XEBEC®
TECHNOLOGY CO.,LTD.

XEBEC TECHNOLOGY CO.,LTD.
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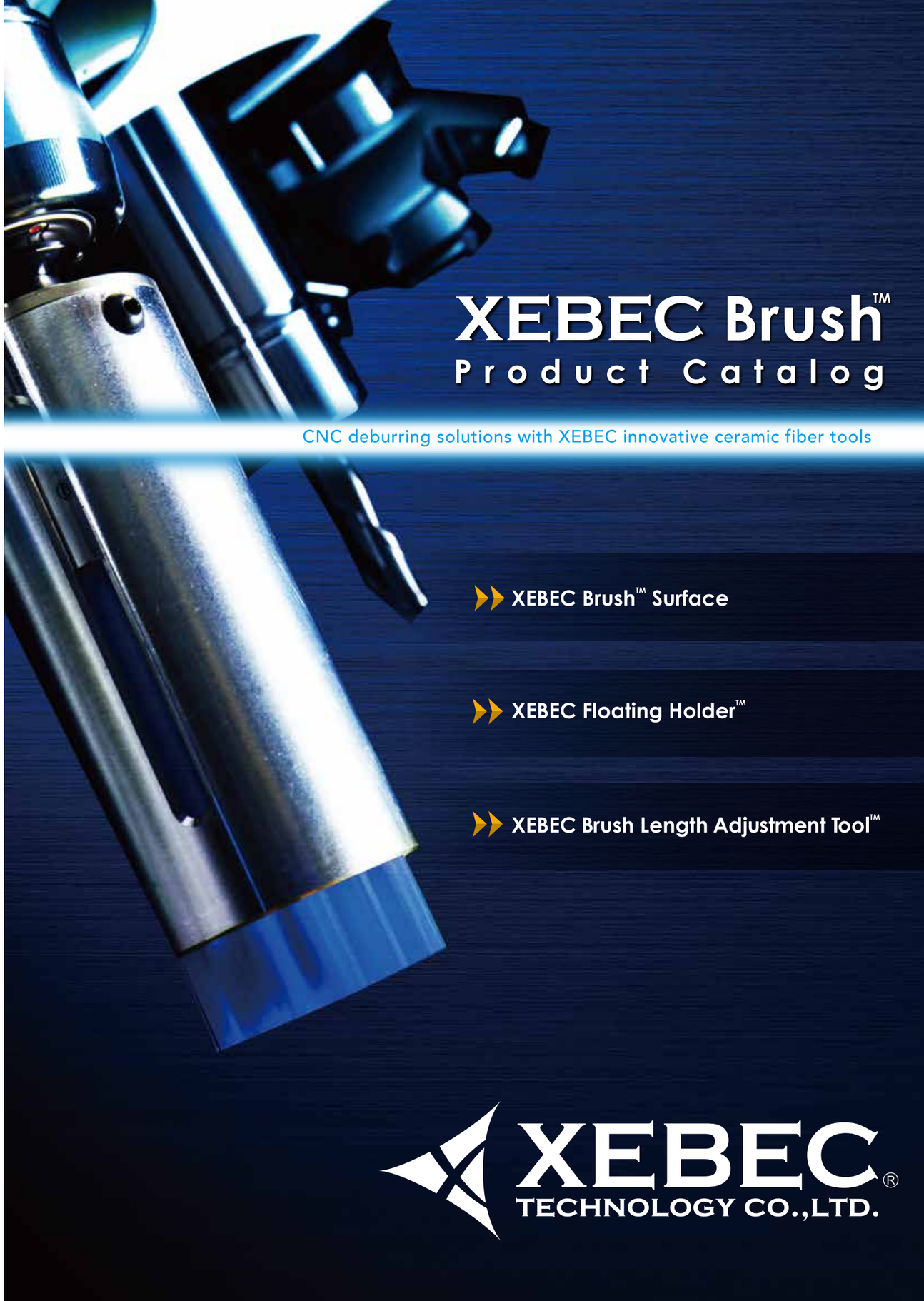
Your Order

2014.11.1000sn



XEBEC Brush™
Product Catalog

CNC deburring solutions with XEBEC innovative ceramic fiber tools

- XEBEC Brush™ Surface
- XEBEC Floating Holder™
- XEBEC Brush Length Adjustment Tool™

XEBEC®
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XEBEC *brushes are made from a material like none other!*

Unmatched grinding force and cutting power!

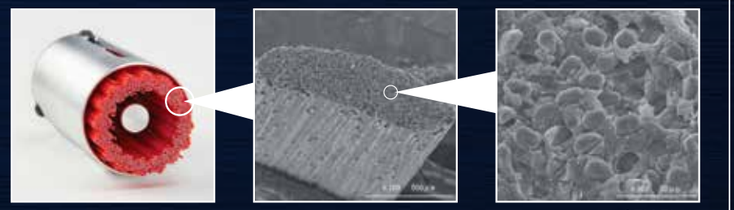
We provide completely new abrasive stones and deburring tools with our revolutionary technology using ceramic fibers.

XEBEC®
TECHNOLOGY CO.,LTD.

The Bristle and Structure

One bristle has 1,000 cutting edges.

Each bristle is made by fixing 500 - 1,000 ceramic fibers, each together with a binder.The tips of each of these fibers, a few dozen microns in diameter, form the cutting edges.Continuous cutting edges provide stable and consistent grinding performance.



SEM Photo

3 Features of XEBEC Brush™

1 ***Superior grinding force. Overwhelming cutting edges.***

The high grinding power exhibited by thousands of cutting surfaces reliably removes burrs.

2 ***Cutting edges that keep cutting.***

The self-sharpening fiber structure works to the very end without losing grinding power.

3 ***No deformation.***

The brushes, made of a high-density fiber structure, have high rigidity and do not become distorted with repeated use.

Only 1 — Unparalleled deburring tools that use bristles made of our uniquely developed ceramic fibers. Patented

XEBEC Brush is a completely new deburring tool using ceramic fibers.We have created unprecedented automated deburring and polishing with our revolutionary materials and technology.We are employed in leading factories in Japan and worldwide, contributing to manufacturing all over the world.

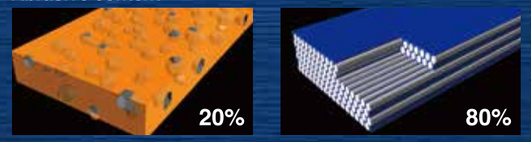
ISO9001 Conformity XEBEC products are manufactured in a plant that meets ISO9001 international quality control and assurance standards.

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 overwhelming grinding power.

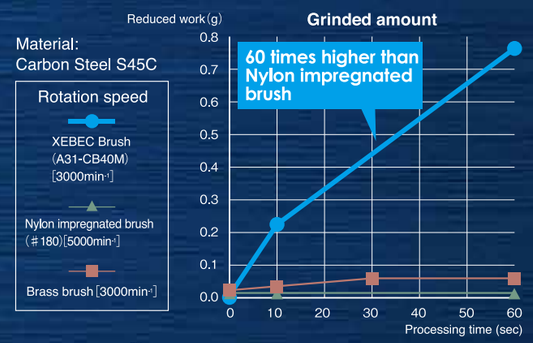
Abrasive content



Handles all sorts of materials up to HRC 65

The brushes can process general materials up to HRC. 65They can handle hard-to-cut and superhard materials from general metals, aluminum, and resin, to SUS, Inconel, and titanium.

Comparison of grinding capacity with other companies' products



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

High grinding power reliably remove burrs
You can adjust the grinding power by changing cutting parameters.

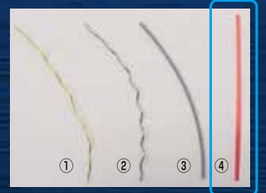
Strength 2 Consistent cutting edges

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

Comparison of brush filament shapes (after use)

①Brass wire ②Steel wire
③Abrasive impregnated nylon brush filament
④XEBEC ceramic fiber bristle (A11: Red)

They maintain their straight shape, and do not spread out like a toothbrush.

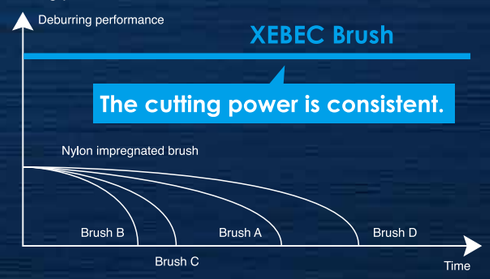


Self-sharpening unique to ceramic fiber

Through the self-sharpening of cutting edges on the fiber ends, the brushes do not become clogged, and new, fresh cutting edges are always protruding.

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.

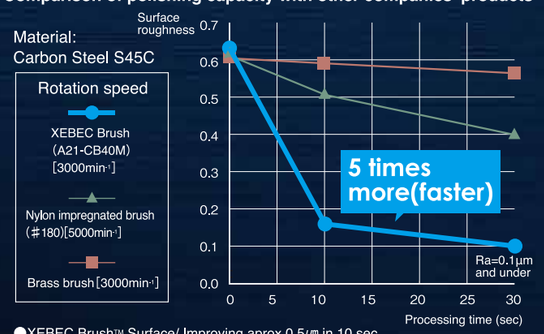
Best achievable surface smoothness: Ra = 0.1μm

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

Before polishing (Ra=0.33μm)　　After polishing (Ra=0.09μm)

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

Comparison of polishing capacity with other companies' products

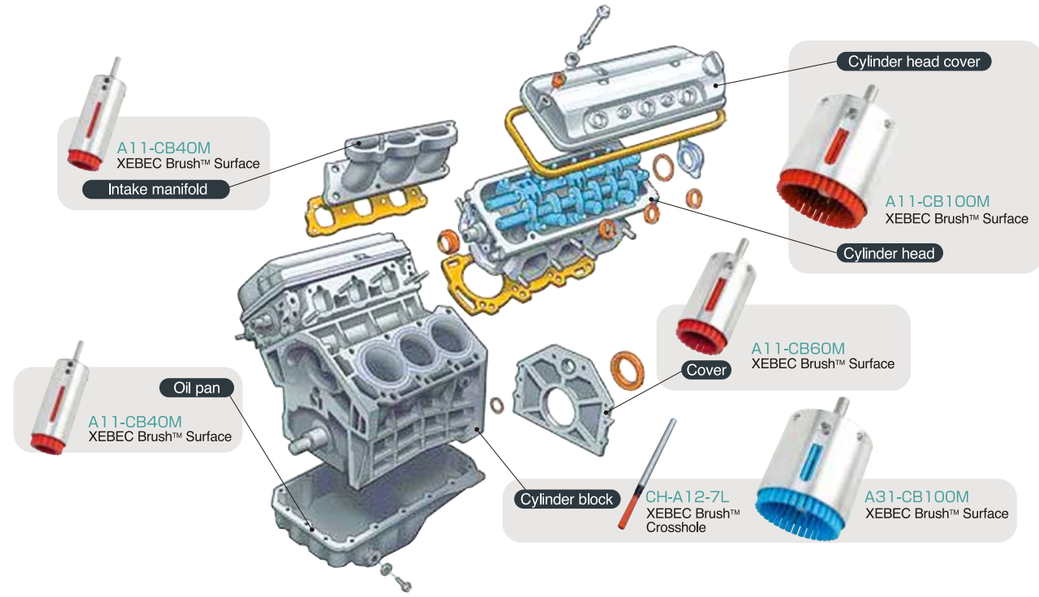


●XEBEC Brush™ Surface/ Improving aprox.0.5μm in 10 sec
●Nylon impregnated brush ／Improving approx. 0.1μm in 10 sec.
●Brass brush - Surface roughness is not improved

XEBEC TECHNOLOGY CO.,LTD.

Successful Applications

Case 1 Successful Applications In Automotive Industry

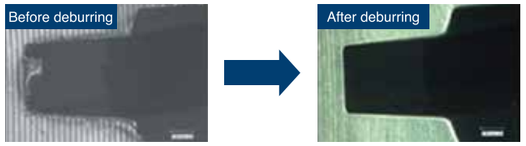


Used for many other purposes, from powertrain parts to fuel injection mechanism parts.

Case 2 Automated Deburring and Polishing Applications

Deburring of aerospace part (Turbine disk)

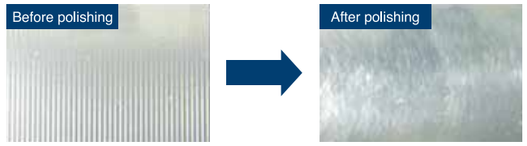
Category	Aerospace part
Workpiece	Turbine disk
Material	Turbine Inconel
Process details	Deburring of gear edge surface after grinding process



XEBEC product used/A11−CB40M
Rotation speed:1500min-1 Depth of cut:0.5mm Processing time:N/A Feed:2400mm/min

Cutter mark removal of medical part (Artificial hip joint)

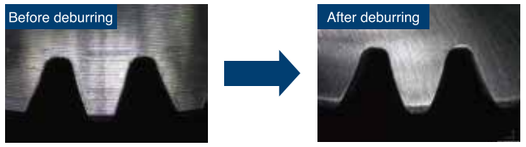
Category	Medical part
Workpiece	Artificial hip joint
Material	Titanium alloy
Process details	Cutter mark removal after ball end milling process



XEBEC product used/A21−CB25M
Rotation speed:3500min-1 Depth of cut:1.0mm Processing time:N/A Feed:100mm/min

Edge deburring of spur gear

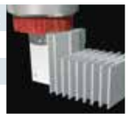
Category	Machine part
Workpiece	Spur gear
Material	Carbon steel S45C
Process details	Edge deburring after gear cutting process

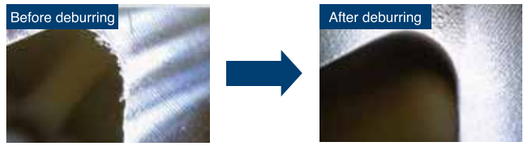


XEBEC product used/A31−CB25M
Rotation speed:3500min-1 Depth of cut:1mm Processing time:N/A Feed:2500mm/min

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−CB40M
Rotation speed:2400min-1 Depth of cut:1mm Processing time:N/A Feed:1200mm/min

Automation with XEBEC Brush™

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

Installation / 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**
- **Specialized machines**
- **Robots**
- **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

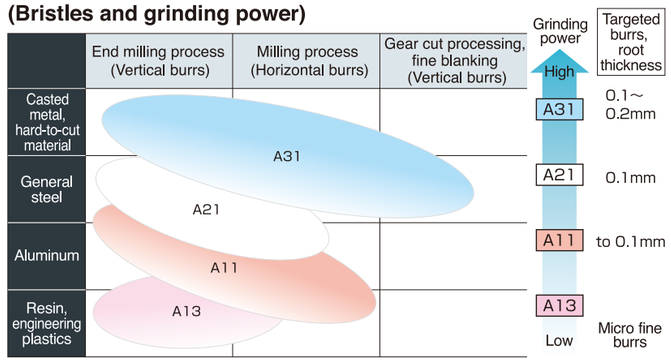
Please choose your brush color after confirming the quality of the workpiece material, the thickness of the burrs, and directionality of burr production.

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.
※It is not absolutely necessary to match the workpiece material type to the brush color.
ex.For aluminum, there are examples of using the white brush and blue brush for aluminum cast (AC) materials.

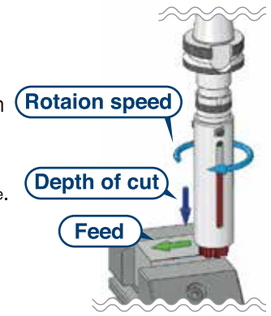
Recommended process conditions

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.**

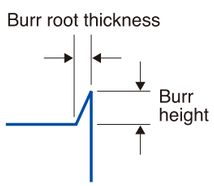
What can be processed with XEBEC brushes

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)

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

Location of burr generation
Surfaces and edges, cross-holes

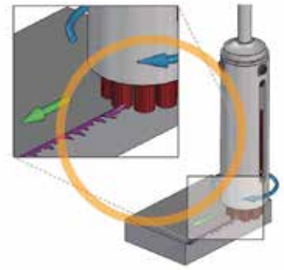
Grinding surface of the tool
Tips on the brush.



Usage Notes

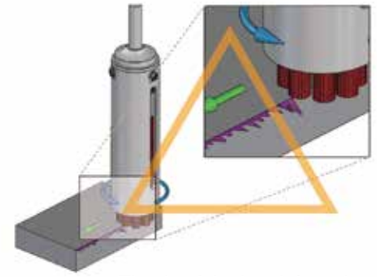
Rotational direction

(Up cutting)



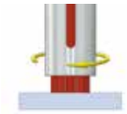
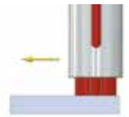
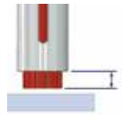
The tip of the brush raises up the burr and removes it.

(Down cutting)



The tip of the brush lays down the burr.

How to set the starting parameters

Brush diameter	Rotation speed S (min-1)		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 0.1mm	
φ 6mm	8000	(MAX10000)	0.5	0.5	(MAX1.0)	4000	2500	5
φ 15mm	4800	(MAX6000)	0.5	1.0	(MAX1.0)	4000	2500	10
φ 25mm	4000	(MAX5000)	0.5	1.0	(MAX1.0)	4000	2500	15
φ 40mm	2400	(MAX3000)	0.5	1.0	(MAX1.0)	4000	2500	15
φ 60mm	1600	(MAX2000)	0.5	1.0	(MAX1.0)	4000	2500	15
φ100mm	960	(MAX1200)	0.5	1.0	(MAX1.0)	4000	2500	15

How to change the 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

	Rotaion speed	Depth of cut	Feed
To increase the grinding power	↗	↗	↘
To decrease the grinding power	↘	↘	↗

↗ To increase ↘ To decrease

Product Lineup

XEBEC Brush™ Product Lineup Patented

XEBEC Brush™ Surface (Cup type)ϕ6~ϕ100

XEBEC Brush™ End type ϕ3,ϕ5

XEBEC Brush™

Type	Product code	Ceramic Fiber Rod (Color)	Diameter D1	Ceramic Fiber rod length	Corresponding sleeve (Product code)
Cup type	A13-CB15M	A13 (Pink)	ϕ 15mm	50mm	S15M-P
	A13-CB06M		ϕ 6mm	30mm	S06M
End type	A13-EB03M		ϕ 3mm	30mm	ϕ3㎜ shank/sleeve unrequired
Cup type	A11-CB100M	A11 (red)	ϕ100mm	75mm	S100M
	A11-CB60M		ϕ 60mm	75mm	S60M
	A11-CB40M		ϕ 40mm	75mm	S40M
	A11-CB25M		ϕ 25mm	75mm	S25M
	A11-CB15M		ϕ 15mm	50mm	S15M-P
	A11-CB06M		ϕ 6mm	30mm	S06M
End type	A11-EB06M		ϕ 5mm	20mm	ϕ3㎜ shank/sleeve unrequired

Type	Product code	Ceramic Fiber Rod (Color)	Diameter D1	Ceramic Fiber rod length	Corresponding sleeve (Product code)
Cup type	A21-CB100M	A21 (White)	ϕ100mm	75mm	S100M
	A21-CB60M		ϕ 60mm	75mm	S60M
	A21-CB40M		ϕ 40mm	75mm	S40M
	A21-CB25M		ϕ 25mm	75mm	S25M
	A21-CB15M		ϕ 15mm	50mm	S15M-P
	A21-CB06M		ϕ 6mm	30mm	S06M
End type	A21-EB06M		ϕ 5mm	20mm	ϕ3㎜ shank/sleeve unrequired
Cup type	A31-CB100M	A31 (Blue)	ϕ100mm	75mm	S100M
	A31-CB60M		ϕ 60mm	75mm	S60M
	A31-CB40M		ϕ 40mm	75mm	S40M
	A31-CB25M		ϕ 25mm	75mm	S25M
	A31-CB15M		ϕ 15mm	50mm	S15M-P
	A31-CB06M		ϕ 6mm	30mm	S06M

※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 and end-types. *Fully-embedded style)
※With the end-type, the brush and shank are a combined unit, so a sleeve is not used.

XEBEC Sleeve™

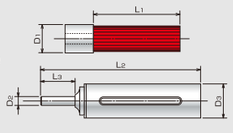
※The external cylinder of the S15M-P is made of Fiber Reinforced Plastic (FRP)

Type	Product code	Axis core diameter D2	Sleeve external diameter D3	Full length (Inc Axis) L2	Axis length L3	Corresponding brush (Product code)
For ϕ100mm	S100M	ϕ 16mm	ϕ 110mm	162mm	40mm	A11/A21/A31-CB100M
For ϕ 60mm	S60M	ϕ 12mm	ϕ 65mm	150mm	35mm	A11/A21/A31-CB60M
For ϕ 40mm	S40M	ϕ 8mm	ϕ 45mm	140mm	30mm	A11/A21/A31-CB40M
For ϕ 25mm	S25M	ϕ 8mm	ϕ 30mm	140mm	30mm	A11/A21/A31-CB25M
For ϕ 15mm	S15M-P	ϕ 6mm	ϕ18.5mm	90mm	30mm	A11/A21/A31/A13-CB15M
For ϕ 6mm	S06M	ϕ 6mm	ϕ 10mm	70mm	30mm	A11/A21/A31/A13-CB06M

※The length is only the length of the sleeve. When in use, the length of the brush protrusion is added. ※Please contact us regarding ϕ80 mm products.
※Spare parts are available for the metal part of the sleeve. Please contact us for details.

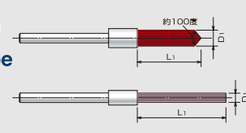
Tool Schematic

XEBEC Brush™ Surface



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

XEBEC Brush™ End type



[A11-EB06M、A21EB06M]

[A13-EB03M]

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.

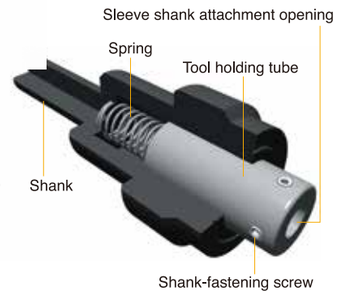
Features

●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 production management!
→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

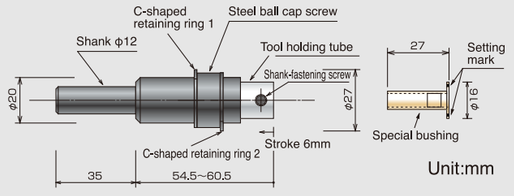


Tool Schematic/Lineup

Straight Shank

＜For ϕ6-ϕ40 brush＞

FH-ST12



Unit:mm

Product code	Workable shank diameter	Supporting brush diameter	Floating stroke	Spring load		Maximum rotation speed
FH-ST12	ϕ6mm When equipped with included bush	ϕ6 ϕ15	6mm	Stroke 0mm	Approx 4.5N	5000min-1
	ϕ8mm	ϕ25 ϕ40		Stroke 6mm	Approx 6.3N	

※ FH-ST12 comes with a high-pressure spring, low-pressure spring, and ϕ6 bushing.
A bush is included with your purchase. Please contact us for information about the ϕ3 shank

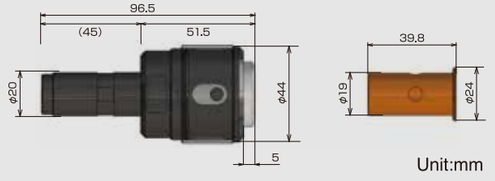
＜FH-ST12 spring load＞

You can change the spring depending upon the processing quality and change the cutting pressure.The default settings are about 4.5N for 0 mm stroke and about 6.3N for 6 mm stroke.

Spring type		Spring load	
		Stroke 0mm	Stroke 6mm
Installed	Standard load	Approx4.5N(0.45kgf)	Approx6.3N(0.63kgf)
Attachment	Low pressure	Approx1.5N(0.15kgf)	Approx3.3N(0.33kgf)
	High pressure	Approx7.2N(0.72kgf)	Approx10.5N(1.05kgf)

＜For ϕ60-ϕ100 brush＞

FH-ST20



Unit:mm

Product code	Supporting shank diameter	Supporting brush diameter	Floating stroke	Spring load (default setting)		Maximum rotation speed
New FH-ST20	ϕ12 mm When equipped with included bush	ϕ60	6mm	Stroke 0mm	Approx 2N	6000min-1
	ϕ16 mm	ϕ100		Stroke 6mm	Approx 6N	

※FH-ST20 comes with a ϕ20 bushing
※If the tool length is problematic, we have a specialty short-length BT holder (tooling).
※The spring load can be adjusted within 2N to 6N for 0 mm strokes, and within 6N to 10N for 6 mm strokes.

BT Shank Type

FH-BT30

FH-BT40

Product code	Supporting model	Supporting shank diameter	Supporting brush diameter	Floating stroke	Spring load (default setting)	Length under gauge line
FH-BT30	For BT30	ϕ8mm When equipped with separately-sold ϕ6 bushing	ϕ40、ϕ25 Separately-sold ϕ6 bushing : ϕ15、ϕ6	6mm	The spring load can be adjusted within 2N to 6N for 0 mm strokes, and within 6N to 10N for 6 mm strokes.	75mm
FH-BT40	For BT40					80mm

The spring load can be adjusted within 2N to 6N for 0 mm strokes, and within 6N to 10N for 6 mm strokes.
The load can be adjusted with a hexagonal wrench.
※Please contact us for BT50 and HSK shank. ※Please contact us for ϕ3 shank.

Notes for Use

- Attach the sleeve (brush) to the XEBEC float holder and tighten the shank fixing screw
- By pressing the brush onto the workpiece surface, the spring inside the XEBEC float holder is compressed, and force is applied to the work.

For effective use

Method of avoiding edge rounding when using a float holder

Step1

Approach work from above without rotating

Cut to the set value (spring compression)

Step 2

Rotate brush and begin feeding.

Stop rotation and feed at the endpoint

Step 3

Away from the work surface

※Effective when the set brush area is greater than half

XEBEC Brush Length Adjustment Tool™

Specially designed jig for XEBEC Brush™

Allows quick in-machine brush adjustment for XEBEC Brush™ Surface(Cup type)
Reduce the setup time.

- No need to remove - No need to scale - Speed setting
- Ideal for use in mass production lines

Product code	XP-EZ-001
Product name	XEBEC Brush Length Adjustment Tool™
Corresponding XEBEC Brush diameter	"XEBEC BrushTM Surface (Cup type)"ϕ15~ϕ100
Built-in hexagonal wrench size	2.0mm 1.5mm

※This is not designed for ϕ6mm brush.

Precautions for use

XEBEC Brush™ Surface

[Maximum Rotation Speed]
- Maximum Rotation Speed(ϕ100mm:1200min^{-1}ϕ60,2000min^{-1}, ϕ40mm:3000min^{-1},ϕ25mm:5000min^{-1},ϕ15mm:6000min^{-1}, ϕ6mm:10000min^{-1},End type:12000min^{-1}
  ϕ3 pink brush: Use at or below 6000min^{-1}
- Usage over the maximum rotation speed is dangerous and may result in breakage.

[Depth of Cut, Grinding Load]
- Usage under excessive depth of cut or grind load may not result in the desired results, as well as shortened brush life caused by pronounced wear and breakage of the fine ceramic fiber rods.
- Processing is the most effective using the tips of the ceramic fiber rod. For the depth of cut, use 0.5mm to 1.0mm as a guideline, up to 1.5mm.Depth of cut should not be exceeding 1mm when polishing flat surface with end type brush.

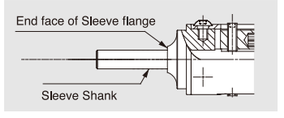
[Ceramic Fiber Rods Projection Adjustment]
- Attaching a sleeve (an external cylinder) to the perimeter of the brush allows for the projection of the ceramic fiber rods to be adjusted for fine-tuning flexibility and trackability.
  Longer projection increases trackability and flexibility, while shorter projection decreases them. However, please keep projection range under 20mm for ϕ100, ϕ60, ϕ40 and ϕ25, under 15mm for ϕ15, and under 10mm for ϕ6.Usage beyond the projection range may result in damage to the brush.

[Bristle Length]
- With usage over time, the overall length of the ceramic fiber rods (bristle length) may shorten, resulting in more grinding power but less easy to fit; please adjust the grind and fit by dropping the rotation speed and depth of cut.

[Truing / Dressing]
- If the brush deforms through usage, please stick some polishing paper onto a board and gently rub onto the tip to adjust the form of the brush. Please do the same for the dressing as well.

[Dry / Wet Processing]
- The brush can be used for both dry and wet processing, but please use a dust collecting device to collect the dust that is produced during dry processing.

[Using with CNC machines]
- When using on high-precision processing equipment, the abrasive powder may adversely affect the sliding parts, so please be sure to collect any dust and keep clean the equipment.



- Please securely install the brush into the chuck (collet chuck, Floating Holder etc.) of the machines with inserting the sleeve shank into the chuck of the machine.
  Confirm no clearance between the end face of sleeve flange and the chuck.If the installation is not perfect, the sleeve shank may be broken by the vibration during processing.
- The brush can be used with the machine that can control revolutions and depth of cut.

[Pre-operation Inspection]
- Conduct a test run for 1 minute or more before starting the operation and 3 minutes or more after changing a tool to confirm if there is any abnormality including vibration of the sleeve, looseness of the brush axis joint, or looseness of the adjusting screw for the projection of the fiber rods.
- Even if there is no abnormal condition observed in the test run, stop the use immediately in case any abnormality, such as vibration, is observed while using the tool.Brush or sleeve shank may crack, distort or break and dangerous.

XEBEC Floating Holder™

[Rotation speed]
- Use at or below 5000min^{-1}Choose the ideal rotation speed carefully after reading the Instruction Manual for XEBEC Brush™Surface.

[Supporting models]
- This is optional tool for XEBEC Brush™ Surface.
  Supporting brush size vary depending on product code.Please refer to pg18-19 for supporting models

[Cutting Load, Floating Stroke]
- The weight of the tool itself affects the cutting load, depending on the tool direction in processing.
- The floating stroke is 6 mm at the maximum.

[Dry / Wet Processing]
- Use a dust collecting device to collect the dust that is produced during dry processing.During wet processing, make sure that the holder is not exposed to the coolant.If the dust or coolant gets inside the holder, the floating function will not work.

[Using with CNC machines]
- When attaching the floating holder to a machining center, do not use a pull bolt with through-hole(center through pull bolt).If the coolant gets inside the holder, the floating portion will not operate.
- Using on horizontal machining center, it may not function when spring load is low. Please check operation before in use.
  Use a spring load heavier or an attached spring that has heavier load.

[Pre-operation Inspection]
- When mounting tool on the machine, insert the shank all the way to the bottom of the chuck, then secure it tightly. In mounting the XEBEC Brush ™Surface, insert the shank all the way into the tool holding tube, and secure it tightly with shank-fastening screw.
- Conduct a test run for 1 minute or more before starting the operation and 3 minutes or more after changing a tool to confirm if there is any abnormality including vibration of the sleeve, looseness of the brush axis joint, or looseness of the adjusting screw for the projection of the fiber rods.The sleeve shank may drop off, distort, or break and dangerous.

Operator Safety Measures

[For Protective Equipment]
- Always wear protective goggles, gloves and masks when operating the tool.Wear long sleeves, tight cuff, and clothing to minimize skin exposure.

[Beware of Grinding Powder]
- Grinding powder and burrs may scatter within an area around the work as the brush revolves; please stay clear of this area.

[Caution to Your Surroundings]
- The area around your work is hazardous in case flying pieces of fiber rods from the tools and grinding powder may scatter, enclose your working area to prevent other people entering, or have the people surrounding your work area protective equipment as well.

⚠ WARNING

Follow the precautions for use and safety measures for operators above without fail.If you fail to observe them, there are following risks.
- A tool or a part of a tool may crack, drop off, distort or break.
- Broken pieces of a tool or grinding dust may stick into your skin, or at worst stick into yours eyes, causing blindness.
- Dust generated by machining process may bring up skin irritancy or allergy.