

Cutting Fiber Lineup

Brush

Type	Product Code	Ceramic Fiber Rod	Diameter	Ceramic Fiber Rod Length	Corresponding Sleeve (Product Code)
Cup Brush	A13-CB15M	A13 (Pink)	φ 15mm	50mm	S15M/S15M-P
	A13-CB06M		φ 6mm	30mm	S06M
End Brush	A13-EB03M		φ 3mm	30mm	Sleeve unrequired
Cup Brush	A11-CB100M	A11 (Red)	φ 100mm	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/S15M-P
	A11-CB06M		φ 6mm	30mm	S06M
End Brush	A11-EB06M		φ 5mm	20mm	Sleeve unrequired
Cup Brush	A21-CB100M	A21 (White)	φ 100mm	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/S15M-P
	A21-CB06M		φ 6mm	30mm	S06M
End Brush	A21-EB06M		φ 5mm	20mm	Sleeve unrequired
Cup Brush	A31-CB100M	A31 (Blue)	φ 100mm	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/S15M-P
	A31-CB06M		φ 6mm	30mm	S06M

*Please be sure to use brush with sleeve.

*Ceramic fiber rod is implanted in a line on the outer perimeter(excluding A11-CB06M, A21-CB06M, A13-CB06M, A11-EB06M, A21-EB06M, A13-EB03M)

*Sleeve is not required for End Brush because brush and shank is connected together(all-in-one). Shank diameter is φ 3mm.

Sleeve

Type	Product Code	Axis Core Diameter	Sleeve External Diameter	Full Length(Incl Axis)	Axis length	Corresponding Brush(Product Code)
for φ 100mm	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	φ 6mm	φ 18mm	90mm	30mm	A11/A21/A31/A13-CB15M
	S15M-P	φ 6mm	φ 19mm	90mm	30mm	A11/A21/A31/A13-CB15M
for φ 6mm	S06M	φ 6mm	φ 10mm	70mm	30mm	A11/A21/A31/A13-CB06M

*Please use the genuine screw for adjusting the projection of the brush length.

*Specifications may be subject to change without notice.

*S15M-P, external cylinder is made of plastic to realize user-friendly price.

★ Floating Holder is available for Cutting Fiber to stabilize the cutting load.

<Precautions In Use>

[Maximum Revolutions]

- Please use within the range of maximum revolutions (φ 100: under 1200 min⁻¹, φ 60: under 2000 min⁻¹, φ 40: under 3000 min⁻¹, φ 25: under 5000 min⁻¹, φ 15: under 6000 min⁻¹, φ 6: under 10000 min⁻¹)
- Usage over the maximum revolutions is dangerous because it may result in breakage.

[Depth of cut, Grinding Load]

- Usage under excessive depth of cut or grind load may result in undesired finishing, as well as shortened tool life caused by pronounced wear and breakage of 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.

[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 φ 100, φ 60, φ 40 and φ 25, under 15mm for φ 15, and under 10mm for φ 6. 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 revolutions and depth of cut.

[Dry/Wet Processing]

- The brush can be used for both dry and wet processing. Please use a dust collecting device to collect dust produced during dry processing.

<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.

[Pre-operation inspection]

- When mounting on machines, insert the shank end all the way to the bottom of the chuck, and secure it tightly. Stop the tool immediately if you find anything unusual such as vibration; dangerous head or shaft breakage, deformation or even tool breakdown may occur.

[Beware of Grinding Powder]

- Grinding powder and burrs may scatter within an area around the work as the tools revolve; please stay clear of this area. When using on high-precision equipment, the abrasive powder may adversely affect the sliding parts, so please be sure to collect any dust and keep clean the equipment.

[Caution to your surroundings]

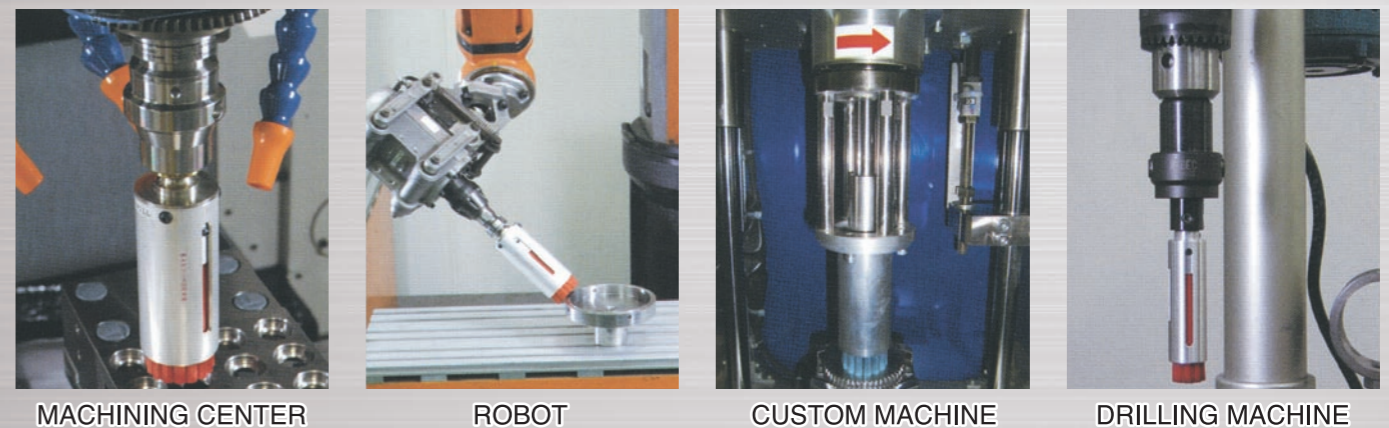
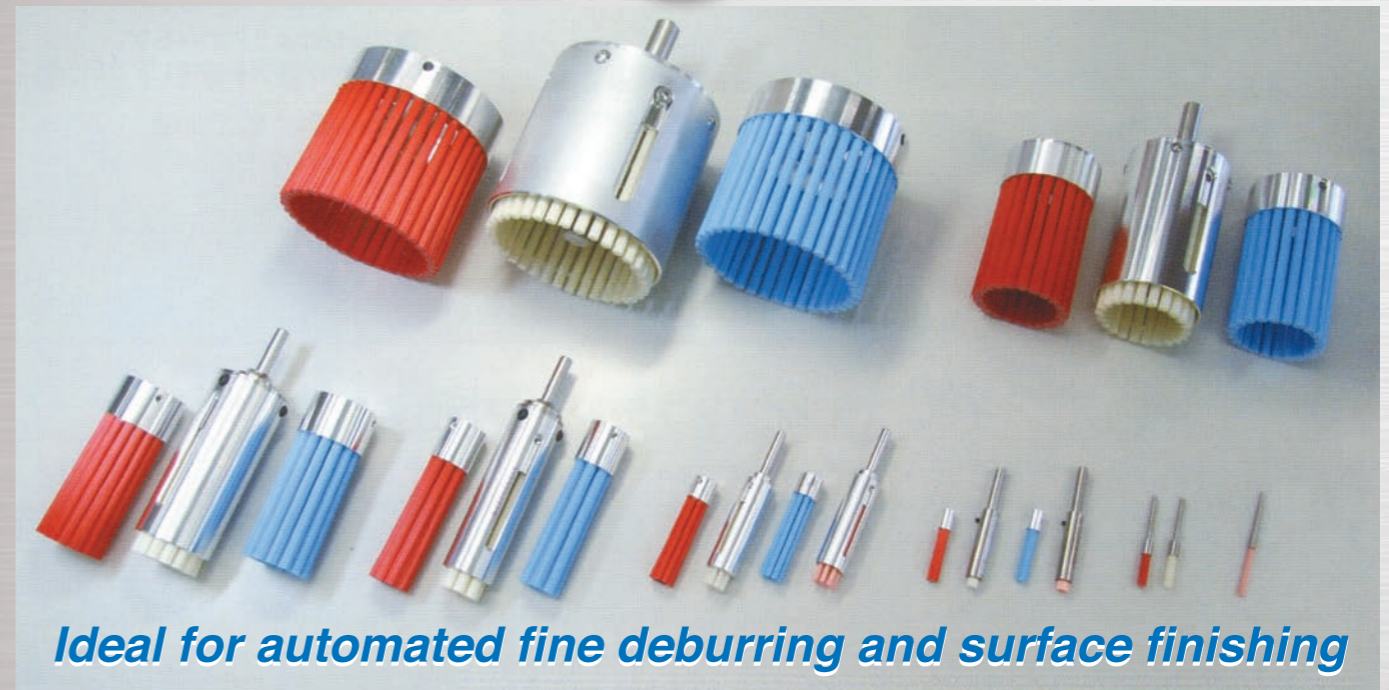
- The area around your work is hazardous in case flying pieces of fiber rods from the tools and grinding powder may scatter, enclose your working area to prevent other people entering, or have the people surrounding your work area protective equipment as well.

⚠ WARNING!

- Follow the precaution in 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 your eyes, causing blindness.
- Dust generated by machining process may bring up skin irritation or allergy.

Patented

Cutting Fiber



**No Abrasive Grains Used!
ONLY CERAMIC FIBER!!!**

Features

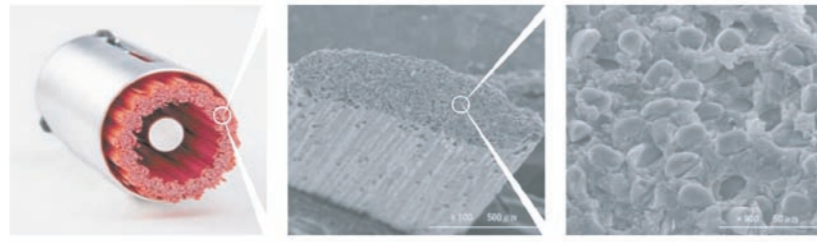
- *Suitable for use on machining centers, robots, custom machines and drilling machines-easy to automate.
- *Superior grinding performance thanks to the self-sharpening action of the cutting edge of the ceramic fiber rod tips. The continuous cutting edge provides stable grinding performance.
- *Superior grinding performance can be consistently achieved by establishing appropriate processing parameters.(Depth of cut and revolutions)
- *Can deburr and finish edges simultaneously.
- *Can improve surface roughness in a shorter time, thus shortening the finishing process.
- *Ideal for fine deburring and surface finishing of automotive parts, aircraft parts and machine parts.

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Ceramic Fiber Rods and Structure

1 Ceramic Fiber Rod in the Cutting Fiber Has 1000 Cutting Edges.

SEM Photograph of Ceramic Fiber Rod Tip



Extremely high grinding power

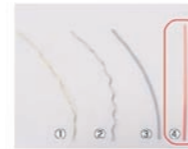
60 times higher grinding power of nylon brush. Burrs are completely removed.

Steady grinding performance to the end

Thanks to fiber structure, continuous cutting edges provide a stable and consistent grinding performance.

No deformation in use

With a feature of ceramic fiber material, it maintains its shape even after repeated use.



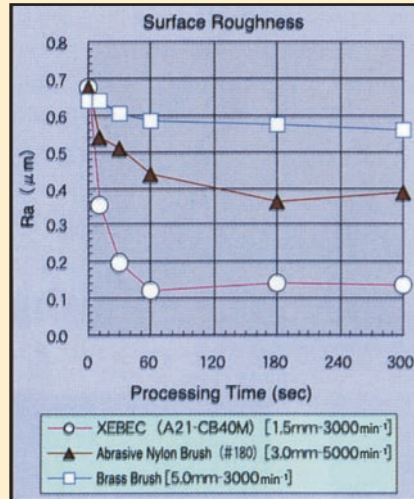
Comparison of Brush Shape after Use
 ① Brass brush
 ② Steel wire
 ③ Abrasive nylon brush
 ④ XEBEC ceramic fiber rod (A11:red)

One ceramic fiber rod is made by binding together 1,000 ceramic fiber, each only several μm in diameter. The tips on each of the 1,000 ceramic fibers are the cutting edges. The self-sharpening action of the cutting edge on the ceramic fiber rod tips provides superior grinding performance. Continuous cutting edges provide a stable and continuous grinding performance.

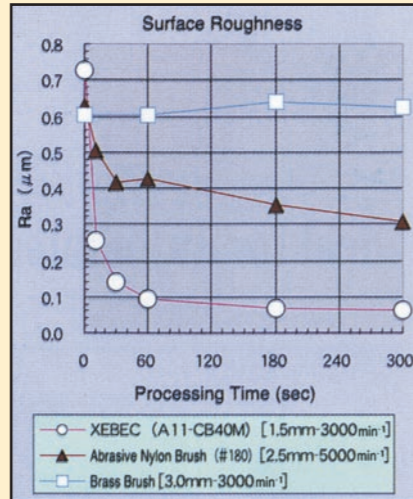
Grinding Performance

Grinding performance Comparison with Abrasive Nylon Brush and Brass Brush

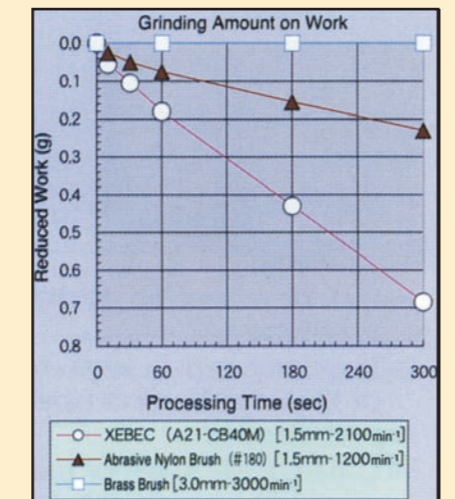
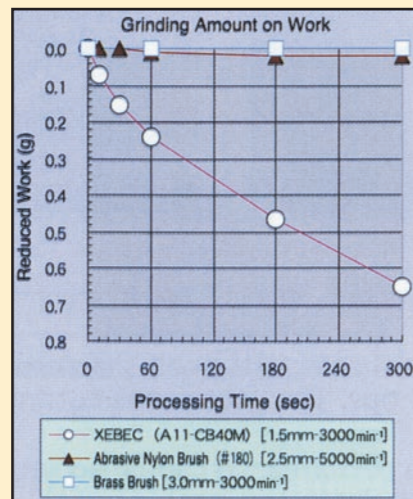
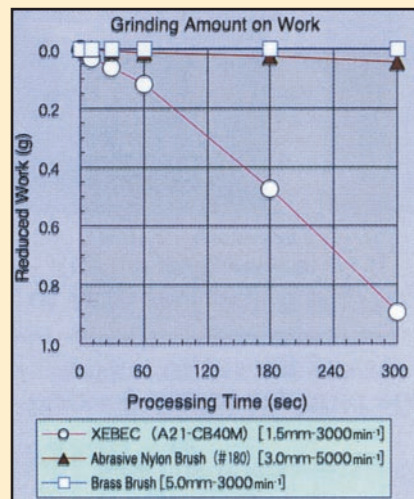
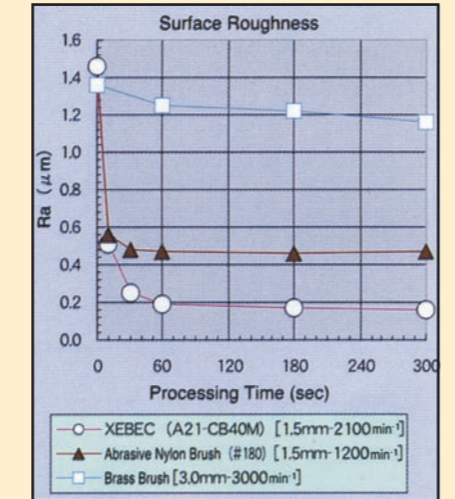
<Grinding Performance Comparison in SUS303(Dry)>



<Grinding Performance Comparison in S50C(Wet)>



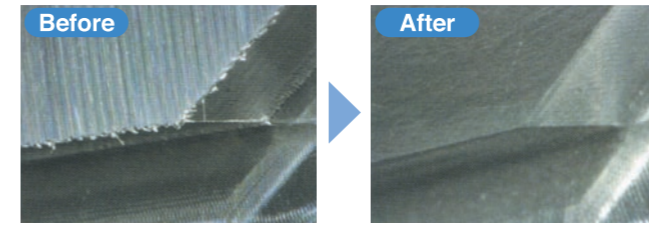
<Grinding Performance Comparison in Aluminum(Wet)>



(Note) ※ Abrasive Nylon Brush means Nylon brush with monofilaments including abrasive grains.
 ※ Legends show [Depth of cut(mm)and Revolutions(min⁻¹)].
 ※ Work Reduction can be controlled through processing conditions(Depth of cut and Revolutions).
 ※ The above data are comparisons based on setting up the most appropriate processing conditions for each tool.
 ※ Because this test was to examine the grinding performance on a flat work,the depth of cut is relatively large.

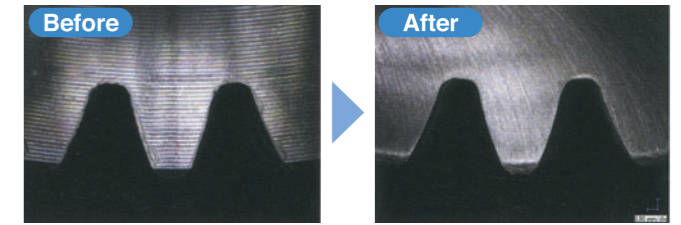
Applications

Fine Deburring after Surface Grinding



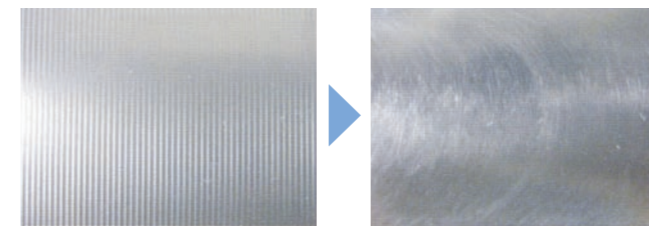
Workpiece/ Plate Material/ SPH440
 Processing Details/ Fine deburring the edges of the cut area on the plate

Fine Deburring after Gear Cutting



Workpiece/ Ring-Shaped Internal Gear Material/ Carbon steel
 Processing Details/ Fine deburring after NC lathing

Tool Marks Removing after Ball-end Milling



Material/ Ti-6Al-4V
 Processing Details/ After endmilling: Rmax28.3 μm
 →After 8 passes of Brush: Rmax2.2 μm

End Brush Applications



Tapered hole deburring

Surface polishing

For Better Use

Target of Cutting Fiber

Targeted burr size Around 0.1mm thickness

Targeted material Aluminum, steel, cast iron, titanium etc. up to HRC 57 and plastic

Processing Condition (Recommended Initial Parameters)

Revolutions

80% of the maximum Revolutions
 ※Refer to maximum Revolutions

ϕ 100mm: 1200min⁻¹ ϕ 60mm: 2000min⁻¹
 ϕ 40mm: 3000min⁻¹ ϕ 25mm: 5000min⁻¹
 ϕ 15mm: 6000min⁻¹ ϕ 6mm: 10000min⁻¹

Depth of Cut (Pushing amount from the surface)



※ No grinding power on the side of brush.

Feed Rate

F4000 when burr thickness is less than 0.1mm*1, F2500 when more than 0.1mm*2
 *1 Burr can be bent by fingernail *2 Burr can not be bent by fingernail

Brush Projection

Brush diameter ϕ 100mm~ ϕ 25mm : 15mm
 ϕ 15mm : 10mm ϕ 6mm : 5mm

Dry/Wet Processing

The brush can be used both for dry and wet processing, but grinding power in wet is slightly higher than in dry.
 After testing with recommended initial parameters, find best parameters.

If remaining burrs, increase revolutions to the maximum.
 If burrs gone and edge chamfered too much, decrease revolutions.(60% of the maximum)

Cutting Fiber Selection

Choose a brush by material and last machining step.

