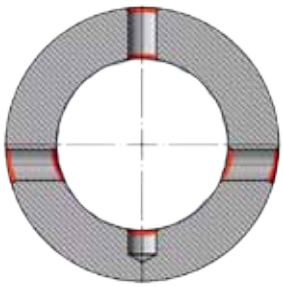
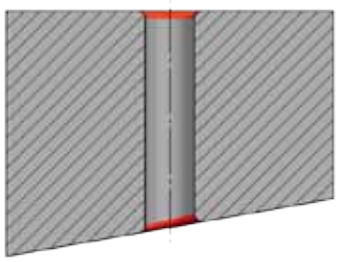
HEULE
PRECISION TOOLS

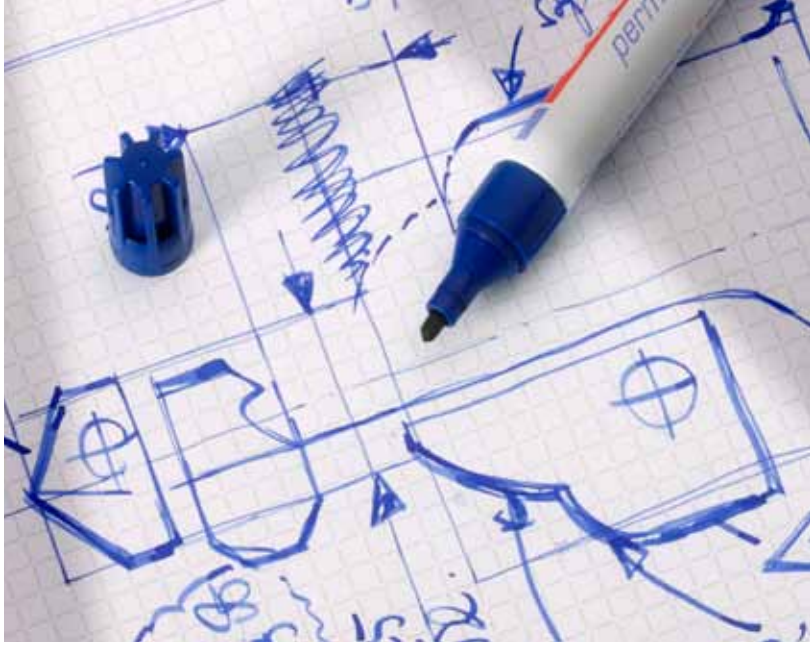
MICROCOFA

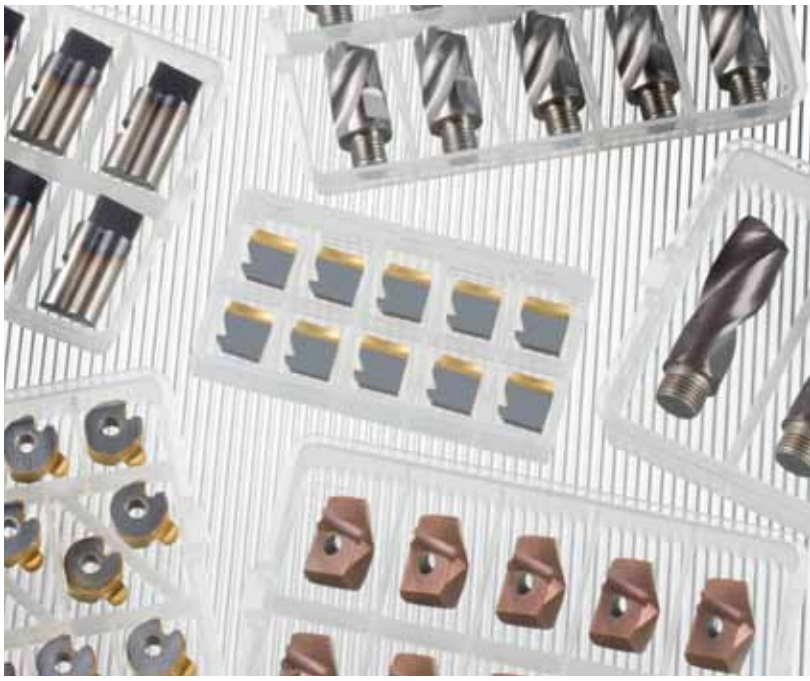
MICRO SERIES
Front & Back Universal Deburring Tools

- Deburrs front and back surfaces of through holes in a single pass
- Provides high quality consistant radial edge breaks
- Coated Carbide Blades provide long tool life
- Sizes 2mm - 4.1mm (.080” - .161”) available from stock









HEULE
PRECISION TOOLS

The Innovator and Quality Leader
in the Cutting Tool Industry since 1961

Innovative Tools with Timesaving Results

Founded in 1961 by Heinrich Heule in the Rhine Valley of eastern Switzerland, HEULE continues to be a world leader in manufacturing of chamfering and deburring tools. After serving the European community for over 25 years, HEULE expanded to the United States. Heule Tool Corporation has been providing high quality chamfering and deburring tools to the North American market since 1988.

HEULE is committed to the values of quality, precision and service. Competent service, fast delivery times and customized solutions are the highest priorities. From all ranks, HEULE's committed and motivated expert staff carry out their work with reliability and professionalism. Customer's worldwide attest to the high quality standard HEULE provides and continually improves through innovative ideas and sophisticated technology.

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Huele Tool Corporation
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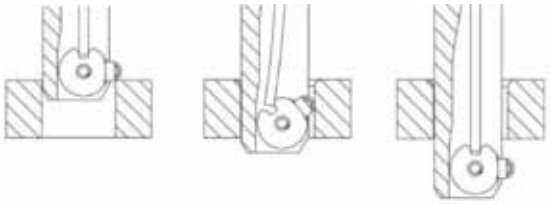
MICROCOFA

Small precision front & back debur solutions for small hole operations



HEULE introduces the NEW MICRO SERIES Carbide tool for all purpose deburring of through holes 2mm-4.1mm (.079"-.161"), front and back, in a single pass. Heule's MICRO COFA deburring tool is the answer for today's manufacturers requiring more simple and flexible solutions without sacrificing quality or tool life. MICRO COFA is a very simple tool for deburring through holes on even or uneven parts from the top and bottom without reversing the spindle, dwelling, or indexing the part. The MICRO COFA tool offers a simple to use, high quality deburring tool with Carbide inserts coated with TiAIN to meet today's manufacturing needs.

Study Details

TOOL
COFA3-3.6-S with blade C3-M-0011-A
(back cutting only)
Theoretical deburring Ø4.2

PRODUCTION
2400 per day with 24 holes in tube

MACHINE
CNC machining center

MATERIAL
Similar to St52 steal with approximately 700N/mm2

HOLE SIZE
Cross hole Ø3.6 with main Hole Ø12.0 which are 90° to each other. Need to be back deburred (unevenness on a Ø4.2mm deburring diameter to Ø12.0 main hole = 0.37mm or 10.24°)

BLADE
Blade life is over 4500 holes

PARAMETER
s= 2500 RPM, f=0.05mm/rev. S-Spring, flood coolant

The COFA Family
2mm - 41mm (.079" - 1.614")

How Does The MICRO COFA Tool Work?

With rotation, the tool is fed into the hole. The front cutting edge deburrs the top of hole and the blade tilts upwards while cutting. The result is a tapered, radiused edge break.

When the blade is in the hole, only the ground and polished non-cutting ball touches the surface protecting it from damage while the tool is fed through the part. There is no need to stop or reverse the spindle.

When the blade reaches the bottom of the part, it springs back into cutting position and the back cutting edge deburrs the bottom of the hole as the tool is withdrawn. When the blade is inside the hole, the tool can be rapid fed out and on to the next hole.

Typical Parts:

Deburrs Eliptical Holes

Radiused Edge Breaks on Flat Parts

How to Order:

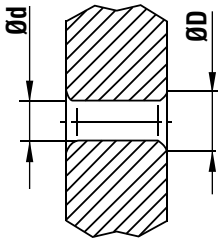
Ordering is simple. The MICRO COFA tool provides different blade and spring options to create the most effective tool for any application depending on the hole geometry and type of material being machined.

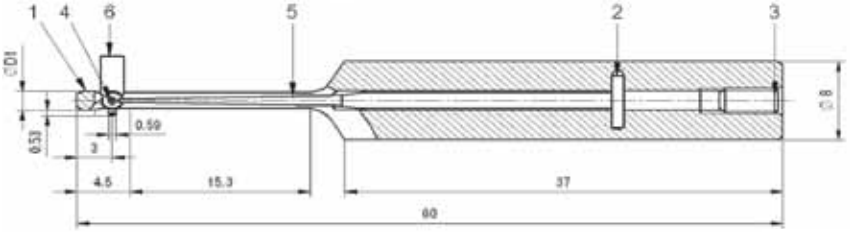
1. Choose the tool that best fits the hole diameter.
2. Choose the blade that best fits the hole geometry.
3. Choose the spring that best fits the material.

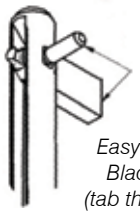
Example: COFA3 b – 4.0 - Z

Tool Series	Blade Option	Min. Hole Dia. Ød (Inches)	Spring Option

Benefits: ***Reduced Cycle Time*** *- Carbide Coated blades run faster and longer.* ***Simple to use*** *- No operator adjustments necessary.* ***Availability*** *- All Tooling is in stock, all tools in a series use a common blade.* ***Consistency*** *- Blades cannot over cut so edge breaks are consistent.* ***Quality*** *- Tapered radiused edge break is superior to hand benching and other edge break methods.*







Easy to change Blade and pin (tab that snaps off)

MICRO COFA Deburring Series 2

Ød		ØD1	ØD	1. Complete Tool with Blade	
Min. Hole mm *inches*		Tool Diameter +0/- .03 mm *inches*	Approx. Cutting Diameter mm *inches*	Front and Back Order Number	Back Only Order Number
2.0	*(.079)*	**1.95** *(.077)*	**2.5** *(.099)*	**COFA2-2.0-** ☐	**COFA2b-2.0-** ☐
2.1	*(.083)*	**2.05** *(.081)*	**2.6** *(.102)*	**COFA2-2.1-** ☐	**COFA2b-2.1-** ☐
2.3	*(.091)*	**2.25** *(.089)*	**2.8** *(.110)*	**COFA2-2.3-** ☐	**COFA2b-2.3-** ☐
2.5	*(.099)*	**2.45** *(.096)*	**3.0** *(.118)*	**COFA2-2.5-** ☐	**COFA2b-2.5-** ☐
2.7	*(.106)*	**2.65** *(.104)*	**3.2** *(.126)*	**COFA2-2.7-** ☐	**COFA2b-2.7-** ☐
2.9	*(.114)*	**2.85** *(.112)*	**3.4** *(.134)*	**COFA2-2.9-** ☐	**COFA2b-2.9-** ☐
3.0	*(.118)*	**2.95** *(.116)*	**3.5** *(.138)*	**COFA2-3.0-** ☐	**COFA2b-3.0-** ☐
3.1	*(.122)*	**3.05** *(.120)*	**3.6** *(.142)*	**COFA2-3.1-** ☐	**COFA2b-3.1-** ☐

Spring Choice: See Below

Sample Order: COFA2-2.0-H or COFA2b-2.0-W

Spare Parts – MICRO COFA 2

2	3	4	7	8
Retainer Pin GH-H-S-	Screw Set GH-H-S-	Split Pin C2-E-	Assembly Pin C2-V-	Wrench GH-H-S-
-1017	-0135	-0002	-0001	-2106

4 Spring Options

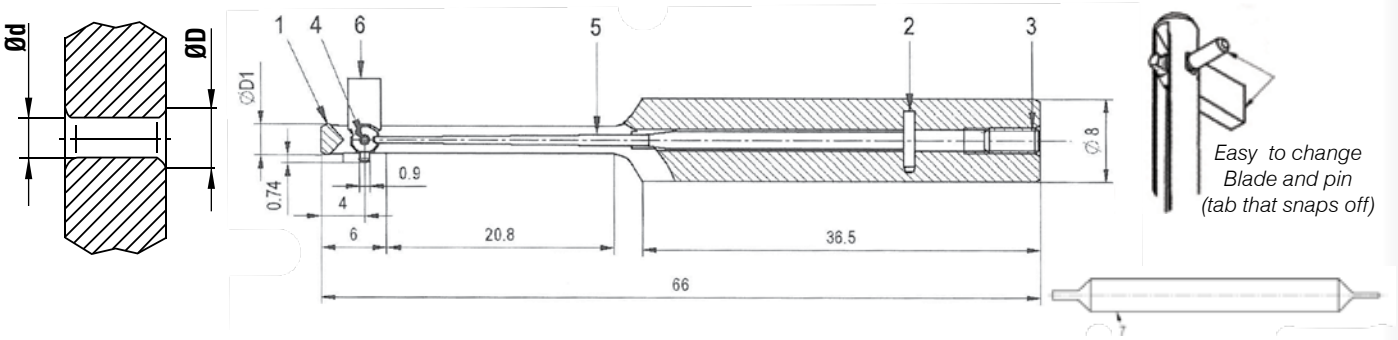
The cutting force of the MICRO COFA tool is controlled by the flat spring
Choose the proper spring for the material being machined

Spring Code	Order Number		Typical Materials *Large or Heavy burrs may require a stronger spring*
W	**C2-E-0013**	Softer	Aluminum, Brass, Magnesium
H	**C2-E-0014**	▲	Grey Cast iron, nodular Iron
S	**C2-E-0015**	▼	Carbon Steel, free Machining Steel
Z*	**C2-E-0016**	Harder	Nickel, Titanium, Stainless

* Not recommended with COFA2-2.0 tool.

6 Blade Options

Blade Code	Blade Type	Geo.	Series 2
	TiAlN 20°	fab	C2-M-0001-A
b	Standard	bco	C2-M-0011-A
y	TiAlN 10°	fab	C2-M-0002-A
yb		bco	C2-M-0012-A
x	TiAlN 30°	fab	C2-M-0004-A
xb		bco	C2-M-0014-A



MICRO COFA Deburring Series 3

Ød		Ød1		ØD		1. Complete Tool with Blade	
Min. Hole mm	*inches*	Tool Diameter +0/- .03 mm	*inches*	Approx. Cutting Diameter mm	*inches*	Front and Back Order Number	Back Only Order Number
3.0	*(.118)*	**2.95**	*(.116)*	**3.7**	*(.146)*	**COFA3-3.0-** ☐	**COFA3b-3.0-** ☐
3.1	*(.122)*	**3.05**	*(.120)*	**3.8**	*(.150)*	**COFA3-3.1-** ☐	**COFA3b-3.1-** ☐
3.3	*(.130)*	**3.25**	*(.128)*	**4.0**	*(.158)*	**COFA3-3.3-** ☐	**COFA3b-3.3-** ☐
3.5	*(.138)*	**3.45**	*(.136)*	**4.2**	*(.165)*	**COFA3-3.5-** ☐	**COFA3b-3.5-** ☐
3.7	*(.146)*	**3.65**	*(.144)*	**4.4**	*(.173)*	**COFA3-3.7-** ☐	**COFA3b-3.7-** ☐
3.9	*(.154)*	**3.85**	*(.152)*	**4.6**	*(.181)*	**COFA3-3.9-** ☐	**COFA3b-3.9-** ☐
4.0	*(.158)*	**3.95**	*(.156)*	**4.7**	*(.185)*	**COFA3-4.0-** ☐	**COFA3b-4.0-** ☐
4.1	*(.161)*	**4.05**	*(.159)*	**4.8**	*(.189)*	**COFA3-4.1-** ☐	**COFA3b-4.1-** ☐

Spring Choice: See Below

Sample Order: COFA3-3.0-H or COFA3b-3.0-W

Spare Parts – MICRO COFA 3

2	3	4	7	8
Retainer Pin GH-H-S-	Screw Set GH-H-S-	Split Pin C3-E-	Assembly Pin C3-V-	Wrench GH-H-S-
-1017	-0135	-0002	-0001	-2106

4 Spring Options

The cutting force of the MICROCOFA tool is controlled by the flat spring
Choose the proper spring for the material being machined

Spring Code	Order Number	Typical Materials *Large or Heavy burrs may require a stronger spring*	
W	**C3-E-0013**	Softer	Aluminum, Brass, Magnesium
H	**C3-E-0014**	▲	Grey Cast iron, nodular Iron
S	**C3-E-0015**	▼	Carbon Steel, free Machining Steel
Z	**C3-E-0016**	Harder	Nickel, Titanium, Stainless

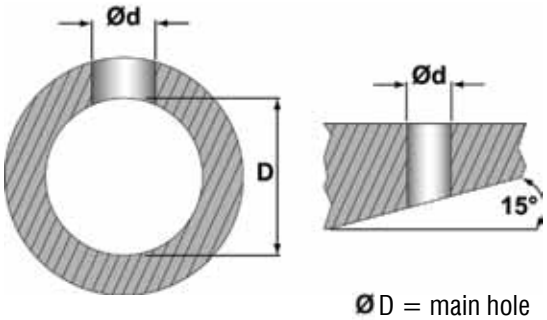
6 Blade Options

Blade Code	Blade Type	Geo.	Series 2
	TiAlN 20° Standard	fab	C3-M-0001-A
b		bco	C3-M-0011-A
y	TiAlN 10°	fab	C3-M-0002-A
yb		bco	C3-M-0012-A
x	TiAlN 30°	fab	C3-M-0004-A
xb		bco	C3-M-0014-A

Technical Information

For the standard MICRO COFA tool, the maximum main hole to cross hole ratio is 2:1 (for holes under 2.5mm, a minimum main hole of 4.5mm is required) and the maximum surface angle is 15°. Above these values, the cutting insert may not have enough clearance. With irregular surfaces, the RPM must be lowered but the feed rate is unaffected. Deburr more extreme contours by using the new 30° blade with extra clearance relief.

H = d/D
H max = 0.5



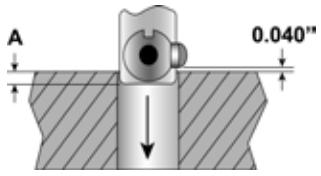
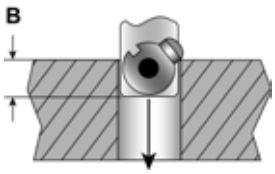
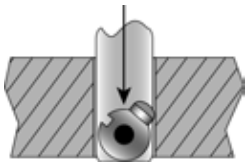
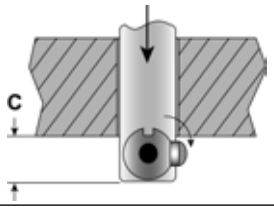
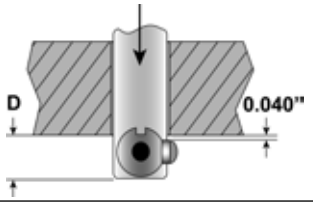
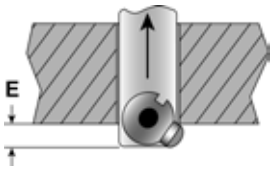
ØD = main hole
Ød = cross hole

Spring Information

The spring gives cutting force to the carbide blade and the MICRO COFA tool easily accommodates several spring sizes. For easier cutting materials such as aluminum, a softer "W" spring is recommended. For harder materials or alloys, a stiffer spring is recommended: "Z".

*Recommend 10° cutting blades

MATERIAL			FEED (IPR)	SPEED (SFM) Carbide-TiN	
	BHN	Spring Index		*Flat to 6°	Uneven Surface
Low Carbon Steels 1010, 1020, 1513	*100-200*	H-Z	0.003-0.007	60-127	45-75
Med. Carbon Steels 1030, 1040, 1050, 1524	*100-200*	H-S	0.003-0.007	67-105	37-60
Free Machining Alloy 4140, 4150, 4130	*125-250* *125-340*	H-S S-Z	0.003-0.007 0.002-0.006	67-90 45-75	33-53 22-53
High Alloy Steel 4340	*250-350*	S-Z	0.002-0.006	45-68	22-53
Stainless Steel 301, 316, 17-4PH etc.	*140-250*	S-Z	0.002-0.006	33-90	15-38
Steel Castings	*90-225* *150-250*	H-S S	0.003-0.007 0.002-0.006	49-90 22-60	33-60 11-38
Gray Cast Iron	*150-250* *200-330*	H H-S	0.004-0.008 0.003-0.007	48-90 22-60	22-53 18-38
Nodular Cast Iron	*125-260* *200-300*	H H-S	0.004-0.008 0.003-0.007	48-105 38-83	26-53 18-38
Aluminum Alloys	*30-180*	W	0.004-0.010	75-225	30-90
Nickel Base Alloys	*140-220* *220-310*	Z	0.002-0.006 0.002-0.005	11-30 7-23	7-23 7-15
Titanium Alloys		Z	0.002-0.006	11-30	7-23

For Front & Back Deburring		For Back Only Deburring
Step 1: Referencing the front of the tool. Rapid traverse the tool the distance "A" into the hole. This will give .040"(1) clearance from the cutter.		For back deburring only, the MICRO COFA tool can rapid traverse through the top hole without damage to your hole surface.
Step 2: In forward working feed machine the top surface of the hole by moving to distance "B". *(Ref. the front of the tool)*		
Step 3: Following, rapid traverse through the hole. The hole cannot be damaged.		**Step 1:** Referencing the front of the tool. Rapid traverse the tool the distance "A" into the hole. This will give .040"(1) clearance from the cutter.
Step 4: In order to make the blade snap out again, the tool has to be positioned beyond the rear bore edge by the distance "C". *(Ref. the front of the tool)*		**Step 2:** In order to make the blade snap out again, the tool has to be positioned beyond the rear bore edge by the distance "C". *(Ref. the front of the tool)*
Step 5: Travel the tool in back rapid feed below the rear material surface of the hole or deburr to reduce cycle time. Move to distance "D". *(Ref. the front of the tool)*		**Step 3 (optional):** Travel the tool in back rapid feed below the rear material surface of the hole or deburr to reduce cycle time. Move to distance "D". *(Ref. the front of the tool)*
Step 6: In back working feed, move to distance "E" to machine the rear surface. *(Ref. the front of the tool)* Rapid out.		**Step 4:** In back working feed, move to distance "E" to machine the rear surface. *(Ref. the front of the tool)* Rapid out.

Tool Type	A	B Flat	B Irregular	C*	D*	E* Flat	E* Irregular
COFA 2	.067" *(1.7)*	.177" *(4.5)*	.194 (4.9)	.177" *(4.5)*	.169" *(4.3)*	.059" *(1.5)*	.040" (1.0)
COFA 3	.098" *(2.5)*	.236" *(6.0)*	.260" *(6.6)*	.236" *(6.0)*	.217" *(5.5)*	.078" *(2.0)*	.055" (1.4)

*Plus Material Thickness

How to Change the Blade COFA Series 2 and 3:

Install

Step 1:
The COFA C2 and C3 blades can be installed and removed by clamping the tool in the COFA assembly fixture*.

Step 2:
Position the blade pin hole over the fixture pin hole by adjusting the set screw at the end of the assembly fixture.

Step 3:
Lay the tool firmly into the assembly fixture, positioning the tool with the longer spring slot facing the clamping screw. Tighten the clamping screw.

Step 4:
Install the blade into the blade window, nose first, so the nose of the blade is on the same side as the larger spring slot opening. Make sure, the bottom slot on the blade is engaged with the end of the spring.

IMPORTANT:
The blade hole and pin hole should be aligned.

Step 5:
Use the assembly pin to make sure the blade hole and the pin hole are aligned. Press the assembly pin all the way through to the larger diameter.

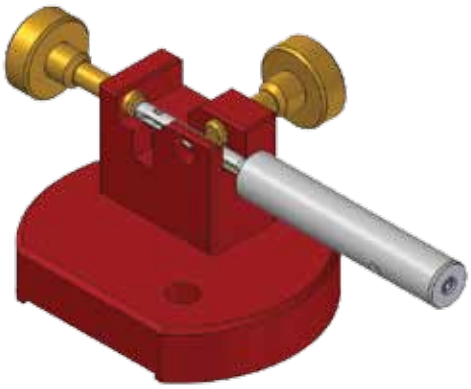
Step 6:
Remove the assembly pin and install the longer (and smaller diameter) of the split pin into the pin hole and blade hole.

Step 7:
Carefully using the other end of the assembly pin drive the split pin flush with the pin hole of the tool.

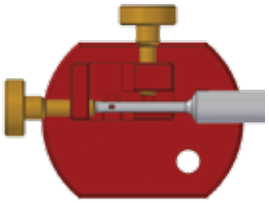
Step 8:
Remove the tool from the fixture. Using your fingers break off the blade tab and longer end of the split pin.

*COFA assembly fixture is not mandatory to remove blades

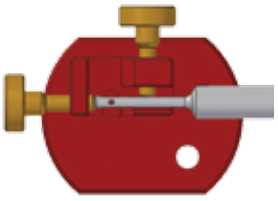
Step 1



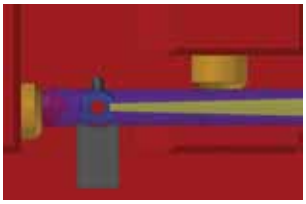
Step 2



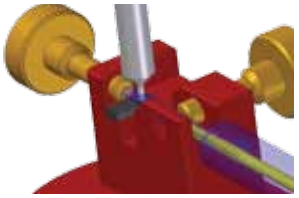
Step 3



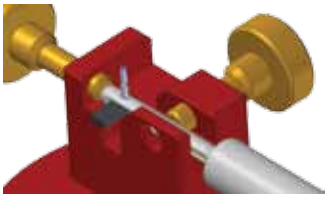
Step 4



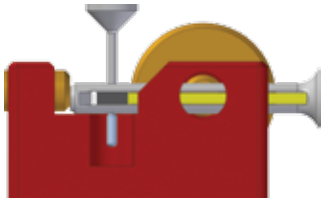
Step 5



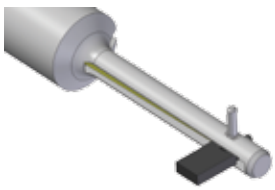
Step 6



Step 7



Step 8



How to Change the Blade COFA Series 2 and 3:

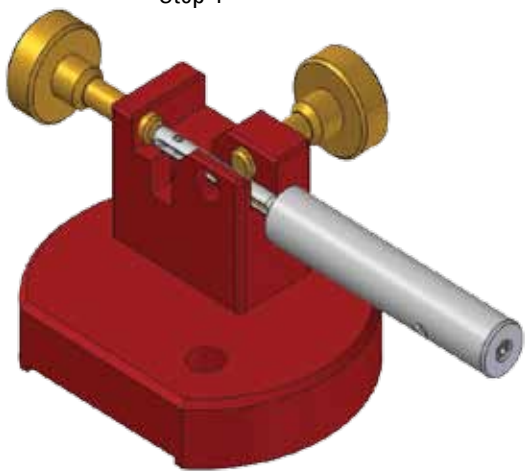
Removal

Step 1:
Lay the tool firmly into the assembly fixture, positioning the tool with the longer spring slot facing on the opposite side of the clamping screw. Tighten the clamping screw.

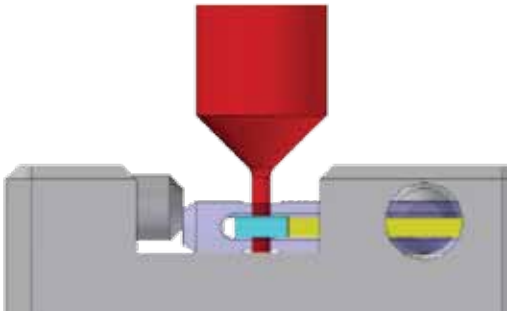
Step 2:
Using the smaller end of the assembly pin, drive the split pin out.

Step 3:
With the help of the small end of the assembly pin, push the blade out.

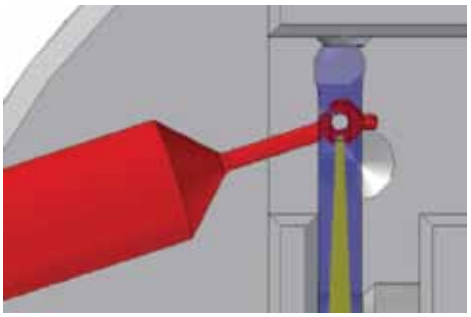
Step 1



Step 2

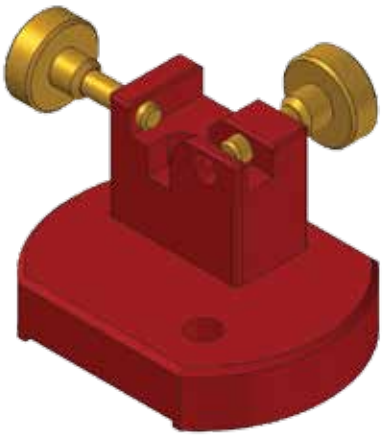


Step 3



OPTIONAL
Assembly Fixture – COFA 2 and 3

Tool Series	Order Number for Assembly Fixture
COFA 2 and 3	**C3-V-0002**



Spring Assembly
Install the spring into the hole on the bottom of the tool. Make sure to orient the spring flat. Use the set screw to hold the spring in the tool

Hint: Use the assembly pin to help remove and assemble the spring

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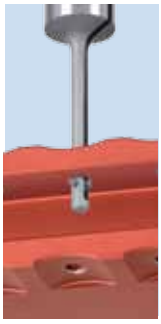


MICRO COFA

Front & back deburring of small through holes

COFA

Universal deburring tool for even deburring on uneven surface

MICRO SNAP

Front & back chamfering of small through holes

SNAP

Simple and economical front & back deburring tool

VEX-S

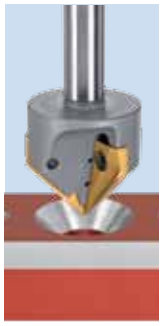
Through hole drilling and chamfering system

COMBI

Combine the latest technology for producing holes with our deburring and chamfering system

DEFA

Adjustable front & back chamfering tool



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