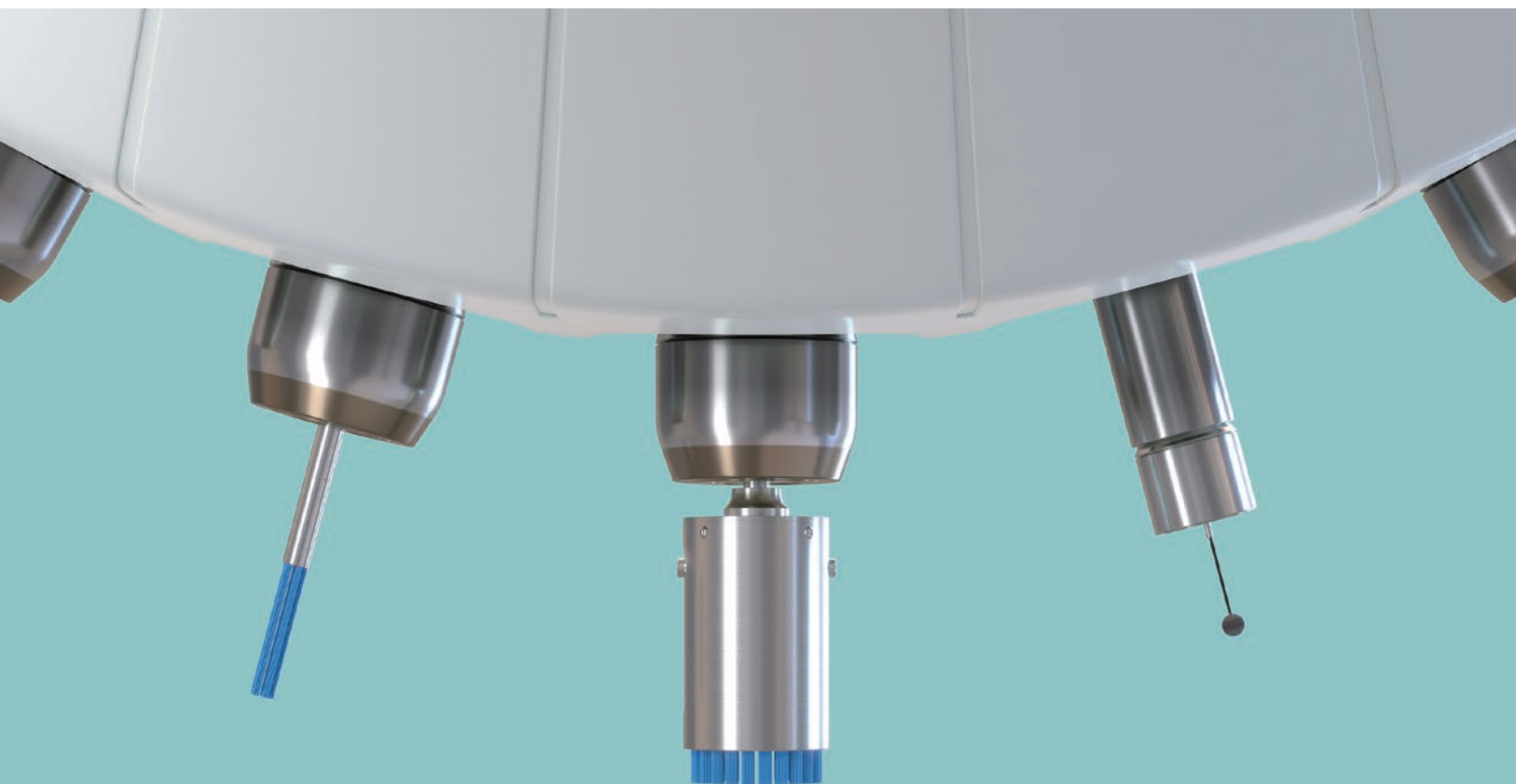
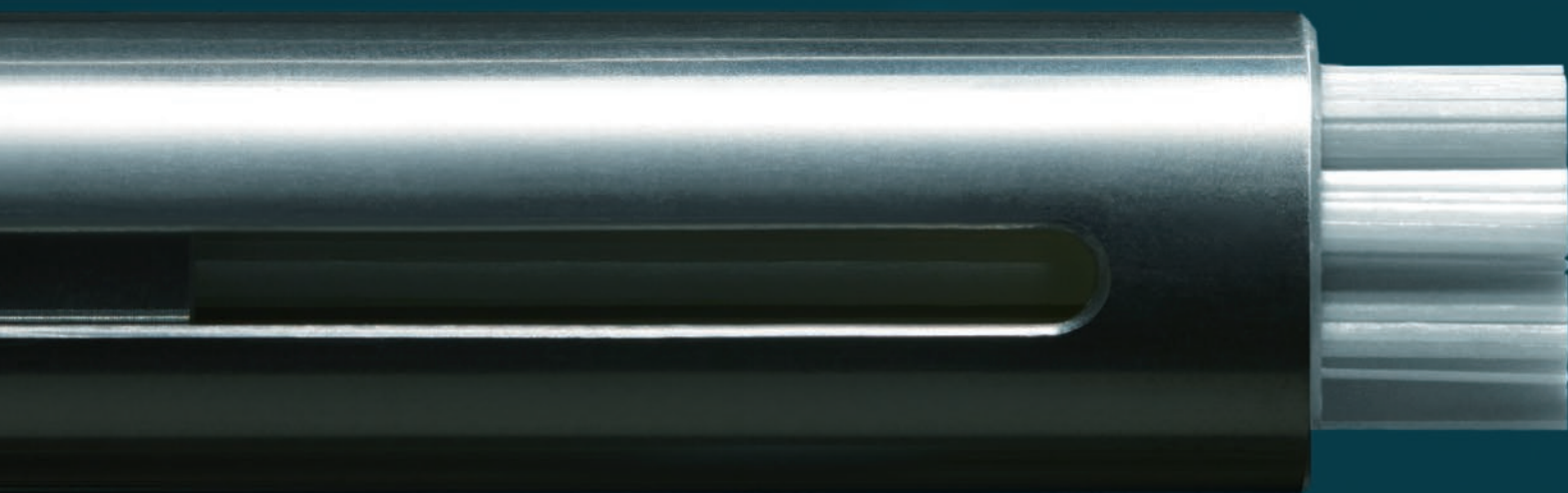
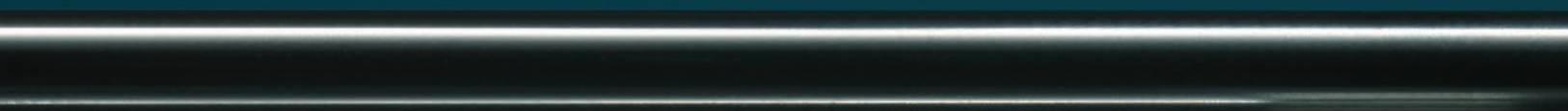
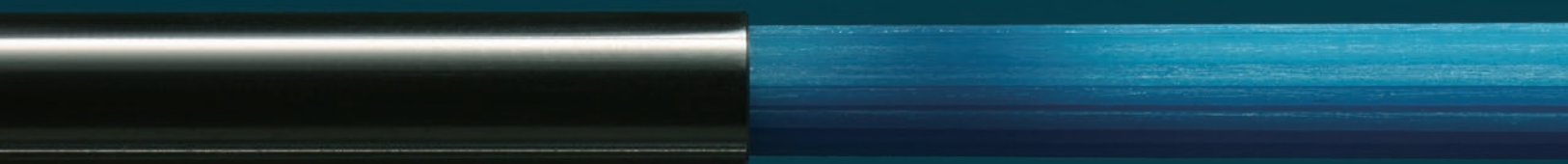
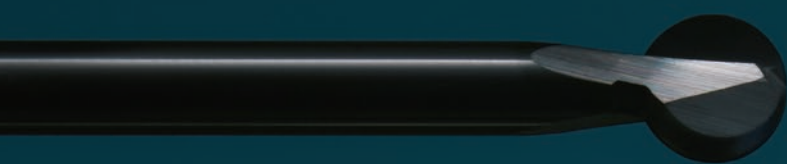
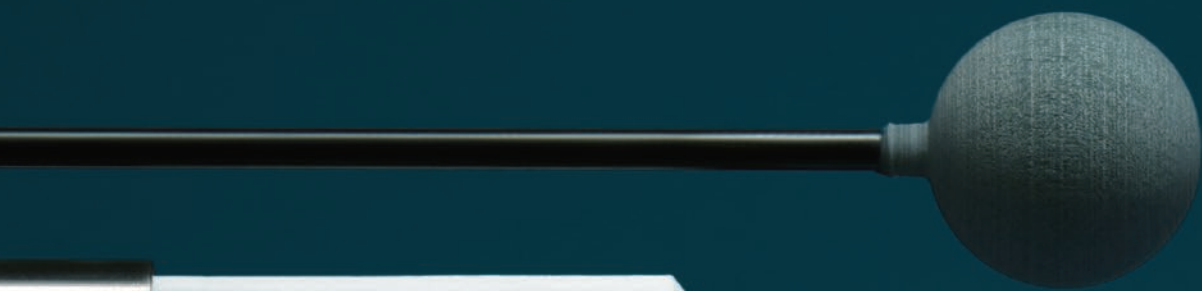




XEBEC TECHNOLOGY  
Product Catalog  
2023/2024



BEAUTIFUL DEBURRING®



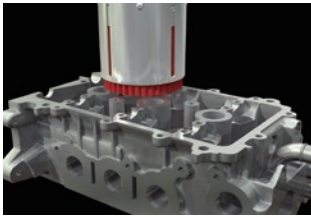
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# Applications

## Automotive

### CNC deburring of cylinder head

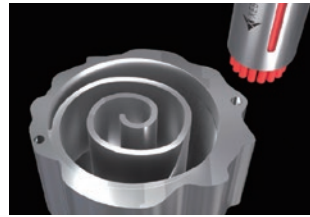


Material: ADC12  
Follows: Face milling  
Tool:  
XEBEC Brush Surface  
A11-CB100M, p. 7



VIDEO

### CNC deburring of scroll compressor



Material: Aluminum  
Follows: Face milling  
Tool:  
XEBEC Brush Surface  
A11-CB40M, p. 7



VIDEO

### CNC deburring of inverter case

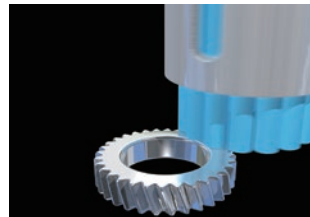


Material: ADC12  
Follows: Face milling  
Tool:  
XEBEC Brush Surface  
A32-CB25M, p. 7



VIDEO

### CNC deburring of pinion gear



Material: S45C  
Follows: Gear hobbing  
Tool:  
XEBEC Brush Surface  
A32-CB40M, p. 7



VIDEO

### CNC removal of coating on combustor part

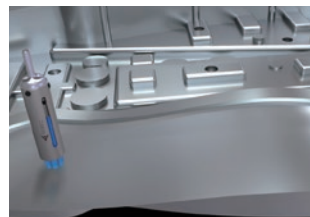


Material: Ceramics  
Follows: Face milling  
Tool:  
XEBEC Brush Surface  
A11-CB15M, p. 7



VIDEO

### CNC polishing of metal mold for car body panel

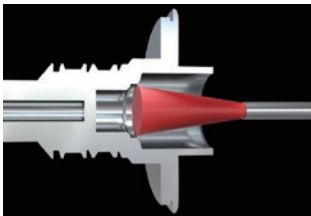


Material: SKD11  
Follows: End milling  
Tool:  
XEBEC Brush Surface  
A32-CB25M & A11-CB25M, p. 7



VIDEO

### CNC deburring of input shaft



Material: SCM  
Follows: Drilling  
Tool:  
XEBEC Brush Crosshole  
CH-A12-7M-TL, p. 11



VIDEO

### CNC deburring of yoke

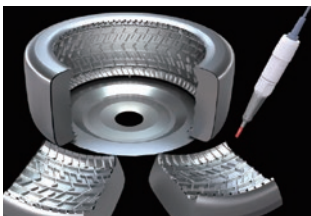


Material: SCM  
Follows: Drilling  
Tool:  
Back Burr Cutter & Deburring  
Tool Path, XC-58-A, p. 27



VIDEO

### Manual polishing of tire mold



Material: Aluminum  
Follows: Ball end milling  
Tool:  
XEBEC Brush Surface End Type  
A11-EB06M, p. 9



VIDEO

### CNC deburring of camshaft

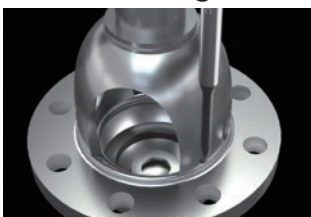


Material: FCD  
Follows: Drilling  
Tool:  
Back Burr Cutter & Deburring  
Tool Path, XC-38-A, p. 27



VIDEO

### CNC deburring of differential case

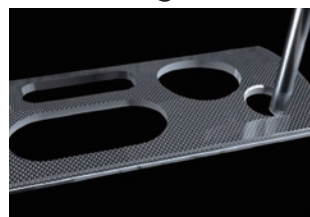


Material: FCD  
Follows: Drilling  
Tool:  
Back Burr Cutter & Deburring  
Tool Path, XC-78-A, p. 27



VIDEO

### Chamfering of exterior part



Material: CFRP  
Follows: Tapping  
Tool:  
Burrless Chamfering Cutter  
XC-C-06-N, p. 33



VIDEO



## Industrial Machinery

### CNC deburring of gearbox

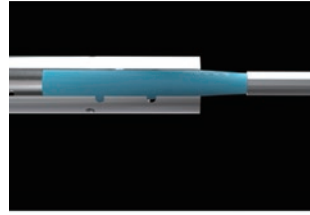


Material: FC250  
Follows: Face milling  
Tool:  
XEBEC Brush Surface  
A32-CB60M, p. 7



VIDEO

### CNC deburring of pipe

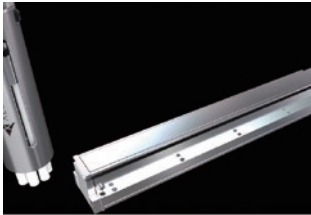


Material: Stainless steel  
Follows: Drilling  
Tool:  
XEBEC Brush Crosshole  
CH-A33-7M, p. 11



VIDEO

### CNC deburring of slide cylinder



Material: Aluminum  
Follows: End milling  
Tool:  
XEBEC Brush Surface  
A21-CB25M, p. 7



VIDEO

### CNC deburring of shaft

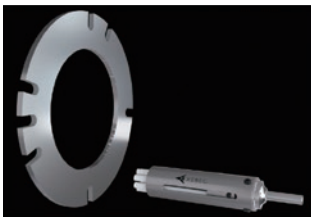


Material: SCM  
Follows: Threading  
Tool:  
XEBEC Brush Wheel Type  
W-A11-50, p. 15



VIDEO

### CNC roughing of brake disc



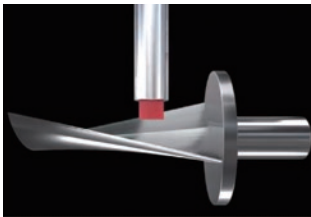
Material: SPHC  
Follows: Turning  
Tool:  
XEBEC Brush Surface  
A21-CB25M, p. 7



VIDEO

## Aerospace

### CNC polishing of turbine blade



Material: SUS630  
Follows: Ball end milling  
Tool:  
XEBEC Brush Surface  
A32-CB25M & A11-CB25M, p. 7



VIDEO

## Orthopedic Medical Devices

### CNC polishing of artificial hip joint



Material: CoCrMo  
Follows: Turning  
Tool:  
XEBEC Brush Surface  
A13-CB06M, p. 7



VIDEO

### Manual deburring of hydraulic manifold



Material: Aluminum  
Follows: Drilling  
Tool:  
XEBEC Stone Flexible Shaft  
CH-PM-6B, p. 37



VIDEO

### CNC deburring of osteosynthesis screw



Material: Titanium  
Follows: End milling  
Tool:  
XEBEC Brush Surface End Type  
A11-EB06M, p. 9



VIDEO

### Manual deburring of shaft



Material: Aluminum  
Follows: Casting  
Tool:  
XEBEC Stone Mounted Point  
AX-PM-6T, p. 39



VIDEO

### CNC deburring of spinal implant



Material: PEEK resin  
Follows: End milling  
Tool:  
Back Burr Cutter & Deburring  
Tool Path, XC-18-A, p. 27



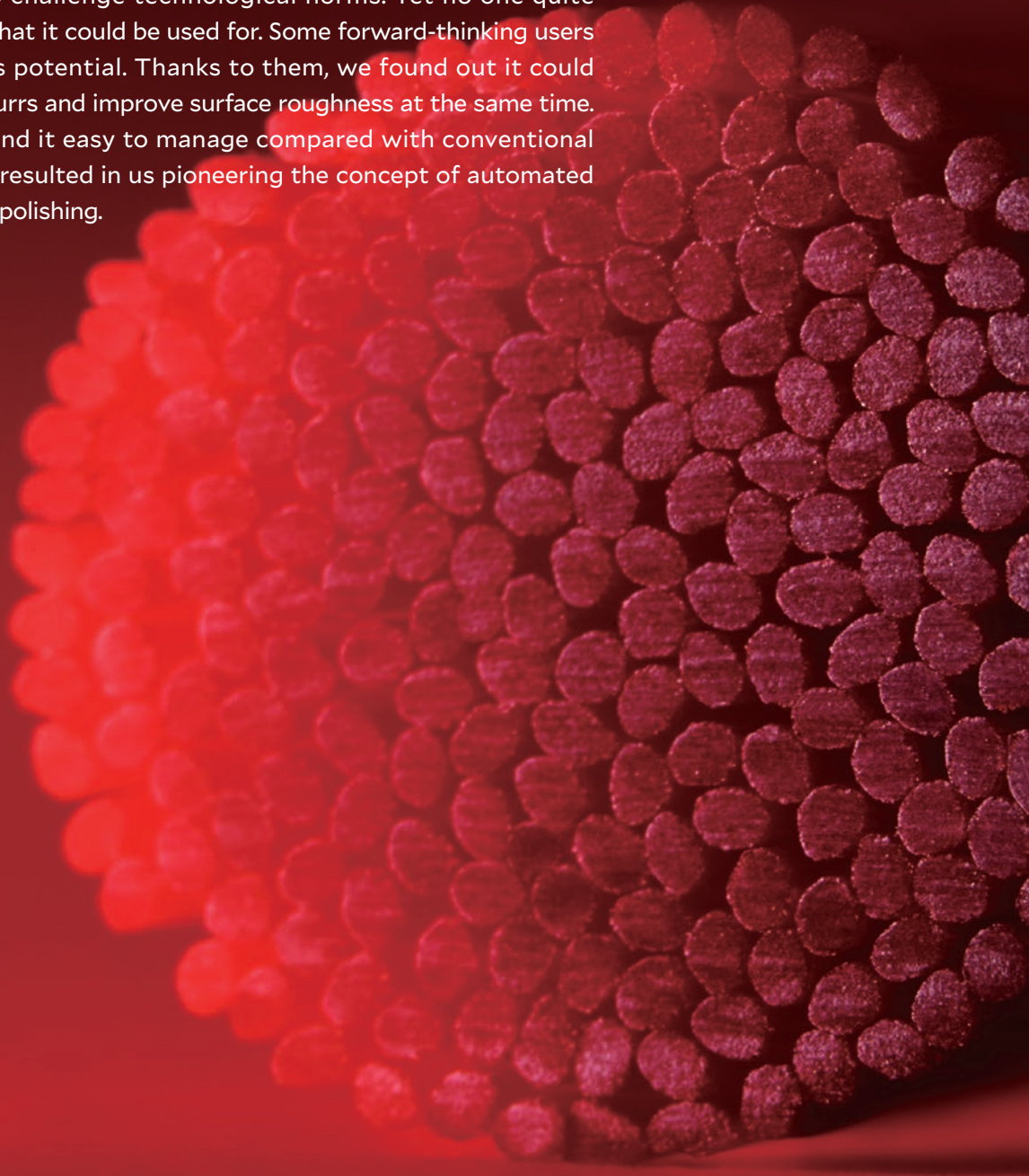
VIDEO

Automate deburring and polishing in your CNC machine

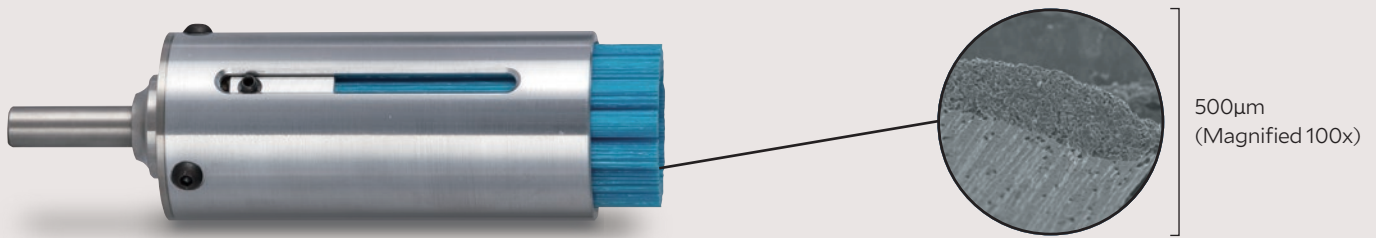
## XEBEC Brush™

“What if we could make a brush out of the same material as ceramic grinding stones. It would be truly groundbreaking!”

And so, the ceramic brush was born. It was one of a kind; the result of a desire to challenge technological norms. Yet no one quite understood what it could be used for. Some forward-thinking users believed in its potential. Thanks to them, we found out it could remove fine burrs and improve surface roughness at the same time. They also found it easy to manage compared with conventional brushes. This resulted in us pioneering the concept of automated deburring and polishing.

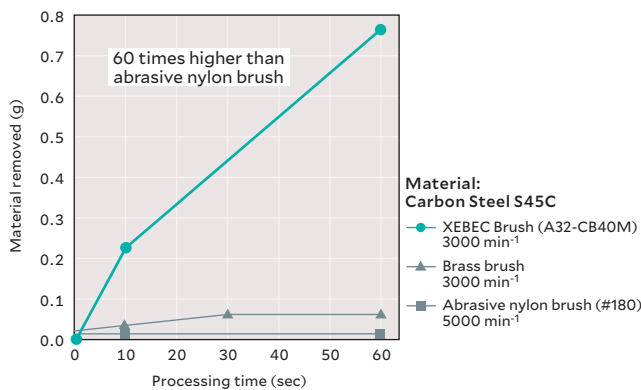


XEBEC Brush uses unique abrasive ceramic fiber material instead of abrasive grain. Each bristle consists of 1,000 ceramic fibers that work as cutting edges. Overwhelming grinding power, consistent cutting performance, and no deformation enables CNC deburring immediately after machining operations inside the same machine tool.



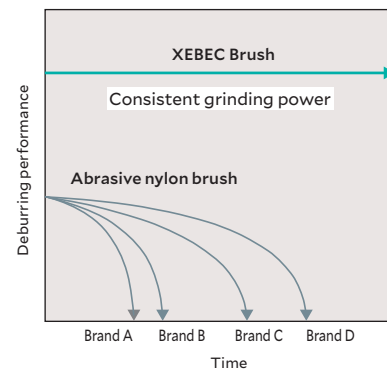
## High grinding power

The content ratio of ceramic fiber is approximately 80%. Cutting edges on the brush tips offer excellent grinding power.



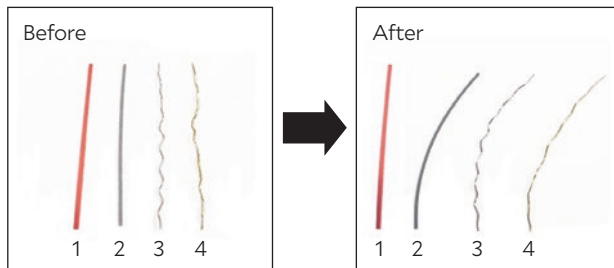
## Consistent grinding performance

New cutting edges are always exposed. Consistent grinding performance throughout due to the uniform structure of the fiber.



## No deformation

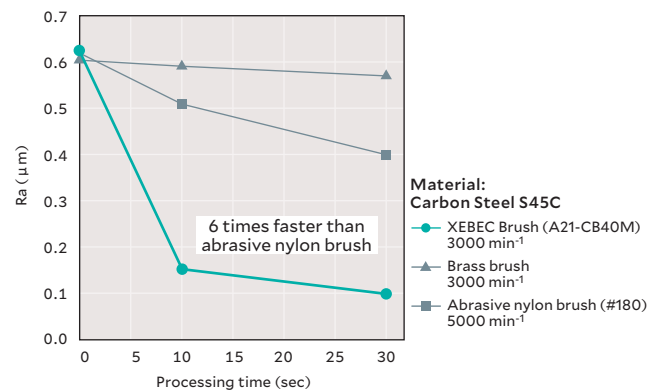
Maintains its straight shape and does not spread out like an old toothbrush. Easy to manage on mass production lines.



1. XEBEC Brush (A11 red bristle)
2. Abrasive nylon brush
3. Steel wire brush
4. Brass wire brush

## Optimal for polishing

The high grinding power of ceramic fiber makes this tool optimal for polishing. Achievable surface roughness is  $R_a = 0.1 \mu\text{m}$  ( $R_z = 0.4 \mu\text{m}$ ).

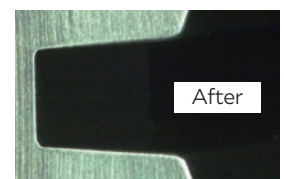
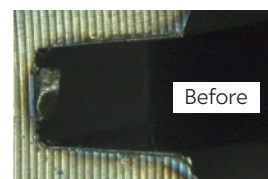


## Brush selection

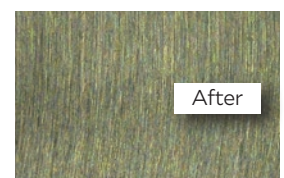
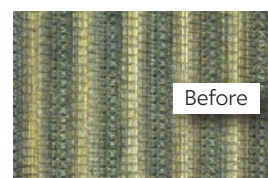
Workpiece material	Resin		Copper, Brass	
			Aluminum	
			Steel	
			Stainless steel	HRSA steel
Burr size	Micro fine burrs			
			Burr thickness ( $\leq 0.1 \text{ mm}$ )	
			Burr thickness ( $0.1 - 0.2 \text{ mm}$ )	
Brush (color)	A13 (pink)	A11 (red)	A21 (white)	A32 (blue)
Grinding power	<div style="display: flex; align-items: center;"> <div style="flex-grow: 1; border-bottom: 1px solid black; position: relative;"> <span style="position: absolute; right: 0; top: -5px;">→ High</span> </div> </div>			

- Not all brush colors are available in all sizes.
- HRSA (heat resistant super alloy)

## Deburring



## Polishing



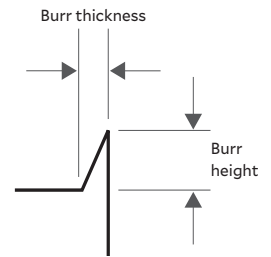


# XEBEC Brush™ Surface Patented

Deburring, cutter mark removal, and surface polishing

## Applicable burr size

Burr thickness  $\leq 0.2$  mm  
(Burrs this size can be bent by fingernails)



VIDEO



## Applicable equipment

This tool can be mounted on equipment shown below.



Machining center



Lathe (with live tools)



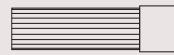
Dedicated machine



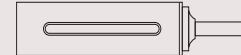
Robot

## Tool composition

Brush and sleeve are sold separately.  
Assemble brush and sleeve before use.



Brush



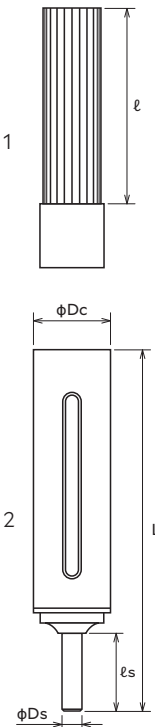
Sleeve

## Brushes

Brush (color)	Product code	Brush diameter (mm)	Bristle length $\ell$ (mm)	Matching sleeve	Fig.
A13 (pink)	A13-CB06M	$\phi 6$	30	S06M	1
	A13-CB15M	$\phi 15$	50	S15M-P	1
A11 (red)	A11-CB06M	$\phi 6$	30	S06M	1
	A11-CB15M	$\phi 15$	50	S15M-P	1
	A11-CB25M	$\phi 25$	75	S25M	1
	A11-CB40M	$\phi 40$	75	S40M-SD10	1
	A11-CB60M	$\phi 60$	75	S60M	1
	A11-CB100M	$\phi 100$	75	S100M	1
	A11-CB100M	$\phi 100$	75	S100M	1
A21 (white)	A21-CB06M	$\phi 6$	30	S06M	1
	A21-CB15M	$\phi 15$	50	S15M-P	1
	A21-CB25M	$\phi 25$	75	S25M	1
	A21-CB40M	$\phi 40$	75	S40M-SD10	1
	A21-CB60M	$\phi 60$	75	S60M	1
	A21-CB100M	$\phi 100$	75	S100M	1
A32 (blue)	A32-CB06M	$\phi 6$	30	S06M	1
	A32-CB15M	$\phi 15$	50	S15M-P	1
	A32-CB25M	$\phi 25$	75	S25M	1
	A32-CB40M	$\phi 40$	75	S40M-SD10	1
	A32-CB60M	$\phi 60$	75	S60M	1
	A32-CB100M	$\phi 100$	75	S100M	1
	A32-CB100M	$\phi 100$	75	S100M	1

Fig. 1

Fig. 2



MANUAL

- Bristle bundles are embedded in a single line on the periphery (except for  $\phi 6$  type).
- Brush size is approximate as the tip expands with rotation.
- Brushes larger than  $\phi 100$  are available by special order. Refer to page 10.

## Sleeves

Product code	Brush dia. (mm)	External dia. Dc (mm)	Shank dia. Ds (mm)	Overall length L (mm)	Shank length $\ell_s$ (mm)	Matching brush	Fig.
S06M	$\phi 6$	$\phi 10$	$\phi 6$	70	29	A13/A11/A21/A32-CB06M	2
S15M-P	$\phi 15$	$\phi 18.5$	$\phi 6$	90	29	A13/A11/A21/A32-CB15M	2
S25M	$\phi 25$	$\phi 30$	$\phi 8$	140	30	A11/A21/A32-CB25M	2
S40M-SD10	$\phi 40$	$\phi 45$	$\phi 10$	140	30	A11/A21/A32-CB40M	2
S60M	$\phi 60$	$\phi 65$	$\phi 12$	150	35	A11/A21/A32-CB60M	2
S100M	$\phi 100$	$\phi 110$	$\phi 16$	162	40	A11/A21/A32-CB100M	2

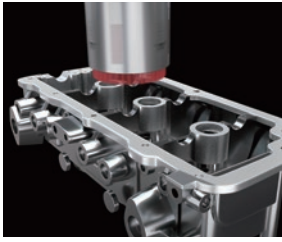
- Overall length L is sleeve length not including brush projection.
- The case of the S15M-P is made of fiber-reinforced plastic (FRP).

Refer to p. 43 to select brush color

## Applications

Higher quality automated deburring

### Cylinder head



Material: Aluminum  
Follows: Face milling  
Tool: A11-CB100M

#### Before

Abrasive nylon brush was used. It was time-consuming and not able to remove all burrs.

#### After

All burrs are removed by high grinding power. Quality is stable. The cycle time is shortened by a high feed rate.

Automation of time-consuming polishing

### Metal mold



Material: Hard material  
Follows: End milling  
Tool: A11-CB25M

#### Before

40 minutes hand polishing per workpiece. Uneven quality resulted in complaints.

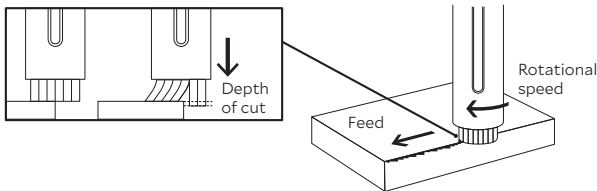
#### After

Shortened the polishing time to one minute per workpiece by automation. Achieved uniform polishing quality.

## How to use

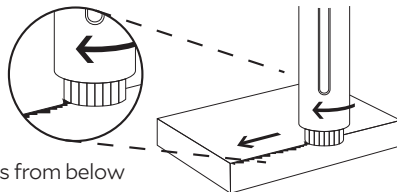
### Rotational speed

Recommended parameters differ depending on brush size. Refer to the chart below for starting parameters for each brush size.



### Rotational direction

Set the rotational direction so that the brush pushes the burrs up from below.



Upcut against burrs from below

### Feed rate - Deburring

Burr thickness: 0.05 mm  
(Very easily bent by fingernails)

4000 mm/min

Burr thickness: 0.1 mm  
(Easily bent by fingernails)

2500 mm/min

### Feed rate - Polishing

Cutter mark removal, polishing

250 - 850 mm/min

### Depth of cut - Vertical burrs

Formed by end milling & drilling  
(Are vertical to brush tip)

0.5 mm

### Depth of cut - Horizontal burrs

Formed by face milling  
(Are horizontal to brush tip)

1.0 mm

### Depth of cut - Polishing

Cutter mark removal, polishing

0.3 - 0.5 mm

## Starting parameters

Product code	Rotational speed (min <sup>-1</sup> )			Depth of cut (mm)			Feed rate (mm/min)			Brush protrusion (mm)	
	Deburring	Cutter mark removal, polishing	Maximum	Vertical burrs	Horizontal burrs	Cutter mark removal, polishing	Burr thickness 0.05 mm	Burr thickness 0.1 mm	Cutter mark removal, polishing	Deburring	Cutter mark removal, polishing
A13-CB06M A11-CB06M A21-CB06M	8000	10000	10000	0.5	0.5	0.3	4000	2500	250	10	10
A32-CB06M	8000	10000	10000	0.3	0.3	0.3	4000	2500	250	10	10
A13-CB15M	4800	6000	6000	1.0	1.0	0.5	4000	2500	450	10	10
A11-CB15M A21-CB15M A32-CB15M	4800	6000	6000	0.5	1.0	0.5	4000	2500	450	10	10
A11-CB25M A21-CB25M A32-CB25M	4000	5000	5000	0.5	1.0	0.5	4000	2500	700	15	10
A11-CB40M A21-CB40M A32-CB40M	2400	3000	3000	0.5	1.0	0.5	4000	2500	800	15	10
A11-CB60M A21-CB60M A32-CB60M	1600	2000	2000	0.5	1.0	0.5	4000	2500	850	15	10
A11-CB100M A21-CB100M A32-CB100M	960	1200	1200	0.5	1.0	0.5	4000	2500	850	15	10

■ Plastic workpieces may deform or discolor. If this occurs, reducing rotational speed to approximately 10% of the starting parameter may solve the problem.

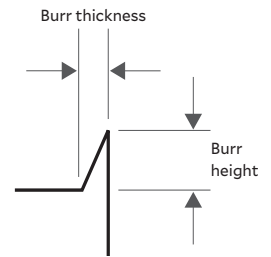


# XEBEC Brush™ Surface End Type

Cutter mark removal and polishing on sealing surfaces

## Applicable burr size

Burr thickness  $\leq 0.1$  mm  
(Burs this size can be easily bent by fingernails)



VIDEO

## Applicable equipment

This tool can be used with equipment that controls rotational speed.



Machining center



Lathe (with live tools)



Dedicated machine



Robot



Rotary tool (electric)

## Brushes

Brush (color)	Product code	Brush dia. (mm)	Shank dia. Dc (mm)	Bristle length $\ell$ (mm)	Overall length L (mm)	Standard rotational speed (min <sup>-1</sup> )	Maximum rotational speed (min <sup>-1</sup> )	Fig.
A13 (pink)	A13-EB01S	$\phi 1$	$\phi 3$	15	52	7000 - 12000	15000	3
	A13-EB015S	$\phi 1.5$	$\phi 3$	15	52	7000 - 12000	15000	3
	A13-EB02S	$\phi 2$	$\phi 3$	15	52	7000 - 12000	15000	3
	A13-EB025S	$\phi 2.5$	$\phi 3$	15	52	7000 - 12000	15000	3
	A13-EB03M	$\phi 3$	$\phi 3$	30	67	4000	6000	3
A11 (red)	A11-EB01S	$\phi 1$	$\phi 3$	15	52	7000 - 12000	15000	3
	A11-EB015S	$\phi 1.5$	$\phi 3$	15	52	7000 - 12000	15000	3
	A11-EB02S	$\phi 2$	$\phi 3$	15	52	7000 - 12000	15000	3
	A11-EB025S	$\phi 2.5$	$\phi 3$	15	52	7000 - 12000	15000	3
	A11-EB06M	$\phi 5$	$\phi 3$	20	57	7000	12000	4
A21 (white)	A21-EB06M	$\phi 5$	$\phi 3$	20	57	7000	12000	4
A32 (blue)	A32-EB06M	$\phi 5$	$\phi 3$	20	57	7000	12000	4

■ Brush size is approximate as the tip expands with rotation.

## Precautions for use

The grinding load must be less than 2 N for hand use.

The brush will break if:

- used beyond the maximum rotational speed
- used beyond the maximum indentation load
- used with a pneumatic rotary tool

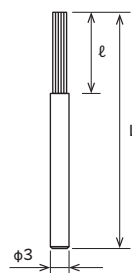


Fig. 3

Tip angle approx. 100 deg.

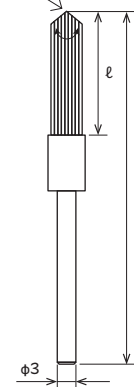


Fig. 4

A11-EB06M  
A21-EB06M  
A32-EB06M



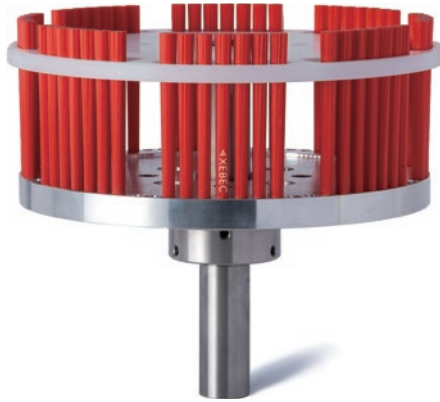
MANUAL

Refer to p. 45 to select brush color

# XEBEC Brush™ Surface Extra-Large

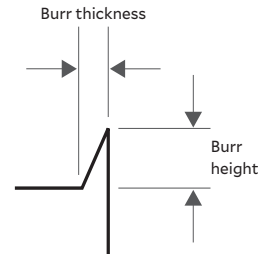
Patented

Deburring, cutter mark removal, surface polishing ( $\geq 100$  mm)



## Applicable burr size

Burr thickness  $\leq 0.2$  mm  
(Burs this size can be bent by fingernails)



VIDEO

## Applicable equipment

This tool can be mounted on equipment shown below.



Machining center



Lathe (with live tools)



Dedicated machine

## Tool composition

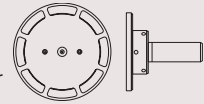
The brush main unit and slide ring are separate items. Assemble the main unit and slide ring before use.

Brush



Slide ring

- Ring
- Base holder
- Shank



## Brushes

Brush (color)	Product code	Brush diameter (mm)	Bristle length $\ell$ (mm)	Matching slide ring (Product code)	Fig.
A11 (red)	A11-CB125M	$\phi 125$	75	SR125M	5
	A11-CB165M	$\phi 165$	75	SR165M	5
	A11-CB200M	$\phi 200$	75	SR200M	5
A21 (white)	A21-CB125M	$\phi 125$	75	SR125M	5
	A21-CB165M	$\phi 165$	75	SR165M	5
	A21-CB200M	$\phi 200$	75	SR200M	5
A32 (blue)	A32-CB125M	$\phi 125$	75	SR125M	5
	A32-CB165M	$\phi 165$	75	SR165M	5
	A32-CB200M	$\phi 200$	75	SR200M	5



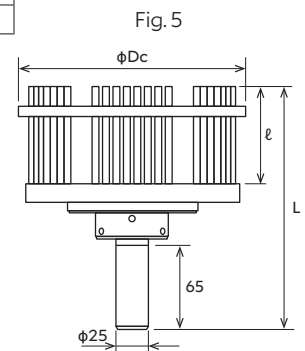
MANUAL

■ Brush size is approximate as the tip expands with rotation.

## Slide rings

Product code	Brush diameter (mm)	Outer dia. Dc (mm)	Shank diameter (mm)	Overall length L (mm)	Fig.
SR125M	$\phi 125$	$\phi 135$	$\phi 25$	187	5
SR165M	$\phi 165$	$\phi 176$	$\phi 25$	187	5
SR200M	$\phi 200$	$\phi 211$	$\phi 25$	187	5

- The slide ring consists of a ring, base holder and shank.
- Base holder and shank sizes are the same for all brush diameters. Ring size varies with brush diameter.
- Combined weights of brushes and slide rings are:  $\phi 125$ : 1920 g,  $\phi 165$ : 2320 g and  $\phi 200$ : 2750 g.



## Starting parameters

Product code	Rotational speed (min <sup>-1</sup> )			Depth of cut (mm)			Feed rate (mm/min)			Brush protrusion (mm)	
	Deburring	Cutter mark removal, polishing	Maximum	Vertical burrs	Horizontal burrs	Cutter mark removal, polishing	Burr thickness 0.05 mm	Burr thickness 0.1 mm	Cutter mark removal, polishing	Deburring	Cutter mark removal, polishing
A11-CB125M A21-CB125M A32-CB125M	800	1000	1000	0.5	1.0	0.5	4000	2500	700	15	10
A11-CB165M A21-CB165M A32-CB165M	600	750	750	0.5	1.0	0.5	4000	2500	700	15	10
A11-CB200M A21-CB200M A32-CB200M	480	600	600	0.5	1.0	0.5	4000	2500	650	15	10

■ In event of problems, refer to p. 43 (XEBEC Brush Surface) for possible adjustments.

Refer to p. 43 to select brush color

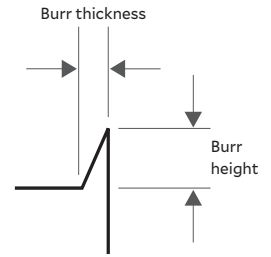
# XEBEC Brush™ Crosshole

Deburring, cutter mark removal, polishing on inner diameters & counterbores ( $\leq \phi 20$  mm)

## Applicable burr size

Burr thickness  $\leq 0.1$  mm

(Burs this size can be easily bent by fingernails)



VIDEO

## Applicable equipment

This tool is used on equipment with rotational speed control ( $> 6500$  min<sup>-1</sup>).



Machining center



Lathe (with live tools)



Dedicated machine



Robot



Rotary tool (electric)

## Brushes

Brush (color)	Product code	Brush dia. (mm)	Shank dia. Dc (mm)	Shank dia. Ds (mm)	Bristle length $\ell$ (mm)	Overall length L (mm)	Maximum rotational speed (min <sup>-1</sup> )	Target hole diameter (mm)	Fig.
A12 (red)	CH-A12-1.5M	$\phi 1.5$	$\phi 2.5$	$\phi 3$	50	120	20000	$\phi 3.5 - 5$	6
	CH-A12-3M-TL	$\phi 3$	$\phi 4$	$\phi 3$	50	120	14000	$\phi 5 - 8$	6
	CH-A12-3L-TL	$\phi 3$	$\phi 4$	$\phi 4$	50	170	12000	$\phi 5 - 8$	6
	CH-A12-5M-TL	$\phi 5$	$\phi 6$	$\phi 6$	50	120	14000	$\phi 8 - 10$	6
	CH-A12-5L-TL	$\phi 5$	$\phi 6$	$\phi 6$	50	170	12000	$\phi 8 - 10$	6
	CH-A12-7M-TL	$\phi 7$	$\phi 8$	$\phi 6$	50	120	14000	$\phi 10 - 20$	6
	CH-A12-7L-TL	$\phi 7$	$\phi 8$	$\phi 8$	50	170	12000	$\phi 10 - 20$	6
	CH-A12-11M	$\phi 11$	$\phi 12$	$\phi 12$	50	120	14000	$\phi 14 - 20$	6
A33 (blue)	CH-A12-11L	$\phi 11$	$\phi 12$	$\phi 12$	50	170	12000	$\phi 14 - 20$	6
	CH-A33-3M	$\phi 3$	$\phi 4$	$\phi 3$	60	130	14000	$\phi 5 - 8$	6
	CH-A33-3L	$\phi 3$	$\phi 4$	$\phi 4$	60	180	12000	$\phi 5 - 8$	6
	CH-A33-5M	$\phi 5$	$\phi 6$	$\phi 6$	60	130	14000	$\phi 8 - 10$	6
	CH-A33-5L	$\phi 5$	$\phi 6$	$\phi 6$	60	180	12000	$\phi 8 - 10$	6
	CH-A33-7M	$\phi 7$	$\phi 8$	$\phi 6$	60	130	14000	$\phi 10 - 14$	6
	CH-A33-7L	$\phi 7$	$\phi 8$	$\phi 8$	60	180	12000	$\phi 10 - 14$	6
	CH-A33-11M	$\phi 11$	$\phi 12$	$\phi 12$	60	130	14000	$\phi 14 - 20$	6
	CH-A33-11L	$\phi 11$	$\phi 12$	$\phi 12$	60	180	12000	$\phi 14 - 20$	6

■ Brush size is approximate as the tip expands with rotation.

## Precautions for use

The shank must be inserted  $\geq 30$  mm in the holder to secure it properly.

The brush will break if:

- used beyond the maximum rotational speed
- used with a pneumatic rotary tool
- rotated outside of the bore (outside workpiece)
- used with brush tip  $< 20$  mm inside bore

The brush may break when used with:

- off-center or angled crossholes
- t-shaped holes, when secondary bore diameter  $\geq$  main bore
- crossholes, when secondary bore diameter  $\geq 70\%$  main bore

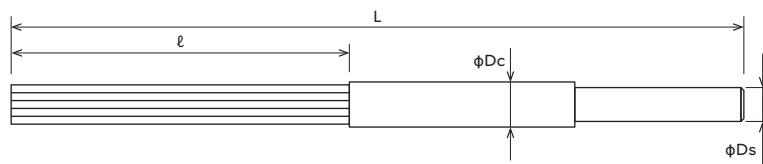


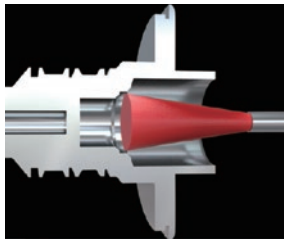
Fig. 6

Refer to p. 46 to select brush color

## Applications

### Automation of crosshole deburring

#### Input shaft



##### Before

Manual deburring by abrasive nylon brush. Not all burrs were removed and output was low.

##### After

A dedicated machine is used to automate deburring. All burrs are removed by high grinding power. Quality is stable.

Material: SCM  
Follows: Drilling  
Tool: CH-A12-7M-TL

### Automation of crosshole deburring

#### Valve case



##### Before

Manual deburring by cutter was time-consuming. Cutter left scratches on inner surface.

##### After

Deburring inside the machine reduced cycle time significantly. No scratching on inner surface and finish quality is stable.

Material: Resin  
Follows: Drilling  
Tool: CH-A12-5M-TL

## How to use

**Caution:** Rotating the brush outside of the bore may damage the brush and cause injury to the operator.

Step 1

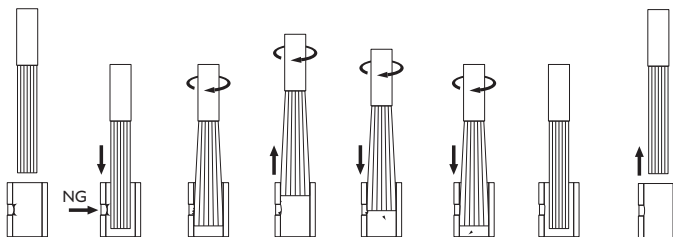
Step 2

Step 3

Step 4

Step 5

Step 6

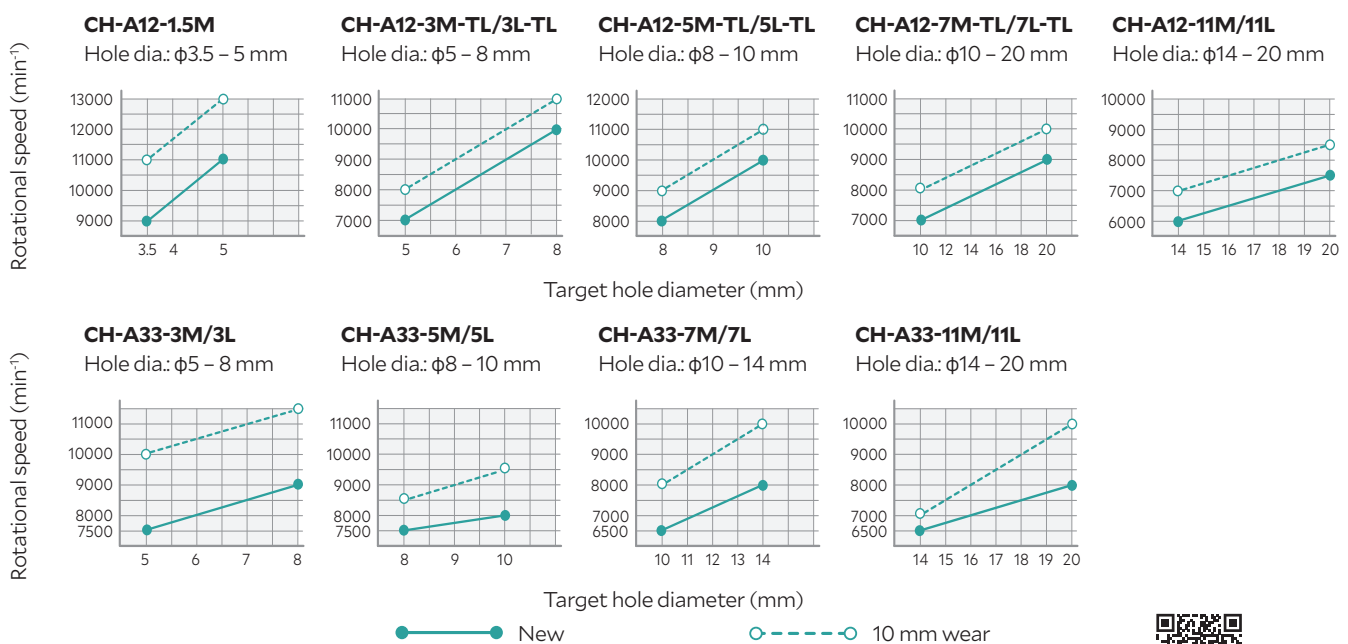


1. Insert the brush stationary into the bore.
2. Rotate the tool once past the crosshole.
3. Machine while pulling the brush back.
4. Machine while pushing the brush forward.
5. Stop the brush rotation.
6. Remove the brush when it is stationary.

## Machining parameter adjustments

### Rotational speed

Brush performance can be optimized by adjusting rotational speed in accordance with brush size, target hole diameter and brush wear. Refer below for recommended rotational speeds.



### Feed rate

300 mm/min

### Rotational direction

Uniform deburring and edge quality can be achieved by rotating the tool in both clockwise and counter-clockwise directions.



MANUAL

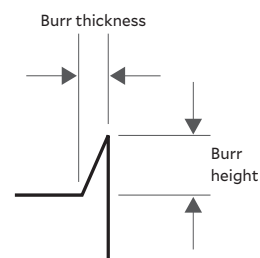
# XEBEC Brush™ Crosshole Extra-Large

Deburring, cutter mark removal, polishing on inner diameters & counterbores ( $\geq \phi 20$  mm)

## Applicable burr size

Burr thickness  $\leq 0.1$  mm

(Burs this size can be easily bent by fingernails)



VIDEO



## Applicable equipment

This tool is used on equipment with rotational speed control ( $> 4000$  min<sup>-1</sup>).



Machining center



Lathe (with live tools)



Dedicated machine



Robot

## Tool composition

Brush and shank are sold separately. Assemble before use.

Brush

Shank



## Brushes

Brush (color)	Product code	Brush dia. (mm)	Bristle length $\ell$ (mm)	Shank insertion depth $d_s$ (mm)	Max. rotational speed (min <sup>-1</sup> )	Target hole diameter (mm)	Matching shank	Fig.
A34 (dark blue)	CH-A34-15	$\phi 15$	60	10	9000	$\phi 20 - 25$	CH-SH-6	7
	CH-A34-20	$\phi 20$	60	16	9000	$\phi 25 - 30$	CH-SH-8	7
	CH-A34-25	$\phi 25$	60	16	9000	$\phi 30 - 35$	CH-SH-8	7

■ Brush size is approximate as the tip expands with rotation.

■ Overall length of assembled brush and shank is 150 mm.

## Shanks

Product code	Shaft dia. $D_s$ (mm)	Shank length $\ell_s$ (mm)	Matching brush	Fig.
CH-SH-6	$\phi 6$	80	CH-A34-15	8
CH-SH-8	$\phi 8$	86	CH-A34-20, CH-A34-25	8



MANUAL

Fig. 7

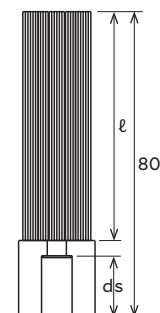
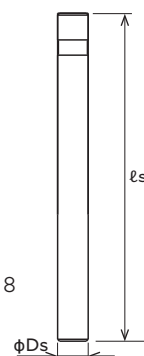


Fig. 8



## Precautions for use

The shank must be inserted  $\geq 30$  mm in the holder to secure it properly.

The brush will break if:

- used beyond the maximum rotational speed
- used with a pneumatic rotary tool
- rotated outside of the bore (outside workpiece)
- used with brush tip  $< 20$  mm inside bore

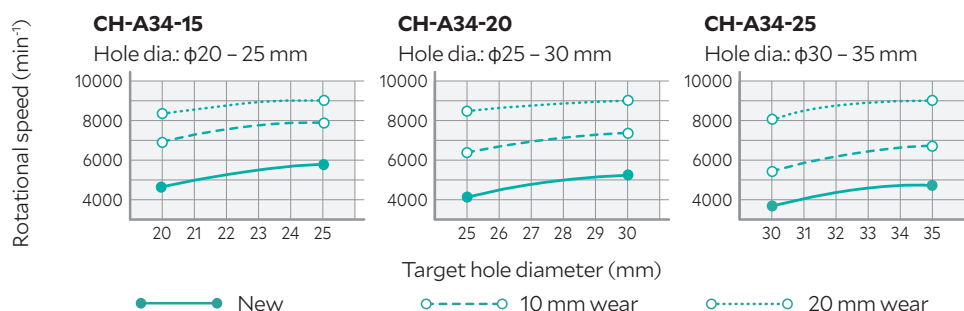
The brush may break when used with:

- crossholes larger than  $\phi 12$

Contact XEBEC technical support before using on crossholes  $> \phi 12$ .

## Machining parameters

Brush performance can be optimized by adjusting rotational speed in accordance with brush size, target hole diameter, and brush wear. Refer below for recommended rotational speeds.



## Rotational speed:

7000 min<sup>-1</sup>

## Feed rate:

300 mm/min

## Rotational direction:

Uniform deburring and edge quality can be achieved by rotating the tool in both clockwise and counter-clockwise directions.

## Applicable materials:

Plastics, nonferrous materials, steel, stainless steel.

Refer to p. 12 for 'How to use'



# XEBEC Brush™ Crosshole Extra-Long Patented

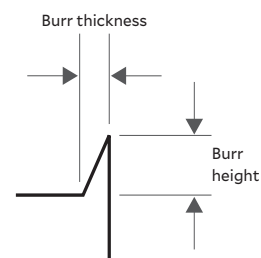
Deburring, cutter mark removal, polishing on bores over  $\phi 150$  mm in depth

Custom-made item



## Applicable burr size

Burr thickness  $\leq 0.1$  mm  
(Burs this size can be easily bent by fingernails)



## Applicable equipment

This tool is used on full cover type equipment with rotational speed control ( $> 6500 \text{ min}^{-1}$ ).



Machining center



Lathe (with live tools)



Dedicated machine

## Tool composition

Brush, collar and shank are sold separately.  
Assemble before use.

## Brushes

Brush (color)	Product code	Brush diameter (mm)	Shank diameter $D_s$ (mm)	Overall length L (mm)	Maximum rotational speed ( $\text{min}^{-1}$ )
A12 (red)	*	$\phi 3$	$\phi 4$	400	12000
	*	$\phi 5$	$\phi 6$	400	12000
	*	$\phi 7$	$\phi 8$	400	12000
	*	$\phi 11$	$\phi 12$	400	12000
A33 (blue)	*	$\phi 3$	$\phi 4$	410	12000
	*	$\phi 5$	$\phi 6$	410	12000
	*	$\phi 7$	$\phi 8$	410	12000
	*	$\phi 11$	$\phi 12$	410	12000

■ This is a custom-made item. Contact XEBEC technical support for details.

■ Brush size is approximate as the tip expands with rotation.

## Precautions for use

The brush will break if:

- used beyond the maximum rotational speed
- used with a pneumatic rotary tool
- rotated outside of the bore (outside workpiece)

The brush may break when used with:

- off-center or angled crossholes
- t-shaped holes, when the secondary bore diameter is  $> 50\%$  of the main bore
- crossholes, when the secondary bore diameter is  $> 25\%$  of the main bore



MANUAL

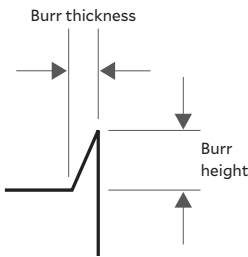
Refer to p. 12 for machining parameters

Refer to p. 46 to select brush color

# XEBEC Brush™ Wheel Type

Deburring, polishing on inner diameters, side walls, and outside diameter threads

**Applicable burr size**  
Burr thickness ≤ 0.1 mm  
(Burs this size can be easily bent by fingernails)



VIDEO



## Applicable equipment

This tool can be mounted on equipment shown below.



Machining center



Lathe (with live tools)



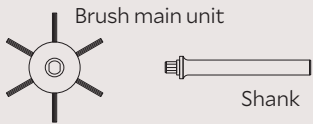
Dedicated machine



Robot

## Tool composition

Brush and shank are sold separately.  
Assemble before use.



## Brushes

Brush (color)	Product code	Brush diameter (mm)	Number of bundles	Matching shank	Fig.
A11 (red)	W-A11-50	φ50	6	W-SH-M/L	9
	W-A11-75	φ75	6		

## Shanks

Product code	Shank diameter Ds (mm)	Shank length ℓs (mm)	Fig.
W-SH-M	φ8	70	10
W-SH-L	φ12	150	10

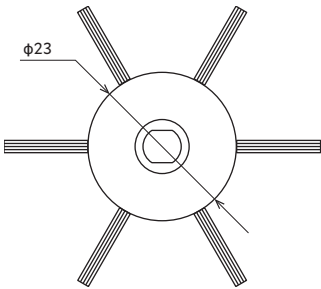


Fig. 9

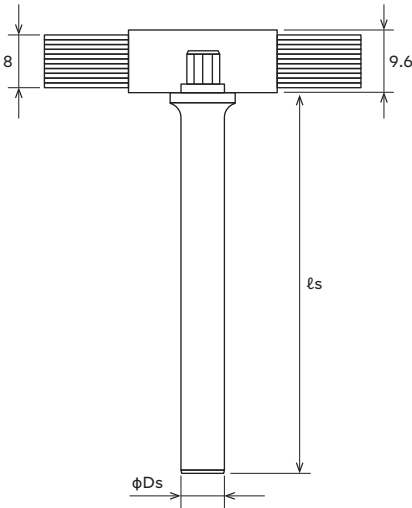


Fig. 10

## Applications

### Automation of thread deburring

#### Output shaft



Material: SCM  
Follows: Turning  
Tool: W-A11-50

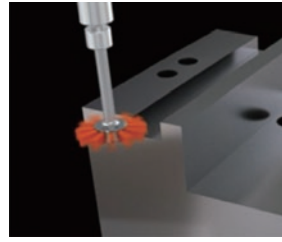
#### Before

A file was used to manually deburr the thread but failed to remove all burrs. Quality was unstable.

#### After

All burrs are removed and quality is stable.

### Automated deburring of face



Material: S50C  
Follows: End milling  
Tool: W-A11-50

#### Before

Burrs formed on the face were removed manually.

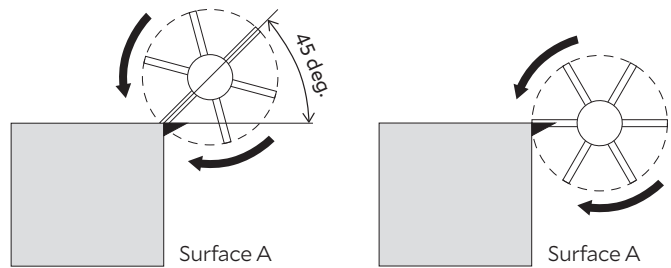
#### After

Burrs are completely removed inside the machining center.

## How to use

As shown in the drawing at right, the best approach to removing burrs formed on surface A is to place the center of the brush at a 45-degree angle to the edge. Burrs are removed by rotating the brush both clockwise and counter-clockwise.

If this is not possible, position the brush as show at far right. The brush should also be rotated in both clockwise and counter-clockwise directions.



## Machining parameters

### Starting parameters

Product code	Cutting speed (m/min)	Rotational speed (min <sup>-1</sup> )	Feed per bundle (mm/bundle)	Depth of cut (mm)	Feed (mm/min)
W-A11-50	250	1600	0.5	0.2	4800
W-A11-75	250	1000	0.5	0.2	3000

### Maximum parameters

Product code	Cutting speed (m/min)	Maximum rotational speed (min <sup>-1</sup> )	Feed per bundle (mm/bundle)	Depth of cut (mm)
W-A11-50 W-A11-75	150 - 350	3000	≤ 1.5	≤ 0.5

■ Bristle stiffness increases as brushes shorten with wear. Reduce the depth of cut if bristles break.



MANUAL

## XEBEC Optional Tools

# XEBEC Optional Tools

Reduce the burden of adjusting for brush wear and achieve more consistent deburring and polishing results.



Holder with brush



## XEBEC Floating Holder™

A built-in spring helps to maintain stable load, reducing the frequency of wear offsets and brush protrusion length adjustments.



Floating holder in use



VIDEO



Sleeve with brush



## XEBEC Self-Adjusting Sleeve™

A built-in gear mechanism automatically adjusts brush protrusion length, reducing human error and providing consistent machining performance.



Self-adjusting sleeve in use



VIDEO



Brush in setter tool



## XEBEC Brush Length Adjustment Tool™

A tool for quick in-machine brush length adjustment.



# XEBEC Floating Holder™

Straight Shank Type  
BT Shank Type

Patented

Straight Shank Type used with  
XEBEC Brush Surface ( $\phi 6 - 100$ )

BT Shank Type used with  
XEBEC Brush Surface ( $\phi 6 - 25$ )

A built-in spring helps to maintain stable load, reducing the frequency of wear offsets and brush protrusion length adjustments.



VIDEO

## Applicable equipment [Straight Shank Type]

This holder can be used on equipment shown below.



Machining  
center



Lathe  
(with live tools)



Dedicated  
machine



Robot

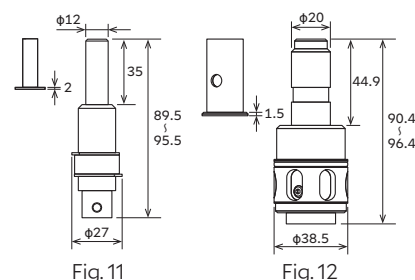
## Applicable equipment [BT Shank Type]

This holder can be used with machine tools that are  
compatible with BT30/40 shanks.

## Straight Shank Type

Product code	Matching brush dia. (mm)	Sleeve shank diameter (mm)	Maximum rotational speed (min <sup>-1</sup> )	Attachments	Fig.
FH-ST12-SL10	$\phi 6$	$\phi 6$ (use with bush 1●)	10000	1. $\phi 6$ bush 2. $\phi 8$ bush 3. Low-pressure spring 4. Standard spring◆ 5. High-pressure spring	11
	$\phi 15$	$\phi 6$ (use with bush 1●)	6000		
	$\phi 25$	$\phi 8$ (use with bush 2●)	5000		
	$\phi 40$	$\phi 10$	3000		
FH-ST20-60	$\phi 60$	$\phi 12$	2000	$\phi 12$ bush	12
FH-ST20-100	$\phi 100$	$\phi 16$	1200	$\phi 16$ bush	12

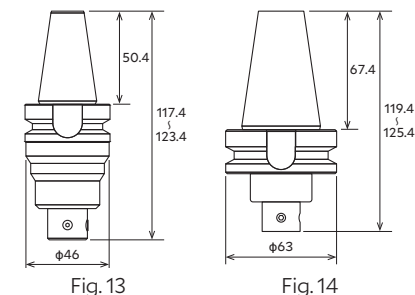
- ◆ Installed when shipped.
- Attachments included when shipped.
- Optional  $\phi 3$  bush is available.
- Refer to p. 20 for the spring load.



## BT Shank Type

Product code	Matching brush dia. (mm)	Sleeve shank diameter (mm)	Maximum rotational speed (min <sup>-1</sup> )	Length under gauge line (mm)	Fig.
FH-BT30	$\phi 6$	$\phi 6$ (with $\phi 6$ bush○)	10000	75	13
	$\phi 15$	$\phi 6$ (with $\phi 6$ bush○)	6000		
	$\phi 25$	$\phi 8$	5000		
FH-BT40	$\phi 6$	$\phi 6$ (with $\phi 6$ bush○)	10000	60	14
	$\phi 15$	$\phi 6$ (with $\phi 6$ bush○)	6000		
	$\phi 25$	$\phi 8$	5000		

- $\phi 6$  bush sold separately.
- Refer to p. 20 for the spring load.

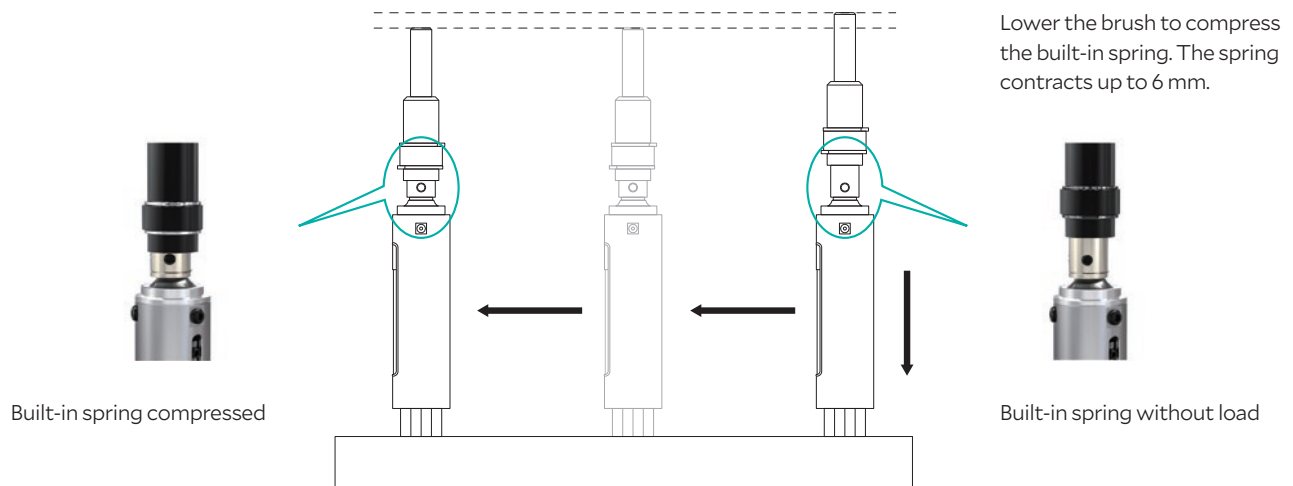


## Precautions for use

- Lower the tool vertically onto the workpiece.
- The tool cannot be used on surfaces that are discontinuous or have protrusions.
- The tool may not function correctly on a horizontal machining center when spring load is low.

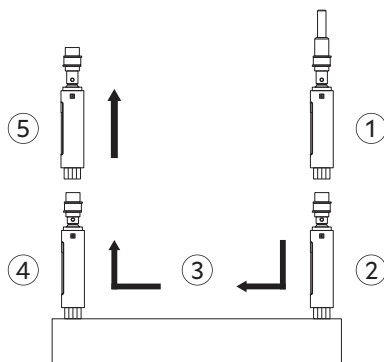
## Mechanism

This tool has a built-in spring. The spring is compressed when the brush contacts the workpiece surface.



## How to use

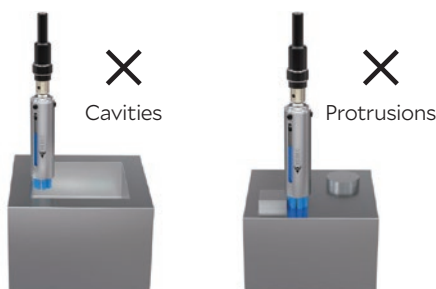
### Product in use



The diagram to the left shows how to use the tool effectively.

1. Approach the workpiece surface from above without rotating the brush.
2. Set the depth of cut and compress the spring.
3. Rotate the brush and start feeding with the spring compressed.
4. Stop rotation and feed when finished machining.
5. Remove the brush upward from the workpiece surface.

### Unacceptable workpiece shapes



Avoid cavities and protrusions to ensure proper operation of the floating mechanism.

### FH-ST12-SL10

Spring type	Outer diameter (mm)	Spring constant (N/mm)	Overall length (mm)	Load by stroke (N)	
				0 mm	6 mm
Standard spring (installed)	φ10	0.30	40	4.5	6.3
Low-pressure spring (attachment)	φ10	0.30	30	1.5	3.3
High-pressure spring (attachment)	φ10	0.55	39	7.2	10.5
Maximum load spring (sold separately)	φ10	3.03	30	15.2	33.4

### FH-ST20-60/100 FH-BT30/40

Load adjustment	Load by stroke (N)		Load adjustment screw position
	0 mm	6 mm	
Standard float	2	6	When load adjustment screw is flush with shaft end.
Higher float	6	10	When load adjustment screw is fully inside shaft.



MANUAL

# XEBEC Self-Adjusting Sleeve™ Patented

Used with  
XEBEC Brush Surface (φ6 – 40)

A built-in gear mechanism automatically adjusts brush protrusion length, reducing human error and providing consistent machining performance.



VIDEO

### Applicable equipment

This tool is used on equipment capable of precise angular control of the sleeve.



Machining center



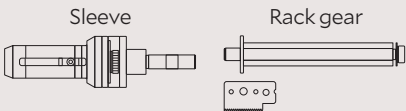
Dedicated machine



Robot

### Tool composition

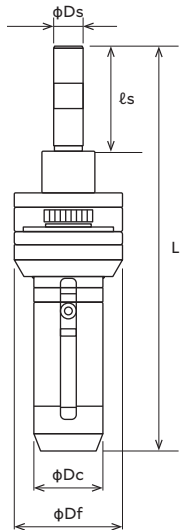
Consists of a sleeve and rack gear. Brushes are sold separately.



### Sleeves

Product code	Matching brush	Sleeve outer dia. Dc (mm)	Maximum outer dia. Df (mm)	Shank diameter Ds (mm)	Overall length L (mm)	Shank length ℓs (mm)	Main body mass (g)	Maximum rotational speed (min <sup>-1</sup> )	Fig.
XP-AUT06M	A13-CB06M	φ14.2	φ37	φ10	124.1	35.0	220	10000	15
	A11-CB06M								
	A21-CB06M								
	A32-CB06M								
XP-AUT15M	A13-CB15M	φ23.4	φ37	φ10	136.3	35.0	270	6000	15
	A11-CB15M								
	A21-CB15M								
	A32-CB15M								
XP-AUT25M	A11-CB25M	φ34.6	φ60	φ16	189.0	41.5	795	5000	15
	A21-CB25M								
	A32-CB25M								
XP-AUT40M	A11-CB40M	φ50.0	φ60	φ16	189.0	41.5	910	3000	15
	A21-CB40M								
	A32-CB40M								

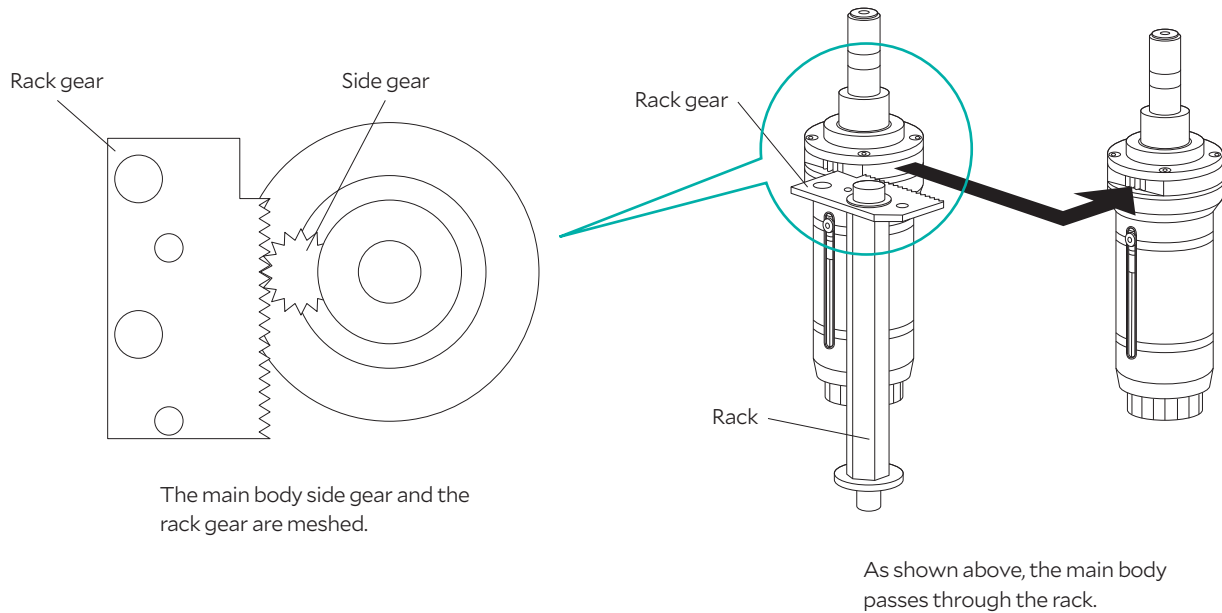
Fig. 15



## How to use

Mount the rack gear inside the machine.

The brush protrusion length is adjusted by rotating the side gear built inside the sleeve with the rack gear.



## Brush protrusion length

The brush protrusion length can be adjusted in increments of 0.05 mm.

It is possible to make an adjustment of up to 1 mm in a single pass. This allows adjustments to be made at a predetermined interval corresponding to tool wear.



MANUAL

# XEBEC Short BT Holder™

Compact tool holder whose length under the gauge line is 23.5 mm (including bush flange thickness 1.5 mm). Optimal when space is limited.

Used with  
XEBEC Brush Surface  
XEBEC Self-Adjusting Sleeve  
XEBEC Floating Holder

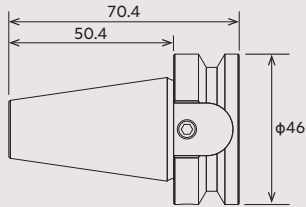
■ Only for use with XEBEC tools



## Applicable equipment

This tool can be used with machine tools that are compatible with BT30 shanks.

## Tool outline



# XEBEC Brush Length Adjustment Tool™

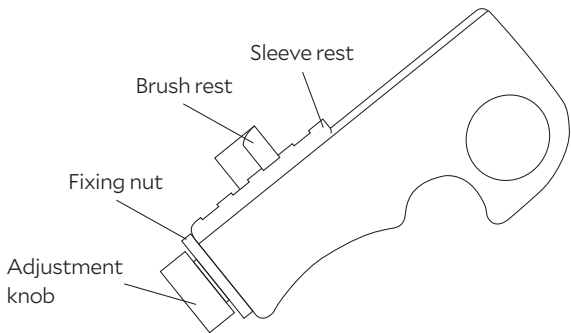
A tool for quick in-machine brush length adjustment.

Used with  
XEBEC Brush Surface (φ15 – 100)

Product code	Matching brush diameter (mm)	Built-in hexagonal wrench size (mm)
XP-EZ-001	φ15 / φ25 / φ40 / φ60 / φ100	1.5, 2.0

## How to use

- Move the brush rest using the adjustment knob to set the amount of brush protrusion.
- Tighten the fixing nut.
- Hold the unit in one hand and align the sleeve rest with the sleeve end.
- Loosen the adjustment screw on the sleeve to allow the bristles to drop to the brush rest.
- Tighten the adjustment screw to secure the brush in place.





## MEMO



Special deburring cutter and made-to-order tool path

## XEBEC Back Burr Cutter and Deburring Tool Path™

“There must be a way to automate crosshole deburring!”

Our efforts to automate deburring made us aware of other problems requiring innovative solutions. We started developing a means to remove somewhat larger burrs from the edges of complex shaped workpieces, without scratching adjacent surfaces. The result was a product that combines optimal tool geometry for deburring with tool paths that inhibit burr formation. It was also symbolic of our approach to development—drawing from whatever field necessary to solve a problem.

A solution combining a made-to-order tool path program with a dedicated cutting tool for high quality finish, extended tool life and the world's fastest automated deburring of drill holes. The ready-to-use CNC program is easy to install and greatly reduces programming time.

**XEBEC Back Burr Cutter**

This cutter is made of micro-grain cemented carbide for longer life. It is heat-resistant with a AlTiCrN coating and can be used with a wide range of materials including non-ferrous metals, such as aluminum alloy, and heat-sensitive materials such as titanium. Cutting performance is improved through optimal blade geometry that inhibits formation of secondary burrs.



**XEBEC Deburring Tool Path**

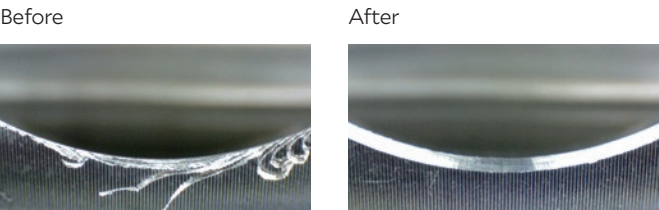
Made-to-order CNC tool path program

```
03_020_EdgeBreakAmount - Notepad
File Edit Format View Help
[( INNER-1D10. -2D5. -T2.8-AR90. -E0)
(EDGE BREAK AMOUNT 0.20)
(UPPER EDGE)
( INC)
(DOWN CUT)

X0.000Y0.000Z0.000
X0.000Y0.000Z-2.741
X0.000Y1.338Z0.000
X-0.274Y-0.021Z0.013
X-0.262Y-0.061Z0.037
X-0.242Y-0.097Z0.054
X-0.214Y-0.127Z0.064
```

**High quality**

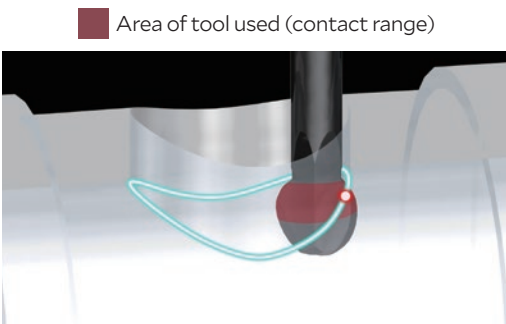
An optimized tool path and use of the ideal approach angle enables uniform break width on edges, while inhibiting formation of secondary burrs.



Five different tool paths provide a choice of edge break widths. (Refer to p. 29 for cutter diameters and corresponding edge break widths.)

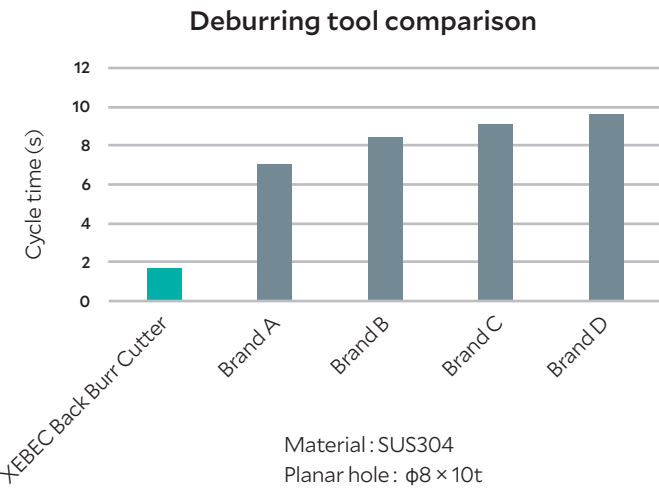
**Long tool life**

Tool life is increased by continuous displacement of the cutter contact point.



**World's fastest deburring**

Cycle time is reduced because there is no wasted motion in the cutter path. Cycle time is up 10 times faster than conventional deburring tools.



# XEBEC Back Burr Cutter™

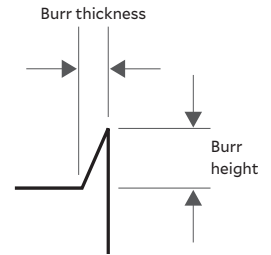
Ideal for deburring both front and back of drilled holes.



VIDEO

## Applicable burr size

Burr thickness ≤ 0.2 mm  
(Burs this size can be bent by fingernails)



## Applicable equipment

This tool is used on equipment with 3-axis simultaneous control.



Machining  
center



Lathe  
(with live tools)

## Tool composition

Consists of a spherical deburring cutter and made-to-order tool path. Refer to p. 29 - 30 for information on the made-to-order tool path (CNC machining program).

## AlTiCrN coated

P: Steel

M: Stainless steel

K: Cast iron

S: Heat-resistant super alloy

N: Non-ferrous metal

Type	Product code	Cutter dia. Dc (mm)	Cutter rad. R (mm)	Neck dia. dn (mm)	Neck length L2 (mm)	Overall length L1 (mm)	Shank dia. Ds (mm)	Number of blades	Fig.
Short	XC-08-AS-3F	φ0.8	0.40	φ0.48	3.0	60	φ3.0	3	16
	XC-13-AS-3F	φ1.3	0.65	φ0.78	5.0	60	φ3.0	3	16
	XC-18-AS-3F	φ1.8	0.90	φ1.10	6.0	60	φ3.0	3	16
	XC-23-AS-3F	φ2.3	1.15	φ1.40	7.5	70	φ3.0	3	16
	XC-28-AS-3F	φ2.8	1.40	φ1.70	9.0	70	φ4.0	3	16
	XC-33-AS-3F	φ3.3	1.65	φ2.00	10.5	70	φ4.0	3	16
	XC-38-AS-3F	φ3.8	1.90	φ2.40	12.0	70	φ4.0	3	16
	XC-48-AS-3F	φ4.8	2.40	φ3.00	15.0	70	φ6.0	3	16
	XC-58-AS-3F	φ5.8	2.90	φ3.50	18.0	70	φ6.0	3	16
Regular	XC-78-AS-3F	φ7.8	3.90	φ4.70	24.0	100	φ8.0	3	16
	XC-98-AS-3F	φ9.8	4.90	φ5.90	30.0	120	φ10.0	3	16
	XC-08-A	φ0.8	0.40	φ0.48	5.0	60	φ3.0	2	16
	XC-13-A	φ1.3	0.65	φ0.78	8.0	60	φ3.0	2	16
	XC-18-A	φ1.8	0.90	φ1.10	10.0	60	φ3.0	2	16
	XC-23-A	φ2.3	1.15	φ1.40	12.5	70	φ3.0	2	16
	XC-28-A	φ2.8	1.40	φ1.70	15.0	70	φ4.0	2	16
	XC-33-A	φ3.3	1.65	φ2.00	17.5	70	φ4.0	2	16
	XC-38-A	φ3.8	1.90	φ2.40	20.0	70	φ4.0	2	16
Straight	XC-48-A	φ4.8	2.40	φ3.00	25.0	70	φ6.0	2	16
	XC-58-A	φ5.8	2.90	φ3.50	30.0	70	φ6.0	2	16
	XC-78-A	φ7.8	3.90	φ4.70	40.0	100	φ8.0	3	16
	XC-98-A	φ9.8	4.90	φ5.90	50.0	120	φ10.0	3	16
	XC-18-B	φ1.8	0.90	φ1.10	—	50	φ1.1	2	17
	XC-23-B	φ2.3	1.15	φ1.40	—	60	φ1.4	2	17
	XC-28-B	φ2.8	1.40	φ1.70	—	70	φ1.7	2	17
	XC-33-B	φ3.3	1.65	φ2.00	—	80	φ2.0	2	17
	XC-38-B	φ3.8	1.90	φ2.40	—	85	φ2.4	2	17
	XC-48-B	φ4.8	2.40	φ3.00	—	105	φ3.0	2	17
	XC-58-B	φ5.8	2.90	φ3.50	—	120	φ3.5	2	17
	XC-78-B	φ7.8	3.90	φ4.70	—	150	φ4.7	3	17
	XC-98-B	φ9.8	4.90	φ5.90	—	180	φ5.9	3	17

## Uncoated

N: Non-ferrous metal

O: Resin

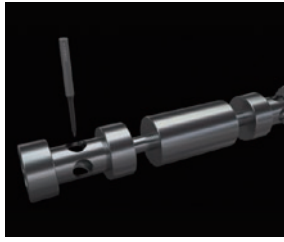
Type	Product code	Cutter dia. Dc (mm)	Cutter rad. R (mm)	Neck dia. dn (mm)	Neck length L2 (mm)	Overall length L1 (mm)	Shank dia. Ds (mm)	Number of blades	Fig.
Regular	XC-08-A-N	φ0.8	0.40	φ0.48	5.0	60	φ3	2	16
	XC-13-A-N	φ1.3	0.65	φ0.78	8.0	60	φ3	2	16
	XC-18-A-N	φ1.8	0.90	φ1.10	10.0	60	φ3	2	16
	XC-23-A-N	φ2.3	1.15	φ1.40	12.5	70	φ3	2	16
	XC-28-A-N	φ2.8	1.40	φ1.70	15.0	70	φ4	2	16
	XC-33-A-N	φ3.3	1.65	φ2.00	17.5	70	φ4	2	16
	XC-38-A-N	φ3.8	1.90	φ2.40	20.0	70	φ4	2	16
	XC-48-A-N	φ4.8	2.40	φ3.00	25.0	70	φ6	2	16
	XC-58-A-N	φ5.8	2.90	φ3.50	30.0	70	φ6	2	16
	XC-78-A-N	φ7.8	3.90	φ4.70	40.0	100	φ8	3	16
	XC-98-A-N	φ9.8	4.90	φ5.90	50.0	120	φ10	3	16



## Applications

### Automation of deburring

#### Valve



Material: Free cutting steel  
Follows: Drilling  
Tool: XC-18-A

#### Before

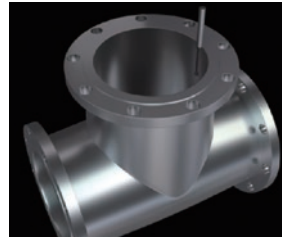
Deburring was done in 3 steps ( $\phi 2$  zero cut, nylon brush deburring,  $\phi 3$  zero cut), with a different tool for each. This resulted in a long cycle time.

#### After

Deburring is performed with a single cutter. Cycle time is 9 seconds shorter and tool cost is reduced.

### Automation of deburring

#### Industrial robot part



Material: SUS304  
Follows: Tapping  
Tool: XC-18-A

#### Before

A lengthy manual deburring was followed by a tap zero cut and air blow. This resulted in a very long cycle time.

#### After

XEBEC deburring tool path reduces the deburring time from 120 to 40 seconds. The workplace is safer as manual deburring is no longer used.

## Starting parameters

### AlTiCrN coated

P: Steel

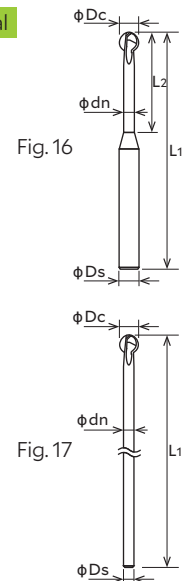
M: Stainless steel

K: Cast iron

S: Heat-resistant super alloy

N: Non-ferrous metal

Type	Product code	Cutter dia. Dc (mm)	Tool protrusion length (mm)	Number of blades	Steel, SS, cast iron, HRSA		Non-ferrous metal	
					Rotational speed n (min <sup>-1</sup> )	Feed rate Vf (mm/min)	Rotational speed n (min <sup>-1</sup> )	Feed rate Vf (mm/min)
Short	XC-08-AS-3F	$\phi 0.8$	3Dc	3	20000	1080	20000	1170
	XC-13-AS-3F	$\phi 1.3$	3Dc	3	20000	1080	20000	1170
	XC-18-AS-3F	$\phi 1.8$	3Dc	3	20000	1080	20000	1170
	XC-23-AS-3F	$\phi 2.3$	3Dc	3	15000	1350	18000	1710
	XC-28-AS-3F	$\phi 2.8$	3Dc	3	12500	1800	15000	2520
	XC-33-AS-3F	$\phi 3.3$	3Dc	3	10600	1890	12700	2250
	XC-38-AS-3F	$\phi 3.8$	3Dc	3	9200	2160	11000	2880
	XC-48-AS-3F	$\phi 4.8$	3Dc	3	7200	1980	8500	2880
	XC-58-AS-3F	$\phi 5.8$	3Dc	3	6000	1620	7000	2160
Regular	XC-78-AS-3F	$\phi 7.8$	3Dc	3	4500	1620	5400	1920
	XC-98-AS-3F	$\phi 9.8$	3Dc	3	3600	1320	4300	1560
	XC-08-A	$\phi 0.8$	5Dc	2	20000	600	20000	650
	XC-13-A	$\phi 1.3$	5Dc	2	20000	600	20000	650
	XC-18-A	$\phi 1.8$	5Dc	2	20000	600	20000	650
	XC-23-A	$\phi 2.3$	5Dc	2	15000	750	18000	950
	XC-28-A	$\phi 2.8$	5Dc	2	12500	1000	15000	1400
	XC-33-A	$\phi 3.3$	5Dc	2	10600	1050	12700	1250
	XC-38-A	$\phi 3.8$	5Dc	2	9200	1200	11000	1600
Straight	XC-48-A	$\phi 4.8$	5Dc	2	7200	1100	8500	1600
	XC-58-A	$\phi 5.8$	5Dc	2	6000	900	7000	1200
	XC-78-A	$\phi 7.8$	5Dc	3	4500	1350	5400	1600
	XC-98-A	$\phi 9.8$	5Dc	3	3600	1100	4300	1300
	XC-18-B	$\phi 1.8$	10Dc	2	4400	220	4400	220
	XC-23-B	$\phi 2.3$	10Dc	2	3500	220	3500	220
	XC-28-B	$\phi 2.8$	10Dc	2	2800	220	2800	220
	XC-33-B	$\phi 3.3$	10Dc	2	2400	190	2400	190
	XC-38-B	$\phi 3.8$	10Dc	2	2000	160	2000	160
	XC-48-B	$\phi 4.8$	10Dc	2	1600	120	1600	120
	XC-58-B	$\phi 5.8$	10Dc	2	1300	100	1300	100
	XC-78-B	$\phi 7.8$	10Dc	3	650	70	650	70
	XC-98-B	$\phi 9.8$	10Dc	3	500	50	500	50



### Precautions for use

- XEBEC Back Burr Cutter is designed for CNC machines. Never use it as a hand tool.
- Turning on advanced preview control on the machine tool results in uniform edges.
- The machining error on holes must be kept as small as possible.



MANUAL

### Uncoated

N: Non-ferrous metal

O: Resin

Type	Product code	Cutter dia. Dc (mm)	Tool protrusion length (mm)	Number of blades	Rotational speed n (min <sup>-1</sup> )	Feed rate Vf (mm/min)
Regular	XC-08-A-N	$\phi 0.8$	5Dc	2	20000	650
	XC-13-A-N	$\phi 1.3$	5Dc	2	20000	650
	XC-18-A-N	$\phi 1.8$	5Dc	2	20000	650
	XC-23-A-N	$\phi 2.3$	5Dc	2	18000	950
	XC-28-A-N	$\phi 2.8$	5Dc	2	15000	1400
	XC-33-A-N	$\phi 3.3$	5Dc	2	12700	1250
	XC-38-A-N	$\phi 3.8$	5Dc	2	11000	1600
	XC-48-A-N	$\phi 4.8$	5Dc	2	8500	1600
	XC-58-A-N	$\phi 5.8$	5Dc	2	7000	1200
	XC-78-A-N	$\phi 7.8$	5Dc	3	5400	1600
	XC-98-A-N	$\phi 9.8$	5Dc	3	4300	1300

### Parameter adjustments

- Machining parameters will vary for the straight type when protrusion lengths other than 10D (shown in table) are used.
- Rotational speed and feed rates shown are intended as guides for setting starting parameters.
- In the event of abnormal vibration or noise, reduce the rotational speed and feed rate proportionally.
- If the maximum rotational speed and feed of the machine is below the starting parameters, reduce them both proportionally to the machine's capability.

# XEBEC Deburring Tool Path™ Patented

An integral component of this deburring solution, XEBEC Deburring Tool Path is a made-to-order CNC tool path program that ensures optimal performance of the XEBEC Back Burr Cutter.

```

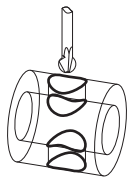
03_020_EdgeBreakAmount - Notepad
File Edit Format View Help
((INNER-1D10,-2D5,-T2.8-AR90,-E0)
(EDGE BREAK AMOUNT 0.20)
(UPPER EDGE)
(INC)
(DOWN CUT)

X0.000Y0.000Z0.000
X0.000Y0.000Z-2.741
X0.000Y1.338Z0.000
X-0.274Y-0.021Z0.013
X-0.262Y-0.061Z0.037
X-0.242Y-0.097Z0.054
X-0.214Y-0.127Z0.064
    
```

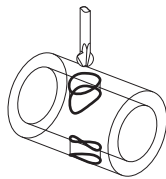
## Standard paths

Standard paths are readily available for the commonly encountered crosshole configurations shown below.

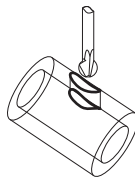
The same cutter can be used for many different types and sizes of hole. This reduces the number of tools in the ATC and the cycle time.



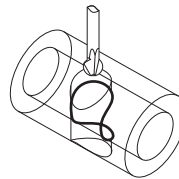
Orthogonal crosshole



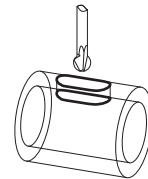
Off-center crosshole



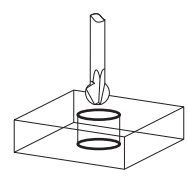
Angled crosshole



Broken crosshole



Slotted hole



Planar hole

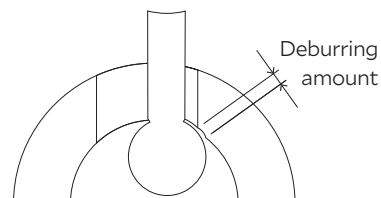
## Deburring amount and allowable cumulative error

Product code	Cutter dia. Dc (mm)	Edge break length (mm)					Max. allowed accumulated variance (mm)
		1	2	3	4	5	
XC-08-AS-3F/A/A-N	φ0.8	0.02	0.04	0.06	0.08	0.10	0.03
XC-13-AS-3F/A/A-N	φ1.3	0.04	0.06	0.08	0.10	0.12	0.05
XC-18-AS-3F/A/B/A-N	φ1.8	0.07	0.09	0.11	0.13	0.15	0.08
XC-23-AS-3F/A/B/A-N	φ2.3	0.07	0.09	0.11	0.13	0.15	0.09
XC-28-AS-3F/A/B/A-N	φ2.8	0.08	0.11	0.14	0.17	0.20	0.10
XC-33-AS-3F/A/B/A-N	φ3.3	0.08	0.11	0.14	0.17	0.20	0.11
XC-38-AS-3F/A/B/A-N	φ3.8	0.09	0.13	0.17	0.21	0.25	0.12
XC-48-AS-3F/A/B/A-N	φ4.8	0.10	0.15	0.20	0.25	0.30	0.15
XC-58-AS-3F/A/B/A-N	φ5.8	0.10	0.15	0.20	0.25	0.30	0.18
XC-78-AS-3F/A/B/A-N	φ7.8	0.10	0.15	0.20	0.25	0.30	0.18
XC-98-AS-3F/A/B/A-N	φ9.8	0.10	0.15	0.20	0.25	0.30	0.18

## Standard Path for Tapped Holes

Tap size	Matching cutter product code	Cutter dia. Dc (mm)	Deburring amount (mm)
M3	XC-23-AS-3F/A/B/A-N	φ2.3	0.11
M4	XC-28-AS-3F/A/B/A-N	φ2.8	0.14
M5	XC-33-AS-3F/A/B/A-N	φ3.3	0.14
M6	XC-38-AS-3F/A/B/A-N	φ3.8	0.17
M8	XC-48-AS-3F/A/B/A-N	φ4.8	0.20
M10	XC-58-AS-3F/A/B/A-N	φ5.8	0.20
M12	XC-78-AS-3F/A/B/A-N	φ7.8	0.20
M16 - 24	XC-98-AS-3F/A/B/A-N	φ9.8	0.20

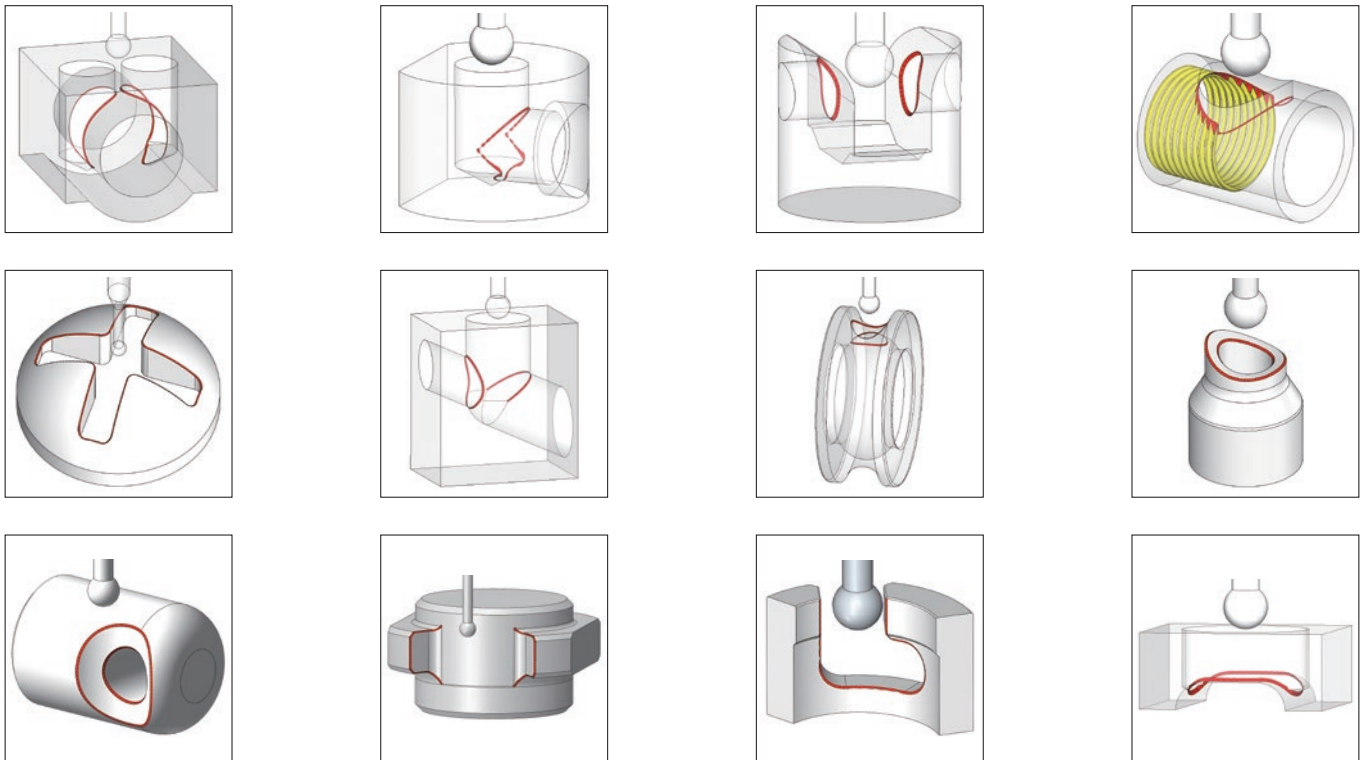
Standard paths are available for thread sizes from M3 to M24.



■ Deburring amount is the chamfer width after an edge is deburred.

## XEBEC Deburring Tool Path All Edges

A customized tool path for extremely complex edge profiles.



## How to order standard paths

A made-to-order tool path for commonly encountered crosshole configurations.

### STEP 1

#### Free assessment

You check whether the XEBEC Back Burr Cutter and Deburring Tool Path can be used with your workpiece and machine. The result is available immediately.

### STEP 2

#### Quotation

You receive a quotation by submitting your contact information.

### STEP 3

#### Order

Send your order to the XEBEC distributor in your region after confirming the details.

### Online Application Form

All you need to do is to enter a few dimensions including hole diameters and to specify the orientation of the workpiece inside the machine.

Visit the special website below to conduct a self-assessment and submit a request for quotation.

<https://xebec-backburr-cutter.com>



WEBSITE

### Ordering XEBEC Deburring Tool Path All Edges

Please contact XEBEC directly to request XEBEC Deburring Tool Path All Edges, a customized solution for deburring paths which do not belong to the six standard types shown on p. 29.



Burrless chamfering with the world's first V-shaped blade

## XEBEC Burrless Chamfering Cutter™

“Let’s make a chamfering tool that only XEBEC would think of.”

At the time, we were looking for additional ways to automate the deburring process and reduce the burden on users. The tools we offered could not provide an exact chamfer. In many cases, users had to alter break edge instructions on drawings to permit edge blending. After much consideration, we came up with the concept of a chamfering tool that does not produce secondary burrs. And settled on the world’s first V-shaped blades as the optimal choice for our tool.

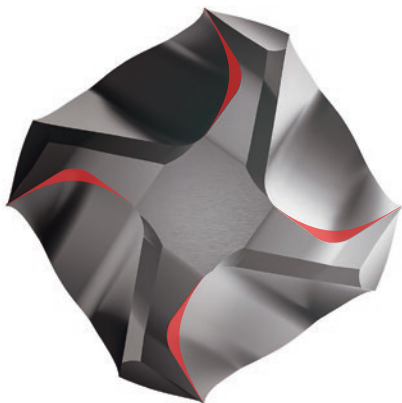


The unique V-shaped blades eliminate the need for deburring after chamfering, reducing man-hours required for deburring, the cost of tools, and machining times.



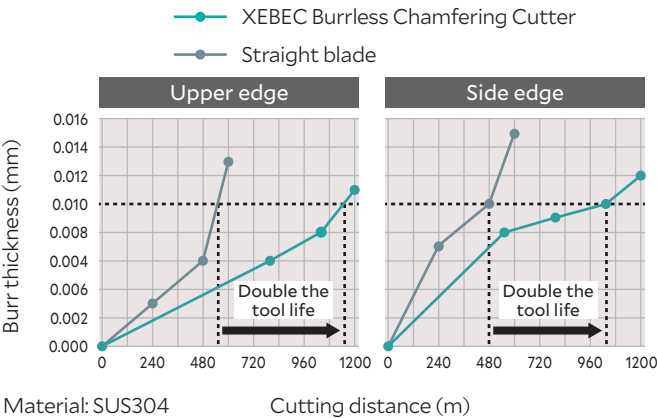
**Reduction of deburring man-hours**

The world's first V-shaped blades (patented) chamfer without creating secondary burrs, eliminating the need for deburring after chamfering.



**Reduction of tool costs**

This cutter has twice the tool life of conventional chamfering tools.



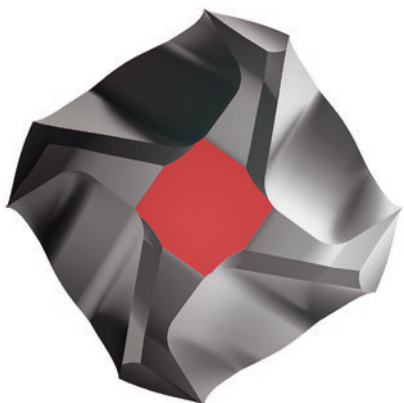
**Reduced machining times**

The multi-blade design enables high feed rates for reduced machining time.



**Flat tip**

Flat tool tip prevents rounding and chipping of the tool tip, reducing tool length measurement errors and improving machining positional accuracy.



# XEBEC Burrless Chamfering Cutter™ Patented

Burrless chamfering with world's first V-shaped blade



VIDEO

## Applicable equipment

This tool can be mounted on equipment shown below.



Machining  
center



Lathe  
(with live tools)

## AlTiCrN coated

P: Steel

M: Stainless steel

K: Cast iron

S: Heat-resistant super alloy

N: Non-ferrous metal

Product code	Chamfer alignment dia. Dc (mm)	Shank diameter Dcon (mm)	Overall length LF (mm)	Neck length L1 (mm)	Maximum depth of cut APMX (mm)	Cutting angle KAPR (deg.)	Number of blades	Chamfering size (mm)	Fig.
XC-C-03-M	φ2	φ6	50	5	1	45	3	C0.3 - C0.6	18
XC-C-06-M	φ4	φ6	60	—	2	45	4	C0.7 - C1.5	19

## Uncoated

N: Non-ferrous metal

O: Resin

Product code	Chamfer alignment dia. Dc (mm)	Shank diameter Dcon (mm)	Overall length LF (mm)	Neck length L1 (mm)	Maximum depth of cut APMX (mm)	Cutting angle KAPR (deg.)	Number of blades	Chamfering size (mm)	Fig.
XC-C-03-N	φ2	φ6	50	5	1	45	3	C0.3 - C0.6	18
XC-C-06-N	φ4	φ6	60	—	2	45	4	C0.7 - C1.5	19

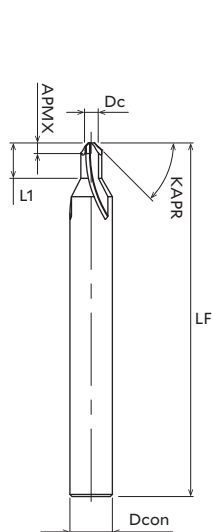


Fig. 18

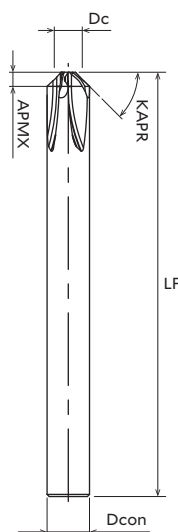
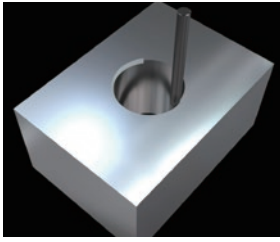


Fig. 19

## Applications

### Automation of chamfering

#### Cooling water pipe block



##### Before

Burrs were formed when chamfering. Manual deburring was required.

##### After

Shortened the chamfering time. Manual deburring is no longer required after chamfering.

Material: SUS304  
Follows: Drilling  
Tool: XC-C-06-M

### Automation of chamfering

#### Machine tool jig



##### Before

Oil stone was used to remove burrs after chamfering. However, it scarred the surface.

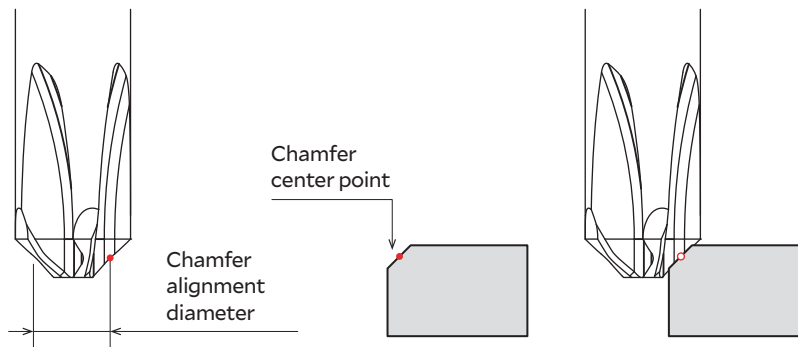
##### After

Oil stone is no longer needed and quality is improved.

Material: S50C  
Follows: End milling  
Tool: XC-C-06-M

## How to use

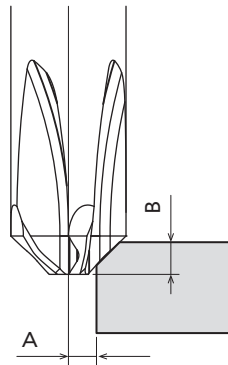
Position the chamfering alignment diameter at the chamfering center point of the workpiece.



## Machining parameters

### Offsets

Product code	Chamfering size (mm)	Offsets (mm)	
		A	B
XC-C-03-M/N	C0.3	0.85	0.65
	C0.4	0.80	0.70
	C0.5	0.75	0.75
	C0.6	0.70	0.80
XC-C-06-M/N	C0.7	1.65	1.35
	C0.8	1.60	1.40
	C0.9	1.55	1.45
	C1.0	1.50	1.50
	C1.1	1.45	1.55
	C1.2	1.40	1.60
	C1.3	1.35	1.65
	C1.4	1.30	1.70
	C1.5	1.25	1.75



### Starting parameters

Product code	Workpiece material	Cutting speed (m/min)	Rotational speed (min <sup>-1</sup> )	Feed rate (mm/min)	Feed per tooth (mm/t)
XC-C-03-M	Steel	60 - 100	12000	1800	0.05
	Stainless steel	40 - 80	9000	1350	0.05
	64 titanium	45 - 60	8000	1200	0.05
	Inconel	20 - 30	4000	600	0.05
XC-C-03-N	Aluminum alloy	200 - 300	40000	6000	0.05
	Resin	60 - 100	12000	1800	0.05
XC-C-06-M	Steel	60 - 100	6300	1260	0.05
	Stainless steel	40 - 80	4800	960	0.05
	64 titanium	45 - 60	4000	800	0.05
	Inconel	20 - 30	2000	400	0.05
XC-C-06-N	Aluminum alloy	200 - 300	20000	4000	0.05
	Resin	60 - 100	6300	1760	0.07



MANUAL

XEBEC Ceramic Stone™





## XEBEC Ceramic Stone™

“A friend with a dream worth realizing.”

XEBEC was founded from a belief in the invention of a childhood friend. A grindstone that can be molded, but does not bend, break, or chip. With the vision of the world’s best ceramic grindstone firmly in their minds, two friends teamed up with a materials manufacturer and developed a unique ceramic fiber suited to grinding. They also received a patent for a grindstone with an original structure that maximizes strength and polishing performance. Known as XEBEC Ceramic Stone, this product now dominates the market for the polishing of intricate features in molds, such as ribs, bosses and corners, and has a reputation for making manual deburring safer and more efficient.

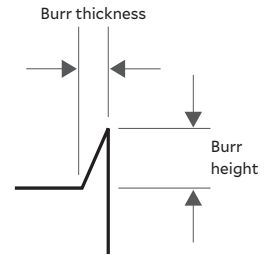
# XEBEC Stone™ Flexible Shaft Patented

Deburring and polishing front and back of crossholes, grooves and areas deep inside the workpiece. The spring steel shaft absorbs vibrations for a soft surface contact.



## Applicable burr size

Burr thickness ≤ 0.2 mm  
(Burrs this size can be bent by fingernails)



VIDEO

## Applicable equipment

This tool is used on equipment with rotational speed control.



Machining center



Lathe (with live tools)



Dedicated machine



Robot



Rotary tool (electric)

## Ball type

Equivalent grit (color)	Product code	Head size (mm)	Shaft dia. (mm)	Shank dia. (mm)	Overall length L (mm)	Standard rotational speed (min <sup>-1</sup> )	Maximum rotational speed (min <sup>-1</sup> )	Fig.
#800 (blue)	CH-PB-3B	φ3	φ1.5	φ3.0	70	5000 - 8000	15000	20
	CH-PB-4B	φ4	φ1.5	φ3.0	70	5000 - 8000	13000	20
	CH-PB-5B	φ5	φ1.5	φ3.0	70	5000 - 8000	12000	20
	CH-PB-6B	φ6	φ1.5	φ3.0	70	5000 - 8000	10000	20
#400 (orange)	CH-PO-3B	φ3	φ1.5	φ3.0	70	5000 - 8000	15000	20
	CH-PO-4B	φ4	φ1.5	φ3.0	70	5000 - 8000	13000	20
	CH-PO-5B	φ5	φ1.5	φ3.0	70	5000 - 8000	12000	20
	CH-PO-6B	φ6	φ1.5	φ3.0	70	5000 - 8000	10000	20
#220 (gray)	CH-PM-3B	φ3	φ1.5	φ3.0	70	5000 - 8000	15000	20
	CH-PM-4B	φ4	φ1.5	φ3.0	70	5000 - 8000	13000	20
	CH-PM-5B	φ5	φ1.5	φ3.0	70	5000 - 8000	12000	20
	CH-PM-6B	φ6	φ1.5	φ3.0	70	5000 - 8000	10000	20
	CH-PM-10B	φ10	φ1.5	φ3.0	70	4000 - 5000	6000	20
	CH-PM-3B-L	φ3	φ1.5	φ3.0	150	—	1000	20
	CH-PM-4B-L	φ4	φ2.3	φ2.3	150	—	3000	21
	CH-PM-5B-L	φ5	φ2.3	φ2.3	150	—	3000	21
	CH-PM-6B-L	φ6	φ2.3	φ2.3	150	—	3000	21
	CH-PM-10B-L	φ10	φ2.3	φ2.3	150	—	2000	21

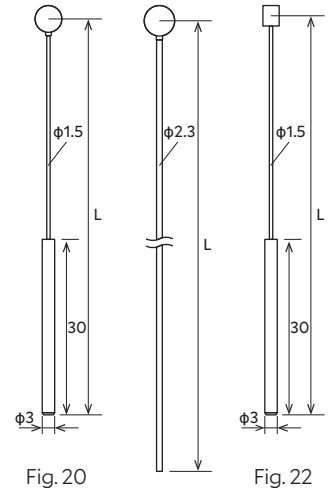


Fig. 20

Fig. 21

Fig. 22

CH-PM-4B-L  
CH-PM-5B-L  
CH-PM-6B-L  
CH-PM-10B-L

## Cylinder type

Equivalent grit (color)	Product code	Head size (mm)	Shaft dia. (mm)	Shank dia. (mm)	Overall length L (mm)	Standard rotational speed (min <sup>-1</sup> )	Maximum rotational speed (min <sup>-1</sup> )	Fig.
#800 (blue)	CH-PB-3R	φ3 × 3	φ1.5	φ3	70	5000 - 8000	15000	22
	CH-PB-4R	φ4 × 4	φ1.5	φ3	70	5000 - 8000	13000	22
	CH-PB-5R	φ5 × 5	φ1.5	φ3	70	5000 - 8000	12000	22
#400 (orange)	CH-PO-3R	φ3 × 3	φ1.5	φ3	70	5000 - 8000	15000	22
	CH-PO-4R	φ4 × 4	φ1.5	φ3	70	5000 - 8000	13000	22
	CH-PO-5R	φ5 × 5	φ1.5	φ3	70	5000 - 8000	12000	22
#220 (gray)	CH-PM-3R	φ3 × 3	φ1.5	φ3	70	5000 - 8000	15000	22
	CH-PM-4R	φ4 × 4	φ1.5	φ3	70	5000 - 8000	13000	22
	CH-PM-5R	φ5 × 5	φ1.5	φ3	70	5000 - 8000	12000	22
	CH-PM-5R-C01	φ5 × 10	φ1.5	φ3	70	5000 - 8000	12000	22

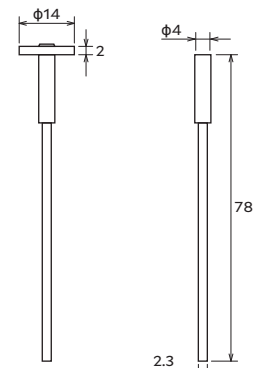


Fig. 23

Fig. 24

## Disc type - stone

Equivalent grit (color)	Product code	Head dia. x thickness (mm)	Max. rotational speed (min <sup>-1</sup> )	Fig.
#220 (gray)	CH-PM-14D	φ14 × 2	5000	23

## Disc type - shaft

Product code	Shaft dia. (mm)	Overall length (mm)	Mounting screw	Max. rotational speed (min <sup>-1</sup> )	Fig.
CH-D-SH	φ2.3	78	M2 × 6	5000	24

## Applications

### Deburring crosshole

#### Aircraft pipe part



Material: Stainless steel  
Follows: Drilling  
Tool: CH-PM-6B

#### Before

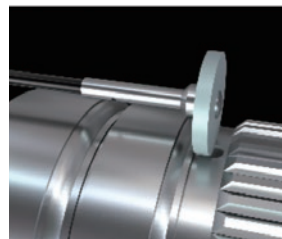
Deburring was carried out with a rubber grinding stone on a rotary tool. Finish quality varied depending on the workers' skill. 40 minutes was required to deburr 16 crossholes.

#### After

The tool is inserted in a crosshole and retracted gently while tracing around the hole edge. Quality of finish is uniform and less time is required for deburring.

### Deburring groove hole

#### Shaft



Material: SCM  
Follows: Drilling  
Tool: CH-PM-145D

#### Before

An oil-impregnated grinding disc was used. The grinding stone shaft was short, making it difficult to access the deburring area. Tool life was poor.

#### After

The longer shaft of the disc type grinding stone makes it easy to access the groove. The ceramic fiber stone is replaced less often because it has a longer tool life. The shaft is reusable. Only the grinding stone is replaced.

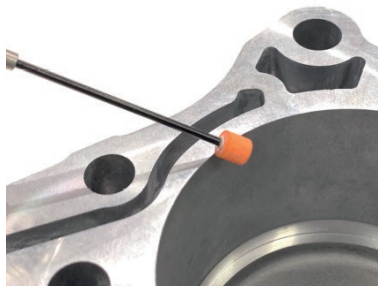
## How to use

The entire surface of the ceramic stone is abrasive and therefore can be used for deburring and polishing.

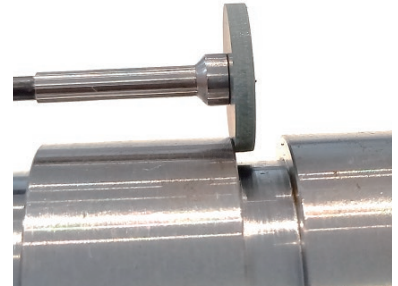
### Ball type



### Cylinder type

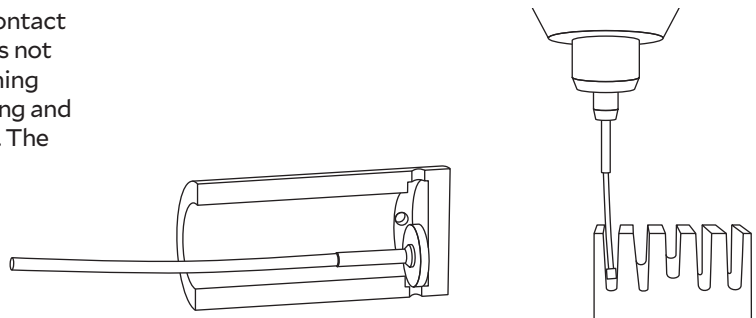


### Disc type



## Characteristics

The spring steel shaft absorbs vibrations for soft contact with the workpiece surface. The ceramic stone does not bounce around, thereby reducing the risk of scratching the workpiece. This makes this tool ideal for polishing and deburring areas that are deep inside the workpiece. The stone is safe to touch as it is not a cutting tool.



### Trial set

This set includes a disc type stone and shaft.

Product code
CHPM14D-SET

### φ2.3 to φ3 Collet Adapter

Adapts the φ2.3 shaft to fit on rotary tools with φ3 shanks.

Product code
RMP3024X

### Precautions for use

A ceramic stone tool will be damaged when:

- used beyond the maximum rotation speed
- used with a pneumatic rotary tool

Users of the disc type should be careful to use only normal (clockwise) rotation. Reverse (counter-clockwise) rotation may cause the screw to loosen and the head to fly off.



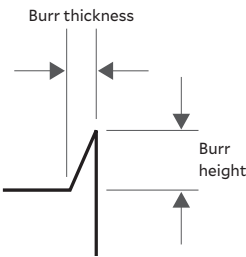
MANUAL



# XEBEC Stone™ Mounted Point

Suitable for use with pneumatic rotary tools at high rotational speed

**Applicable burr size**  
Burr thickness ≤ 0.2 mm  
(Burrs this size can be bent by fingernails)



VIDEO



## Applicable equipment

This tool can be mounted on rotary tools.



Rotary tool  
(electric)



Rotary tool  
(pneumatic)

Equivalent grit (color)	Product code	Head size (mm)	Shank dia. (mm)	Head length (mm)	Overall length (mm)	Maximum rotational speed (min <sup>-1</sup> )	Fig.
#220 (gray)	AX-PM-3R	φ3	φ3	20	48	60000	25
	AX-PM-5RF	φ5	φ3	8	48	30000	26
	AX-PM-6T	φ6	φ3	20	48	60000	27

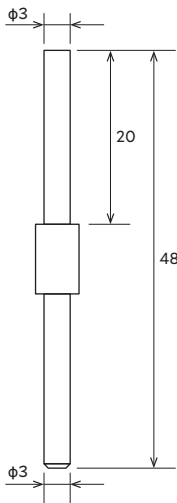


Fig. 25  
AX-PM-3R

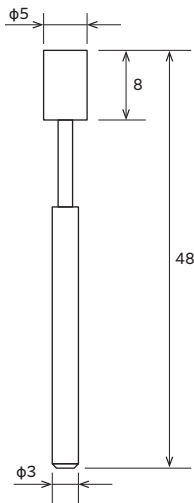


Fig. 26  
AX-PM-5RF

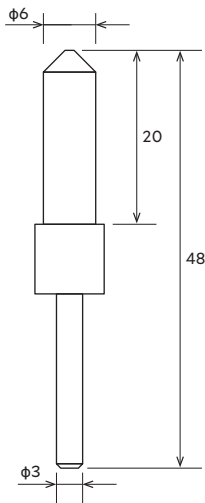
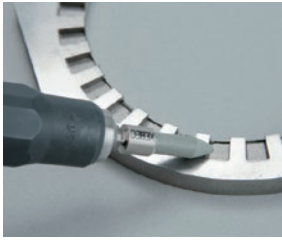


Fig. 27  
AX-PM-6T

## Applications

### Deburring of edges



#### Before

A file was used for deburring. However, it caused secondary burrs and a quality problem.

#### After

Secondary burrs are not formed and edge quality is improved.

Material: Stainless steel  
Tool: AX-PM-6T

### Deburring of parting lines



#### Before

A rotary bar was used because the burrs were large. However, there was a safety problem.

#### After

The switch to abrasive stone makes the process safer to perform. The ceramic fiber stone's grinding power improves work efficiency.

Material: Aluminum  
Tool: AX-PM-6T

## How to use

All surfaces of the ceramic stone are abrasive and all of them can be used for deburring and polishing. These ceramic stones are capable of withstanding high speed. As such they can be used with pneumatic rotary tools in addition to electric rotary tools.



MANUAL

# Mobile Micromotor System

Battery-powered rotary tool for use at workstations where power supply is unavailable.  
The handpiece is ultra-lightweight, ideal for manual operation without causing fatigue.



Product code	Matching shank diameter (mm)	Maximum rotational speed (min <sup>-1</sup> )	Standard components
M2P33STX	φ3 mm shank	30000	Handpiece with stand, controller, ON/OFF foot switch, power cable for charging

■ Capable of about 5 hours of continuous use on a single charge.




# XEBEC Brush™ Surface

## How to select


Refer to the charts below and select the brush color based on the workpiece material, burr thickness and surface roughness.

### Deburring

Workpiece material	Resin	Copper, Brass		
		Aluminum		
		Steel		
				Stainless steel
				HRSA steel
Burr size	Micro fine burrs			
			Burr thickness ( $\leq 0.1\text{mm}$ )	
			Burr thickness ( $0.1 - 0.2\text{mm}$ )	
Brush (color)	A13 (pink)	A11 (red)	A21 (white)	A32 (blue)
Grinding power				

- Not all brush colors are available in all sizes.
- HRSA (heat resistant super alloy)

### Cutter mark removal and polishing

Workpiece material	Copper, Brass		
	Aluminum		
	Steel		
			Stainless steel
			HRSA steel
Achievable surface roughness	$\leq \text{Ra } 0.1 \mu\text{m}$		$\geq \text{Ra } 0.1 \mu\text{m}$
Brush (color)	A13 (pink)	A11 (red)	A21 (white)
Grinding power			

- Not all brush colors are available in all sizes.
- HRSA (heat resistant super alloy)

## Machining adjustments - Burrs remain

Take the following actions, if burrs remain despite using the recommended depth of cut for the given burr size.

### 1. Increase rotational speed

Increase the rotational speed to the maximum.

Brush size (mm)	Product code	Initial rotational speed ( $\text{min}^{-1}$ )	Maximum rotational speed ( $\text{min}^{-1}$ )
$\phi 6$	A13-CB06M, A11-CB06M, A21-CB06M, A32-CB06M	8000	10000
$\phi 15$	A13-CB15M, A11-CB15M, A21-CB15M, A32-CB15M	4800	6000
$\phi 25$	A11-CB25M, A21-CB25M, A32-CB25M	4000	5000
$\phi 40$	A11-CB40M, A21-CB40M, A32-CB40M	2400	3000
$\phi 60$	A11-CB60M, A21-CB60M, A32-CB60M	1600	2000
$\phi 100$	A11-CB100M, A21-CB100M, A32-CB100M	960	1200
$\phi 125$	A11-CB125M, A21-CB125M, A32-CB125M	800	1000
$\phi 165$	A11-CB165M, A21-CB165M, A32-CB165M	600	750
$\phi 200$	A11-CB200M, A21-CB200M, A32-CB200M	480	600

### 2. Check the rotational direction of the brush

XEBEC recommends cutting upwards so that the bristles lift burrs up.

### 3. Change the brush color

Check whether the brush color is suitable for the workpiece material and burr size. The grinding power of colors increases as follows: pink < red < white < blue.

## Machining adjustments - Edges too rounded

It is not possible to remove burrs with brushes without rounding edges to some extent. Take the following actions to improve edge sharpness.

### 1. Increase feed rate

To make a sharper edge, increase the feed rate in 1,000 mm/min increments within the range where burrs can be removed. Increasing the feed rate also helps reduce the cycle time.

### 2. Decrease rotational speed

Decrease rotational speed in 10 to 20 percent increments within the range where burrs can be removed.

### 3. Check the brush color

Check whether the brush color is suitable for the workpiece material and burr size. Rounding of edges increases as follows: pink < red < white < blue.

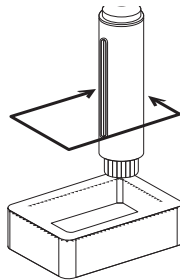
## Reference data - Tool life

### Example 1

Material	Aluminum die-casting
Follows	Face milling
Burr thickness	0.1 mm
Tool path length	1000 mm/piece

Tool	A11-CB25M
Rotational speed	4000 min <sup>-1</sup>
Feed rate	2400 mm/min
Depth of cut	1 mm
Wear amount	50 mm out of 75 mm

Tool life	10 km (10000 pieces)
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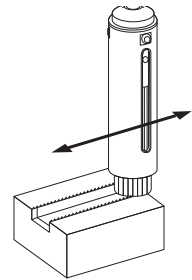


### Example 2

Material	S45C
Follows	End milling
Burr thickness	0.1 mm
Tool path length	200 mm/piece

Tool	A21-CB25M
Rotational speed	4000 min <sup>-1</sup>
Feed rate	2000 mm/min
Depth of cut	0.5 mm
Wear amount	50 mm out of 75 mm

Tool life	3 km (15000 pieces)
-----------	---------------------



- Tool life varies greatly depending on the material, machining conditions, and burr size and direction.
- The above data is not guaranteed. Please use as a guide.

## Machining adjustments - Surface roughness worsens

It may be possible to improve the surface finish. Try the following.

### 1. Check the brush color

The ability to improve surface roughness is inversely proportional to the grinding power, meaning that A13 (pink) achieves the best surface roughness, followed by A11 (red), A21 (white), and A32 (blue). Make sure to select the appropriate brush color based on the workpiece material and target surface roughness.

### 2. Wet machining

The brush can be used for both dry and wet (oil-based and water-soluble) machining. Wet machining may improve surface roughness and tool life.

### 3. Increase the number of passes

When comparing with the same cycle time, increasing the number of passes makes a bigger difference than decreasing the feed rate.

### Example

Rotational speed	4000 min <sup>-1</sup>
Depth of cut	0.5 mm
Feed rate	600 mm/min
Number of passes	1



Rotational speed	4000 min <sup>-1</sup>
Depth of cut	0.5 mm
Feed rate	1200 mm/min
Number of passes	2

## Reference data - Surface roughness after deburring

Material	A11 (red)	A21 (white)	A32 (blue)
A5052	Approx. Ra 0.6 μm, Rz 5.0 μm		
S50C		Approx. Ra 0.2 μm, Rz 1.6 μm	
SUS304			Approx. Ra 0.3 μm, Rz 2.4 μm

# XEBEC Brush™ Surface End Type

How to select

Refer to the chart below and select the brush color based on the workpiece material, burr thickness and surface roughness.

Workpiece material	Resin		Copper, Brass	
			Aluminum	
			Steel	
				Stainless steel
				HRSA steel
				Cast iron
Burr size	Micro fine burrs			
			Burr thickness (≤ 0.1mm)	
Achievable surface roughness	≤ Ra 0.1 μm			
			≥ Ra 0.1 μm	
Brush (color)	A13 (pink)	A11 (red)	A21 (white)	A32 (blue)
Grinding power	—————→ High			

■ HRSA (heat resistant super alloy)



# XEBEC Brush™ Crosshole

## How to select

Refer to the chart below and select the brush color based on the workpiece material, burr thickness and surface roughness.

Workpiece material	Resin	Steel
	Copper, Brass	Stainless steel
	Aluminum	
		HRSA steel
Burr size	Micro fine burrs	
	Burr thickness ( $\leq 0.1\text{mm}$ )	
Achievable surface roughness	$\leq \text{Ra } 0.1 \mu\text{m}$	
	$\geq \text{Ra } 0.1 \mu\text{m}$	
Brush (color)	A12 (red)	A33 (blue)
		A34 (dark blue)
Grinding power	→ High	

■ HRSA (heat resistant super alloy)

## Machining adjustments - Burrs remain

Take the following actions, if burrs remain despite using the correct brush and rotational speed for the given burr size.

1. Check the brush color
2. Increase rotational speed to the maximum
3. Increase the number of passes
4. Decrease the feed rate

## Machining adjustments - Extending tool life

Try the following, if tool life is short despite using the correct brush for the given burr size.

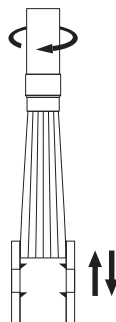
1. Decrease the rotational speed
2. Increase the feed rate

### Example

Material	S45C
Follows	Drilling
Burr thickness	0.1 mm
Main bore	$\phi 10 \text{ mm}$
Crosshole	$\phi 5 \text{ mm}$

Tool	CH-A12-5M-TL
Rotational speed	$10000 \text{ min}^{-1}$
Feed rate	$300 \text{ mm/min}$
Depth of cut	1 mm
Wear amount	10 mm out of 50 mm

Tool life	4500 holes
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- Tool life varies greatly depending on the material, machining conditions, and burr size and direction.
- The above data is not guaranteed. Please use as a guide.

## XEBEC Brush™ Surface Wheel Type

### Machining adjustments - Burrs remain

Take the following actions, if burrs remain despite using the recommended depth of cut for the given burr size.

#### Increase the feed amount

Increase the feed amount in increments of 10 to 20 percent.

### Machining adjustments - Extending tool life

Try the following, if tool life is short despite using the correct brush for the given burr size.

#### Increase the feed amount

Increase the feed rate in increments of 10 to 20 percent.

### Reference data - Tool life

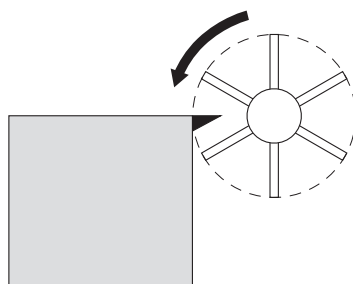
It is not possible to remove burrs with brushes without rounding edges to some extent. Take the following actions to improve edge sharpness.

#### Example

Material	S45C
Follows	End milling
Burr thickness	0.1 mm
Tool path length	120 mm/piece

Tool	W-A11-50
Cutting speed (Rotational speed)	250 m/min (1600 min <sup>-1</sup> )
Feed per bundle (Feed rate)	0.7 mm/bundle (7000 mm/min)
Depth of cut	0.2 mm
Wear amount	50 mm out of 75 mm

Tool life	600 m (5000 pieces)
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- Tool life varies greatly depending on the material, machining conditions, and burr size and direction.
- The above data is not guaranteed. Please use as a guide.

## XEBEC Floating Holder™

### Maintenance

Schedule a regular maintenance for cleaning and greasing sliding parts to ensure smooth movement and functioning. Recommended grease: Lithium soap grease (NLGI Grade #2).

## Safety Precautions

- Please make sure to **read the instruction manual before use.**
- In order to ensure safety, be sure to **observe the operator safety measures and operational precautions listed below.**

The following precautions exist to ensure safe use of the products and prevent injury to persons using the products and other persons in the vicinity, as well as prevent property damage. They are classified as “Warnings” and “Cautions” depending on the level of potential injury and danger involved. “Warnings” and “Cautions” should be strictly observed as they all are related to safety.

### [WARNINGS]

These have the potential to cause death or serious injury to persons or serious property damage if handled improperly.

### [CAUTIONS]

These have the potential to cause injury to persons or property damage if handled improperly.



## Warnings

### [Use of protective clothing and equipment]

Wear safety glasses, protective gloves and masks when using the tools. Wear clothing with long sleeves or other clothing that does not expose the skin. Cuffs and hems of clothing should be tightly fastened.

### [Use of protective covers]

Machine tools and dedicated machines should be equipped with covers and other safety measures capable of protecting users from injury in the event of tool fragmentation.

### [Cutting dust and particles]

Cutting dust and burrs are scattered into the air with the rotation of the tool. These should be removed by a dust collector and persons should not enter the affected area.

### [Work surroundings]

An enclosure should be installed around the work area to prevent persons other than the operator from entering the work area. Persons who enter the work area should always wear protective clothing and use protective equipment.

*Ignoring the aforementioned warnings may result in the following:*

- *Fragments and cutting particles may enter the eyes, causing loss of sight in severe cases.*
- *Fragments and cutting particles may cause injury by cutting into skin.*
- *Cutting dust resulting from tool use may irritate the skin, cause allergic reactions and damage lungs.*



## Cautions

### [Prior to machining]

Operate the tool for at least one minute (3 minutes after the tool has been replaced) before conducting any actual cutting. Cease operation immediately in the event of any sign of abnormality with the machine or loosening of the tool shank. Continued use may result in the shank flying out of the holder, causing damage to the machine, the jig, and workpiece, as well as injury or loss of sight to the operator.

### [Abnormal vibration]

Cease operation immediately at the first sign of abnormalities such as vibration. Continued use may result in the shank flying out of the holder, causing damage to the machine, the jig, and workpiece, as well as injury or loss of sight to the operator.

### [Maximum rotational speed]

Do not operate the tool beyond its maximum rotational speed. Set the machining conditions based on the instruction manual. Operation at speeds beyond the maximum rotational speed may damage the tool, the machine, the workpiece, and also cause loss of sight or other injury to the operator.

- *A dust collector should be used during machining and cleaned thoroughly afterwards.*
- *Insufficient removal of dust and cleaning of dust collectors may result in damage to machine tool slides and other exposed sliding surfaces.*

# About XEBEC

## Beautiful deburring

XEBEC has been helping factories and machining shops around the world automate their deburring processes since 2002. With our wealth of knowledge accumulated over the years, we strive everyday to solve customer deburring problems faster than before. We aim to change the way people think about deburring and create value-added in customers' finishing processes. A world where people can make use of their creative talents to the fullest, is a world where XEBEC wants to be.

## XEBEC's three innovations

### Technology innovation

Ongoing technological innovation through integration of materials, hardware and software from many scientific fields enables us to find superior solutions to fundamental problems.

### Process innovation

Challenging accepted practices to optimize and innovate business processes such as product marketing, manufacturing, sales and delivery.

### Precision Management

Attaching the upmost importance to every aspect of quality management, such as stable product quality, shipping accuracy, and timely and polite customer support.

## Corporate outline

Corporate name	XEBEC Technology Co., Ltd	Head office	Fuerte Kojimachi 1-7 Building 4F Kojimachi 1-7-25, Chiyoda-ku Tokyo, Japan 102-0083
Incorporated	June 3, 1996		
Main business	Development, manufacturing and sales of industrial tools for deburring, polishing, chamfering, and surface finishing.		Tel. +81-3-3239-3481 Fax. +81-3-5211-8964
Capitalization	JPY 99,000,000		
President & CEO	Norihiko Sumiyoshi		

# History

XEBEC Burrless Chamfering Cutter™ released.	Jul. 2023	
XEBEC Stone™ Flexible Shaft Disc Type released.	Feb. 2022	
XEBEC Brush™ Crosshole Extra-Large released.	Sep. 2021	
	Nov. 2018	Corporate branding renewed.
	Jun. 2018	XEBEC Back Burr Cutter and Deburring Tool Path chosen product of the year in Germany's Best of Industry Awards (cutting division).
	Mar. 2017	'Deburring Productivity Day' certified by Japan Anniversary Association
XEBEC Brush™ Wheel Type released.	Oct. 2016	
XEBEC Back Burr Cutter and Deburring Tool Path™ released.	Jun. 2016	
	Nov. 2015	'XEBEC Plus Engineering Center' opened in Okazaki, Aichi.
XEBEC Self-Adjusting Sleeve™ released.	Oct. 2015	
Mobile Micromotor System released.	Apr. 2015	
	Mar. 2015	One of 100 companies awarded the Diversity Management Award by the Ministry of Economy, Trade and Industry.
	May 2014	Headquarters moved to current location at Kojimachi, Chiyoda-ku, Tokyo.
	Jun. 2013	'XEBEC Plus R&D Center' opened in Ota-ku, Tokyo. Vertical machining center (with additional axis) acquired.
XEBEC Brush Length Adjustment Tool™ released.	Apr. 2013	
	Aug. 2012	Test cut facility established at the head office. SCARA robot acquired.
XEBEC Floating Holder™ released.	Oct. 2010	
XEBEC Stone™ Mounted Point released.	Oct. 2008	
	Oct. 2007	Norihiko Sumiyoshi appointed president and CEO.
XEBEC Stone™ Flexible Shaft released. XEBEC Brush™ Crosshole released.	Nov. 2004	
XEBEC Brush™ Surface released.	Apr. 2002	
XEBEC Ceramic Stone™ Meister Finish released.	May 1998	
	Jun. 1997	Certified as an authorized corporation by the Ministry of Economy, Trade and Industry under the Act on Temporary Measures for Facilitating Specific New Businesses.
	Jun. 1996	XEBEC Technology Co., Ltd incorporated. (Founder: Takehiko Sumiyoshi)



**XEBEC Technology Co., Ltd**

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