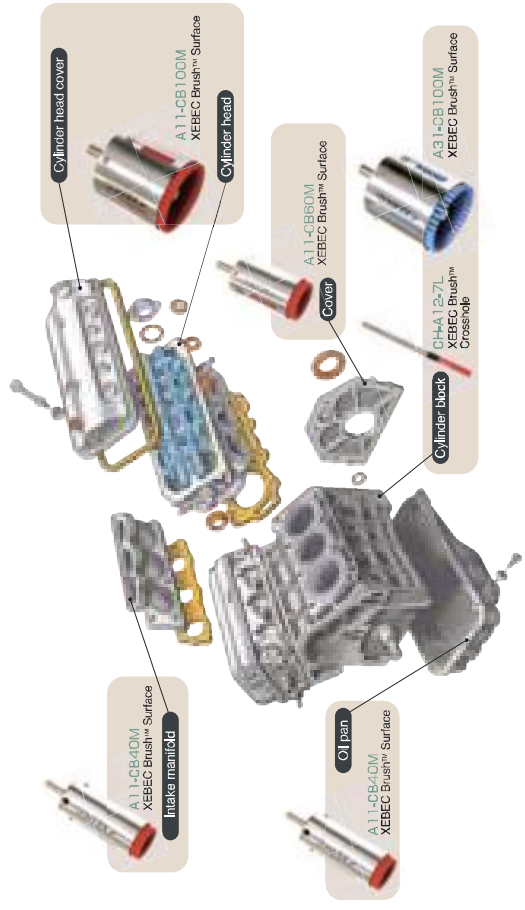


# Successful Applications In Automotive Industry

## Case 1 Successful Applications In Automotive Industry

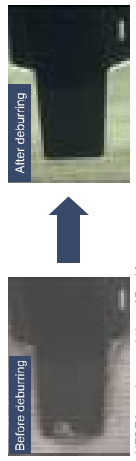


Used for many other purposes, from powertrain parts to fuel injection mechanism parts.

## Case 2 Automated Deburring and Polishing Applications

### Deburring of aerospace part (Turbine disk)

Category	Aerospace part
Workpiece	Turbine disk
Material	Turbine Inconel
Process details	Deburring of gear edge surface after grinding process



XEBEC product used/A11-CB40M  
Rotation speed:1500mm<sup>2</sup>/min Depth of cut:0.5mm Processing time:N/A Feed:2400mm/min

### Edge deburring of spur gear

Category	Machine part
Workpiece	Spur gear
Material	Carbon steel S45C
Process details	Edge deburring after gear cutting process



XEBEC product used/A31-CB25M  
Rotation speed:5500mm<sup>2</sup>/min Depth of cut:1mm Processing time:N/A Feed:2500mm/min

### Cutter mark removal of medical part (Artificial hip joint)

Category	Medical part
Workpiece	Artificial hip joint
Material	Titanium alloy
Process details	Cutter mark removal after ball end milling process



XEBEC product used/A21-CB25M  
Rotation speed:3500mm<sup>2</sup>/min Depth of cut:0.6mm Processing time:N/A Feed:100mm/min

### Fine deburring of cooling fins

Category	Automotive part, Semiconductor device part
Workpiece	Cooling fins
Material	Carbon steel Aluminum alloy
Process details	Edge deburring

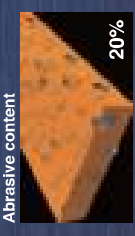


XEBEC product used/A11-CB30M  
Rotation speed:2400mm<sup>2</sup>/min Depth of cut:1mm Processing time:N/A Feed:1200mm/min

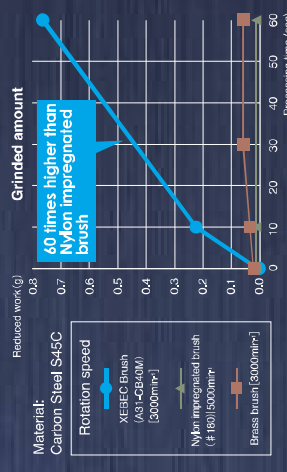
## Strength 1 Overpowering grinding force

Free of abrasive grains. The fiber content ratio is approximately 80%.

Our uniquely developed ceramic fibers themselves are the abrasives; their fiber content ratio is over 80%. The thousands of cutting edges that are made up of the ends of each individual fiber create overpowering grinding power.



Comparison of grinding capacity with other companies' products

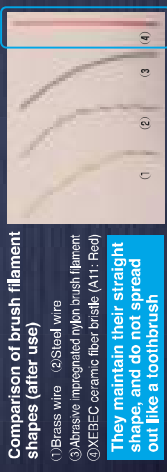


● XEBEC Brush™ Surface/ Grinding approx.0.22g in 10 sec  
● Nylon brush/ Not grinding  
● Brass brush/ Not grinding

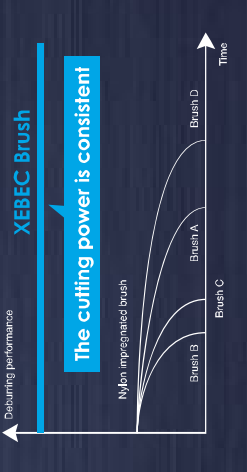
High grinding power reliably remove burrs  
Grinding power can be adjusted by changing cutting parameters.

## Strength 2 Consistent cutting edges

Even after repeated use, the brushes do not become distorted.



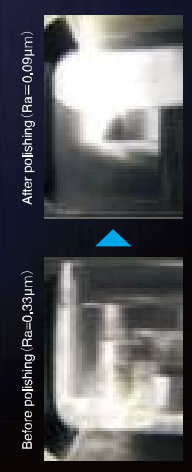
The stability of performance makes true automation possible.  
Particularly since this "controllable brush" constantly maintains its stable cutting power, it is possible to automate the deburring and polishing process.



## Strength 3 Amazing polishing capacity

Best achievable surface smoothness: Ra = 0.1µm

The superfine fibers, measured in micrometers, can improve surface roughness in a short time.



● Material/NAK80 ● XEBEC tool used/ A31-CB15M, S5000/F300

# Automation with XEBEC Brush™

XEBEC brushes are tools that allow for the automation of deburring and polishing with machining centers, robots, and specialized machines.

## Intended Machine Tool

XEBEC brushes can, after being mounted to the dedicated sleeve, be attached to machinery with a standard collet chuck, milling chuck, drill chuck, etc.

- Machining centers
- Robots
- Specialized machines
- Drilling machines

After mounting on NC machine tools such as above, use with the recommended processing conditions below.



Mount the brush to the sleeve and firmly affix it with the attached screw. After affixing, just mount it to the MC or robot's collet chuck.

\*Since the brushes are standard chuck diameters, you can simply mount them to devices that handle that diameter.

## How to select a XEBEC Brush™ Surface

The bristle colors differ depending upon the brush's grinding power. Please choose your brush referencing the figure to the right.

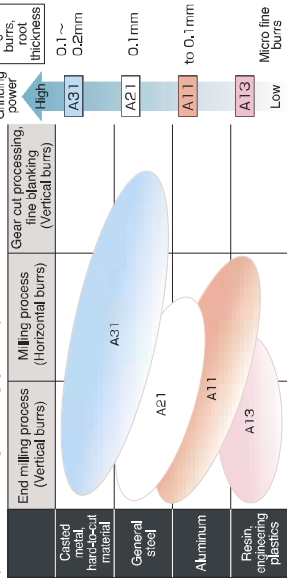
### Brush color

Please choose your brush color after confirming the quality of the workpiece material, the thickness of the burrs, and directionality of burr production.

### Brush diameter

We recommend choosing a brush diameter that is about 1.5 to 2 times the size of the width to be processed. (Please refer to the product lineup on page 7)

### (Bristles and grinding power)



\*Grinding power increases in the order pink - red - white - blue - light blue. If it is absolutely necessary to grind the workpiece material types to this brush color, for steel or aluminum, there are examples of using the white brush and blue brush for aluminum cast (AC) materials.

## Recommended process conditions

### 3 parameters

Rotation speed (S) 80% of the maximum rotation speed

Depth of cut (D) 0.5~1.0mm, depending on direction of burr generation (Recommended to cut 0.5mm for vertical burrs, 1.0mm for horizontal burrs)

Feed rate (F) About F2,500~F4,000mm/min

There is no limit to the use. You can set it in response to the necessary cycle time.

- We recommend wet processing (no matter the type).
- If the amount of brush projection is below 5 mm, the grinding power increases and it affects the finish.



## What can be processed with XEBEC brushes

### Targeted burrs

Fine burrs with a root thickness of 0.1~0.2mm or less (About the size that can be easily bent with a fingernail)

### Location of burr generation

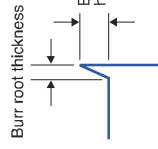
Surfaces and edges, cross-holes

### Workable materials

Standard metals, stainless steel, aluminum, Inconel, cast iron, resin, etc. (less than HRC 65).

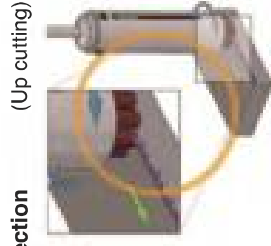
### Grinding surface of the tool

Tips on the brush.



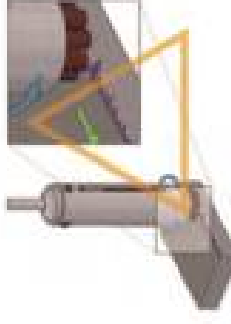
## Process Notes

### Rotational direction



The tip of the brush raises up the burr and removes it.

### (Down cutting)



The tip of the brush lays down the burr.

## How to set the starting process parameters

Brush diameter	Rotation speed S (min <sup>-1</sup> )		Depth of cut D (mm)		Feed rate F (mm/min)		Brush projection (mm)
	Recommended rotation speed	Maximum rotation speed	Vertical burrs	Horizontal burrs	Burr root thickness 0.05mm	Burr root thickness 0.1 mm	
φ 6mm	8000	(MAX10000)	0.5	0.5	4000	2500	5
φ 15mm	4800	(MAX6000)	0.5	1.0	4000	2500	10
φ 25mm	4000	(MAX5000)	0.5	1.0	4000	2500	15
φ 40mm	2400	(MAX3000)	0.5	1.0	4000	2500	15
φ 60mm	1600	(MAX2000)	0.5	1.0	4000	2500	15
φ 100mm	960	(MAX1200)	0.5	1.0	4000	2500	15

## How to change the process parameters

### ● If burrs remain

→ Increase the rotation speed (S) to the maximum

### ● If you want to extend tool life

● If the edge is too rounded after removing the burrs

→ Decrease the rotation speed (S) in increments of 1,000/min

→ If you want to shorten the cycle time, increase the feed rate (F) in increments of 1,000 mm/min

	Rotation speed	Depth of cut	Feed
To increase grinding power	↑	↑	↑
To decrease grinding power	↓	↓	↓
	↑ To increase	↑ To increase	↑ To decrease

# Product Lineup

## XEBEC Brush™ Product Lineup Patented

### XEBEC Brush™ Surface (Cup type) $\phi 6 \sim \phi 100$



### XEBEC Brush™ End type $\phi 3, \phi 5$



### XEBEC Brush™

Type	Product code	Length Fiber Rod (mm)	Diameter D1	Length Fiber Rod (mm)	Corresponding Sleeve (Product code)
Cup type	A13-CB15M (Pink)	$\phi 15$ mm	$\phi 15$ mm	50mm	S15MP
	A13-CB30M	$\phi 30$ mm	$\phi 30$ mm	30mm	S05M
	A11-CB100M	$\phi 100$ mm	$\phi 100$ mm	75mm	S100M
	A11-CB60M	$\phi 60$ mm	$\phi 60$ mm	75mm	S60M
End type	A11-CB40M	$\phi 40$ mm	$\phi 40$ mm	75mm	S40M
	A11-CB25M	$\phi 25$ mm	$\phi 25$ mm	75mm	S25M
	A11-CB15M	$\phi 15$ mm	$\phi 15$ mm	50mm	S15MP
	A11-CB05M	$\phi 5$ mm	$\phi 5$ mm	20mm	S05M

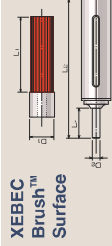
※be absolutely certain to mount the brush to the sleeve for use. ※One row of bristles is embedded around the periphery. (Except the A13/A11/A21/A31-CB06M end-type). Fully-embedded style) ※With the end-type, the brush and shank are a combined unit, so a sleeve is not used.

### XEBEC Sleeve™

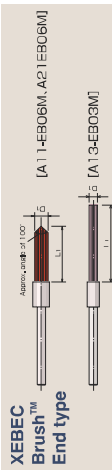
Type	Product code	Axis core diameter D2	Axis length L3	Corresponding brush (Product code)
For $\phi 100$ mm	S100M	$\phi 110$ mm	40mm	A11/A21/A31-CB100M
	S60M	$\phi 65$ mm	30mm	A11/A21/A31-CB60M
	S40M	$\phi 45$ mm	30mm	A11/A21/A31-CB40M
	S25M	$\phi 30$ mm	30mm	A11/A21/A31-CB25M
For $\phi 15$ mm	S15MP	$\phi 18.5$ mm	30mm	A11/A21/A31/A13-CB15M
	S05M	$\phi 10$ mm	30mm	A11/A21/A31/A13-CB05M

※The length is only the length of the sleeve. When in use, the length of the brush protrusion is added. ※Sleeve is approximately 40mm products. ※Please contact us regarding  $\phi 80$  mm products.

## Tool Schematic



Please check the specs of each item in the lineup above.



# Optional Tools

## XEBEC Floating Holder™ Patented

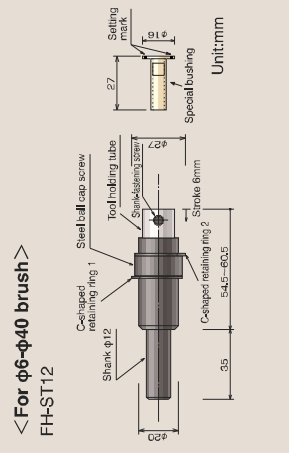
XEBEC Floating Holder™ is an optional tool for XEBEC Brush™ Surface to stabilize the cutting load. It contributes significantly to consistent quality on the mass production line.



- Features**
  - Extension of brush tool life! (Up to 4 times longer)**  
→ Since the processing state is more stable, it reduces the amount of tool wear.
  - Reduce process adjustments!**  
→ Extend the interval of adjustment for brush projection and depth of cut due to tool wear.
  - Consistent quality finish!**  
→ Reduce changes in depth of cut due to tool wear for consistent edge quality.
- Available in straight shank type and BT shank type. Can be installed on a wide variety of machinery from drilling machines to NC devices.

## Tool Schematic/Lineup

### Straight Shank



Product code	Workable shank diameter	Supporting brush diameter	Floating stroke	Spring load	Maximum rotation speed
FH-ST12	$\phi 6$ mm When equipped with induced brush	$\phi 6$ $\phi 15$ $\phi 25$ $\phi 40$	6mm	Stroke Approx 4.5N Stroke Approx 6.3N	5000min <sup>-1</sup>

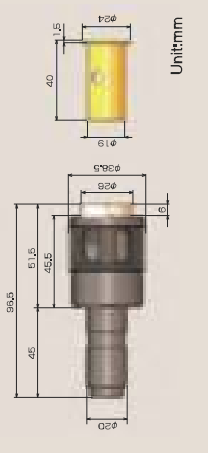
※ FH-ST12 comes with a high-pressure spring, low-pressure spring, and  $\phi 6$  bushing. A bush is included with your purchase. Please contact us for information about the  $\phi 3$  shank.

### < FH-ST12 spring load >

You can change the spring to vary the cutting pressure and resulting process / finish results.

Spring type	Spring load	
	Stroke 6mm	Stroke 6mm
	Approx 4.5N (0.45kgf)	Approx 6.3N (0.63kgf)
Installed	Approx 1.5N (0.15kgf)	Approx 3.3N (0.33kgf)
Attachment	Approx 7.2N (0.72kgf)	Approx 10.5N (1.05kgf)

### < For $\phi 60 \sim \phi 100$ brush >



Product code	Supporting diameter	Floating stroke	Spring load (Initial setting)	Maximum rotation speed
FH-ST20-GC	$\phi 12$ mm	$\phi 60$	Stroke 0mm Stroke Approx 2N (0.2kgf)	2,000min <sup>-1</sup> (*)
FH-ST20-100	$\phi 16$ mm	$\phi 100$	Stroke Approx 6N (0.6kgf)	1,200min <sup>-1</sup> (*)

※It is recommended to periodically carry out maintenance.  
※Maximum rotation speed conforms to the instruction manual for XEBEC Brush™ Surface.  
※The maximum rotation speed for this product as a standard unit is 5,000 min<sup>-1</sup>.  
※If the tool length is problematic, we have a specially short-length BT holder (tooling).  
※The spring load can be adjusted with 2N to 6N for 6 mm strokes, and within 6N to 10N for 6 mm strokes.