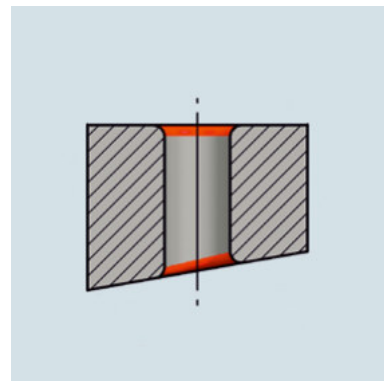
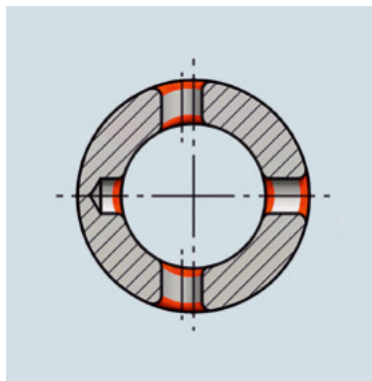
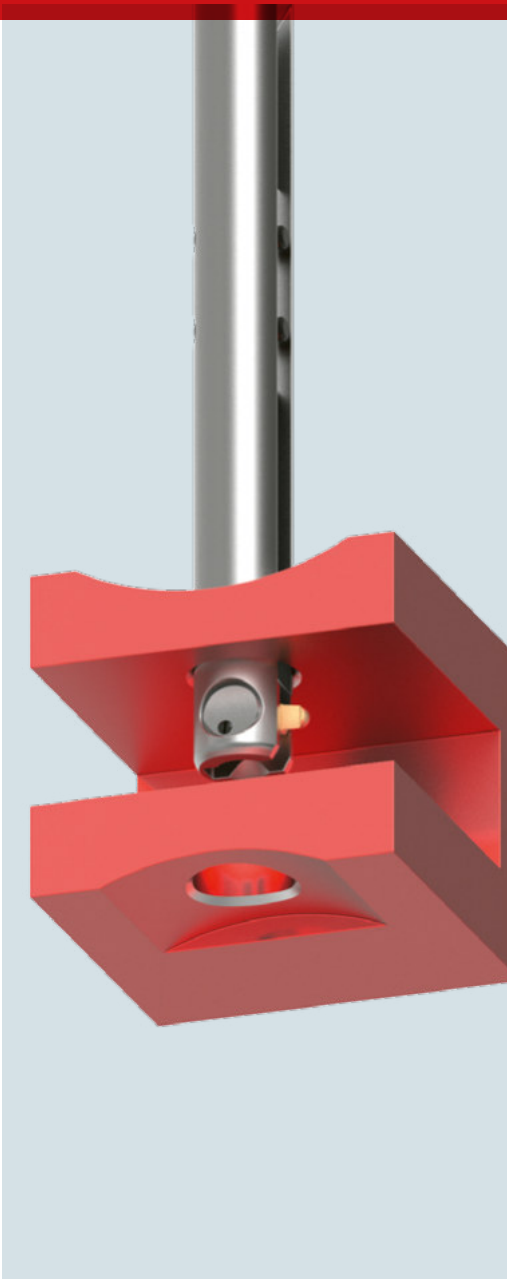


## COFA

Consistent deburring of even and uneven bore edges, front and back in one operation.





## Online Information

[www.heule.com/en/deburring/cofa](http://www.heule.com/en/deburring/cofa)



# COFA

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# COFA – The Universal Deburring Tool

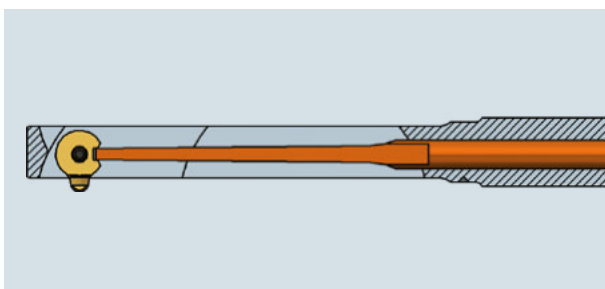
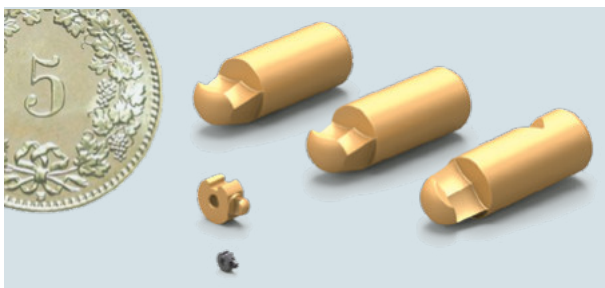
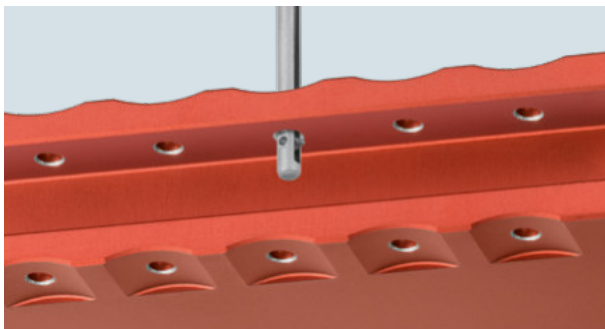


**Consistent front and back deburring of even and uneven bore edges, in ONE OPERATION**

COFA is the first and unrivaled tool system that removes burrs on the front and back of a drilled through-hole on even and uneven surfaces in a single cycle. It radially removes the burrs off the bore edges, without requiring the workpiece to be turned or the spindle stopped.

It is built for high volume production in CNC machines but can also be used for manual operation. The proven advanced system assures high efficiency and the required process capability.

## Characteristics and Advantages



- The COFA standard tool series ranges from bore diameter 2.0 mm up to 26.0 mm. The cassette system is designed for bore diameters larger than 26.0 mm.
- As the developer and manufacturer of this tool system, HEULE is able to provide also tailor-made solutions for specific applications.
- The exchangeable carbide blades are carried out with material dependent coatings.
- Tool types C6 up to C12 allow up to three different deburring capacities without changing the tool due to the exchangeable blade sizes.
- Combining the simple functioning principle with the robust construction method guarantees a safe and reliable process.
- Another important advantage of this function principle is the strict absence of secondary burrs.

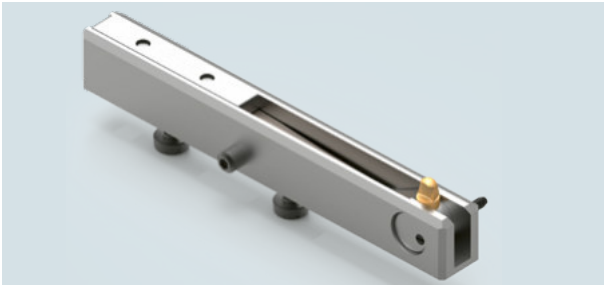


- In order to achieve a high process capability, important components such as a blade holder and tool body have been designed for maximum life and stable cycle times.



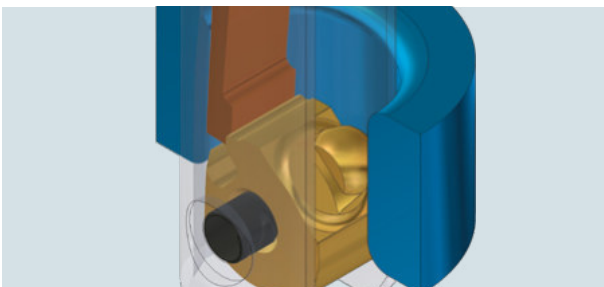
- The COFA system guarantees a consistent, radially shaped deburring of even and uneven bore edges.

- No matter what the thickness of the workpiece is, the deburring capacity always remains the same.

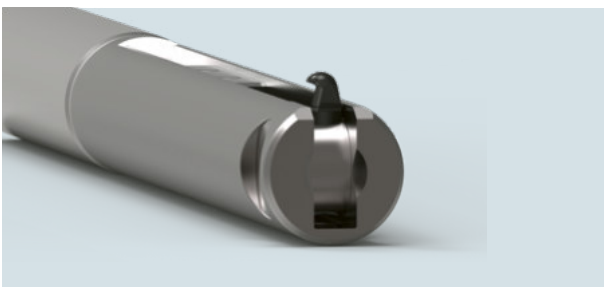


- The cassette solution integrates the deburring process into an existing customer tool. By combining two or several processes in one single tool, the cycle time can be reduced considerably.

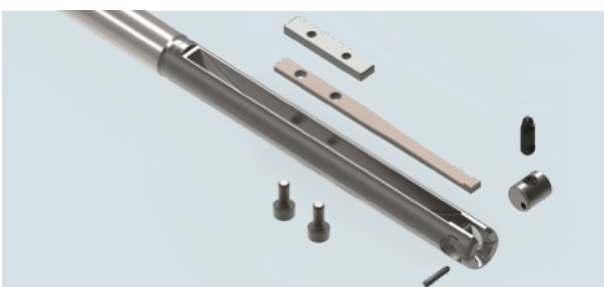
- The cassette expands the maximum diameter of still machinable bore edges without limits.



- The ball shape of the blade protects the bore surface from damage when traversing the bore.
- The tolerance and the roughness of reamed bores remain unchanged.



- The thread tool series has been optimized for easy center positioning of the screws.



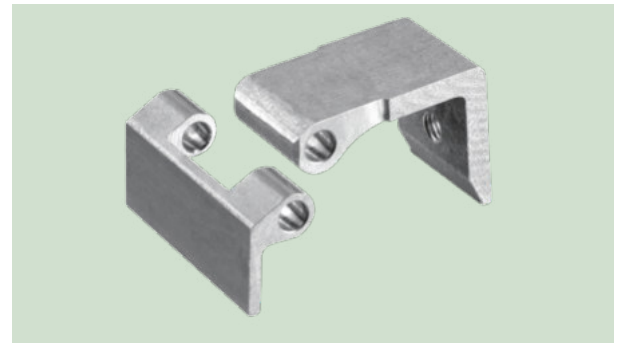
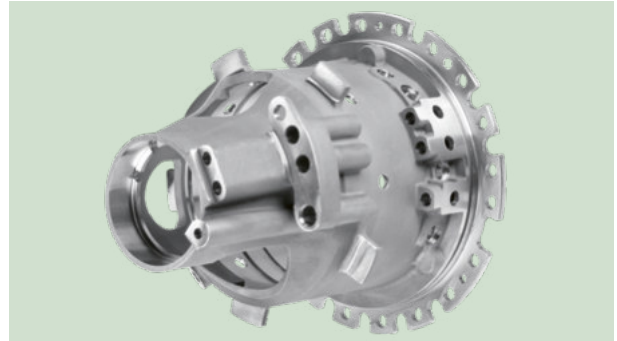
- The simple tool design allows fast and safe maintenance.

COFA has been specifically designed for front and back deburring on even and uneven bore edges, in one single pass. It radially removes the burrs off the bore edges. Independent of the Z-position of the workpiece, the deburring capacity of the tool does not vary.

The tool concept is suitable for soft as well as difficult to machine materials. This is done

without the need for preadjustments. The blades are made out of coated carbide and guarantee a long tool life. They are exchangeable according to the required deburring capacity.

Typical applications are forks, common rails, castings, tubes with cross bores and other workpieces with cross bores in main bores.



## Tool Description

The COFA tool family consists of three different groups of tool types. It starts with COFA C2 and C3, followed by COFA 4M and 5M in the intermediate segment and COFA C6, C8 and C12 representing the upper end of the range. The illustration COFA C2 shows the real dimensions of the tool.

The concepts differ because of the different tool dimensions. Whereas the blade and the blade holder form a unit in COFA C2/C3 and 4M/5M which is held in the tool body by a rollpin, it has been split into two separate components in C6 to C12.

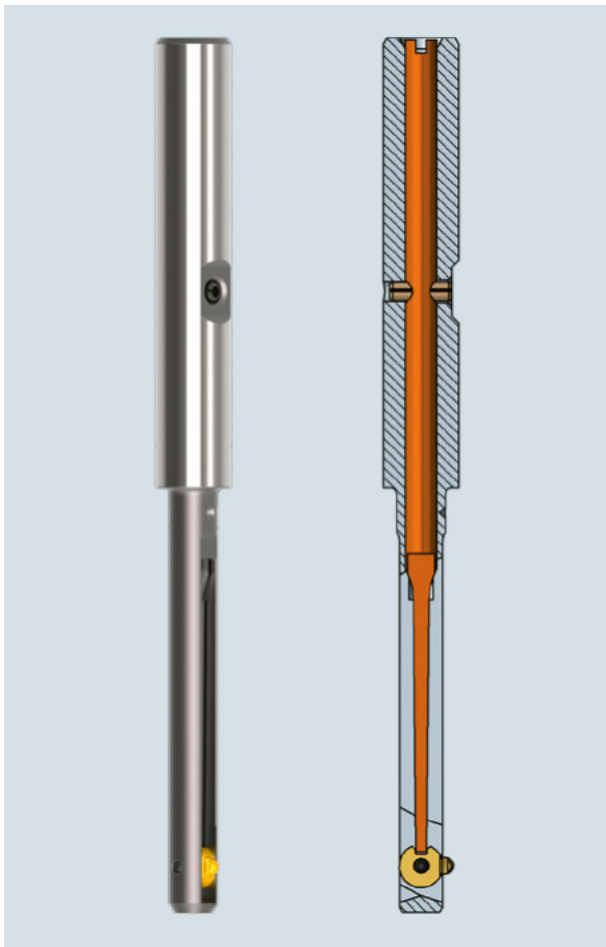


Image: COFA 4M

The design principle of the single-piece blade has been in use successfully for decades. The *New Generation* design of the larger tools consists of an independent blade that is fit into a more rigidly guided blade holder. This increases the already long tool life as well as the process capability.

The blade itself needs less material and can be exchanged fast and easily. The different blade sizes available for the same tool allow to apply different deburring capacities.

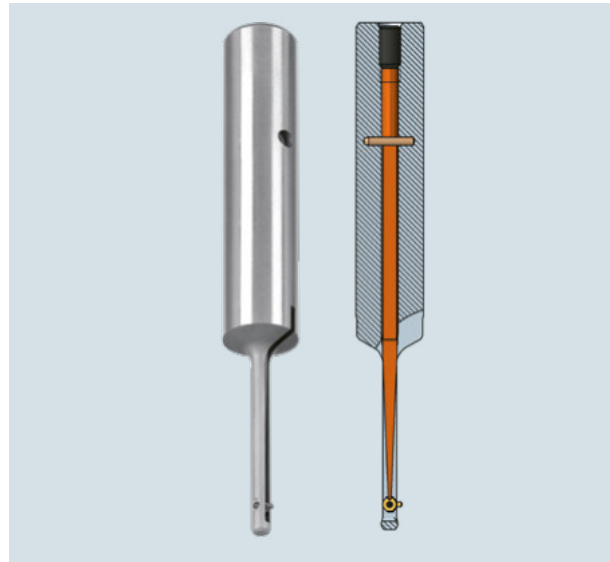


Image: COFA C2

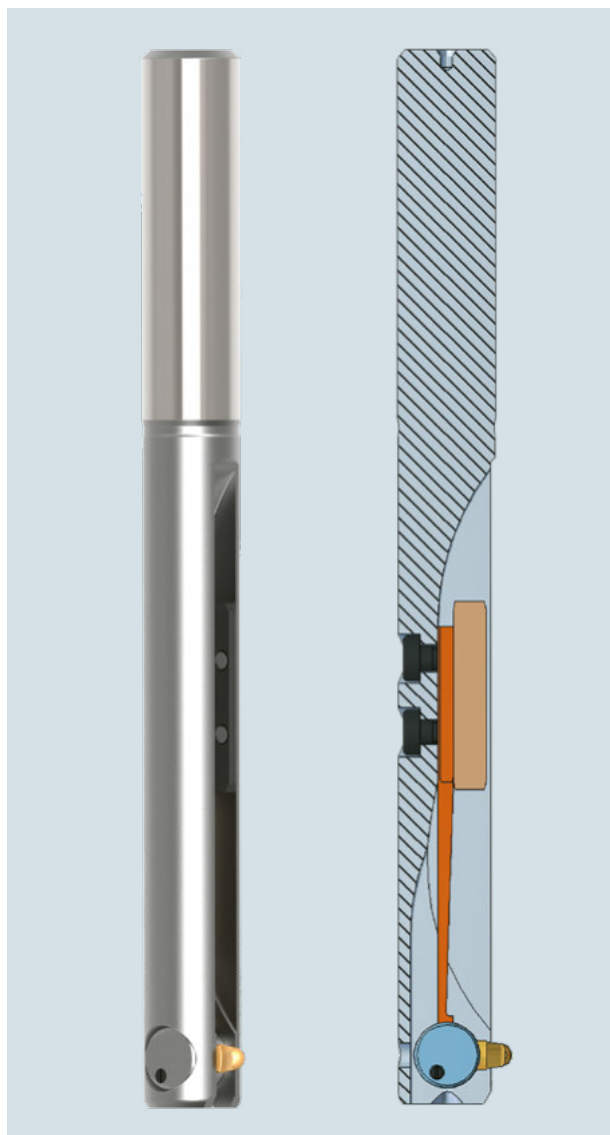
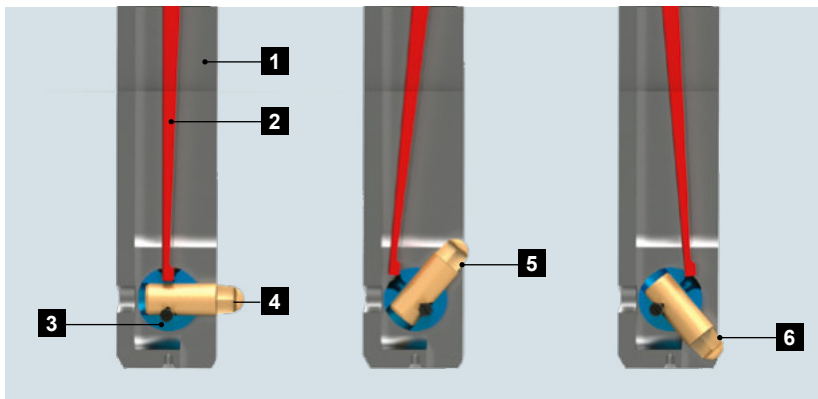


Image: COFA C12

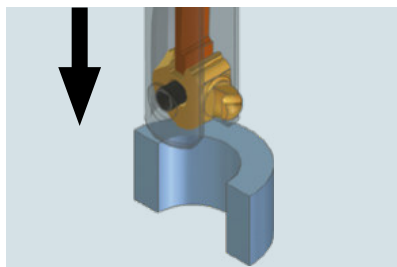
## Function Principle



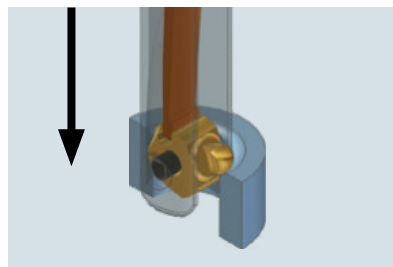
- 1** Tool body
- 2** Spring
- 3** Blade holder
- 4** Blade Type C6 - C12
- 5** Cutting edge forward
- 6** Cutting edge backward

The COFA blade is mounted spring-loaded in the tool body. In COFA C2 to 5M, the swivel movement is guided by a rollpin, whereas it is a blade holder for COFA C6 to C12 (illustrated above). This way, the cutting edge follows the uneven bore edge. The more the tool enters into the bore, the more the blade swings into the tool body. The result is a radially shaped consistent deburring of the bore edge.

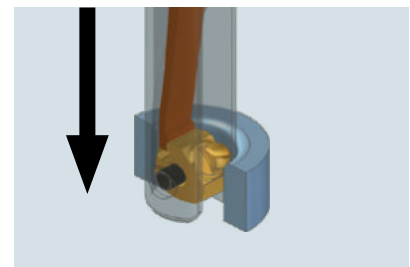
## Process Steps Description



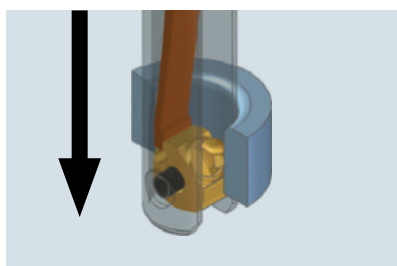
The process is very simple. First, rapid traverse of the cutting unit of the tool above the top material surface of hole or burr. Referencing the front edge of the cutting blade.



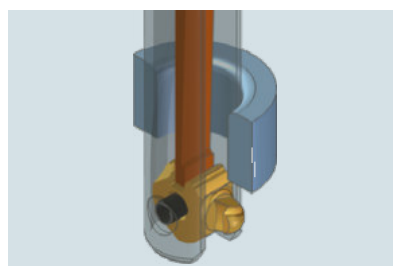
In working feed forward and working speed, the deburring of the upper bore edge is carried out.



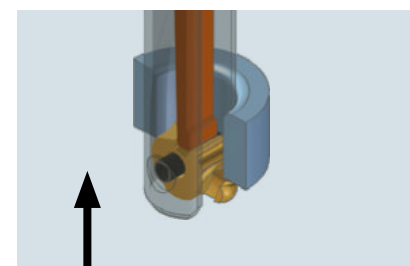
Once deburring is complete, traverse in rapid feed without stopping the spindle. Pay attention to interfering edges in the interior (i.e. cross bore, groove).



Despite of the swivel movement of the spindle, the ball shaped blade head glides softly on the surface without any damage.



As soon as the blade swings out again at the back side of the work piece, the rapid feed is stopped.



In working feed, the deburring of the back bore edge is carried out. Once finished, traverse in rapid speed and without stopping the spindle, out of the hole.



# COFA Range Summary

The product range comprises tools for the use in bore diameters ranging from 2.0 mm to 26.0 mm. In addition, using cassettes, any size of bore diameter can be deburred. The deburring capacity (radially) is 0.1 mm up to 1.4 mm maximum depending on

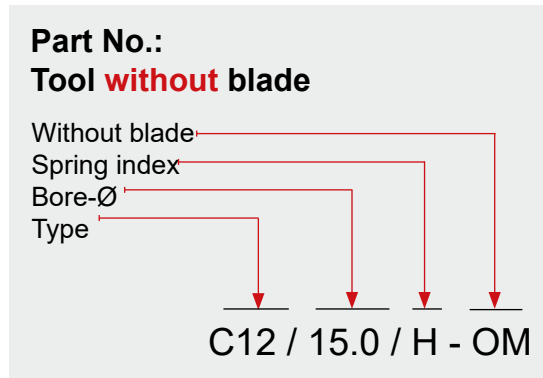
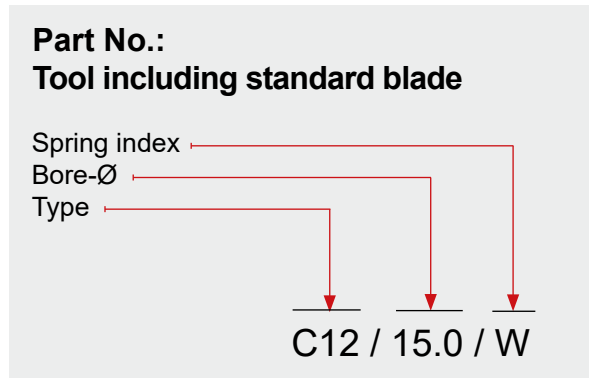
bore dimension and blade selection.

Within the tool range, there are variants of diameters that cover a minimal bore diameter range.



Bore	Max. Deburring Capacity <sup>1</sup>	Tool Series
Ø2.0 – Ø3.1 mm	0.15 mm	COFA C2
Ø3.0 – Ø4.1 mm	0.25 mm	COFA C3
Ø4.0 – Ø5.0 mm	0.25 mm	COFA 4M
Ø5.0 – Ø6.0 mm	0.35 mm	COFA 5M
Ø6.0 – Ø8.4 mm	0.70 mm	COFA C6
Ø8.0 – Ø12.4 mm	0.90 mm	COFA C8
Ø12.0 – Ø26.0 mm	1.40 mm	COFA C12
from Ø10.0 mm	0.70 mm	COFA C6 Cassette
from Ø14.0 mm	0.90 mm	COFA C8 Cassette
from Ø20.0 mm	1.40 mm	COFA C12 Cassette
Thread M8 Ø6.8 mm	8.5 mm	COFA C6/M8
Thread M10 Ø8.5 mm	10.40 mm	COFA C8/M10
Thread M12 Ø 10.2 mm	12.20 mm	COFA C8/M12
Thread M16 Ø14.0 mm	16.80 mm	COFA C12/M16
Thread M20 Ø17.5 mm	20.40 mm	COFA C12/M20

<sup>1)</sup> The deburring result differs due to material, cutting data and application. The value listed is the maximum that is theoretically achievable. The spring has to be selected accordingly.



**Tool type**

Within a tool type there are different tool sizes available. The tool types C2/C3/4M/5M have the same blade size within the own line. The types C6/C8/C12 house two blade sizes (M, L) each. The cassette tools use the standard blades. The tool series for threads however houses special blade sizes.

**Tool size**

The tool size is defined by the bore diameter. Tool diameter and deburring capacity are shown in the tables.

If a tool is used in a larger bore than indicated by the tool size, a correspondingly smaller deburred area results due to the given deburr diameter of a tool size. This is acceptable in most cases or even sometimes desirable.

**Spring index**

Depending on the material to be machined, the tools are available with different spring loads. The tools can be equipped with a different spring by a simple exchange operation.

**Clamping system**

As standard, all tools will be manufactured with a cylindrical shank. Weldon / Whistle Notch clamping systems can be produced upon request. They are not available from stock.

- HB = Weldon
- HE = Whistle Notch

Order Example:  
COFAC12/15.0/H-HB-OM

**Without special designation the tool will be supplied with the standard blade built in as defined per type series.** This is the M type blade for tool types C6 up to C12. If a special blade is needed - i.e only backward cutting - the tool has to be ordered **without** blade (add extension "OM") and order the special blade separately (see tool order example C6 to C12 on page 27).

**Coating blades**

All COFA blades are made of carbide. The three available coatings are:  
T: Steel, titanium, Inconel (standard)  
D: Aluminium alloys  
A: For increased requirements

**Order Example COFA C2/C3**

*Requirements:* Deburr bore, no defined chamfer  
Bore-Ø: 2.6 mm  
Material: Cast  
*Selection:*  
Tool: Part No. C2/2.6/H  
Deburr-Ø: 3.1 mm  
Blade: Standard Blade

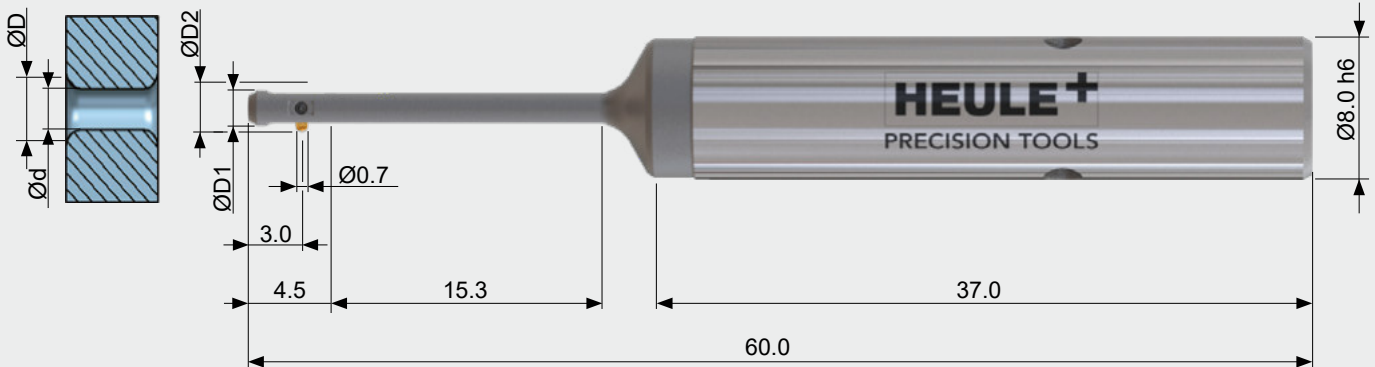
**Order Example COFA C6/C8/C12**

*Requirements:* Deburr hole, Ø9.5 mm minimum  
Bore-Ø: 8.4 mm  
Material: Titanium  
*Selection:*  
Tool: Part No. C8/8.4/Z-OM  
Spring type: Z for titanium  
Blade: Part No. C8-M-0001-T

**Recommendation**

Select the tool size so that the resulting chamfer will be **just as large as requested** and not as large as possible.

# COFA C2 Tool Ø 2.0 mm to 3.1 mm



## Tool Table

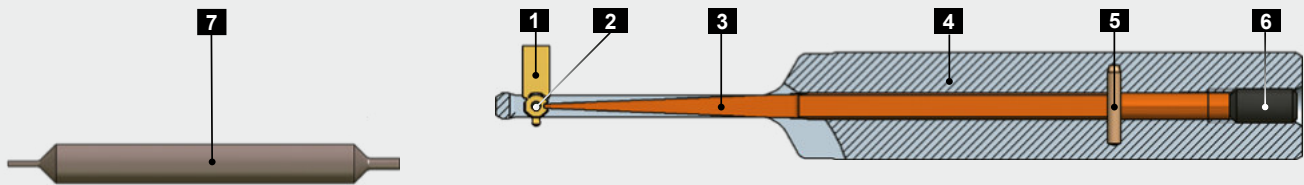
Bore-Ø d	Deburr-Ø max. <sup>1</sup> D	Tool-Ø D1	Maximum-Ø <sup>2</sup> D2	Tool with Standard Blade	
				Part No.	Spring index
2.0	2.2	1.95	2.7	C2/2.0/ ...	Please add the spring index after the Part Number! Order example: C2/2.8/W Refer to spring index on page 31
2.1	2.3	2.05	2.8	C2/2.1/ ...	
2.2	2.4	2.15	2.9	C2/2.2/ ...	
2.3	2.5	2.25	3.0	C2/2.3/ ...	
2.4	2.6	2.35	3.1	C2/2.4/ ...	
2.5	2.7	2.45	3.2	C2/2.5/ ...	
2.6	2.8	2.55	3.3	C2/2.6/ ...	
2.7	2.9	2.65	3.4	C2/2.7/ ...	
2.8	3.0	2.75	3.5	C2/2.8/ ...	
2.9	3.1	2.85	3.6	C2/2.9/ ...	
3.0	3.2	2.95	3.7	C2/3.0/ ...	
3.1	3.3	3.05	3.8	C2/3.1/ ...	

<sup>1)</sup> The deburring result varies depending on material, cutting data and application. The indicated dimension is the theoretically possible maximum. The spring has to be selected accordingly.

<sup>2)</sup> Pay attention to the interfering edges.

### ORDERING INFORMATION

Is the tool part number written without the extension "OM" (= without blade), the standard blade C2-M-0006-A is already mounted. Please refer to the explanations on page 29.



### Spare Parts

Pos.	Description	Part No.
<b>1</b>	COFA C2 Blade	see below
<b>2</b>	Roll pin Ø0.7x1.7	C2-E-0002
<b>3</b>	Bending spring	see below
<b>4</b>	Tool body	upon request
<b>5</b>	Locking pin Ø1.0m6x6	GH-H-S-1017
<b>6</b>	Threaded pin M2.5x5	GH-H-S-0135
<b>7</b>	Assembly pin	C2-V-0001
	Allen wrench for pos. 6	GH-H-S-2106

### Spring Index

Type	Bending spring	Part No.	Application
W2	soft (softer than W1)	C2-E-0011	Special applications
W1	soft (softer than W)	C2-E-0012	Special applications
W	soft	C2-E-0013	Aluminium alloys, copper zinc alloys, soft mat.
<b>H</b>	<b>hard</b>	<b>C2-E-0014*</b>	<b>Standard applications, all steel types</b>
S	super hard	C2-E-0015	Hard and tough materials
Z	extra hard (harder > S)	C2-E-0016	Very tough materials or very large burr formations
Z1	extra hard (harder > Z)	C2-E-0017	Special applications

### Blades

Angle	Part No. forward and backward cutting		Part No. backward cutting only	
	Coating A	Coating D	Coating A	Coating D
10°	C2-M-0007-A	C2-M-0007-D	C2-M-0017-A	C2-M-0017-D
<b>20°</b>	<b>C2-M-0006-A*</b>	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

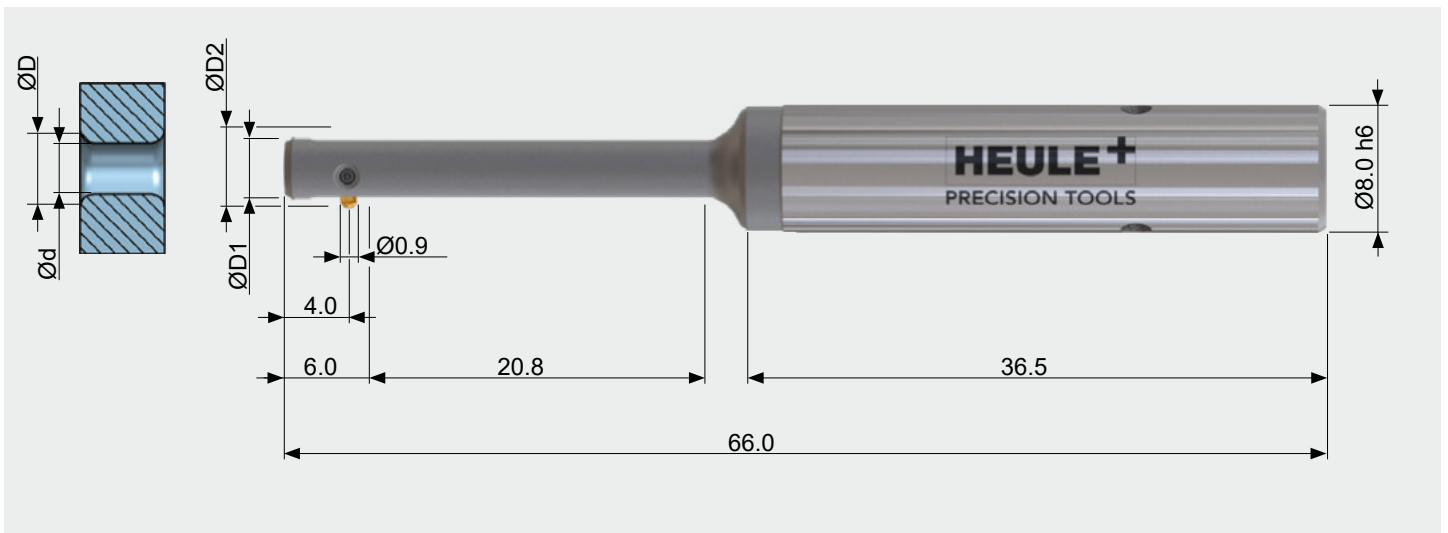
\*Standard items / Please enquire about stock or delivery times for all non-standard blades.

### Explanations to coatings (see on page 29)

A: Coating for steel, titanium, Inconel

D: Coating for aluminium alloys only

# COFA C3 Tool Ø 3.0 mm to 4.1 mm



## Tool Table

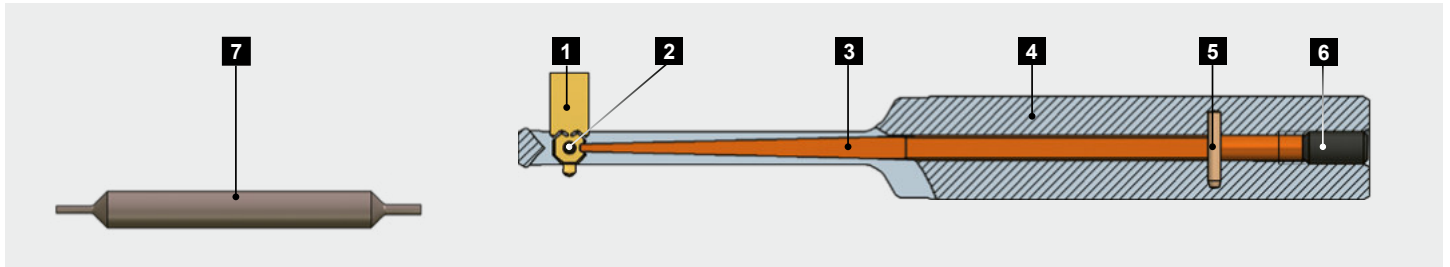
Bore-Ø d	Deburr-Ø max. <sup>1</sup> D	Tool-Ø D1	Maximum-Ø <sup>2</sup> D2	Tool with Standard Blade	
				Part No.	Spring index
3.0	3.3	2.95	4.0	C3/3.0/ ...	Please add the spring index after the part no.! Order example: C3 / 3.2 / Z Refer to spring index on page 33
3.1	3.4	3.05	4.1	C3/3.1/ ...	
3.2	3.5	3.15	4.2	C3/3.2/ ...	
3.3	3.6	3.25	4.3	C3/3.3/ ...	
3.4	3.7	3.35	4.4	C3/3.4/ ...	
3.5	3.8	3.45	4.5	C3/3.5/ ...	
3.6	3.9	3.55	4.6	C3/3.6/ ...	
3.7	4.0	3.65	4.7	C3/3.7/ ...	
3.8	4.1	3.75	4.8	C3/3.8/ ...	
3.9	4.2	3.85	4.9	C3/3.9/ ...	
4.0	4.3	3.95	5.0	C3/4.0/ ...	
4.1	4.4	4.05	5.1	C3/4.1/ ...	

<sup>1)</sup> The deburring result varies depending on material, cutting data and application. The indicated dimension is the theoretically possible maximum. The spring has to be selected accordingly.

<sup>2)</sup> Pay attention to the interfering edges.

### ORDERING INFORMATION

Is the tool part number written without the extension "OM" (= without blade), the standard blade C3-M-0006-A is already mounted. Please refer to the explanations on page 29.



### Spare Parts

Pos.	Description	Part No.
<b>1</b>	COFA C3 blade	see below
<b>2</b>	Roll pin Ø1.0x2.7	C3-E-0002
<b>3</b>	Bending spring	see below
<b>4</b>	Tool body	upon request
<b>5</b>	Locking pin Ø1.0m6x6	GH-H-S-1017
<b>6</b>	Threaded pin M2.5x5	GH-H-S-0135
<b>7</b>	Assembly pin	C3-V-0001
	Allen wrench for pos. 6	GH-H-S-2106

### Spring Index

Type	Bending spring	Part No.	Application
W2	soft (softer than W1)	C3-E-0011	Special applications
W1	soft (softer than als W)	C3-E-0012	Special applications
W	soft	C3-E-0013	Aluminium alloys, copper tin alloys, soft materials
<b>H</b>	<b>hard</b>	<b>C3-E-0014*</b>	<b>Standard applications, all steel types</b>
S	super hard	C3-E-0015	Hard and tough materials
Z	extra hard (harder > S)	C3-E-0016	Very tough materials or very large burr formations
Z1	extra hard (harder > Z)	C3-E-0017	Special applications

### Blades

Angle	Part No. forward and backward cutting		Part No. backward cutting only	
	Coating A	Coating D	Coating A	Coating D
10°	C3-M-0007-A	C3-M-0007-D	C3-M-0017-A	C3-M-0017-D
<b>20°</b>	<b>C3-M-0006-A*</b>	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

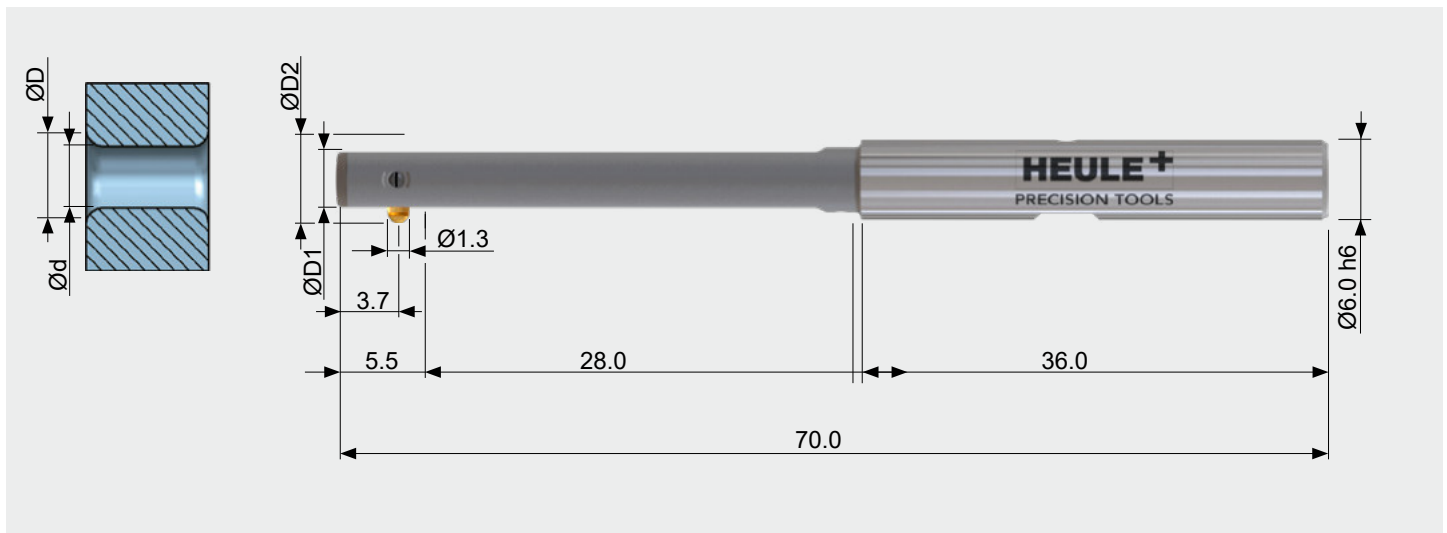
\*Standard items / Please enquire about stock or delivery times for all non-standard blades.

**Explanations to coatings:** (see page 29)

A: Coating for steel, titanium, Inconel

D: Coating for aluminium alloys only

# COFA 4M Tool Ø 4.0 mm to 5.1 mm



## Tool Table

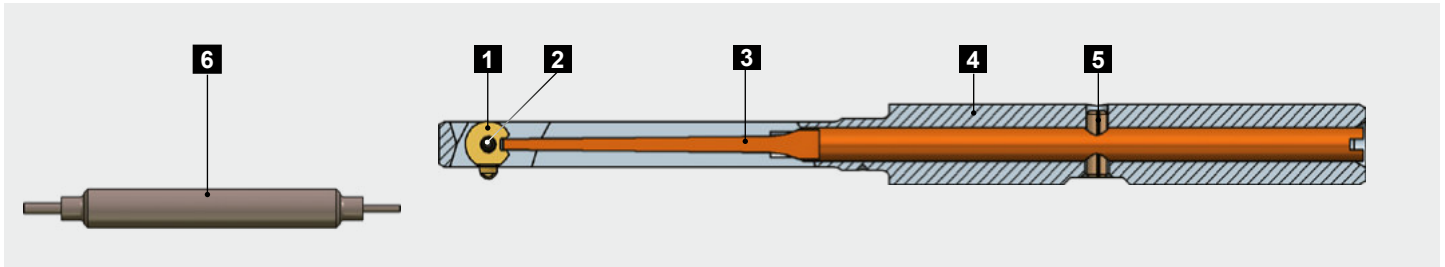
Bore-Ø d	Debur-Ø max. <sup>1</sup> D	Tool-Ø D1	Maximum-Ø <sup>2</sup> D2	Tool with Standard Blade	
				Part No.	Spring index
4.0 - 4.1	4.5	3.9	5.2	COFA4M/4.0/ ...	Please add the spring index after the part no.! Order example: COFA4M/4.2/S Refer to spring index on page 35
4.1 - 4.2	4.6	4.0	5.3	COFA4M/4.1/ ...	
4.2 - 4.3	4.7	4.1	5.4	COFA4M/4.2/ ...	
4.3 - 4.4	4.8	4.2	5.5	COFA4M/4.3/ ...	
4.4 - 4.5	4.9	4.3	5.6	COFA4M/4.4/ ...	
4.5 - 4.6	5.0	4.4	5.7	COFA4M/4.5/ ...	
4.6 - 4.7	5.1	4.5	5.8	COFA4M/4.6/ ...	
4.7 - 4.8	5.2	4.6	5.9	COFA4M/4.7/ ...	
4.8 - 4.9	5.3	4.7	6.0	COFA4M/4.8/ ...	
4.9 - 5.0	5.4	4.8	6.1	COFA4M/4.9/ ...	
5.0 - 5.1	5.5	4.9	6.2	COFA4M/5.0/ ...	

<sup>1)</sup> The deburring result varies depending on material, cutting data and application. The indicated dimension is the theoretically possible maximum. The spring has to be selected accordingly.

<sup>2)</sup> Pay attention to the interfering edges.

### ORDERING INFORMATION

Is the tool part number written without the extension "OM" (= without blade), the standard blade GH-C-M-0504 is already mounted. Please refer to the explanations on page 29.



### Spare Parts

Pos.	Description	Part No.
<b>1</b>	COFA 4M Blade	see below
<b>2</b>	Roll pin Ø1.0x3.8	GH-C-E-0819
<b>3</b>	Bending spring	see below
<b>4</b>	Tool body	upon request
<b>5</b>	Roll pin Ø1.5x5.0	GH-H-S-0902
<b>6</b>	Assembly pin	GH-C-V-0206

### Spring Index

Type	Bending spring	Part No.	Application
W2	soft (softer than W1)	GH-C-E-0341	Special applications
W1	soft (softer than W)	GH-C-E-0340	Special applications
W	soft	GH-C-E-0342	Aluminium alloys, copper zinc alloys, soft mat.
<b>H</b>	<b>hard</b>	<b>GH-C-E-0343*</b>	<b>Standard applications, all steel types</b>
S	super hard	GH-C-E-0344	Hard and tough materials
Z	extra hard (harder > S)	GH-C-E-0345	Very tough materials or very large burr formations
Z1	extra hard (harder > Z)	GH-C-E-0346	Special applications
Z2	extra hard (harder > Z1)	GH-C-E-0347	Special applications
Z3	extra hard (harder > Z2)	GH-C-E-0348	Special applications

### Blades

Angle	Part No. forward and backward cutting		Part No. backward cutting only	
	Coating T	Coating D	Coating T	Coating D
10°	GH-C-M-0704	GH-C-M-0784	GH-C-M-0814	GH-C-M-0894
20°	<b>GH-C-M-0504*</b>	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	---

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

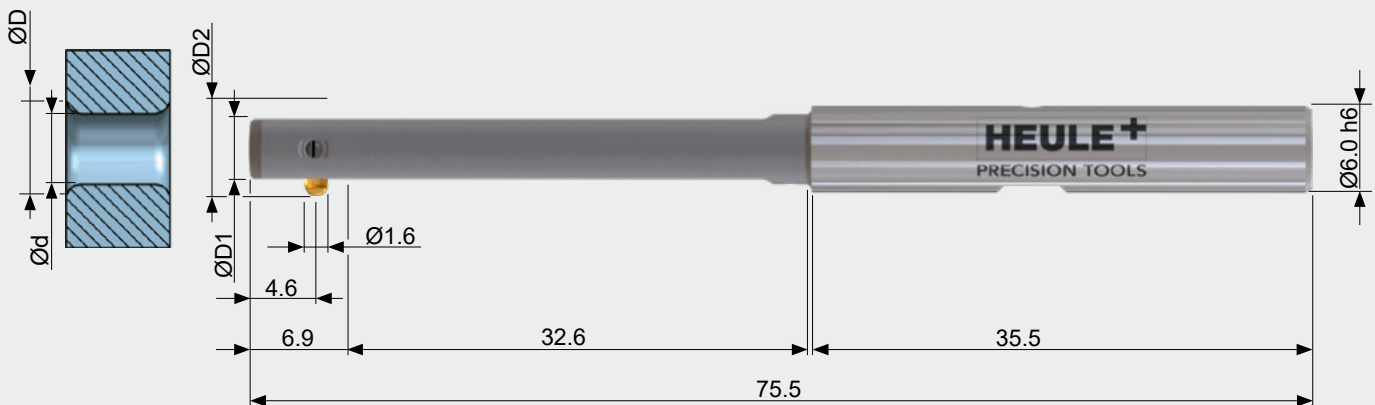
### Explanations to coatings (see page 29)

T: Coating for steel, titanium, Inconel

D: Coating for aluminium alloys only



# COFA 5M Tool Ø 5.0 mm to 6.1 mm



## Tool Table

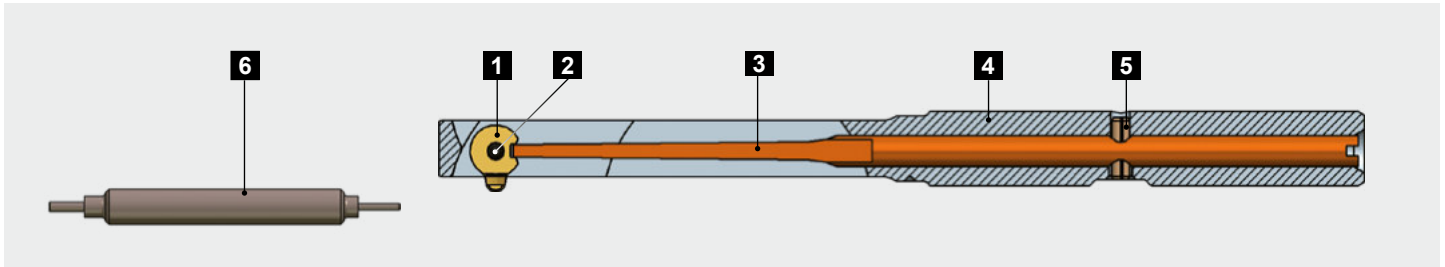
Bore-Ø d	Deburr-Ø max. <sup>1</sup> D	Tool-Ø D1	Maximum-Ø <sup>2</sup> D2	Tool with Standard Blade	
				Part No. incl.	Spring index
5.0 - 5.1	5.7	4.9	6.6	COFA5M/5.0/ ...	Please add the spring index after the part no.! Order example: COFA 5M / 5.6 / Z1 Refer to spring index on page 37
5.1 - 5.2	5.8	5.0	6.7	COFA5M/5.1/ ...	
5.2 - 5.3	5.9	5.1	6.8	COFA5M/5.2/ ...	
5.3 - 5.4	6.0	5.2	6.9	COFA5M/5.3/ ...	
5.4 - 5.5	6.1	5.3	7.0	COFA5M/5.4/ ...	
5.5 - 5.6	6.2	5.4	7.1	COFA5M/5.5/ ...	
5.6 - 5.7	6.3	5.5	7.2	COFA5M/5.6/ ...	
5.7 - 5.8	6.4	5.6	7.3	COFA5M/5.7/ ...	
5.8 - 5.9	6.5	5.7	7.4	COFA5M/5.8/ ...	
5.9 - 6.0	6.6	5.8	7.5	COFA5M/5.9/ ...	
6.0 - 6.1	6.7	5.9	7.6	COFA5M/6.0/ ...	

<sup>1)</sup> The deburring result varies depending on material, cutting data and application. The indicated dimension is the theoretically possible maximum. The spring has to be selected accordingly.

<sup>2)</sup> Pay attention to the interfering edges.

### ORDERING INFORMATION

Is the tool part number written without the extension "OM" (= without blade), the standard blade GH-C-M-0505 is already mounted. Please refer to the explanations on page 29.



### Spare Parts

Pos.	Description	Part No.
<b>1</b>	COFA 5M Blades	see below
<b>2</b>	Roll pin Ø1.2x4.8	GH-C-E-0820
<b>3</b>	Bending spring	see below
<b>4</b>	Tool body	upon request
<b>5</b>	Roll pin Ø1.5x5.0	GH-H-S-0902
<b>6</b>	Assembly pin	GH-C-V-0211

### Spring Index

Type	Bending spring	Part No.	Application
W2	soft (softer than W1)	GH-C-E-0351	Special applications
W1	soft (softer than W)	GH-C-E-0350	Special applications
W	soft	GH-C-E-0352	Aluminium alloys, copper zinc alloys, soft mat.
<b>H</b>	<b>hard</b>	<b>GH-C-E-0353*</b>	<b>Standard applications, all steel types</b>
S	super hard	GH-C-E-0354	Hard and tough materials
Z	extra hard (harder > S)	GH-C-E-0355	Very tough materials or very large burr formations
Z1	extra hard (harder > Z)	GH-C-E-0356	Special applications
Z2	extra hard (harder > Z1)	GH-C-E-0357	Special applications
Z3	extra hard (harder > Z2)	GH-C-E-0358	Special applications

### Blades

Angle	Part No. forward and backward cutting		Part No. backward cutting only	
	Coating T	Coating D	Coating T	Coating D
10°	GH-C-M-0705	GH-C-M-0785	GH-C-M-0815	GH-C-M-0895
20°	<b>GH-C-M-0505*</b>	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	---

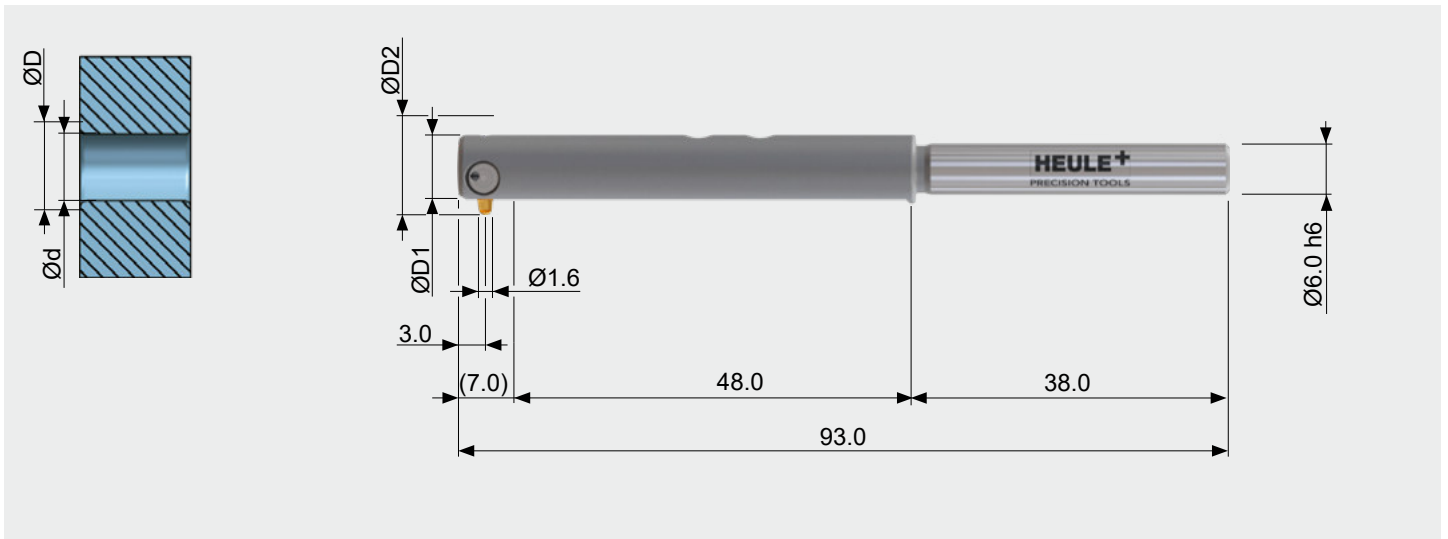
\*Standard items / Please enquire about stock or delivery times for all non-standard blades.

### Explanations to coatings (see page 29)

T: Coating for steel, titanium, Inconel

D: Coating for aluminium alloys only

# COFA C6 Tool Ø 6.0 mm to 8.4 mm



## Tool Table

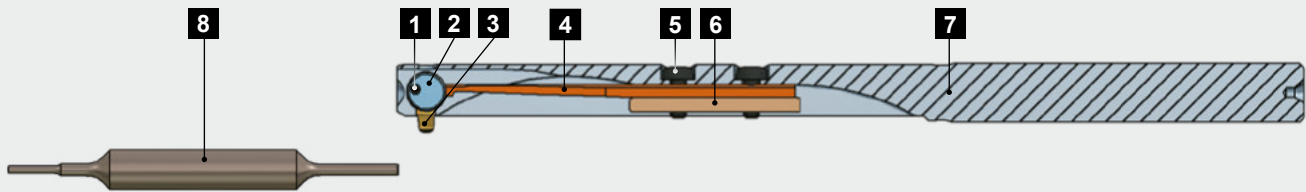
Bore-Ø d	Deburr-Ø <sup>1</sup> D		Tool-Ø D1	Maximum-Ø <sup>2</sup> D2		Tool with Standard Blade	
	M	L		M	L	Part No.	Spring index
6.0	7.0	7.4	5.8	8.3	8.7	C6/6.0/ ...	Please add the spring index after the part no.! Order example: C6/8.0/H Refer to spring index on page 39
6.2	7.2	7.6	6.0	8.5	8.9	C6/6.2/ ...	
6.4	7.4	7.8	6.2	8.7	9.1	C6/6.4/ ...	
6.6	7.6	8.0	6.4	8.9	9.3	C6/6.6/ ...	
6.8	7.8	8.2	6.6	9.1	9.5	C6/6.8/ ...	
7.0	8.0	8.4	6.8	9.3	9.7	C6/7.0/ ...	
7.2	8.2	8.6	7.0	9.5	9.9	C6/7.2/ ...	
7.4	8.4	8.8	7.2	9.7	10.1	C6/7.4/ ...	
7.6	8.6	9.0	7.4	9.9	10.3	C6/7.6/ ...	
7.8	8.8	9.2	7.6	10.1	10.5	C6/7.8/ ...	
8.0	9.0	9.4	7.8	10.3	10.7	C6/8.0/ ...	
8.2	9.2	9.6	8.0	10.5	10.9	C6/8.2/ ...	
8.4	9.4	9.8	8.2	10.7	11.1	C6/8.4/ ...	

<sup>1)</sup> The deburring result varies depending on material, cutting data and application. The indicated dimension is the theoretically possible maximum. The spring has to be selected accordingly.

<sup>2)</sup> Pay attention to the interfering edges.

## ORDERING INFORMATION

Is the tool part number written without the extension "OM" (= without blade), the standard blade C6-M-0006-T is already mounted. Please refer to the explanations on page 29.



### Spare Parts

Pos.	Description	Part No.
<b>1</b>	Roll pin Ø1.0 x 8.0	C6-E-0003
<b>2</b>	Blade holder	C6-E-0001
<b>3</b>	COFA C6 Blade	see below
<b>4</b>	Bending spring	see below
<b>5</b>	Torx screw T5 / Wrench for Pos.5	GH-H-S-0803 / GH-H-S-2020
<b>6</b>	Fixing strip	GH-C-E-0812
<b>7</b>	Tool body	upon request
<b>8</b>	Assembly pin	C6-V-0006

### Spring Index

Type	Bending spring	Part No.	Application
W2	soft (softer than W1)	C6-E-0006	Special applications
W1	soft (softer than W)	C6-E-0007	Special applications
W	soft	C6-E-0008	Aluminium alloys, copper zinc alloys, soft mat.
<b>H</b>	<b>hard</b>	<b>C6-E-0009*</b>	<b>Standard applications, all steel types</b>
S	super hard	C6-E-0010	Hard and tough materials
Z	extra hard (harder > S)	C6-E-0011	Very tough materials or very large burr formations
Z1	extra hard (harder > Z)	C6-E-0012	Special applications
Z2	extra hard (harder > Z1)	C6-E-0013	Special applications
Z3	extra hard (harder > Z2)	C6-E-0014	Special applications

### Blades

Angle	Part No. forward and backward cutting			
	Coating T		Coating D	
	M	L	M	L
10°	C6-M-0007-T	C6-M-0002-T	C6-M-0007-D	C6-M-0002-D
20°	<b>C6-M-0006-T*</b>	C6-M-0001-T	C6-M-0006-D	C6-M-0001-D
25°	C6-M-0008-T	C6-M-0003-T	C6-M-0008-D	C6-M-0003-D
30°	C6-M-0009-T	C6-M-0004-T	C6-M-0009-D	C6-M-0004-D

Angle	Part No. backward cutting only			
	Coating T		Coating D	
	M	L	M	L
10°	C6-M-0027-T	C6-M-0022-T	C6-M-0027-D	C6-M-0022-D
20°	C6-M-0026-T	C6-M-0021-T	C6-M-0026-D	C6-M-0021-D
25°	C6-M-0028-T	C6-M-0023-T	C6-M-0028-D	C6-M-0023-D
30°	C6-M-0029-T	C6-M-0024-T	C6-M-0029-D	C6-M-0024-D

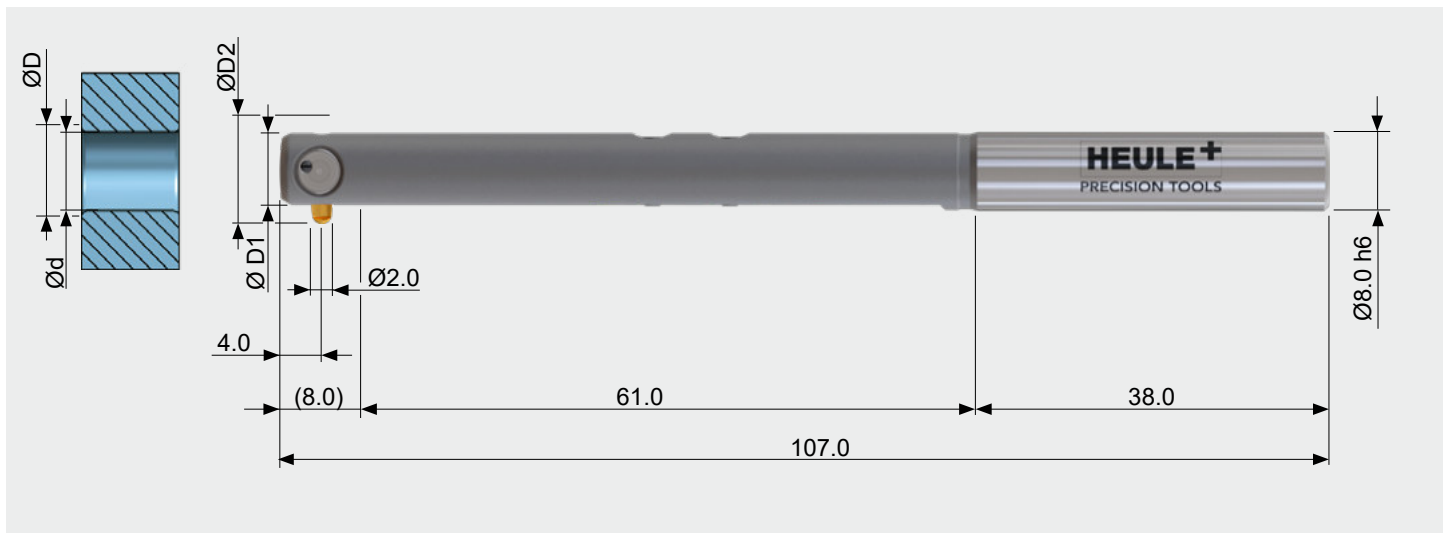
\*Standard items / Please enquire about stock or delivery times for all non-standard blades.

**Explanations to coatings** (see page 29)

T: Coating for steel, titanium, Inconel

D: Coating for aluminium alloys only

# COFA C8 Tool Ø 8.0 mm to 12.4 mm



## Tool Table

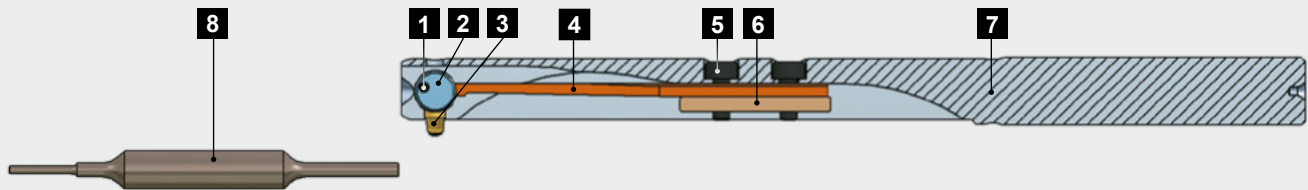
Bore-Ø d	Deburr-Ø <sup>1</sup> D		Tool-Ø D1	Maximum-Ø <sup>2</sup> D2		Tool with Standard Blade	
	M	L		M	L	Part No.	Spring index
Blade size	M	L		M	L		
8.0	9.2	9.8	7.8	10.8	11.4	C8/8.0/	...
8.2	9.4	10.0	8.0	11.0	11.6	C8/8.2/	...
8.4	9.6	10.2	8.2	11.2	11.8	C8/8.4/	...
8.6	9.8	10.4	8.4	11.4	12.0	C8/8.6/	...
8.8	10.0	10.6	8.6	11.6	12.2	C8/8.8/	...
9.0	10.2	10.8	8.8	11.8	12.4	C8/9.0/	...
9.2	10.4	11.0	9.0	12.0	12.6	C8/9.2/	...
9.4	10.6	11.2	9.2	12.2	12.8	C8/9.4/	...
9.6	10.8	11.4	9.4	12.4	13.0	C8/9.6/	...
9.8	11.0	11.6	9.6	12.6	13.2	C8/9.8/	...
10.0	11.2	11.8	9.8	12.8	13.4	C8/10.0/	...
10.2	11.4	12.0	10.0	13.0	13.6	C8/10.2/	...
10.4	11.6	12.2	10.2	13.2	13.8	C8/10.4/	...
10.6	11.8	12.4	10.4	13.4	14.0	C8/10.6/	...
10.8	12.0	12.6	10.6	13.6	14.2	C8/10.8/	...
11.0	12.2	12.8	10.8	13.8	14.4	C8/11.0/	...
11.2	12.4	13.0	11.0	14.0	14.6	C8/11.2/	...
11.4	12.6	13.2	11.2	14.2	14.8	C8/11.4/	...
11.6	12.8	13.4	11.4	14.4	15.0	C8/11.6/	...
11.8	13.0	13.6	11.6	14.6	15.2	C8/11.8/	...
12.0	13.2	13.8	11.8	14.8	15.4	C8/12.0/	...
12.2	13.4	14.0	12.0	15.0	15.6	C8/12.2/	...
12.4	13.6	14.2	12.2	15.2	15.8	C8/12.4/	...

Please add the spring index after the part number!  
Order example: C8/8.0/Z1  
Refer to spring index on page 41

<sup>1)</sup> The deburring result varies depending on material, cutting data and application. The indicated dimension is the theoretically possible maximum. The spring has to be selected accordingly. <sup>2)</sup> Pay attention to the interfering edges.

### ORDERING INFORMATION:

Is the tool part number written without the extension "OM" (= without blade), the standard blade C8-M-0006-T is already mounted. Please refer to the explanations on page 29.



## Spare Parts

Pos.	Description	Part No.
<b>1</b>	Roll pin Ø1.2 x 10.0	C8-E-0003
<b>2</b>	Blade holder	C8-E-0001
<b>3</b>	COFA C8 Blade	see below
<b>4</b>	Bending spring	see below
<b>5</b>	Screw M2x5.0 / Wrench for Pos.5	GH-H-S-0517 / GH-H-S-2105
<b>6</b>	Fixing strip	GH-C-E-0808
<b>7</b>	Tool body	upon request
<b>8</b>	Assembly pin	C8-V-0005

## Spring Index

Type	Bending spring	Part No.	Application
W2	soft (softer than W1)	C8-E-0006	Special applications
W1	soft (softer than W)	C8-E-0007	Special applications
W	soft	C8-E-0008	Aluminium alloys, copper zinc alloys, soft mat.
<b>H</b>	<b>hard</b>	<b>C8-E-0009*</b>	<b>Standard applications, all steel types</b>
S	super hard	C8-E-0010	Hard and tough materials
Z	extra hard (harder > S)	C8-E-0011	Very tough materials or very large burr formations
Z1	extra hard (harder > Z)	C8-E-0012	Special applications
Z2	extra hard (harder > Z1)	C8-E-0013	Special applications
Z3	extra hard (harder > Z2)	C8-E-0014	Special applications

## Blades

Angle	Part No. forward and backward cutting			
	Coating T		Coating D	
	M	L	M	L
10°	C8-M-0007-T	C8-M-0002-T	C8-M-0007-D	C8-M-0002-D
20°	C8-M- <b>0006-T*</b>	C8-M-0001-T	C8-M-0006-D	C8-M-0001-D
25°	C8-M-0008-T	C8-M-0003-T	C8-M-0008-D	C8-M-0003-D
30°	C8-M-0009-T	C8-M-0004-T	C8-M-0009-D	C8-M-0004-D

Angle	Part No. backward cutting only			
	Coating T		Coating D	
	M	L	M	L
10°	C8-M-0027-T	C8-M-0022-T	C8-M-0027-D	C8-M-0022-D
20°	C8-M-0026-T	C8-M-0021-T	C8-M-0026-D	C8-M-0021-D
25°	C8-M-0028-T	C8-M-0023-T	C8-M-0028-D	C8-M-0023-D
30°	C8-M-0029-T	C8-M-0024-T	C8-M-0029-D	C8-M-0024-D

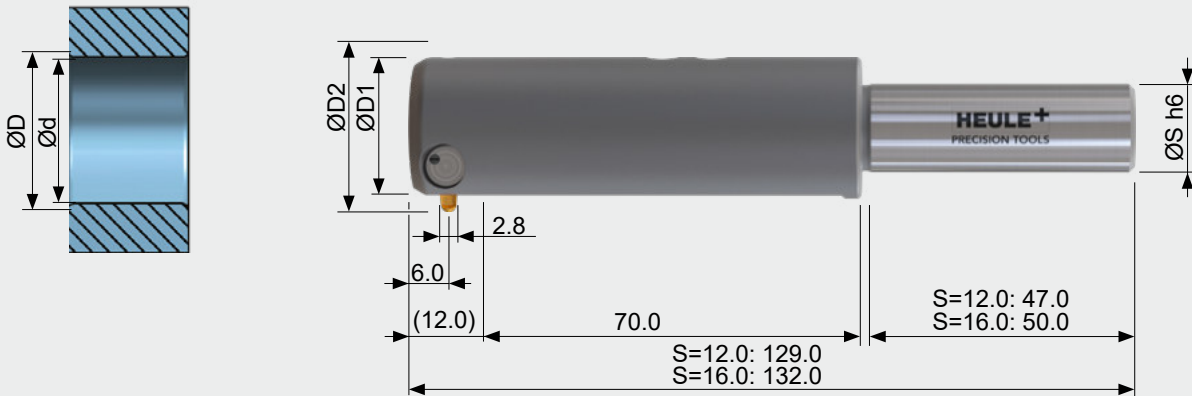
\*Standard items / Please enquire about stock or delivery times for all non-standard blades.

**Explanations to coatings** (see page 29)

T: Coating for steel, titanium, Inconel

D: Coating for aluminium alloys only

# COFA C12 Tool Ø 12.0 mm to 26.0 mm



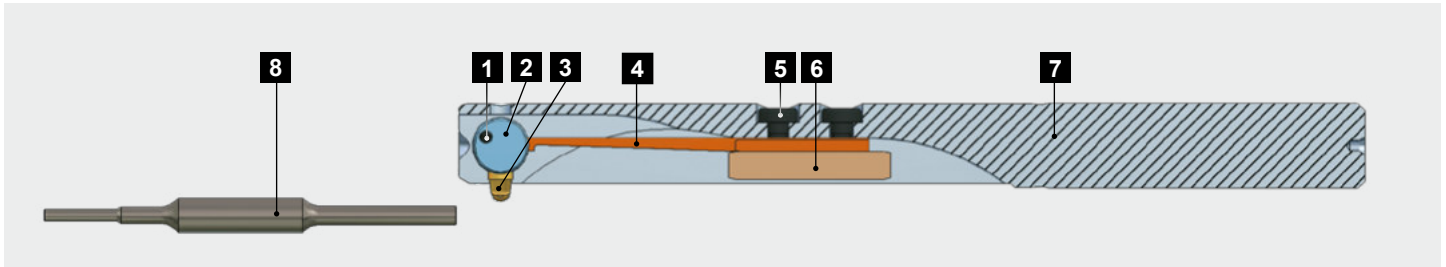
## Tool Table

							Tool with Standard Blade		
Bore-Ø d	Deburr-Ø <sup>1</sup> max. D		Tool-Ø D1	Maximum-Ø <sup>2</sup> D2		Shaft-Ø S	Part No.	Spring index	
Blade size	M	L		M	L				
12.0	13.6	14.8	11.8	15.7	17.0	12.0	C12/12.0/ ...	Please add the spring index after the part number! Order example: C12/16.0/Z Refer to spring index on page 43	
12.5	14.1	15.3	12.3	16.2	17.5	12.0	C12/12.5/ ...		
13.0	14.6	15.8	12.8	16.7	18.0	12.0	C12/13.0/ ...		
13.5	15.1	16.3	13.3	17.2	18.5	12.0	C12/13.5/ ...		
14.0	15.6	16.8	13.8	17.7	19.0	12.0	C12/14.0/ ...		
14.5	16.1	17.3	14.3	18.2	19.5	12.0	C12/14.5/ ...		
15.0	16.6	17.8	14.8	18.7	20.0	12.0	C12/15.0/ ...		
15.5	17.1	18.3	15.3	19.2	20.5	12.0	C12/15.5/ ...		
16.0	17.6	18.8	15.8	19.7	21.0	12.0	C12/16.0/ ...		
16.5	18.1	19.3	16.3	20.2	21.5	12.0	C12/16.5/ ...		
17.0	18.6	19.8	16.8	20.7	22.0	12.0	C12/17.0/ ...		
17.5	19.1	20.3	17.3	21.2	22.5	12.0	C12/17.5/ ...		
18.0	19.6	20.8	17.8	21.7	23.0	12.0	C12/18.0/ ...		
18.5	20.1	21.3	18.3	22.2	23.5	12.0	C12/18.5/ ...		
19.0	20.6	21.8	18.8	22.7	24.0	12.0	C12/19.0/ ...		
19.5	21.1	22.3	19.3	23.2	24.5	12.0	C12/19.5/ ...		
20.0	21.6	22.8	19.8	23.7	25.0	16.0	C12/20.0/ ...		
20.5	22.1	23.3	20.3	24.2	25.5	16.0	C12/20.5/ ...		
21.0	22.6	23.8	20.8	24.7	26.0	16.0	C12/21.0/ ...		
▼									
26.0	Please refer to page 44								

<sup>1)</sup> The deburring result varies depending on material, cutting data and application. The indicated dimension is the theoretically possible maximum. The spring has to be selected accordingly. <sup>2)</sup> Pay attention to the interfering edges.

### ORDERING INFORMATION:

Is the tool part number written without the extension "OM" (= without blade), the standard blade C12-M-0006-T is already mounted. Please refer to the explanations on page 29.



## Spare Parts

Pos.	Description	Part No.
<b>1</b>	Roll pin Ø1.8 x 15.0	C12-E-0003
<b>2</b>	Blade holder	C12-E-0001
<b>3</b>	COFA C12 Blade	see below
<b>4</b>	Bending spring	see below
<b>5</b>	Screw M3x8.0 / Wrench for Pos.5	GH-H-S-0530 / GH-H-S-2102
<b>6</b>	Fixing strip	GH-C-E-0800
<b>7</b>	Tool body	upon request
<b>8</b>	Assembly pin	C12-V-0005

## Spring Index

Type	Bending spring	Part No.	Application
W2	soft (softer than W1)	C12-E-0006	Special applications
W1	soft (softer than W)	C12-E-0007	Special applications
W	soft	C12-E-0008	Aluminium alloys, copper zinc alloys, soft mat.
<b>H</b>	<b>hard</b>	<b>C12-E-0009*</b>	<b>Standard applications, all steel types</b>
S	super hard	C12-E-0010	Hard and tough materials
Z	extra hard (harder > S)	C12-E-0011	Very tough materials or very large burr formations
Z1	extra hard (harder > Z)	C12-E-0012	Special applications
Z2	extra hard (harder > Z1)	C12-E-0013	Special applications
Z3	extra hard (harder > Z2)	C12-E-0014	Special applications

## Blades

Angle	Part No. forward and backward cutting			
	Coating T		Coating D	
	M	L	M	L
10°	C12-M-0007-T	C12-M-0002-T	C12-M-0007-D	C12-M-0002-D
20°	C12-M- <b>0006-T*</b>	C12-M-0001-T	C12-M-0006-D	C12-M-0001-D
25°	C12-M-0008-T	C12-M-0003-T	C12-M-0008-D	C12-M-0003-D
30°	C12-M-0009-T	C12-M-0004-T	C12-M-0009-D	C12-M-0004-D

Angle	Part No. backward cutting only			
	Coating T		Coating D	
	M	L	M	L
10°	C12-M-0027-T	C12-M-0022-T	C12-M-0027-D	C12-M-0022-D
20°	C12-M-0026-T	C12-M-0021-T	C12-M-0026-D	C12-M-0021-D
25°	C12-M-0028-T	C12-M-0023-T	C12-M-0028-D	C12-M-0023-D
30°	C12-M-0029-T	C12-M-0024-T	C12-M-0029-D	C12-M-0024-D

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

**Explanations to coatings** (see page 29):

T: Coating for steel, titanium, Inconel

D: Coating for aluminium alloys only



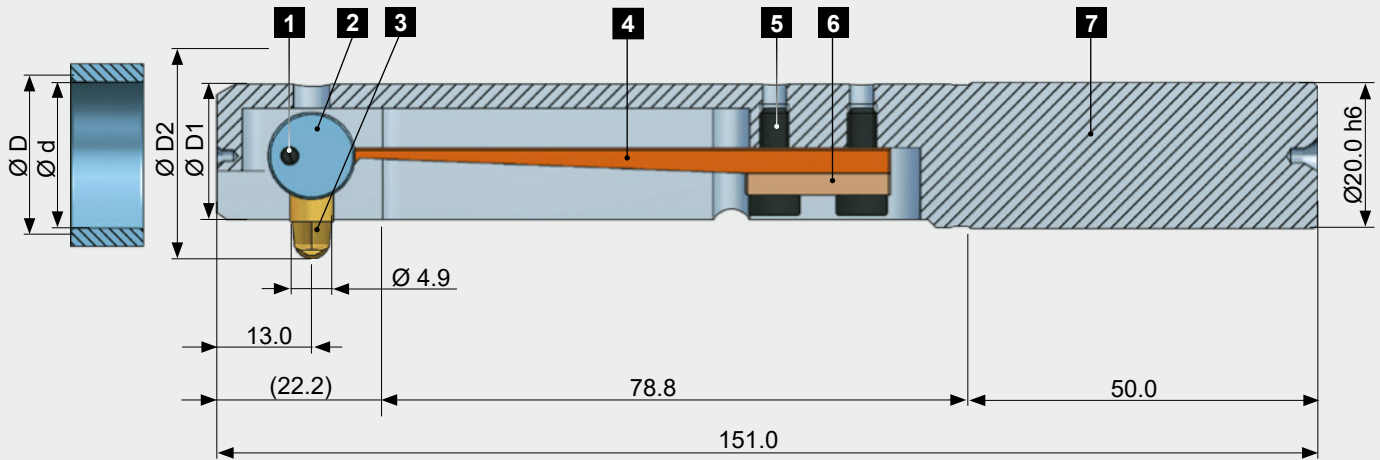
							Tool with Standard Blade	
Bore-Ø d	Deburr-Ø <sup>1</sup> max. D		Tool-Ø D1	Maximum-Ø <sup>2</sup> D2		Shaft-Ø S	Part No.	Spring index
Blade size	M	L		M	L			
21.5	23.1	24.3	21.3	25.2	26.5	16.0	C12/21.5/ ...	Please add the spring index after the part number! Order example: C12/16.0/Z Refer to spring index on page 43
22.0	23.6	24.8	21.8	25.7	27.0	16.0	C12/22.0/ ...	
22.5	24.1	25.3	22.3	26.2	27.5	16.0	C12/22.5/ ...	
23.0	24.6	25.8	22.8	26.7	28.0	16.0	C12/23.0/ ...	
23.5	25.1	26.3	23.3	27.2	28.5	16.0	C12/23.5/ ...	
24.0	25.6	26.8	23.8	27.7	29.0	16.0	C12/24.0/ ...	
24.5	26.1	27.3	24.3	28.2	29.5	16.0	C12/24.5/ ...	
25.0	26.6	27.8	24.8	28.7	30.0	16.0	C12/25.0/ ...	
25.5	27.1	28.3	25.3	29.2	30.5	16.0	C12/25.5/ ...	
26.0	27.6	28.8	25.8	29.7	31.0	16.0	C12/26.0/ ...	

<sup>1)</sup> The deburring result varies depending on material, cutting data and application. The indicated dimension is the theoretically possible maximum. The spring has to be selected accordingly. <sup>2)</sup> Pay attention to the interfering edges.

**ORDERING INFORMATION**

Is the tool part number written without the extension "OM" (= without blade), the standard blade C12-M-0006-T is already mounted. Please refer to the explanations on page 29.

## COFA C20 Tool from Ø 20.0 mm



## Spare Parts

Pos.	Description	Part No.
<b>1</b>	Roll pin Ø2.5 x 13.0	C20-E-0003
<b>2</b>	Blade holder	C20-E-0001
<b>3</b>	COFA C20 Blade	upon request
<b>4</b>	Bending spring	upon request
<b>5</b>	Screw M3x16 / Wrench for Pos.5	GH-H-S-0543 / GH-H-S-2100
<b>6</b>	Fixing strip	C20-E-0800
<b>7</b>	Tool body	upon request
	Assembly pin	C20-V-0009

The COFA C20 tool is the largest COFA tool within the HEULE product range. This deburring tool may be equipped with three different blade sizes. Depending on the specific application requirements, SMALL, LARGE or MEDIUM blades are used.

As the name says, these three blades produce deburr diameters of different size. It is important to know that these deburr diameters vary depending on the application and the material. Also COFA C20 is using springs. They differ in respect of hardness and are selected according to the material.

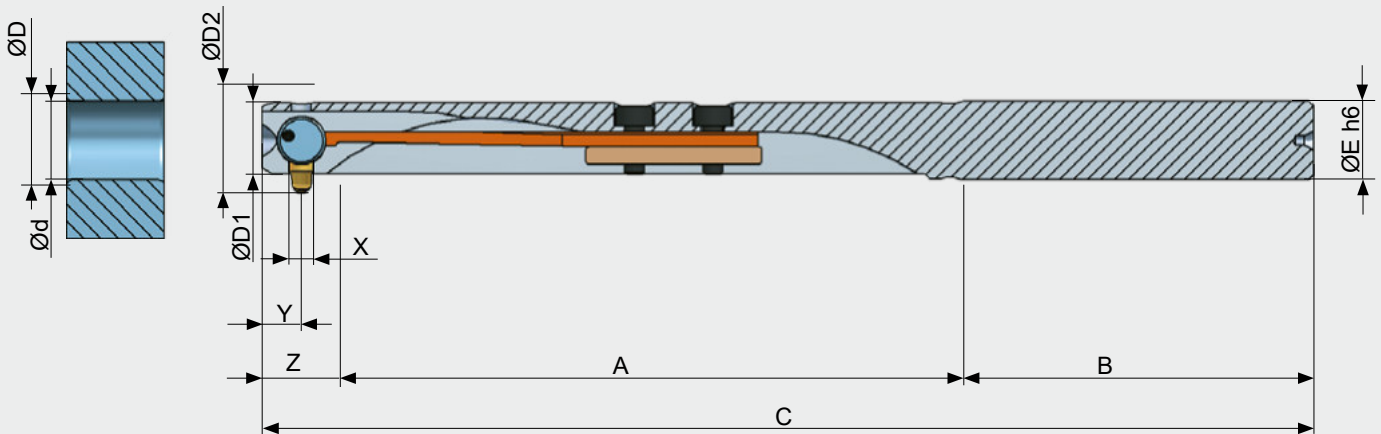
The C20 tool is similar to the COFA C12. The proven design of the C12 tool systems with blade holder and tool body will remain. The C20 tool is built for large to very large deburr diameters and this in connection with various materials. In order to treat a request for quotation and to carry out a feasibility study, HEULE needs the data listed below:

**Information / data required by HEULE to examine the feasibility of your application<sup>1</sup>.**

- Main bore-Ø including tolerance
- Cross bore-Ø including tolerance
- Bore depth
- Material
- Penetration angle
- Offset (if applicable)
- Production volume per year
- Cycle time
- Machine (CNC / others)
- Solution / process today
- Particular requirements
- STEP drawing

<sup>1</sup>) Application Data Sheet see page 270

# COFA Thread Series M8 to M20



The COFA Thread Tool has been designed particularly for the deburring of threaded bores. The deburring follows the drilling of the core bore. The

dimensions of the deburring of the workpieces correspond to DIN 13-1 (ISO 68).

## Tool Table

	Bore-Ø d	Deburr-Ø <sup>1</sup> D	Tool-Ø D1	Maximum-Ø <sup>2</sup> D2	Tool complete with Blade	
					Part No. forward and backward cutting	Spring index
M8	6.8	8.5	6.7	9.7	C6 / M8 / ...	Please add spring index to part number! Order example: C8 / M12 / Z1 Refer to spring index on C6: 39, C8: 41, C12: 43
M10	8.5	10.4	8.4	12.2	C8 / M10 / ...	
M12	10.2	12.2	10.1	13.9	C8 / M12 / ...	
M16	14.0	16.8	13.8	18.9	C12 / M16 / ...	
M20	17.5	20.4	17.4	22.8	C12 / M20 / ...	

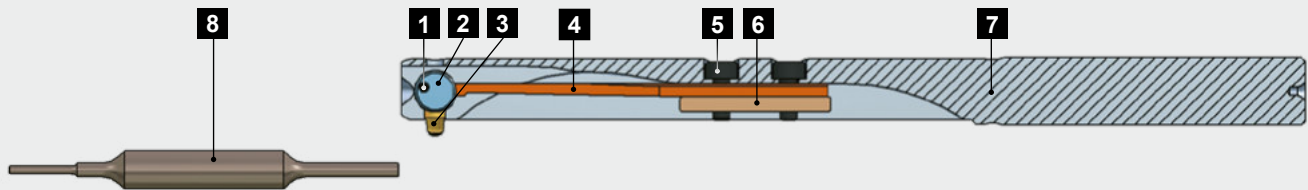
<sup>1)</sup> The deburring result varies depending on material, cutting data and application. The indicated dimension is the theoretically possible maximum. The spring has to be selected accordingly. <sup>2)</sup> Pay attention to the interfering edges.

## ORDERING INFORMATION

Is the tool part number written without the extension "OM" (= without blade), the standard blade is already mounted. Please refer to the explanations on page 29.

## Dimension Table

Type	A	B	C	X	Y	Z	ØE
M8	48.2	38.0	93.0	1.6	3.0	6.8	6.0 h6
M10	61.0	38.0	107.5	2.0	4.0	8.5	8.0 h6
M12	61.0	38.0	107.5	2.0	4.0	8.5	8.0 h6
M16	69.2	47.0	128.7	2.8	6.0	12.5	12.0 h6
M20	69.2	47.0	128.7	2.8	6.0	12.5	12.0 h6



## Spare Parts

Pos.	Description	M8 Ø6.7	M10/M12 Ø8.4/10.1	M16/M20 Ø13.9/17.3
<b>1</b>	Roll pin	C6-E-0003	C8-E-0003	C12-E-0003
<b>2</b>	Blade holder	C6-E-0001	C8-E-0001	C12-E-0001
<b>3</b>	COFA blade	see below	see below	see below
<b>4</b>	Bending spring	see page 39	see page 41	see page 43
<b>5</b>	Screw Wrench for Pos. 5	GH-H-S-0803 GH-H-S-2006	GH-H-S-0517 GH-H-S-2105	GH-H-S-0530 GH-H-S-2102
<b>6</b>	Fixing strip	GH-C-E-0812	GH-C-E-0808	GH-C-E-0800
<b>7</b>	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
<b>8</b>	Assembly pin	C6-V-0006	C8-V-0005	C12-V-0005

## Spring Index

Type	Bending spring	Part No.	Application
W2	soft (softer than W1)	The part numbers for the springs are identical with those for the standard tools. See for C6 - page 39 C8 - page 41 C12 - page 43	Special applications
W1	soft (softer than W)		Special applications
W	soft		Aluminium alloys, copper zinc alloys, soft mat.
H	hard		<b>Standard applications, all steel types</b>
S	super hard		Hard and tough materials
Z	extra hard (harder > S)		Very tough materials or very large burr formations
Z1	extra hard (harder > Z)		Special applications
Z2	extra hard (harder > Z1)		Special applications
Z3	extra hard (harder > Z2)		Special applications

## Blades

	Part No. for 20° Thread Blades forward and backward cutting		Part No. for 20° Thread Blades backward cutting only	
	Coating T	Coating D	Coating T	Coating D
M8	<b>C6-M-0001-T*</b>	C6-M-0001-D	C6-M-0021-T	C6-M-0021-D
M10	<b>C8-M-0001-T*</b>	C8-M-0001-D	C8-M-0021-T	C8-M-0021-D
M12	<b>C8-M-0001-T*</b>	C8-M-0001-D	C8-M-0021-T	C8-M-0021-D
M16	<b>C12-M-0001-T*</b>	C12-M-0001-D	C12-M-0021-T	C12-M-0021-D
M20	<b>C12-M-0001-T*</b>	C12-M-0001-D	C12-M-0021-T	C12-M-0021-D

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

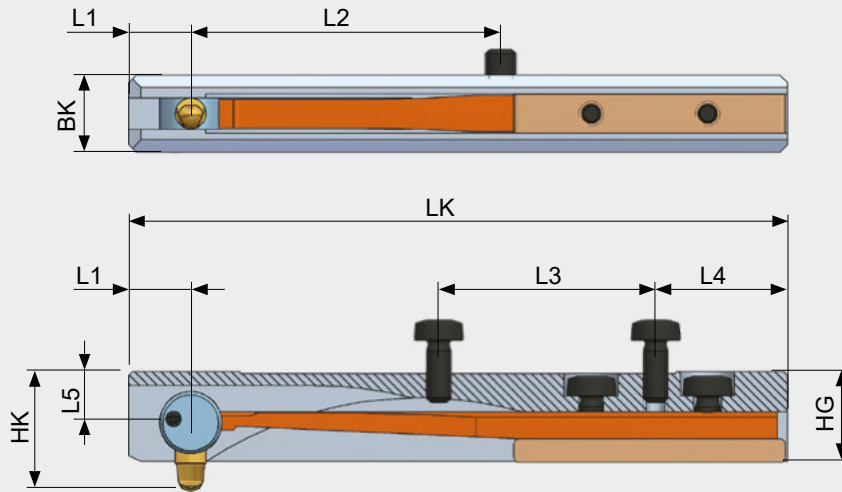
Explanations to coatings (see page 29):

T: Coating for steel, titanium, Inconel

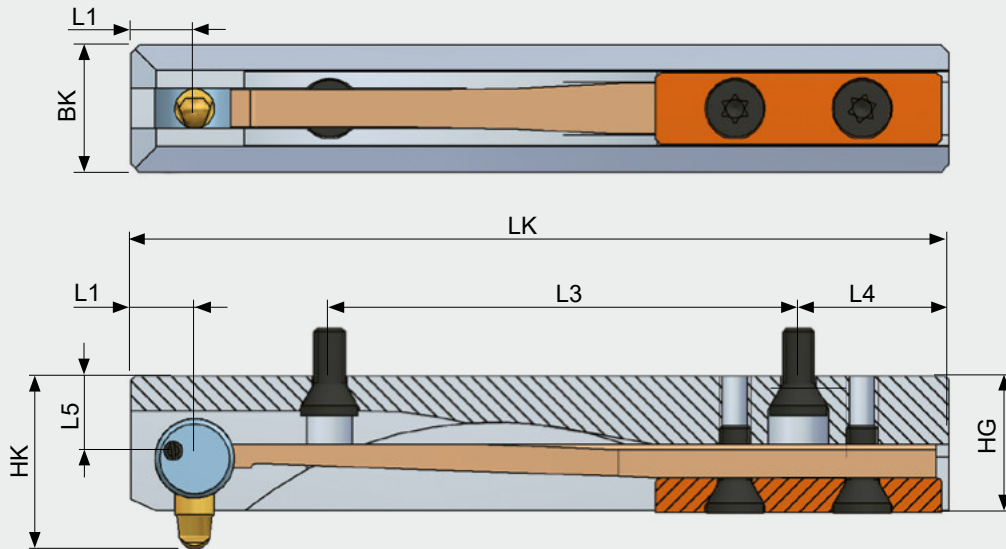
D: Coating for aluminium alloys only

# COFA Cassette Systems C6 to C12

COFA C6 Cassette



COFA C8/C12 Cassette



The COFA Cassette is used for installation into combination tools and cassette holders. The holder can be ordered from HEULE, or

the customers can use their own, utilising the following specifications.

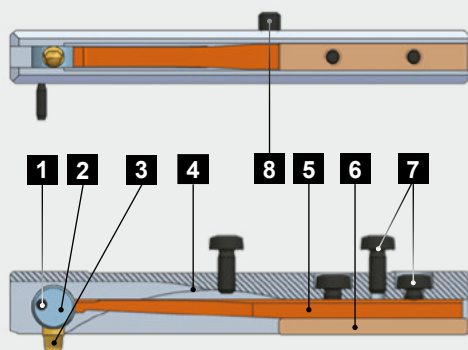
## Tool Table

Type	For bores >Ø d	Deburr-Ø D	Blade types C6 - C12	Cassette <b>without Blade</b> <sup>1</sup>	
				Part No.	Spring index
C6	10.0	to be calculated	see page 39	C6-O-0900/ ...	s. page 39
C8	14.0	to be calculated	see page 41	C8-O-0900/ ...	s. page 41
C12	20.0	to be calculated	see page 43	C12-O-0900/ ...	s. page 43

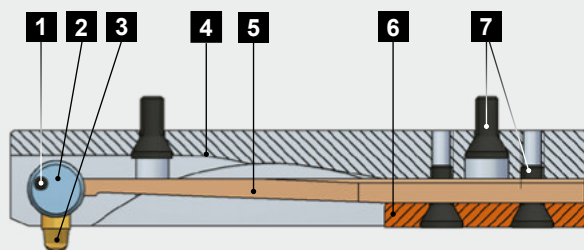
### ORDERING INFORMATION

<sup>1</sup>) The COFA cassettes will be supplied **without blades**. The blades have to be ordered separately always. Please refer to pages 39, 41, 43.

COFA C6



COFA C8 / C12



## Spare Parts

Pos.	Description	C6	C8	C12
<b>1</b>	Roll pin	C6-E-0003	C8-E-0003	C12-E-0003
<b>2</b>	Blade holder	C6-E-0001	C8-E-0001	C12-E-0001
<b>3</b>	COFA blade	see page 39	see page 41	see page 43
<b>4</b>	Tool body	C6-G-0900	C8-G-0900	C12-G-0900
<b>5</b>	Bending spring	see below	see below	see below
<b>6</b>	Fixing strip	GH-C-E-0812	C8-E-0800	C12-E-0800
<b>7</b>	Screw	GH-H-S-0803	GH-H-S-0050	GH-H-S-0012
<b>8</b>	Threaded pin M2x2	GH-H-S-0137	-	-

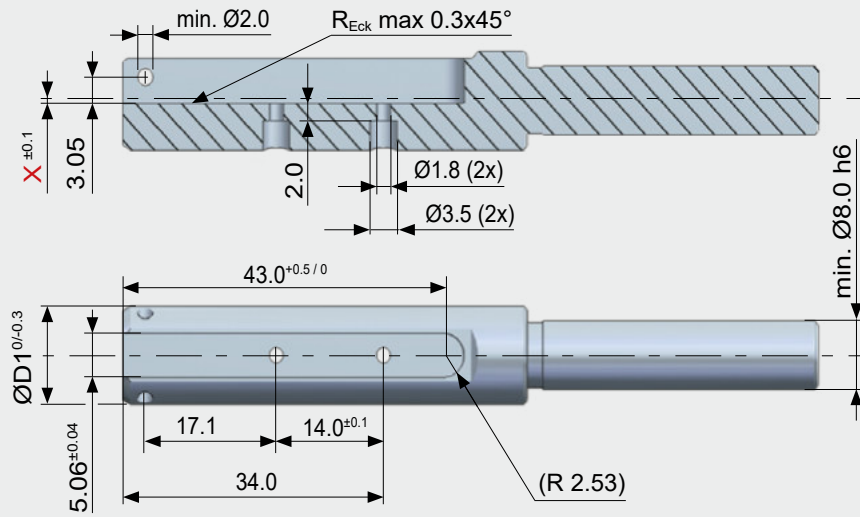
## Spring Index

Type	Bending spring	Part No.	Application
W2	soft (softer than W1)	The part numbers for the springs are identical with those for the standard tools. See for C6 - page 39 C8 - page 41 C12 - page 43	Special applications
W1	soft (softer than W)		Special applications
W	soft		Aluminium alloys, copper zinc alloys, soft mat.
H	hard		<b>Standard applications, all steel types</b>
S	super hard		Hard and tough materials
Z	extra hard (harder > S)		Very tough materials or very large burr formations
Z1	extra hard (harder > Z)		Special applications
Z2	extra hard (harder > Z1)		Special applications
Z3	extra hard (harder > Z2)		Special applications

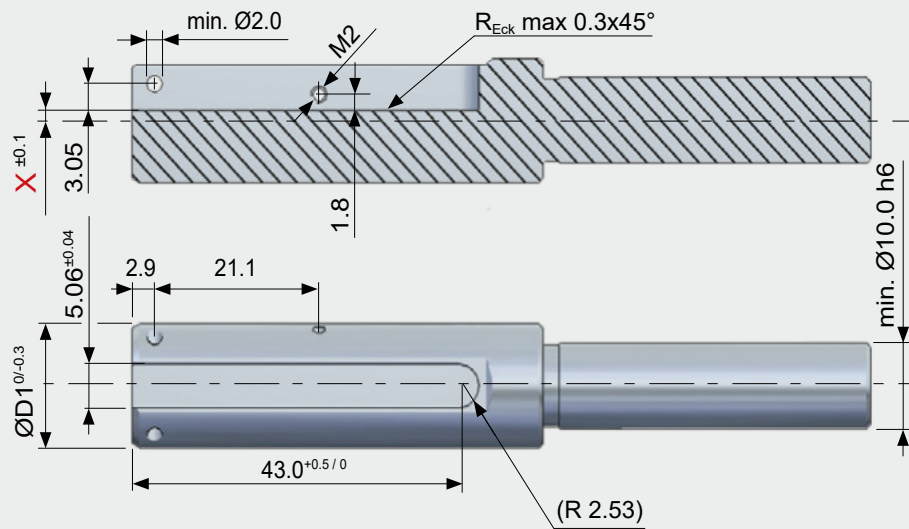
## Dimension Table

Type	BK	HG	LK	HK	L1	L2	L3	L4	L5
<b>C6</b>	5.0	5.8	42.5	M 7.6	4.0	20.0	14.0	8.5	3.3
<b>C6</b>				L 7.8		-			
<b>C8</b>	8.0	8.5	51.5	M 10.6	4.0	-	29.6	9.5	5.2
<b>C8</b>				L 11.0		-			
<b>C12</b>	10.0	13.0	60.0	M 15.6	7.5	-	35.0	8.5	7.7
<b>C12</b>				L 16.2		-			

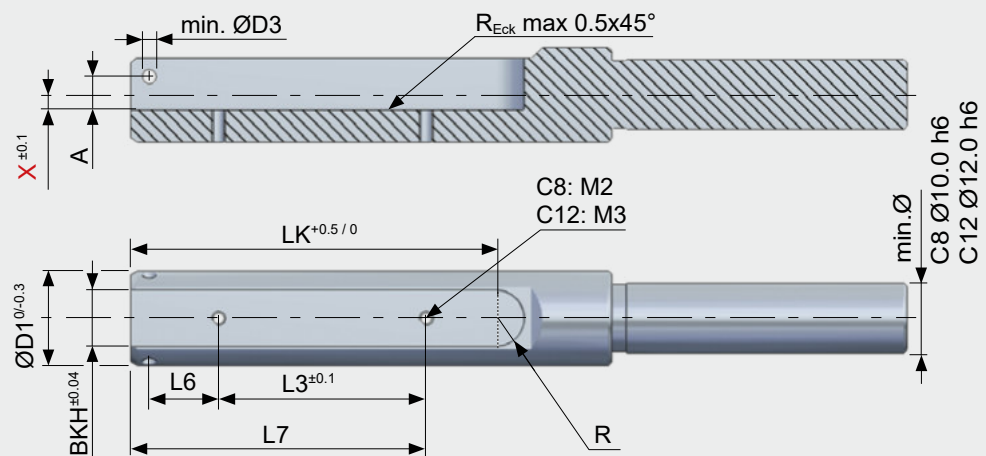
COFA C6  
 Ø10.0-14.99 mm



COFA C6  
 >15.0 mm



COFA C8  
 COFA C12

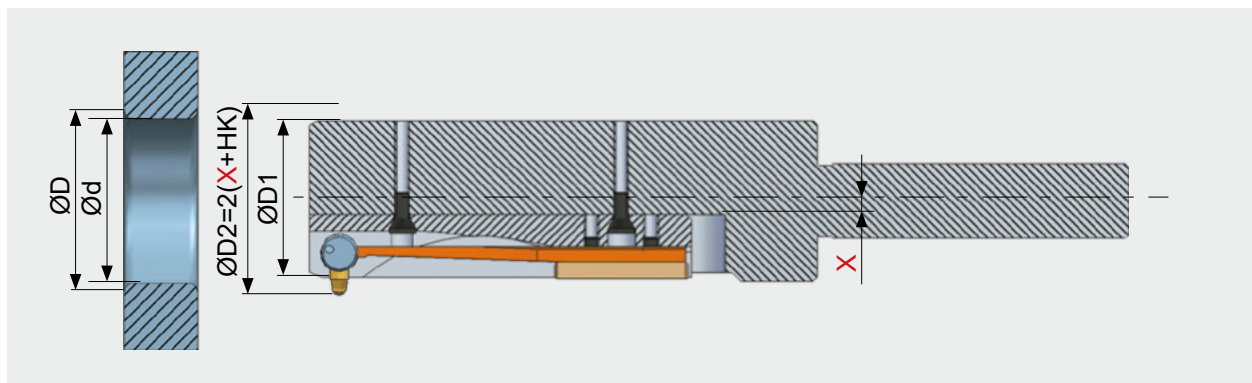


## Limiting Values

from Bore Ø	C6		C8		C12	
	Ø10.0		Ø14.0		Ø20.0	
	M	L	M	L	M	L
max. ØD	Ød + 0.8	Ød + 1.4	Ød + 1.1	Ød + 1.8	Ød + 1.5	Ød + 2.8
max. ØD1	Ød - 0.5		Ød - 0.5		Ød - 0.5	

## Dimension Table Cassette Holder

	BKH	LK	D3	L3	L6	L7	X	A	R
<b>C6</b>	Please use directly figures in the drawings on page 50						Must be calculated for every application (see formula below)		
<b>C8</b>	8.06	52.0	2.0	29.6	9.85	42.1		4.70	4.03
<b>C12</b>	10.06	61.0	3.0	35.0	11.1	51.5		6.45	5.03



**C6:**  $X = \text{Ød}/2 - 6.3$

**C8:**  $X = \text{Ød}/2 - 9.2$

**C12:**  $X = \text{Ød}/2 - 13.7$

## Calculation example installation dimension X

Example COFA6 cassette		
Given:	Sought:	
	Dimension X	Blade
Bore Ø d: 12.5 mm	$X = \text{Ød} / 2 - 6.3$	
	$X = (12.5 \text{ mm} / 2) - 6.3 \text{ mm}$	
	$X = 6.25 \text{ mm} - 6.3 \text{ mm}$	
	$X = -0.05 \text{ mm}$	
Debur Ø D: 13.7 mm >> deburring width 0.6 mm		L blade (0.7 mm)
	$X = -0.05 \text{ mm} + (0.6 \text{ mm} - 0.7 \text{ mm})$	
	$X = -0.05 \text{ mm} - 0.1 \text{ mm}$	
	<b>X = -0.15 mm</b>	



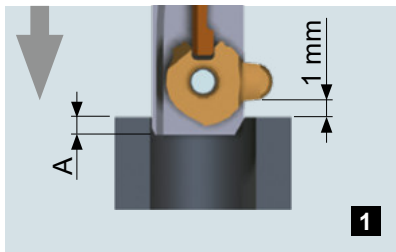
# Technical Data and Settings

## Cutting Data COFA

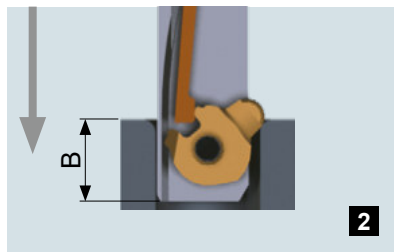
Material	Condition	Tensile strength (N/mm <sup>2</sup> )	Hardness HB	COFA C2 / C3		COFA 4M to C12	
				Cutting speed (m/min)	Feed (mm/rev)	Cutting speed (m/min)	Feed (mm/rev)
Unalloyed steel		<500	<150	20-60	0.05-0.15	20-60	0.1-0.3
Cast steel		500 - 850	150 - 250	20-60	0.05-0.15	20-60	0.1-0.3
Grey cast iron		<500	<150	30-80	0.05-0.15	30-80	0.1-0.3
Ductile cast iron		300 - 800	90 - 240	20-60	0.05-0.15	20-60	0.1-0.3
Low alloy steel	annealed	<850	<250	20-60	0.05-0.15	20-60	0.1-0.3
	tempered	850 - 1000	250 - 300	20-40	0.05-0.15	20-40	0.1-0.3
	tempered	>1000 - 1200	>300 - 350	15-30	0.05-0.15	15-30	0.1-0.3
High alloy steel	annealed	<850	<250	15-30	0.05-0.15	15-30	0.1-0.3
	tempered	850 - 1100	250 - 320	10-20	0.05-0.15	10-20	0.1-0.3
Stainless steel	ferritic	450 - 650	130 - 190	15-30	0.05-0.15	15-30	0.1-0.3
	austenitic	650 - 900	190 - 270	10-20	0.05-0.15	10-20	0.1-0.3
	martensitic	500 - 700	150 - 200	15-30	0.05-0.15	15-30	0.1-0.3
Special alloy (Inconel, titanium)		<1200	<350	10-20	0.05-0.15	10-20	0.1-0.3
Wrought or cast aluminium alloys				30-70	0.05-0.15	30-70	0.1-0.3
Copper alloy	Brass			30-70	0.05-0.15	30-70	0.1-0.3
	Bronze short-chipping			20-60	0.05-0.15	20-60	0.1-0.3
	Bronze long-chipping			20-40	0.05-0.15	20-40	0.1-0.3

### WARNING NOTICE

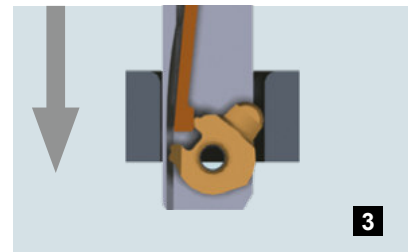
All listed cutting data are standard values only! The cutting values depend on the amount of slope of the uneven bore edge. (i.e. high slope ► low cutting value). The feed also depends on the sloping ratio. In case of hard to machine materials or uneven bore edges, we recommend to apply cutting speeds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



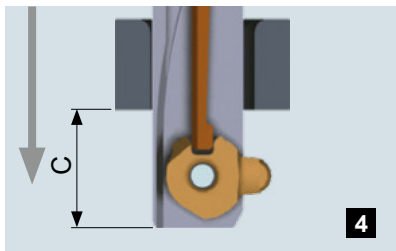
Rapid traverse of the cutting unit of the tool above the top material surface of hole or burr. Referencing the front edge of the cutting blade **A**.



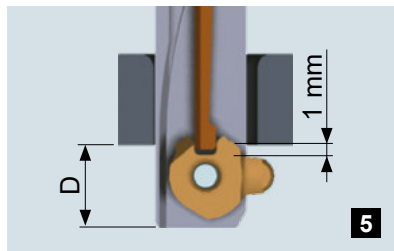
In forward working feed machine the top surface of the hole to position **B**.



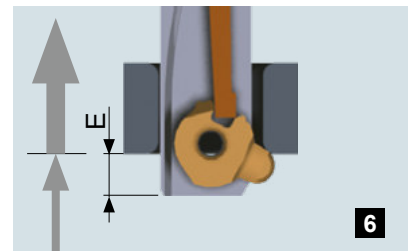
Rapid traverse through the hole. The surface of the hole cannot be damaged.



In order to make the blade snap out again, the tool has to be positioned beyond the rear bore edge by measurement **C**.



Travel the tool back in rapid feed below the rear material surface of the hole or the burr **D**.



In back working feed the backward deburring is executed until position **E**. Then exit in rapid traverse.

Dimension Table to Programming Information

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

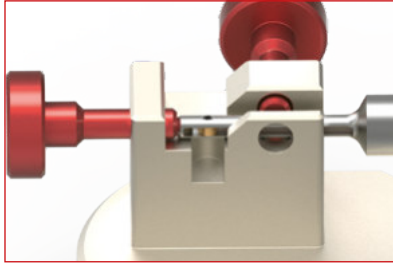
**NOTE**

Important - Please pay attention to irregular surfaces! Please consider unevenness when programming the distances. See also the explanations on page 59.

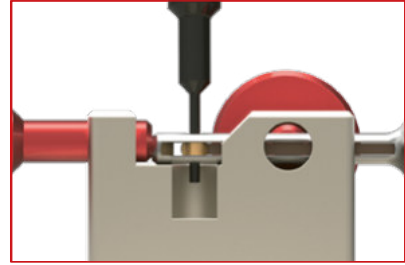


Assembly device for tool type COFA C2 / C3

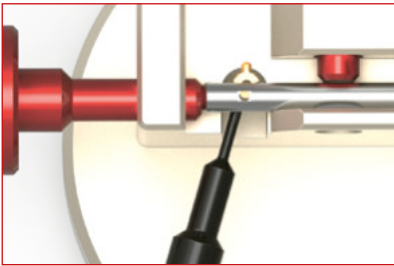
Please refer to page 57 for order information.



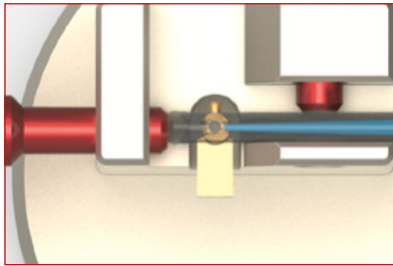
Adjust the tool lengthwise so that the blade bore is above the recess for the roll pin. Then clamp the tool. Make sure that the larger spring recess in the shaft is on clamp screw side.



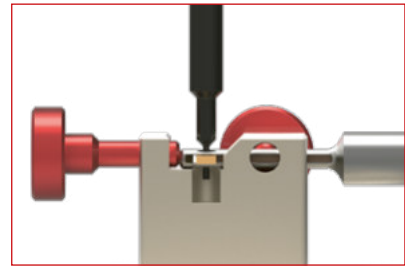
Push the roll pin out of the tool by using the smaller diameter of the assembly pin.



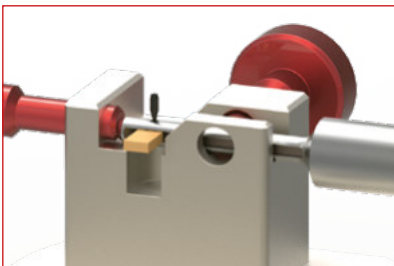
Push out the blade by using the smaller diameter of the assembly pin.



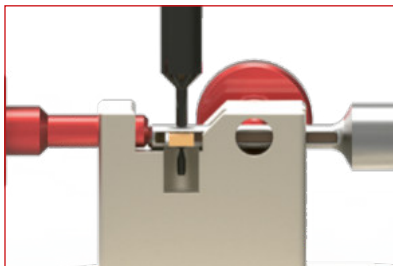
Insert the new blade nose first. The nose must be on the side of the shaft where the larger spring recess is (observe the mark on the tool). The spring must engage with the groove of the blade.



Center the blade with the help of the assembly pin. Its smaller diameter serves for pre-centering.



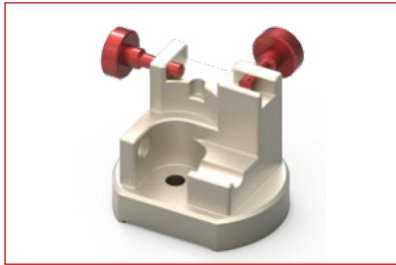
Insert roll pin with its longer and thinner section first.



Use assembly pin to push roll pin level with blade. Then unclamp the tool.

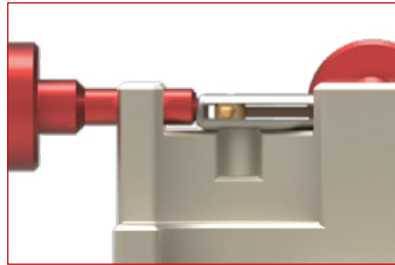


Brake off the assembly aid extensions of the blade and from the roll pin manually.

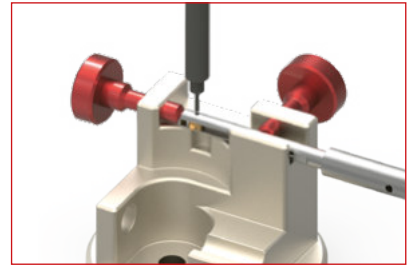


Assembly device for tool types COFA 4M and 5M

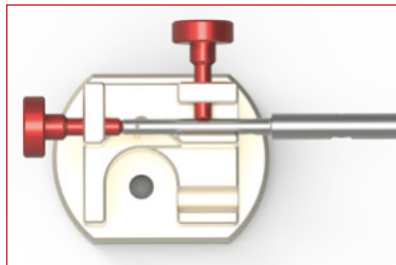
Please refer to page 57 for order information.



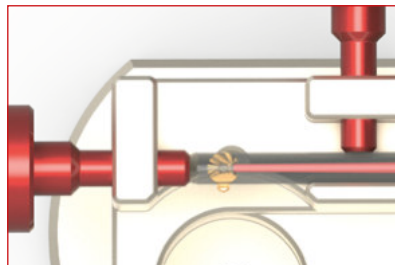
Adjust the tool lengthwise so that the blade bore is above the recess for the split pin. Clamp the tool as shown.



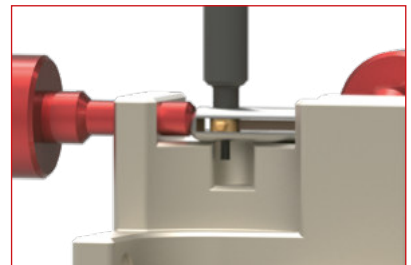
Push the split pin carefully out of the bore. Make sure you apply the assembly pin to the split end of the pin. If necessary, use a small hammer.



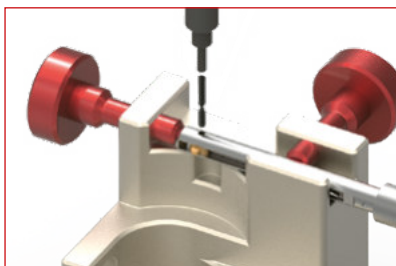
Push out the blade by means of the long end of the assembly pin.



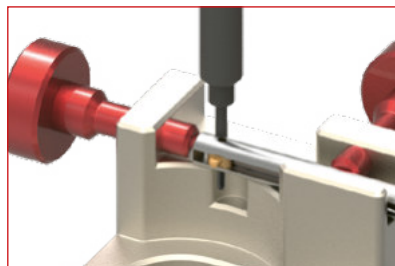
Insert the new blade into the tool with the blade groove orientated towards the spring. Please observe the marks on the tool body.



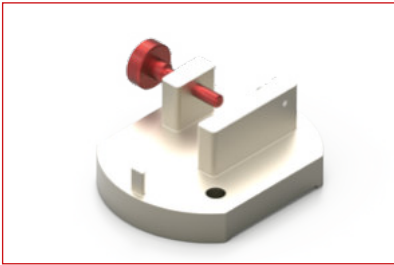
Guide the assembly pin with its long end through the bore and center the blade.



Insert the split pin manually with the split end upwards. Then push it with the assembly pin.



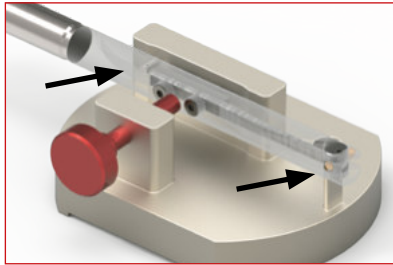
The assembly pin must be level with both sides of the tool body.



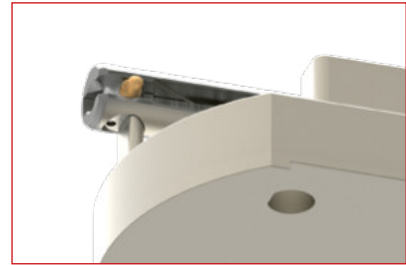
Assembly device for tool types COFA C6 - C12

Note: Execute blade change on mounted tool only.

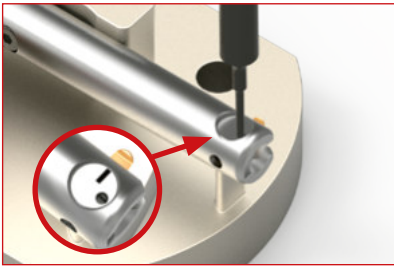
Please refer to page 57 for order information.



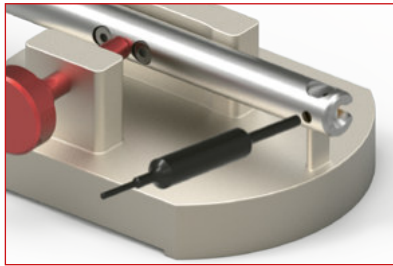
Place tool into the assembly device so that support pin from the assembly device enters into the spring recess behind the fixing strip and that the tool holder lies with its contour flush on the front rest.



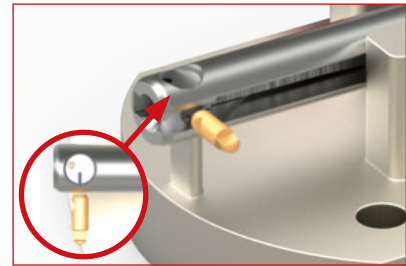
Make sure that the bore with the split pin is entirely free. Then, clamp the tool.



There are a line mark and the black split pin visible (see remark on page 55). Push the split pin through the tool holder by using the smaller diameter of the assembly pin (same direction for disassembly and assembly!).



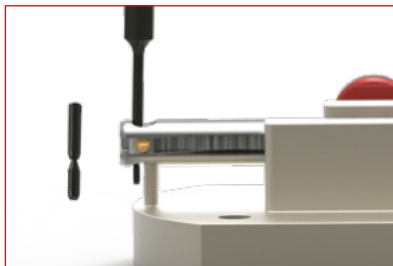
Use larger diameter of assembly pin to push the blade out of the blade holder.



Insert new blade with cutting edges up into the blade holder. Make sure that the blade is pushed in from the line mark side.



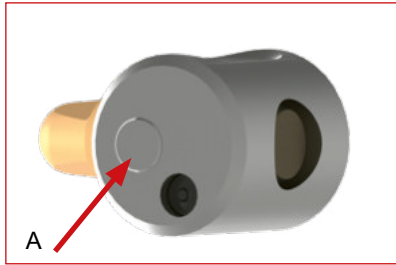
In order to define the right position of the blade and to pre-center for the new split pin, push the assembly pin in the split pin hole.



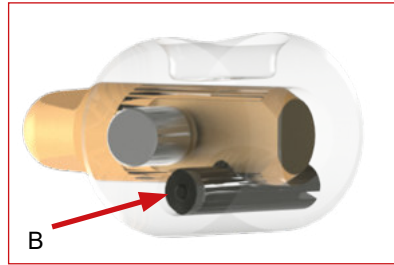
Insert new split pin short section first into the hole until the back end of the pin is flush with tool holder.



Loosen clamping screw and take the tool into your hands. Manually brake off the projecting section of the split pin at the predetermined breaking point.



The positioning pin (A) is a fixed component of the tool holder. The positioning pin and the black split pin are responsible for the correct position of the blade.



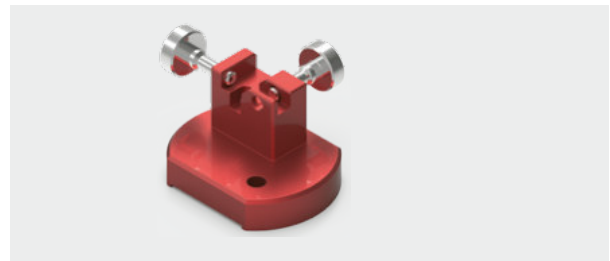
Only the split pin (B) may be removed for dismounting the blade. The positioning pin must remain in the blade holder.

**NOTE**

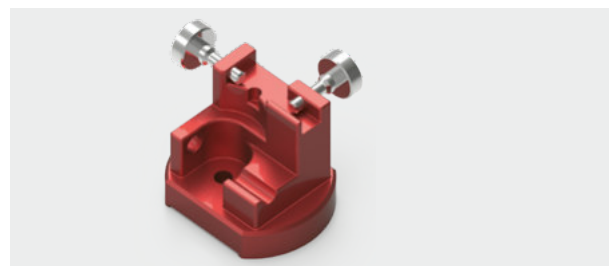
When changing the blade the positioning pin **must not** be removed. Please observe that re-inserting it after removal is prohibited. The correct positioning of the blade after inserting **cannot** be guaranteed anymore.

**Accessories – Assembly Aid for Blade Change**

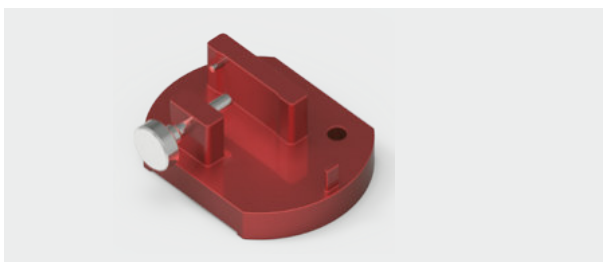
Assembly Aid	
Type	Part No.
COFA C2 and C3	C3-V-0002

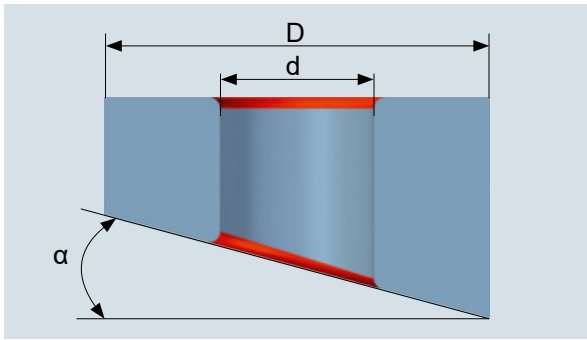


Assembly Aid	
Type	Part No.
COFA 4M and 5M	GH-C-V-0541



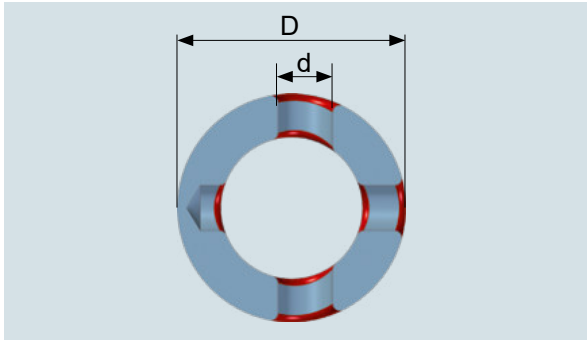
Assembly Aid	
Type	Part No.
COFA C6	C6-V-0008
COFA C8	C8-V-0007
COFA C12	C12-V-0018





The maximum diameter ratio (d:D) is about 0.5. This corresponds approximately to a sloping surface of  $\leq 18^\circ$ .

For diameter ratios (d:D) exceeding 0.5, respectively inclined surfaces with  $\alpha$  larger than  $18^\circ$ , only a trial will show whether the application can be resolved successfully with the COFA standard blade ( $20^\circ$ ). The machining of higher irregularities can be done upon request with special blades (see blade range in respective blade table  $10^\circ$ ,  $25^\circ$ ,  $30^\circ$ ).

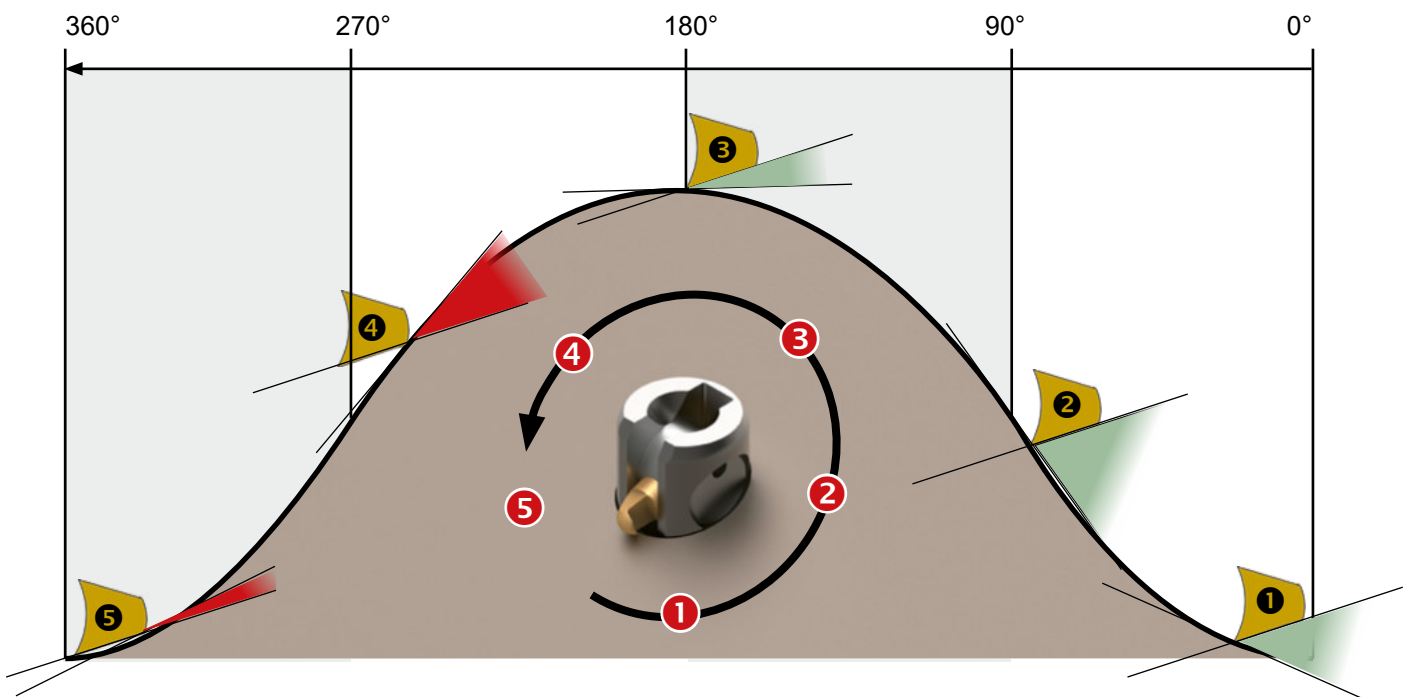


Formula for verifying the possible use of standard blades:

$$d:D \leq 0.5$$

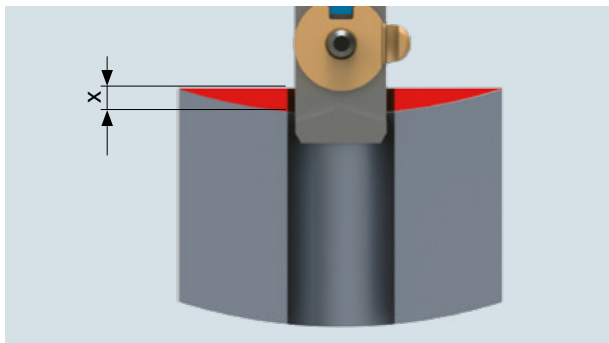
Cutting data for uneven bore edges:

- ▶ Speed: reduce
- ▶ Feed: leave

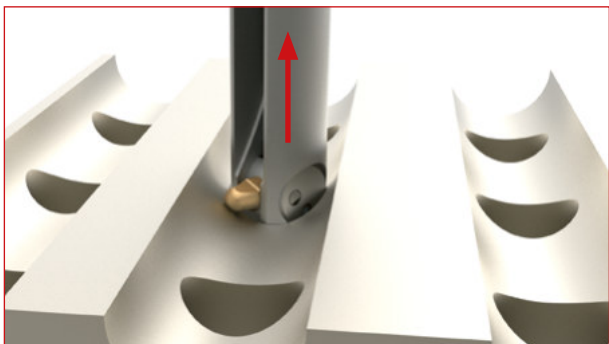


### NOTE

The clearance angle of the blade must be larger than the gradient of the sinus curve (slope) in order that the blade remains cutting. If this is not the case, the blade rests on the workpiece. With the result that there is no deburring or only partially (not the full circle) because the blade lies with its back on the workpiece.

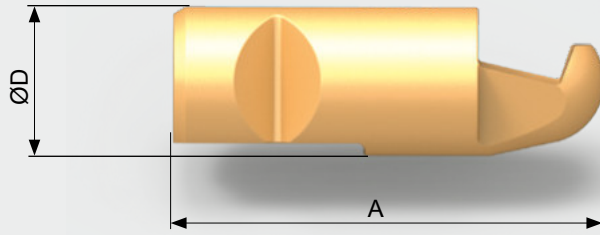


Please pay attention to irregular surfaces! Please consider unevenness X when programming the distances.



When machining bores with a high unevenness, it is important to stop the spindle before retracting the tool out of the bore. This will prevent the blade from hitting hard the slope of the exterior.





**Dimension Table**

Size	COFA C6		COFA C8		COFA C12	
	M	L	M	L	M	L
ØD	Ø2.0 h6	Ø2.0 h6	Ø2.5 h6	Ø2.5 h6	Ø3.5 h6	Ø3.5 h6
A	6.05	6.25	7.54	7.85	11.37	11.98

# FAQ COFA

Problem	Reason	Remedial Action
Bad uneven chamfer	• Rpm too high	⇒ Reduce rpm strongly, keep feed rate
	• Ratio between cross hole and tube dia.Ø (d:D) is larger than 0.5	⇒ Ratio is too big for the tool, no solution possible with COFA
	• Too large tool chosen	⇒ Use a tool with smaller diameter (for example C12/Ø15.0 ► C12/Ø14.5)
Vibrations, chattering marks	• Rpm too high	⇒ Reduce rpm
	• Feed rate too low	⇒ Increase feed rate (per revolution)
	• Spring too soft	⇒ Build in harder spring (spring index), existing tool can be modified
Chamfer too large	• Too large tool chosen	⇒ Use a tool with smaller diameter (for example C12/Ø15.0 ► C12/Ø14.5) or if applicable a smaller blade size
Deburring incomplete	• Spring too soft	⇒ Build in harder spring (spring index), existing tool can be modified
	• Clearance angle too small	⇒ Use another blade
Secondary burr	• Spring too hard	⇒ Build in softer spring