

BSF

Competitive back spotfacing and counterboring tool
for counterbores up to 2.3 x bore diameter

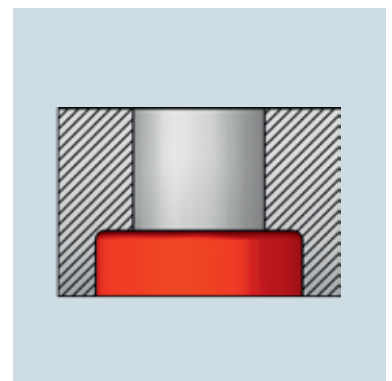
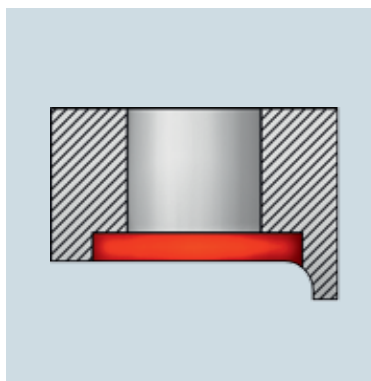


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BSF - The Competitive Back Counterbore Tool



Back Spotfacing up to 2.3 x Bore Diameter

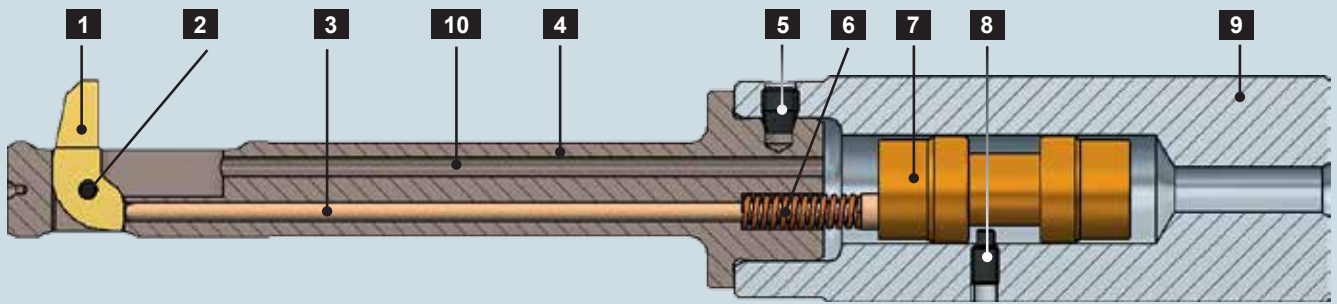
The surprisingly simple BSF tool concept allows back spotfacing or back counterboring in one operation without turning the workpiece. The robust tool is distinguished by its simplicity and high process capability.

The blade swings out into the working position by the rotation of the spindle. The retraction of the blade is controlled by the internal coolant pressure of the machine.



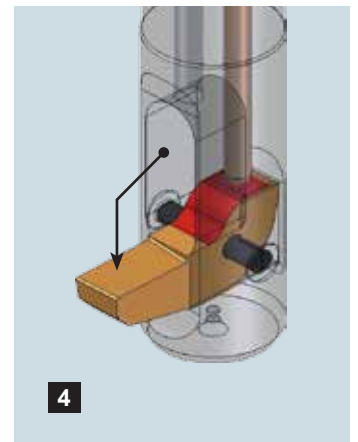
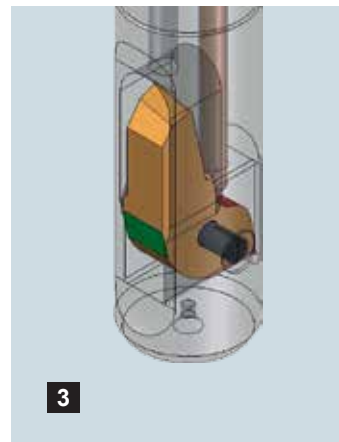
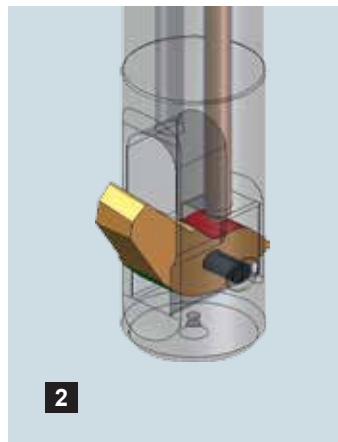
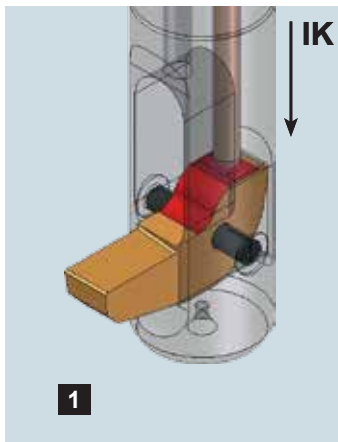
Characteristics and Advantages:

- The BSF tool is designed for automatic operation and is immediately ready for service. It works without an anti-rotation device, nor change of turning direction or any machine adaptations.
- The simple swing mechanism combined with the internal coolant pressure system (min. 20 bar, max 50 bar) is granting that neither chips nor dirt remain sticking.
- The tool change is very simple. Also the other tool components are replaced quickly.
- The tool works vertically and horizontally.
- Standard range with steps of 0.5 mm from bore diameter 6.5 mm to 21.0 mm.
- Blades are elaborated in carbide for all dimensions, with different coatings.
- Chips and dirt are flushed out of the blade windows thanks to a specifically developed tool geometry. Thus, a high process reliability is granted.



- | | |
|--|-------------------------------------|
| 1 Blade | 6 Spring |
| 2 Split pin (always supplied with blade) | 7 Piston |
| 3 Control pin | 8 Adjusting screw for piston system |
| 4 Blade housing | 9 Shank |
| 5 Fixing screw | 10 Coolant bore / Internal coolant |

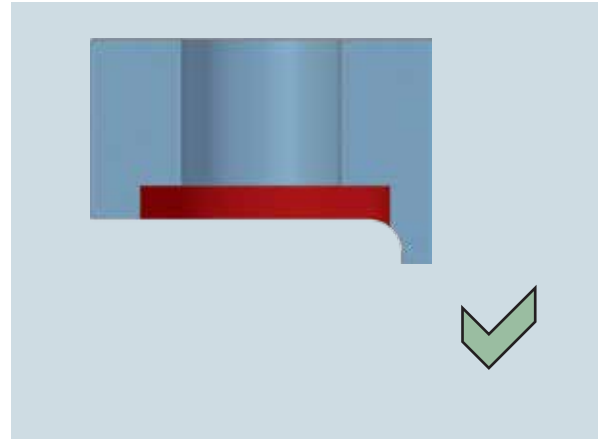
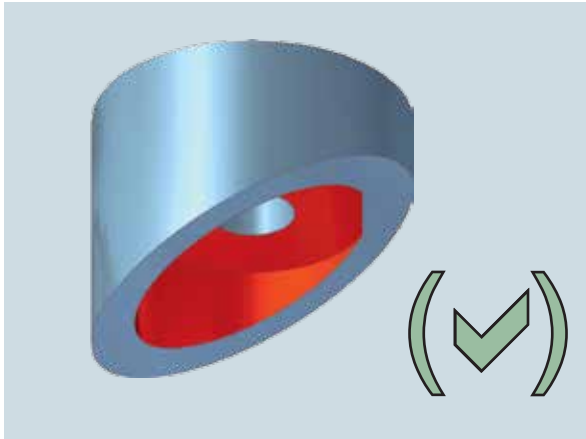
Blade Working Principle



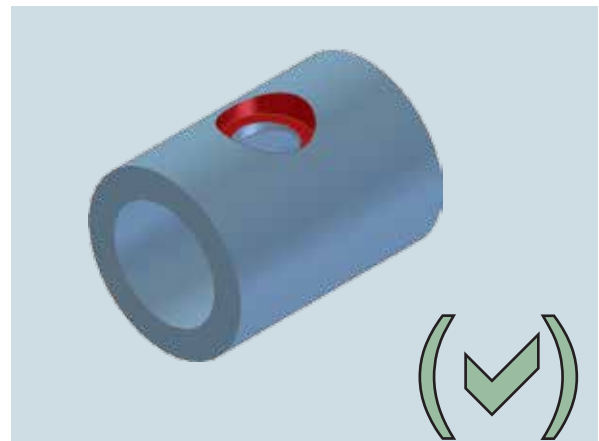
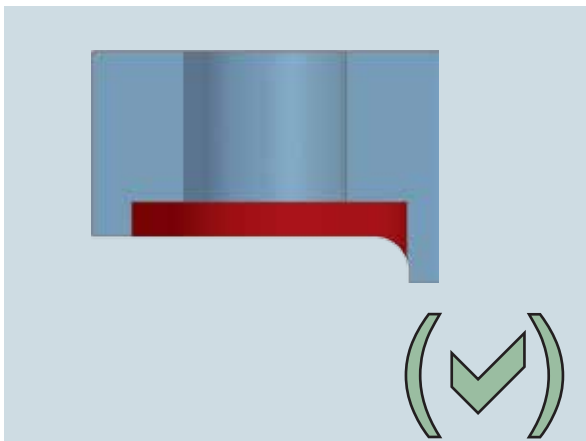
- 1 The internal coolant builds up pressure on the piston (see tool description position 7). The blade is being folded in by the control pin which presses on the red surface.
- 2 During the blade movement, the pressure surface of the blade pivots away and the control pin - still under coolant pressure - is now on the blade curve and forces the blade to fully retract.
- 3 The control pin holds the blade in the retracted position and the tool may be moved in the axial direction (z-axis).
- 4 When switching off the internal coolant pressure and starting the spindle rotation applying the recommended activation speed, the blade swings out into the working position.

Maximum Slope

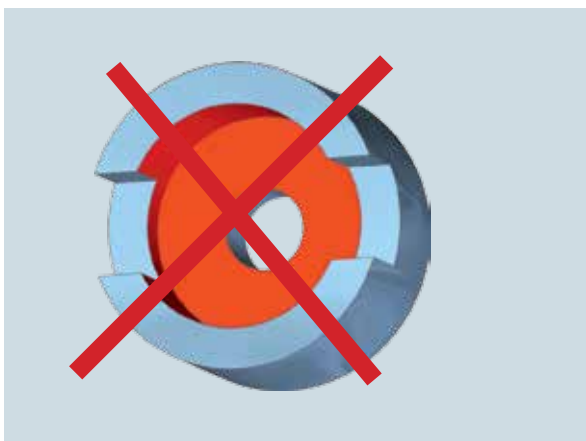
Partly interrupted cut (sloping surface) of up to 30° is permitted. If you are working near a radius area do not use internal coolant.



Technical advice is needed on machining capabilities.

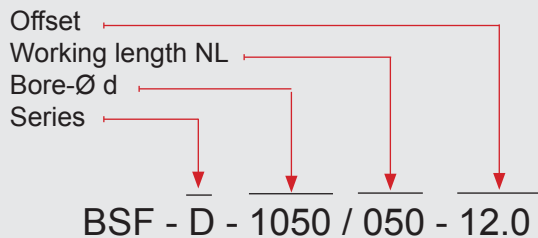


Fully interrupted cut (nut, groove, a. s. o.) is **not possible**.

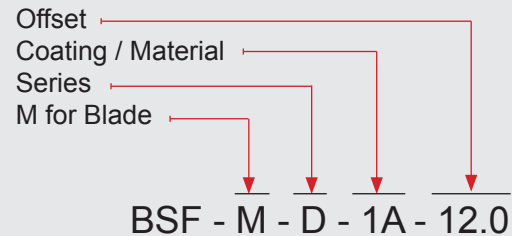


All BSF tools will be supplied without blades. The blade must be determined and ordered separately.

Article number for Tool



Article number for Blade



Series

The BSF standard tool system is divided into 7 series (A-G). The series allows a simple tool and blade selection to avoid mistakes when determining blades.

Bore diameter d

The bore diameter is the key parameter for the standardized BSF program. The series corresponds with the bore ranges.

Counterbore diameter D

The counterbore diameter is calculated by adding the offset value of the tool to the offset value of the blade.

Shank system

BSF-tools are executed by default with a cylindrical shank. If requested, they can also be produced with a Weldon shank or a Whistle Notch shank. In this case, please add the suffix "-HB" to the tool article number for a Weldon shank, respectively "-HE" for a Whistle Notch shank.

without suffix = Cylindrical shank (Standard)

HB = Weldon

HE = Whistle Notch

Specific example with Weldon shank:

BSF-D-1050/050-12.0 - **HB**

Blade selection / Designation

The article number of the required blade can be taken from the tool table or it can be determined by using the BSF Tool Selector on www.heule.com.

Series

The series steps of the blades are identical with the tool series. For example : an "E" series blade must be chosen for an "E" series tool.

Offset value

The counterbore-Ø can be calculated by adding offset value of the tool to the offset value of the blade, for example $12.0 + 12.0 = \text{counterbore-Ø } 24.0$ (see above / please refer also to the example on page 40).

Material / Coating

Blade material and coating depend on the application. The standardized blades will be selected accordingly.

Material:

1 = Carbide blade

Coating:

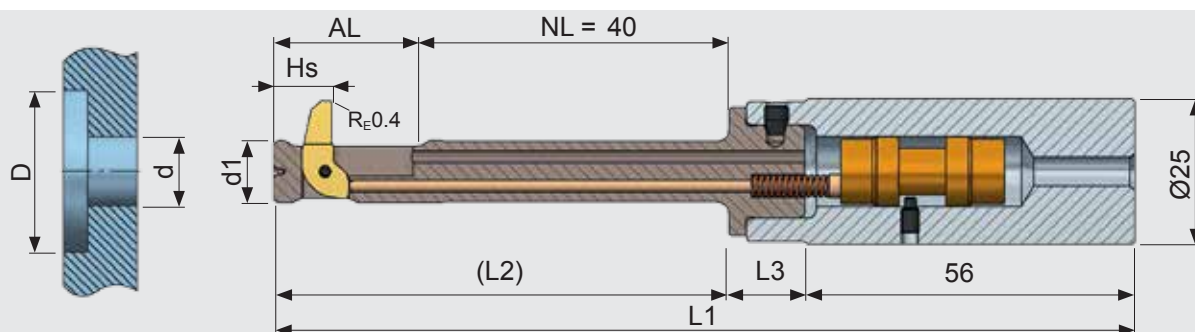
A = general (i.e. steel, titanium)

D = Aluminium

Explanation how to choose your tool and blade

Please choose your tool with the tables from page 7 on. Look up your bore-Ø first before you decide which counterbore-Ø you need. After these steps you will be able to take your tool and blade number out of the table.

BSF Tool & Blade for Bore-Ø 6.5 to 7.0 mm



Tool Table

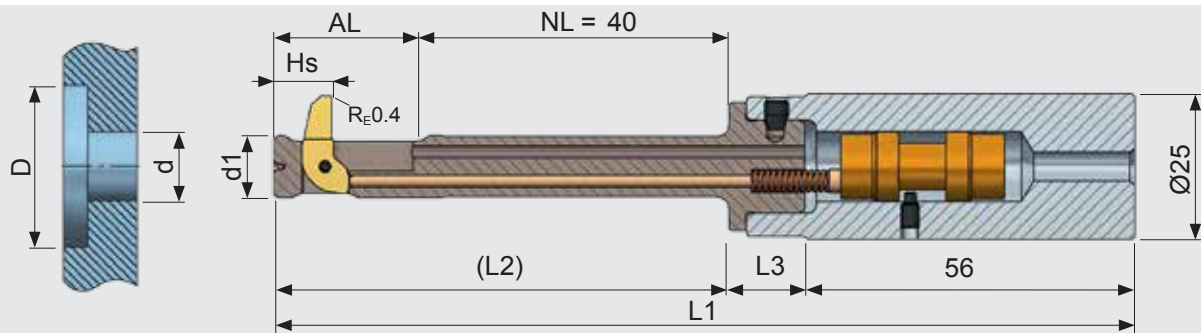
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
6.50	6.40	9.50	14.25	6.15	127.75	58.25	13.50	BSF-A-0650/040-6.5	BSF-M-A-1A-3.0
		10.00						BSF-A-0650/040-7.0	
		10.50						BSF-A-0650/040-7.5	
		11.00						BSF-A-0650/040-6.5	BSF-M-A-1A-4.5
		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	127.75	58.25	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	

¹⁾A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

BSF Tool & Blade for Bore-Ø 7.5 to 8.5 mm



Tool Table

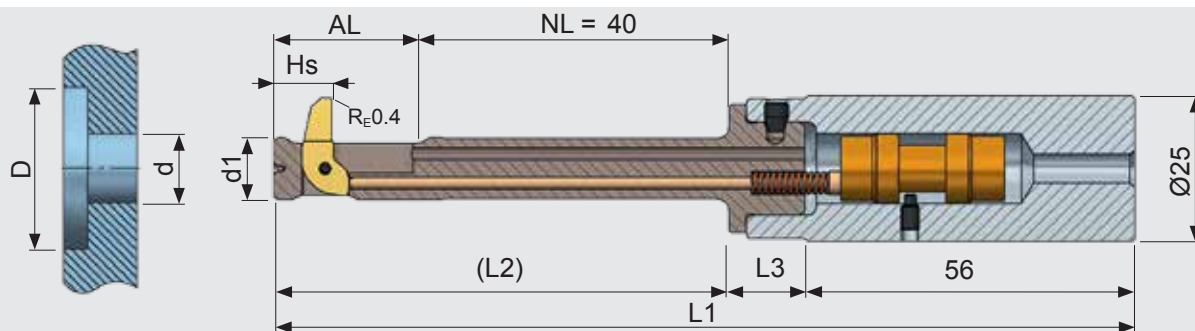
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
7.50	7.40	11.00	17.00	7.55	130.50	61.00	13.50	BSF-B-0750/040-7.5	BSF-M-B-1A-3.5
		11.50						BSF-B-0750/040-8.0	
		12.00						BSF-B-0750/040-8.5	
		12.50						BSF-B-0750/040-7.5	BSF-M-B-1A-5.0
		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						BSF-B-0800/040-8.0	BSF-M-B-1A-3.5
		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	

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Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

BSF Tool & Blade for Bore-Ø 7.5 to 8.5 mm



Tool Table

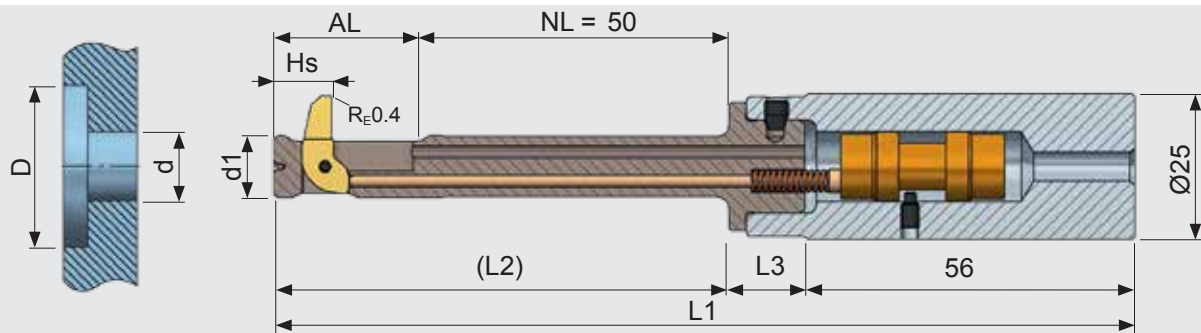
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
8.50	8.40	12.00	17.75	7.55	131.25	61.75	13.50	BSF-B-0850/040-8.5	BSF-M-B-1A-3.5
		12.50						BSF-B-0850/040-9.0	
		13.00						BSF-B-0850/040-9.5	
		13.50						BSF-B-0850/040-8.5	BSF-M-B-1A-5.0
		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	

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Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered seperately.

BSF Tool & Blade for Bore-Ø 9.0 to 10.0 mm



Tool Table

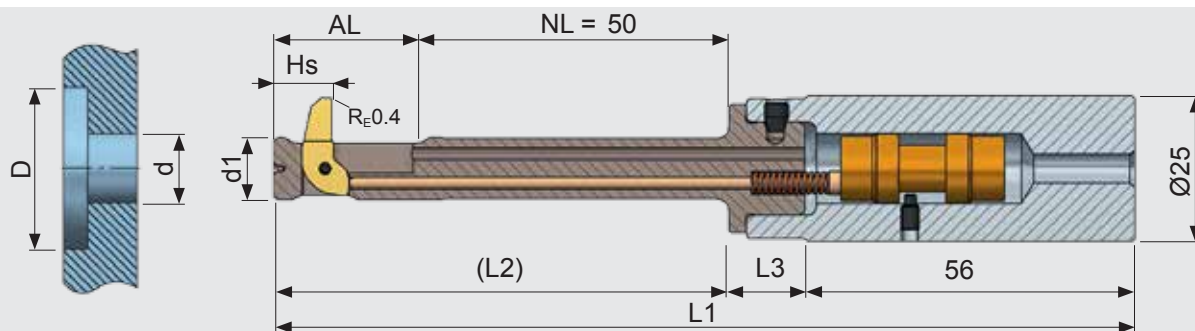
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
9.00	8.90	13.50	20.25	8.55	143.75	74.25	13.50	BSF-C-0900/050-9.5	BSF-M-C-1A-4.0
		14.00						BSF-C-0900/050-10.0	
		14.50						BSF-C-0900/050-10.5	
		15.00						BSF-C-0900/050-9.5	BSF-M-C-1A-5.5
		15.50						BSF-C-0900/050-10.0	
		16.00						BSF-C-0900/050-10.5	
	16.50	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	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	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	21.00						BSF-C-0900/050-9.5	BSF-M-C-1A-11.5
9.50	9.40	14.00						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	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	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	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	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	21.50						BSF-C-0950/050-10.0	BSF-M-C-1A-11.5
		22.00						BSF-C-0950/050-10.5	

¹A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

BSF Tool & Blade for Bore-Ø 9.0 to 10.0 mm



Tool Table

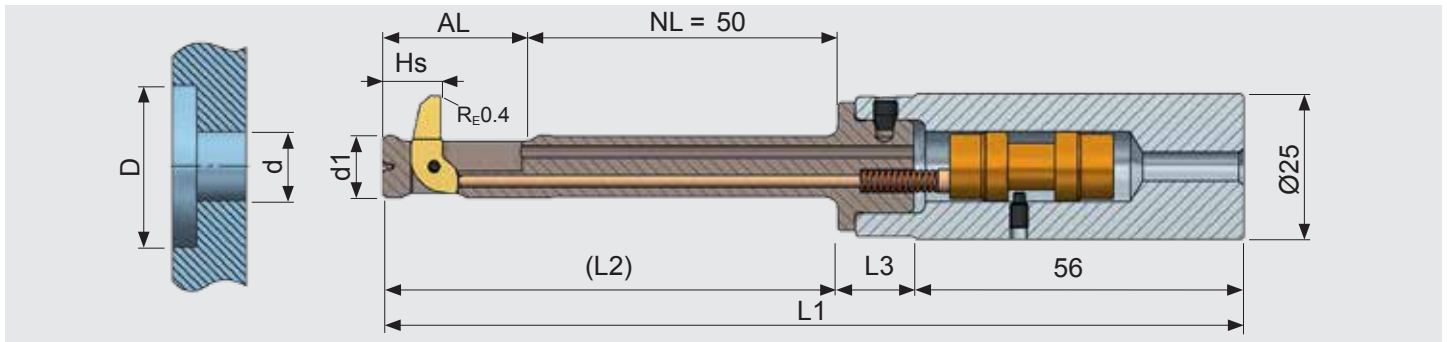
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
10.00	9.90	14.50	20.25	8.55	143.75	74.25	13.50	BSF-C-1000/050-10.5	BSF-M-C-1A-4.0
		15.00						BSF-C-1000/050-11.0	
		15.50						BSF-C-1000/050-11.5	
		16.00						BSF-C-1000/050-10.5	BSF-M-C-1A-5.5
		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	

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Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered seperately.

BSF Tool & Blade for Bore-Ø 10.5 to 11.5 mm



Tool Table

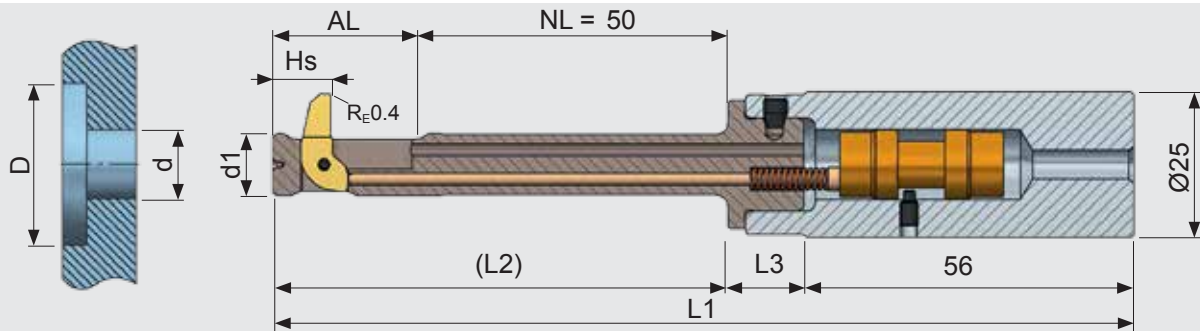
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
10.50	10.40	15.50	22.50	9.63	146.00	76.50	13.50	BSF-D-1050/050-11.0	BSF-M-D-1A-4.5
		16.00						BSF-D-1050/050-11.5	
		16.50						BSF-D-1050/050-12.0	
		17.00						BSF-D-1050/050-12.5	
		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	

¹⁾ A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered seperately.

BSF Tool & Blade for Bore-Ø 10.5 to 11.5 mm



Tool Table

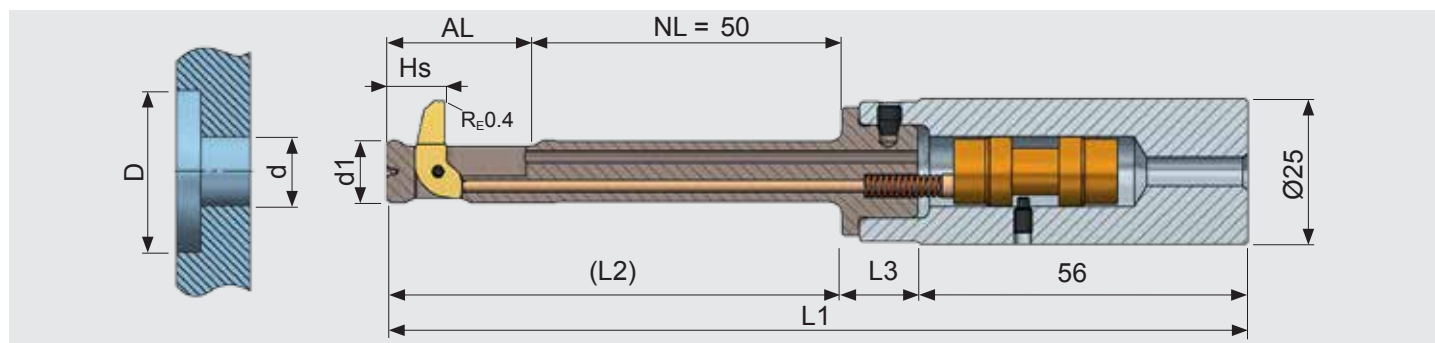
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
11.00	10.90	16.00	22.50	9.63	146.00	76.50	13.50	BSF-D-1100/050-11.5	BSF-M-D-1A-4.5
		16.50						BSF-D-1100/050-12.0	
		17.00						BSF-D-1100/050-12.5	
		17.50						BSF-D-1100/050-13.0	
		18.00						BSF-D-1100/050-13.5	
		18.50						BSF-D-1100/050-11.5	BSF-M-D-1A-7.0
		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	

¹⁾ A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

BSF Tool & Blade for Bore-Ø 10.5 to 11.5 mm



Tool Table

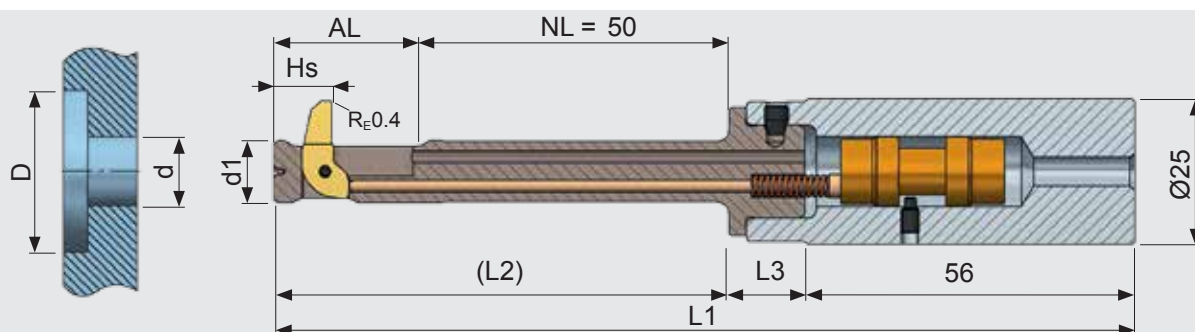
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
11.50	11.40	16.50	23.75	9.63	147.25	77.75	13.50	BSF-D-1150/050-12.0	BSF-M-D-1A-4.5
		17.00						BSF-D-1150/050-12.5	
		17.50						BSF-D-1150/050-13.0	
		18.00						BSF-D-1150/050-13.5	
		18.50						BSF-D-1150/050-14.0	
		19.00						BSF-D-1150/050-12.0	BSF-M-D-1A-7.0
		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

¹⁾ A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

BSF Tool & Blade for Bore-Ø 12.0 to 14.0 mm



Tool Table

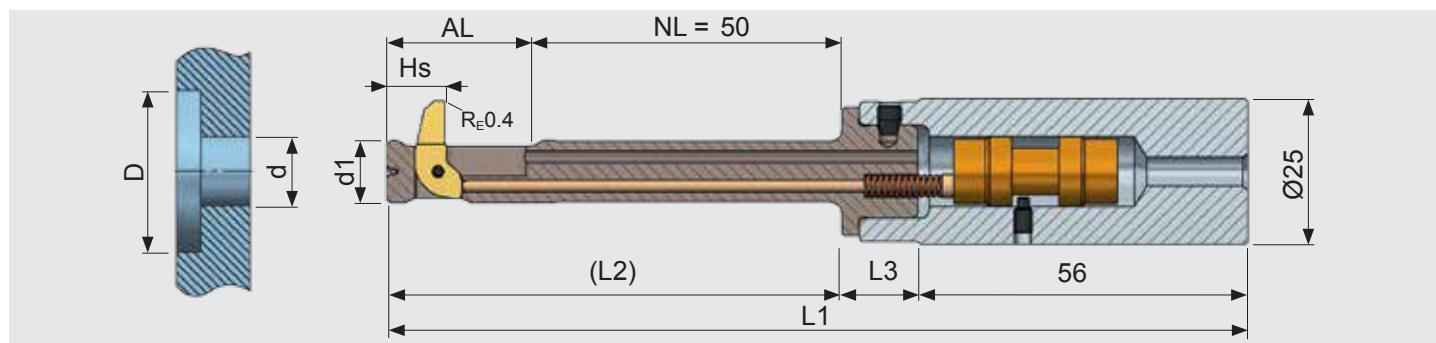
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
12.00	11.90	18.00	26.75	11.40	150.25	80.75	13.50	BSF-E-1200/050-13.0	BSF-M-E-1A-5.0
		18.50						BSF-E-1200/050-13.5	
		19.00						BSF-E-1200/050-14.0	
		19.50						BSF-E-1200/050-14.5	
		20.00						BSF-E-1200/050-15.0	
		20.50						BSF-E-1200/050-13.0	BSF-M-E-1A-7.5
		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	BSF-M-E-1A-12.5
		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

¹⁾ A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

BSF Tool & Blade for Bore-Ø 12.0 to 14.0 mm



Tool Table

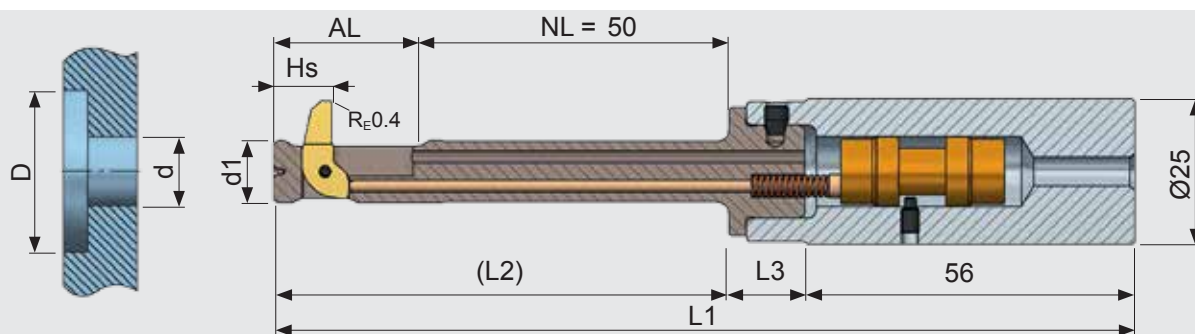
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
12.50	12.40	18.50	26.75	11.40	150.25	80.75	13.50	BSF-E-1250/050-13.5	BSF-M-E-1A-5.0
		19.00						BSF-E-1250/050-14.0	
		19.50						BSF-E-1250/050-14.5	
		20.00						BSF-E-1250/050-15.0	
		20.50						BSF-E-1250/050-15.5	
		21.00						BSF-E-1250/050-13.5	BSF-M-E-1A-7.5
		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	BSF-M-E-1A-12.5
		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	

¹⁾ A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered seperately.

BSF Tool & Blade for Bore-Ø 12.0 to 14.0 mm



Tool Table

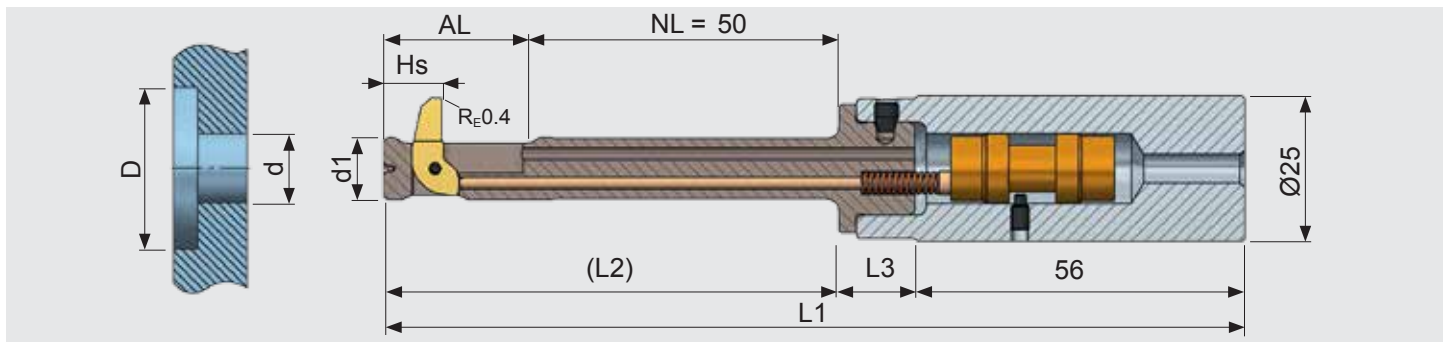
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
13.00	12.90	19.00	26.75	11.40	150.25	80.75	13.50	BSF-E-1300/050-14.0	BSF-M-E-1A-5.0
		19.50						BSF-E-1300/050-14.5	
		20.00						BSF-E-1300/050-15.0	
		20.50						BSF-E-1300/050-15.5	
		21.00						BSF-E-1300/050-16.0	
		21.50						BSF-E-1300/050-14.0	BSF-M-E-1A-7.5
		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	BSF-M-E-1A-12.5
		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	

¹⁾ A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

BSF Tool & Blade for Bore-Ø 12.0 to 14.0 mm



Tool Table

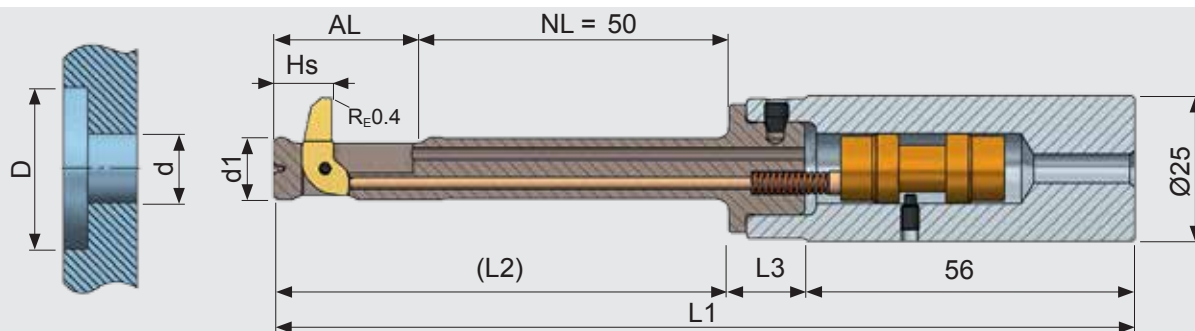
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
13.50	13.40	19.50	26.75	11.40	150.25	80.75	13.50	BSF-E-1350/050-14.5	BSF-M-E-1A-5.0
		20.00						BSF-E-1350/050-15.0	
		20.50						BSF-E-1350/050-15.5	
		21.00						BSF-E-1350/050-16.0	
		21.50						BSF-E-1350/050-16.5	
		22.00						BSF-E-1350/050-14.5	BSF-M-E-1A-7.5
		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	BSF-M-E-1A-12.5
		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	

¹⁾ A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered seperately.

BSF Tool & Blade for Bore-Ø 12.0 to 14.0 mm



Tool Table

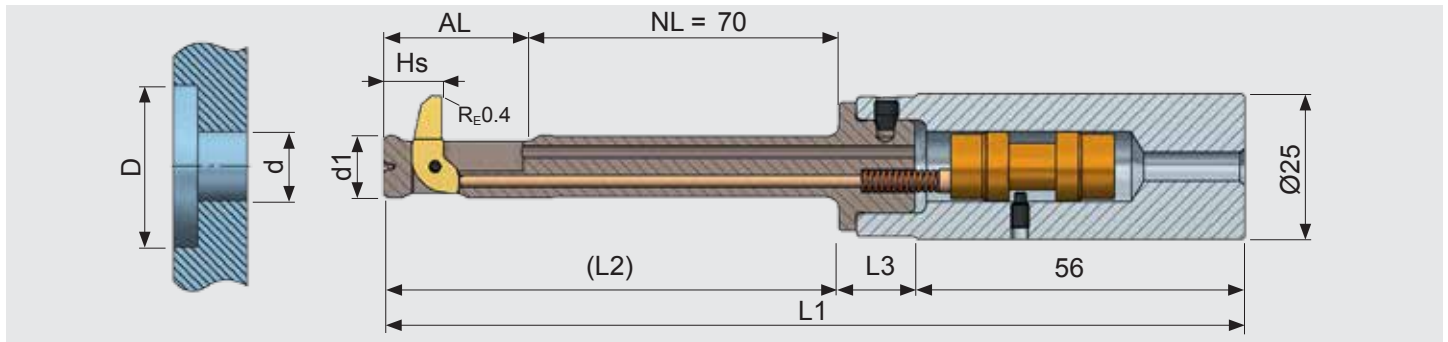
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
14.00	13.90	20.00	28.00	11.40	151.50	82.00	13.50	BSF-E-1400/050-15.0	BSF-M-E-1A-5.0
		20.50						BSF-E-1400/050-15.5	
		21.00						BSF-E-1400/050-16.0	
		21.50						BSF-E-1400/050-16.5	
		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

¹⁾ A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

BSF Tool & Blade for Bore-Ø 14.5 to 17.0 mm



Tool Table

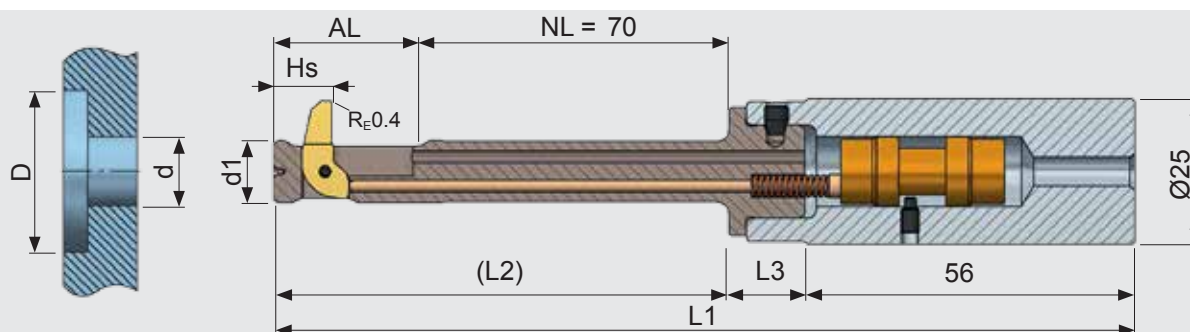
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
14.50	14.40	21.50	30.75	13.40	193.75	104.75	33.00	BSF-F-1450/070-16.0	BSF-M-F-1A-5.5
		22.00						BSF-F-1450/070-16.5	
		22.50						BSF-F-1450/070-17.0	
		23.00						BSF-F-1450/070-17.5	
		23.50						BSF-F-1450/070-18.0	
		24.00						BSF-F-1450/070-18.5	
		24.50						BSF-F-1450/070-19.0	
		25.00						BSF-F-1450/070-16.0	BSF-M-F-1A-9.0
		25.50						BSF-F-1450/070-16.5	
		26.00						BSF-F-1450/070-17.0	
		26.50						BSF-F-1450/070-17.5	
		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	BSF-M-F-1A-12.5
		29.00						BSF-F-1450/070-16.5	
		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	
		32.00						BSF-F-1450/070-16.0	BSF-M-F-1A-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	

¹⁾ A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered seperately.

BSF Tool & Blade for Bore-Ø 14.5 to 17.0 mm



Tool Table

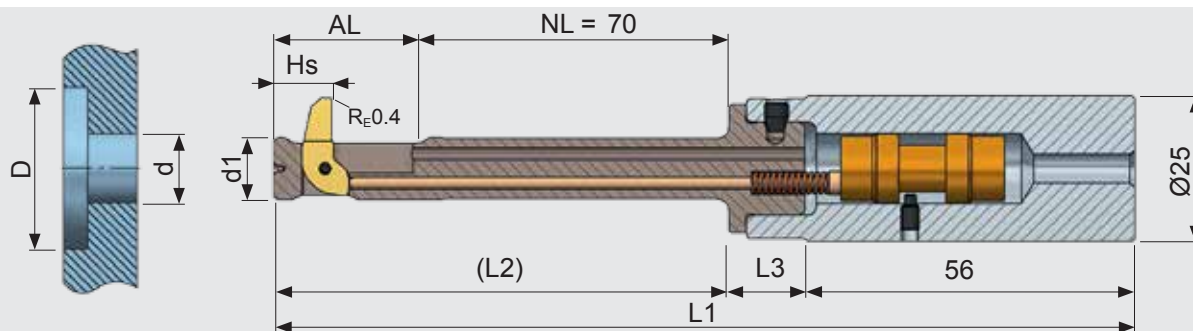
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
15.00	14.90	22.00	30.75	13.40	193.75	104.75	33.00	BSF-F-1500/070-16.5	BSF-M-F-1A-5.5
		22.50						BSF-F-1500/070-17.0	
		23.00						BSF-F-1500/070-17.5	
		23.50						BSF-F-1500/070-18.0	
		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	

¹⁾ A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

BSF Tool & Blade for Bore-Ø 14.5 to 17.0 mm



Tool Table

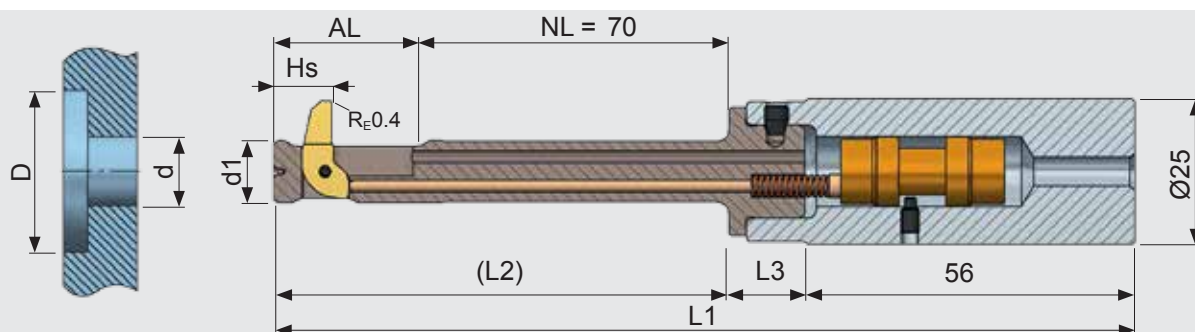
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
15.50	15.40	22.50	30.75	13.40	193.75	104.75	33.00	BSF-F-1550/070-17.0	BSF-M-F-1A-5.5
		23.00						BSF-F-1550/070-17.5	
		23.50						BSF-F-1550/070-18.0	
		24.00						BSF-F-1550/070-18.5	
		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	

¹A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

BSF Tool & Blade for Bore-Ø 14.5 to 17.0 mm



Tool Table

Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
16.00	15.90	23.00	32.50	13.40	195.50	106.50	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	BSF-M-F-1A-9.0
		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	BSF-M-F-1A-16.0
		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

¹⁾ A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

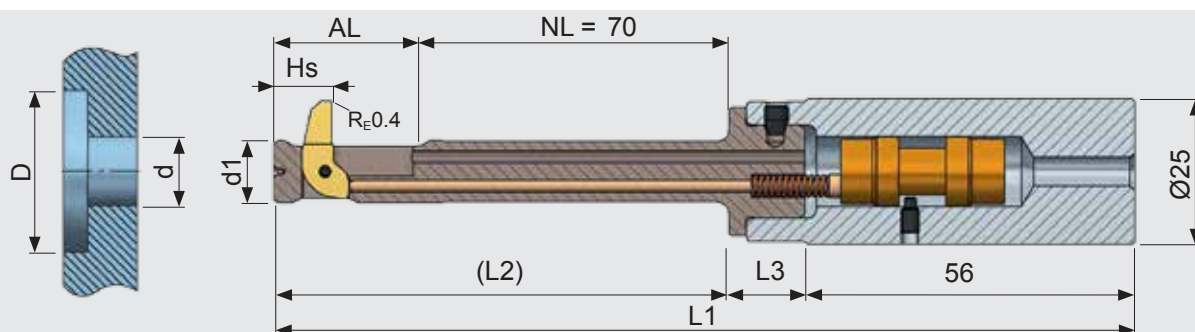
Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹	
16.50	16.40	23.50	32.50	13.40	195.50	106.50	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	BSF-M-F-1A-9.0	
		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-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-M-F-1A-16.0	
		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-M-F-1A-19.5	
		38.00								BSF-F-1650/070-18.5

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

BSF Tool & Blade for Bore-Ø 14.5 to 17.0 mm



Tool Table

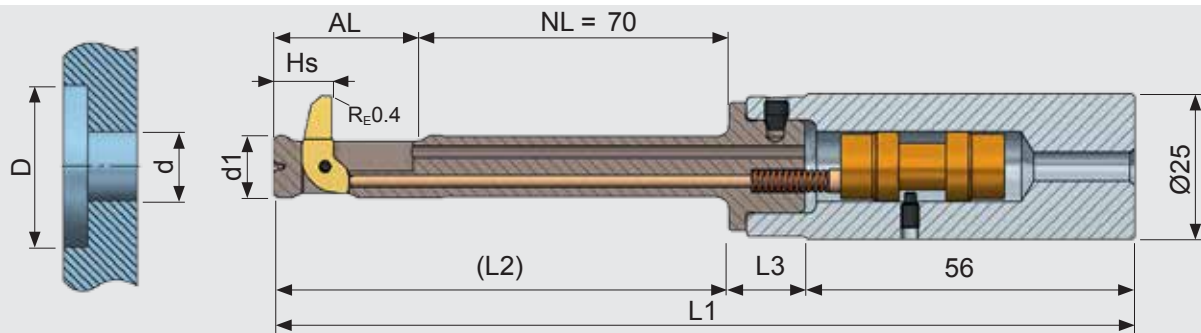
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
17.00	16.90	24.00	32.50	13.40	195.50	106.50	33.00	BSF-F-1700/070-18.5	BSF-M-F-1A-5.5
		24.50						BSF-F-1700/070-19.0	
		25.00						BSF-F-1700/070-19.5	
		25.50						BSF-F-1700/070-20.0	
		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	

¹⁾A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

BSF Tool & Blade for Bore-Ø 17.5 to 21.0 mm



Tool Table

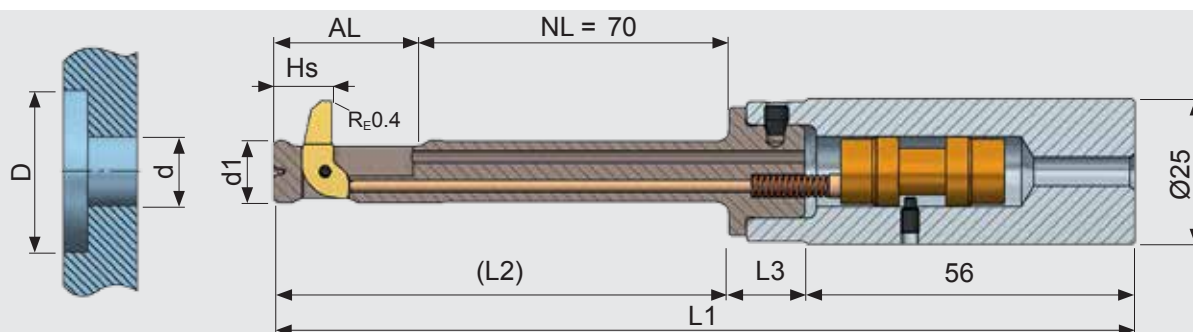
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
17.50	17.40	26.00	37.25	16.30	200.25	111.25	33.00	BSF-G-1750/070-20.0	BSF-M-G-1A-6.0
		26.50						BSF-G-1750/070-20.5	
		27.00						BSF-G-1750/070-21.0	
		27.50						BSF-G-1750/070-21.5	
		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	

¹A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

BSF Tool & Blade for Bore-Ø 17.5 to 21.0 mm



Tool Table

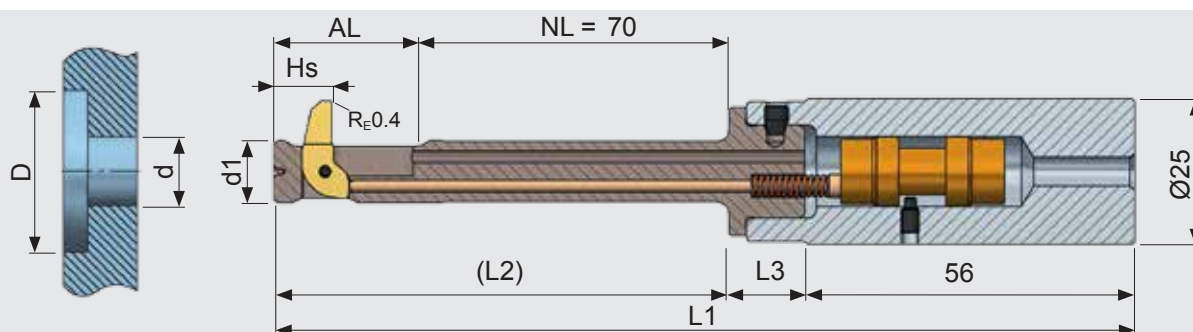
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
18.00	17.90	26.50	37.25	16.30	200.25	111.25	33.00	BSF-G-1800/070-20.5	BSF-M-G-1A-6.0
		27.00						BSF-G-1800/070-21.0	
		27.50						BSF-G-1800/070-21.5	
		28.00						BSF-G-1800/070-22.0	
		28.50						BSF-G-1800/070-22.5	
		29.00						BSF-G-1800/070-23.0	
		29.50						BSF-G-1800/070-23.5	
		30.00						BSF-G-1800/070-24.0	
		30.50						BSF-G-1800/070-24.5	
		31.00						BSF-G-1800/070-20.5	BSF-M-G-1A-10.5
		31.50						BSF-G-1800/070-21.0	
		32.00						BSF-G-1800/070-21.5	
		32.50						BSF-G-1800/070-22.0	
		33.00						BSF-G-1800/070-22.5	
		33.50						BSF-G-1800/070-23.0	
		34.00						BSF-G-1800/070-23.5	
		34.50						BSF-G-1800/070-24.0	
		35.00						BSF-G-1800/070-24.5	
		35.50						BSF-G-1800/070-20.5	BSF-M-G-1A-15.0
		36.00						BSF-G-1800/070-21.0	
		36.50						BSF-G-1800/070-21.5	
		37.00						BSF-G-1800/070-22.0	
		37.50						BSF-G-1800/070-22.5	
		38.00						BSF-G-1800/070-23.0	
		38.50						BSF-G-1800/070-23.5	
		39.00						BSF-G-1800/070-24.0	
		39.50						BSF-G-1800/070-24.5	
		40.00						BSF-G-1800/070-20.5	BSF-M-G-1A-19.5
		40.50						BSF-G-1800/070-21.0	
		41.00						BSF-G-1800/070-21.5	
		41.50						BSF-G-1800/070-22.0	

¹⁾ A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

BSF Tool & Blade for Bore-Ø 17.5 to 21.0 mm



Tool Table

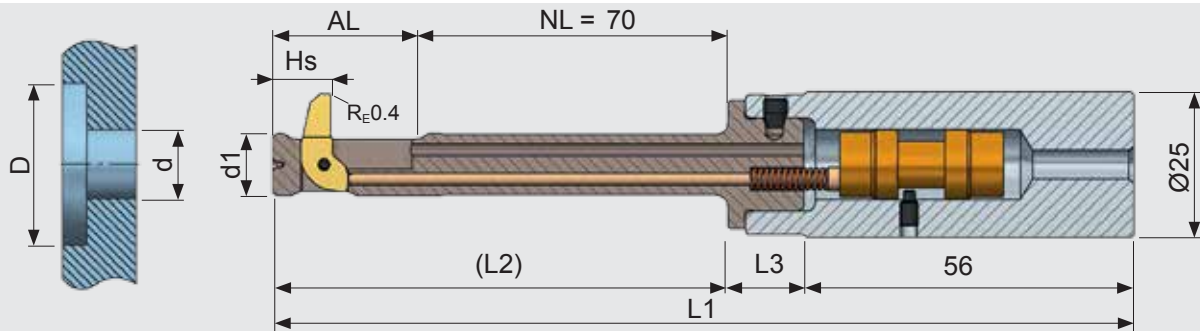
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
18.50	18.40	27.00	37.25	16.30	200.25	111.25	33.00	BSF-G-1850/070-21.0	BSF-M-G-1A-6.0
		27.50						BSF-G-1850/070-21.5	
		28.00						BSF-G-1850/070-22.0	
		28.50						BSF-G-1850/070-22.5	
		29.00						BSF-G-1850/070-23.0	
		29.50						BSF-G-1850/070-23.5	
		30.00						BSF-G-1850/070-24.0	
		30.50						BSF-G-1850/070-24.5	
		31.00						BSF-G-1850/070-25.0	
		31.50						BSF-G-1850/070-21.0	BSF-M-G-1A-10.5
		32.00						BSF-G-1850/070-21.5	
		32.50						BSF-G-1850/070-22.0	
		33.00						BSF-G-1850/070-22.5	
		33.50						BSF-G-1850/070-23.0	
		34.00						BSF-G-1850/070-23.5	
		34.50						BSF-G-1850/070-24.0	
		35.00						BSF-G-1850/070-24.5	
		35.50						BSF-G-1850/070-25.0	
		36.00						BSF-G-1850/070-21.0	BSF-M-G-1A-15.0
		36.50						BSF-G-1850/070-21.5	
		37.00						BSF-G-1850/070-22.0	
		37.50						BSF-G-1850/070-22.5	
		38.00						BSF-G-1850/070-23.0	
		38.50						BSF-G-1850/070-23.5	
		39.00						BSF-G-1850/070-24.0	
		39.50						BSF-G-1850/070-24.5	
		40.00						BSF-G-1850/070-25.0	
		40.50						BSF-G-1850/070-21.0	BSF-M-G-1A-19.5
		41.00						BSF-G-1850/070-21.5	
		41.50						BSF-G-1850/070-22.0	
		42.00						BSF-G-1850/070-22.5	
		42.50						BSF-G-1850/070-23.0	
		43.00						BSF-G-1850/070-23.5	

¹⁾ A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

BSF Tool & Blade for Bore-Ø 17.5 to 21.0 mm



Tool Table

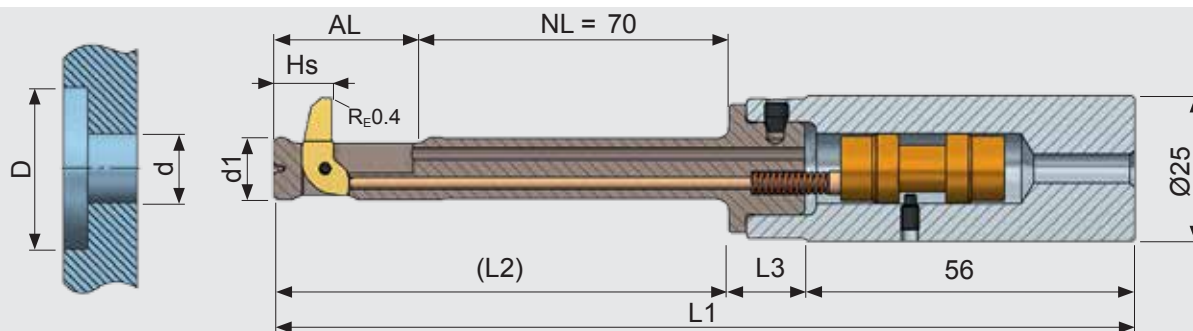
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
19.00	18.90	27.50	37.25	16.30	200.25	111.25	33.00	BSF-G-1900/070-21.5	BSF-M-G-1A-6.0
		28.00						BSF-G-1900/070-22.0	
		28.50						BSF-G-1900/070-22.5	
		29.00						BSF-G-1900/070-23.0	
		29.50						BSF-G-1900/070-23.5	
		30.00						BSF-G-1900/070-24.0	
		30.50						BSF-G-1900/070-24.5	
		31.00						BSF-G-1900/070-25.0	
		31.50						BSF-G-1900/070-25.5	
		32.00						BSF-G-1900/070-21.5	BSF-M-G-1A-10.5
		32.50						BSF-G-1900/070-22.0	
		33.00						BSF-G-1900/070-22.5	
		33.50						BSF-G-1900/070-23.0	
		34.00						BSF-G-1900/070-23.5	
		34.50						BSF-G-1900/070-24.0	
		35.00						BSF-G-1900/070-24.5	
		35.50						BSF-G-1900/070-25.0	
		36.00						BSF-G-1900/070-25.5	
		36.50						BSF-G-1900/070-21.5	BSF-M-G-1A-15.0
		37.00						BSF-G-1900/070-22.0	
		37.50						BSF-G-1900/070-22.5	
		38.00						BSF-G-1900/070-23.0	
		38.50						BSF-G-1900/070-23.5	
		39.00						BSF-G-1900/070-24.0	
		39.50						BSF-G-1900/070-24.5	
		40.00						BSF-G-1900/070-25.0	
		40.50						BSF-G-1900/070-25.5	
		41.00						BSF-G-1900/070-21.5	BSF-M-G-1A-19.5
		41.50						BSF-G-1900/070-22.0	
		42.00						BSF-G-1900/070-22.5	
		42.50						BSF-G-1900/070-23.0	
		43.00						BSF-G-1900/070-23.5	
		43.50						BSF-G-1900/070-24.0	
		44.00						BSF-G-1900/070-24.5	

¹⁾ A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

BSF Tool & Blade for Bore-Ø 17.5 to 21.0 mm



Tool Table

Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
19.50	19.40	28.00	37.25	16.30	200.25	111.25	33.00	BSF-G-1950/070-22.0	BSF-M-G-1A-6.0
		28.50						BSF-G-1950/070-22.5	
		29.00						BSF-G-1950/070-23.0	
		29.50						BSF-G-1950/070-23.5	
		30.00						BSF-G-1950/070-24.0	
		30.50						BSF-G-1950/070-24.5	
		31.00						BSF-G-1950/070-25.0	
		31.50						BSF-G-1950/070-25.5	
		32.00						BSF-G-1950/070-26.0	
		32.50						BSF-G-1950/070-22.0	BSF-M-G-1A-10.5
		33.00						BSF-G-1950/070-22.5	
		33.50						BSF-G-1950/070-23.0	
		34.00						BSF-G-1950/070-23.5	
		34.50						BSF-G-1950/070-24.0	
		35.00						BSF-G-1950/070-24.5	
		35.50						BSF-G-1950/070-25.0	
		36.00						BSF-G-1950/070-25.5	
		36.50						BSF-G-1950/070-26.0	
		37.00						BSF-G-1950/070-22.0	BSF-M-G-1A-15.0
		37.50						BSF-G-1950/070-22.5	
		38.00						BSF-G-1950/070-23.0	
		38.50						BSF-G-1950/070-23.5	
		39.00						BSF-G-1950/070-24.0	
		39.50						BSF-G-1950/070-24.5	
		40.00						BSF-G-1950/070-25.0	
		40.50						BSF-G-1950/070-25.5	
		41.00						BSF-G-1950/070-26.0	
		41.50						BSF-G-1950/070-22.0	BSF-M-G-1A-19.5
		42.00						BSF-G-1950/070-22.5	
		42.50						BSF-G-1950/070-23.0	
		43.00						BSF-G-1950/070-23.5	
		43.50						BSF-G-1950/070-24.0	
		44.00						BSF-G-1950/070-24.5	
		44.50						BSF-G-1950/070-25.0	
		45.00						BSF-G-1950/070-25.5	

¹⁾ A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

Technical drawing of a mechanical part, showing a cross-section and a side view with dimensions.

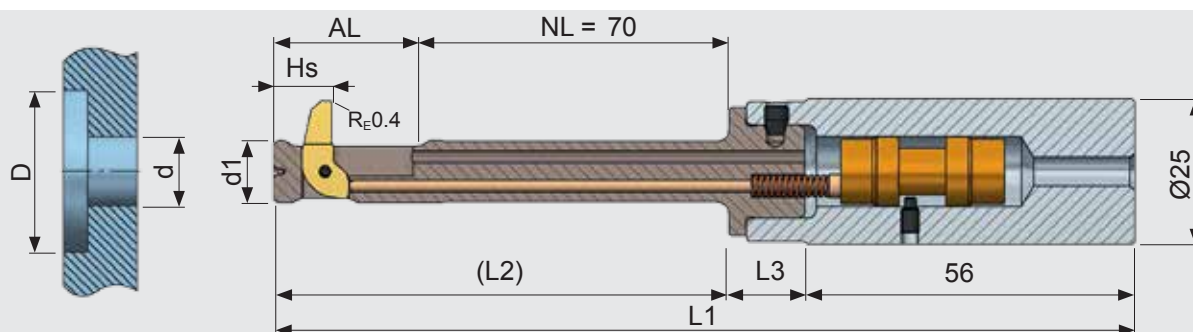
Dimensions:

- D : Outer diameter of the cross-section.
- d : Inner diameter of the cross-section.
- $d1$: Diameter of the pin at the top of the side view.
- AL : Length of the top flange.
- $NL = 70$: Total length of the part.
- Hs : Height of the top flange.
- $R_{E0.4}$: Fillet radius at the top of the pin.
- $(L2)$: Length of the main body.
- $L1$: Total length of the main body.
- $L3$: Length of the bottom flange.
- 56 : Length of the bottom flange.
- $\varnothing 25$: Diameter of the pin at the bottom of the side view.

Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
20.00	19.90	28.50	37.25	16.30	200.25	111.25	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	BSF-M-G-1A-10.5
		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	
		42.00						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	

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

BSF Tool & Blade for Bore-Ø 17.5 to 21.0 mm



Tool Table

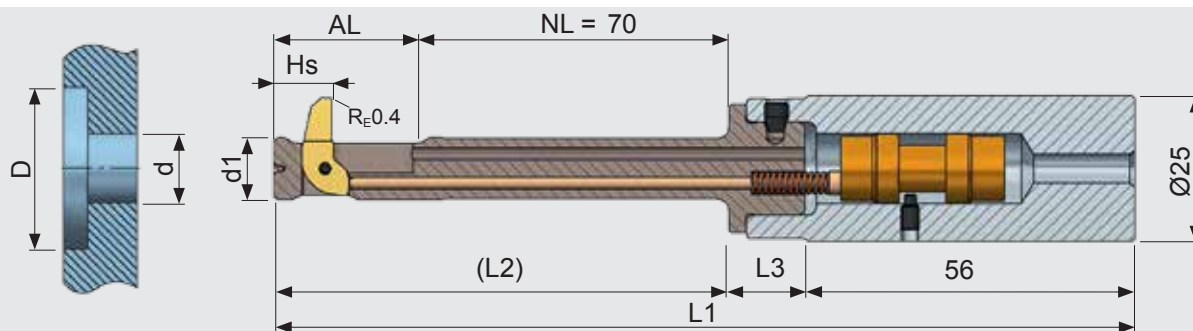
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
20.50	20.40	29.00	39.50	16.30	202.50	113.50	33.00	BSF-G-2050/070-23.0	BSF-M-G-1A-6.0
		29.50						BSF-G-2050/070-23.5	
		30.00						BSF-G-2050/070-24.0	
		30.50						BSF-G-2050/070-24.5	
		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	
		42.50						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	

¹⁾A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

BSF Tool & Blade for Bore-Ø 17.5 to 21.0 mm


Tool Table

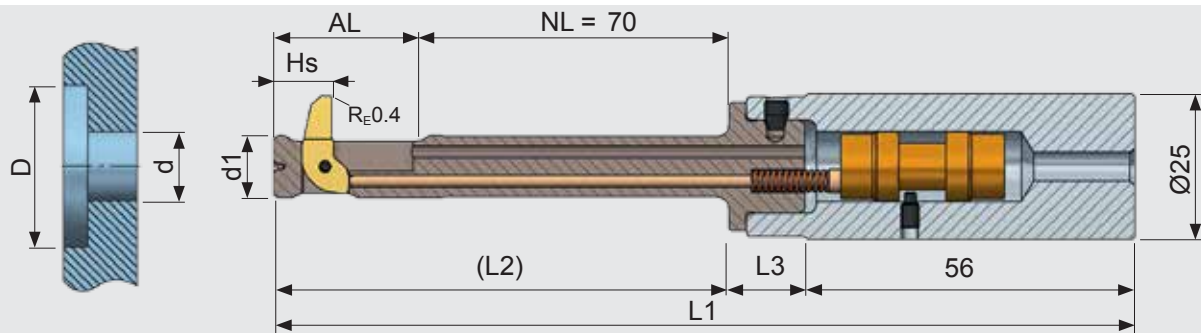
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
20.50	20.40	47.00	39.50	16.30	202.50	113.50	33.00	BSF-G-2050/070-23.0	BSF-M-G-1A-24.0
		47.50						BSF-G-2050/070-23.5	

¹⁾ A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

BSF Tool & Blade for Bore-Ø 17.5 to 21.0 mm



Tool Table

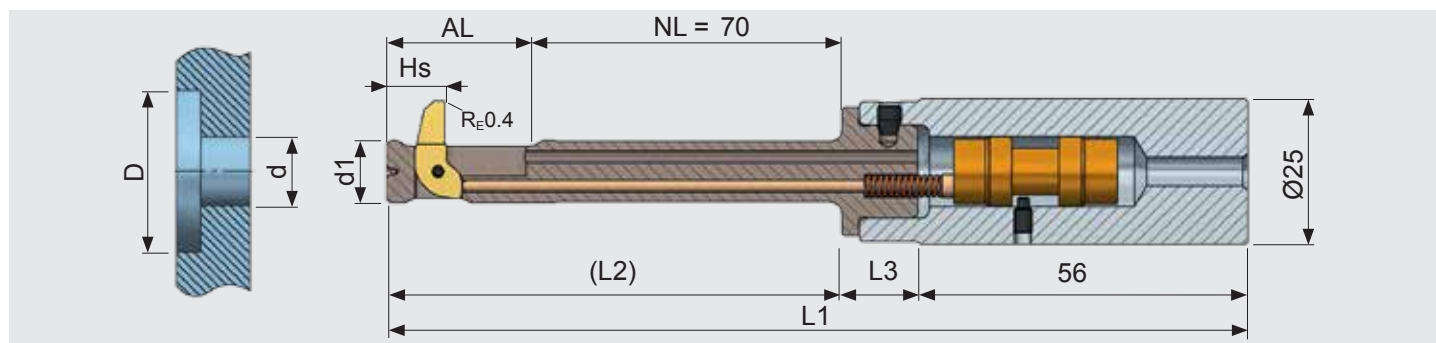
Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
21.00	20.90	29.50	39.50	16.30	202.50	113.50	33.00	BSF-G-2100/070-23.5	BSF-M-G-1A-6.0
		30.00						BSF-G-2100/070-24.0	
		30.50						BSF-G-2100/070-24.5	
		31.00						BSF-G-2100/070-25.0	
		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	BSF-M-G-1A-10.5
		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	BSF-M-G-1A-15.0
		38.50						BSF-G-2100/070-23.5	
		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	BSF-M-G-1A-19.5
		42.50						BSF-G-2100/070-27.5	
		43.00						BSF-G-2100/070-23.5	
		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	

¹A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.

BSF Tool & Blade for Bore-Ø 17.5 to 21.0 mm



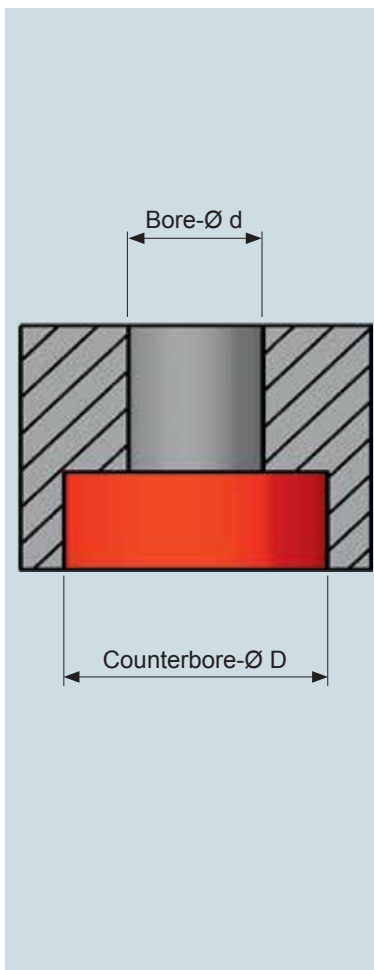
Tool Table

Min. Bore-Ø d	Tool-Ø d1	Counter- bore-Ø D	AL	HS	L1	L2	L3	Tool without blade Article number	Blade Article number ¹
21.00	20.90	47.50	39.50	16.30	202.50	113.50	33.00	BSF-G-2100/070-23.5	BSF-M-G-1A-24.0
		48.00						BSF-G-2100/070-24.0	
		48.50						BSF-G-2100/070-24.5	
		49.00						BSF-G-2100/070-25.0	

¹⁾ A = Coating for steel alloys, titanium and inconel / D = Coating for Aluminium alloys (please see page 6)

Note

- Standard shank for tool article number without any addition: Cylindrical shank.
- With addition: "-HB" = Weldon shank, "-HE" = Whistle Notch shank (please see page 6)
- Attention: The blades for the tool need to be ordered separately.



Bore-Ø d	Counterbores for Socket Head Cap Screws Counterbore-Ø D			
6.5		11	13	15
	Tool	BSF-A-0650/040-6.5	BSF-A-0650/040-7.0	BSF-A-0650/040-7.5
	Blade	BSF-M-A-1A-4.5	BSF-M-A-1A-6.0	BSF-M-A-1A-7.5
8.5		15	16	18
	Tool	BSF-B-0850/040-8.5	BSF-B-0850/040-9.5	BSF-B-0850/040-8.5
	Blade	BSF-M-B-1A-6.5	BSF-M-B-1A-6.5	BSF-M-B-1A-9.5
10.5		18	20	24
	Tool	BSF-D-1050/050-11.0	BSF-D-1050/050-13.0	BSF-D-1050/050-12.0
	Blade	BSF-M-D-1A-7.0	BSF-M-D-1A-7.0	BSF-M-D-1A-12.0
13.0		20	24	26
	Tool	BSF-E-1300/050-15.0	BSF-E-1300/050-14.0	BSF-E-1300/050-16.0
	Blade	BSF-M-E-1A-5.0	BSF-M-E-1A-10.0	BSF-M-E-1A-10.0
17.0		26	30	33
	Tool	BSF-F-1700/070-20.5	BSF-F-1700/070-21.0	BSF-F-1700/070-20.5
	Blade	BSF-M-F-1A-5.5	BSF-M-F-1A-9.0	BSF-M-F-1A-12.5
21.0		33	36	40
	Tool	BSF-G-2100/070-27.0	BSF-G-2100/070-25.5	BSF-G-2100/070-25.0
	Blade	BSF-M-G-1A-6.0	BSF-M-G-1A-10.5	BSF-M-G-1A-15.0

Machine Parameters - Minimum Requirements

Machine	Tool holder with internal cooling
	Clamping system Weldon without extra sealing option possible
	Activation speed to swing out the blade: up to 5000 rev./min.
	The activation speed depends on bore diameter and counterbore ratio. Please refer to page 38 for accurate indications.
Coolant system	Internal coolant through spindle center, minimum 20 bar
	Activation pressure: 20-50 bar
	Working pressure: 20-40 bar
	Attention: When machining soft materials, reduce internal coolant pressure!
	Coolant programmable (on/off)
Clamping workpiece	Coolant must be filtered (filter dimension $\leq 25 \mu\text{m}$)
	Coolant emulsion or equivalent coolant
	The BSF tool is a pull operating tool. Make sure that there is enough space behind the workpiece for the chips. When machining long chipping materials, program the feed cycle so that you get short chips. The removal of the chips is supported by the coolant flushing.
Clamping system	When using tools with a cylindrical shank, a clamping collet seal is compulsory.

Cutting Data

Material Application	Vc (m/min)	Feed F (mm/rev)						
		Series and bore diameter						
		A 6.50 - 7.00	B 7.50 - 8.50	C 9.00 - 10.00	D 10.50 - 11.50	E 12.00 - 14.00	F 14.50 - 17.00	G 17.50 - 21.00
Carbon steel < 700 N/mm ²	40-80	0.01-0.02	0.01-0.03	0.02-0.04	0.03-0.06	0.03-0.08	0.03-0.08	0.03-0.08
Carbon steel > 700 N/mm ²	30-70	0.01-0.02	0.01-0.03	0.02-0.03	0.02-0.05	0.03-0.06	0.03-0.06	0.03-0.08
Alloy steel < 800 N/mm ²	30-60	0.01-0.02	0.01-0.03	0.02-0.04	0.03-0.06	0.03-0.08	0.03-0.08	0.03-0.08
Alloy steel > 800 N/mm ²	20-50	0.005-0.01	0.01-0.02	0.02-0.03	0.02-0.05	0.03-0.05	0.03-0.05	0.03-0.06
Tool steel < 1000 N/mm ²	20-40	0.01-0.02	0.01-0.03	0.02-0.04	0.03-0.06	0.03-0.08	0.03-0.08	0.03-0.08
Tool steel > 1000 N/mm ²	10-30	0.005-0.01	0.01-0.02	0.02-0.03	0.02-0.04	0.03-0.05	0.03-0.05	0.03-0.06
Stainless steel < 700 N/mm ²	20-30	0.01-0.02	0.01-0.03	0.02-0.04	0.03-0.06	0.03-0.05	0.03-0.05	0.03-0.06
Stainless steel > 700 N/mm ²	15-20	0.005-0.01	0.01-0.02	0.02-0.03	0.02-0.04	0.03-0.05	0.03-0.05	0.03-0.06
Grey cast	20-40	0.005-0.01	0.01-0.02	0.02-0.03	0.02-0.05	0.03-0.05	0.03-0.06	0.05-0.08
Aluminium	60-120	0.02-0.03	0.02-0.04	0.02-0.05	0.02-0.08	0.05-0.1	0.05-0.1	0.05-0.12
special alloy material	10-20	0.005-0.01	0.01-0.02	0.01-0.02	0.02-0.04	0.02-0.05	0.02-0.05	0.03-0.06

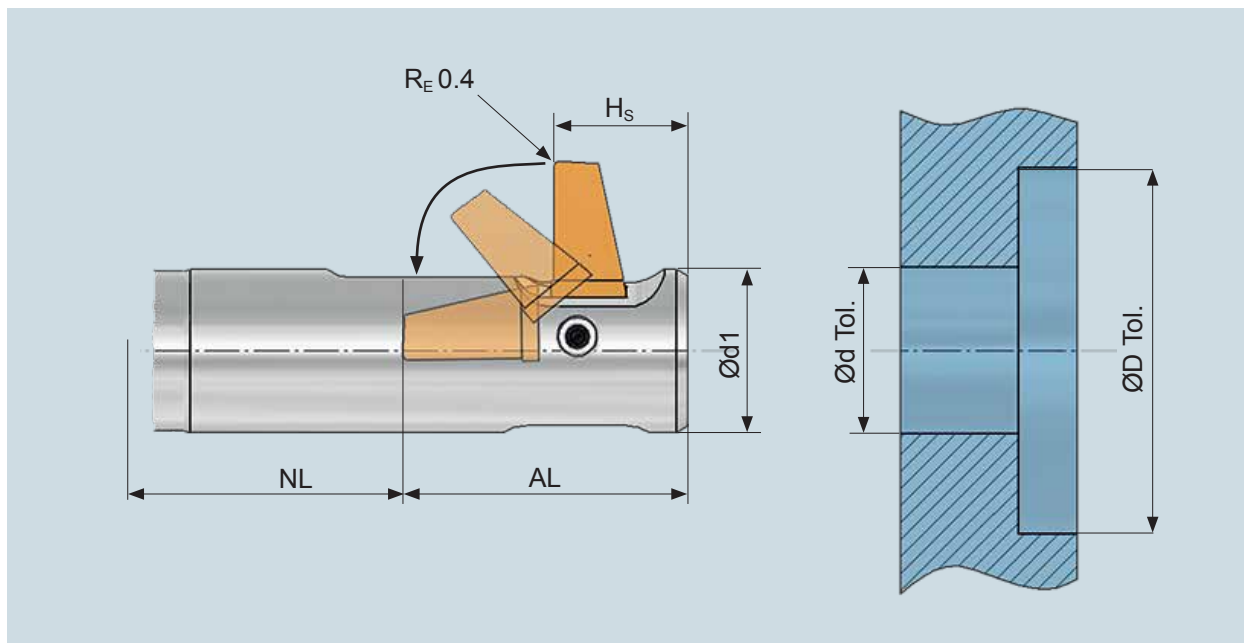
Note:

- Cutting data depend on the degree of unevenness of the bore edge (i.e. large unevenness ► low cutting value). Feed depends on bore-counterbore-ratio.
- For uneven bore edges, generally apply cutting speeds at the lower end of the range.
- All listed cutting data are standard values only!

Activation speed

The activation speed (rev./min.) to be set to swing out the blade depends on the bore diameter and the counterbore ratio (counterbore diameter : bore diameter).

Counterbore ratio	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3
Bore-Ø 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



Caption

Ød Tol.	Tolerance Bore diameter	+0.1 0	+0.2 0
ØD Tol.	Tolerance Counterbore diameter	±0.2	±0.3
Ød1	Tool diameter		

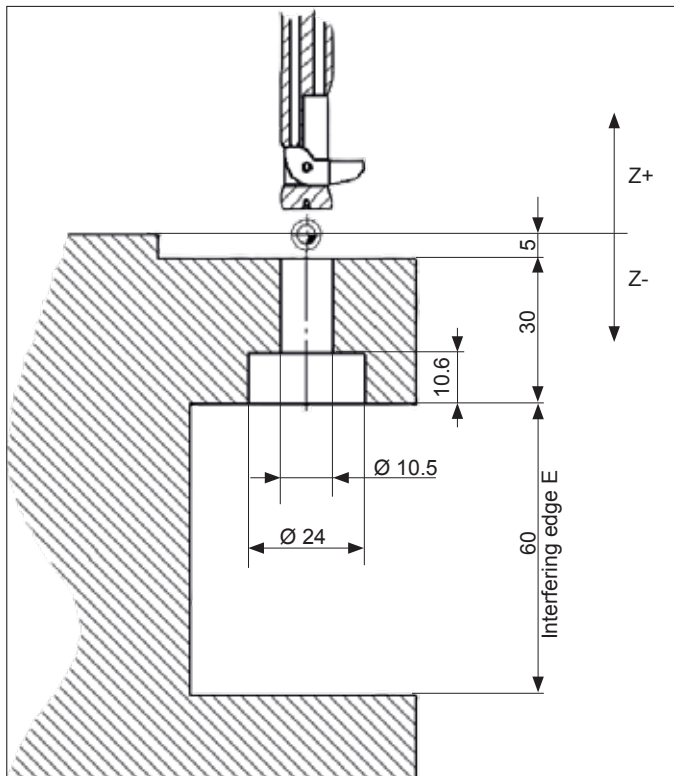
R_E Edge radius standard 0.4 mm

NL	Working length (see drawings from page 7 on)
AL	Swing length (see tables from page 7 on)
H_s	Blade height (see tables from page 7 on)

Note:

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

Furthermore, mind the tool collision diameter (counterbore diameter + 2 mm) when you move the tool to the tool storage. Reason: The blade can fold out of the blade housing by its own weight.



Application example

Counterbore M10 for Socket Head Cap Screw with internal hexagonal recess DIN 974-1.

Dimension according to drawing

Bore diameter d	10.5 mm
Counterbore diameter D	24.0 mm
Working length	approx. 30 mm
Counterbore depth	10.6 mm
Interfering edge E	60.0 mm
Material	Steel C45

1. Tool selection and series selection

Tool selection by bore diameter and counterbore diameter (see page 12)

Tool: Bore diameter 10.5 mm
Counterbore diameter 24.0 mm
Result series D / 50 mm

Solution: BSF-D-1050/050-12.0

2. Blade selection

Blade selection by series (see page 12)

Blade: Series D (Bore diameter 10.5 mm)
Material steel C45: Carbide = 1
Coating A

Solution: BSF-M-D-1A-12.0

FANUC control

Workpiece carbon steel C45

Cutting data (see page 37)

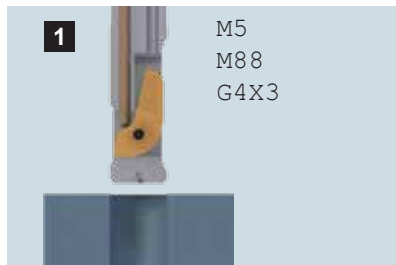
$V_c = 30 \text{ m/min.} \rightarrow S = 400 \text{ rev./min.}$

$F = 0.05 \text{ mm/rev.}$

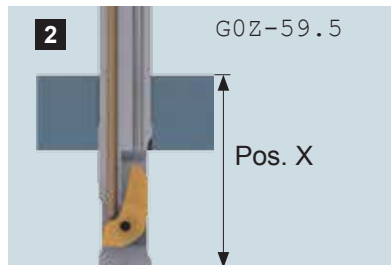
Activation speed (see page 38)

Counterbore ratio = $24.0 : 10.5 = 2.28$

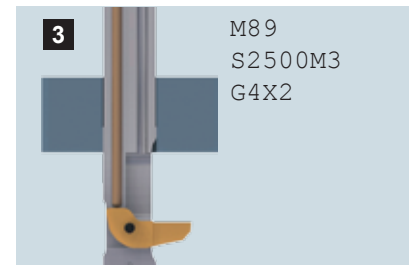
\rightarrow Activation speed = 2500 rev./min.



Position the tool above the top material surface, spindle stop, internal coolant ON, 2-5 sec. dwell time (depending on the pump), the blade retracts.



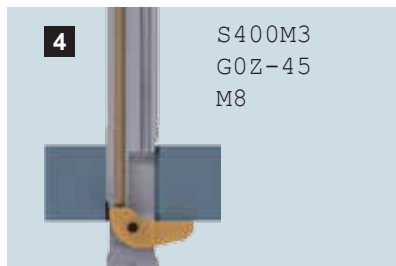
Traverse in rapid feed to position X.
(Position X = $5 \text{ mm} + 30 \text{ mm} + \text{swing length}^1 22.5 \text{ mm} + \text{safety distance } 2.0 \text{ mm}$)



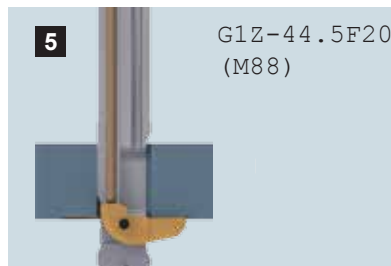
Switch OFF internal coolant, start activation speed², 1-2 sec. dwell time (attention to coolant pressure), blade swings out into the working position, Recommended internal coolant pressure: 20-50 bar

¹⁾ values for swing length (AL) see page 7 onwards

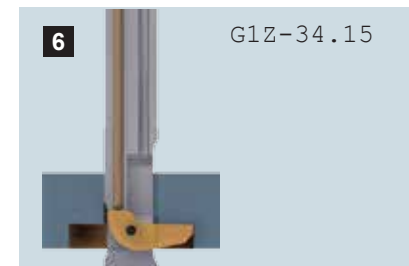
²⁾ Values for activation speed see page 38



Travel the tool in rapid feed with working speed³ until 0.25 mm below the rear material surface (attention burr size, part tolerances). External coolant on.

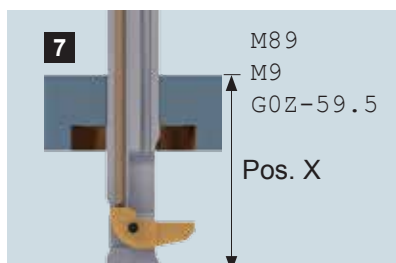


Start machining in working feed. When full cut is reached (0.25 mm deep) internal coolant ON especially when working with deeper counterbores. Attention to internal coolant pressure particularly when machining soft materials!

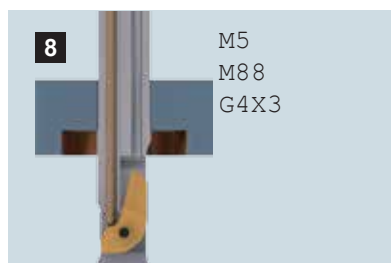


Continue machining to desired counterbore depth. Cutting free without internal coolant.

³⁾ Cutting values see page 37



When the counterbore depth is reached, switch OFF internal coolant, in rapid feed back to position X.

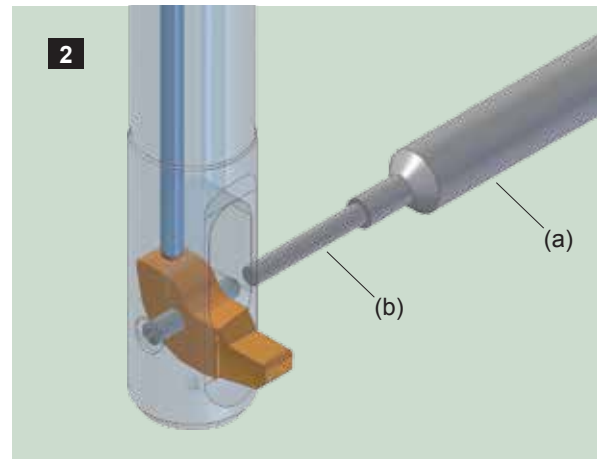
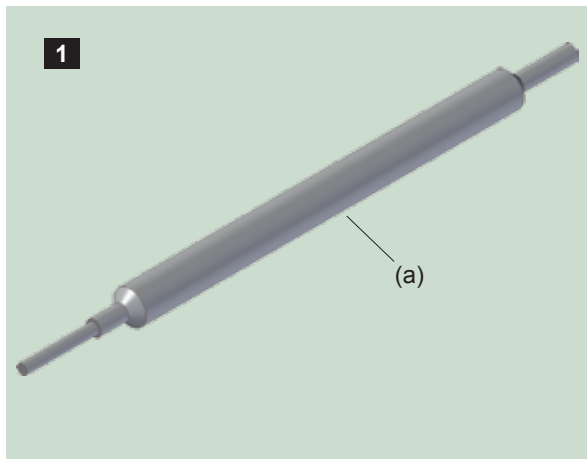


Spindle stop, internal coolant ON, 2-5 sec. dwell time (attention coolant pressure), blade retracts. Recommended internal coolant pressure: 20-50 bar

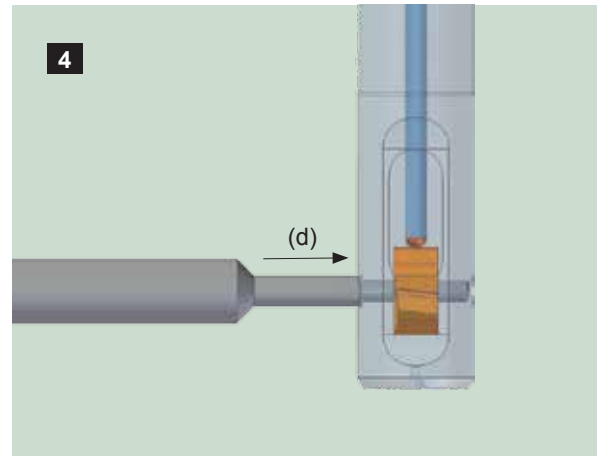
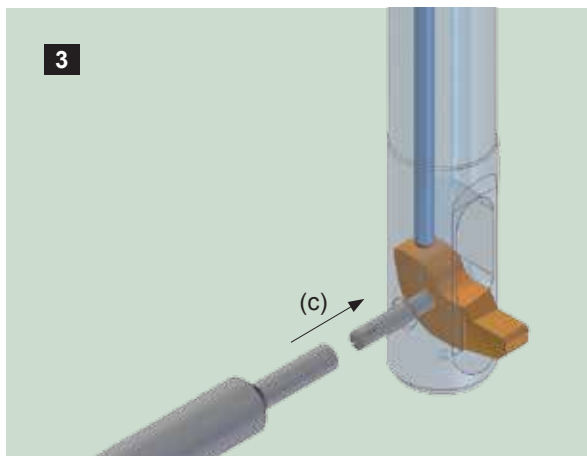


Now, move out of the workpiece in rapid speed.

Dismantling



Assembling



Dismantling

We supply an assembly pin (a) for the BSF blade change. Use the stepped end (b) of the assembly pin and position the assembly pin with the slot free end onto the split pin. Press the assembly pin in until the split pin falls out and the blade is free.

Assembling

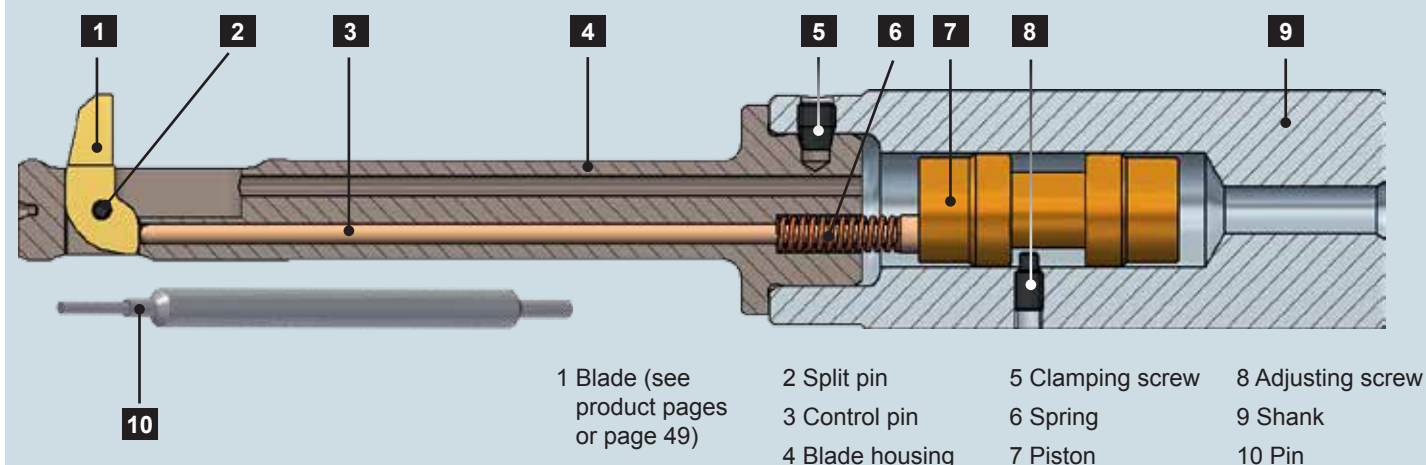
Insert the blade. Then insert the split pin with the flat end of the assembly pin first and position the blade (c). Push the split pin with the non-stepped end of the assembly pin until it is flush with the blade housing (d). Blade is fixed in place.

Note:

The blade must move freely by its own weight. If it is not, dismantle the blade and repeat the steps listed above. The blade and blade housing must be checked for soiling.

After an extended storage time it is recommended to check that the blade moves out freely. Dried oil, coolant or dust may cause the blade to stick.

Every time the blade is changed **the split pin must be replaced** (pin is included in blade shipment). Using a split pin several times may cause blade fixing problems.



Tool Art. Nbr.	Pos. 2	Pos. 3	Pos. 4	Pos. 5	Pos. 6	Pos. 7	Pos. 8	Pos. 9	Pos. 10	Key to Pos. 5
BSF-A-0650/040-6.5	BSF-E-0009	BSF-B-0001	BSF-N-A-0650/N025/040	GH-H-S-0201	GH-H-F-0052	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0009	GH-H-S-2023
BSF-A-0650/040-7.0	BSF-E-0009	BSF-B-0001	BSF-N-A-0650/0000/040	GH-H-S-0201	GH-H-F-0052	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0009	GH-H-S-2023
BSF-A-0650/040-7.5	BSF-E-0009	BSF-B-0001	BSF-N-A-0650/P025/040	GH-H-S-0201	GH-H-F-0052	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0009	GH-H-S-2023
BSF-A-0700/040-7.0	BSF-E-0009	BSF-B-0002	BSF-N-A-0700/0000/040	GH-H-S-0201	GH-H-F-0052	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0009	GH-H-S-2023
BSF-A-0700/040-7.5	BSF-E-0009	BSF-B-0002	BSF-N-A-0700/P025/040	GH-H-S-0201	GH-H-F-0052	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0009	GH-H-S-2023
BSF-A-0700/040-8.0	BSF-E-0009	BSF-B-0002	BSF-N-A-0700/P050/040	GH-H-S-0201	GH-H-F-0052	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0009	GH-H-S-2023
BSF-B-0750/040-7.5	BSF-E-0018	BSF-B-0003	BSF-N-B-0750/N025/040	GH-H-S-0201	GH-H-F-0052	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0009	GH-H-S-2023
BSF-B-0750/040-8.0	BSF-E-0018	BSF-B-0003	BSF-N-B-0750/0000/040	GH-H-S-0201	GH-H-F-0052	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0009	GH-H-S-2023
BSF-B-0750/040-8.5	BSF-E-0018	BSF-B-0003	BSF-N-B-0750/P025/040	GH-H-S-0201	GH-H-F-0052	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0009	GH-H-S-2023
BSF-B-0800/040-8.0	BSF-E-0018	BSF-B-0003	BSF-N-B-0800/0000/040	GH-H-S-0201	GH-H-F-0052	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0009	GH-H-S-2023
BSF-B-0800/040-8.5	BSF-E-0018	BSF-B-0003	BSF-N-B-0800/P025/040	GH-H-S-0201	GH-H-F-0052	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0009	GH-H-S-2023
BSF-B-0800/040-9.0	BSF-E-0018	BSF-B-0003	BSF-N-B-0800/P050/040	GH-H-S-0201	GH-H-F-0052	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0009	GH-H-S-2023
BSF-B-0850/040-8.5	BSF-E-0018	BSF-B-0004	BSF-N-B-0850/P025/040	GH-H-S-0201	GH-H-F-0052	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0009	GH-H-S-2023
BSF-B-0850/040-9.0	BSF-E-0018	BSF-B-0004	BSF-N-B-0850/P050/040	GH-H-S-0201	GH-H-F-0052	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0009	GH-H-S-2023
BSF-B-0850/040-9.5	BSF-E-0018	BSF-B-0004	BSF-N-B-0850/P075/040	GH-H-S-0201	GH-H-F-0052	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0009	GH-H-S-2023
BSF-C-0900/050-9.5	BSF-E-0010	BSF-B-0005	BSF-N-C-0900/N025/050	GH-H-S-0201	GH-H-F-0053	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0006	GH-H-S-2023
BSF-C-0900/050-10.0	BSF-E-0010	BSF-B-0005	BSF-N-C-0900/0000/050	GH-H-S-0201	GH-H-F-0053	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0006	GH-H-S-2023
BSF-C-0900/050-10.5	BSF-E-0010	BSF-B-0005	BSF-N-C-0900/P025/050	GH-H-S-0201	GH-H-F-0053	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0006	GH-H-S-2023
BSF-C-0950/050-10.0	BSF-E-0010	BSF-B-0005	BSF-N-C-0950/0000/050	GH-H-S-0201	GH-H-F-0053	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0006	GH-H-S-2023
BSF-C-0950/050-10.5	BSF-E-0010	BSF-B-0005	BSF-N-C-0950/P025/050	GH-H-S-0201	GH-H-F-0053	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0006	GH-H-S-2023
BSF-C-0950/050-11.0	BSF-E-0010	BSF-B-0005	BSF-N-C-0950/P050/050	GH-H-S-0201	GH-H-F-0053	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0006	GH-H-S-2023
BSF-C-1000/050-10.5	BSF-E-0010	BSF-B-0005	BSF-N-C-1000/P025/050	GH-H-S-0201	GH-H-F-0053	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0006	GH-H-S-2023
BSF-C-1000/050-11.0	BSF-E-0010	BSF-B-0005	BSF-N-C-1000/P050/050	GH-H-S-0201	GH-H-F-0053	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0006	GH-H-S-2023
BSF-C-1000/050-11.5	BSF-E-0010	BSF-B-0005	BSF-N-C-1000/P075/050	GH-H-S-0201	GH-H-F-0053	BSF-E-0014	GH-H-S-0302	BSF-S-0003	BSF-V-0006	GH-H-S-2023

Spare Parts

[illegible]

Spare Parts

[illegible]

Spare Parts

[illegible]

Spare Parts

[illegible]

Spare Parts

Tool Art. Nbr.	Pos. 2	Pos. 3	Pos. 4	Pos. 5	Pos. 6	Pos. 7	Pos. 8	Pos. 9	Pos. 10	Key to Pos. 5
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-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
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-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
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-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
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-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
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-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
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-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
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-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
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-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
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-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
BSF-G-2050/070-23.0	BSF-E-0013	BSF-B-0012	BSF-N-G-2050/P050/070	GH-H-S-0202	GH-H-F-0051	BSF-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
BSF-G-2050/070-23.5	BSF-E-0013	BSF-B-0012	BSF-N-G-2050/P075/070	GH-H-S-0202	GH-H-F-0051	BSF-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
BSF-G-2050/070-24.0	BSF-E-0013	BSF-B-0012	BSF-N-G-2050/P100/070	GH-H-S-0202	GH-H-F-0051	BSF-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
BSF-G-2050/070-24.5	BSF-E-0013	BSF-B-0012	BSF-N-G-2050/P125/070	GH-H-S-0202	GH-H-F-0051	BSF-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
BSF-G-2050/070-25.0	BSF-E-0013	BSF-B-0012	BSF-N-G-2050/P150/070	GH-H-S-0202	GH-H-F-0051	BSF-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
BSF-G-2050/070-25.5	BSF-E-0013	BSF-B-0012	BSF-N-G-2050/P175/070	GH-H-S-0202	GH-H-F-0051	BSF-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
BSF-G-2050/070-26.0	BSF-E-0013	BSF-B-0012	BSF-N-G-2050/P200/070	GH-H-S-0202	GH-H-F-0051	BSF-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
BSF-G-2050/070-26.5	BSF-E-0013	BSF-B-0012	BSF-N-G-2050/P225/070	GH-H-S-0202	GH-H-F-0051	BSF-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
BSF-G-2050/070-27.0	BSF-E-0013	BSF-B-0012	BSF-N-G-2050/P250/070	GH-H-S-0202	GH-H-F-0051	BSF-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
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-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
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-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
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-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
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-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
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-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
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-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
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-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
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-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100
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-E-0014	GH-H-S-0302	BSF-S-0004	BSF-V-0008	GH-H-S-2100

Recommendation:

Selecting the right tool or component is easy using the **BSF TOOL SELECTOR** on www.heule.com.



Blade Art. Nbr.	Length L	Width B	Height H
BSF-M-A-1A-3.0	7.70	2.00	4.50
BSF-M-A-1A-4.5	8.40	2.00	4.50
BSF-M-A-1A-6.0	9.20	2.00	4.50
BSF-M-A-1A-7.5	9.90	2.00	4.50
BSF-M-A-1A-9.0	10.70	2.00	4.50
BSF-M-B-1A-3.5	8.90	2.50	5.50
BSF-M-B-1A-5.0	9.60	2.50	5.50
BSF-M-B-1A-6.5	10.40	2.50	5.50
BSF-M-B-1A-8.0	11.10	2.50	5.50
BSF-M-B-1A-9.5	11.90	2.50	5.50
BSF-M-B-1A-11.0	12.70	2.50	5.50
BSF-M-C-1A-4.0	10.80	3.00	6.50
BSF-M-C-1A-5.5	11.60	3.00	6.50
BSF-M-C-1A-7.0	12.30	3.00	6.50
BSF-M-C-1A-8.5	13.10	3.00	6.50
BSF-M-C-1A-10.0	13.80	3.00	6.50
BSF-M-C-1A-11.5	14.60	3.00	6.50
BSF-M-C-1A-13.0	15.30	3.00	6.50
BSF-M-D-1A-4.5	12.50	3.50	7.25
BSF-M-D-1A-7.0	13.80	3.50	7.25
BSF-M-D-1A-9.5	15.00	3.50	7.25
BSF-M-D-1A-12.0	16.30	3.50	7.25
BSF-M-D-1A-14.5	17.50	3.50	7.25
BSF-M-E-1A-5.0	14.30	4.50	8.50
BSF-M-E-1A-7.5	15.50	4.50	8.50
BSF-M-E-1A-10.0	16.80	4.50	8.50
BSF-M-E-1A-12.5	18.10	4.50	8.50
BSF-M-E-1A-15.0	19.30	4.50	8.50
BSF-M-E-1A-17.5	20.60	4.50	8.50
BSF-M-F-1A-5.5	17.20	5.00	10.00
BSF-M-F-1A-9.0	19.00	5.00	10.00
BSF-M-F-1A-12.5	20.80	5.00	10.00
BSF-M-F-1A-16.0	22.60	5.00	10.00
BSF-M-F-1A-19.5	24.30	5.00	10.00
BSF-M-G-1A-6.0	20.80	6.00	12.00
BSF-M-G-1A-10.5	23.10	6.00	12.00
BSF-M-G-1A-15.0	25.40	6.00	12.00
BSF-M-G-1A-19.5	27.70	6.00	12.00
BSF-M-G-1A-24.0	29.90	6.00	12.00

The blade swings out on its own after the spindle stops (vertical position), is that normal?

Yes. The BSF is designed so the blade swings out automatically since it is not fixed when the internal coolant pressure is off. Nevertheless, it is compulsory to set the recommended activation speed for machining.

After running the machine, a counterbore is missing.

Has the correct correct activation speed been programmed? Please check if the blade is sticking in the blade housing. If it is, dismount the blade and clean the window of the blade housing and the blade itself.

Does it matter which side you mount the split in?

No.

There is a bore hole tolerance of H7. Does the BSF tool damage the bore?

Yes, it is a single blade tool. We recommend to counterbore on a smaller bore diameter (semi-finished bore) and to open the bore to the correct diameter after the counterbore operation.

Is it possible to hold the BSF tool in a shrink system?

No. Shank and other BSF items are manufactured out of tool steel. These parts have other shrinking parameters than carbide which is the common material (shank) for shrink systems!

The blade housing is fixed with 3 clamping screws. Is there a recommended fixing procedure?

No. The blade housing can be set in any position.

Is filtering of the coolant absolutely necessary?

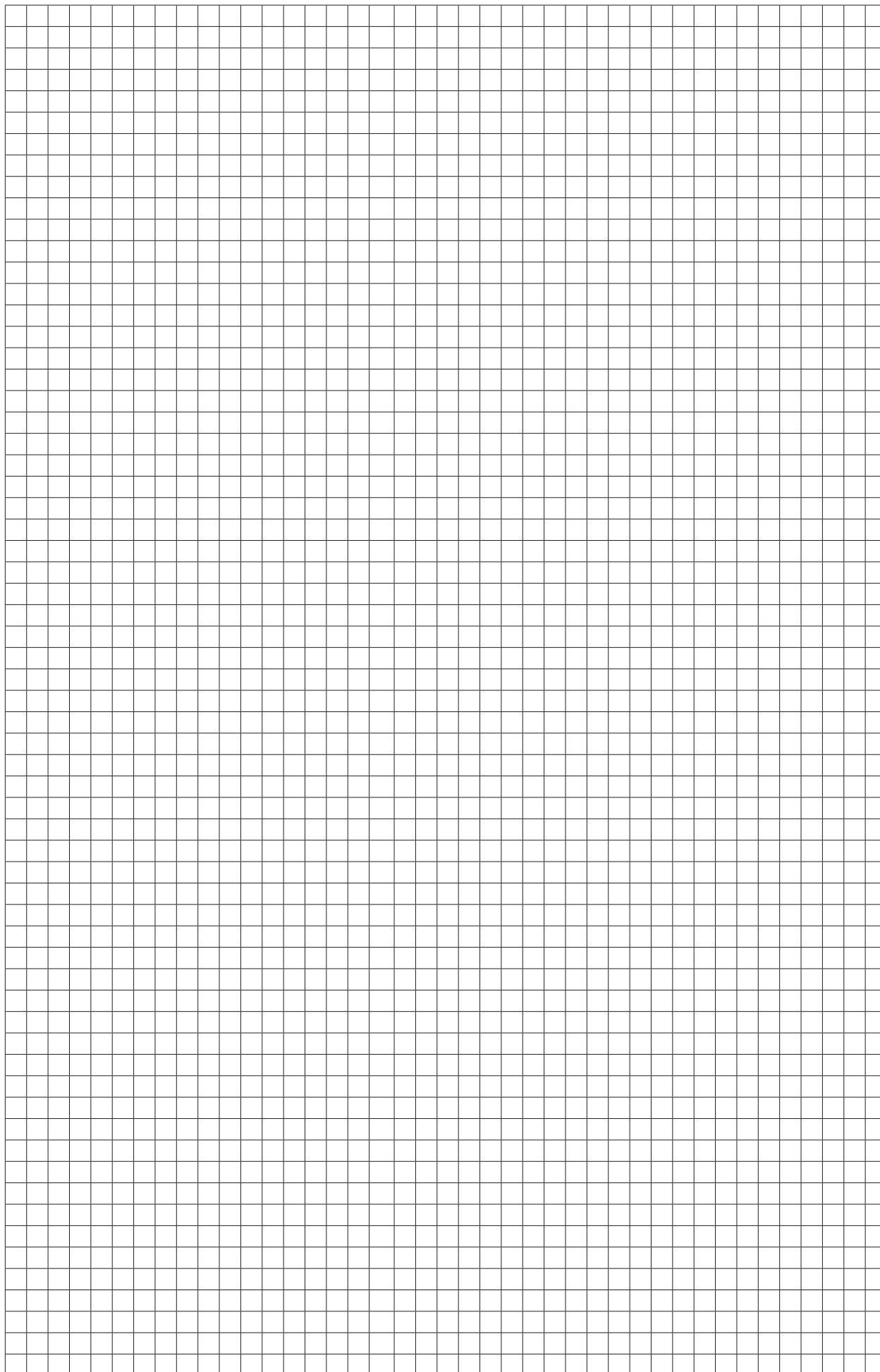
Yes. The cooling agent has to be filtered by a 25my filter.

Does the tool work with a coolant pressure of under 20 bar?

It may be possible but every application has to be verified individually.

Is it possible to run the internal coolant while machining?

Yes, but only when the blade is full cutting mode.



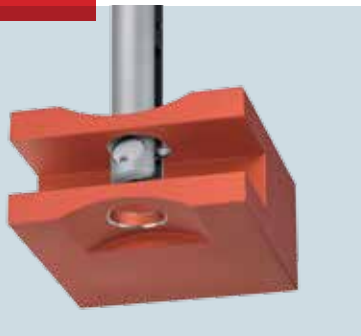


One Operation.

HEULE tools for front and back machining of bore edges in one single pass.

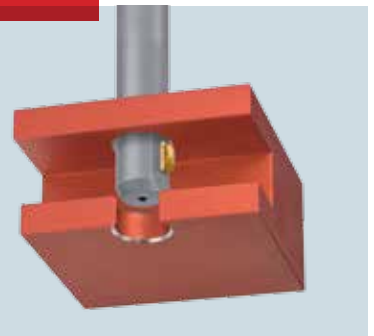
Deburring

- COFA
- SNAP



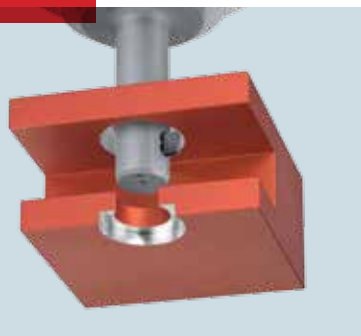
Chamfering

- SNAP
- GH-S
- DEFA



Countersinking

- BSF
- SOLO
- GH-Z/E



Drilling

- VEX-P
- VEX-S



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