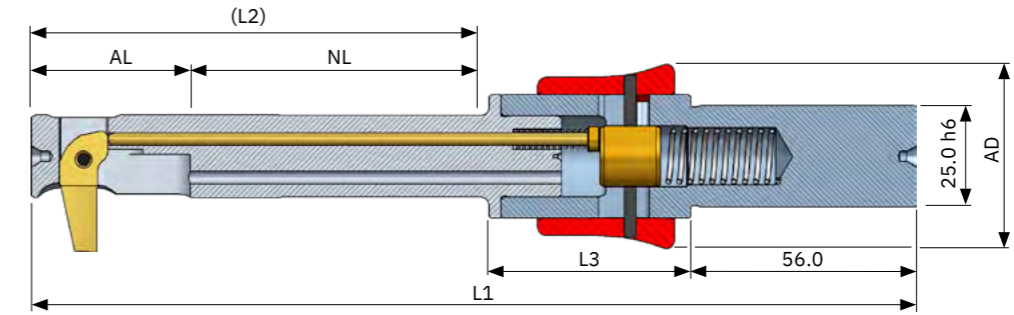
BSF Air



Dimensions

Assembly	Bore Ø d mm	AL mm	NL mm	L1 mm	L2 mm	L3 mm
A	6.50	14.25	40.00	188.50	54.25	74.00
A	7.00	15.00	40.00	189.00	55.00	74.00
B	7.50	17.00	40.00	191.00	57.00	74.00
B	8.00	17.00	40.00	191.00	57.00	74.00
B	8.50	17.75	40.00	191.75	57.75	74.00
C	9.00	20.25	50.00	204.05	70.25	74.00
C	9.50	20.25	50.00	204.05	70.25	74.00
C	10.00	20.25	50.00	204.05	70.25	74.00
D	10.50	22.50	50.00	206.30	72.50	74.00
D	11.00	22.50	50.00	206.30	72.50	74.00
D	11.50	23.75	50.00	207.75	73.75	74.00
E	12.00	26.75	50.00	210.75	76.75	74.00
E	12.50	26.75	50.00	210.75	76.75	74.00
E	13.00	26.75	50.00	210.75	76.75	74.00
E	13.50	26.75	50.00	210.75	76.75	74.00
E	14.00	28.00	50.00	212.00	78.00	74.00
F	14.50	30.75	70.00	242.75	100.75	82.00
F	15.00	30.75	70.00	242.75	100.75	82.00
F	15.50	30.75	70.00	242.75	100.75	82.00
F	16.00	32.50	70.00	244.50	102.50	82.00
F	16.50	32.50	70.00	244.50	102.50	82.00
F	17.00	32.50	70.00	244.50	102.50	82.00
G	17.50	37.25	70.00	249.05	107.25	82.00
G	18.00	37.25	70.00	249.05	107.25	82.00
G	18.50	37.25	70.00	249.05	107.25	82.00
G	19.00	37.25	70.00	249.05	107.25	82.00
G	19.50	37.25	70.00	249.05	107.25	82.00
G	20.00	37.25	70.00	249.05	107.25	82.00
G	20.50	39.50	70.00	251.50	109.50	82.00
G	21.00	39.50	70.00	251.50	109.50	82.00

BSF Manual



Dimensions

Assembly	Bore Ø d mm	AL mm	NL mm	L1 mm	L2 mm	L3 mm	AD mm
A	6.50	14.25	40.00	156.25	54.25	42.00	36.50
A	7.00	15.00	40.00	157.00	55.00	42.00	36.50
B	7.50	17.00	40.00	159.00	57.00	42.00	36.50
B	8.00	17.00	40.00	159.00	57.00	42.00	36.50
B	8.50	17.75	40.00	159.75	57.75	42.00	36.50
C	9.00	20.25	50.00	172.25	70.25	42.00	36.50
C	9.50	20.25	50.00	172.25	70.25	42.00	36.50
C	10.00	20.25	50.00	172.25	70.25	42.00	36.50
D	10.50	22.50	50.00	174.50	72.50	42.00	36.50
D	11.00	22.50	50.00	174.50	72.50	42.00	36.50
D	11.50	23.75	50.00	175.75	73.75	42.00	36.50
E	12.00	26.75	50.00	178.75	76.75	42.00	36.50
E	12.50	26.75	50.00	178.75	76.75	42.00	36.50
E	13.00	26.75	50.00	178.75	76.75	42.00	36.50
E	13.50	26.75	50.00	178.75	76.75	42.00	36.50
E	14.00	28.00	50.00	180.00	78.00	42.00	36.50
F	14.50	30.75	70.00	210.75	100.75	50.00	45.40
F	15.00	30.75	70.00	210.75	100.75	50.00	45.40
F	15.50	30.75	70.00	210.75	100.75	50.00	45.40
F	16.00	32.50	70.00	212.50	102.50	50.00	45.40
F	16.50	32.50	70.00	212.50	102.50	50.00	45.40
F	17.00	32.50	70.00	212.50	102.50	50.00	45.40
G	17.50	37.25	70.00	217.25	107.25	50.00	45.40
G	18.00	37.25	70.00	217.25	107.25	50.00	45.40
G	18.50	37.25	70.00	217.25	107.25	50.00	45.40
G	19.00	37.25	70.00	217.25	107.25	50.00	45.40
G	19.50	37.25	70.00	217.25	107.25	50.00	45.40
G	20.00	37.25	70.00	217.25	107.25	50.00	45.40
G	20.50	39.50	70.00	219.50	109.50	50.00	45.40
G	21.00	39.50	70.00	219.50	109.50	50.00	45.40

BSF conversion kits

The shank in the standard range is fully compatible with the air-activated and manually activated versions. Accordingly, the adaptation to the blade housing is compatible with the shanks of the other two activation types. To convert your existing tool to a different type of activation, simply order the corresponding shank of the same series for your blade housing.

The cylindrical shank is standard. For Weldon please add "-HB", for Whistle Notch > add "-HE" to the part no. (e.g. BSFA-O-0001-HB).

For existing blade housing:	Shank Ø 20 mm Part no.	Shank Ø 25 mm Part no.	Shank Ø 32 mm Part no.
Series A-E			
IK	BSF-O-0001	BSF-O-0002	-
Air	BSFA-O-0001	BSFA-O-0002	BSFA-O-0003
Manual	BSFM-O-0011	BSFM-O-0012	BSFM-O-0013
Series F-G			
IK	BSF-O-0003	BSF-O-0004	BSF-O-0005
Air	BSFA-O-0004	BSFA-O-0005	BSFA-O-0006
Manual	BSFM-O-0014	BSFM-O-0015	BSFM-O-0016



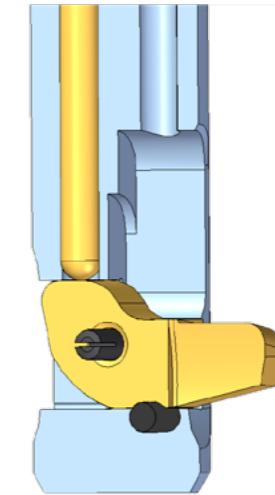
BSF options

Smaller tolerance range of ±0.1 mm with BSF-P

The BSF-P version enables a counterbore diameter accuracy with a tolerance band of 0.2 mm (±0.1 mm).

The individual production of these blades means that any other customer-specific requirements can also be incorporated, e.g. with regard to form.

The adaptation to the blade housing is compatible with the standard BSF version as well as with BSF Air and BSF Manual.

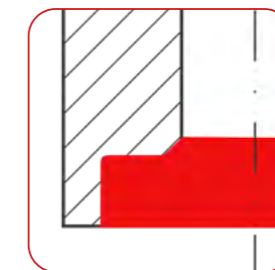


BSF-P: The additional interlocking bolt in the blade housing helps to position the blade more precisely.

Counterboring with inside chamfers

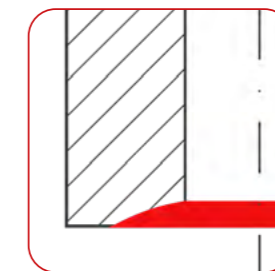
BSF carbide blades can also be produced with custom forms. A common example is the additional cutting of an internal chamfer.

Standard blade blanks ground to the desired form are used. Blades with customised forms can also be manufactured for the BSF-P version.



Spherical formed blades

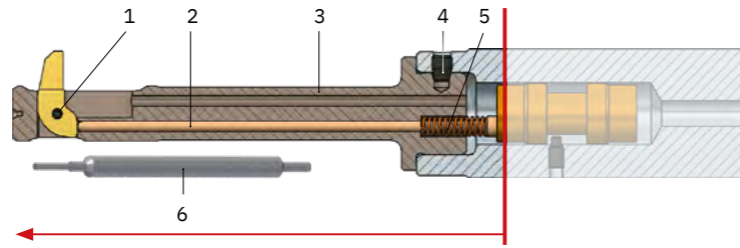
The higher counterboring accuracy of the BSF-P version and the manufacturing process make additional customer specifications possible, e.g. spherical convex form.



BSF

INDIVIDUAL

BSF spare parts



	1	2	3	4	5	6
	Split pin	Control bolt	Blade housing	Clamping screw	Pressure spring	Assembly pin
BSF-G-1950/070-22.0	BSF-E-0013	BSF-B-0012	BSF-N-G-1950/0000/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-1950/070-22.5	BSF-E-0013	BSF-B-0012	BSF-N-G-1950/P025/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-1950/070-23.0	BSF-E-0013	BSF-B-0012	BSF-N-G-1950/P050/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-1950/070-23.5	BSF-E-0013	BSF-B-0012	BSF-N-G-1950/P075/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-1950/070-24.0	BSF-E-0013	BSF-B-0012	BSF-N-G-1950/P100/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-1950/070-24.5	BSF-E-0013	BSF-B-0012	BSF-N-G-1950/P125/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-1950/070-25.0	BSF-E-0013	BSF-B-0012	BSF-N-G-1950/P150/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-1950/070-25.5	BSF-E-0013	BSF-B-0012	BSF-N-G-1950/P175/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-1950/070-26.0	BSF-E-0013	BSF-B-0012	BSF-N-G-1950/P200/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2000/070-22.5	BSF-E-0013	BSF-B-0012	BSF-N-G-2000/P025/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2000/070-23.0	BSF-E-0013	BSF-B-0012	BSF-N-G-2000/P050/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2000/070-23.5	BSF-E-0013	BSF-B-0012	BSF-N-G-2000/P075/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2000/070-24.0	BSF-E-0013	BSF-B-0012	BSF-N-G-2000/P100/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2000/070-24.5	BSF-E-0013	BSF-B-0012	BSF-N-G-2000/P125/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2000/070-25.0	BSF-E-0013	BSF-B-0012	BSF-N-G-2000/P150/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2000/070-25.5	BSF-E-0013	BSF-B-0012	BSF-N-G-2000/P175/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2000/070-26.0	BSF-E-0013	BSF-B-0012	BSF-N-G-2000/P200/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2000/070-26.5	BSF-E-0013	BSF-B-0012	BSF-N-G-2000/P225/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2050/070-23.0	BSF-E-0013	BSF-B-0013	BSF-N-G-2050/P050/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2050/070-23.5	BSF-E-0013	BSF-B-0013	BSF-N-G-2050/P075/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2050/070-24.0	BSF-E-0013	BSF-B-0013	BSF-N-G-2050/P100/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2050/070-24.5	BSF-E-0013	BSF-B-0013	BSF-N-G-2050/P125/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2050/070-25.0	BSF-E-0013	BSF-B-0013	BSF-N-G-2050/P150/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2050/070-25.5	BSF-E-0013	BSF-B-0013	BSF-N-G-2050/P175/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2050/070-26.0	BSF-E-0013	BSF-B-0013	BSF-N-G-2050/P200/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2050/070-26.5	BSF-E-0013	BSF-B-0013	BSF-N-G-2050/P225/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2050/070-27.0	BSF-E-0013	BSF-B-0013	BSF-N-G-2050/P250/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2100/070-23.5	BSF-E-0013	BSF-B-0013	BSF-N-G-2100/P075/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2100/070-24.0	BSF-E-0013	BSF-B-0013	BSF-N-G-2100/P100/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2100/070-24.5	BSF-E-0013	BSF-B-0013	BSF-N-G-2100/P125/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2100/070-25.0	BSF-E-0013	BSF-B-0013	BSF-N-G-2100/P150/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2100/070-25.5	BSF-E-0013	BSF-B-0013	BSF-N-G-2100/P175/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2100/070-26.0	BSF-E-0013	BSF-B-0013	BSF-N-G-2100/P200/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2100/070-26.5	BSF-E-0013	BSF-B-0013	BSF-N-G-2100/P225/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2100/070-27.0	BSF-E-0013	BSF-B-0013	BSF-N-G-2100/P250/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008
BSF-G-2100/070-27.5	BSF-E-0013	BSF-B-0013	BSF-N-G-2100/P275/070	GH-H-S-0202	GH-H-F-0051	BSF-V-0008


BSF FAQ

Question	Causes	Remedy
<ul style="list-style-type: none"> Blade folds out automatically when the spindle stops (vertical machining). 	<ul style="list-style-type: none"> Gravity. The blade is not fixed in the blade housing without the coolant pressure or compressed air switched on, or the activation ring on the BSF Manual set to lock. 	<ul style="list-style-type: none"> If the blade is to remain securely in the blade housing, switch on internal coolant, compressed air or actuate the activation ring on the BSF-M. Attention: To bring the blade safely into the working position (unfolding), the activation speed of the spindle must be correctly programmed.
<ul style="list-style-type: none"> No counterbore after machining 	<ul style="list-style-type: none"> Blade does not fold out 	<ul style="list-style-type: none"> Check whether the spindle activation speed has been selected correctly. Check whether the blade is jammed in the blade window. If so, remove the blade and clean the blade and blade window.
<ul style="list-style-type: none"> Blade does not fold in reliably 	<ul style="list-style-type: none"> Internal coolant pressure too low Air pressure on the machine spindle too low 	<ul style="list-style-type: none"> Minimum pressure is 20 bar. If this pressure cannot be reached, switch to BSF Air or BSF Manual if possible. Minimum air pressure is 5 bar. Check the available air pressure in the spindle. HEULE can provide a measuring device for this purpose if required.
<ul style="list-style-type: none"> Is coolant filtration necessary? 	<ul style="list-style-type: none"> Yes. Excessively contaminated cooling medium impairs the activation operation of the blade. 	<ul style="list-style-type: none"> The cooling medium must be cleaned with a minimum filter size of 25 µm.
<ul style="list-style-type: none"> Can machining be done with internal coolant or compressed air? 	<ul style="list-style-type: none"> Yes. This helps to remove chips and cool the tool/blade. 	<ul style="list-style-type: none"> Attention: The blade must be fully in the cut before the internal coolant is switched on.
<ul style="list-style-type: none"> I have a bore with H7 tolerance. Will the BSF damage the finished bore? 	<ul style="list-style-type: none"> It is possible that the BSF will leave marks on the finished bore. 	<ul style="list-style-type: none"> We recommend using the BSF tool on a pre-machining diameter.
<ul style="list-style-type: none"> Does it matter from which side the split pin is inserted when changing the blade? 	<ul style="list-style-type: none"> No 	
<ul style="list-style-type: none"> Is it possible to hold the BSF tool in a shrink-fit chuck? 	<ul style="list-style-type: none"> No. The shank is made of tool steel and has a different thermal expansion compared to carbide tools. 	
<ul style="list-style-type: none"> The blade housing is assembled onto the shank with 3 clamping screws. Is there a recommended location or position? 	<ul style="list-style-type: none"> No, the tool works in any position. 	

SOLO

The counterboring and spotfacing tool for any machine. Forwards and backwards. Interrupted cutting possible.

The advantages – Your benefit



SOLO enables automatic spotfacing and counterboring on both the front and back of the bore without turning the workpiece.

Versatile use thanks to modular design: The control unit and shank are standard, while the blade housing, blade control and blade are customised to the customer's application.




The optimum processing result with maximum cost-effectiveness is guaranteed.



SOLO achieves maximum process reliability and performance thanks to its design optimised for the customer's specific application and its reliability-oriented, simple construction.

THE RANGE



Bore Ø range mm	Counterbore Ø range mm	Workpiece material	Series
Ø6.0 - Ø25.0	≈ 1.9 x bore Ø	Aluminium	SOLO
Ø6.0 - Ø25.0	≈ 1.9 x bore Ø	Steel, titanium, Inconel	SOLO2
Ø25.0–Ø 45.0	≈ 1.9 x bore Ø		SOLO25

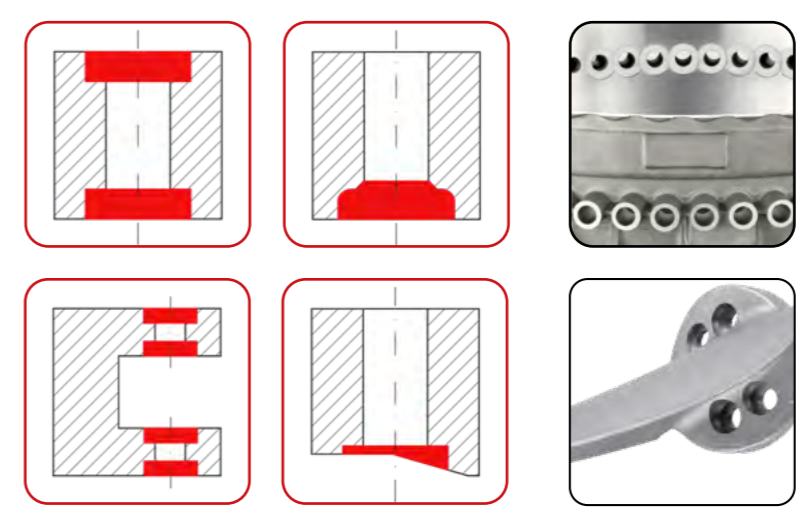
SOLO does not have a standardised product range. Each SOLO tool is designed specifically for the application as part of our **INDIVIDUAL** range, with one of the three control unit types being used in each case.

Is SOLO an option for you? **We would be happy to examine the feasibility** of SOLO in your application and give you a quote so that you can assess the economic viability. Please send us full application information.

CHECKLIST FOR FEASIBILITY CHECK

- Bore Ø including tolerance
- Counterbore Ø or chamfer Ø with tolerance
- Bore depth
- Counterbore depth + form and position tolerances if necessary
- Chamfer angle with tolerance
- Workpiece 3D model (STEP, DXF)
- Material
- Interfering edges / distances
- Machine (type, internal coolant, external coolant, compressed air)
- Shank type
- Production volume per year
- Batch size
- Current solution
- Special requirements

FIELD OF APPLICATION



SOLO

INDIVIDUAL

OPERATING PRINCIPLE

Two versions of the SOLO have been developed to fulfil the requirements of different workpiece materials requiring different cutting speeds. These are SOLO and SOLO2. The two tool systems are visually identical, have however a distinct internal configuration difference.

Centrifugal force caused by rotation of the tool causes two guided weights inside the control unit to slide outwards. The linear motion of the sliding weights is converted into rotary motion with a rack and pinion systems. the pinion is mounted onto the end of the blade control shaft, which rotate as the weights slide back and forth. this rotary motion of the blade control shaft is utilised to either extend or retract the blade.

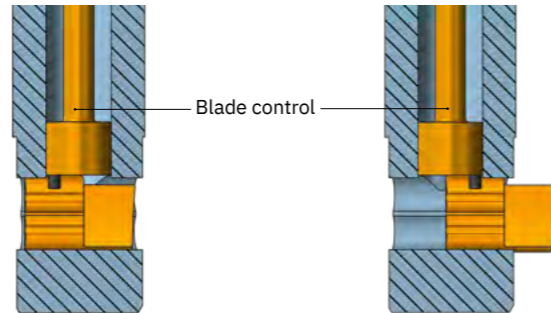
The distance travelled by the weights is exactly calculated to cause the blade control shaft to rotate by 180°. The centrifugal/outward movement of the weights therefore causes the blade to extend with the SOLO and to retract with the SOLO2.



SOLO – higher cutting speed requirements – the blade is retracted when the spindle is stopped.
The blade is extended to working position when the spindle rotation speed exceeds 1900 rpm. The blade is retracted back into the blade housing by stopping the spindle.



SOLO2 – lower cutting speed requirements – the blade is extended when the spindle is stopped.
The blade remains in its extended working position up to a spindle speed of 1500 rpm. To retract the blade for entry into or exit from the bore, the spindle speed is increased to above 1900 rpm.



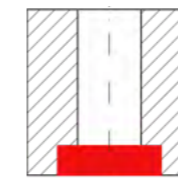
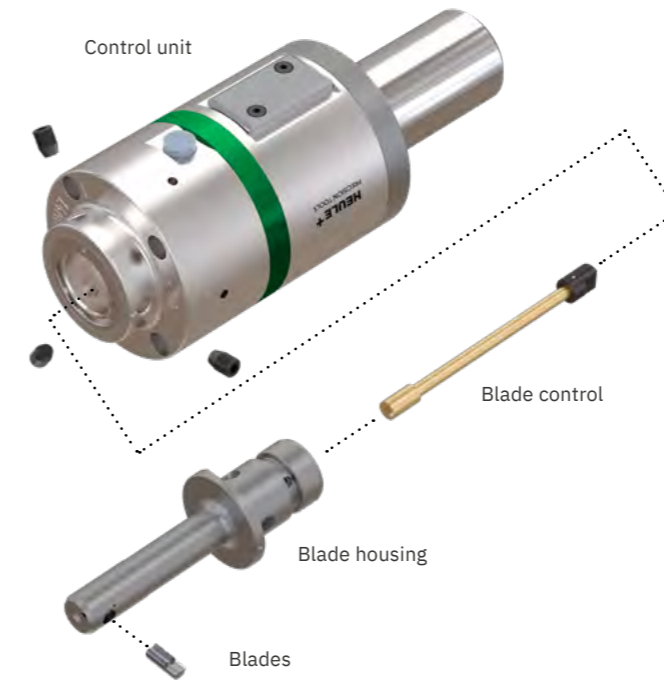
Blade housing with retracted blade

Blade housing with extended blade. The rotary motion of the pinion causes the blade control to extend or retract the blade.

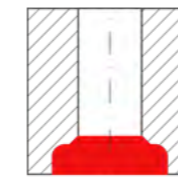
OVERVIEW DISTINGUISHING FEATURES

	SOLO	SOLO2	SOLO25
Colour of centre ring	black	green	no colour
Blade position when spindle stops	retracted	extended	extended
Extension speed	1900 rpm	0 = spindle stop	0 = spindle stop
Retraction speed	0 = spindle stop	1900 rpm	2200 rpm
Machining speed	> 1900 rpm	0–1500 rpm	0–1500 rpm

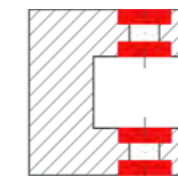
TOOL DESIGN



Blade for back spotfacing



Blade for back counterboring



Bronze guide bushing



Blade holder with inserts for front and back spotfacing

SOLO is characterised by its simplicity and user-friendliness. The blade can be replaced in the machine by hand.

Resistant to dirt and chips: The radially extending and retracting blade is guided through the blade housing, ensuring high process reliability. This prevents chips from becoming trapped.

The components that are subject to wear are very easy to replace during routine maintenance.

Blades

The design of the blade and the blade housing are customised for the specific application.

The use of bronze guide bushings is recommended for applications with high radial forces during machining, such as when cutting radiuses, chamfers, or when the cut is interrupted. Guide bushings can also be useful to reduce any marking on the surface of the bore caused by the blade housing, especially when machining softer materials.

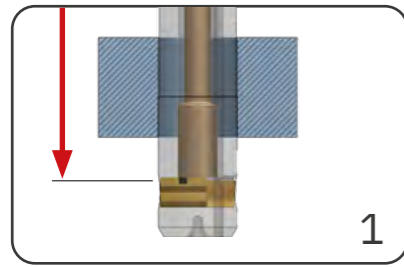
Operating instructions

- > Blade change
- > Changing the control bolt
- > Maintenance manual

heule.com > Service > Media & download centre



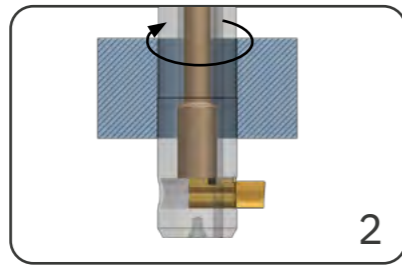
SOLO PROCESS STEPS



- Spindle stop! Blade is retracted
- Rapid feed through the workpiece

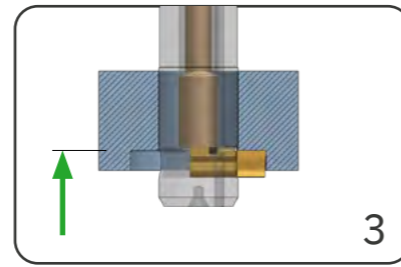
Example M5
G0 Z-32.0¹⁾

¹⁾ 32.0=30.0+2.0 (safety)



- Spindle rotation clockwise
- Spindle speed (>1900 rpm) – Blade extends
- Dwell time min. 1 sec.
- External/internal coolant on

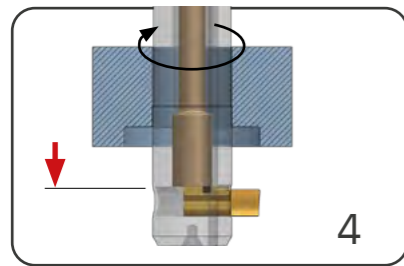
S2729 M3
G4 X2
M8 (M88)



- Working feed to counterbore depth

G1 Z-22.0²⁾ F136

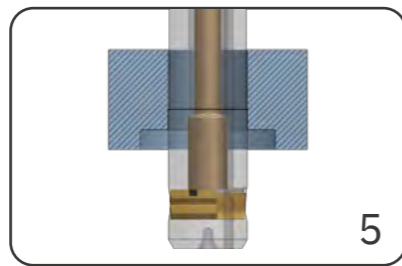
²⁾ 22.0=30.0-8.0



- Rapid feed out of the workpiece
- External/internal coolant off

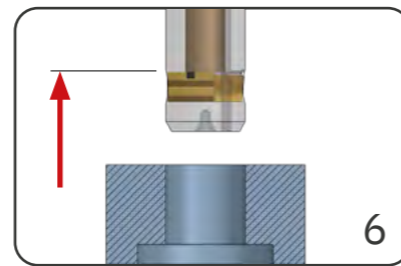
G0 Z-32.0³⁾
M9 (M89)

³⁾ 32.0=30.0+2.0 (safety)



- Spindle stop! Blade retracts
- Dwell time at least 1 sec.

M5
G4 X2

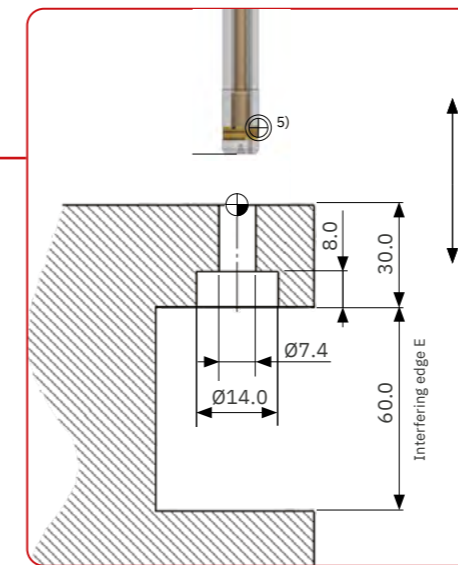


- Rapid feed out of the workpiece

G0 Z+13.3⁴⁾

⁴⁾ 13.3=11.3+2.0 (safety)

APPLICATION AND PROGRAMMING EXAMPLE



Cylindrical counterbore on the back of the bore

Application data

Material: Aluminium
Counterbore Ø: 14.0 mm
Counterbore depth: 8.0 mm
Bore Ø: 7.4 mm

Tool selection

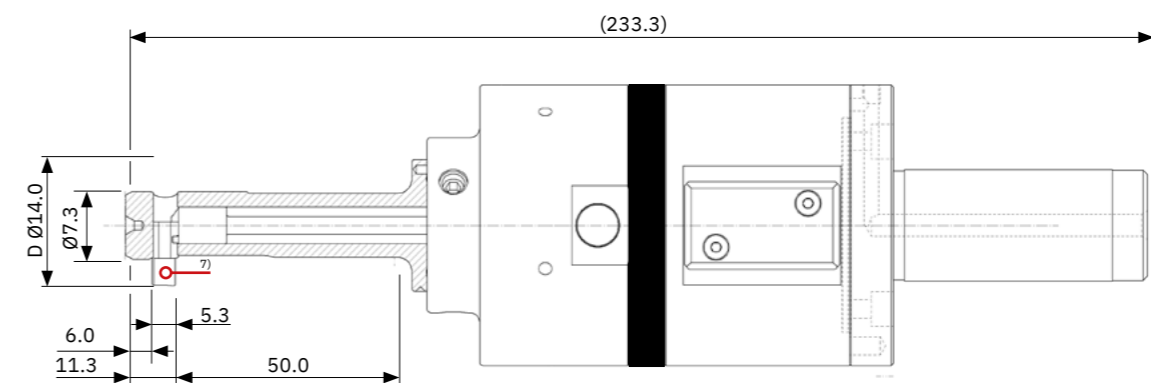
Tool: see below
Blade: backward cutting only

Cutting data

Cutting speed V_c : 120 m/min.
Tool working feed: 0.05 mm/rev

⁵⁾ We recommend programming the zero point of the tool to the cutting edge of the blade.

TOOL FOR APPLICATION ⁶⁾



⁶⁾ All SOLO tools are customised. The dimensions of this tool must not be used to program your own application. The applicable values can be found in your own tool drawing.

⁷⁾ Attention: Blade position when spindle stops is RETRACTED. Minimum spindle speed for machining is >1900 rpm, as the activation speed is 1900 rpm.

COUNTERBORING TOLERANCE

Bore Ø tolerance in mm	+0.1 0	+0.2 0
Counterbore Ø tolerance in mm	±0.2	±0.3



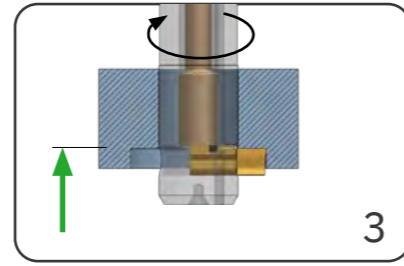
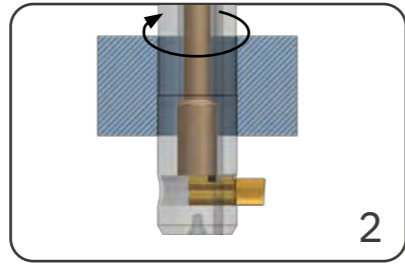
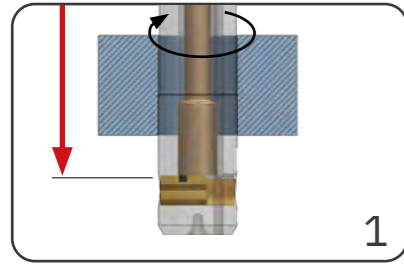
Please note the recommended value for the tolerance of the bore diameter. The larger the tolerance, the more the quality can be affected (damage to the bore, pressing, counterbore diameter becomes smaller).

Note for commissioning the SOLO after extended idle period



A manual function check must be carried out after the tool has been idle for an extended period. Non-use can lead to the coolant and dirt drying out and the blade and blade control sticking together. This adhesive effect can lead to malfunction. To free them, the blade control and blade must be manipulated manually on the tool before it is put back into operation.

PROCESS STEPS SOLO2 / SOLO25



- Activation speed (>1900 rpm)
 - Blade retracts
- Dwell time min. 1 sec.
- Rapid feed through the workpiece

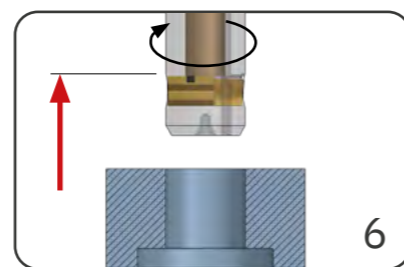
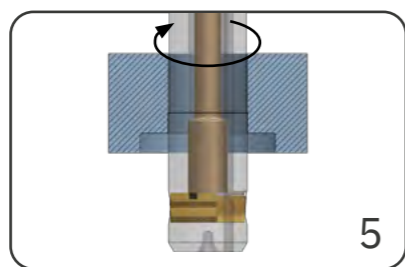
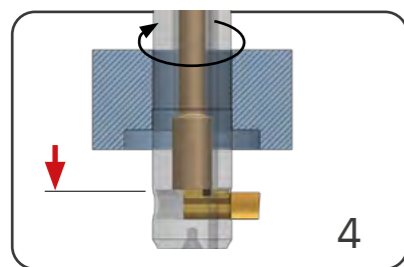
- Spindle stop! Blade extends
- Dwell time min. 1 sec.
- External/internal coolant on
- Spindle speed (max. 1500 rpm)

- Working feed to counterbore depth

Example
 S1900 M3
 G4 X2
 G0 Z-32.0¹⁾
¹⁾ 32.0=30.0+2.0 (safety)

M5 G4 X2
 M8 (M88)
 S227 M3

G1 Z-22.0²⁾ F7
²⁾ 22.0=30.0-8.0



- Rapid feed out of the workpiece
- Spindle stop! Blade remains extended
- External/internal coolant off

- Activation speed (>1900 rpm)
 - Blade retracts
- Dwell time min. 1 sec.

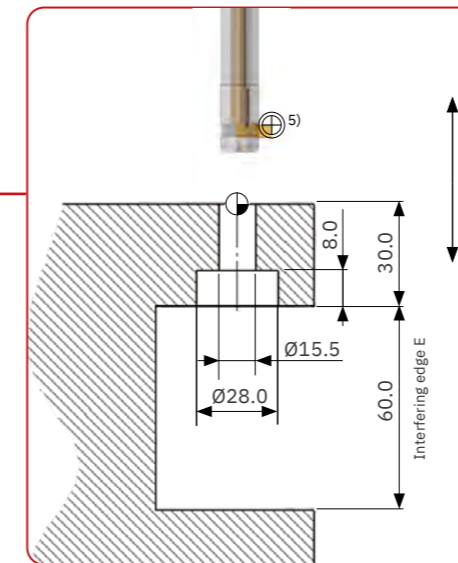
- Rapid feed out of the workpiece

G0 Z-32.0³⁾
 M5
 M9 (M89)
³⁾ 32.0=30.0+2.0 (safety)

S1900 M3
 G4 X2

G0 Z+13.3⁴⁾
⁴⁾ 13.3=11.3+2.0 (safety)

APPLICATION AND PROGRAMMING EXAMPLE



Cylindrical counterbore on the back of the bore

Application data

Material: X5CrNi1810
 Counterbore diameter: 28.0 mm
 Counterbore depth: 8.0 mm
 Bore diameter: 15.5 mm

Tool and blade selection

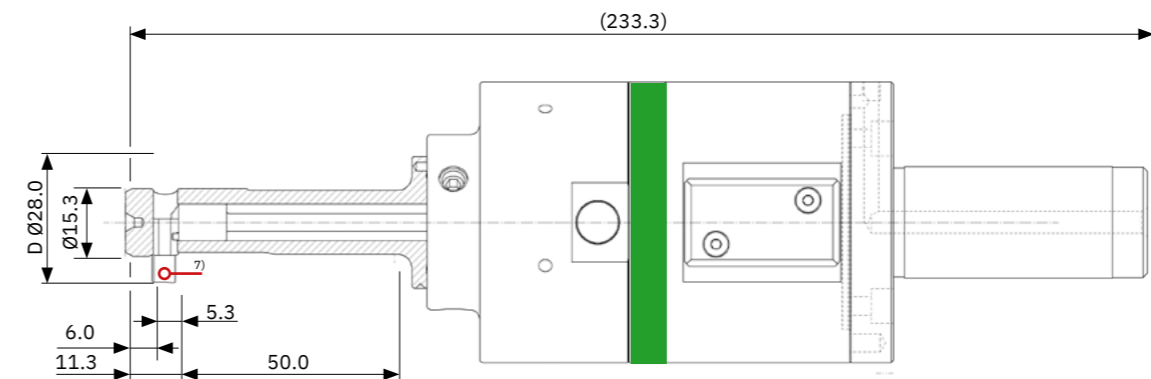
Tool: see below
 Blade: backward cutting only

Cutting data

Cutting speed V_c : 20 m/min.
 Tool working feed: 0.03 mm/rev

⁵⁾ We recommend programming the zero point of the tool to the cutting edge of the blade.

TOOL FOR APPLICATION⁶⁾



⁶⁾ All SOLO tools are customised. The dimensions of this tool must not be used to program your own application. The applicable values can only be found in your own tool drawing.

⁷⁾ Blade EXTENDED at standstill. Max. spindle speed 1500 rpm, as the activation speed is 1900 rpm.

COUNTERBORING TOLERANCE

Bore Ø tolerance in mm	+0.1 0	+0.2 0
Counterbore Ø tolerance in mm	±0.2	±0.3



Note for commissioning the SOLO after extended idle period

A manual function check must be carried out after the tool has been idle for an extended period. Non-use can lead to the coolant and dirt drying out and the blade and blade control sticking together. This adhesive effect can lead to malfunction. To free them, the blade control and blade must be manipulated manually on the tool before it is put back into operation.



Please note the recommended value for the tolerance of the bore diameter. The larger the tolerance, the more the quality can be affected (damage to the bore, pressing, counterbore diameter becomes smaller).

CUTTING DATA SOLO / SOLO2 / SOLO25

	Description	Tensile str. RM (MPa)*	Hardness (HB)	Hardn. (HRC)	Cutting speed (FZ)	Working feed (VC)
P0	Low-carbon steel, long-chipping, C <0.25%	<530	<125	–	50–90	0.03–0.1
P1	Low-carbon steel, short-chipping, C <0.25%	<530	<125	–	50–90	0.03–0.1
P2	Steel with carbon content C >0.25%	>530	<220	<25	50–90	0.03–0.1
P3	Alloy steel and tool steel, C >0.25%	600–850	<330	<35	50–90	0.03–0.08
P4	Alloy steel and tool steel, C >0.25%	850–1400	340–450	35–48	30–50	0.02–0.05
P5	Ferritic, martensitic and stainless PH steel	600–900	<330	<35	40–80	0.03–0.08
P6	High-strength ferritic, martensitic and PH stainless steel	900–1350	350–450	35–48	30–50	0.02–0.05
M1	Austenitic stainless steel	<600	130–200	–	30–50	0.03–0.08
M2	High-strength austenitic stainless steel	600–800	150–230	<25	15–25	0.02–0.05
M3	Duplex stainless steel	<800	135–275	<30	30–50	0.02–0.05
K1	Cast iron	125–500	120–290	<32	50–110	0.03–0.1
K2	Ductile cast iron with up to medium strength	<600	130–260	<28	50–90	0.03–0.08
K3	High-strength cast iron and bainitic cast iron	>600	180–350	<43	50–90	0.03–0.08
N1	Wrought aluminium alloys	–	–	–	100–200	0.03–0.12
N2	Aluminium alloys with low Si content	–	–	–	100–200	0.03–0.12
N3	Aluminium alloys with high Si content	–	–	–	100–200	0.03–0.12
N4	Copper, brass and zinc base	–	–	–	50–90	0.03–0.08
S1	Iron-based heat-resistant alloys	500–1200	160–260	25–48	15–25	0.02–0.05
S2	Cobalt-based heat-resistant alloys	1000–1450	250–450	25–48	15–25	0.02–0.05
S3	Nickel-based heat-resistant alloys	600–1700	160–450	<48	15–25	0.02–0.05
S4	Titanium and titanium alloys	900–1600	300–400	33–48	15–25	0.02–0.05



The cutting data listed are guide values! They depend on the amount of slope of the uneven surface. (e.g. high slope > low cutting value).
For materials that are difficult to machine, we recommend applying cutting speeds that are at the lower end of the range.

MAINTENANCE INTERVAL / SERVICES

Periodic maintenance interval after 18 months or 200,000 cycles

HEULE Werkzeug AG offers technical support and services for all products.

Any service or maintenance which requires the removal of sealed screws may only be carried out by personnel certified or authorised by HEULE Werkzeug AG.

Professional maintenance and timely service cycles guarantee process reliability.

MANDATORY MAINTENANCE / SAFETY

Maintenance is mandatory once the maintenance interval has been reached. In addition to the work that must be carried out by persons authorised by HEULE, the following three processes can be carried out independently by the customer:

IMPORTANT: The control unit may only be opened by certified and authorised personnel. HEULE Werkzeug AG accepts no liability if it has been opened by unauthorised persons.

- Blade change
- Replacing the blade control
- Replacing the blade housing



SAFETY NOTE

If these guidelines are not adhered to, there is **considerable risk of injury** during operation of the tool.

VEX

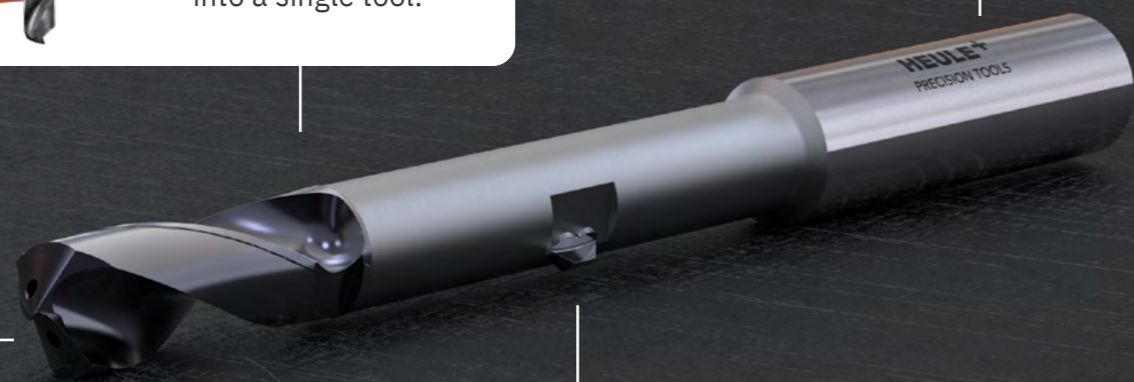
Streamlines the drilling operation. Simultaneous drilling and chamfering, front and back in one single pass.

The advantages – Your benefit



VEX combines the patented SNAP chamfering technology with a high-performance carbide drill insert into a single tool.

One operation and the bore is complete, including chamfer on both bore edges, without turning the workpiece and without changing tools.



Replaceable twist drill inserts and chamfering blades made of carbide with coatings for specific workpiece materials.



For bores from a diameter of 5.0 mm to 17.0 mm and bore depths from 1xd to 2xd. For additional solutions, see **INDIVIDUAL**.

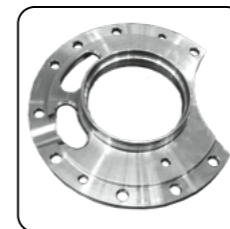
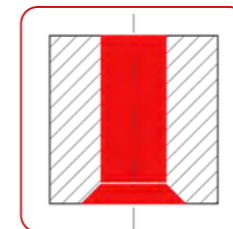
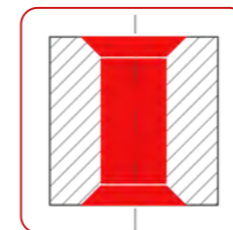
THE RANGE



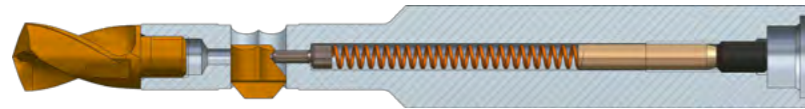
Bore Ø range mm	Max. bore depth mm		Internal coolant supply		Chamfer size mm	Series	Catalogue page
	1xd	2xd	with	without			
VEX-S					max.		
5.0–5.99	6.0	12.0		x	1.0	B	198 202
6.0–6.99	7.0	14.0	x	x	1.0	C	198 202
7.0–8.49	8.5	17.0	x	x	1.0	D	198 202
8.5–10.49	10.5	21.0	x	x	1.0	E	200 204
10.5–11.49	11.5	23.0	x	x	1.0	F	200 204
VEX-P	1.5xd						
11.0–13.99	21.0		x	-	1.0	C	208
14.0–17.00	25.5		x	-	1.0	D	210

If the required tool is not included in the standard range above, the **INDIVIDUAL** range can offer you a possible solution. If required, we can also develop custom solutions that are fully tailored to your application.

FIELD OF APPLICATION



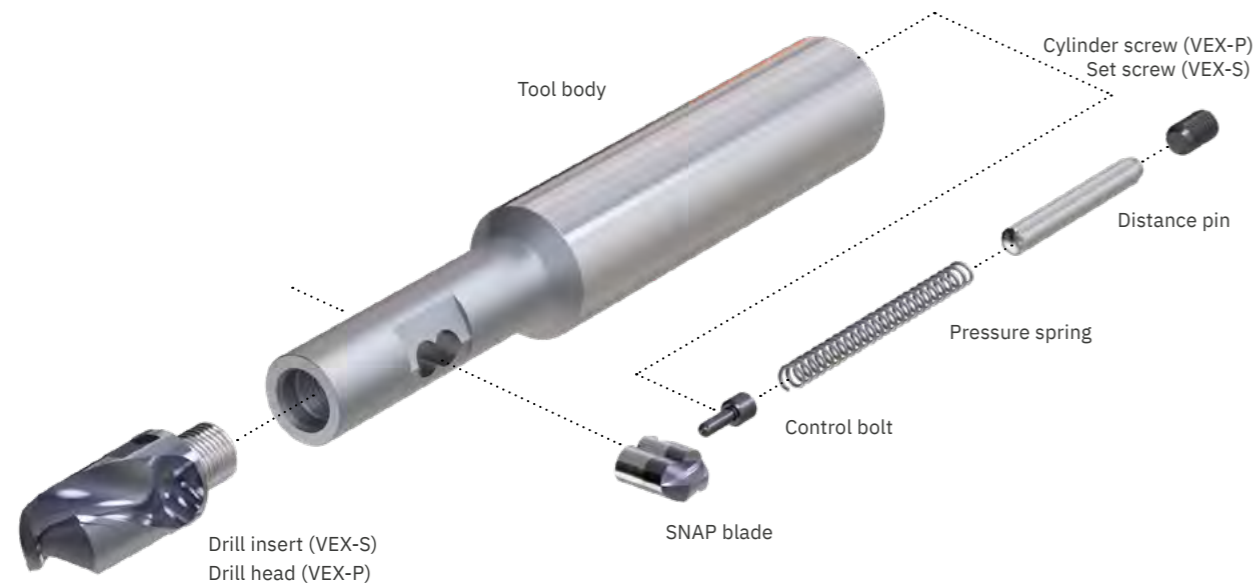
TOOL DESIGN



The VEX tool combines a replaceable high-performance twist drill with the tried-and-tested SNAP chamfering system.

The VEX twist drill insert is replaceable and has a self-centering high-performance cutting geometry. It can be re-sharpened once. This carbide drill insert is available with or without internal coolant supply.

The twist drill insert is connected to the tool body with a specially developed threaded interface. This adaptation ensures perfect radial alignment, good power transmission and quick and easy replacement of the drill insert.



Operating instructions

> Blade change

heule.com > Service > Media & download centre

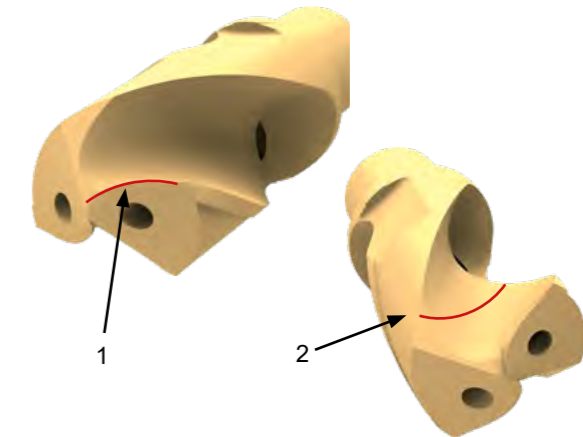


OPERATING PRINCIPLE

With the combination of drilling and chamfering tools, it is possible to drill the bore and simultaneously chamfer it forward and backward in a single operation.

The VEX cutting geometry guarantees high drilling performance with short chip formation. The convex cutting edge (1), which merges into a concave flute angle, breaks the chips from long-chipping materials into short pieces. The large flutes ensure optimum chip removal (2).

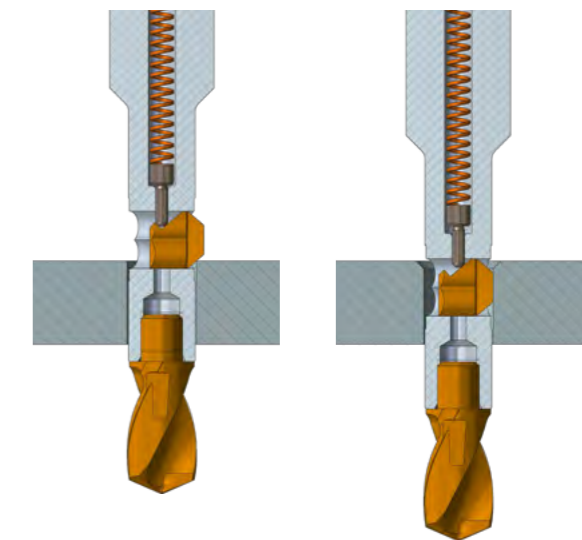
The coolant is fed through the carbide insert onto the end flank and thus directly into the bore.



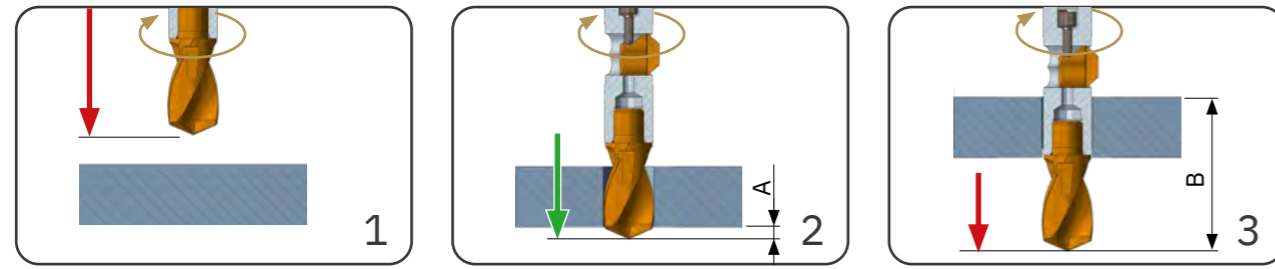
The SNAP chamfering blade is kept movable by a spring-loaded control bolt in the tool body. The specially ground SNAP blade, which cuts forwards and backwards or backward cutting only, produces the desired chamfer in the working feed.

Upon reaching the defined chamfer size, the blade retracts into the tool body. The chamfer size and angle are geometrically defined by the blade and can only be changed by using a different SNAP blade.

A specially designed sliding section of the blade prevents the bore from being damaged. When exiting the bore, the spring-loaded control bolt returns the blade to its neutral position to machine the edge of the bore.



VEX PROCESS STEPS

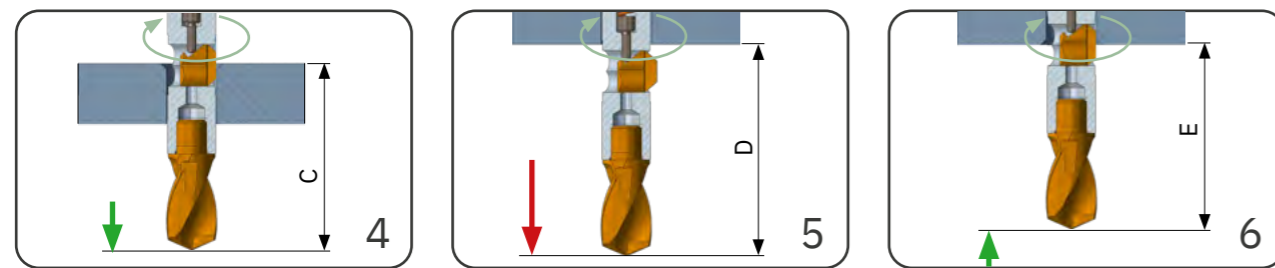


- Spindle speed **drilling (!)** on
- External coolant on. (Internal coolant on if available.)
- Rapid feed to the front of the workpiece
- Working feed **drilling (!)** to position **A**
- Rapid feed to position **B**

```

Example S 3184 M3
           M8
           G0 Z+1.0
           G1 Z-12.91) F636
           G0 Z-28.1
    
```

¹⁾ 12.9=10.0+2.9



- Spindle speed **chamfering (!)**
- Working feed **chamfering (!)** to position **C**
- Rapid feed to position **D**
- Working feed **chamfering (!)** to position **E**
- Rapid feed out of the workpiece

```

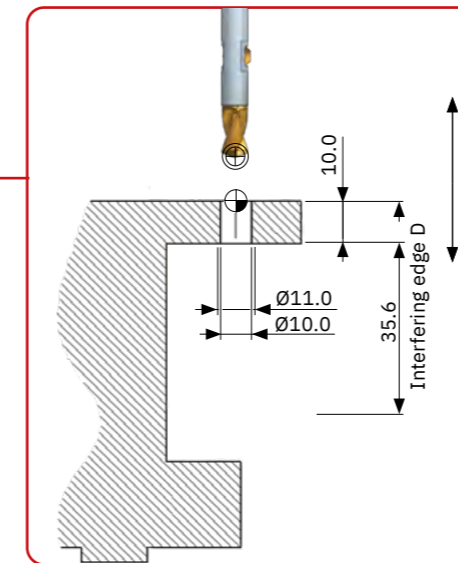
S 1158 M3
G1 Z-32.1 F174
           G0 Z-45.62)
           G1 Z-42.13)
           G0 Z+1.0
    
```

²⁾ 45.6=10.0+35.6 ³⁾ 42.1=10.0+32.1

DIMENSION TABLE FOR PROGRAMMING

mm	A	B		C		D		E	
		1xd	2xd	1xd	2xd	1xd	2xd	1xd	2xd
Series B Ø5.00–5.49	2.0	17.9	23.7	21.9	27.7	25.4	31.2	21.9	27.7
Series B Ø5.50–5.99	2.1	18.8	25.1	22.8	29.1	26.3	32.6	22.8	29.1
Series C Ø6.00–6.49	2.2	19.6	26.3	23.6	30.3	27.1	33.8	23.6	30.3
Series C Ø6.50–6.99	2.3	20.6	27.9	24.6	31.9	28.1	35.4	24.6	31.9
Series D Ø7.00–7.49	2.4	22.8	30.7	26.8	34.7	30.3	38.1	26.8	34.7
Series D Ø7.50–7.99	2.5	23.6	31.9	27.6	35.9	31.1	39.4	27.6	35.9
Series D Ø8.00–8.49	2.6	24.4	33.2	28.4	37.2	31.9	40.7	28.4	37.2
Series E Ø8.50–8.99	2.7	25.6	34.9	29.6	38.9	33.1	42.4	29.6	38.9
Series E Ø9.00–9.49	2.8	26.4	36.2	30.4	40.2	33.9	43.7	30.4	40.2
Series E Ø9.50–9.99	2.9	27.3	37.6	31.3	41.6	34.8	45.5	31.3	41.6
Series E Ø10.00–10.49	2.9	28.1	38.9	32.1	42.9	35.6	46.4	32.1	42.9
Series E Ø10.50–10.99	3.1	29.1	40.2	33.1	44.2	36.6	47.7	33.1	44.2
Series F Ø11.00–11.49	3.1	29.9	41.5	33.9	45.5	37.4	49.0	33.9	45.5

APPLICATION AND PROGRAMMING EXAMPLE



Application data

Material: Steel C45 / P3
 Bore Ø: 10.0 mm
 Chamfer Ø: 11.0 mm
 Workpiece: 10.0 mm
 Machining: both bore edges
 Cooling: External coolant

Tool, blade and drill insert selection

Tool: GH-Q-O-4010, max. bore depth 10.5, w/o int. coolant
 Chamfering blade: GH-Q-M-30215, coating A, for- and backward cutting
 Drill insert: P-S-E2-1000-1A, bore Ø10.0, coating A, w/o int. coolant

Cutting data drilling

Cutting speed V_c : 90–110 m/min.
 Tool working feed: 0.15–0.25 mm/rev

Cutting data chamfering

Cutting speed V_c : 30–50 m/min.
 Tool working feed: 0.1–0.2 mm/rev

VEX CUTTING DATA

Description	Tensile str. RM (MPa)	Hardness (HB)	Hardn. (HRC)	VEX – Drilling			SNAP – Chamfering		
				VC	FZ	B*	VC	FZ	B*
P0 Low-carbon steel, long-chipping, C <0.25%	<530	<125	–	100–130	0.15–0.25	A	40–60	0.1–0.3	A
P1 Low-carbon steel, short-chipping, C <0.25%	<530	<125	–	100–130	0.15–0.25	A	40–60	0.1–0.3	A
P2 Steel with carbon content C >0.25%	>530	<220	<25	90–110	0.15–0.25	A	40–60	0.1–0.3	A
P3 Alloy steel and tool steel, C >0.25%	600–850	<330	<35	90–110	0.15–0.25	A	30–50	0.1–0.2	A
P4 Alloy steel and tool steel, C >0.25%	850–1400	340–450	35–48	90–110	0.15–0.25	A	30–50	0.1–0.2	A
P5 Ferritic, martensitic and stainless PH steel	600–900	<330	<35	30–50	0.08–0.12	A	20–40	0.05–0.15	A
P6 High-strength ferritic, martensitic and PH stainless steel	900–1350	350–450	35–48	20–30	0.08–0.12	A	20–40	0.05–0.15	A
M1 Austenitic stainless steel	<600	130–200	–	30–40	0.08–0.12	A	10–20	0.05–0.15	A
M2 High-strength austenitic stainless steel	600–800	150–230	<25	30–40	0.08–0.12	A	10–20	0.05–0.15	A
M3 Duplex stainless steel	<800	135–275	<30	20–30	0.08–0.12	A	10–20	0.05–0.15	A
K1 Cast iron	125–500	120–290	<32	90–180	0.2–0.35	A	50–90	0.1–0.3	A
K2 Ductile cast iron with up to medium strength	<600	130–260	<28	90–180	0.2–0.35	A	40–60	0.1–0.3	A
K3 High-strength cast iron and bainitic cast iron	>600	180–350	<43	90–160	0.2–0.35	A	40–60	0.1–0.3	A
N1 Wrought aluminium alloys	–	–	–	140–200	0.25–0.35	D	70–120	0.1–0.3	D
N2 Aluminium alloys with low Si content	–	–	–	60–100	0.2–0.3	D	70–120	0.1–0.3	D
N3 Aluminium alloys with high Si content	–	–	–	40–60	0.15–0.25	D	70–120	0.1–0.3	D
N4 Copper, brass and zinc base	–	–	–	40–60	0.15–0.25	D	30–70	0.05–0.15	D
S1 Iron-based heat-resistant alloys	500–1200	160–260	25–48	20–25	0.06–0.1	A	8–15	0.02–0.1	A
S2 Cobalt-based heat-resistant alloys	1000–1450	250–450	25–48	20–25	0.06–0.1	A	8–15	0.02–0.1	A
S3 Nickel-based heat-resistant alloys	600–1700	160–450	<48	20–25	0.06–0.1	A	8–15	0.02–0.1	A
S4 Titanium and titanium alloys	900–1600	300–400	33–48	20–25	0.06–0.1	A	8–15	0.02–0.1	A

* coating for blades

COOLING

An internal coolant supply is required to ensure optimum chip transport.

For drilling depths larger than $1 \times d$, we recommend using a tool with internal coolant, as this results in a significantly longer tool life.

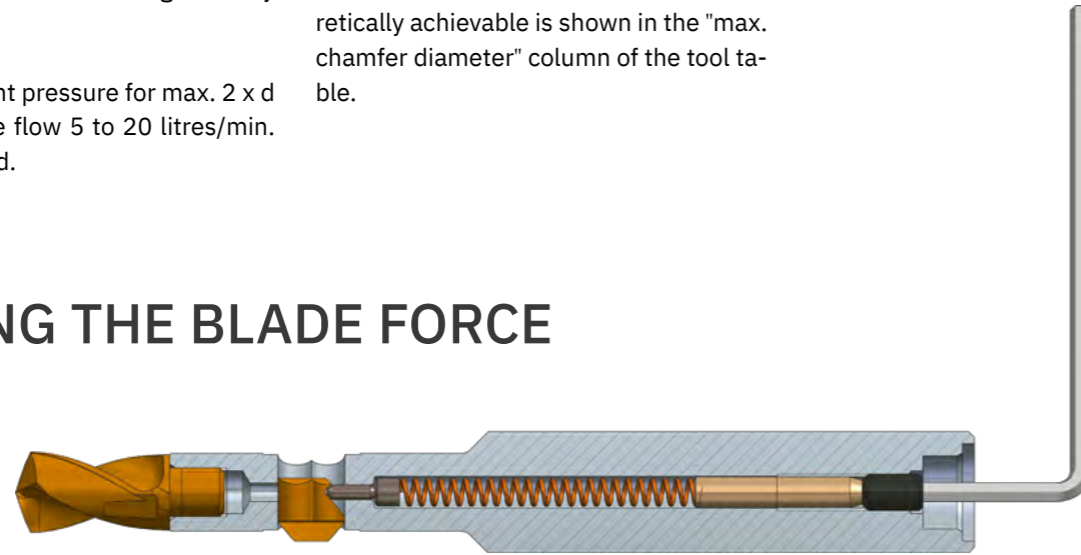
Minimum coolant pressure for max. $2 \times d$ is 8 bar. Volume flow 5 to 20 litres/min. is recommended.

SELECTING THE CHAMFER Ø

The chamfer size is essentially determined by the blade selected (blade length). Each blade produces a specific chamfer diameter.

The maximum chamfer diameter theoretically achievable is shown in the "max. chamfer diameter" column of the tool table.

SETTING THE BLADE FORCE



The blade force can be adjusted using the set screw. The blade force should be set so high that the blade extends completely after exiting the bore. This ensures that the blade can also provide the necessary cutting force. The tougher the material, the harder the spring should be set.

However, the blade force does not affect the chamfer diameter. An adapted spring force increases the blade's service life and improves the quality of the chamfer.

A high blade force is required for extremely tough materials. The spring can

be replaced for this purpose: GH-H-F-0041.

How it works:

Clockwise rotation increases the spring load (tough steel, Inconel, titanium).

Anti-clockwise rotation reduces the spring load (aluminium).



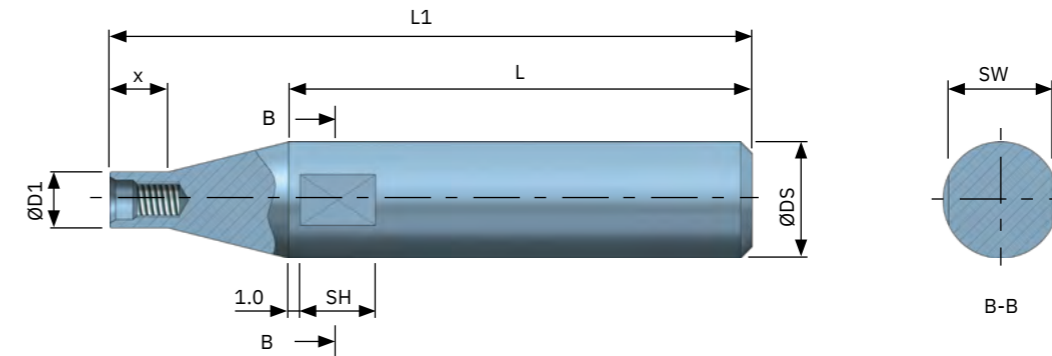
Important!

The blade force does not affect the chamfer diameter. It is essentially determined by the blade selected. Each blade produces a defined chamfer diameter.

Setting details for blade force

Tool	Thread size	max. screw-in depth	Number of revolutions
SNAP5	M3	6.0 mm	approx. 12

RE-SHARPING DEVICE FOR DRILL INSERT



Series	Thread	ØD1	ØDS	x	L	L1	SW	SH	Re-sharpening device part no.
B	M3*0.35	4.8	10.0	5.0	40.0	55.4	9.0	6.5	GH-V-V-0052
C	M4*0.5	5.8	10.0	5.0	40.0	55.8	9.0	6.5	GH-V-V-0053
D	M5*0.5	6.8	10.0	5.0	40.0	56.0	9.0	6.5	GH-V-V-0054
E	M6*0.75	8.3	16.0	8.0	50.0	70.6	14.0	7.0	GH-V-V-0055
F	M8*0.75	10.3	16.0	8.0	50.0	70.3	14.0	7.0	GH-V-V-0056

Selecting the correct VEX tool

TOOL SELECTOR TOOL TABLES

The HEULE Tool Selector is the **quickest and easiest way to find the right tool.**

Send your search result along with your application data to the HEULE contact person near you. They will check the application and offer you options if required.

If your search produces no results, please contact HEULE with your application data anyway. We also develop customised solutions and are happy to advise you.

Although the correct tool is generally selected by the bore- \varnothing to be produced, it is the bore depth (1xd or 2xd) and the internal coolant (with or without) which determine the appropriate tool selection table in the catalogue.

Next, the drill insert is selected. The final selection is the chamfering blade.

If the standard does not fit your needs, please do not hesitate to contact your HEULE representative for advice, either using the enquiry form or by telephone.

Tool Selector

> Step-by-step guide to find the right solution

heule.com/en/tool-selector/vex




Tool Selector

Still have questions?

> HEULE Consulting and Support

heule.com/en/contact



CONFIGURING VEX TOOLS

1. Select drill insert



The correct drill insert is determined according to the following criteria:

1.1 Bore depth

- 1xd
- 2xd

1.2 Bore diameter

The drill inserts are available from stock in \varnothing increments of 0.5 mm. Other drill inserts in increments of 0.1 mm are available, but not necessarily from stock. Please enquire about availability and delivery date.

1.3 Internal coolant (IC)

- without IC
- with IC

Example:
P-S-B2-0510-1A
 P: Drill insert
 S: without IC
 B2: Bore depth 1xd
 0510: Bore diameter 5.1 mm
 1: Cutting material carbide
 A: Coating for steel

2. Select tool



The criteria for selecting the tool are:

2.1 Bore depth

- 1xd
- 2xd

2.2 Internal cooling (IC)

- without IC
- with IC

2.3 Bore diameter range

One tool covers a bore diameter range of 0.5 mm (e.g. 5.0-5.49).

3. Select chamfering blade



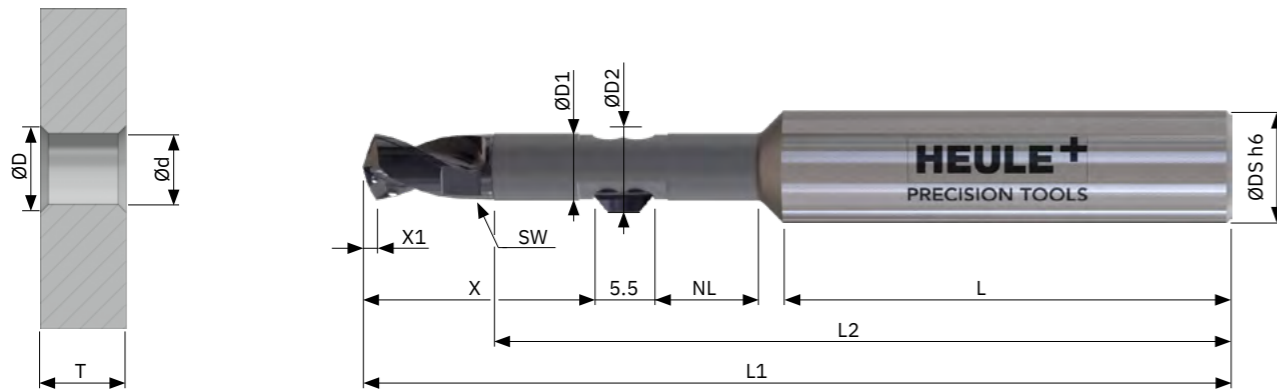
The possible chamfer diameters can be found in the same row in the product table.

3.1 Chamfer diameter

Once the chamfer diameter has been determined, an arrow indicates the table with the chamfer blade part numbers.

Special blades offering additional chamfer diameters are available upon request.

VEX-S $\varnothing 5.0$ to 8.49 mm | Bore depth 1xd



Tool and drill insert

Tool **without** drill insert, **without** blade. Both must be ordered separately.

- Drill inserts also available in increments of 0.1 mm in diameter.
- Drill inserts ending in "A" are for steel alloys; those ending in "D" for aluminium (e.g. P-S-B2-0500-1D).
- The tool can be used over a defined bore diameter range (see dimension table on page 199).
- As standard with cylindrical shank, optional: Weldon "-HB", Whistle Notch "-HE", but not available from stock

Bore \varnothing mm	Drill insert		Tool		Chamfering blade $\varnothing D$ mm
	without IC Part no.	with IC Part no.	without IC Part no.	with IC Part no.	
5.0	P-S-B2-0500-1A	-	GH-Q-O-4000	-	5.5 / 6.0 / 6.5 / 7.0
5.5	P-S-B2-0550-1A	-	GH-Q-O-4001	-	6.0 / 6.5 / 7.0 / 7.5
6.0	P-S-C2-0600-1A	P-SK-C2-0600-1A	GH-Q-O-4002	GH-Q-O-4022	6.5 / 7.0 / 7.5 / 8.0
6.35	P-S-C2-0635-1A	P-SK-C2-0635-1A	GH-Q-O-4002	GH-Q-O-4022	6.5 / 7.0 / 7.5 / 8.0
6.5	P-S-C2-0650-1A	P-SK-C2-0650-1A	GH-Q-O-4003	GH-Q-O-4023	7.0 / 7.5 / 8.0 / 8.5
6.8	P-S-C2-0680-1A	P-SK-C2-0680-1A	GH-Q-O-4003	GH-Q-O-4023	7.0 / 7.5 / 8.0 / 8.5
7.0	P-S-D2-0700-1A	P-SK-D2-0700-1A	GH-Q-O-4004	GH-Q-O-4024	7.5 / 8.0 / 8.5 / 9.0
7.5	P-S-D2-0750-1A	P-SK-D2-0750-1A	GH-Q-O-4005	GH-Q-O-4025	8.0 / 8.5 / 9.0 / 9.5
8.0	P-S-D2-0800-1A	P-SK-D2-0800-1A	GH-Q-O-4006	GH-Q-O-4026	8.5 / 9.0 / 9.5 / 10.0

Parts in stock highlighted in green

VEX-S $\varnothing 5.0$ to 8.49 mm | Bore depth 1xd

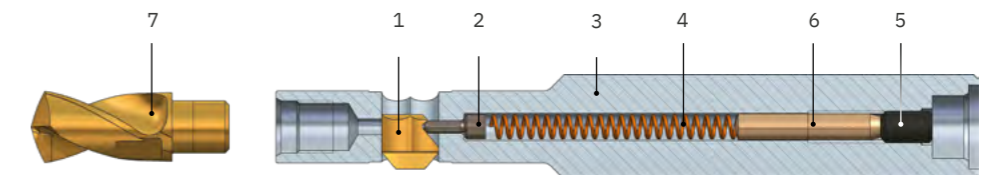
Blade GS geometry 90°

max. chamfer \varnothing mm	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating A for steel, titanium, Inconel	Coating D for aluminium	Coating A for steel, titanium, Inconel	Coating D for aluminium
5.5	GH-Q-M-30204	GH-Q-M-30404	GH-Q-M-31204	GH-Q-M-31404
6.0	GH-Q-M-30205	GH-Q-M-30405	GH-Q-M-31205	GH-Q-M-31405
6.5	GH-Q-M-30206	GH-Q-M-30406	GH-Q-M-31206	GH-Q-M-31406
7.0	GH-Q-M-30207	GH-Q-M-30407	GH-Q-M-31207	GH-Q-M-31407
7.5	GH-Q-M-30208	GH-Q-M-30408	GH-Q-M-31208	GH-Q-M-31408
8.0	GH-Q-M-30209	GH-Q-M-30409	GH-Q-M-31209	GH-Q-M-31409
8.5	GH-Q-M-30210	GH-Q-M-30410	GH-Q-M-31210	GH-Q-M-31410
9.0	GH-Q-M-30211	GH-Q-M-30411	GH-Q-M-31211	GH-Q-M-31411
9.5	GH-Q-M-30212	GH-Q-M-30412	GH-Q-M-31212	GH-Q-M-31412
10.0	GH-Q-M-30213	GH-Q-M-30413	GH-Q-M-31213	GH-Q-M-31413

Tool dimension table

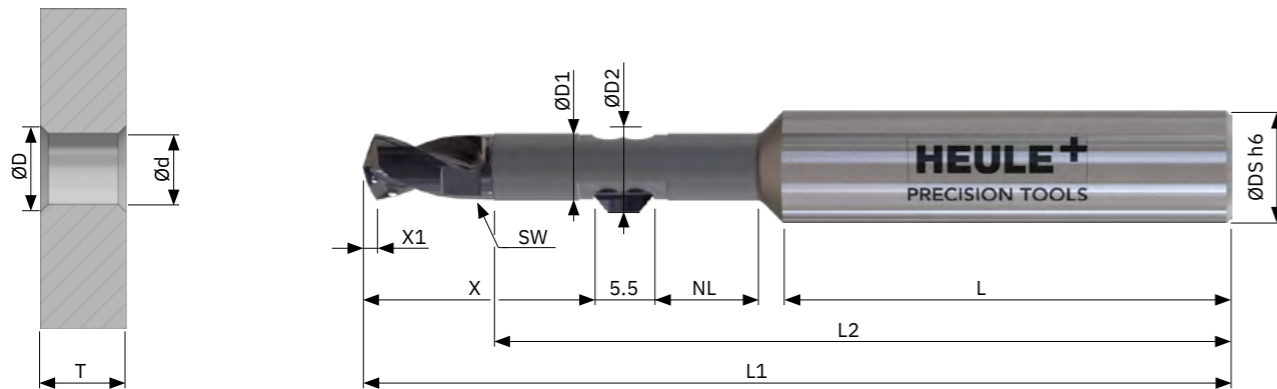
Bore \varnothing range mm	Bore depth T	$\varnothing D1$	$\varnothing D2$	$\varnothing DS$	L	L1	L2	NL	X	X1	Series
5.00–5.49	5.5	4.9	$\varnothing D2 = \varnothing D + 0.6$ mm	8.0	36.0	70.5	60.3	8.1	18.9	1.0	B
5.50–5.99	6.0	5.4		8.0	36.0	71.6	60.5	8.6	19.8	1.1	B
6.00–6.49	6.5	5.9		10.0	40.0	77.7	66.0	9.1	20.6	1.2	C
6.50–6.99	7.0	6.4		10.0	40.0	78.9	66.2	9.6	21.6	1.3	C
7.00–7.49	7.5	6.9		10.0	40.0	81.4	67.8	10.1	23.8	1.4	D
7.50–7.99	8.0	7.4		10.0	40.0	82.4	68.0	10.6	24.6	1.5	D
8.00–8.49	8.5	7.9		12.0	45.0	89.5	74.3	11.1	25.4	1.6	D

Spare parts



Item	Description	Part no.	
1	SNAP chamfering blade	see above	
2	Control bolt $\varnothing 1.2$ mm	GH-Q-E-0008	
3	Tool (tool body)	see page 206	
4	Pressure spring $\varnothing 2.35 \times \varnothing 0.35 \times 30.0$	GH-H-F-0019	
5	Set screw M3.5x5.0 DIN913 Allen key SW1.5	GH-H-S-0127 GH-H-S-2101	not included
6	Distance pin bore \varnothing range 5.00-5.99 mm Distance pin bore \varnothing range 6.00-7.99 mm Distance pin bore \varnothing range 8.00-11.49 mm	GH-Q-E-0052 GH-Q-E-0043 GH-Q-E-0048	
7	Drill insert Wrench	see page 198 see page 207	not included

VEX-S $\varnothing 8.5$ to 11.49 mm | Bore depth 1xd



Tool and drill insert

Tool **without** drill insert, **without** blade. Both must be ordered separately.

- Drill inserts also available in increments of 0.1 mm in diameter.
- Drill inserts ending in "A" are for steel alloys; those ending in "D" for aluminium (e.g. P-S-E2-0850-1D).
- The tool can be used over a defined bore diameter range (see dimension table on page 201).
- As standard with cylindrical shank, optional: Weldon "-HB", Whistle Notch "-HE", but not available from stock

Bore \varnothing mm	Drill insert		Tool		Chamfering blade $\varnothing D$ mm
	without IC Part no.	with IC Part no.	without IC Part no.	with IC Part no.	
8.5	P-S-E2-0850-1A	P-SK-E2-0850-1A	GH-Q-4007	GH-Q-4027	9.0 / 9.5 / 10.0 / 10.5
9.0	P-S-E2-0900-1A	P-SK-E2-0900-1A	GH-Q-4008	GH-Q-4028	9.5 / 10.0 / 10.5 / 11.0
9.5	P-S-E2-0950-1A	P-SK-E2-0950-1A	GH-Q-4009	GH-Q-4029	10.0 / 10.5 / 11.0 / 11.5
10.0	P-S-E2-1000-1A	P-SK-E2-1000-1A	GH-Q-4010	GH-Q-4030	10.5 / 11.0 / 11.5 / 12.0
10.5	P-S-E2-1050-1A	P-SK-E2-1050-1A	GH-Q-4011	GH-Q-4031	11.0 / 11.5 / 12.0 / 12.5
11.0	P-S-E2-1100-1A	P-SK-E2-1100-1A	GH-Q-4012	GH-Q-4032	11.5 / 12.0 / 12.5 / 13.0

Parts in stock highlighted in green

VEX-S $\varnothing 8.5$ to 11.49 mm | Bore depth 1xd

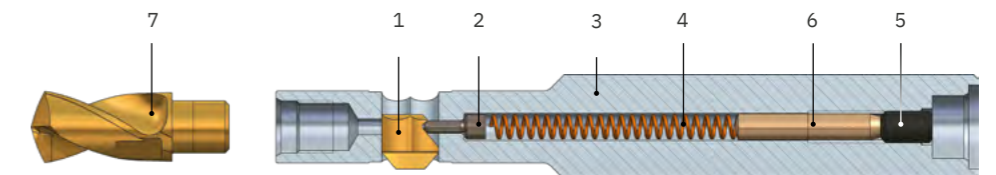
Blade GS geometry 90°

max. chamfer \varnothing mm	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating A for steel, titanium, Inconel	Coating D for aluminium	Coating A for steel, titanium, Inconel	Coating D for aluminium
9.0	GH-Q-M-30211	GH-Q-M-30411	GH-Q-M-31211	GH-Q-M-31411
9.5	GH-Q-M-30212	GH-Q-M-30412	GH-Q-M-31212	GH-Q-M-31412
10.0	GH-Q-M-30213	GH-Q-M-30413	GH-Q-M-31213	GH-Q-M-31413
10.5	GH-Q-M-30214	GH-Q-M-30414	GH-Q-M-31214	GH-Q-M-31414
11.0	GH-Q-M-30215	GH-Q-M-30415	GH-Q-M-31215	GH-Q-M-31415
11.5	GH-Q-M-30216	GH-Q-M-30416	GH-Q-M-31216	GH-Q-M-31416
12.0	GH-Q-M-30217	GH-Q-M-30417	GH-Q-M-31217	GH-Q-M-31417
12.5	GH-Q-M-30218	GH-Q-M-30418	GH-Q-M-31218	GH-Q-M-31418
13.0	GH-Q-M-30219	GH-Q-M-30419	GH-Q-M-31219	GH-Q-M-31419

Tool dimension table

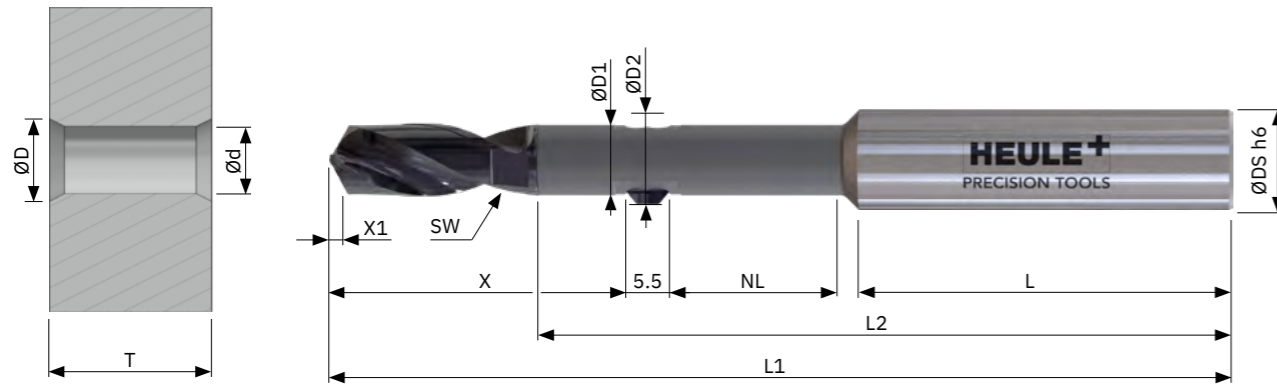
Bore \varnothing range mm	Bore depth T	$\varnothing D1$	$\varnothing D2$	$\varnothing DS$	L	L1	L2	NL	X	X1	Series
8.5–8.99	9.0	8.4	$\varnothing D2 =$ $\varnothing D + 0.6$ mm	12.0	45.0	90.9	74.8	11.6	26.6	1.7	E
9.0–9.49	9.5	8.9		12.0	45.0	91.9	75.0	12.1	27.4	1.8	E
9.5–9.99	10.0	9.4		12.0	45.0	93.1	75.3	12.6	28.3	1.9	E
10.0–10.49	10.5	9.9		14.0	45.0	95.1	76.5	13.1	29.1	1.9	E
10.5–10.99	11.0	10.4		14.0	45.0	96.4	77.3	13.6	30.1	2.1	F
11.0–11.49	11.5	10.9		14.0	45.0	97.4	77.5	14.1	30.9	2.1	F

Spare parts



Item	Description	Part no.	
1	SNAP chamfering blade	see above	
2	Control bolt $\varnothing 1.2$ mm	GH-Q-E-0008	
3	Tool (tool body)	see page 206	
4	Pressure spring $\varnothing 2.35 \times \varnothing 0.35 \times 30.0$	GH-H-F-0019	
5	Set screw M3.5x5.0 DIN913 Allen key SW1.5	GH-H-S-0127 GH-H-S-2101	not included
6	Distance pin bore \varnothing range 8.00-11.49 mm	GH-Q-E-0048	
7	Drill insert Wrench	see page 200 see page 207	not included

VEX-S $\varnothing 5.0$ to 8.49 mm | Bore depth 2xd



Tool and drill insert

Tool **without** drill insert, **without** blade. Both must be ordered separately.

- Drill inserts also available in increments of 0.1 mm in diameter.
- Drill inserts ending in "A" are for steel alloys; those ending in "D" for aluminium (e.g. P-S-B4-0500-1D).
- The tool can be used within a defined bore diameter range (see dimension table on page 203).
- As standard with cylindrical shank, optional: Weldon "-HB", Whistle Notch "-HE", but not available from stock

Bore \varnothing mm	Drill insert		Tool		Chamfering blade $\varnothing D$ mm
	without IC Part no.	with IC Part no.	without IC Part no.	with IC Part no.	
5.0	P-S-B4-0500-1A	-	GH-Q-O-4050	-	5.5 / 6.0 / 6.5 / 7.0
5.5	P-S-B4-0550-1A	-	GH-Q-O-4051	-	6.0 / 6.5 / 7.0 / 7.5
6.0	P-S-C4-0600-1A	P-SK-C4-0600-1A	GH-Q-O-4052	GH-Q-O-4072	6.5 / 7.0 / 7.5 / 8.0
6.35	P-S-C4-0635-1A	P-SK-C4-0635-1A	GH-Q-O-4052	GH-Q-O-4072	6.5 / 7.0 / 7.5 / 8.0
6.5	P-S-C4-0650-1A	P-SK-C4-0650-1A	GH-Q-O-4053	GH-Q-O-4073	7.0 / 7.5 / 8.0 / 8.5
6.8	P-S-C4-0680-1A	P-SK-C4-0680-1A	GH-Q-O-4053	GH-Q-O-4073	7.0 / 7.5 / 8.0 / 8.5
7.0	P-S-D4-0700-1A	P-SK-D4-0700-1A	GH-Q-O-4054	GH-Q-O-4074	7.5 / 8.0 / 8.5 / 9.0
7.5	P-S-D4-0750-1A	P-SK-D4-0750-1A	GH-Q-O-4055	GH-Q-O-4075	8.0 / 8.5 / 9.0 / 9.5
8.0	P-S-D4-0800-1A	P-SK-D4-0800-1A	GH-Q-O-4056	GH-Q-O-4076	8.5 / 9.0 / 9.5 / 10.0

Parts in stock highlighted in green

VEX-S $\varnothing 5.0$ to 8.49 mm | Bore depth 2xd

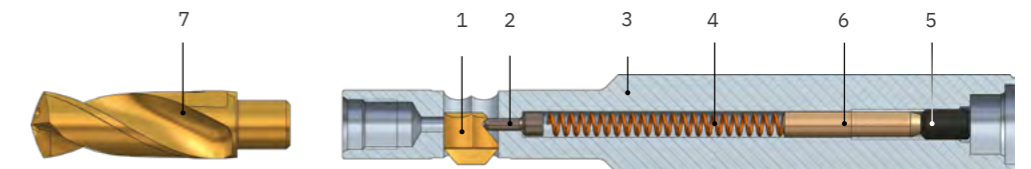
Blade GS geometry 90°

max. chamfer \varnothing mm	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating A for steel, titanium, Inconel	Coating D for aluminium	Coating A for steel, titanium, Inconel	Coating D for aluminium
5.5	GH-Q-M-30204	GH-Q-M-30404	GH-Q-M-31204	GH-Q-M-31404
6.0	GH-Q-M-30205	GH-Q-M-30405	GH-Q-M-31205	GH-Q-M-31405
6.5	GH-Q-M-30206	GH-Q-M-30406	GH-Q-M-31206	GH-Q-M-31406
7.0	GH-Q-M-30207	GH-Q-M-30407	GH-Q-M-31207	GH-Q-M-31407
7.5	GH-Q-M-30208	GH-Q-M-30408	GH-Q-M-31208	GH-Q-M-31408
8.0	GH-Q-M-30209	GH-Q-M-30409	GH-Q-M-31209	GH-Q-M-31409
8.5	GH-Q-M-30210	GH-Q-M-30410	GH-Q-M-31210	GH-Q-M-31410
9.0	GH-Q-M-30211	GH-Q-M-30411	GH-Q-M-31211	GH-Q-M-31411
9.5	GH-Q-M-30212	GH-Q-M-30412	GH-Q-M-31212	GH-Q-M-31412
10.0	GH-Q-M-30213	GH-Q-M-30413	GH-Q-M-31213	GH-Q-M-31413

Tool dimension table

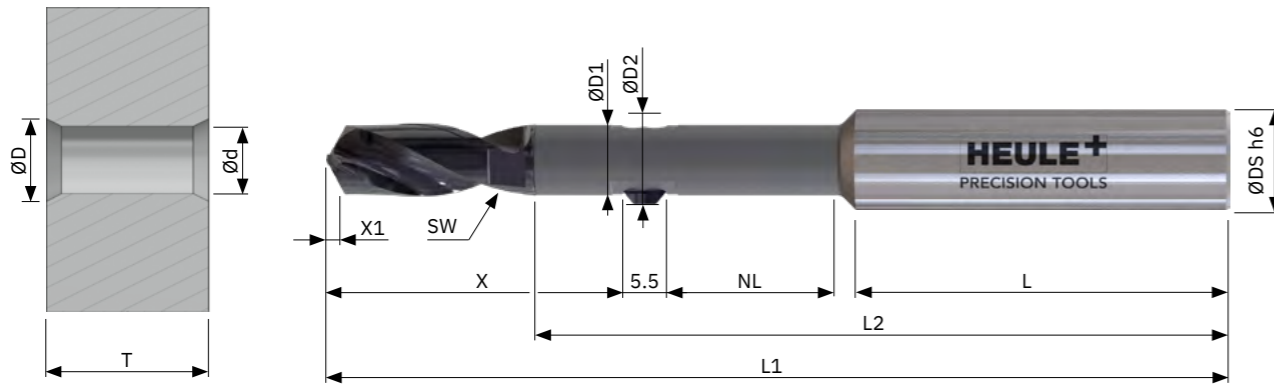
Bore \varnothing range mm	Bore depth T	$\varnothing D1$	$\varnothing D2$	$\varnothing DS$	L	L1	L2	NL	X	X1	Series
5.00–5.49	11.0	4.9	$\varnothing D2 = \varnothing D + 0.6$ mm	8.0	36.0	81.8	65.5	13.6	24.7	1.0	B
5.50–5.99	12.0	5.4		8.0	36.0	82.9	65.8	13.6	26.1	1.1	B
6.00–6.49	13.0	5.9		10.0	40.0	90.8	72.4	15.6	27.3	1.2	C
6.50–6.99	14.0	6.4		10.0	40.0	93.3	73.3	16.7	28.9	1.3	C
7.00–7.49	15.0	6.9		10.0	40.0	96.7	75.3	17.9	31.7	1.4	D
7.50–7.99	16.0	7.4		10.0	40.0	98.7	76.0	18.6	32.9	1.5	D
8.00–8.49	17.5	7.9		12.0	45.0	106.7	82.7	19.8	34.2	1.6	D

Spare parts



Item	Description	Part no.	
1	SNAP chamfering blade	see above	
2	Control bolt $\varnothing 1.2$ mm	GH-Q-E-0008	
3	Tool (tool body)	see page 206	
4	Pressure spring $\varnothing 2.35 \times \varnothing 0.35 \times 30.0$	GH-H-F-0019	
5	Set screw M3.5x5.0 DIN913 Allen key SW1.5	GH-H-S-0127 GH-H-S-2101	not included
6	Distance pin bore \varnothing range 5.00-5.49 mm Distance pin bore \varnothing range 5.50-7.99 mm Distance pin bore \varnothing range 8.00-11.49 mm	GH-Q-E-0043 GH-Q-E-0048 GH-Q-E-0039	
7	Drill insert Wrench	see page 202 see page 207	not included

VEX-S $\varnothing 8.5$ to 11.49 mm | Bore depth 2xd



Tool and drill insert

Tool **without** drill insert, **without** blade. Both must be ordered separately.

- Drill inserts also available in increments of 0.1 mm in diameter.
- Drill inserts ending in "A" are for steel alloys; those ending in "D" for aluminium (e.g. P-S-E4-0850-1D).
- The tool can be used over a defined bore diameter range (see dimension table on page 205).
- As standard with cylindrical shank, optional: Weldon "-HB", Whistle Notch "-HE", but not available from stock

Bore \varnothing mm	Drill insert		Tool		Chamfering blade $\varnothing D$ mm
	without IC Part no.	with IC Part no.	without IC Part no.	with IC Part no.	
8.5	P-S-E4-0850-1A	P-SK-E4-0850-1A	GH-Q-4057	GH-Q-4077	9.0 / 9.5 / 10.0 / 10.5
9.0	P-S-E4-0900-1A	P-SK-E4-0900-1A	GH-Q-4058	GH-Q-4078	9.5 / 10.0 / 10.5 / 11.0
9.5	P-S-E4-0950-1A	P-SK-E4-0950-1A	GH-Q-4059	GH-Q-4079	10.0 / 10.5 / 11.0 / 11.5
10.0	P-S-E4-1000-1A	P-SK-E4-1000-1A	GH-Q-4060	GH-Q-4080	10.5 / 11.0 / 11.5 / 12.0
10.5	P-S-F4-1050-1A	P-SK-F4-1050-1A	GH-Q-4061	GH-Q-4081	11.0 / 11.5 / 12.0 / 12.5
11.0	P-S-F4-1100-1A	P-SK-F4-1100-1A	GH-Q-4062	GH-Q-4082	11.5 / 12.0 / 12.5 / 13.0

Parts in stock highlighted in green

VEX-S $\varnothing 8.5$ to 11.49 mm | Bore depth 2xd

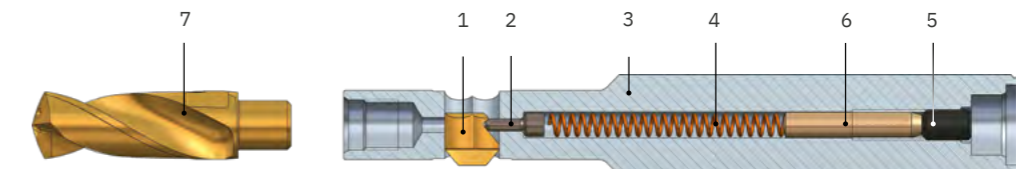
Blade GS geometry 90°

max. chamfer \varnothing mm	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating A for steel, titanium, Inconel	Coating D for aluminium	Coating A for steel, titanium, Inconel	Coating D for aluminium
9.0	GH-Q-M-30211	GH-Q-M-30411	GH-Q-M-31211	GH-Q-M-31411
9.5	GH-Q-M-30212	GH-Q-M-30412	GH-Q-M-31212	GH-Q-M-31412
10.0	GH-Q-M-30213	GH-Q-M-30413	GH-Q-M-31213	GH-Q-M-31413
10.5	GH-Q-M-30214	GH-Q-M-30414	GH-Q-M-31214	GH-Q-M-31414
11.0	GH-Q-M-30215	GH-Q-M-30415	GH-Q-M-31215	GH-Q-M-31415
11.5	GH-Q-M-30216	GH-Q-M-30416	GH-Q-M-31216	GH-Q-M-31416
12.0	GH-Q-M-30217	GH-Q-M-30417	GH-Q-M-31217	GH-Q-M-31417
12.5	GH-Q-M-30218	GH-Q-M-30418	GH-Q-M-31218	GH-Q-M-31418
13.0	GH-Q-M-30219	GH-Q-M-30419	GH-Q-M-31219	GH-Q-M-31419

Tool dimension table

Bore \varnothing range mm	Bore depth T	$\varnothing D1$	$\varnothing D2$	$\varnothing DS$	L	L1	L2	NL	X	X1	Series
8.5–8.99	18.0	8.4	$\varnothing D2 = \varnothing D + 0.6$ mm	12.0	45.0	90.9	83.8	20.6	35.9	1.7	E
9.0–9.49	19.0	8.9		12.0	45.0	91.9	85.3	22.6	37.2	1.8	E
9.5–9.99	20.0	9.4		12.0	45.0	93.1	86.5	23.6	38.6	1.9	E
10.0–10.49	21.0	9.9		14.0	45.0	95.1	87.0	23.6	39.9	1.9	E
10.5–10.99	22.0	10.4		14.0	45.0	96.4	88.3	24.6	41.2	2.1	F
11.0–11.49	23.0	10.9		14.0	45.0	97.4	89.0	25.6	42.5	2.1	F

Spare parts



Item	Description	Part no.	
1	SNAP chamfering blade	see above	
2	Control bolt $\varnothing 1.2$ mm	GH-Q-E-0008	
3	Tool (tool body)	see page 206	
4	Pressure spring $\varnothing 2.35 \times \varnothing 0.35 \times 30.0$	GH-H-F-0019	
5	Set screw M3.5x5.0 DIN913 Allen key SW1.5	GH-H-S-0127 GH-H-S-2101	not included
6	Distance pin bore \varnothing range 8.00-11.49 mm	GH-Q-E-0039	
7	Drill insert Wrench	see page 204 see page 207	not included

TOOL BODY

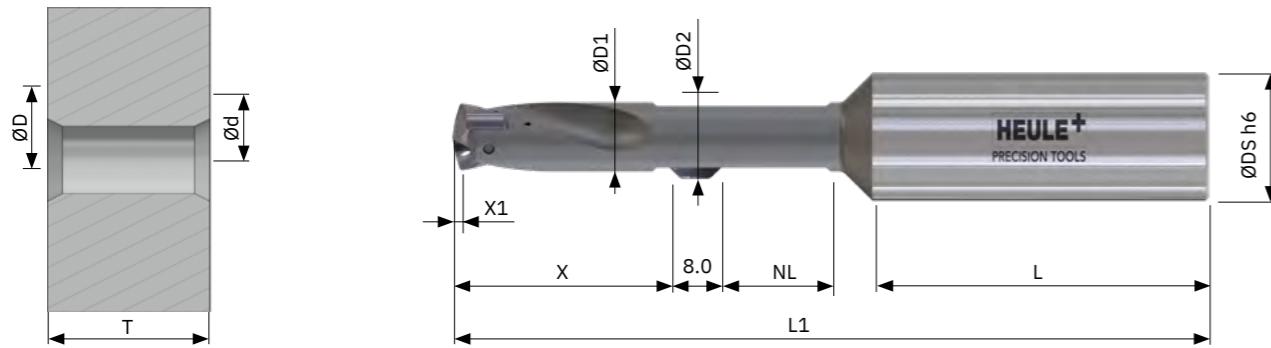
Bore depth 5.0–11.5 1xd		Tool body without int. cooling		Tool body with internal cooling
Bore Ø range mm d	Bore depth T	Series	Part no.	Part no.
5.00–5.49	5.5	B	GH-Q-G-4000	-
5.50–5.99	6.0	B	GH-Q-G-4001	-
6.00–6.49	6.5	C	GH-Q-G-4002	GH-Q-G-4022
6.50–6.99	7.0	C	GH-Q-G-4003	GH-Q-G-4023
7.00–7.49	7.5	D	GH-Q-G-4004	GH-Q-G-4024
7.50–7.99	8.0	D	GH-Q-G-4005	GH-Q-G-4025
8.00–8.49	8.5	D	GH-Q-G-4006	GH-Q-G-4026
8.50–8.99	9.0	E	GH-Q-G-4007	GH-Q-G-4027
9.00–9.49	9.5	E	GH-Q-G-4008	GH-Q-G-4028
9.50–9.99	10.0	E	GH-Q-G-4009	GH-Q-G-4029
10.00–10.49	10.5	E	GH-Q-G-4010	GH-Q-G-4030
10.50–10.99	11.0	F	GH-Q-G-4011	GH-Q-G-4031
11.00–11.49	11.5	F	GH-Q-G-4012	GH-Q-G-4032

Bore depth 11.0–23.0 2xd		Tool body without int. cooling		Tool body with int. cooling
Bore Ø range mm d	Bore depth T	Series	Part no.	Part no.
5.00–5.49	11.0	B	GH-Q-G-4050	-
5.50–5.99	12.0	B	GH-Q-G-4051	-
6.00–6.49	13.0	C	GH-Q-G-4052	GH-Q-G-4072
6.50–6.99	14.0	C	GH-Q-G-4053	GH-Q-G-4073
7.00–7.49	15.0	D	GH-Q-G-4054	GH-Q-G-4074
7.50–7.99	16.0	D	GH-Q-G-4055	GH-Q-G-4075
8.00–8.49	17.0	D	GH-Q-G-4056	GH-Q-G-4076
8.50–8.99	18.0	E	GH-Q-G-4057	GH-Q-G-4077
9.00–9.49	19.0	E	GH-Q-G-4058	GH-Q-G-4078
9.50–9.99	20.0	E	GH-Q-G-4059	GH-Q-G-4079
10.00–10.49	21.0	E	GH-Q-G-4060	GH-Q-G-4080
10.50–10.99	22.0	F	GH-Q-G-4061	GH-Q-G-4081
11.00–11.49	23.0	F	GH-Q-G-4062	GH-Q-G-4082

MISCELLANEOUS

Bore Ø range d mm	Series	Width- across flats SW	Torque Ncm	Open Jaw spanner Part no.	Torque wrench insert Part no.	Torque screwdriver Part no.
5.00–5.49	B	4.0	170	GH-H-S-2301	GH-H-S-2331	GH-H-S-2401
5.50–5.99	B	4.0	170	GH-H-S-2301	GH-H-S-2331	GH-H-S-2401
6.00–6.49	C	5.0	250	GH-H-S-2301	GH-H-S-2332	GH-H-S-2401
6.50–6.99	C	5.0	250	GH-H-S-2301	GH-H-S-2332	GH-H-S-2401
7.00–7.49	D	6.0	400	GH-H-S-2302	GH-H-S-2333	GH-H-S-2402
7.50–7.99	D	6.0	400	GH-H-S-2302	GH-H-S-2333	GH-H-S-2402
8.00–8.49	D	7.0	400	GH-H-S-2302	GH-H-S-2334	GH-H-S-2402
8.50–8.99	E	7.0	600	GH-H-S-2302	GH-H-S-2334	GH-H-S-2402
9.00–9.49	E	8.0	600	GH-H-S-2303	GH-H-S-2335	GH-H-S-2402
9.50–9.99	E	8.0	600	GH-H-S-2303	GH-H-S-2335	GH-H-S-2402
10.00–10.49	E	9.0	600	GH-H-S-2303	GH-H-S-2336	GH-H-S-2402
10.50–10.99	F	9.0	600	GH-H-S-2303	GH-H-S-2336	GH-H-S-2402
11.00–11.49	F	9.0	600	GH-H-S-2303	GH-H-S-2336	GH-H-S-2402

VEX-P $\varnothing 11.0$ to 13.99 mm | Bore depth 1.5xd



Tools and drill heads

Tool **without** drill head, **without** blade. Both must be selected and ordered separately.

- Drill heads also available in increments of 0.1 mm in diameter
- Drill heads ending in "A" are for steel alloys; those ending in "D" for aluminium (e.g. P-P-C-1100-1D).
- As standard with cylindrical shank, optional: Weldon "-HB", Whistle Notch "-HE", but not available from stock and not recommended due to possible radial run-out error.

Bore \varnothing mm	Drill head Part no.	Tool with IC Part no.	Chamfering blade $\varnothing D$ / mm
11.0	P-P-C-1100-1A	GH-Q-O-4250	11.5 ¹⁾ / 12.0 ¹⁾ / 12.5 ¹⁾
11.5	P-P-C-1150-1A	GH-Q-O-4251	12.0 ¹⁾ / 12.5 ¹⁾ / 13.0 ¹⁾
12.0	P-P-C-1200-1A	GH-Q-O-4252	12.5 / 13.0 / 13.5 / 14.0
12.5	P-P-C-1250-1A	GH-Q-O-4253	13.0 / 13.5 / 14.0 / 14.5
12.7	P-P-C-1270-1A	GH-Q-O-4253	13.0 / 13.5 / 14.0 / 14.5
13.0	P-P-C-1300-1A	GH-Q-O-4254	13.5 / 14.0 / 14.5 / 15.0
13.1	P-P-C-1310-1A	GH-Q-O-4254	13.5 / 14.0 / 14.5 / 15.0
13.5	P-P-C-1350-1A	GH-Q-O-4255	14.0 / 14.5 / 15.0 / 15.5

¹⁾ When selecting blades on page 209 only select from the chamfer diameter rows labelled "1)".

Tool dimension table

Bore \varnothing range mm	Bore depth T	$\varnothing D1$	$\varnothing D2$	$\varnothing DS$	L	L1	NL	X	X1	Nm	Series
											C
11.00–11.49	17.2	10.8	$\varnothing D2 = \varnothing D + 0.6$ mm	20h6	52.0	116.9	17.2	33.5	2.5	1.1	C
11.50–11.99	18.0	11.3		20h6	52.0	118.2	18.0	34.3	2.6	1.1	C
12.00–12.49	18.7	11.8		20h6	52.0	119.4	18.7	35.0	2.7	1.1	C
12.50–12.99	19.5	12.3		20h6	52.0	120.6	19.5	35.8	2.8	1.1	C
13.00–13.49	20.2	12.8		20h6	52.0	121.9	20.2	36.6	2.9	1.1	C
13.50–13.99	21.0	13.3		20h6	52.0	123.1	21.0	37.3	3.0	1.1	C

Parts in stock highlighted in green

VEX-P $\varnothing 11.0$ to 13.99 mm | Bore depth 1.5xd

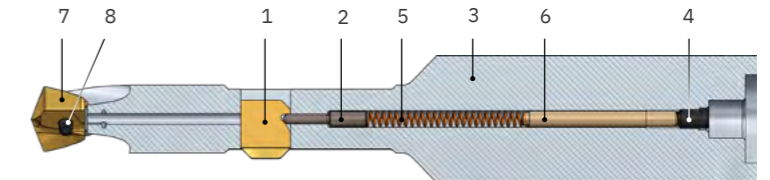
Blade GS geometry 90°

max. chamfer \varnothing mm	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating A for steel, titanium, Inconel	Coating D for aluminium	Coating A for steel, titanium, Inconel	Coating D for aluminium
11.5 ¹⁾	GH-Q-M-03826	GH-Q-M-13526	GH-Q-M-05826	GH-Q-M-15526
12.0 ¹⁾	GH-Q-M-03827	GH-Q-M-13527	GH-Q-M-05827	GH-Q-M-15527
12.5 ¹⁾	GH-Q-M-03828	GH-Q-M-13528	GH-Q-M-05828	GH-Q-M-15528
13.0 ¹⁾	GH-Q-M-03829	GH-Q-M-13529	GH-Q-M-05829	GH-Q-M-15529

¹⁾ Blade only for bore diameter range 11.00 to 11.99

12.5	GH-Q-M-03840	GH-Q-M-13540	GH-Q-M-05840	GH-Q-M-15540
13.0	GH-Q-M-03841	GH-Q-M-13541	GH-Q-M-05841	GH-Q-M-15541
13.5	GH-Q-M-03842	GH-Q-M-13542	GH-Q-M-05842	GH-Q-M-15542
14.0	GH-Q-M-03843	GH-Q-M-13543	GH-Q-M-05843	GH-Q-M-15543
14.5	GH-Q-M-03844	GH-Q-M-13544	GH-Q-M-05844	GH-Q-M-15544
15.0	GH-Q-M-03845	GH-Q-M-13545	GH-Q-M-05845	GH-Q-M-15545
15.5	GH-Q-M-03846	GH-Q-M-13546	GH-Q-M-05846	GH-Q-M-15546

Spare parts



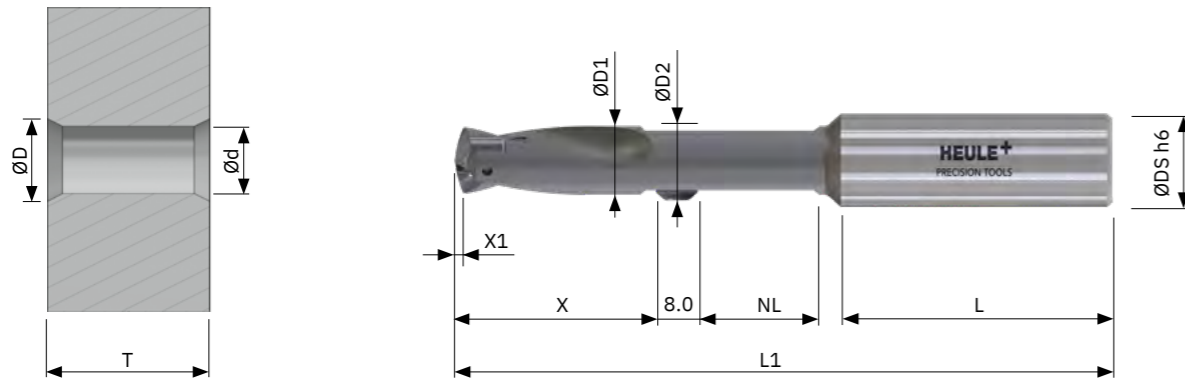
Item	Description	Part no.	
1	SNAP chamfering blade	see above	
2	Control bolt bore \varnothing range $\varnothing 11.0$ – 11.99 mm $\varnothing 12.0$ – 17.00 mm	GH-Q-E-0078 GH-Q-E-0002	
3	Tool body	see page 213	
4	Cylinder screw bore \varnothing range $\varnothing 11.00$ – 11.99 mm $\varnothing 12.00$ – 17.00 mm Allen key $\varnothing 11.00$ – 11.99 mm $\varnothing 12.00$ – 17.00 mm	GH-H-S-0127 GH-H-S-0119 GH-H-S-2101 GH-H-S-2100	not included not included
5	Pressure spring bore \varnothing range $\varnothing 11.00$ – 11.99 mm $\varnothing 12.00$ – 17.00 mm	GH-H-F-0019 GH-H-F-0007	
6	Distance pin bore \varnothing range $\varnothing 11.00$ – 11.99 mm $\varnothing 12.00$ – 15.49 mm	GH-Q-E-0047 GH-Q-E-0012	
7	Drill head	see page 208	
8	Clamping screw bore \varnothing range $\varnothing 11.00$ – 13.99 mm Torx spanner $\varnothing 11.00$ – 13.99 mm	GH-H-S-0038 GH-H-S-2022	not included

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Cutting data Page 193

Tool Selector – Product selection made easy heule.com/en/tool-selector/vex

VEX-P $\varnothing 14.0$ to 17.0 mm | bore depth 1.5xd



Tools and drill heads

Tool **without** drill head, **without** blade. Both must be selected and ordered separately.

- Drill heads also available in increments of 0.1 mm in diameter.
- Drill heads ending in "A" are for steel alloys; those ending in "D" for aluminium (e.g. P-P-C-1400-1D).
- As standard with cylindrical shank, optional: Weldon "-HB", Whistle Notch "-HE", but not available from stock and not recommended due to possible radial run-out error.

Bore \varnothing mm	Drill head Part no.	Tool with IC Part no.	Chamfering blade $\varnothing D$
14.0	P-P-D-1400-1A	GH-Q-O-4256	14.5 / 15.0 / 15.5 / 16.0
14.5	P-P-D-1450-1A	GH-Q-O-4257	15.0 / 15.5 / 16.0 / 16.5
15.0	P-P-D-1500-1A	GH-Q-O-4258	15.5 / 16.0 / 16.5 / 17.0
15.5	P-P-D-1550-1A	GH-Q-O-4259	16.0 / 16.5 / 17.0 / 17.5
16.0	P-P-D-1600-1A	GH-Q-O-4260	16.5 / 17.0 / 17.5 / 18.0
16.5	P-P-D-1650-1A	GH-Q-O-4261	17.0 / 17.5 / 18.0 / 18.5
17.0	P-P-D-1700-1A	GH-Q-O-4261	17.5 / 18.0 / 18.5 / 19.0

Tool dimension table

Bore \varnothing range mm	Bore depth T	$\varnothing D1$	$\varnothing D2$	$\varnothing DS$	L	L1	NL	X	X1	Nm	Series
											D
14.00–14.49	21.7	13.8	$\varnothing D2 = \varnothing D + 0.6$ mm	20h6	52.0	123.4	21.7	37.1	3.1	1.2	D
14.50–14.99	22.5	14.3		20h6	52.0	124.6	22.5	37.8	3.2	1.2	D
15.00–15.49	23.2	14.8		20h6	52.0	125.9	23.2	38.5	3.3	1.2	D
15.50–15.99	24.0	15.3		20h6	52.0	127.2	24.0	39.3	3.4	1.2	D
16.00–16.49	24.7	15.8		20h6	52.0	128.3	24.7	40.0	3.5	1.2	D
16.50–17.00	25.5	16.3		20h6	52.0	129.7	25.5	40.8	3.6	1.2	D

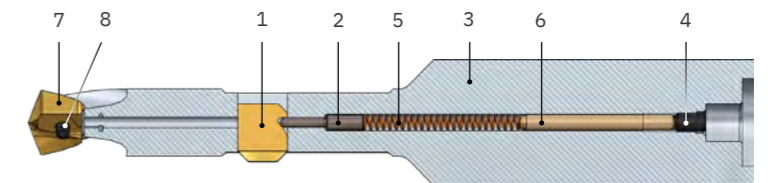
Parts in stock highlighted in green

VEX-P $\varnothing 14.0$ to 17.0 mm | bore depth 1.5xd

Blade GS geometry 90°

max. chamfer \varnothing mm	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating A for steel, titanium, Inconel	Coating D for aluminium	Coating A for steel, titanium, Inconel	Coating D for aluminium
14.5	GH-Q-M-03844	GH-Q-M-13544	GH-Q-M-05844	GH-Q-M-15544
15.0	GH-Q-M-03845	GH-Q-M-13545	GH-Q-M-05845	GH-Q-M-15545
15.5	GH-Q-M-03846	GH-Q-M-13546	GH-Q-M-05846	GH-Q-M-15546
16.0	GH-Q-M-03847	GH-Q-M-13547	GH-Q-M-05847	GH-Q-M-15547
16.5	GH-Q-M-03848	GH-Q-M-13548	GH-Q-M-05848	GH-Q-M-15548
17.0	GH-Q-M-03849	GH-Q-M-13549	GH-Q-M-05849	GH-Q-M-15549
17.5	GH-Q-M-03850	GH-Q-M-13550	GH-Q-M-05850	GH-Q-M-15550
18.0	GH-Q-M-03851	GH-Q-M-13551	GH-Q-M-05851	GH-Q-M-15551
18.5	GH-Q-M-03852	GH-Q-M-13552	GH-Q-M-05852	GH-Q-M-15552
19.0	GH-Q-M-03853	GH-Q-M-13553	GH-Q-M-05853	GH-Q-M-15553

Spare parts



Item	Description	Part no.	
1	SNAP chamfering blade	see page above	
2	Control bolt bore \varnothing range $\varnothing 12.0$ – 17.00 mm	GH-Q-E-0002	
3	Tool body	see page 213	
4	Cylinder screw bore \varnothing range $\varnothing 12.00$ – 17.00 mm Allen key $\varnothing 12.00$ – 17.00 mm	GH-H-S-0119 GH-H-S-2100	not included
5	Pressure spring bore \varnothing range $\varnothing 12.00$ – 17.00 mm	GH-H-F-0007	
6	Distance pin bore \varnothing range $\varnothing 12.00$ – 15.49 mm $\varnothing 15.50$ – 17.00 mm	GH-Q-E-0012 GH-Q-E-0022	
7	Drill head	see page 210	
8	Clamping screw bore range $\varnothing 14.00$ – 17.00 mm Torx spanner $\varnothing 14.00$ – 17.00 mm	GH-H-S-0035 GH-H-S-2023	not included

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Tool Selector – Product selection made easy heule.com/en/tool-selector/vex

VEX FAQ

Question	Causes	Remedy
Built-up edge	<ul style="list-style-type: none"> • Cutting speed too low • Insufficient cooling / lubrication • Incorrect coating for the material 	<ul style="list-style-type: none"> • Increase cutting speed • Increase coolant pressure • Select another coating
Chip jam	<ul style="list-style-type: none"> • Working feed rate too high for chip removal • Drill insert too short for bore depth • Insufficient cooling 	<ul style="list-style-type: none"> • Reduce working feed rate • With VEX-S, use a longer drill insert or improve drilling cycle • Increase coolant pressure
Large burr formation at the exit of the bore	<ul style="list-style-type: none"> • Cutting values too high • Insufficient cooling • Drill insert/head worn 	<ul style="list-style-type: none"> • Reduce cutting speed • Increase coolant pressure • Replace drill insert/head
Fluctuating accuracy	<ul style="list-style-type: none"> • Working feed rate too high • Insufficient cooling • Spindle/setup not stable 	<ul style="list-style-type: none"> • Reduce working feed rate • Increase coolant pressure • Check radial run-out • Check spindle and setup stability
Poor surface quality	<ul style="list-style-type: none"> • Incorrect cutting values • Insufficient cooling • Spindle/setup not stable • Drill insert/head worn 	<ul style="list-style-type: none"> • Increase or reduce working feed rate and cutting speed • Increase coolant pressure • Check radial run-out • Check spindle and setup stability • Replace drill insert or head • Improve drilling process
Vibration / chatter	<ul style="list-style-type: none"> • Incorrect cutting values • Insufficient cooling • Spindle/setup not stable 	<ul style="list-style-type: none"> • Increase or reduce the cutting speed • Increase or reduce the working feed rate • Increase coolant pressure • Check radial run-out • Check spindle and setup stability
Wear on cutting edge	<ul style="list-style-type: none"> • Incorrect cutting values • Insufficient cooling • Spindle/setup not stable 	<ul style="list-style-type: none"> • Increase cutting speed • Reduce working feed rate • Increase coolant pressure • Check spindle and setup stability
Wear on cross-cutting edge	<ul style="list-style-type: none"> • Working feed rate too high • Insufficient cooling • Spindle/setup not stable 	<ul style="list-style-type: none"> • Reduce working feed rate • Increase coolant pressure • Check spindle and setup stability

VEX FAQ – continued

Question	Causes	Remedy
Wear on guiding section	<ul style="list-style-type: none"> • incorrect cutting values • Insufficient cooling • Spindle/setup not stable 	<ul style="list-style-type: none"> • Reduce cutting speed • Reduce working feed rate • Increase coolant pressure • Check radial run-out • Check spindle and setup stability
Break of cutting edge	<ul style="list-style-type: none"> • incorrect cutting values • Insufficient cooling • Spindle/setup not stable 	<ul style="list-style-type: none"> • Increase cutting speed • Increase coolant pressure • Check spindle and setup stability
Break of top of drill insert	<ul style="list-style-type: none"> • Working feed rate too high • Insufficient cooling • Spindle/setup not stable 	<ul style="list-style-type: none"> • Reduce working feed rate • Increase coolant pressure • Check spindle and setup stability
No chamfer or chamfer not consistent	see FAQ for SNAP on page 100	

VEX-P spare parts – Tool body

Item	Description	Part no.
3	Tool body bore Ø range	
	Ø 11.00–11.49 mm	GH-Q-G-4250
	Ø 11.50–11.99 mm	GH-Q-G-4251
	Ø 12.00–12.49 mm	GH-Q-G-4252
	Ø 12.50–12.99 mm	GH-Q-G-4253
	Ø 13.00–13.49 mm	GH-Q-G-4254
	Ø 13.50–13.99 mm	GH-Q-G-4255
	Ø 14.00–14.49 mm	GH-Q-G-4256
	Ø 14.50–14.99 mm	GH-Q-G-4257
	Ø 15.00–15.49 mm	GH-Q-G-4258
	Ø 15.50–15.99 mm	GH-Q-G-4259
	Ø 16.00–16.49 mm	GH-Q-G-4260
	Ø 16.50–17.00 mm	GH-Q-G-4261

SNAP18 MODULE

Your drill body.
Our chamfering module.
Your time savings.

The advantages – Your benefit

Combine your tried-and-tested drill body with the advantages of the SNAP18 module. Reduce the number of process steps and thus time and costs. For maximum optimisation, two modules for higher working feed rates can also be integrated into one drill body.

Just one operation and the bore is complete, including chamfer on both bore edges, without turning the workpiece and without changing tools.



Clean, reliable and repeatable results. The chamfering capacity is 0.5 to 1.0 mm depending on the blade selected.



The module is designed for drill bodies from a bore diameter of 18.0 mm. It is positioned approx. 25.0 mm behind the drill insert.



THE RANGE

Module

Bore Ø range mm	Max. chamfering capacity	Series	Part no.
18.0-50.0	1.0 mm	SNAP18	SMC18-O-0900

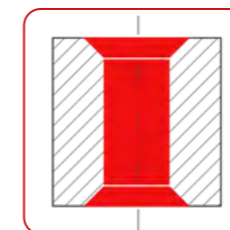
Blade DR geometry 90°

Chamfering capacity	Part no. forward and backward cutting		Part no. backward cutting only	
	Coating A for steel, titanium, Inconel	Coating D for aluminium	Coating A for steel, titanium, Inconel	Coating D for aluminium
0.5 mm	SMC18-M-0200-A	SMC18-M-0300-D	SMC18-M-0250-A	SMC18-M-0350-D
1.0 mm	SMC18-M-0210-A	SMC18-M-0310-D	SMC18-M-0260-A	SMC18-M-0360-D

The SNAP18 Module is designed for integration into standard drills. Please contact us should you have an application to ensure smooth integration.

If the required tool is not included in the range above, the **INDIVIDUAL** range can offer you a possible solution. If required, we can also develop custom solutions that are fully tailored to your application.

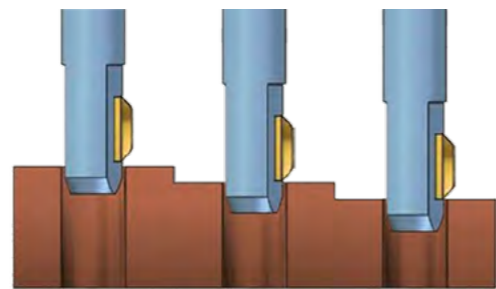
FIELD OF APPLICATION



OPERATING PRINCIPLE

SNAP technology at the core

The guiding section of the blade causes the blade to retract into the tool body once the maximum chamfer size has been achieved. As a result, parts with fluctuating tolerances of surface/edge positions (i.e. with castings), are machined with consistent chamfer results every time. The spherically ground sliding section of the blade enables the tool to pass through the workpiece without damaging the surface of the bore.



Easy installation

A pocket for mounting the SNAP18 Module is machined in the drill body as close as possible to the drill insert. The crucial advantage here is that you can utilise your own tried-and-tested drill technology without having to change drill supplier.

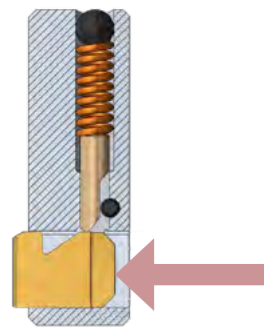


BLADE CHANGE

A single screw holds the module in the drill body. To change the blade, loosen the screw, remove the module and replace the carbide blade in seconds using the assembly aid for blade change.

Assembly aid for blade change

PRO version for more frequent blade changes and LIGHT for occasional blade changes.



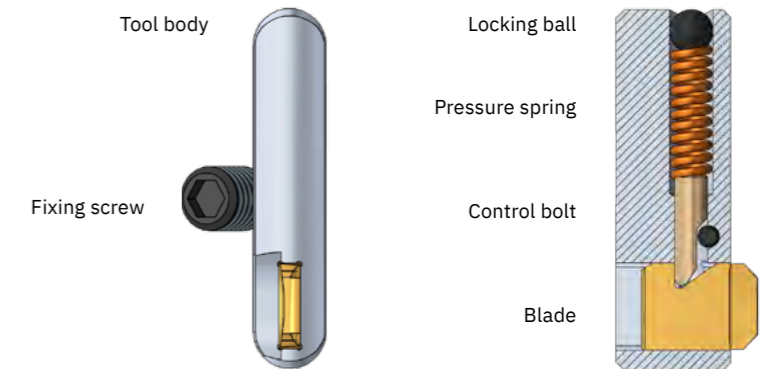
PRO
Part no. SMC18-V-0006



LIGHT
Part no. SMC18-V-0007

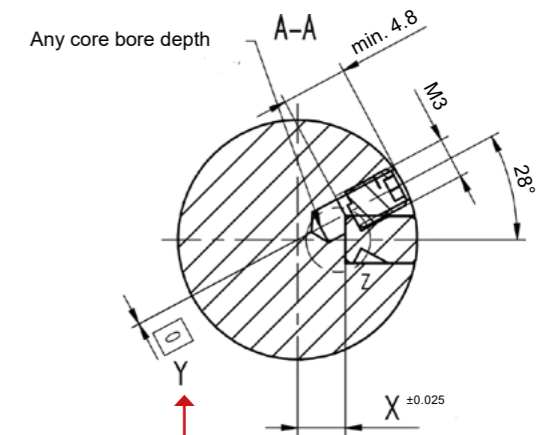
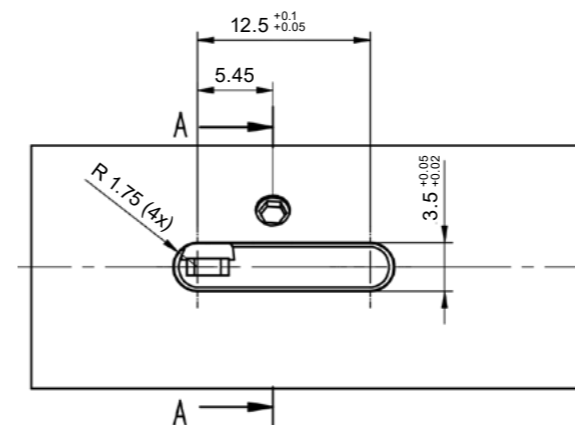
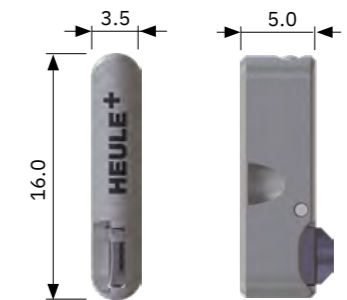
TOOL DESIGN

Both the module and the blades were developed for the tough industrial environment and designed for series production. The compact tool concept with few wearing parts delivers impressive performance.



INSTALLATION INSTRUCTIONS

The existing drill body must be machined with a pocket by the customer – in consultation with the drill body manufacturer. A single screw holds the module in the drill body.



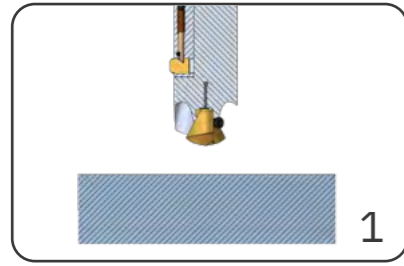
Formula for calculating dimension X:

$$X = \frac{\text{Bore diameter}}{2} - 5.5$$

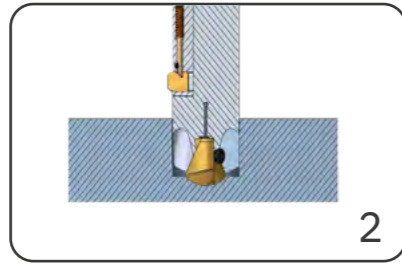
Formula for calculating dimension Y:

$$Y = \frac{(\text{bore diameter} - 18.0)}{2} \times \sin(28^\circ)$$

PROCESS STEPS SNAP18 MODULE

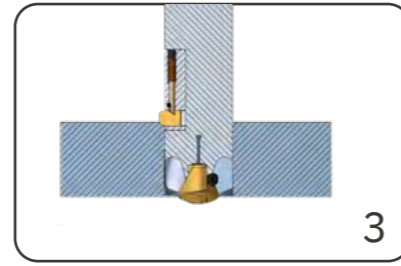


The direction of rotation does not need to be changed and the spindle does not need to be stopped at any point during the machining process. The drill tool is positioned in front of the workpiece in rapid feed.

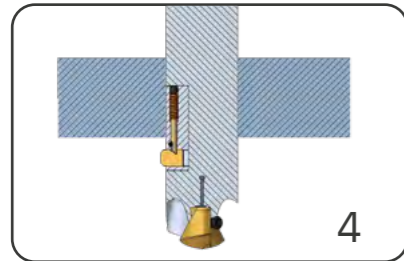


Drill the bore (according to the manufacturer's cutting data) until the module blade is just above the upper edge of the bore.

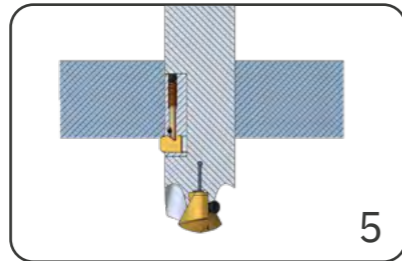
IMPORTANT:
Drilling and chamfering can be done simultaneously.



Carry out chamfering (according to the HEULE cutting data) until the blade is fully retracted (chamfer depth +1mm).

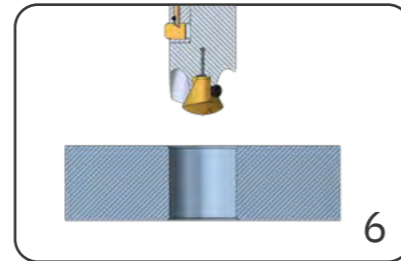


Complete the drilling process and move to the starting position for machining the back edge (burr height + 1 mm).



Carry out chamfering until the blade is fully retracted (chamfer depth +1 mm).

IMPORTANT:
To avoid blade breakage, the edge of the bore must always (even after the machine stops!) be traversed through at working speed and working feed.



Move out of the workpiece in rapid feed and move to the next bore.

SNAP18 MODULE CUTTING DATA

	Description	Tensile str. RM (MPa)	Hardness (HB)	Hardn. (HRC)	Cutting data ¹⁾		
					VC	FZ	B*
P0	Low-carbon steel, long-chipping, C <0.25%	<530	<125	–	40–60	0.05–0.1	A
P1	Low-carbon steel, short-chipping, C <0.25%	<530	<125	–	40–60	0.05–0.1	A
P2	Steel with carbon content C >0.25%	>530	<220	<25	40–60	0.05–0.1	A
P3	Alloy steel and tool steel, C >0.25%	600–850	<330	<35	30–50	0.05–0.1	A
P4	Alloy steel and tool steel, C >0.25%	850–1400	340–450	35–48	30–50	0.05–0.1	A
P5	Ferritic, martensitic and stainless PH steel	600–900	<330	<35	20–40	0.05–0.08	A
P6	High-strength ferritic, martensitic and PH stainless steel	900–1350	350–450	35–48	20–40	0.05–0.08	A
M1	Austenitic stainless steel	<600	130–200	–	10–20	0.05–0.08	A
M2	High-strength austenitic stainless steel	600–800	150–230	<25	10–20	0.05–0.08	A
M3	Duplex stainless steel	<800	135–275	<30	10–20	0.05–0.08	A
K1	Cast iron	125–500	120–290	<32	50–90	0.05–0.1	A
K2	Ductile cast iron with up to medium strength	<600	130–260	<28	40–60	0.05–0.1	A
K3	High-strength cast iron and bainitic cast iron	>600	180–350	<43	40–60	0.05–0.1	A
N1	Wrought aluminium alloys	–	–	–	70–120	0.05–0.2	D
N2	Aluminium alloys with low Si content	–	–	–	70–120	0.05–0.2	D
N3	Aluminium alloys with high Si content	–	–	–	70–120	0.05–0.2	D
N4	Copper, brass and zinc base	–	–	–	30–70	0.05–0.15	D
S1	Iron-based heat-resistant alloys	500–1200	160–260	25–48	8–15	0.02–0.06	A
S2	Cobalt-based heat-resistant alloys	1000–1450	250–450	25–48	8–15	0.02–0.06	A
S3	Nickel-based heat-resistant alloys	600–1700	160–450	<48	8–15	0.02–0.06	A
S4	Titanium and titanium alloys	900–1600	300–400	33–48	8–15	0.02–0.06	A

¹⁾ Higher cutting feed rates can be achieved by installing two or more modules.



The cutting values for drilling are generally higher than those for chamfering. With the installation of at least two SNAP 18 Modules, the chamfering performance can be optimised to such an extent that little or no compromise needs to be made in terms of processing speed.

Operating instructions

> Blade change

heule.com > Service >
Media & download centre



INDIVIDUAL

Customised tools for maximum output.

The advantages – Your benefit

Special requirements sometimes require special solutions. Be it in relation to the complexity of the task to be solved, or the demand for maximum economic efficiency and process reliability.

As a manufacturer with its own development team and testing centre, HEULE has decades of experience and expertise to solve demanding problems in the shortest possible time.



Tried and tested HEULE technology is customised to your specific application.



Whether a modified standard tool or a customised solution, our focus is on optimising your machining process for maximum reduction of your unit costs.

OUR RANGE OF SOLUTIONS

Our mission is to reduce your production costs. This involves several components: optimised process times, long service life of the cutting tools, maximum process reliability and simple maintenance and availability of the tool.

If a tool from our standard range only fulfils your requirements to a limited extent: no problem. As an innovative problem solver, HEULE offers the option of “customising”. You receive a semi-standard tool customised to your requirements or we can develop a special solution for you.

With our development team, test centre and production under one roof, we can offer you solutions that exceed your expectations in the shortest possible time. The cornerstone for this is open communication and partnership-based cooperation.

INDIVIDUAL

SPECIAL

tool concept developed to meet your requirements

SEMI-STANDARD

A) optimised standard product
B) tool system, which is always designed to meet your requirements

STANDARD

from stock
or available within a very short time

OUR PERFORMANCE PACKAGE

Page 10



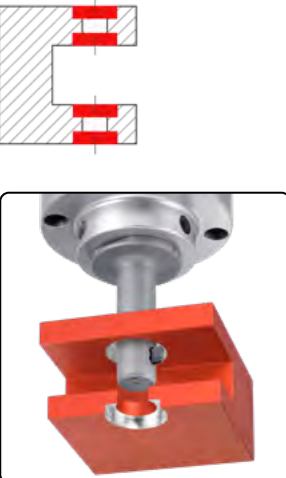
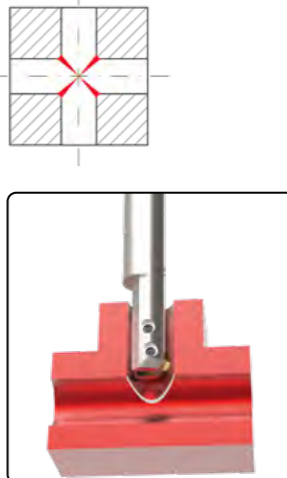
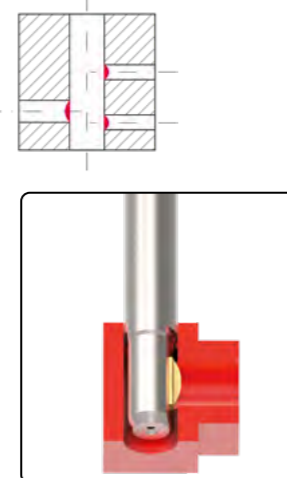
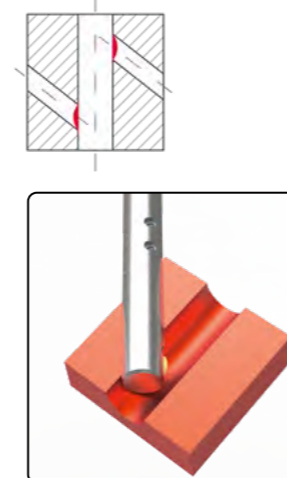
Individual

SEMI-STANDARD TOOLS

Standard tools from the COFA, DL2, SNAP, DEFA, BSF and VEX product groups can be adapted and modified to achieve the required result. Such solutions deviate only slightly from the standard and therefore do not have to be designed from scratch. Possible modifications include:

- a shorter or longer working length
- customised tool dimensions to fit your bore
- modified blade geometry
- a special blade coating
- etc.

The SOLO tool system and the tools for cross bore deburring from the X-BORES series (COFA-X, SNAP-X and CBD) are always designed and optimised to meet your requirements.

SOLO	COFA-X <small>X-BORES</small>	SNAP-X <small>X-BORES</small>	CBD <small>X-BORES</small>
Tool for spotfacing and counterboring on any machine, forwards and backwards in one operation.	Deburring tool for cross bores up to a bore ratio of 1:1.	Tool for penetrating the main bore, which deburrs the incoming cross bores.	Deburring tool for bore intersections with a small ratio of main bore to cross bore that enters the cross bore at a very flat angle.
For details see page 178	For details see page 46		
			

SPECIAL TOOLS

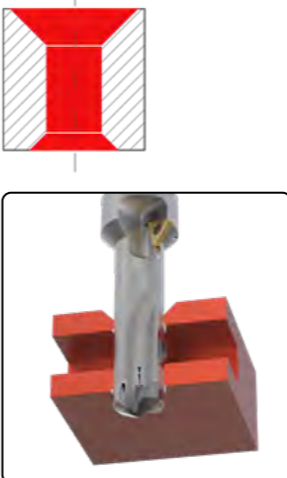
These are tool solutions that are developed, designed and produced for specific applications. HEULE draws on tried and tested HEULE technologies and combines or adapts them according to your requirements.

Are you looking for a new solution?
Get in touch with us!
We look forward to hearing from you.



EXAMPLE: COMBINATION TOOLS

Combination tools combine several operations in one tool for maximum efficiency in a single operation (For example: drilling, countersinking, chamfering backwards)



CHECKLIST FOR FEASIBILITY CHECK

Workpiece
Workpiece 3D model (STEP, DXF)
Material, hardness, surface

Production information
Production volume per year
Machine (type, internal cooling, ext. cooling, compressed air)
Cycle time
Shank type

Current solution
Description of the current tool/solution
Production sequence
Special requirements

New solution
Important aspects and requirements of the new solution

On-site worldwide



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ONE OPERATION