

COFA

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

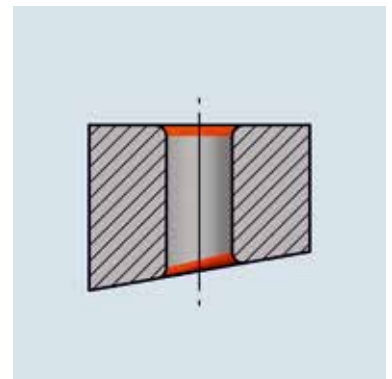
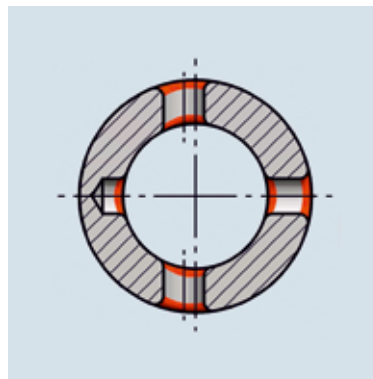
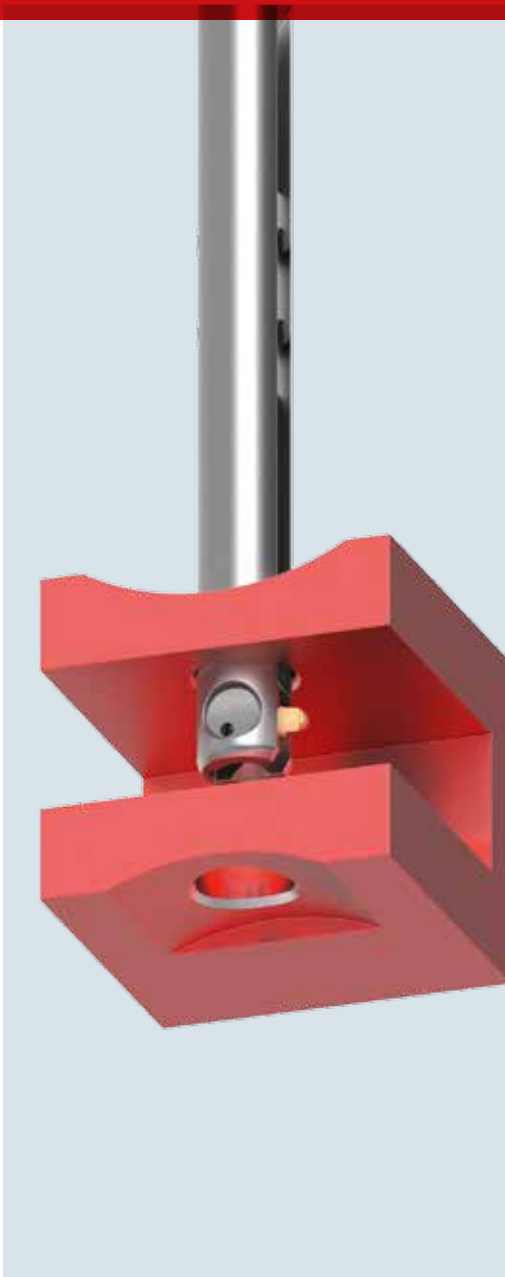


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COFA - The Universal Deburring Tool

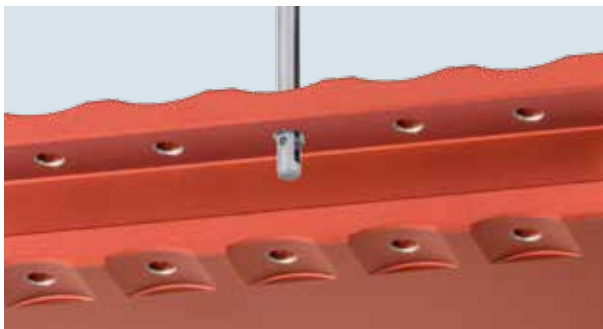


Consistent front and back deburring of even and uneven bore edges, in One Operation

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 work piece to be turned or the spindle stopped.

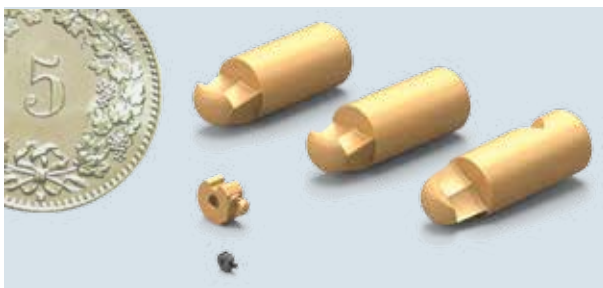
It is built for high volume production in CNC machines but can also be used for manual operation. The proven advanced system assures high efficiency and the required process capability.

Characteristics and Advantages

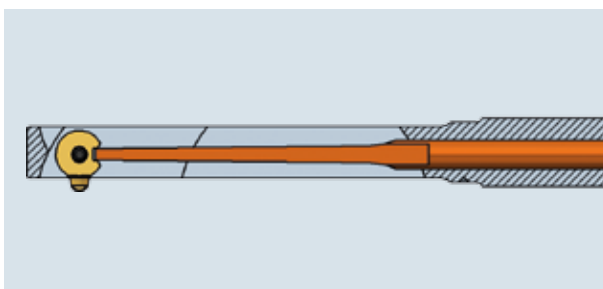


- The COFA standard tool series ranges from bore diameter Ø2.0 mm up to Ø26 mm. The cassette system is designed for bore diameters larger than Ø26.

- 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 dependant coatings.
- Tool types C6 up to C20 allow up to three different deburring capacities without changing the tool due to the exchangeable blade sizes.



- Combining the simple functioning principle together 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.



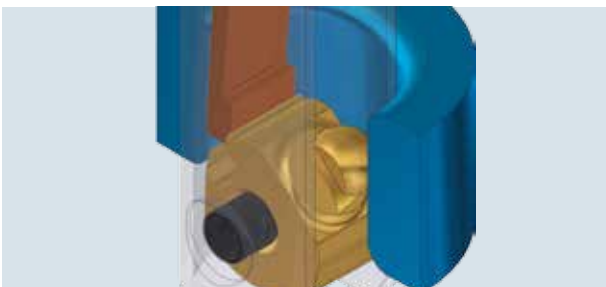
- The COFA system guarantees a consistent, radially shaped deburring of even and uneven bore edges.

- No matter what the Z-position of the tool, the deburring capacity always remains the same.



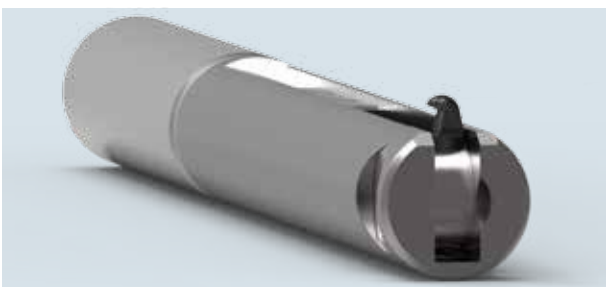
- The cassette solution integrates the deburring process into an existing customer tool. By combining two or several processes in one single tool, the cycle time can be reduced considerably.

- 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 crossing 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.



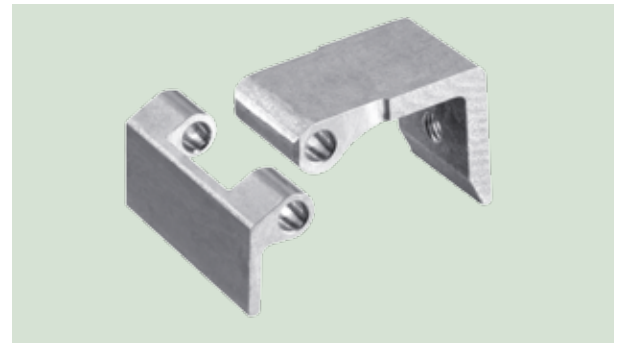
- The simple tool design allows fast and safe maintenance.

COFA has been specifically designed for front and back deburring on even and uneven bore edges, in one operation. It radially removes the burrs off the bore edges. Independent of the Z-position of the work piece, 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 work pieces with cross bores in main bores.



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. COFA *New Generation* C6, C8, C12, C20 representing the upper end of the range is the latest development. The illustrations on this page show the real dimensions of the tools.

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 COFA *New Generation*.

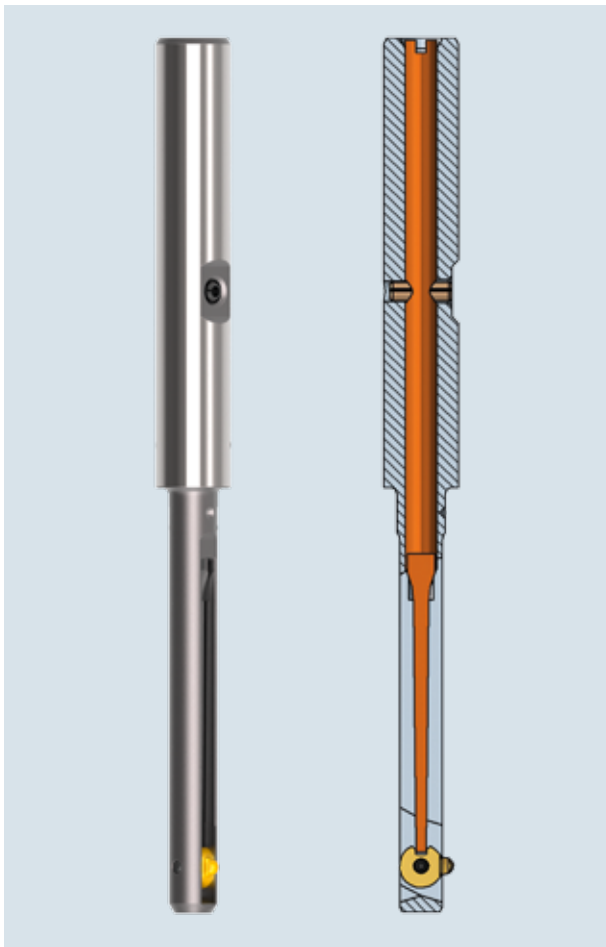


Image: COFA 4M

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 independant 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.

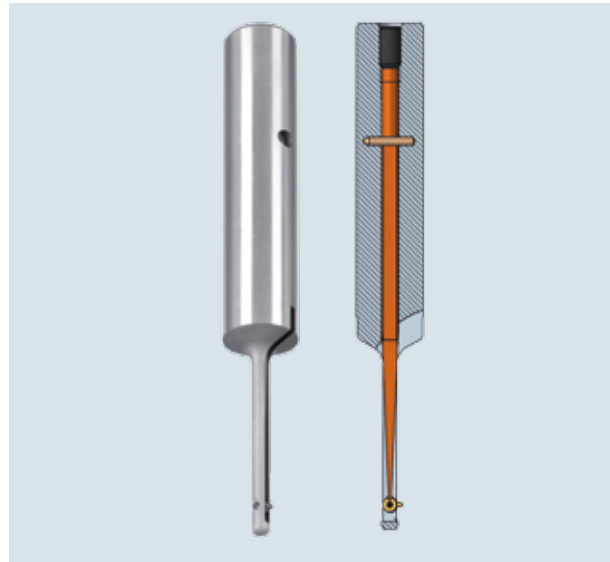


Image: COFA C2

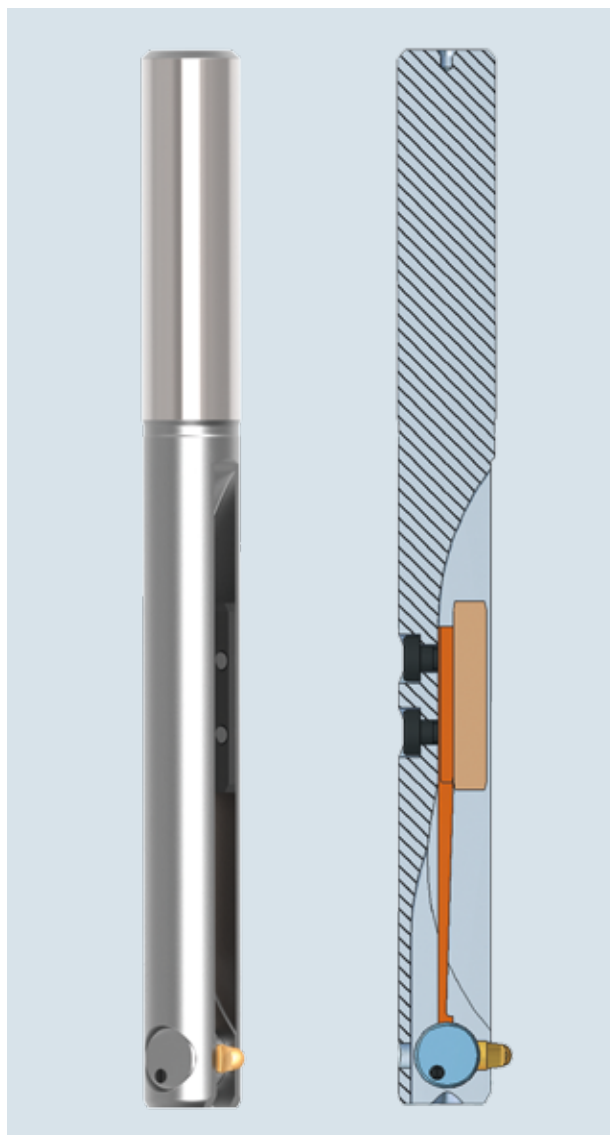
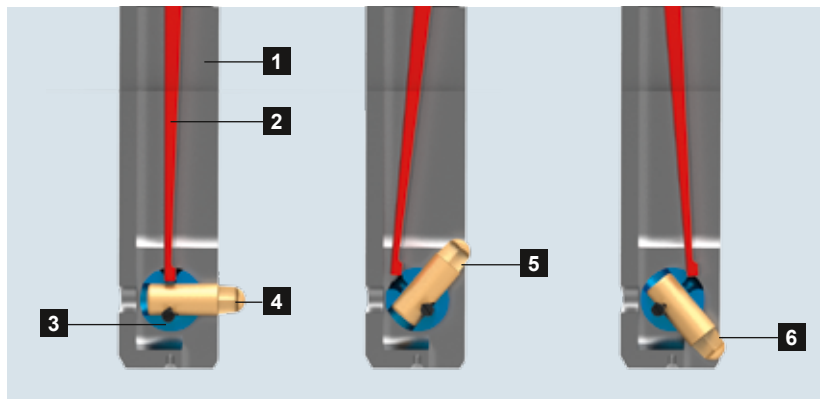


Image: COFA C12

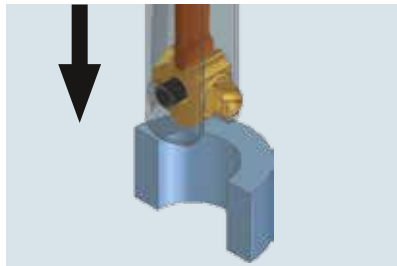
Function Principle



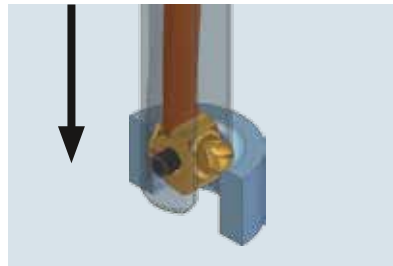
- 1** Tool body
- 2** Spring
- 3** Blade holder
- 4** Blade Type C6 - C20
- 5** Cutting edge forward
- 6** Cutting edge backward

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 C20 (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.

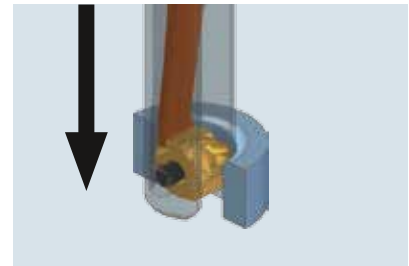
Process Steps Description



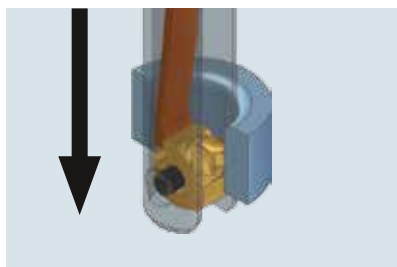
The process is very simple. First, rapid traverse of the cutting unit of the tool above the top material surface of hole or burr. Referencing the front edge of the cutting blade.



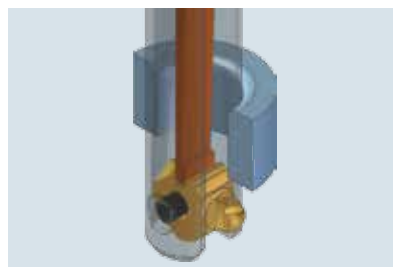
In working feed forward and working speed, the deburring of the upper bore edge is carried out.



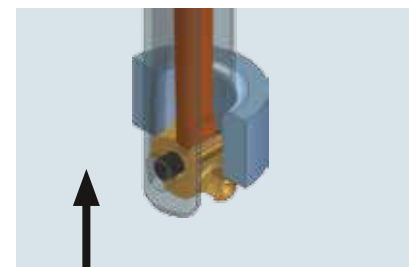
Once deburring is complete, traverse in rapid feed without stopping the spindle in the hole. Note: Interfering edges in the interior (i.e. cross bore).



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.

Product Range

The product range comprises of tools for the use in bore diameters ranging from 2 mm to 26 mm. In addition, using cassettes, any size of bore diameter can be deburred. The deburring capacity (radially) is 0.1 up to 2.25 mm maximum depending on bore dimension and blade selection.

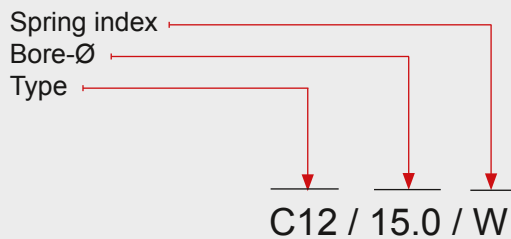
Within the tool range, there are variants of diameters that cover a minimal bore diameter range.



Bore	Max. Deburring Capacity ¹	Tool Series
Ø 2.0 – Ø 3.1 mm	0.15 mm	COFA C2
Ø 3.0 – Ø 4.1 mm	0.25 mm	COFA C3
Ø 4.0 – Ø 5.0 mm	0.25 mm	COFA 4M
Ø 5.0 – Ø 6.0 mm	0.35 mm	COFA 5M
Ø 6.0 – Ø 8.4 mm	0.70 mm	COFA C6
ab Ø 10 mm	0.70 mm	COFA C6 cassette
Ø 8.0 – Ø 12.4 mm	0.90 mm	COFA C8
ab Ø 14 mm	0.90 mm	COFA C8 cassette
Ø 12.0 – Ø 22.0 mm	1.40 mm	COFA C12
ab Ø 20 mm	1.40 mm	COFA C12 cassette
Ø 20.0 – Ø 26.0 mm	2.25 mm	COFA C20
ab Ø 25 mm	2.25 mm	COFA C20 cassette

¹⁾ 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.

Part Number: Tool including standard blade



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 C20 line has three blade sizes (S, M, L). 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 used in a larger bore than indicated by the tool size, a correspondingly smaller deburred area results due to the deburring capacity of a given tool size remains the same. 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 tool will be manufactured with a cylindrical shank. Weldon / Whistle Notch clamping systems can be ordered upon request - but are not available from stock. (-HB = Weldon; -HE = Whistle Notch; Ex.: COFA C12 / 15.0 / H - HB - OM)

Order Example COFA C2/C3

Requirements:	Deburr bore, no defined chamfer
Bore-Ø:	2.6 mm
Material:	Cast
Selection:	
Tool article number:	C2/2.6/H
Deburr-Ø:	3.1 mm
Spring type:	H for cast

Order Example COFA C6/C8/C12/C20

Requirements:	Deburr hole, Ø9.5 mm minimum
Bore-Ø:	8.4 mm
Material:	Titanium
Selection:	
Tool article number	C8/8.4/Z-OM
Deburr-Ø:	>10.0 mm
Spring type:	Z for titanium
Blade:	C8-M-0001-T, L blade approx. Ø10.2 mm

Part Number: Tool without blade



Recommendation

Select the tool size so that the resulting chamfer will be **just as large as requested**.

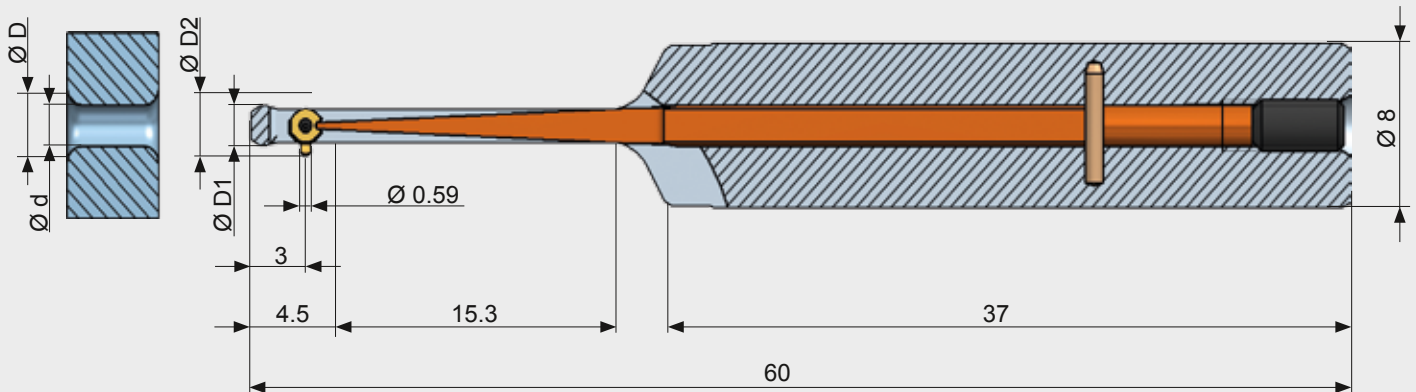
Without special designation the tool will be supplied with the standard blade built in as defined per type series. This is the M type blade for tool types C6 up to C20. If a special blade is needed - i.e only backward cutting - the tool has to be ordered **without** blade (add extension "OM") and order the special blade separately (see tool order example C6 to C20).

Material / Coating blades

All COFA blades are made of carbide. The available standard coatings are:

- A: steel, titan, Inconel
- T: steel, titan, Inconel
- D: aluminium alloys

COFA C2 Tool Ø 2 mm to 3.1 mm



Tool Table

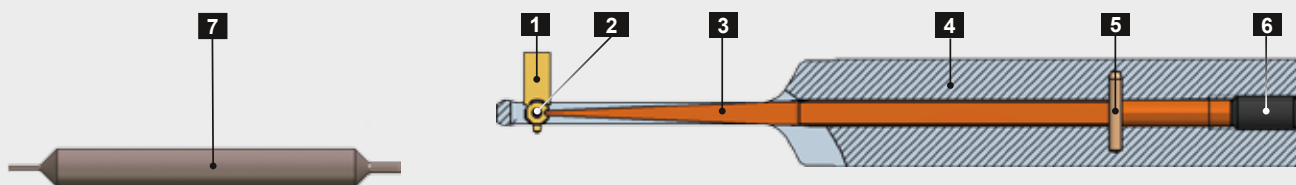
Tool dimensions				Tool with standard blade	
Bore-Ø d	Deburr-Ø max. ¹ D	Tool-Ø D1	Maximum-Ø ² D2	Part No. incl.	Spring index
2.0	2.2	1.95	2.7	C2 / 2.0 / ...	Please add the spring index after the part no.! Order example: C2 / 2.8 / W Refer to spring index on page 11
2.1	2.3	2.05	2.8	C2 / 2.1 / ...	
2.2	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 / ...	

¹⁾ 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.

²⁾ Pay attention to the interfering edges.

Note:

Is the tool part number is written without the extension "OM" (= without blade), the standard blade C2-M-0006-A is already mounted. Please refer to the explanations on page 9.



Spare Parts

Pos.	Description	Part No.
1	COFA C2 Blade	see below
2	Roll pin Ø0.7x1.7	C2-E-0002
3	Bending spring	see below
4	Tool body	upon request
5	Locking pin Ø1m6x6	GH-H-S-1017
6	Threaded pin M2.5x5	GH-H-S-0135
7	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 tin alloys, soft materials
H	hard	C2-E-0014*	Standard applications, all steel types
S	super hard	C2-E-0015	Hard and tough materials
Z	extra hard (harder > Z)	C2-E-0016	Very tough materials or very large burr formations
Z1	extra hard (harder > Z1)	C2-E-0017	Special applications

Blades

Angle	Part No. for COFA C2 Blades forward and backward cutting		Part No. for COFA C2 Blades 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
20°	C2-M-0006-A*	C2-M-0006-D	C2-M-0016-A	C2-M-0016-D
25°	C2-M-0008-A	C2-M-0008-D	C2-M-0018-A	C2-M-0018-D
30°	C2-M-0009-A	C2-M-0009-D	C2-M-0019-A	C2-M-0019-D

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

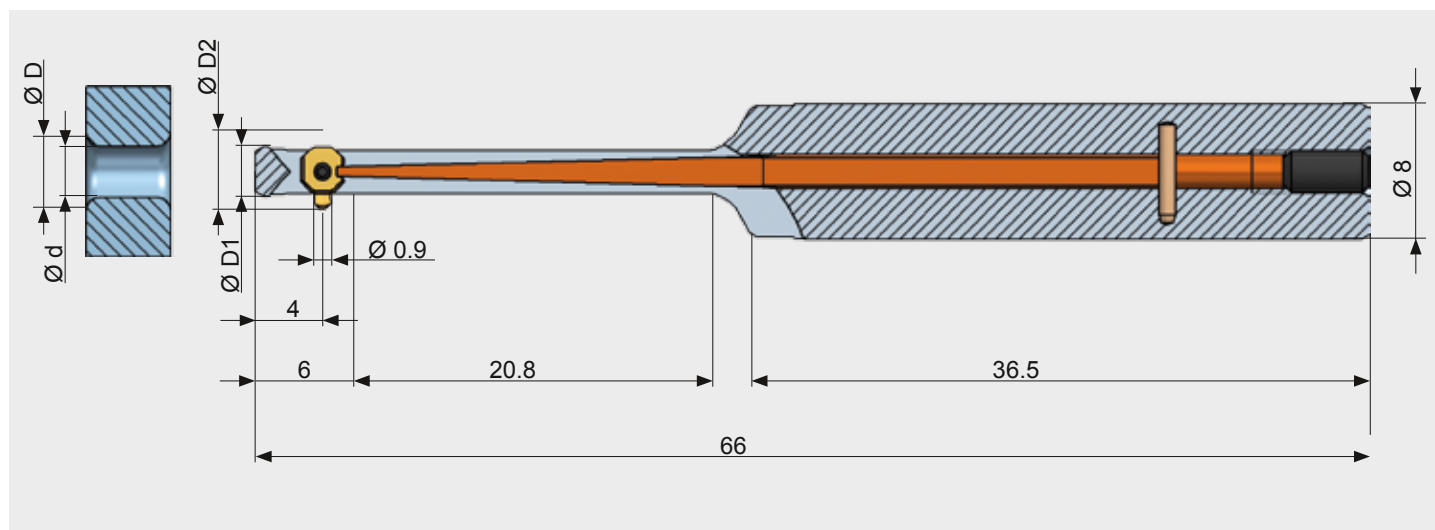
Explanations to coatings:

A: Coating for steel, titan, Inconel

D: Coating for aluminium alloys only

See also page 9.

COFA C3 Tool Ø 3 mm to 4.1 mm



Tool Table

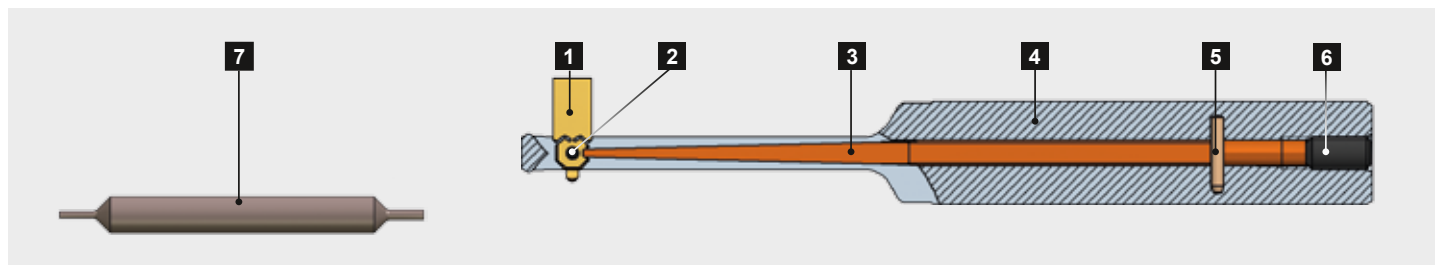
Tool dimensions				Tool with standard blade	
Bore-Ø d	Deburr-Ø max. ¹ D	Tool-Ø D1	Maximum-Ø ² D2	Part No. incl.	Spring index
3.0	3.3	2.95	4.0	C3 / 3.0 / ...	Please add the spring index after the part no. Order example: C3 / 3.2 / Z Refer to spring index on page 13
3.1	3.4	3.05	4.1	C3 / 3.1 / ...	
3.2	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 / ...	

¹⁾ 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.

²⁾ Pay attention to the interfering edges.

Note:

Is the tool part number is written without the extension "OM" (= without blade), the standard blade C3-M-0006-A is already mounted. Please refer to the explanations on page 9.



Spare Parts

Pos.	Description	Part No.
1	COFA C3 blade	see below
2	Roll pin Ø1.0x2.7	C3-E-0002
3	Bending spring	see below
4	Tool body	upon request
5	Locking pin Ø1m6x6	GH-H-S-1017
6	Threaded pin M2.5x5	GH-H-S-0135
7	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
H	hard	C3-E-0014*	Standard applications, all steel types
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. for COFA C3 Blades forward and backward cutting		Part No. for COFA C3 Blades 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
20°	C3-M-0006-A*	C3-M-0006-D	C3-M-0016-A	C3-M-0016-D
25°	C3-M-0008-A	C3-M-0008-D	C3-M-0018-A	C3-M-0018-D
30°	C3-M-0009-A	C3-M-0009-D	C3-M-0019-A	C3-M-0019-D

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

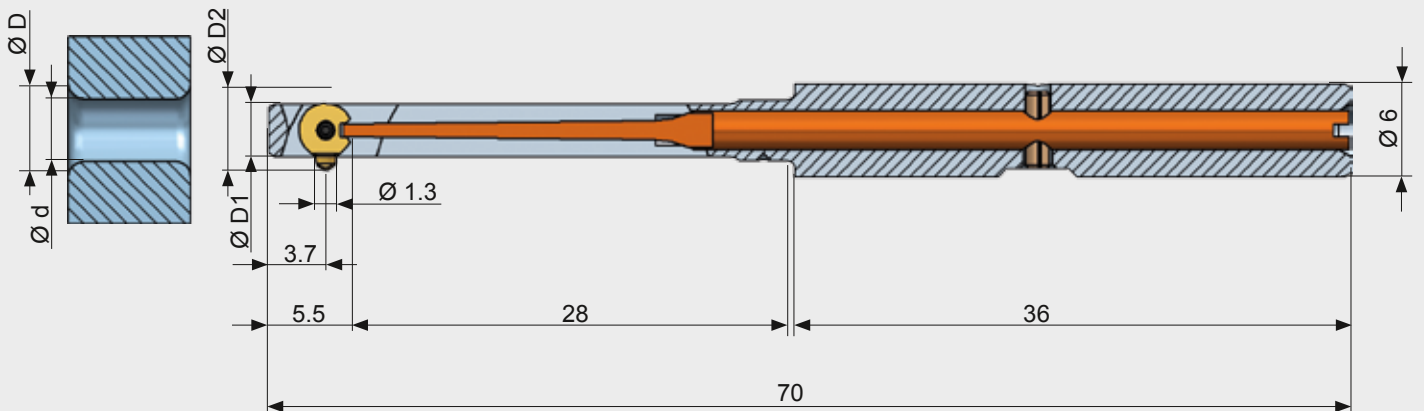
Explanations to coatings:

A: Coating for steel, titan, Inconel

D: Coating for aluminium alloys only

See also page 9.

COFA 4M Tool Ø 4 mm to 5.1 mm



Tool Table

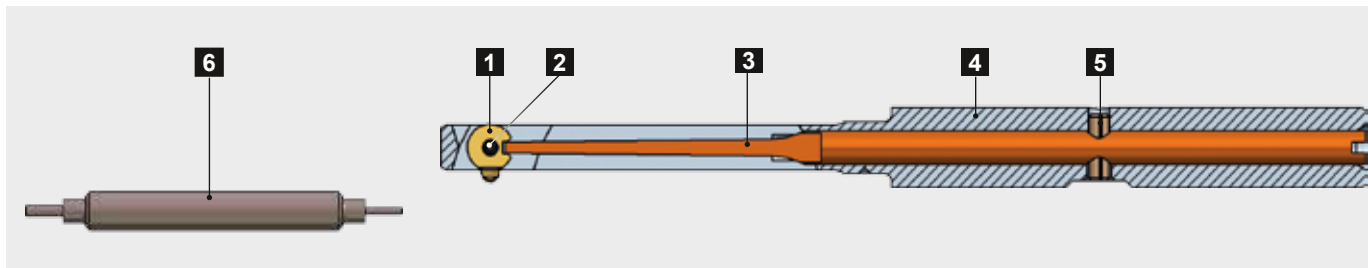
Tool dimensions				Tool with standard blade	
Bore-Ø d	Deburr-Ø max. ¹ D	Tool-Ø D1	Maximum-Ø ² D2	Part No. incl.	Spring index
4.0 - 4.1	4.5	3.9	5.2	COFA 4M / 4.0 / ...	Please add the spring index after the part no.! Order example: COFA 4M / 4.2 / S Refer to spring index on page 15
4.1 - 4.2	4.6	4.0	5.3	COFA 4M / 4.1 / ...	
4.2 - 4.3	4.7	4.1	5.4	COFA 4M / 4.2 / ...	
4.3 - 4.4	4.8	4.2	5.5	COFA 4M / 4.3 / ...	
4.4 - 4.5	4.9	4.3	5.6	COFA 4M / 4.4 / ...	
4.5 - 4.6	5.0	4.4	5.7	COFA 4M / 4.5 / ...	
4.6 - 4.7	5.1	4.5	5.8	COFA 4M / 4.6 / ...	
4.7 - 4.8	5.2	4.6	5.9	COFA 4M / 4.7 / ...	
4.8 - 4.9	5.3	4.7	6.0	COFA 4M / 4.8 / ...	
4.9 - 5.0	5.4	4.8	6.1	COFA 4M / 4.9 / ...	
5.0 - 5.1	5.5	4.9	6.2	COFA 4M / 5.0 / ...	

¹⁾ 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.

²⁾ Pay attention to the interfering edges.

Note:

Is the tool part number is written without the extension "OM" (= without blade), the standard blade GH-C-M-0504 is already mounted. Please refer to the explanations on page 9.



Spare Parts

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

Spring Index

Type	Bending spring	Part No.	Application
W2	soft (softer than W1)	upon request	Special applications
W1	soft (softer than W)	upon request	Special applications
W	soft	GH-C-E-0342	Aluminium alloys, copper tin alloys, soft materials
H	hard	GH-C-E-0343*	Standard applications, all steel types
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)	upon request	Special applications
Z3	extra hard (harder > Z2)	upon request	Special applications

Blades

Angle	Part No. for COFA 4M Blades forward and backward cutting		Part No. for COFA 4M Blades 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°	GH-C-M-0504*	GH-C-M-0584	GH-C-M-0914	GH-C-M-0994
25°	GH-C-M-0161	---	GH-C-M-0181	---
30°	GH-C-M-0148	---	GH-C-M-0182	---

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

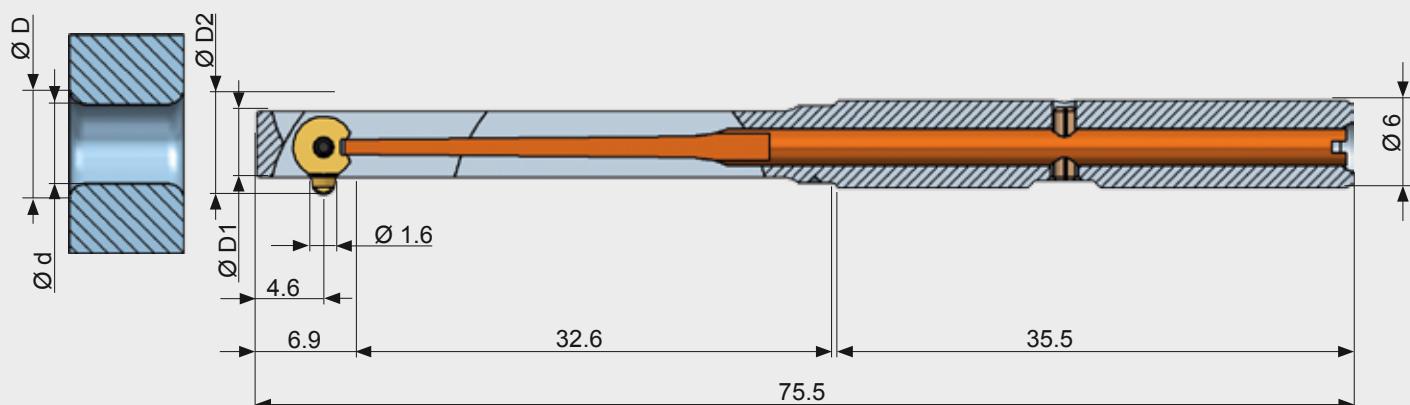
Explanations to coatings:

T: Coating for steel, titan, Inconel

D: Coating for aluminium alloys only

See also page 9.

COFA 5M Tool Ø 5 mm to 6.1 mm



Tool Table

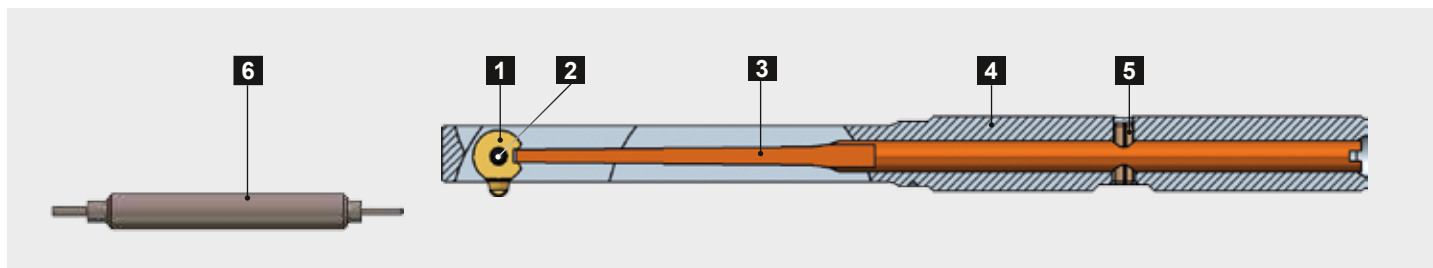
Tool dimensions				Tool with standard blade	
Bore-Ø d	Debur-Ø max. ¹ D	Tool-Ø D1	Maximum-Ø² D2	Part No.	Spring index
5.0 - 5.1	5.7	4.9	6.6	COFA 5M / 5.0 / ...	Please add the spring index after the part no.! Order example: COFA 5M / 5.6 / Z1 Refer to spring index on page 17
5.1 - 5.2	5.8	5.0	6.7	COFA 5M / 5.1 / ...	
5.2 - 5.3	5.9	5.1	6.8	COFA 5M / 5.2 / ...	
5.3 - 5.4	6.0	5.2	6.9	COFA 5M / 5.3 / ...	
5.4 - 5.5	6.1	5.3	7.0	COFA 5M / 5.4 / ...	
5.5 - 5.6	6.2	5.4	7.1	COFA 5M / 5.5 / ...	
5.6 - 5.7	6.3	5.5	7.2	COFA 5M / 5.6 / ...	
5.7 - 5.8	6.4	5.6	7.3	COFA 5M / 5.7 / ...	
5.8 - 5.9	6.5	5.7	7.4	COFA 5M / 5.8 / ...	
5.9 - 6.0	6.6	5.8	7.5	COFA 5M / 5.9 / ...	
6.0 - 6.1	6.7	5.9	7.6	COFA 5M / 6.0 / ...	

¹⁾ 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.

²⁾ Pay attention to the interfering edges.

Note:

Is the tool part number is written without the extension "OM" (= without blade), the standard blade GH-C-M-0505 is already mounted. Please refer to the explanations on page 9.



Spare Parts

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

Spring Index

Type	Bending spring	Part No.	Application
W2	soft (softer than W1)	upon request	Special applications
W1	soft (softer than W)	upon request	Special applications
W	soft	GH-C-E-0352	Aluminium alloys, copper tin alloys, soft materials
H	hard	GH-C-E-0353*	Standard applications, all steel types
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)	upon request	Special applications
Z3	extra hard (harder > Z2)	upon request	Special applications

Blades

Angle	Part No. for COFA 5M Blades forward and backward cutting		Part No. for COFA 5M Blades 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°	GH-C-M-0505*	GH-C-M-0585	GH-C-M-0915	GH-C-M-0995
25°	GH-C-M-0163	- - -	GH-C-M-0183	- - -
30°	GH-C-M-0150	- - -	GH-C-M-0184	- - -

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

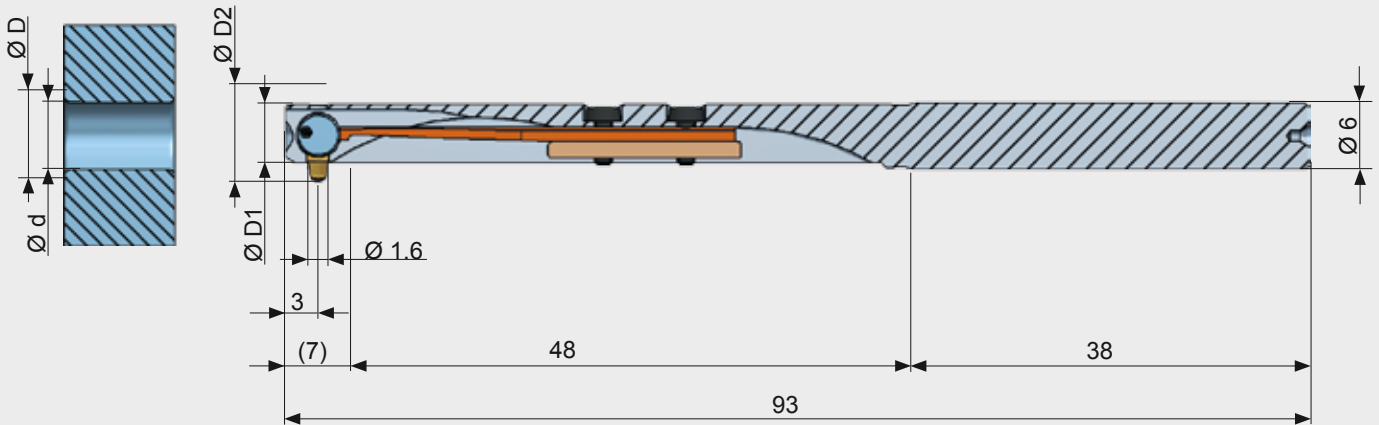
Explanations to coatings:

T: Coating for steel, titan, Inconel

D: Coating for aluminium alloys only

See also page 9.

COFA C6 Tool Ø 6 mm to 8.4 mm



Tool Table

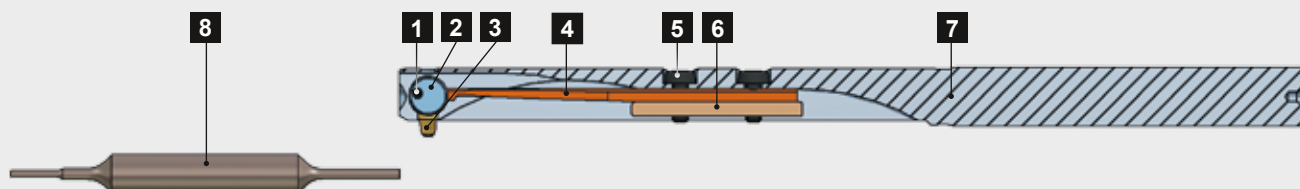
Tool dimensions						Tool with standard blade	
Bore-Ø d	Debur-Ø ¹ D		Tool-Ø D1	Maximum-Ø ² D2		Part No. incl.	Spring index
Blade size	M	L		M	L		
6.0	7.0	7.4	5.8	8.3	8.7	C6 / 6.0 / ...	Please add the spring index after the part no.! Order example: C6 / 8.0 / H Refer to spring index on page 19
6.2	7.2	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 / ...	

¹⁾ 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.

²⁾ Pay attention to the interfering edges.

Note:

Is the tool part number is written without the extension "OM" (= without blade), the standard blade C6-M-0006-T is already mounted. Please refer to the explanations on page 9.



Spare Parts

Pos.	Description	Part No.
1	Roll pin	C6-E-0003
2	Blade holder	C6-E-0001
3	COFA C6 Blade	see below
4	Bending spring	see below
5	Torx screw T5 / Wrench for Pos.5	GH-H-S-0803 / GH-H-S-2006
6	Fixing strip	GH-C-E-0812
7	Tool body	upon request
8	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 tin alloys, soft materials
H	hard	C6-E-0009*	Standard applications, all steel types
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. for COFA C6 Blades 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°	C6-M-0006-T*	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. for COFA C6 Blades 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

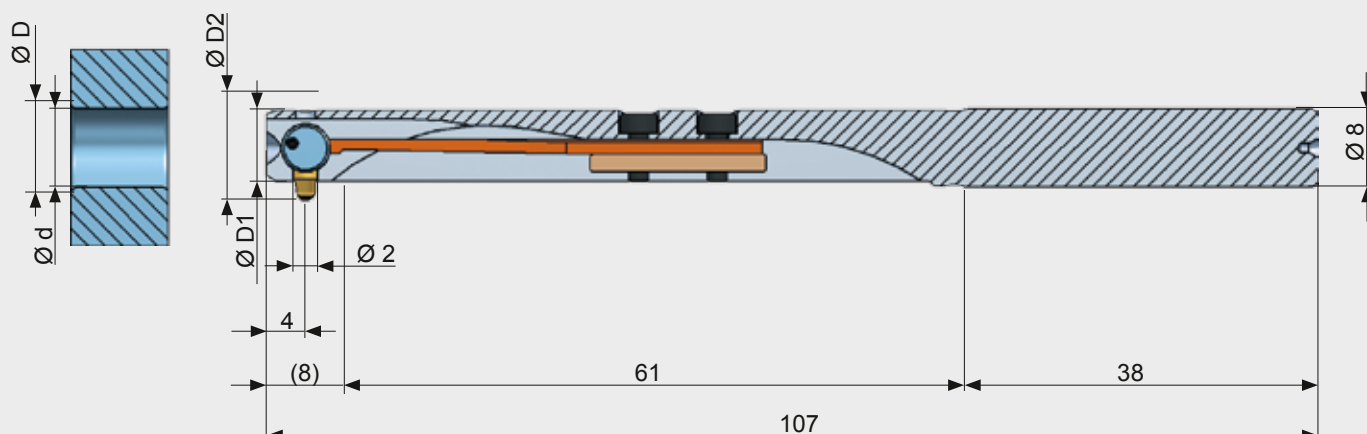
*Standard items / Please enquire about stock or delivery times for all non-standard blades.

Explanations to coatings (see also page 9):

T: Coating for steel, titan, Inconel

D: Coating for aluminium alloys only

COFA C8 Tool Ø 8 mm to 12.4 mm



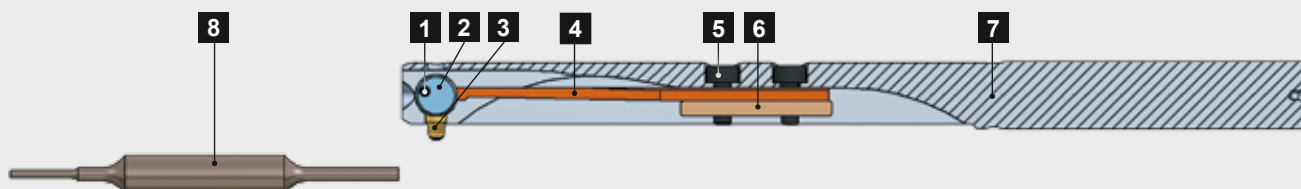
Tool Table

Tool dimensions						Tool with standard blade	
Bore-Ø d	Deburr-Ø ¹ D		Tool-Ø D1	Maximum-Ø ² D2		Part No. incl.	Spring index
Blade size	M	L		M	L		
8.0	9.2	9.8	7.8	10.8	11.4	C8 / 8.0 / ...	Please add the spring index after the part no.! Order example: C8 / 8.0 / Z1 Refer to spring index on page 21
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 / ...	

¹⁾ 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. ²⁾ Pay attention to the interfering edges.

Note:

Is the tool part number is written without the extension "OM" (= without blade), the standard blade C8-M-0006-T is already mounted. Please refer to the explanations on page 9.



Spare Parts

Pos.	Description	Part No.
1	Roll pin	C8-E-0003
2	Blade holder	C8-E-0001
3	COFA C8 Blade	see below
4	Bending spring	see below
5	Screw M2x5 / Wrench for Pos.5	GH-H-S-0517 / GH-H-S-2105
6	Fixing strip	GH-C-E-0808
7	Tool body	upon request
8	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 tin alloys, soft materials
H	hard	C8-E-0009*	Standard applications, all steel types
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

Part No. for COFA C8 Blades forward and backward cutting				
Angle	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- 0006-T*	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

Part No. for COFA C8 Blades backward cutting only				
Angle	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 also page 9):

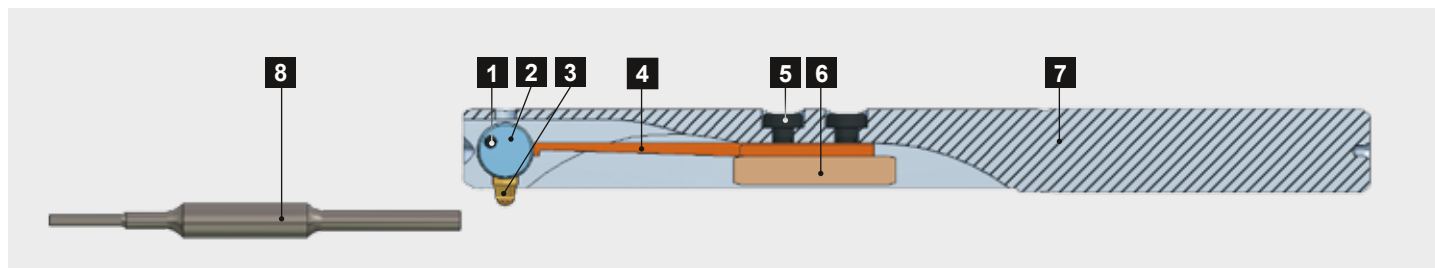
T: Coating for steel, titan, Inconel

D: Coating for aluminium alloys only



¹⁾ 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. ²⁾ Pay attention to the interfering edges.

Is the tool part number is written without the extension "OM" (= without blade), the standard blade C12-M-0006-T is already mounted. Please refer to the explanations on page 9.



Spare Parts

Pos.	Description	Part No.
1	Roll pin	C12-E-0003
2	Blade holder	C12-E-0001
3	COFA C12 Blade	see below
4	Bending spring	see below
5	Screw M3x8 / Wrench for Pos.5	GH-H-S-0530 / GH-H-S-2102
6	Fixing strip	GH-C-E-0800
7	Tool body	upon request
8	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 tin alloys, soft materials
H	hard	C12-E-0009*	Standard applications, all steel types
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

	Part No. for COFA C12 Blades forward and backward cutting			
	Coating T		Coating D	
	M	L	M	L
Angle				
10°	C12-M-0007-T	C12-M-0002-T	C12-M-0007-D	C12-M-0002-D
20°	C12-M- 0006-T*	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

	Part No. for COFA C12 Blades backward cutting only			
	Coating T		Coating D	
	M	L	M	L
Angle				
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

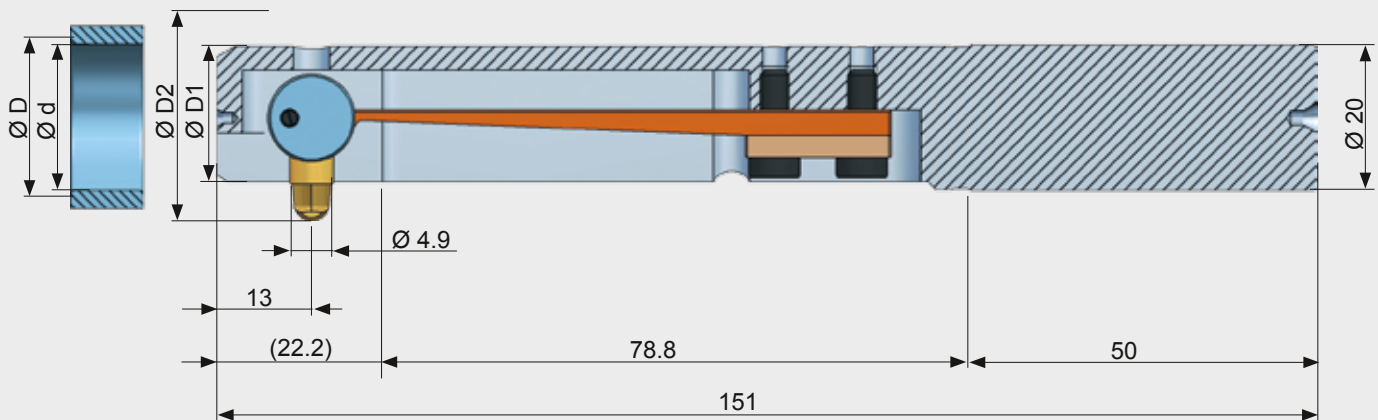
*Standard items / Please enquire about stock or delivery times for all non-standard blades.

Explanations to coatings (see also page 9):

T: Coating for steel, titan, Inconel

D: Coating for aluminium alloys only

COFA C20 Tool Ø 20 mm to 26.0 mm



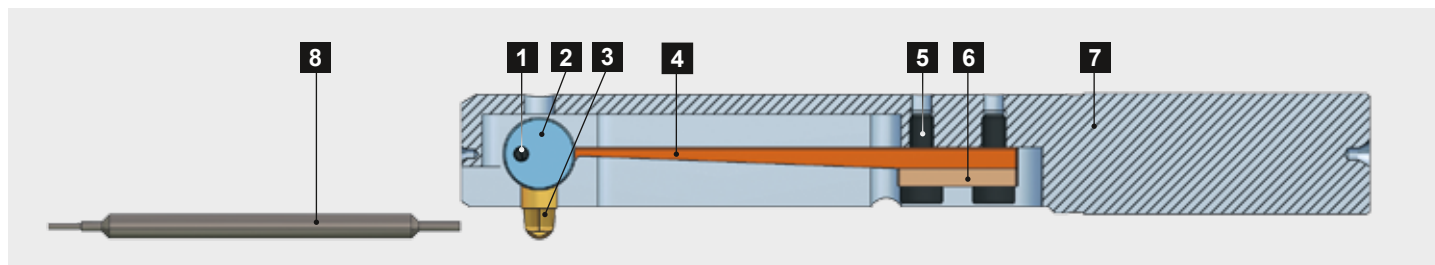
Tool Table

Tool dimensions								Tool with standard blade	
Bore-Ø d	Debur-Ø¹ D			Tool-Ø D1	Maximum-Ø² D2			Part No. incl.	Spring index
Blade size	S	M	L		S	M	L		
20.0	21.8	23.0	24.6	19.8	25.2	26.4	28.3	C20 / 20.0 / ...	Please add the spring index after the part no.! Order example: C20 / 23.0 / W Refer to spring index on page 25
20.5	22.3	23.5	25.1	20.3	25.7	26.9	28.8	C20 / 20.5 / ...	
21.0	22.8	24.0	25.6	20.8	26.2	27.4	29.3	C20 / 21.0 / ...	
21.5	23.3	24.5	26.1	21.3	26.7	27.9	29.8	C20 / 21.5 / ...	
22.0	23.8	25.0	26.6	21.8	27.2	28.4	30.3	C20 / 22.0 / ...	
22.5	24.3	25.5	27.1	22.3	27.7	28.9	30.8	C20 / 22.5 / ...	
23.0	24.8	26.0	27.6	22.8	28.2	29.4	31.3	C20 / 23.0 / ...	
23.5	25.3	26.5	28.1	23.3	28.7	29.9	31.8	C20 / 23.5 / ...	
24.0	25.8	27.0	28.6	23.8	29.2	30.4	32.3	C20 / 24.0 / ...	
24.5	26.3	27.5	29.1	24.3	29.7	30.9	32.8	C20 / 24.5 / ...	
25.0	26.8	28.0	29.6	24.8	30.2	31.4	33.3	C20 / 25.0 / ...	
25.5	27.3	28.5	30.1	25.3	30.7	31.9	33.8	C20 / 25.5 / ...	
26.0	27.8	29.0	30.6	25.8	31.2	32.4	34.3	C20 / 26.0 / ...	

¹⁾ 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. ²⁾ Pay attention to the interfering edges.

Note:

Is the tool part number is written without the extension "OM" (= without blade), the standard blade C20-M-0006-T is already mounted. Please refer to the explanations on page 9.



Spare Parts

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

Spring Index

Type	Bending spring	Part No.	Application
W3	soft (softer than W2)	C20-E-0021	Special applications
W2	soft (softer than W1)	C20-E-0006	Special applications
W1	soft (softer than W)	C20-E-0007	Special applications
W	soft	C20-E-0008	Aluminium alloys, copper tin alloys, soft materials
H	hard	C20-E-0009*	Standard applications, all steel types
S	super hard	C20-E-0010	Hard and tough materials
Z	extra hard (harder > S)	C20-E-0011	Very tough materials or very large burr formations
Z1	extra hard (harder > Z)	C20-E-0012	Special applications
Z2	extra hard (harder > Z1)	C20-E-0013	Special applications

Blades

Part No. for COFA C20 Blades forward and backward cutting						
Angle	Coating T			Coating D		
	S	M	L	S	M	L
10°	C20-M-0012-T	C20-M-0007-T	C20-M-0002-T	C20-M-0012-D	C20-M-0007-D	C20-M-0002-D
20°	C20-M-0011-T	C20-M-0006-T*	C20-M-0001-T	C20-M-0011-D	C20-M-0006-D	C20-M-0001-D
25°	C20-M-0013-T	C20-M-0008-T	C20-M-0003-T	C20-M-0013-D	C20-M-0008-D	C20-M-0003-D
30°	C20-M-0014-T	C20-M-0009-T	C20-M-0004-T	C20-M-0014-D	C20-M-0009-D	C20-M-0004-D

Part No. for COFA C20 Blades backward cutting only						
Angle	Coating T			Coating D		
	S	M	L	S	M	L
10°	C20-M-0032-T	C20-M-0027-T	C20-M-0022-T	C20-M-0032-D	C20-M-0027-D	C20-M-0022-D
20°	C20-M-0031-T	C20-M-0026-T	C20-M-0021-T	C20-M-0031-D	C20-M-0026-D	C20-M-0021-D
25°	C20-M-0033-T	C20-M-0028-T	C20-M-0023-T	C20-M-0033-D	C20-M-0028-D	C20-M-0023-D
30°	C20-M-0034-T	C20-M-0029-T	C20-M-0024-T	C20-M-0034-D	C20-M-0029-D	C20-M-0024-D

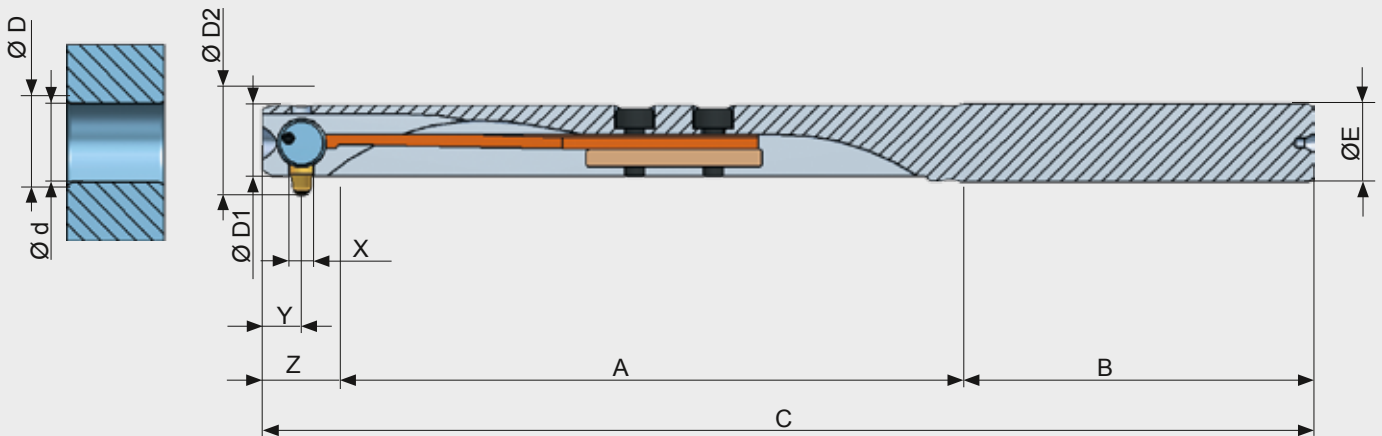
*Standard items / Please enquire about stock or delivery times for all non-standard blades.

Explanations to coatings (see also page 9):

T: Coating for steel, titan, Inconel

D: Coating for aluminium alloys only

COFA Thread Series M8 to M30



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 work pieces correspond to DIN 13-1 (ISO 68).

Tool Table

Tool dimensions					Tool complete with blade	
	Bore-Ø d	Deburr-Ø ¹ D	Tool-Ø D1	Maximum-Ø ² D2	Part No. forward and backward cutting	Spring index
M8	6.7	8.2	6.5	9.5	C6 / M8 / ...	Please add spring index to part number! Order example: C12 / M14 / Z1 Refer to spring index on page 27
M10	8.4	10.2	8.2	12.0	C8 / M10 / ...	
M12	10.1	12.2	9.9	13.7	C8 / M12 / ...	
M14	12.0	14.2	11.8	16.8	C12 / M14 / ...	
M16	13.9	16.2	13.7	16.8	C12 / M16 / ...	
M20	17.3	20.2	17.1	22.5	C12 / M20 / ...	
M24	20.8	24.2	20.5	28.1	C20 / M24 / ...	
M30	26.2	30.2	26.0	34.1	C20 / M30 / ...	

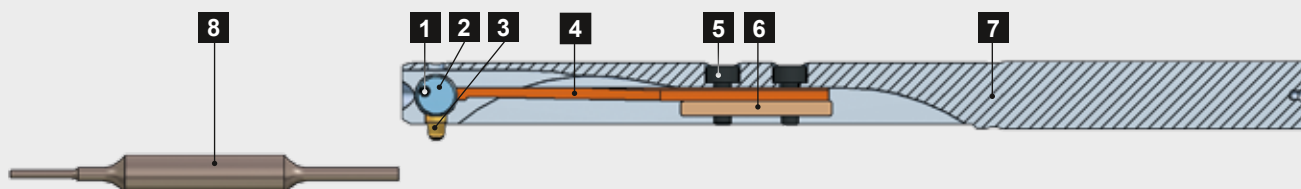
¹⁾ The deburring result varies depending on material, cutting data and application. The indicated dimension is the theoretically possible maximum. The spring has to be selected accordingly. ²⁾ Pay attention to the interfering edges.

Note:

Is the tool part number is written without the extension "OM" (= without blade), the standard blade is already mounted. Please refer to the explanations on page 9.

Measure 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
M14	69.2	47.0	128.7	2.8	6.0	12.5	12.0 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
M24	77.5	50.0	151.0	4.9	13.0	21.0	20.0 h6
M30	77.5	50.0	151.0	4.9	13.0	21.0	20.0 h6



Spare Parts

Pos.	Description	M8 Ø6.7	M10/M12 Ø8.4/10.1	M14/M16/M20 Ø12.0/13.9/17.3	M24/M30 Ø20.3/26.3
1	Roll pin	C6-E-0003	C8-E-0003	C12-E-0003	C20-E-0003
2	Blade holder	C6-E-0001	C8-E-0001	C12-E-0001	C20-E-0001
3	COFA blade	see below	see below	see below	see below
4	Bending spring	see page 19	see page 21	see page 23	see page 25
5	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	GH-H-S-0543 GH-H-S-2100
6	Fixing strip	GH-C-E-0812	GH-C-E-0808	GH-C-E-0800	C20-E-0800
7	Tool body	C6-G-0030	Ø8.4: C8-G-0030 Ø10.1: C8-G-0031	Ø12.0: C12-G-0030 Ø13.9: C12-G-0031 Ø17.3: C12-G-0032	Ø20.8: C20-G-0030 Ø26.2: C20-G-0031
8	Assembly pin	C6-V-0006	C8-V-0005	C12-V-0005	C20-V-0009

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 19 C8 - page 21 C12 - page 23 C20 - page 25	Special applications
W1	soft (softer than W)		Special applications
W	soft		Aluminium alloys, copper tin alloys, soft materials
H	hard		Standard applications, all steel types
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 Number for 20° Thread Blades forward and backward cutting		Part Number for 20° Thread Blades backward cutting only	
	Coating T	Coating D	Coating T	Coating D
M8	C6-M-0001-T*	C6-M-0001-D	C6-M-0021-T	C6-M-0021-D
M10	C8-M-0001-T*	C8-M-0001-D	C8-M-0021-T	C8-M-0021-D
M12	C8-M-0001-T*	C8-M-0001-D	C8-M-0021-T	C8-M-0021-D
M14	C12-M-0001-T*	C12-M-0001-D	C12-M-0021-T	C12-M-0021-D
M16	C12-M-0001-T*	C12-M-0001-D	C12-M-0021-T	C12-M-0021-D
M20	C12-M-0001-T*	C12-M-0001-D	C12-M-0021-T	C12-M-0021-D
M24	C20-M-0001-T*	C20-M-0001-D	C20-M-0021-T	C20-M-0021-D
M30	C20-M-0001-T*	C20-M-0001-D	C20-M-0021-T	C20-M-0021-D

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

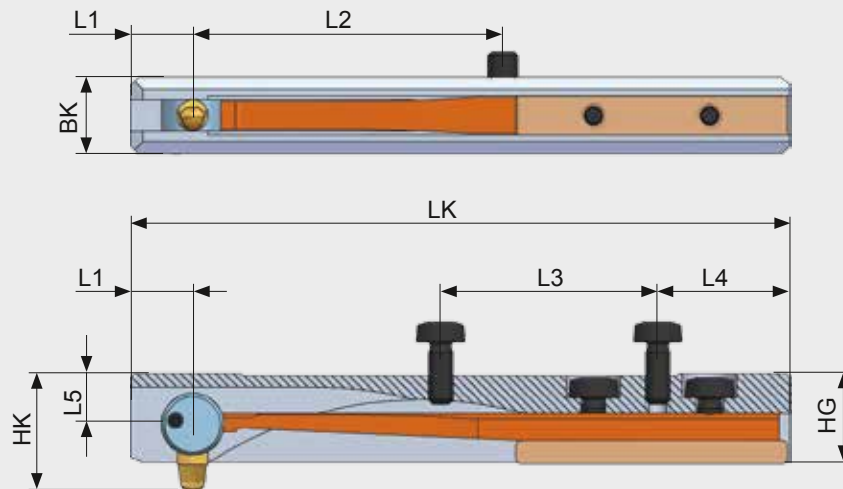
Explanations to coatings (see also page 9):

T: Coating for steel, titan, Inconel

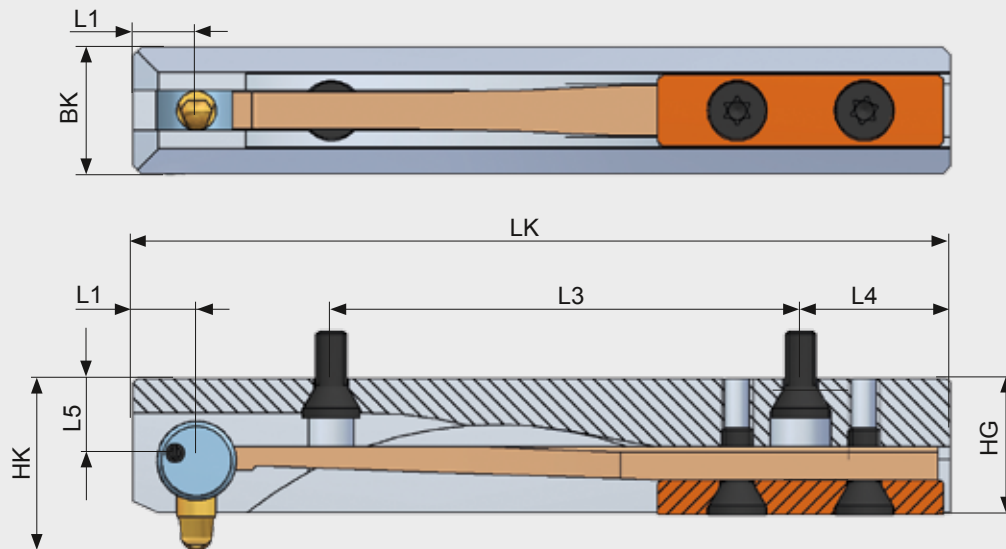
D: Coating for aluminium alloys only

COFA Cassette Systems C6 to C20

COFA C6 Cassette



COFA C8/C12/C20 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.

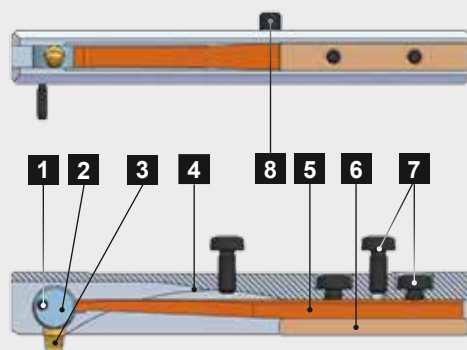
Tool Table

Tool dimensions				Cassette without blade*	
Type	For bores >Ø d	Deburr-Ø D	Blade types	Part No. incl.	Spring index
C6	10.0	to be calculated	see page 19	C6-O-0900 / ...	see text
C8	14.0	to be calculated	see page 21	C8-O-0900 / ...	Spring index
C12	20.0	to be calculated	see page 23	C12-O-0900 / ...	on page 26
C20	25.0	to be calculated	see page 25	C20-O-0900 / ...	Thread Tools

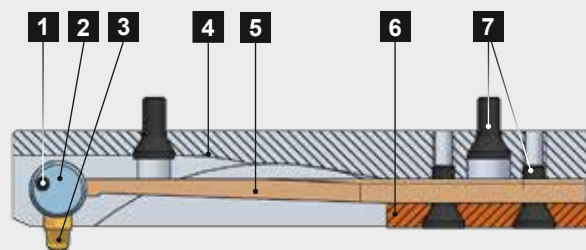
Note:

* The COFA cassettes will be supplied **without blades**! The blades have to be ordered separately. Please refer to pages 19, 21, 23, 25.

COFA C6



COFA C8 / C12 / C20



Spare Parts

Pos.	Description	C6	C8	C12	C20
1	Roll pin	C6-E-0003	C8-E-0003	C12-E-0003	C20-E-0003
2	Blade holder	C6-E-0001	C8-E-0001	C12-E-0001	C20-E-0001
3	COFA blade	see page 19	see page 21	see page 23	see page 25
4	Tool body	C6-G-0900	C8-G-0900	C12-G-0900	C20-G-0900
5	Bending spring	see below	see below	see below	see below
6	Fixing strip	GH-C-E-0812	C8-E-0800	C12-E-0800	C20-E-0800
7	Screw	GH-H-S-0803	GH-H-S-0050	GH-H-S-0012	GH-H-S-0543
8	Threaded pin M2x2	GH-H-S-0137	-	-	-

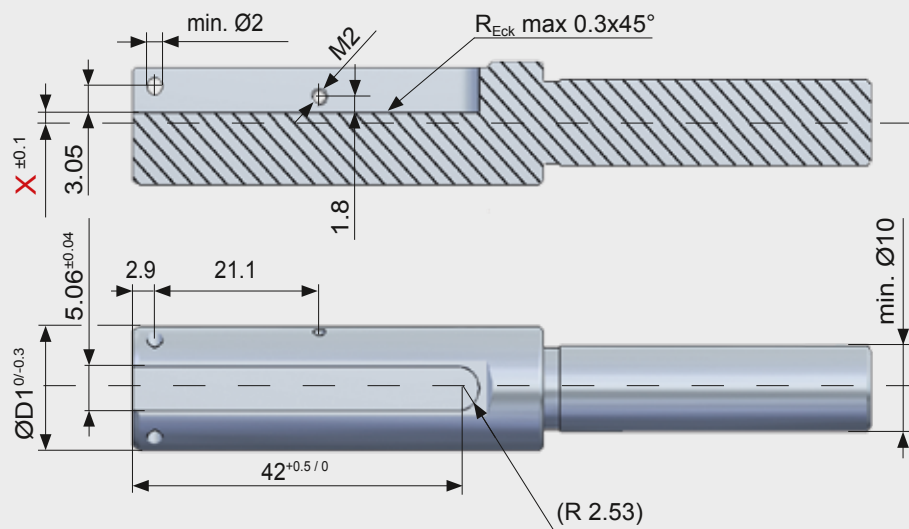
Spring Index

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 19 C8 - page 21 C12 - page 23 C20 - page 25	Special applications
W1	soft (softer than W)		Special applications
W	soft		Aluminium alloys, copper tin alloys, soft materials
H	hard		Standard applications, all steel types
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

Measure Table

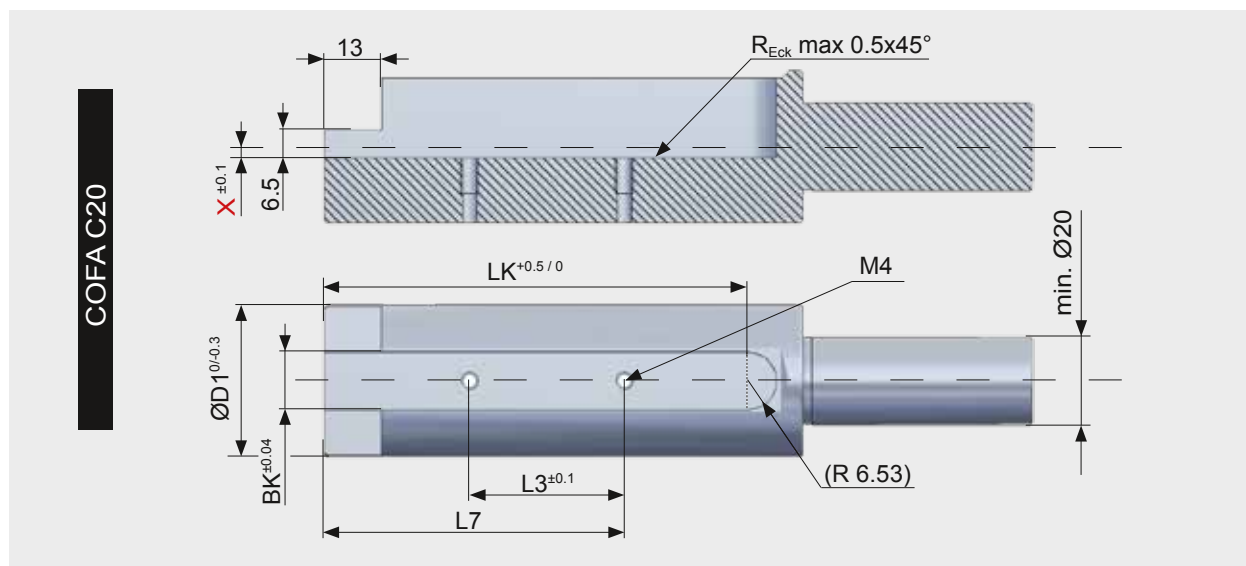
Typ	BK	HG	LK	HK	L1	L2	L3	L4	L5
C6	5.0	5.8	42.5	see page 31 below	4.0	20.0	14.0	8.5	3.3
C8	8.0	8.5	51.5		4.0	-	29.6	9.5	5.2
C12	10.0	13.0	60.0		7.5	-	35.0	8.5	7.7
C20	13.0	18.7	96.0		12.0	-	35.0	28.0	10.0

COFA C6 Ø15.0 -



Technical drawing of a bolt and nut assembly. The drawing includes the following dimensions and specifications:

- Bolt Head:** Diameter $\varnothing D3$, height A .
- Bolt Body:** Diameter $\varnothing D1$ (tolerance $0/-0.3$), length $LK^{+0.5/0}$.
- Bolt Thread:** C8: M2, C12: M3.
- Bolt Head to Thread Transition:** Radius $R_{Eck} \max 0.5 \times 45^\circ$.
- Nut:** Diameter $\varnothing D10$, length $LK^{+0.5/0}$.
- Nut Thread:** C8: R 4.03, C12: R 5.03.
- Other Dimensions:** $BK \pm 0.04$, $L6$, $L3 \pm 0.1$, $L7$, $\min. \varnothing$ (nut thread diameter).



Limiting Values

from Bore- \varnothing	C6		C8		C12		C20		
	$\varnothing 10.0$		$\varnothing 14.0$		$\varnothing 20.0$		$\varnothing 25.0$		
	M	L	M	L	M	L	S	M	L
max. $\varnothing D$	$\varnothing d + 0.8$	$\varnothing d + 1.4$	$\varnothing d + 1.1$	$\varnothing d + 1.8$	$\varnothing d + 1.5$	$\varnothing d + 2.8$	$\varnothing d + 1.8$	$\varnothing d + 3.0$	$\varnothing d + 4.5$
max. $\varnothing D1$	$\varnothing d - 0.5$		$\varnothing d - 0.5$		$\varnothing d - 0.5$		$\varnothing d - 0.5$		

Measure Table Cassette Holder

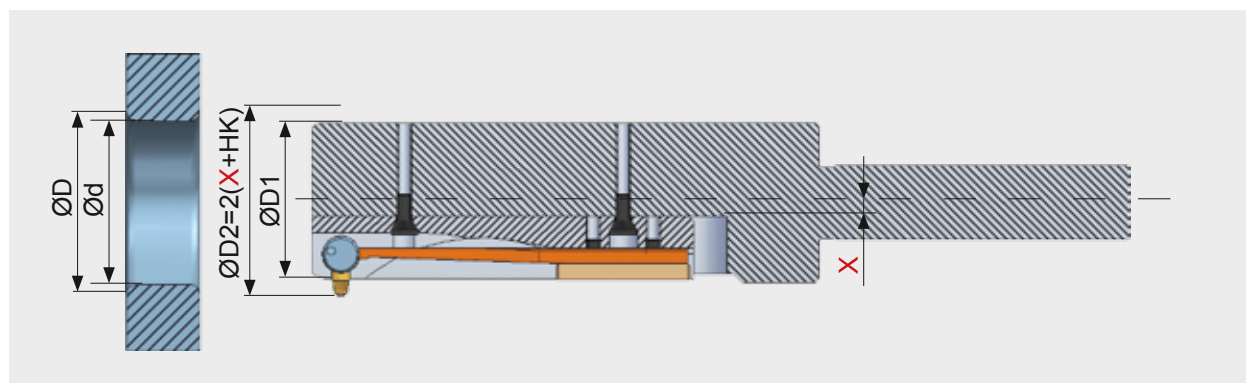
	BK	LK	D3	L3	L6	L7	X	A	R
C6	s. p. 30	42.5	s. p. 30	s. p. 30	s. p. 30	s. p. 30	Must be calculated for every application (see formula below)	s. p. 30	s. p. 30
C8	8.06	52.0	2.0	29.55	9.85	42.05		4.70	4.03
C12	10.06	61.0	3.0	35.0	11.1	51.5		6.45	5.03
C20	13.06	96.5	5.0	35.0	24.0	68.0		-	6.53

C6: $X = \varnothing d / 2 - 6.3$

C8: $X = \varnothing d / 2 - 9.2$

C12: $X = \varnothing d / 2 - 13.7$

C20: $X = \varnothing d / 2 - 20.0$



Measure Table HK

C6		C8		C12		C20		
M	L	M	L	M	L	S	M	L
7.6	7.8	10.6	11.0	15.6	16.2	22.6	23.3	24.2

Cutting Data

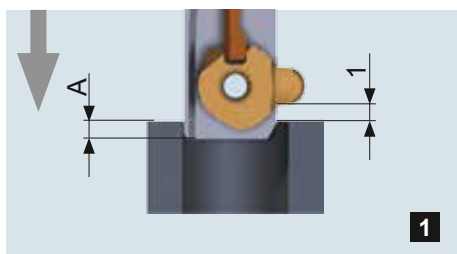
Material	COFA C2 and C3		COFA 4 M and 5M	
	Speed	Feed	Speed	Feed
	v (m/min)	s (mm/U)	v (m/min)	s (mm/U)
Unalloyed steel up to 700 N/mm ²	20 - 60	0.05 - 0.15	30 - 100	0.2 - 0.5
Alloyed steel up to 950 N/mm ²	20 - 60	0.05 - 0.15	30 - 100	0.2 - 0.5
Tool steel up to 1000 N/mm ²	15 - 30	0.05 - 0.15	30 - 80	0.2 - 0.5
Stainless steel up to 700 N/mm ²	15 - 30	0.05 - 0.15	30 - 80	0.2 - 0.5
Grey cast iron up to HB 220	20 - 60	0.05 - 0.15	30 - 100	0.2 - 0.5
Aluminium alloys, copper-tin-alloys	30 - 70	0.05 - 0.15	40 - 120	0.2 - 0.5

Material	COFA C6 / C8 / C12		COFA C20	
	Speed	Feed	Speed	Feed
	v (m/min)	s (mm/U)	v (m/min)	s (mm/U)
Unalloyed steel up to 700 N/mm ²	20 - 60	0.2 - 0.5	30 - 100	0.2 - 0.5
Alloyed steel up to 950 N/mm ²	20 - 60	0.2 - 0.5	30 - 100	0.2 - 0.5
Tool steel up to 1000 N/mm ²	15 - 30	0.2 - 0.5	30 - 80	0.2 - 0.5
Stainless steel up to 700 N/mm ²	15 - 30	0.2 - 0.5	30 - 80	0.2 - 0.5
Grey cast iron up to HB 220	20 - 60	0.2 - 0.5	30 - 100	0.2 - 0.5
Aluminium alloys Copper-tin-alloys	30 - 70	0.2 - 0.5	40 - 120	0.2 - 0.5

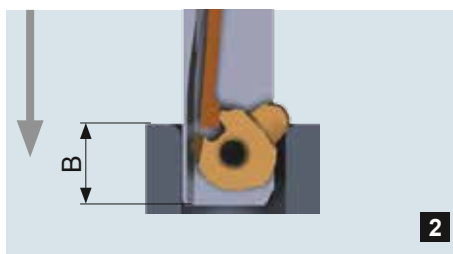
Note:

The cutting values depend on the amount of slope of the uneven bore edge. (i.e. high slope → low cutting value).

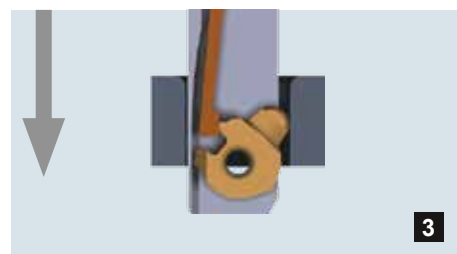
We recommend to apply cutting speeds that are at the lower end of the range for uneven bore edges.



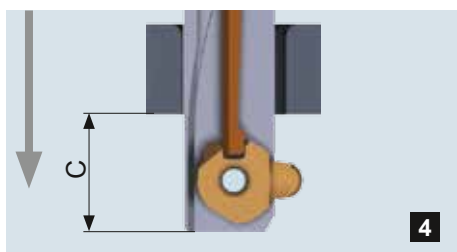
Rapid traverse of the cutting unit of the tool above the top material surface of hole or burr. Referencing the front edge of the cutting blade **A**.



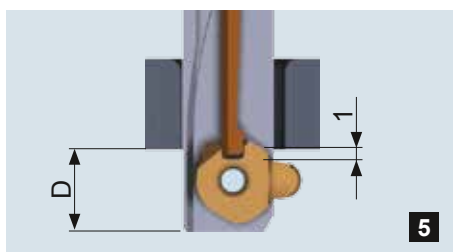
In forward working feed machine the top surface of the hole to position **B**.



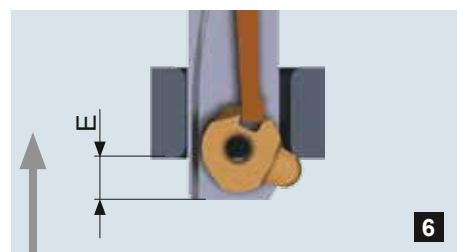
Rapid traverse through the hole. The surface of the hole cannot be damaged.



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.

Note:

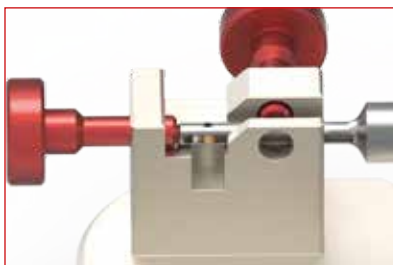
Important - Please pay attention to irregular surfaces! Please consider unevenness when programming the distances. See also the explanations on page 39.

Dimension table					
Tool type	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	8.8	8.5	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
COFA C20 Small	9.3	20.9	21.2	16.8	5.1
COFA C20 Medium	9.3	22.4	22.2	16.8	3.6
COFAC20 Large	9.3	24.5	23.5	16.8	1.5

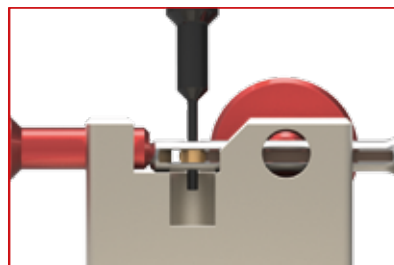


Assembly device for tool type COFA C2 / C3

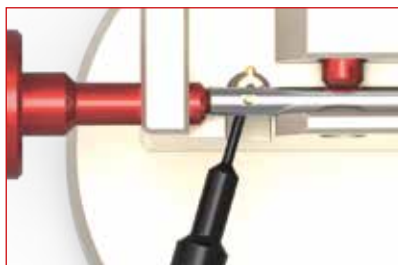
Please refer to page 37 for order information.



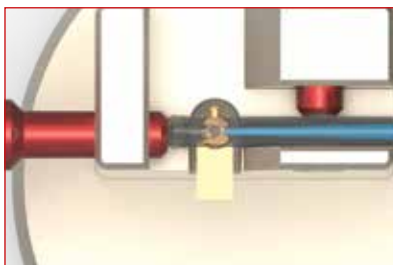
Adjust the tool lengthwise so that the blade bore is above the recess for the roll pin. Then clamp the tool. Make sure that the larger spring recess in the shaft is on clamp screw side.



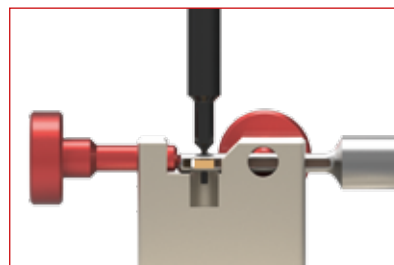
Push the roll pin out of the tool by using the smaller diameter of the assembly pin.



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



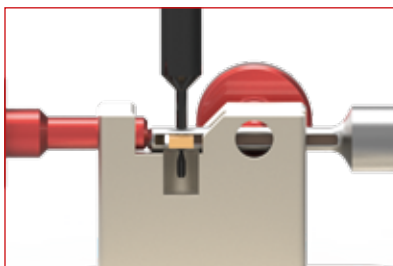
Insert the new blade nose first. The nose must be on the side of the shaft where the larger spring recess is (observe the mark on the tool). The spring must engage with the groove of the blade.



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

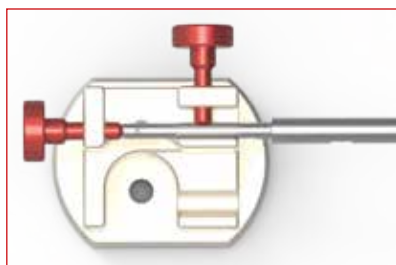
Please refer to page 37 for order information.



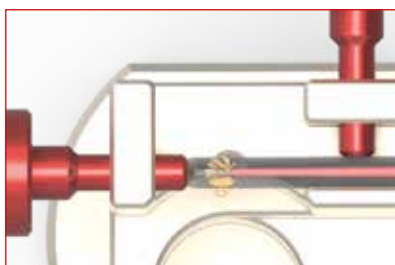
Adjust the tool lengthwise so that the blade bore is above the recess for the roll pin. Then clamp the tool as shown.



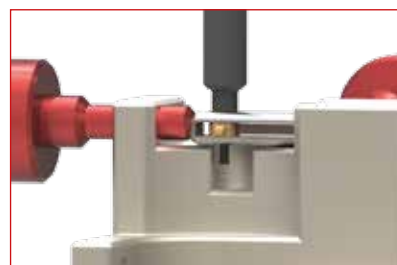
Push the roll pin carefully out of the bore. Make sure you apply the assembly pin to split end of the roll pin. If necessary, use a small hammer.



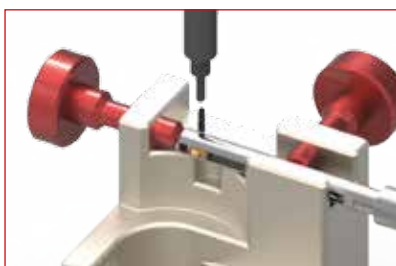
Rotate the tool 180° so that the larger spring recess of the shaft is on the clamp screw side.



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



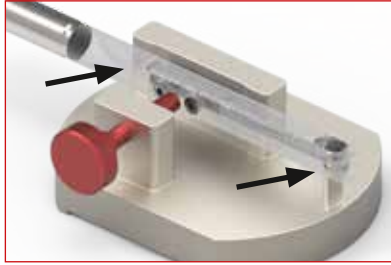
The assembly pin must be level with both sides of the tool body.



Assembly device for tool types COFA C6 - C12

Note: Execute blade change on mounted tool only.

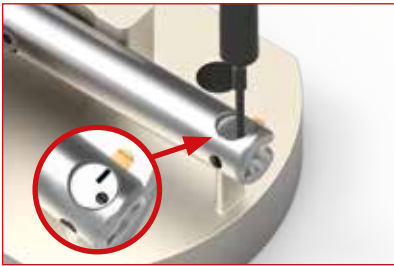
Please refer to page 37 for order information.



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.



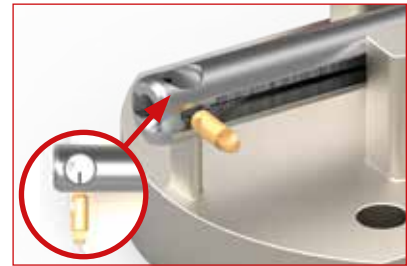
Make sure that the bore with the roll pin is entirely free. Then, clamp the tool.



There are a line mark and the black roll pin visible (see remark on page 37). Push the roll 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.



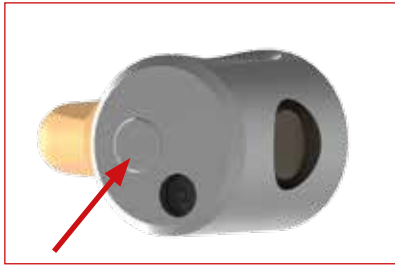
In order to define the right position of the blade and to pre-center for the new roll pin, push the assembly pin in the roll pin hole.



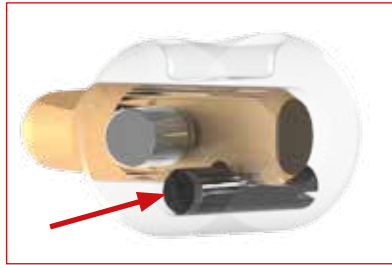
Insert new roll pin short section first into the hole until the back end of the pin is flush with tool holder.



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



The positioning pin (see red arrow) is a fixed component of the tool holder. The positioning pin and the black roll pin are responsible for the correct position of the blade.



Only the roll pin may be removed for dismounting the blade.

Note:

When changing the blade the positioning pin can **not** be removed.

Accessories - Assembly Aid for Blade Change



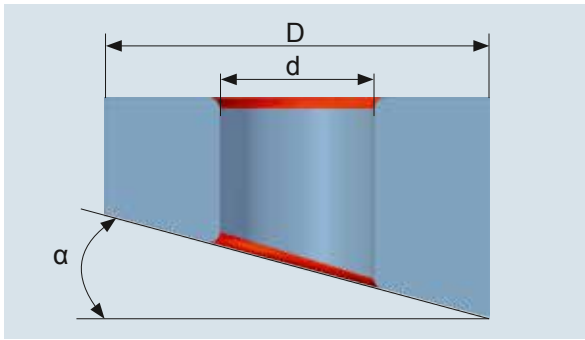
Type	Part No.
COFA C2 +C3	C3-V-0002



COFA 4M + 5M	GH-C-V-0541
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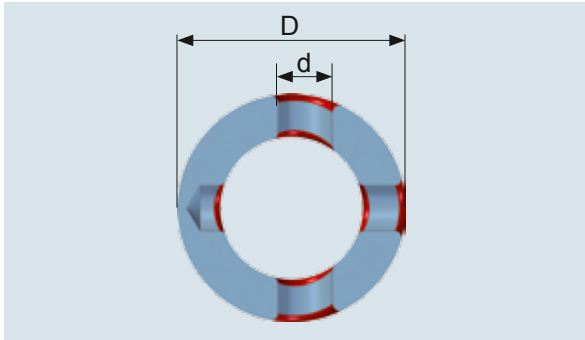


COFA C6	C6-V-0008
COFA C8	C8-V-0007
COFA C12	C12-V-0006



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 α larger than 18° , only a trial will show whether the application can be resolved successfully with the COFA standard blade (20°). The machining of higher irregularities can be done upon request with special blades (see blade range in respective blade table 10° , 25° , 30°).



Formula for verifying the possible use of standard blades:

$$d:D \leq 0.5$$

Cutting data for uneven bore edges:

- ▶ Speed: reduce
- ▶ Feed: leave

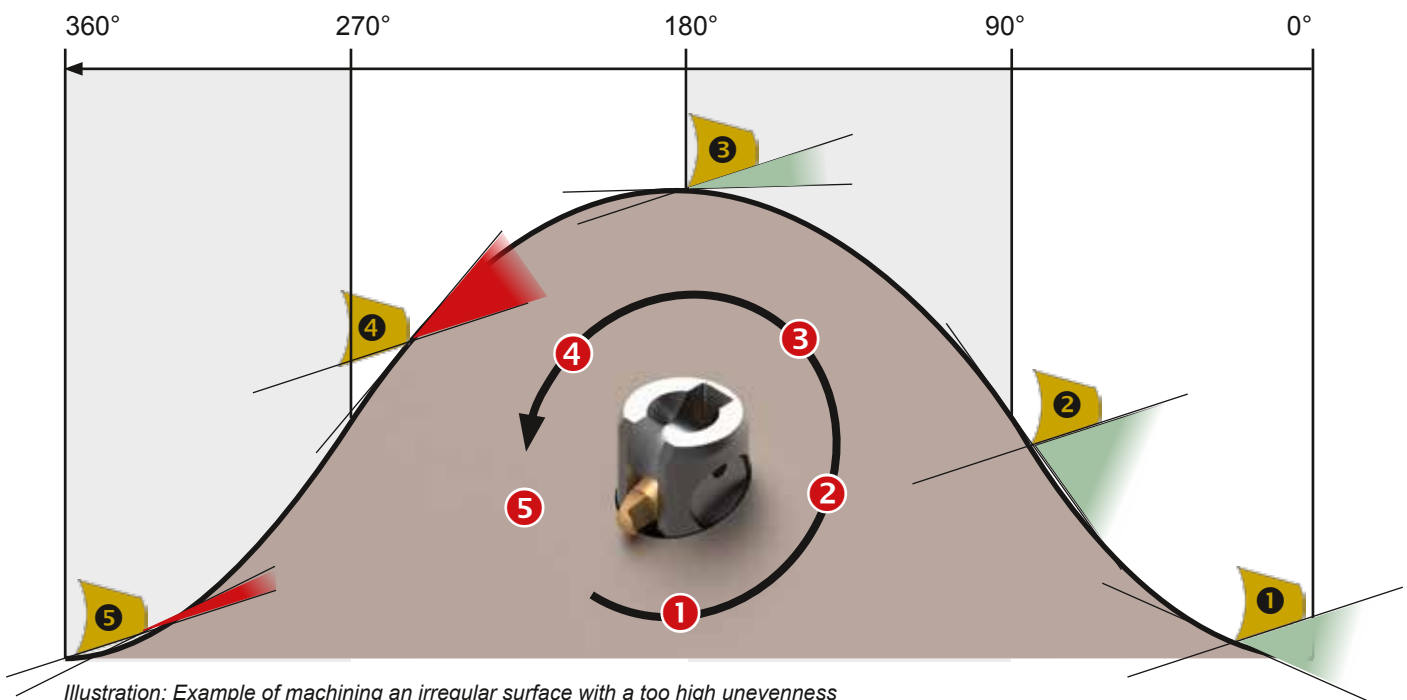
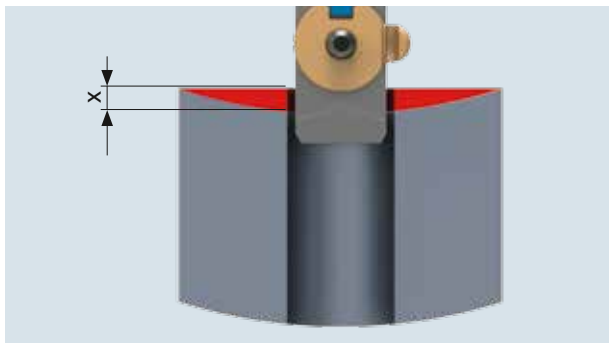


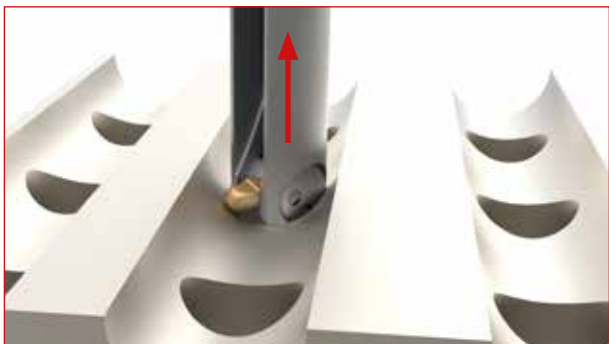
Illustration: Example of machining an irregular surface with a too high unevenness

Note:

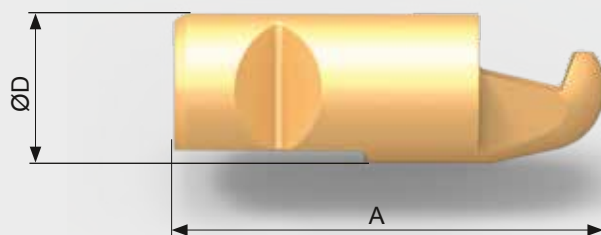
The clearance angle of the blade must be larger than the gradient of the sinus curve (slope) in order that the blade remains cutting. If this is not the case, the blade rests on the work piece. With the result that there is no deburring or only partially (not the full circle) because the blade lies with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



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.

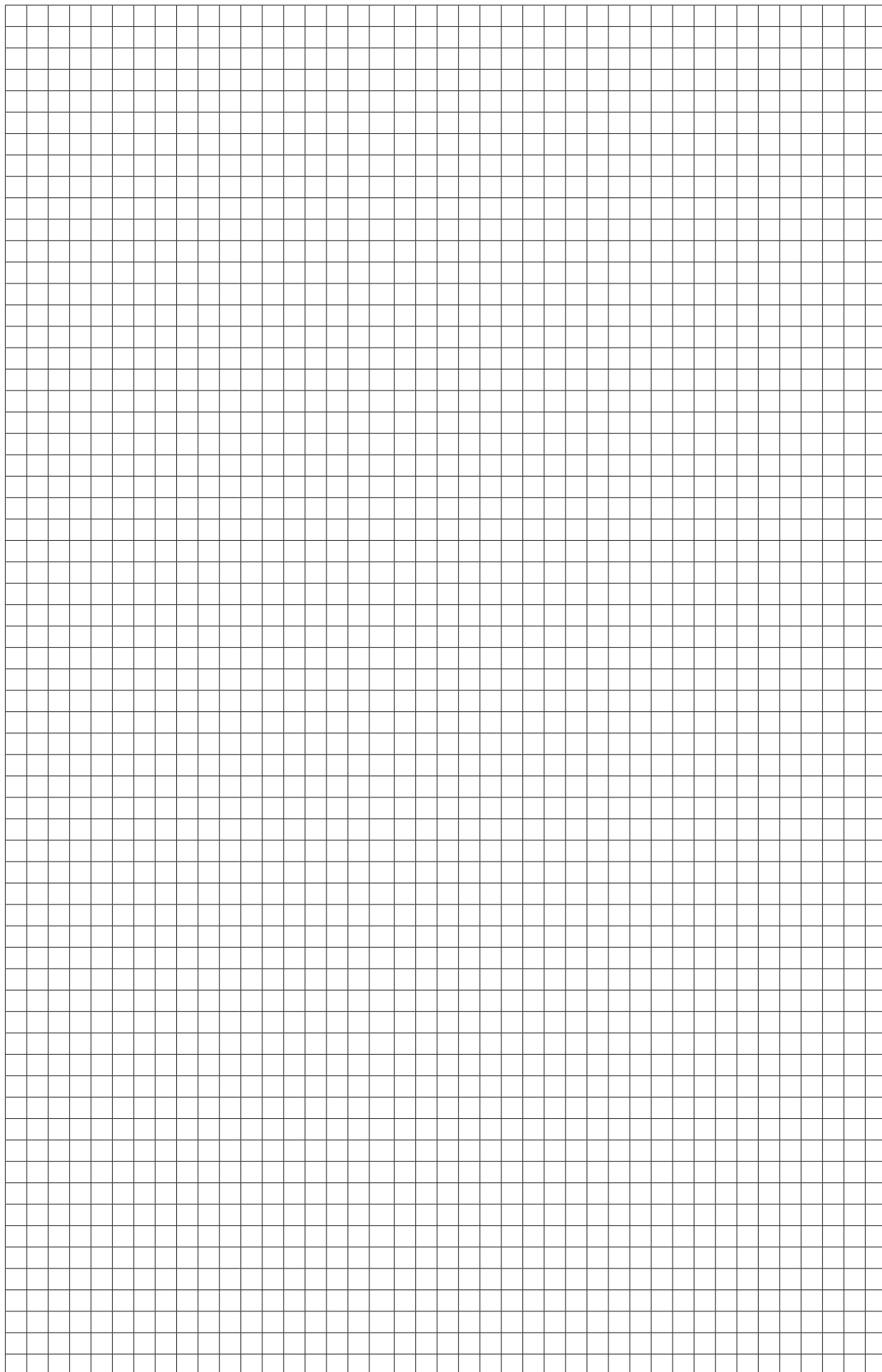


Measure Table

	COFA C6		COFA C8		COFA C12		COFA C20		
Size	M	L	M	L	M	L	S	M	L
ØD	Ø2 h6	Ø2 h6	Ø2.5 h6	Ø2.5 h6	Ø3.5 h6	Ø3.5 h6	Ø6.0 h6	Ø6.0 h6	Ø6.0 h6
A	6.05	6.25	7.54	7.85	11.57	11.98	16.8	17.42	18.34

FAQ

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



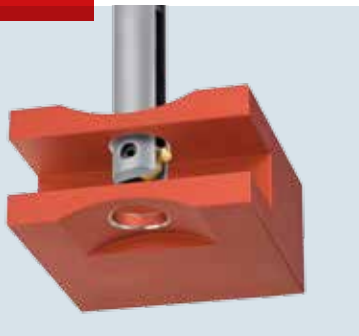


One Operation.

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

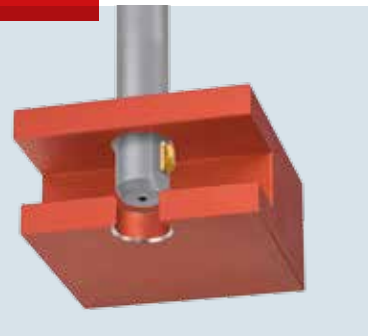
Deburring

- COFA
- SNAP



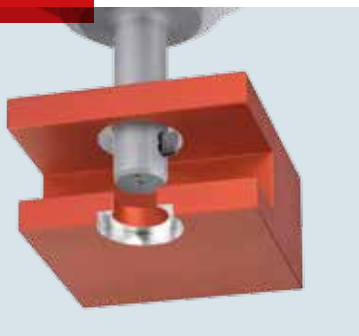
Chamfering

- SNAP
- GH-S
- DEFA



Countersinking

- BSF
- SOLO
- GH-Z/E



Drilling

- VEX-P
- VEX-S



HEULE+
PRECISION TOOLS

HEULE WERKZEUG AG
Wegenstrasse 11
9436 Balgach
Switzerland

Telefon +41 71 7263838
Telefax +41 71 7263839
info@heule.com
www.heule.com

HEULE TOOL CORPORATION
4722 A Interstate Drive
Cincinnati, Ohio 45246
USA

Phone +1 513 8609900
Fax +1 513 8609992
info@heuletool.com
www.heuletool.com

HEULE TRADING (WUXI) CO.,
LTD.
Room 1711, Gelunbu Plaza
No. 291 Guangyi Road
214000 Wuxi, Jiangsu
China

Phone +86 510 820 022 404
Fax +86 510 82797040
china@heule.com
www.heule.cn

HEULE KOREA CO., LTD.
#1-1607, Ace Dongbaek
Tower, Dongbaek Jungang-ro
16 st. 16-4, Kiheung-gu,
Yongin, Gyeonggi-do,
South Korea 446 916

Phone +82 31 8005-8392
Fax +82 31 8005-8383
info@heule.co.kr
www.heule.co.kr