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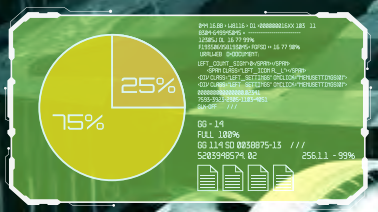
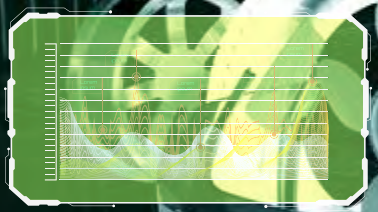
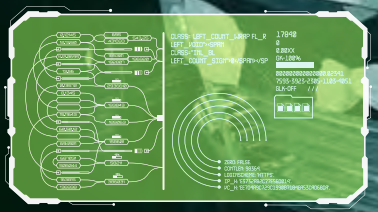
deburringtechnologies.com

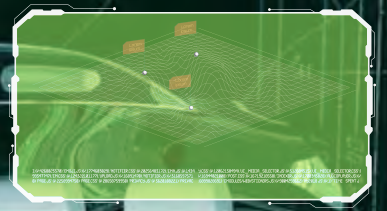
Advanced Manufacturing Solutions

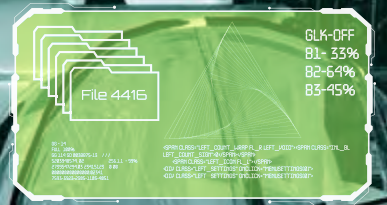
Powertrain











DEBURRING & FINISHING

- Cross Holes
- Finishing & Polishing
- Cutter Mark Removal
- Edge Break

Advanced Manufacturing Solutions

Powertrain

deburringtechnologies.com

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DEBURRING & FINISHING

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Getting your engines running

Demand for new, fuel-efficient engines and innovative motors is driving the need for newly designed components. A part's shape, weight and finish must be precisely calculated to meet new higher standards for performance. But not all manufacturers are prepared to produce these parts efficiently.

Today's challenges are accelerating an evolution in manufacturing processes

A new generation of engineers has risen to the challenge. Designing new technologies and innovative manufacturing methods - they are setting new standards of efficiency. Their ingenuity will increase production despite skilled labor shortages. Encouraging manufacturers to invest in machines that equip them to handle the surge in demand for new powertrain technologies.

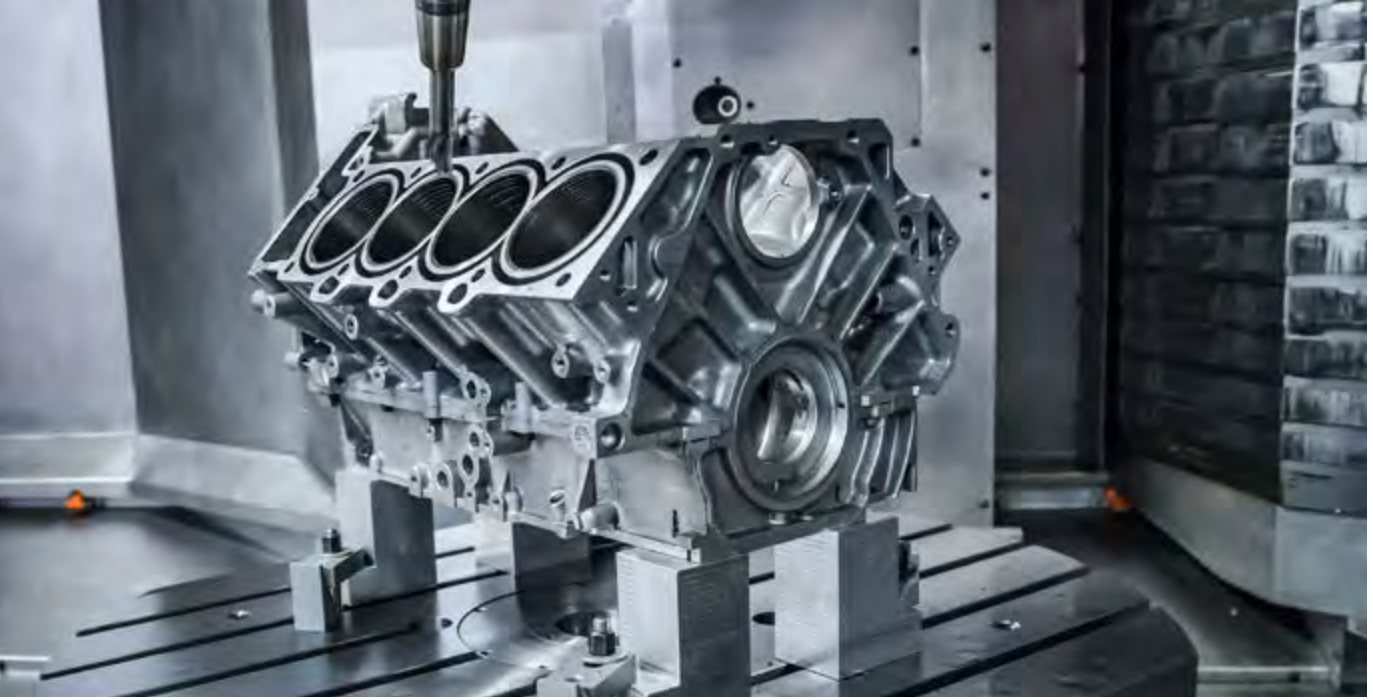
Driving the pressure

The current demand for engine and motor production is accelerating, with no signs of letting up. It may feel like you can't produce parts fast enough. This can add increased pressure to process engineers to develop new systems that speed up production. So, how do you increase volume without sacrificing quality?

Are you equipped to meet your production goals?

Engineering solutions

Innovations in automated deburring and finishing can make a huge impact on productivity by allowing precious labor hours to be allocated elsewhere. While improved quality and the elimination of scrap provide the savings needed to reinvest in modern tools and equipment.



Quality over quantity - Do you have to choose?

Product quality is of particular concern in powertrain manufacturing. So, engineers are rightly cautious about introducing new or unfamiliar finishing processes. But, it is becoming increasingly obvious that the old-fashioned methods of manual deburring are a burden to production time.

Finish precision parts on the machine

The perfect fit for tight tolerances

The manufacturing and finishing techniques of the future are automated. And many of the tolerances are too tight to be achieved by hand. Which means you must rise to meet the growing demand for your components by automating the finishing process - cutting production time, and ensuring consistent quality in your operations.

DOWNLOAD THE PDF:
Powertrain Industry Use Case Study

Labor hours for manual deburring can be better spent elsewhere

Often, there is untapped potential within manufacturers' ranks. You can provide employees opportunities to gain new skills, certifications and degrees so they can move up or change course as your company evolves structurally, technologically and otherwise.

READ THE FULL STORY ON OUR BLOG:
Upskilling to Overcome the Labor Shortage in Manufacturing

Upskill your team members to fill vital roles and prepare them for a role in your company's future

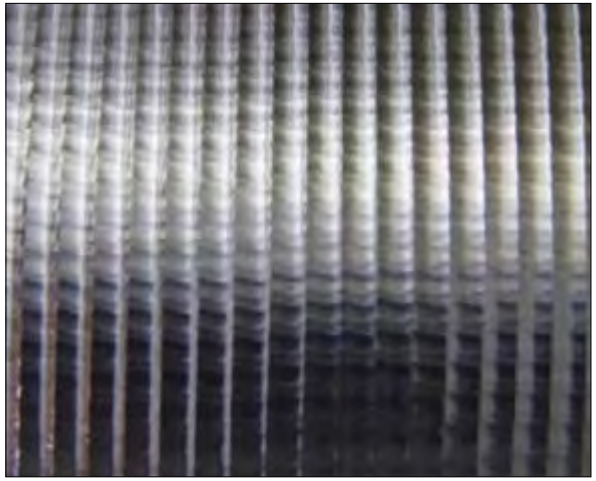
Achieving a mirror finish

What is considered a mirror finish?
Usually about 1 to 12 Ra (microinches)

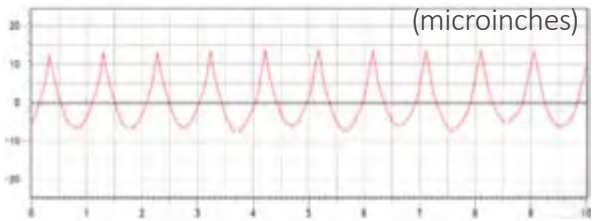
Xebec brushes cannot typically achieve a mirror finish on their own. But using them before polishing will drastically reduce surface roughness and cut polishing time to a minimum.

Use Xebec Brushes to remove cutter marks and prepare the surface for polishing

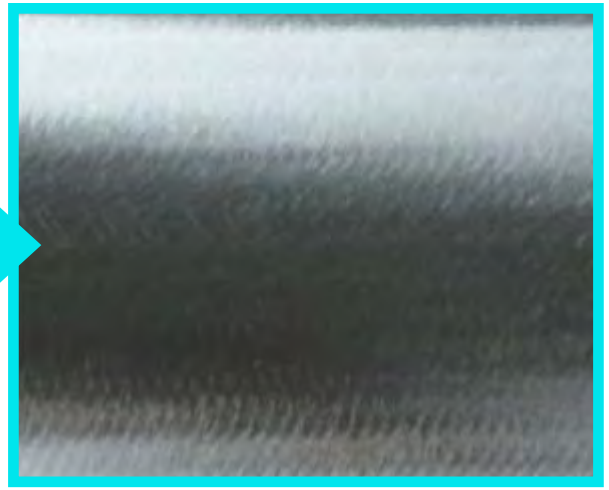
BEFORE



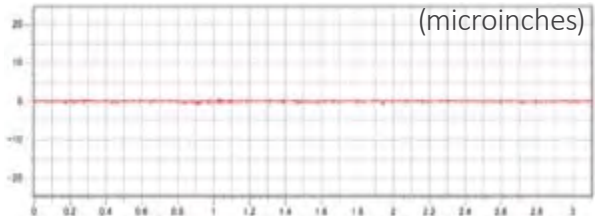
SURFACE ROUGHNESS: **193 Ra** (microinches)



AFTER



SURFACE ROUGHNESS: **6.25 Ra** (microinches)

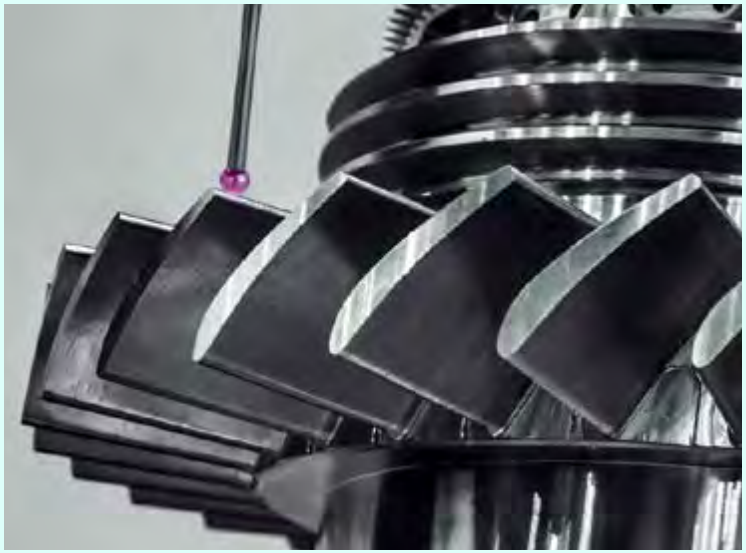


Cutter mark removal and surface finishing

Xebec Brush can typically achieve 4 to 10 Ra (microinches) - depending on the material. Initial processing can improve finish by approximately 1/2 per pass with Xebec Brush in a machine. Properly preparing the surface before the polishing process will keep production time to a minimum and improve finish quality and consistency.

MORE POLISHING EXAMPLES:
Initial processing with Xebec Brushes to achieve a mirror finish in less time

In one example, Xebec Brush shortened polishing time from 60 min to 1.5 min



Inconsistencies in manual deburring can result in rework and scrapped parts

When working with complex and intricate products that require tight tolerances, precision is make-or-break. You can't afford to scrap a nearly completed part because a slip of the hand altered the edge break or a distracted laborer over-worked a radius.

In reality, a clean edge break simply can't be consistently achieved manually. Scrapping an expensive part in the deburring stage can cause backups across the board.

Eliminate rework and scrapped parts by modernizing your deburring operations

READ THE FULL STORY ON OUR BLOG:
5 Lean Manufacturing Challenges to Meet with Xebec Deburring Solutions

Use Xebec Brush™ in a robotic arm for fast, consistent finishing

Innovations in automated manufacturing technologies

New technologies for machining and deburring can provide incredible time savings, in the speed of production, and the elimination of rework or scrapped parts. These technologies also provide the security of quality consistency. Because sacrificing quality is not an option.

Modernization of your deburring operations can equal enormous savings and productivity gains. It is the most efficient way to help your team meet the most demanding of productivity goals.

READ THE FULL STORY ON OUR BLOG:
How Xebec Deburring Products Help Manufacturers Conquer Today's Challenges

IMPROVING QUALITY

Xebec products safely achieve outstanding repeatable part quality to meet the most demanding industry standards.

INCREASING PRODUCTIVITY

Innovative products for a wide range of manufacturing processes & products that decrease processing time and increase throughput.

REDUCING COSTS

Longer tool life, faster processes and lower scrap levels equals the greatest value, resulting in lowest cost per piece.

Cam Cap

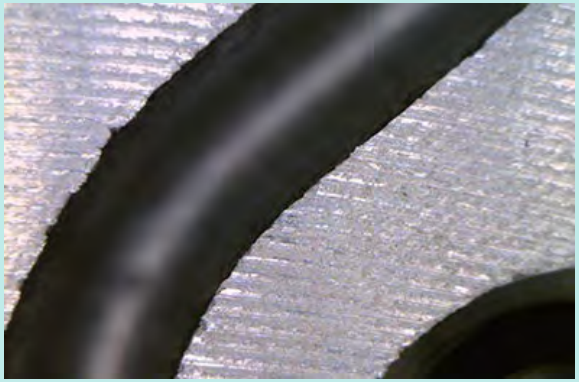
Workpiece information

Industry	Automotvie
Part name	Cam cap
Material type	ADC12
Cutting process	Front cutter processing

Processing conditions

Tool	XEBEC Brush for surface (A11-CB40M)
Processing detail	Deburring the matching surface after face milling process.
Spindle Speed (min^{-1})	1,350
Table Feed (mm/min)	2,000
Depth of cut (mm)	0.5

Before



Tool	Abrasive-impregnated nylon brush
Problem	Burrs remained due to insufficient grinding force of nylon brushes and additional manual deburring process required.

After

Tool	XEBEC Brush for Surface (A11-CB40M)
Result	Stable and efficient deburring realized by fully automated deburring with machining centers.

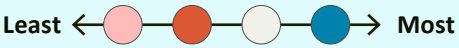
LEARN MORE ABOUT
XEBEC Brush™ Surface

TOOL XEBEC Brush™ Surface

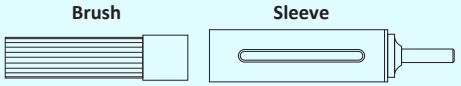
Available in Diameters:
6, 15, 25, 40, 60, 100 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:



XEBEC Brush™ Surface

Ideal for:

- **Surface Deburring**
- **Cutter Mark Removal**
- **Edge Radius**
- **Surface Finishing**
- **Polishing**

Deburring & finishing following face-milling, end-milling & drilling.

Cam Shaft

Workpiece information

Industry	Automotive
Part name	Camshaft
Material type	FCD
Cutting process	Drilling

Processing conditions

Tool	XEBEC Back Burr Cutter and Path (XC-38-A)
Processing detail	Back deburring after drilling
Spindle Speed (min^{-1})	9,000
Table Feed (mm/min)	1,000
Depth of cut (mm)	0.25
Machining time (sec)	—

Before

Tool — Spring-type back deburring tools

Problem — Uneven edge resulted in over-deburring or incomplete deburring.

After

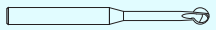
Tool — XEBEC Back Burr Cutter and Path (XC-38-A)

Result — Uniform edge quality in shorter operating time realized.

LEARN MORE ABOUT
XEBEC™ Back Burr Cutter & Path

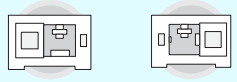
TOOL XEBEC™ Back Burr Cutter & Path

Spherical Cutting Tool



Custom Path Data

The tool can be mounted on machining center (XYZ-axis) or combined lathe (XZY or XZC-axis). 3-axis simultaneous control is required.



Machining Center | Combined Lathe

XEBEC™ Back Burr Cutter & Path

Ideal for:

- **Deburring Difficult Holes**
- **Inner and Outer Diameters**
- **Irregular, Off-Center Holes**

One Cutter size supports various edges in different sizes and shapes.

Carrier

Workpiece information

Industry	Automotive
Part name	Carrier
Material type	Press
Cutting process	Drilling

Processing conditions

Tool	XEBEC Stone Flexible Shaft (CH-PM6B)
Processing detail	Cross hole deburring after drilling process
Spindle Speed (min^{-1})	9,000
Table Feed (mm/min)	—
Depth of cut (mm)	0.5
Machining time (sec)	—

Before

Tool — Rotary bar and rotating tool

Problem — Rotary bar used with rotary tool is used for processing. Edge shape damaged and secondary burr (back burr) generated.

After

Tool — XEBEC Stone Flexible Shaft (CH-PM6B)

Result — Stable edge shape realized without generating the secondary burr.

LEARN MORE ABOUT
XEBEC Stone™ Flexible Shaft

TOOL XEBEC Stone™ Flexiblte Shaft

Head Styles:
Cylinder Sphere

Available in Diameters:
3, 4, 5, 6, 10 mm

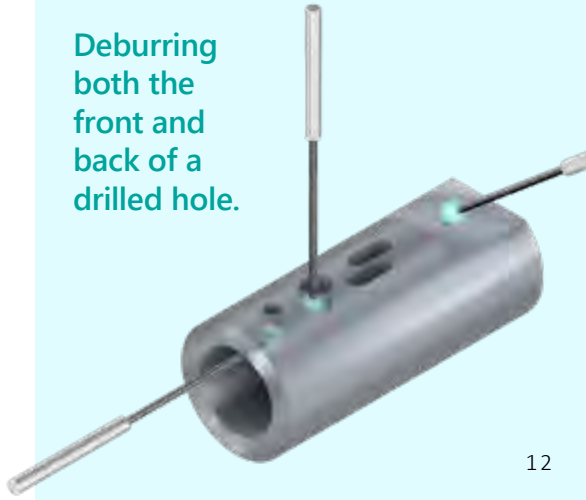
Stone color and grit:
Blue #800 Orange #400 Gray #220

XEBEC Stone™ Flexible Shaft

Ideal for:
- Deburring Cross Holes
- Soft Contact
- Suppresses Vibrations

Available styles:
- Extended Flexible Shaft
- Cylinder or Sphere Heads

Deburring both the front and back of a drilled hole.



Common Rail

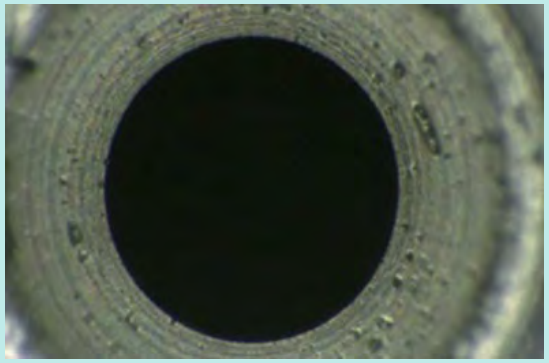
Workpiece information

Industry	Automotive
Part name	Common rail
Material type	S48C
Cutting process	Grinding

Processing conditions

Tool	XEBEC Brush Surface (A21-CB25M) XEBEC Floating Holder (FH-ST12)
Processing detail	Deburring the seal surface after grinding process
Spindle Speed (min^{-1})	3,000
Depth of cut (mm)	4

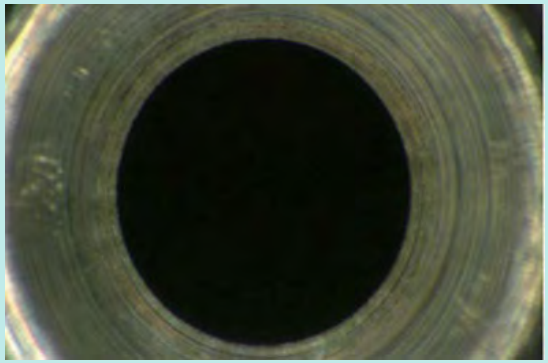
Before



Tool: Sandpaper

Problem: Low production rate due to unstable surface roughness. Short tool life of sandpaper caused a cost problem.

After



Tool: XEBEC Brush for Surface (A21-CB25M)
XEBEC Floating Holder (FH-ST12)

Result: Required surface roughness realized in shorter cycle time. Reduction of labor costs corresponding to 20 hours of manual deburring work with sandpaper has been achieved.

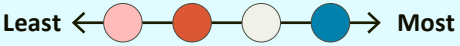
LEARN MORE ABOUT
XEBEC Brush™ Surface

TOOL XEBEC Brush™ Surface

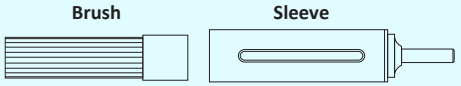
Available in Diameters:
6, 15, 25, 40, 60, 100 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:



XEBEC Brush™ Surface

Ideal for:

- **Surface Deburring**
- **Cutter Mark Removal**
- **Edge Radius**
- **Surface Finishing**
- **Polishing**

Deburring & finishing following face-milling, end-milling & drilling.

Connecting Rod Edge Face

Workpiece information

Industry	Automotive
Part name	Connecting rod (edge face)
Material type	S45C
Cutting process	Front cutter processing

Processing conditions

Tool	XEBEC Brush for Surface (A31-CB25M)
Processing detail	Deburring the edge face after milling process
Spindle Speed (min^{-1})	4,000
Table Feed (mm/min)	2,500
Depth of cut (mm)	1
Machining time (sec)	—

Before

Tool: Wire brush

Problem: Burrs remained. Brushes deformed and caused the quality control problem in mass production.

After

Tool: XEBEC Brush for Surface (A31-CB25M)

Result: Automated deburring with stable quality during production realized.

LEARN MORE ABOUT
XEBEC Brush™ Surface

TOOL XEBEC Brush™ Surface

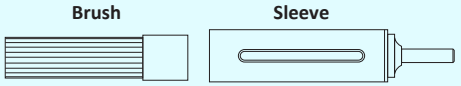
Available in Diameters:
6, 15, 25, 40, 60, 100 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:

Least ← → Most

Brush Requires Brush Sleeve to Operate:



XEBEC Brush™ Surface

Ideal for:

- **Surface Deburring**
- **Cutter Mark Removal**
- **Edge Radius**
- **Surface Finishing**
- **Polishing**

Deburring & finishing following face-milling, end-milling & drilling.

Connecting Rod Surface

Workpiece information

Industry	Automotive
Part name	Connecting rod (Matching surface)
Material type	S45C
Cutting process	Front cutter processing

Processing conditions

Tool	XEBEC Brush for Surface (A31-CB40M)
Processing detail	Deburring the matching surface after face milling process
Spindle Speed (min^{-1})	1,300
Table Feed (mm/min)	2,800
Depth of cut (mm)	0.4
Machining time (sec)	—

Before

Tool: Abrasive-impregnated nylon brush

Problem: Burrs remain after deburring by nylon brush due to low grinding power. Additional manual deburring required. Quality unstable and labor cost increased.

After

Tool: XEBEC Brush for Surface (A31-CB40M)

Result: No burrs left and deburring quality stabilized.

LEARN MORE ABOUT
XEBEC Brush™ Surface

TOOL XEBEC Brush™ Surface

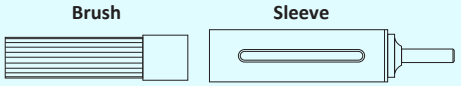
Available in Diameters:
6, 15, 25, 40, 60, 100 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:

Least ← → Most

Brush Requires Brush Sleeve to Operate:



XEBEC Brush™ Surface

Ideal for:

- **Surface Deburring**
- **Cutter Mark Removal**
- **Edge Radius**
- **Surface Finishing**
- **Polishing**

Deburring & finishing following face-milling, end-milling & drilling.

Control Box (Battery Box)

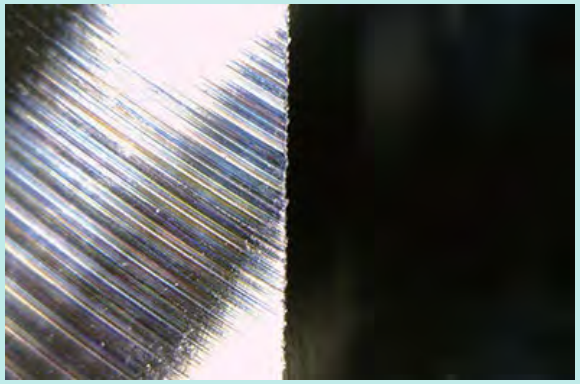
Workpiece information

Industry	Automotive
Part name	Control box
Material type	Aluminum alloy
Cutting process	Front cutter processing

Processing conditions

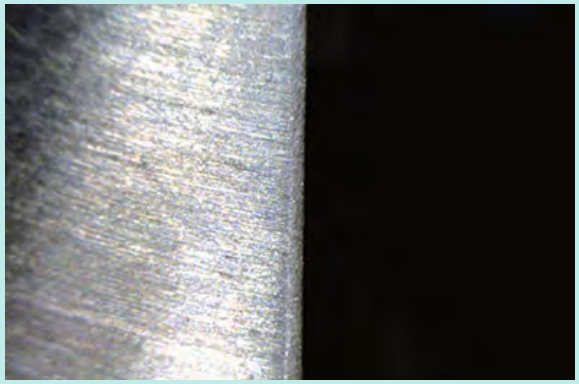
Tool	XEBEC Brush for Surface (A11-CB25M)
Processing detail	Deburring the edge face after milling process
Spindle Speed (min^{-1})	4,000
Table Feed (mm/min)	2,500
Depth of cut (mm)	1
Machining time (sec)	—

Before



Tool	Wire brush
Problem	Burr remains by wire brush due to low grinding power and additional manual deburring required.

After



Tool	XEBEC Brush for Surface (A11-CB25M)
Result	No burrs left. Productivity improved drastically.

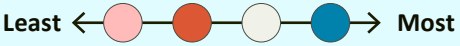
LEARN MORE ABOUT
XEBEC Brush™ Surface

TOOL XEBEC Brush™ Surface

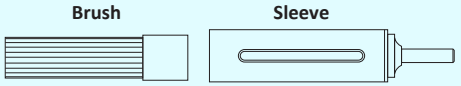
Available in Diameters:
6, 15, 25, 40, 60, 100 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:



XEBEC Brush™ Surface

Ideal for:

- **Surface Deburring**
- **Cutter Mark Removal**
- **Edge Radius**
- **Surface Finishing**
- **Polishing**

Deburring & finishing following face-milling, end-milling & drilling.

Cooling Fin

Workpiece information

Industry	Automotive
Part name	Cooling fin
Material type	Aluminum alloy
Cutting process	Others

Processing conditions

Tool	XEBEC Brush for Surface (A11-CB40M)
Processing detail	Deburring the edge after cutting process
Spindle Speed (min^{-1})	3,000
Table Feed (mm/min)	800
Depth of cut (mm)	1

Before

Tool: Wire brush

Problem: After deburring process, burrs remained due to complicated shape of workpiece.

After

Tool: XEBEC Brush Surface (A11-CB40M)

Result: No burrs left and finish quality improved.

LEARN MORE ABOUT
XEBEC Brush™ Surface

TOOL XEBEC Brush™ Surface

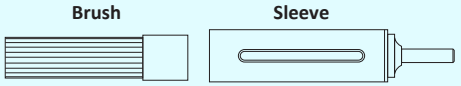
Available in Diameters:
6, 15, 25, 40, 60, 100 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:

Least ← → Most

Brush Requires Brush Sleeve to Operate:



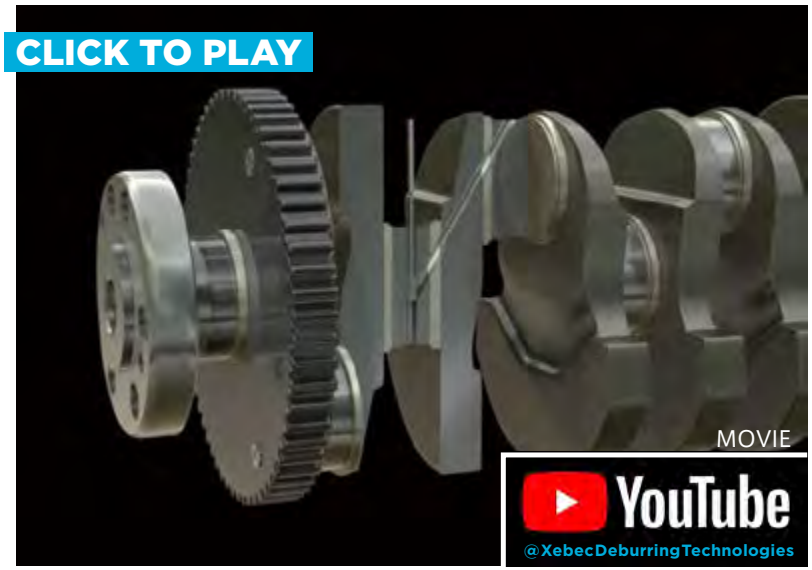
XEBEC Brush™ Surface

Ideal for:

- **Surface Deburring**
- **Cutter Mark Removal**
- **Edge Radius**
- **Surface Finishing**
- **Polishing**

Deburring & finishing following face-milling, end-milling & drilling.

Crankshaft Cross Hole



Workpiece information

Industry	Automotive
Part name	Crankshaft (Cross hole)
Material type	S48C
Cutting process	Drilling

Processing conditions

Tool	XEBEC Stone Flexible Shaft (CH-PM-5R-C01)
Processing detail	Cross-hole deburring after drilling process
Spindle Speed (min^{-1})	1,350
Table Feed (mm/min)	—
Depth of cut (mm)	0.5
Machining time (sec)	—

Before

Tool — Cutter

Problem — Burrs left by manual deburring. Caused low production rate.

After

Tool — XEBEC Stone Flexible Shaft (CH-PM-5R-C01)

Result — By introduction of automated deburring with machining center, stable edge quality and cost reduction realized.

TOOL XEBEC Stone™ Flexiblte Shaft

Head Styles:

Cylinder Sphere

Available in Diameters:
3, 4, 5, 6, 10 mm

Stone color and grit:

Blue #800 Orange #400 Gray #220

XEBEC Stone™ Flexible Shaft

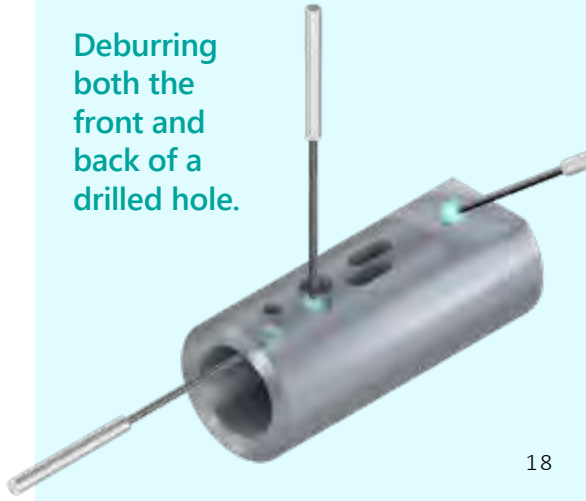
Ideal for:

- **Deburring Cross Holes**
- **Soft Contact**
- **Suppresses Vibrations**

Available styles:

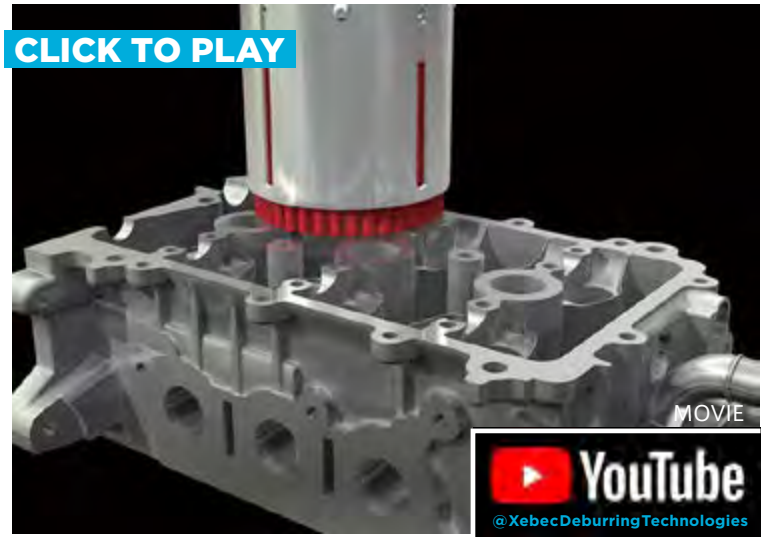
- **Extended Flexible Shaft**
- **Cylinder or Sphere Heads**

Deburring both the front and back of a drilled hole.



LEARN MORE ABOUT
XEBEC Stone™ Flexible Shaft

Cylinder Head Surface



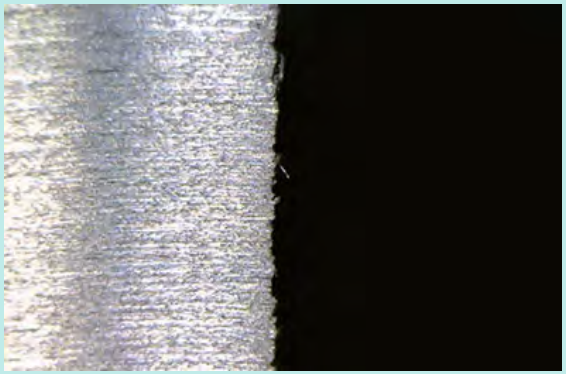
Workpiece information

Industry	Automotive
Part name	Cylinder head (Matching surface)
Material type	ADC12
Cutting process	Face milling processing

Processing conditions

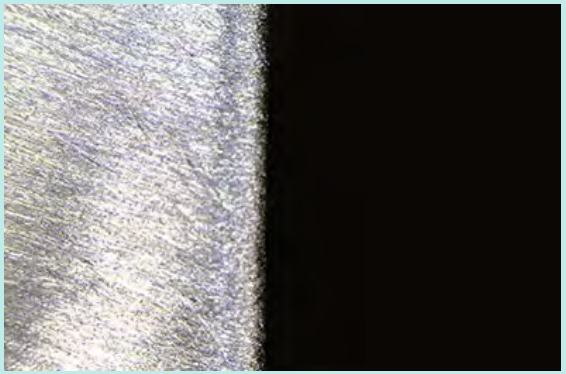
Tool	XEBEC Brush Surface (A11-CB100M)
Processing detail	Deburring of the matching surface after face milling process.
Spindle Speed (min^{-1})	1,350
Table Feed (mm/min)	2,000
Depth of cut (mm)	0.5
Machining time (sec)	—

Before



Tool	Abrasives-impregnated nylon brush
Problem	It took long hours for deburring and burrs still remained after processing due to low grinding power. Moreover, workpiece was stained by nylon brushes and man-hour is required for cleaning.

After



Tool	XEBEC Brush for Surface (A11-CB100M)
Result	Shorter cycle time was realized by high-feed processing. Coolant contamination was reduced to one third and man-hour for cleaning saved.

LEARN MORE ABOUT
XEBEC Brush™ Surface

TOOL XEBEC Brush™ Surface

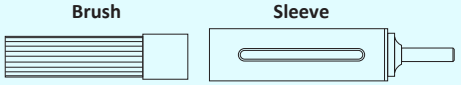
Available in Diameters:
6, 15, 25, 40, 60, 100 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:

Least ← → Most

Brush Requires Brush Sleeve to Operate:



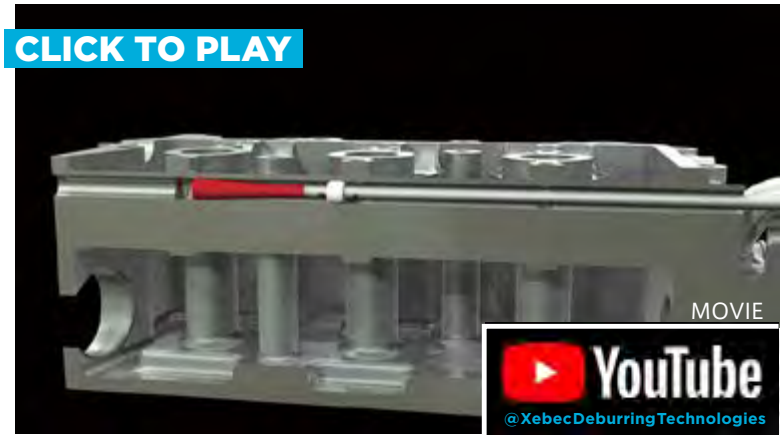
XEBEC Brush™ Surface

Ideal for:

- **Surface Deburring**
- **Cutter Mark Removal**
- **Edge Radius**
- **Surface Finishing**
- **Polishing**

Deburring & finishing following face-milling, end-milling & drilling.

Cylinder Head Oil Gallery



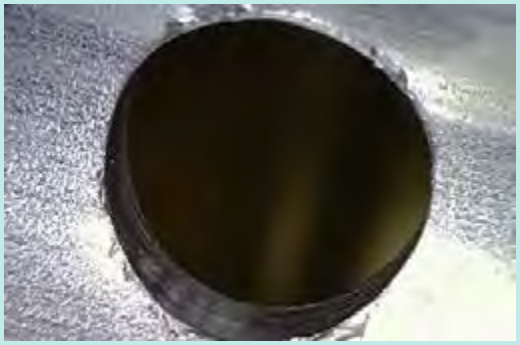
Workpiece information

Industry	Automotvie
Part name	Cylinder head (Oil gallery)
Material type	ADC12
Cutting process	Drilling

Processing conditions

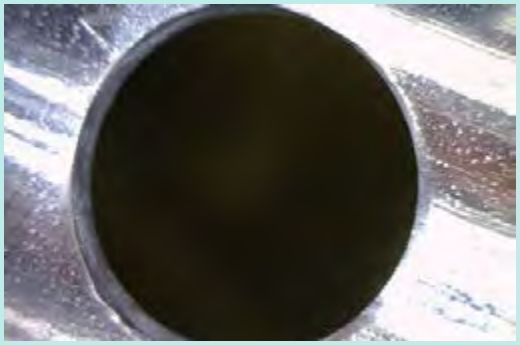
Tool	XEBEC Brush Crosshole Extra-Long (CH-A12-5F)
Processing detail	Cross hole deburring and internal polishing after drillng process
Spindle Speed (min^{-1})	7,200
Table Feed (mm/min)	2,000
Depth of cut (mm)	—

Before



Tool	Abrasive-impregnated nylon brush
Problem	Burrs were not removed completely. This caused the problem of quality inspection.

After



Tool	XEBEC Brush Cross hole Extra-Long (CH-A12-5F)
Result	Deburring and polishing quality stabilized.

LEARN MORE ABOUT
XEBEC Brush™ Crosshole

TOOL XEBEC Brush™ Crosshole

Available in Diameters:
1.5, 3, 5, 7, 11 mm

Available Colors (Aggressiveness):
Red, Blue

Aggressiveness indicated by Color:
Least ← → **Most**

Length
Standard and Extended Lengths

XEBEC Brush™ Crosshole

Ideal for:

- **Cross Hole Deburring**
- **Inner Walls of Cylinders**

Brush tip flares under centrifugal force to remove burrs along inner walls of the hole.

Exhaust Manifold

Workpiece information

Industry	Automotive
Part name	Exhaust manifold
Material type	AC4C
Cutting process	Front cutter processing

Processing conditions

Tool	XEBEC Brush for Surface (A21-CB60M)
Processing detail	Deburring of the matching surface after face milling process.
Spindle Speed (min^{-1})	1,000
Table Feed (mm/min)	2,000
Depth of cut (mm)	0.5

Before

Tool: File

Problem: It took time for manual deburring. This caused unstable quality.

After

Tool: XEBEC Brush for Surface (A21-CB60M)

Result: Automated deburring with stable quality in a shorter cycle time realized.

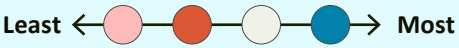
LEARN MORE ABOUT
XEBEC Brush™ Surface

TOOL XEBEC Brush™ Surface

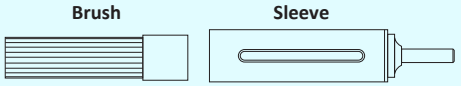
Available in Diameters:
6, 15, 25, 40, 60, 100 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:



XEBEC Brush™ Surface

Ideal for:

- **Surface Deburring**
- **Cutter Mark Removal**
- **Edge Radius**
- **Surface Finishing**
- **Polishing**

Deburring & finishing following face-milling, end-milling & drilling.

Flange Mounting Hole

Workpiece information

Industry	Automotive
Part name	Flange (Mounting hole)
Material type	Aluminum
Cutting process	Drilling

Processing conditions

Tool	XEBEC Back Burr Cutter and Path (XC-38-A)
Processing detail	Back deburring after drilling
Spindle Speed (min^{-1})	6,000
Table Feed (mm/min)	900
Machining time (sec)	—

Before

Tool: Curved bearing scraper

Problem: CNC deburring was not possible due to an off-centered edge. It was not possible to make a path data by users. Manual deburring was time-consuming because no scratch was allowed on a certain part of workpiece.

After

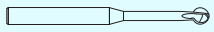
Tool: XEBEC Back Burr Cutter and Path (XC-38-A)

Result: Edge quality improved by CNC deburring. Defective products caused by scratches eliminated.

LEARN MORE ABOUT
XEBEC™ Back Burr Cutter & Path

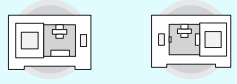
TOOL XEBEC™ Back Burr Cutter & Path

Spherical Cutting Tool



Custom Path Data

The tool can be mounted on machining center (XYZ-axis) or combined lathe (XZY or XZC-axis). 3-axis simultaneous control is required.



Machining Center | Combined Lathe

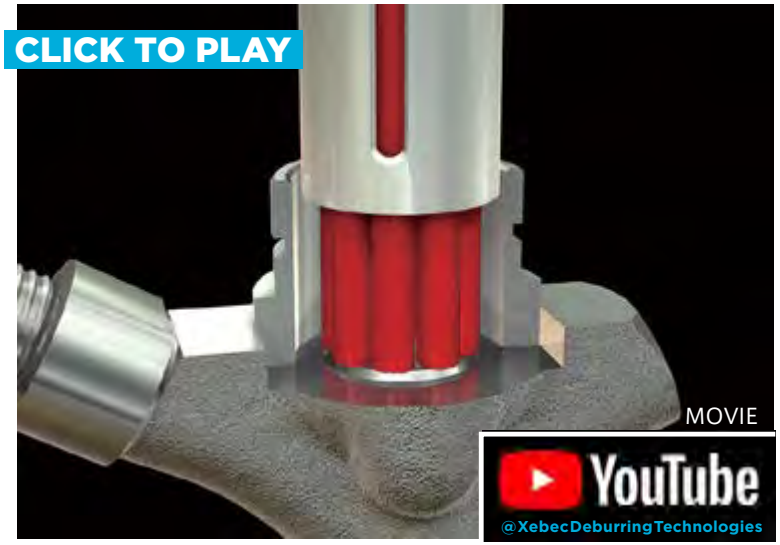
XEBEC™ Back Burr Cutter & Path

Ideal for:

- **Deburring Difficult Holes**
- **Inner and Outer Diameters**
- **Irregular, Off-Center Holes**

One Cutter size supports various edges in different sizes and shapes.

Injector Body Nozzle



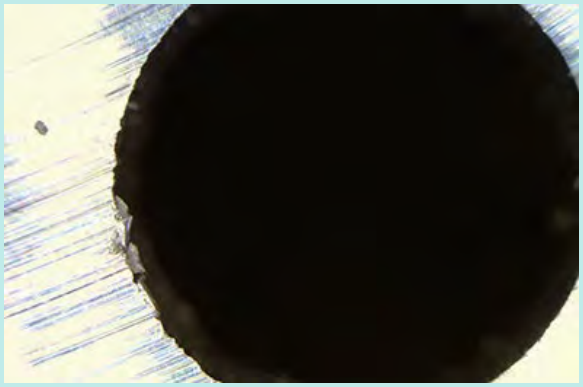
Workpiece information

Industry	Automotive
Part name	Injector body (Nozzles)
Material type	SCM
Cutting process	Drilling

Processing conditions

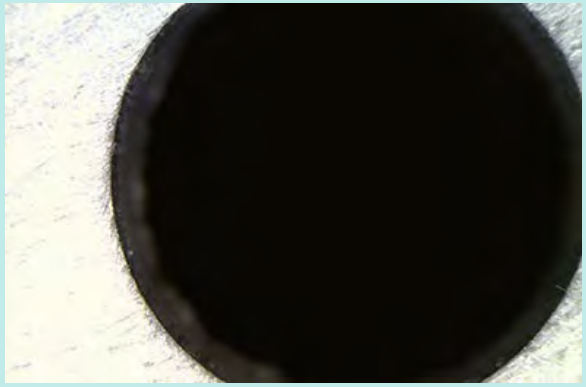
Tool	XEBEC Brush Surface (A11-CB15M) XEBEC Floating Holder (FH-ST12)
Processing detail	Deburring the edge face after drilling process
Spindle Speed (min^{-1})	2000
Depth of cut (mm)	4

Before



Tool	Abrasive-impregnated nylon brush
Problem	Burrs remained and full inspection required, resulting in high labor cost.

After



Tool	XEBEC Brush for Surface (A11-CB15M), XEBEC Floating Holder (FH-ST12)
Result	No burr remaining realized by automated deburring with machining center. Besides, this enabled introduction of random sampling instead of full inspection and cost reduction achieved. Surface roughness of processed area improved.

LEARN MORE ABOUT
XEBEC Brush™ Surface

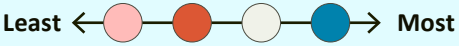
TOOL

XEBEC Brush™ Surface

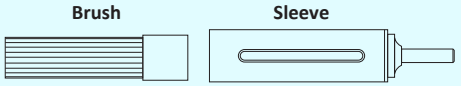
Available in Diameters:
6, 15, 25, 40, 60, 100 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:



XEBEC Brush™ Surface

Ideal for:

- **Surface Deburring**
- **Cutter Mark Removal**
- **Edge Radius**
- **Surface Finishing**
- **Polishing**

Deburring & finishing following face-milling, end-milling & drilling.

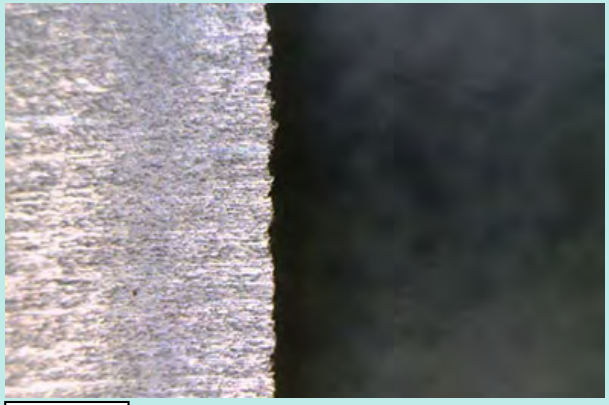
Injector Body Shoulder

Industry	Automotive
Part name	Injector body (Shoulder)
Material type	SCM
Cutting process	End milling processing

Processing conditions

Tool	XEBEC Brush Surface (A21-CB06M) XEBEC Floating Holder (FH-ST12)
Processing detail	Deburring of boundary line on the casting surface after end milling
Spindle Speed (min^{-1})	5000
Depth of cut (mm)	4

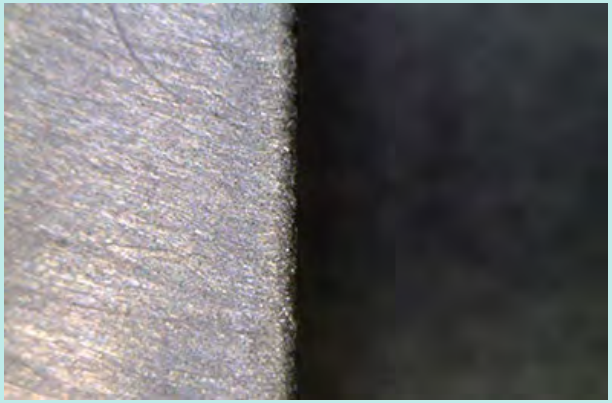
Before



Tool: Abrasive-impregnated nylon brush

Problem: Burrs remained and full inspection required, resulting in high labour cost.

After



Tool: XEBEC Brush for Surface (A21-CB06M)
XEBEC Floating Holder (FH-ST12)

Result: Complete removal of burrs achieved by CNC deburring with machining center. Besides, this enabled introduction of random sampling instead of full inspection and cost reduction achieved. Besides, surface roughness of processed area improved.

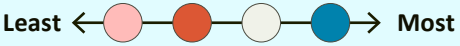
LEARN MORE ABOUT
XEBEC Brush™ Surface

TOOL XEBEC Brush™ Surface

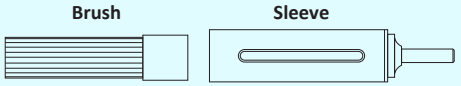
Available in Diameters:
6, 15, 25, 40, 60, 100 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:



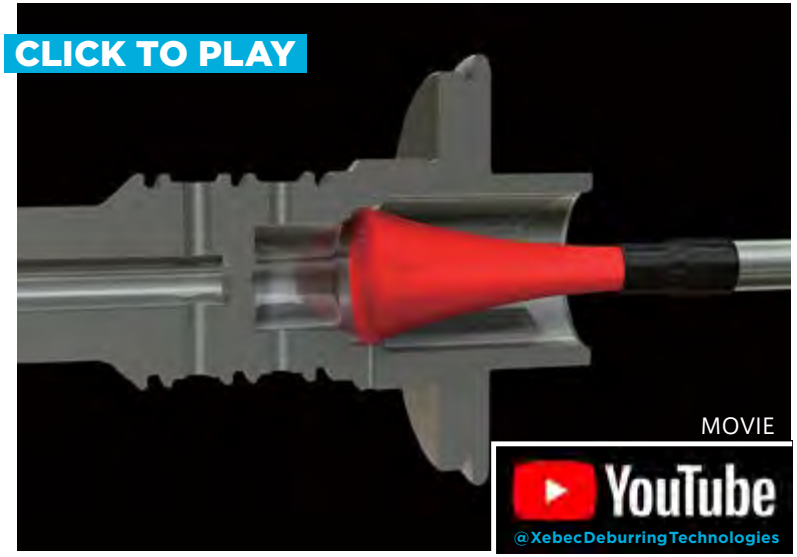
XEBEC Brush™ Surface

Ideal for:

- **Surface Deburring**
- **Cutter Mark Removal**
- **Edge Radius**
- **Surface Finishing**
- **Polishing**

Deburring & finishing following face-milling, end-milling & drilling.

Input Shaft Cross Hole



Workpiece information

Industry	Automotive
Part name	Input shaft (Cross hole)
Material type	SCM
Cutting process	Drilling

Processing conditions

Tool	XEBEC Brush™ Crosshole (CH-A12-5M + CH-A12-7M)
Processing detail	Crosshole deburring after drilling process
Spindle Speed (min^{-1})	9,000
Table Feed (mm/min)	300

Before

Tool — Abrasive-impregnated nylon brush

Problem — Burrs are left by manual deburring. It caused low efficiency in processing.

After

Tool — XEBEC Brush for Cross hole (CH-A12-5M + CH-A12-7M)

Result — Full automation realized with custom made machine. No burrs left and finish quality improved.

LEARN MORE ABOUT
XEBEC Brush™ Crosshole

TOOL **XEBEC Brush™ Crosshole**

Available in Diameters:
1.5, 3, 5, 7, 11 mm

Available Colors (Aggressiveness):
Red, Blue

Aggressiveness indicated by Color:
Least ← → **Most**

Length
Standard and Extended Lengths

XEBEC Brush™ Crosshole
Ideal for:
- **Cross Hole Deburring**
- **Inner Walls of Cylinders**

Brush tip flares under centrifugal force to remove burrs along inner walls of the hole.

Oil Pan

Workpiece information

Industry	Automotive
Part name	Oil pan
Material type	Alminium alloy
Cutting process	Front cutter processing

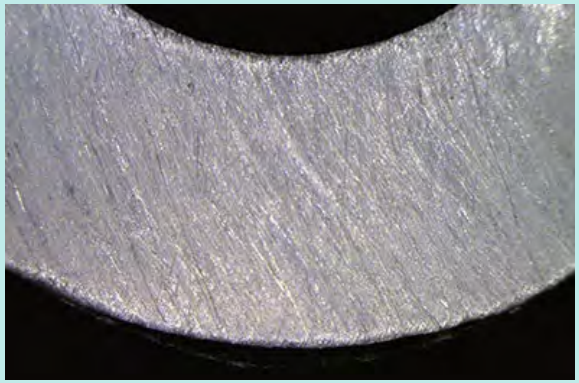
Processing conditions

Tool	XEBEC Brush for Surface (A31-CB25M)
Processing detail	Deburring of the matching surface after face milling process.
Spindle Speed (min^{-1})	2,000
Table Feed (mm/min)	3,000
Depth of cut (mm)	0.5
Machining time (sec)	—

Before

Tool	Wire brush
Problem	Scratches are left by deburring with wire brushes.

After



Tool	XEBEC Brush for Surface (A31-CB25M)
Result	Full automation deburring with machining center realized with improved surface quality.

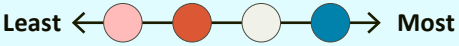
LEARN MORE ABOUT
XEBEC Brush™ Surface

TOOL XEBEC Brush™ Surface

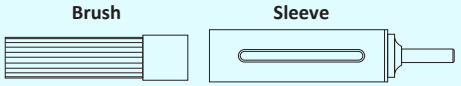
Available in Diameters:
6, 15, 25, 40, 60, 100 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:



XEBEC Brush™ Surface

Ideal for:

- **Surface Deburring**
- **Cutter Mark Removal**
- **Edge Radius**
- **Surface Finishing**
- **Polishing**

Deburring & finishing following face-milling, end-milling & drilling.

Output Shaft

Workpiece information

Industry	Automotive
Part name	Output Shaft (Oil hole)
Material type	SCM
Cutting process	Drilling

Processing conditions

Tool	XEBEC Back Burr Cutter and Path (XC-28-A + α)
Processing detail	Back deburring after drilling
Spindle Speed (min^{-1})	12,500
Table Feed (mm/min)	1,000
Depth of cut (mm)	—
Machining time (sec)	—

Before

Tool — Back deburring tools (cotter pin type)

Problem — Poor deburring performances such as remained burrs, secondary burrs and uneven edges.

After

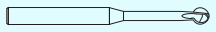
Tool — XEBEC Back Burr Cutter and Path (XC-28-A + special path)

Result — Uniform deburring amount without secondary burrs realized by high quality CNC deburring.

LEARN MORE ABOUT
XEBEC™ Back Burr Cutter & Path

TOOL XEBEC™ Back Burr Cutter & Path

Spherical Cutting Tool



Custom Path Data

The tool can be mounted on machining center (XYZ-axis) or combined lathe (XZY or XZC-axis). 3-axis simultaneous control is required.

Machining Center

Combined Lathe

XEBEC™ Back Burr Cutter & Path

Ideal for:

- **Deburring Difficult Holes**
- **Inner and Outer Diameters**
- **Irregular, Off-Center Holes**

One Cutter size supports various edges in different sizes and shapes.

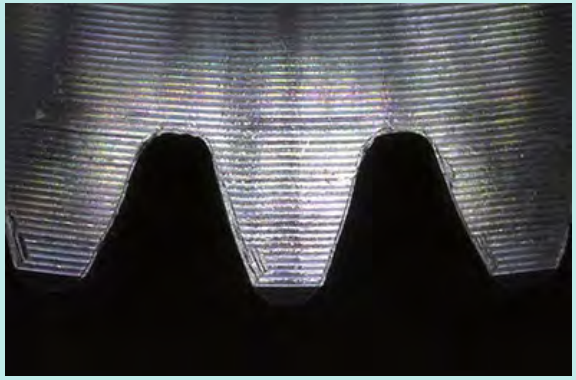
Pinion Gear

Industry	Automotive
Part name	Pinion gear
Material type	S45C
Cutting process	Gear cutting

Processing conditions

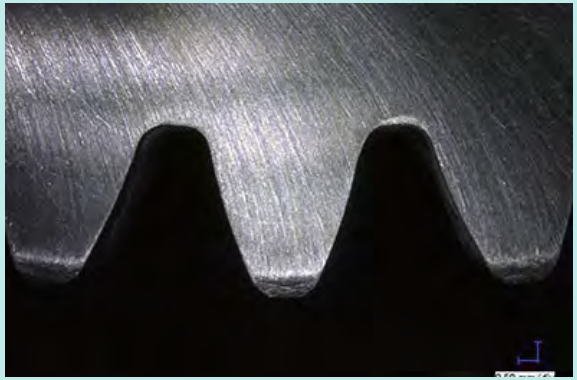
Tool	XEBEC Brush Surface (A31-CB40M) XEBEC Floating Holder (FH-ST12)
Processing detail	Deburring the gear edge face after hobbing process
Spindle Speed (min^{-1})	900
Table Feed (mm/min)	2,400
Depth of cut (mm)	3

Before



Tool	File
Problem	It took time for manual deburring and edge quality was not stable.

After



Tool	XEBEC Brush for Surface (A31-CB40M) XEBEC Floating Holder (FH-ST12)
Result	Deburring is automated. Consistent finish in a short time.

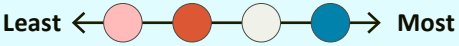
LEARN MORE ABOUT
XEBEC Brush™ Surface

TOOL XEBEC Brush™ Surface

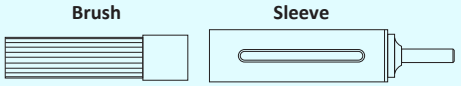
Available in Diameters:
6, 15, 25, 40, 60, 100 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:



XEBEC Brush™ Surface

Ideal for:

- **Surface Deburring**
- **Cutter Mark Removal**
- **Edge Radius**
- **Surface Finishing**
- **Polishing**

Deburring & finishing following face-milling, end-milling & drilling.

Plate

Workpiece information

Industry	Automotive
Part name	Plate
Material type	SPH440
Cutting process	Others

Processing conditions

Tool	XEBEC Brush Surface (A11-CB60M)
Processing detail	Deburring the external circumference edge and (4) bores
Spindle Speed (min^{-1})	900
Depth of cut (mm)	1
Machining time (sec)	3

Before

Tool — Plastic brush

Problem — The brush edge deformed. The inner diameter of cross hole H7 could not be maintained. Mass production machining was not possible.

After

Tool — XEBEC Brush for Surface (A11-CB60M)

Result — Deburring with maintaining the inner edge profile of cross hole H7 without deformation realized. Quality requirement achieved. Also, tool life 65000 pcs/brush realized.

LEARN MORE ABOUT
XEBEC Brush™ Surface

TOOL XEBEC Brush™ Surface

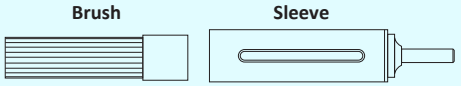
Available in Diameters:
6, 15, 25, 40, 60, 100 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:

Least ← → Most

Brush Requires Brush Sleeve to Operate:



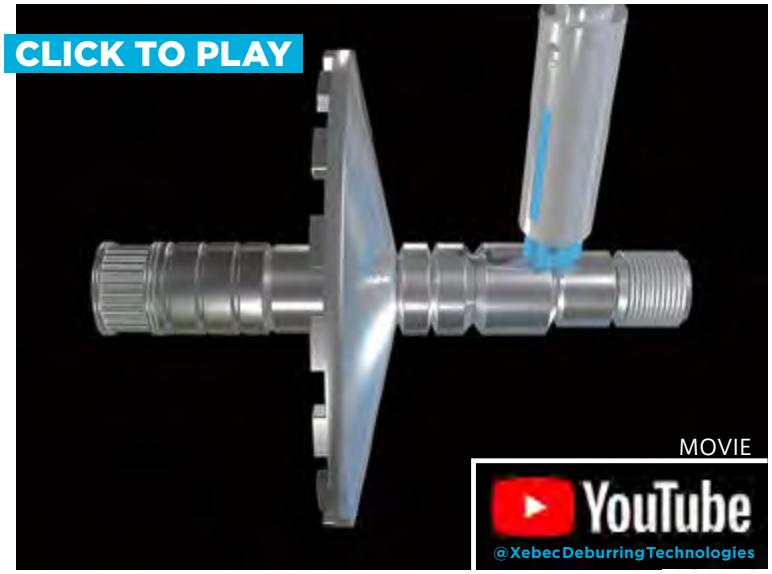
XEBEC Brush™ Surface

Ideal for:

- **Surface Deburring**
- **Cutter Mark Removal**
- **Edge Radius**
- **Surface Finishing**
- **Polishing**

Deburring & finishing following face-milling, end-milling & drilling.

Pulley



Workpiece information

Industry	Automotvie
Part name	Pulley
Material type	Scr420
Cutting process	Side cutter processing

Processing conditions

Tool	XEBEC Brush Surface (A31-CB25M)
Processing detail	Deburring the outer edge after side cutter
Spindle Speed (min^{-1})	1,800
Table Feed (mm/min)	1
Depth of cut (mm)	1,800
Machining time (sec)	—

Before

Tool: File

Problem: It took long time for manual deburring.

After

Tool: XEBEC Brush Surface (A31-CB25M)

Result: Automated deburring with stable quality in a shorter cycle time realized.

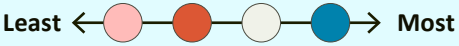
LEARN MORE ABOUT
XEBEC Brush™ Surface

TOOL XEBEC Brush™ Surface

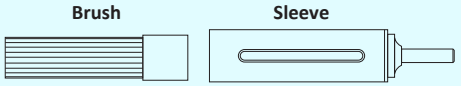
Available in Diameters:
6, 15, 25, 40, 60, 100 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:



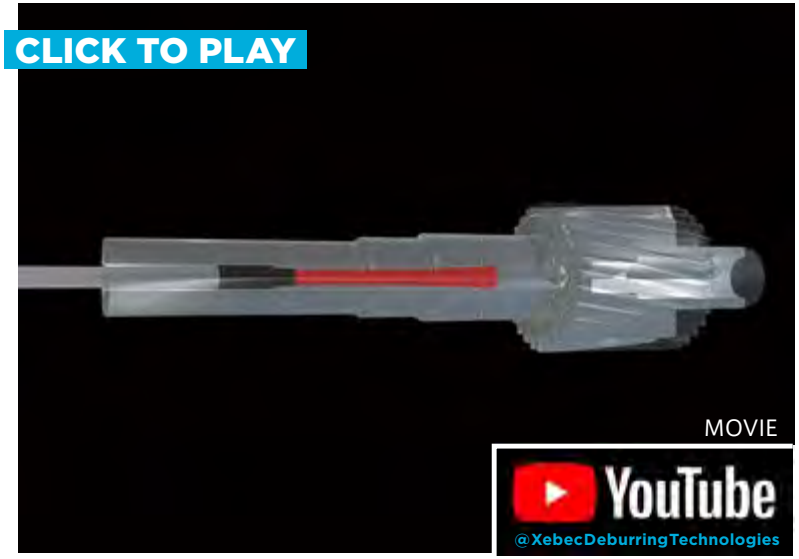
XEBEC Brush™ Surface

Ideal for:

- **Surface Deburring**
- **Cutter Mark Removal**
- **Edge Radius**
- **Surface Finishing**
- **Polishing**

Deburring & finishing following face-milling, end-milling & drilling.

Reduction Gear Cross Hole



Workpiece information

Industry	Automotive
Part name	Reduction gear (Cross hole)
Material type	Scr420
Cutting process	Drilling

Processing conditions

Tool	XEBEC Brush Crosshole (CH-A12-3L)
Processing detail	Crosshole deburring after drilling process
Spindle Speed (min^{-1})	10,800
Table Feed (mm/min)	300

Before

Tool — Wire brush

Problem — Burr remained by low grinding power. Quality unstable due to deformation of brush material.

After

Tool — XEBEC Brush Crosshole (CH-A12-3L)

Result — Burr eliminated and stable quality realized at mass-production line.

LEARN MORE ABOUT
XEBEC Brush™ Crosshole

TOOL **XEBEC Brush™ Crosshole**

Available in Diameters:
1.5, 3, 5, 7, 11 mm

Available Colors (Aggressiveness):
Red, Blue

Aggressiveness indicated by Color:
Least ← → **Most**

Length
Standard and Extended Lengths

XEBEC Brush™ Crosshole
Ideal for:
- **Cross Hole Deburring**
- **Inner Walls of Cylinders**

Brush tip flares under centrifugal force to remove burrs along inner walls of the hole.

Ring Plate

Workpiece information

Industry	Automotive
Part name	Ring plate
Material type	SPH
Cutting process	Others

Processing conditions

Tool	XEBEC Brush for Surface (A32-CB25M)
Processing detail	Deburring outer edge after pressing
Spindle Speed (min^{-1})	4,000
Table Feed (mm/min)	—
Depth of cut (mm)	0.5
Machining time (sec)	—

Before

Tool: Abrasives-impregnated nylon brush

Problem: Nylon brushes did not have enough grinding power. On the other hand, grindstones did not fit well to workpieces and burr remained. Therefore, deburring could not be automated.

After

Tool: XEBEC Brush Surface (A32-CB25M)

Result: No burrs left. Full automation process realized.

LEARN MORE ABOUT
XEBEC Brush™ Surface

TOOL XEBEC Brush™ Surface

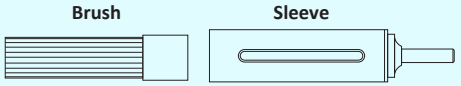
Available in Diameters:
6, 15, 25, 40, 60, 100 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:

Least ← → Most

Brush Requires Brush Sleeve to Operate:



XEBEC Brush™ Surface

Ideal for:

- **Surface Deburring**
- **Cutter Mark Removal**
- **Edge Radius**
- **Surface Finishing**
- **Polishing**

Deburring & finishing following face-milling, end-milling & drilling.

Ring-Shaped Internal Gear

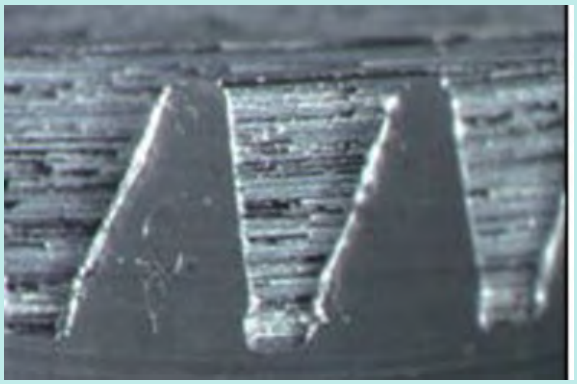
Workpiece information

Industry	Automotive
Part name	Ring-shaped internal gear
Material type	S45C
Cutting process	Gear cutting

Processing conditions

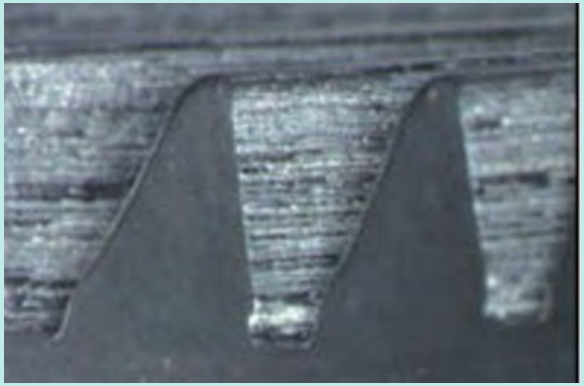
Tool	XEBEC Brush Surface (A31-CB40M)
Processing detail	Deburring the gear end face after gear cutting process
Spindle Speed (min^{-1})	2,000
Depth of cut (mm)	0.5

Before



Tool	File
Problem	Metal filing handwork caused unstable quality. Complex shape of workpiece caused long lead time of deburring and high labour cost.

After



Tool	XEBEC Brush for Surface (A31-CB40M)
Result	Fully automated deburring introduced. Stable quality with shorter processing time as well as cost reduction realized.

LEARN MORE ABOUT
XEBEC Brush™ Surface

TOOL XEBEC Brush™ Surface

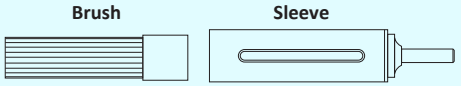
Available in Diameters:
6, 15, 25, 40, 60, 100 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:

Least ← → **Most**

Brush Requires Brush Sleeve to Operate:



XEBEC Brush™ Surface

Ideal for:

- **Surface Deburring**
- **Cutter Mark Removal**
- **Edge Radius**
- **Surface Finishing**
- **Polishing**

Deburring & finishing following face-milling, end-milling & drilling.

Shaft Parts

Workpiece information

Industry	Automotive
Part name	Shaft parts
Material type	SCM
Cutting process	Threading

Processing conditions

Tool	XEBEC Brush for Surface (A21-CB25M)
Processing detail	Deburring (contouring) unfinished parts of female screw with inner diameter Φ24.
Spindle Speed (min^{-1})	3,000
Table Feed (mm/min)	—

Before

Tool — Nylon / wire brush

Problem — Burrs remained by nylon/wire brushes due to insufficient grinding force and manual deburring was required later.

After

Tool — XEBEC Brush for Surface (A21-CB25M)

Result — Automated deburring realized with machining center by contouring the cut-out portion of female bolts with brush after processing the tap. Also, surface quality stabilized.

LEARN MORE ABOUT
XEBEC Brush™ Surface

TOOL XEBEC Brush™ Surface

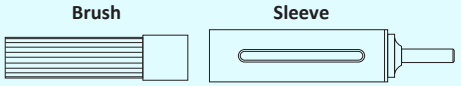
Available in Diameters:
6, 15, 25, 40, 60, 100 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:

Least ← → Most

Brush Requires Brush Sleeve to Operate:



XEBEC Brush™ Surface

Ideal for:

- **Surface Deburring**
- **Cutter Mark Removal**
- **Edge Radius**
- **Surface Finishing**
- **Polishing**

Deburring & finishing following face-milling, end-milling & drilling.

Transmission Case Cross Hole

Workpiece information

Industry	Automotive
Part name	Transmission case (Cross hole)
Material type	ADC12
Cutting process	Drilling

Processing conditions

Tool	XEBEC Brush Crosshole (CH-A12-7L)
Processing detail	Crosshole deburring after drilling process
Spindle Speed (min^{-1})	7,200
Table Feed (mm/min)	300

Before

Tool — Twisted brushes and rotary tool

Problem — Twisted brush was used with rotary tool. It took man-hour for deburring the inside diameter by manual work.

After

Tool — XEBEC Brush Crosshole (CH-A12-7L)

Result — By introduction of automated deburring, workability and quality of inside diameter improved.

LEARN MORE ABOUT
XEBEC Brush™ Crosshole

TOOL XEBEC Brush™ Crosshole

Available in Diameters:
1.5, 3, 5, 7, 11 mm

Available Colors (Aggressiveness):
Red, Blue

Aggressiveness indicated by Color:
Least ← → **Most**

Length
Standard and Extended Lengths

XEBEC Brush™ Crosshole

Ideal for:

- **Cross Hole Deburring**
- **Inner Walls of Cylinders**

Brush tip flares under centrifugal force to remove burrs along inner walls of the hole.

Transmission Case Surface

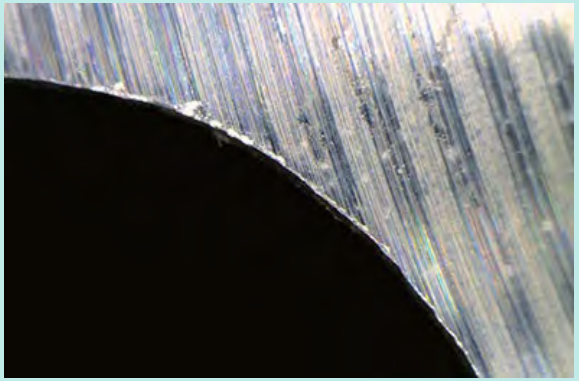
Workpiece information

Industry	Automotvie
Part name	Transmission (Matching surface)
Material type	ADC12
Cutting process	Front cutter processing

Processing conditions

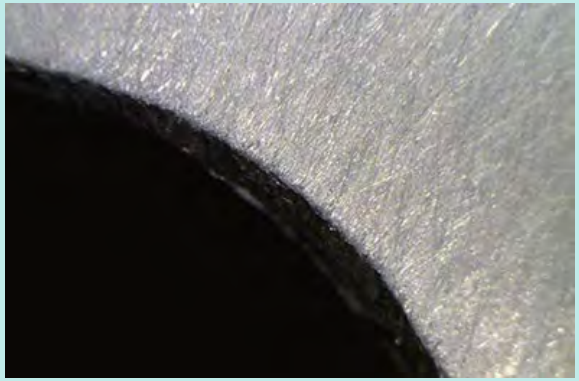
Tool	XEBEC Brush Surface (A11-CB40M)
Processing detail	Deburring of the matching surface after face milling process
Spindle Speed (min^{-1})	2,160
Table Feed (mm/min)	7,000
Depth of cut (mm)	0.5

Before



Tool	Abrasive-impregnated nylon brush
Problem	Burrs left due to low grinding power. Additional manual deburring processing was required.

After



Tool	XEBEC Brush Surface (A11-CB40M)
Result	By the introduction of XEBEC Brush, deburring in a shorter time realized.

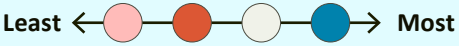
LEARN MORE ABOUT
XEBEC Brush™ Surface

TOOL XEBEC Brush™ Surface

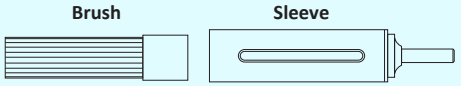
Available in Diameters:
6, 15, 25, 40, 60, 100 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:



XEBEC Brush™ Surface

Ideal for:

- **Surface Deburring**
- **Cutter Mark Removal**
- **Edge Radius**
- **Surface Finishing**
- **Polishing**

Deburring & finishing following face-milling, end-milling & drilling.

VCT Housing

Industry	Automotive
Part name	VCT housing
Material type	Sintered metal
Cutting process	Front cutter processing

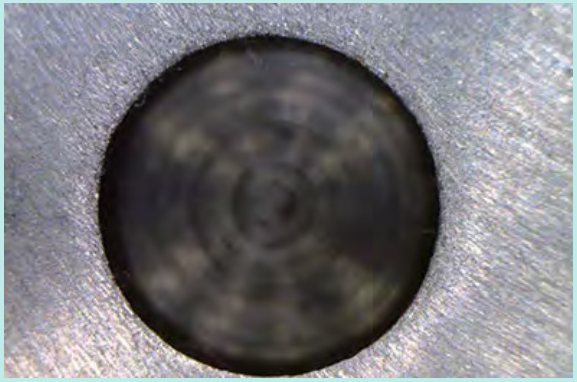
Processing conditions

Tool	XEBEC Brush for Surface (A11-CB40M)
Processing detail	Deburring the edge face after milling process
Spindle Speed (min^{-1})	500
Table Feed (mm/min)	2,000
Depth of cut (mm)	0.5
Machining time (sec)	—

Before

Tool	Abrasive-impregnated nylon brush
Problem	Deformation of nylon brush shape occurred in mass production process. It caused unstable quality due to insufficient deburring performance and burr remaining.

After



Tool	XEBEC Brush for Surface (A11-CB40M)
Result	No deformation of brush shape in mass production process. Stable cutting parameters with no burrs realized.

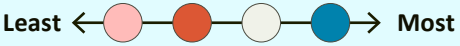
LEARN MORE ABOUT
XEBEC Brush™ Surface

TOOL **XEBEC Brush™ Surface**

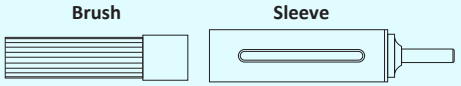
Available in Diameters:
6, 15, 25, 40, 60, 100 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:



XEBEC Brush™ Surface

Ideal for:

- **Surface Deburring**
- **Cutter Mark Removal**
- **Edge Radius**
- **Surface Finishing**
- **Polishing**

Deburring & finishing following face-milling, end-milling & drilling.

Yoke Ring

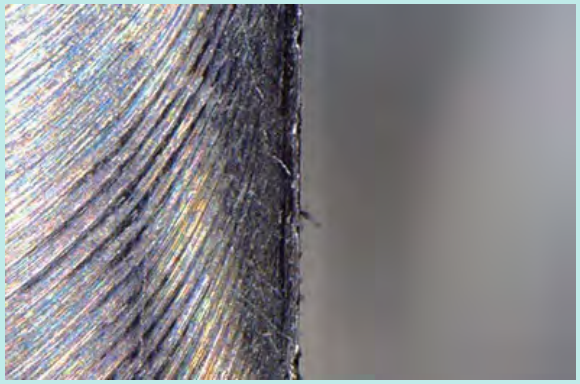
Workpiece information

Industry	Automotive
Part name	Yoke
Material type	SUS430
Cutting process	Chamfering

Processing conditions

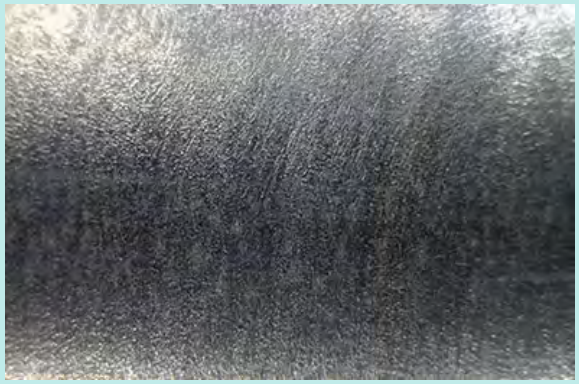
Tool	XEBEC Brush Surface (A31-CB25M)
Processing detail	Deburring the section after chamfering process
Spindle Speed (min^{-1})	3,000
Table Feed (mm/min)	—
Depth of cut (mm)	1
Machining time (sec)	—

Before



Tool	Cutter, sandpaper
Problem	Manual deburring caused unstable quality and high labor cost.

After



Tool	XEBEC Brush Surface (A31-CB25M)
Result	Fully automated deburring enabled stable quality and shorter processing time. Also the efficiency of processing improved by changing the burr direction by review of pre-process.

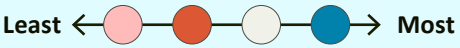
LEARN MORE ABOUT
XEBEC Brush™ Surface

TOOL XEBEC Brush™ Surface

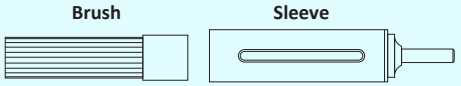
Available in Diameters:
6, 15, 25, 40, 60, 100 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:



XEBEC Brush™ Surface

Ideal for:

- **Surface Deburring**
- **Cutter Mark Removal**
- **Edge Radius**
- **Surface Finishing**
- **Polishing**

Deburring & finishing following face-milling, end-milling & drilling.

Yoke Cylinder

Workpiece information

Industry	Automotive
Part name	Yoke
Material type	SCM
Cutting process	Drilling

Processing conditions

Tool	XEBEC Back Burr Cutter and Path (XC-58-A)
Processing detail	Deburring the back burr after drilling process
Spindle Speed (min^{-1})	6,000
Depth of cut (mm)	900

Before

Tool — Back burr deburring tool (Blade type)

Problem — When inserting the tool, scratch occurred by tool contact.

After

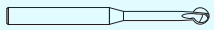
Tool — XEBEC Back Burr Cutter and Path (XC-58-A)

Result — By pinpoint deburring for the edge, no scratch with shorter cycle time realized.

TOOL

XEBEC™ Back Burr Cutter & Path

Spherical Cutting Tool



Custom Path Data

The tool can be mounted on machining center (XYZ-axis) or combined lathe (XZY or XZC-axis). 3-axis simultaneous control is required.

Machining Center

Combined Lathe

XEBEC™ Back Burr Cutter & Path

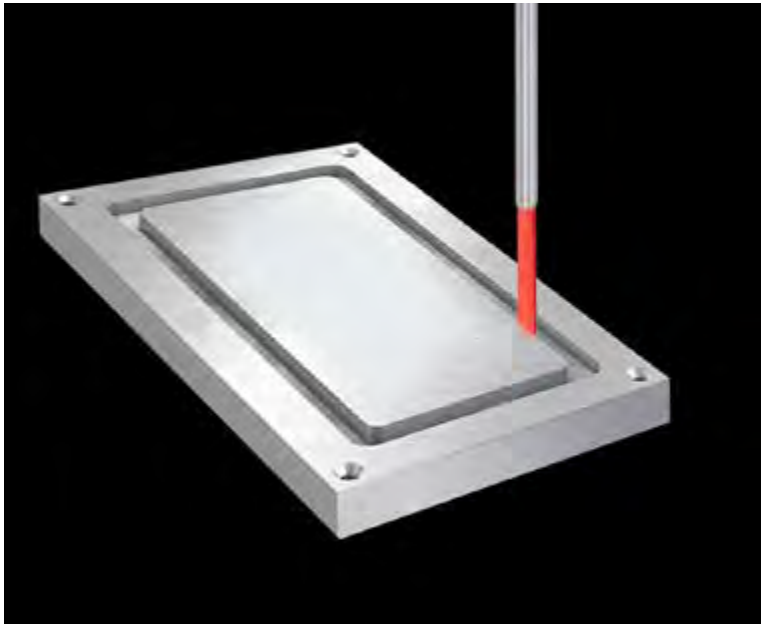
Ideal for:

- **Deburring Difficult Holes**
- **Inner and Outer Diameters**
- **Irregular, Off-Center Holes**

One Cutter size supports various edges in different sizes and shapes.

LEARN MORE ABOUT
XEBEC™ Back Burr Cutter & Path

Channeled Plate



Workpiece information

Industry	Energy
Part name	Channeled Plate
Material type	Aluminum Alloy
Cutting process	Surface Deburring & Finishing

Processing conditions

Tool	XEBEC™ Brush End Type (A11-EB025S)
Processing detail	Deburring and finishing of channeled surface feature
Spindle Speed	6,500 RPM
Feed Rate	100 IPM

TOOL XEBEC Brush™ End Type

Available in Diameters:
1, 1.5, 2, 2.5, 3, 5 mm

Available Colors (Aggressiveness):
Pink, Red, White, Blue

Aggressiveness indicated by Color:

Least ← → **Most**

XEBEC Brush™ End Type

Ideal for:

- **Detailed, Intricate Parts**
- **Surface Deburring**
- **Cutter Mark Removal**
- **Polishing**

Cutter-mark removal, polishing and finishing of parts with narrow features.

LEARN MORE ABOUT
XEBEC Brush™ End Type

Threaded Compressor Fitting

Workpiece information

Industry	Energy
Part name	Threaded Fitting
Material type	Stainless
Cutting process	Surface Deburring & Finishing

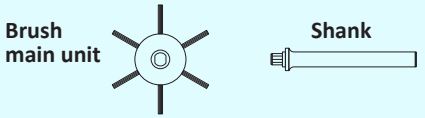
Processing conditions

Tool	XEBEC™ Wheel Brush (W-A11-75)
Processing detail	Deburring and finishing of outer diameter of threads and inner diameter.
Spindle Speed	1,250 RPM
Feed Rate	150 IPM

TOOL XEBEC™ Wheel Brush

Available in Diameters:
50, 75 mm

Requires reusable Shank to operate
70 or 150 mm Shank lengths



Available Colors (Aggressiveness):
Red

XEBEC™ Wheel Brush
Ideal for:

- **Deburring and Polishing**
- **Side Surfaces**
- **Inner and Outer Diameters**

Can be used in CNC and robotic machines.

LEARN MORE ABOUT
XEBEC™ Wheel Brush

XEBEC® Success Stories

How Automated Deburring Saved Over $275,000

A Real Example of Moving from a Manual Deburring Process to an Automated Process using Xebec Brush™ Surface

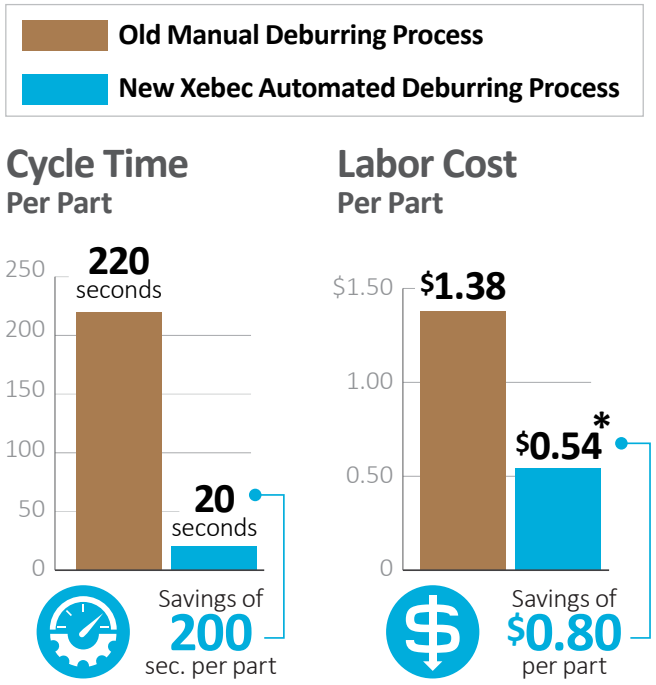
Wow, there we go again. At Xebec, we continue to help people with deburring problems become heroes in their own company. Check out this amazing cost savings example from the firearms industry.

Our customer was manually deburring the two parts shown in the calculations below. By switching to an automated process, utilizing a ceramic Xebec surface brush, they are looking at an estimated savings of over $275k per year.

Labor Cost

Manual	Machine
$22/hr	$80/hr

At first glance, manual deburring appears to cost less.



Example 1:

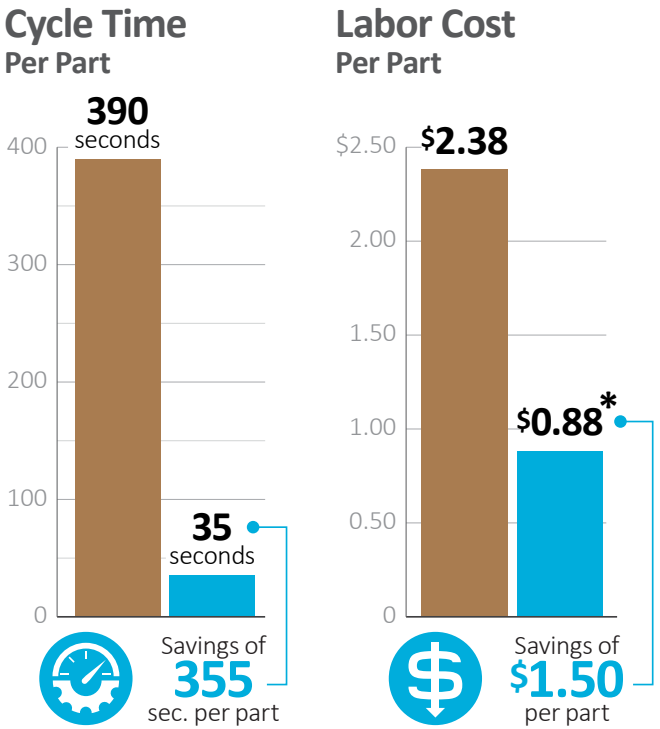
Estimated annual cost savings of $96,058

- Original manual deburring process had a cycle time of 220 seconds per part. With labor burden rates at $22 per hour, that equates to $1.34 in labor cost per part.
- New Xebec automated process has a cycle time of 20 seconds per part. With machine costs at $80 per hour, that equates to just $0.44 cost per piece. Add in the cost of the ceramic brush $0.10 per piece ($149.27 / 1500 pieces) and you have a total cost per piece of just $0.54.
- Manual deburring $1.34 per part – Xebec deburring $0.54 per part = $0.80 savings per part
- Customer is making 10,000 of these parts per month (120k per year).
- 120,000 pieces multiplied by $0.80 per piece cost savings = $96,058

***Cost includes all tool expenses.**

Xebec 15mm Surface Brush: $149.27 each

Total Brush cost for 120,000 parts: $11,941.60 or $0.10/part



In addition to cost savings, part quality and consistency are greatly improved with the Xebec Brush.

Example 2:

Estimated annual cost savings of $180,000

- Original manual deburring process had a cycle time of 390 seconds per part. With labor burden rates at $22 per hour, that equates to $2.38 in labor cost per part.
- New Xebec automated process has a cycle time of 35 seconds per part. With machine costs at $80 per hour, that equates to just $0.78 cost per piece. Add in the cost of the ceramic brush $0.10 per piece ($149.27 / 1500 pieces) and you have a total cost per piece of just $0.88.
- Manual deburring $2.38 per part – Xebec deburring $0.88 per part = $1.50 savings per part
- Customer is making 10,000 of these parts per month (120k per year).
- 120,000 pieces multiplied by $1.50 per piece cost savings = $180,000

Xebec cost savings initiatives also assist with resource management. This initiative alone created a platform to reduce a group equivalent of six full time employees. Not only does this offer cost savings, but also gives the end user an opportunity to redeploy those valuable resources elsewhere.

In addition to cost savings, our ceramic fibers are second to none and ensure a consistent and greatly improved finish to their product. We are very proud of our product and our company and would love to help you be a hero in your company as well as we continue to help the resurgence of American manufacturing, by redefining perfection.

Are you ready to modernize your deburring process?

LEARN MORE ABOUT
Cost Savings with XEBEC™

Surface Deburring & Finishing

YouTube Click to Play Video: **@ Xebec Deburring Technologies**

- Surface Deburring, Finishing and Polishing
- Deburring after machine processing and finishing of edges
- Precision parts such as recievers and bolt carriers that must be deburred while maintaining edge quality with out secondary burrs
- Grinding and finishing of flat or uneven surfaces
- CNC machine applications, following milling passes

Crosshole Deburring & Finishing

YouTube Click to Play Video: **@ Xebec Deburring Technologies**

- Crosshole deburring, polishing of inner wall surfaces of cylinders
- Effectively removes burrs generated around cross-holes under rotational/centrifugal force
- Soft contact abrasive for deburring crossholes and detailed finishing of parts
- Flexible tool shafts allow soft contact with work piece

Detailed Finishing

YouTube Click to Play Video: **@ Xebec Deburring Technologies**

- Wide variety of tool shapes and sizes for detailed and intricate part finishing
- Chamfers, edge breaks, burrs, blending, finishing, polishing, EDM scale removal and more
- Use by hand, with Xebec Micro Motor, ultrasonic polishers, robots or CNC machines.

Xebec® Ceramic Fiber

The ceramic fibers are woven to create self-sharpening filaments that maintain consistent cutting action on the tips. Unlike wire and abrasive impregnated nylon brush filaments, the unique design of the Xebec fiber rod maintains its shape with no deformation even after repeated use. This leads to consistent performance time after time.

More than a brush - performs like a cutting tool.

FINE FINISHING

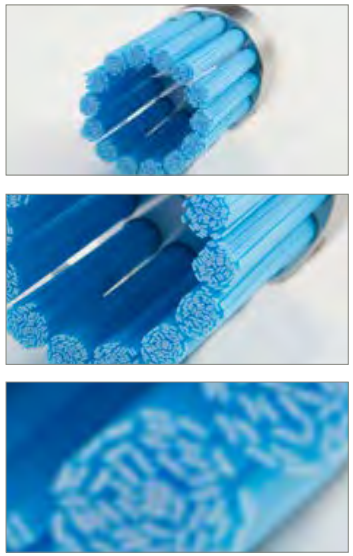
up to

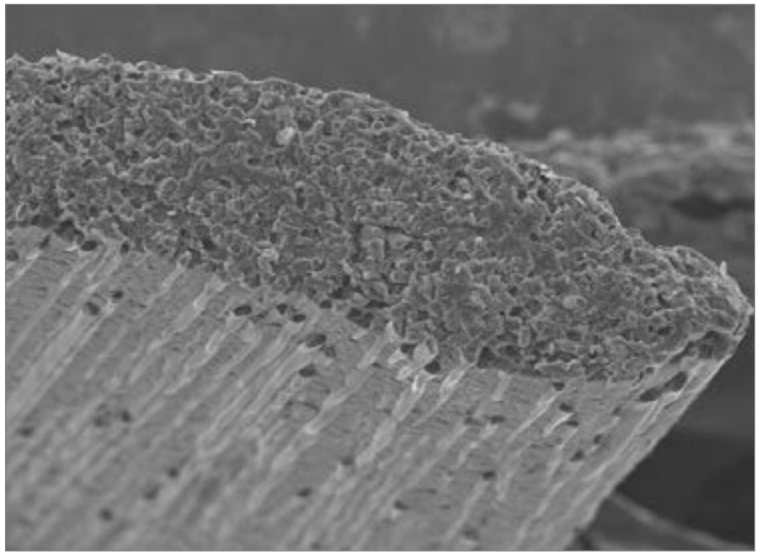
3.937 Ra

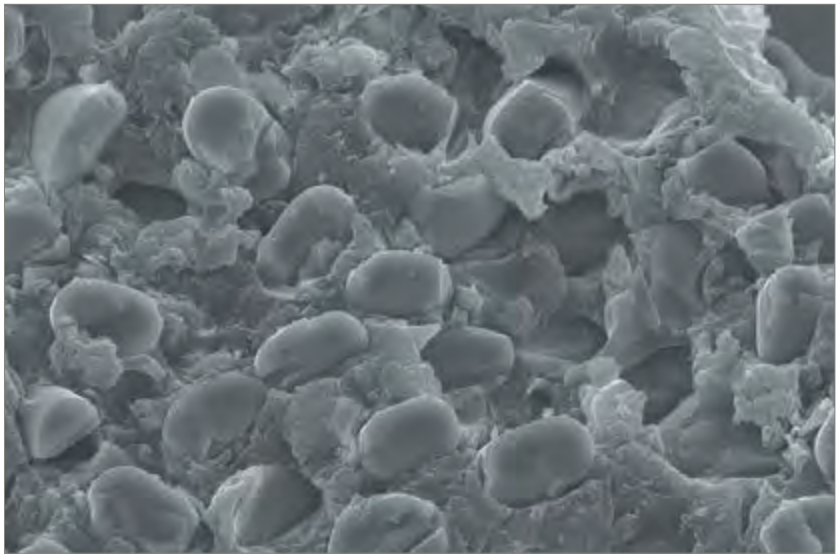
µi microinches

(**0.1 *µm*** micrometers)

Continuous Ceramic Fibers







Watch Xebec FAQ's: Your Questions Answered

YouTube Click to Play Video: **@ Xebec Deburring Technologies**

READ THE FULL STORY ON OUR BLOG:

Ceramic Fiber Brush: The Deburring Brush that Performs Like a Cutting Tool

FLEXIBLE BRISTLES

XEBEC Brush™

Ceramic Fibers are formed into bristles to produce tip cutting Brushes

Cuts from the tip

SOLID

XEBEC Stone™

Ceramic Fibers are formed into Stones capable of cutting on all sides

Cuts on all sides

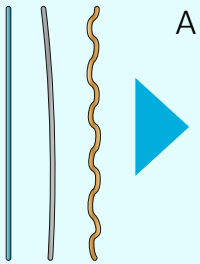
YouTube Click to Play Video: @ Xebec Deburring Technologies

No Deformation

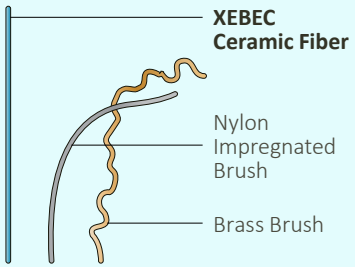
Bristles made from Xebec™ ceramic fiber filament maintain their shape even after repeated use. Which means the grinding power is not diminished over time and performance quality is consistently fine.

BEFORE

Individual bristles before and after repeated use

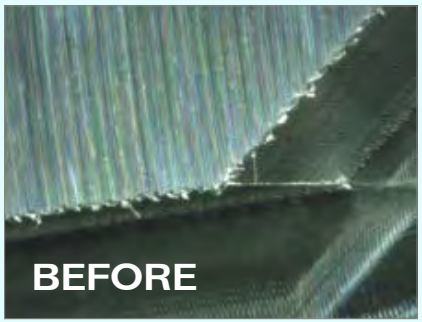


AFTER



Self-Sharpening Effect

New cutting edges are continuously exposed through tool use. Which means tool remains “sharp” and product performance is consistently high.

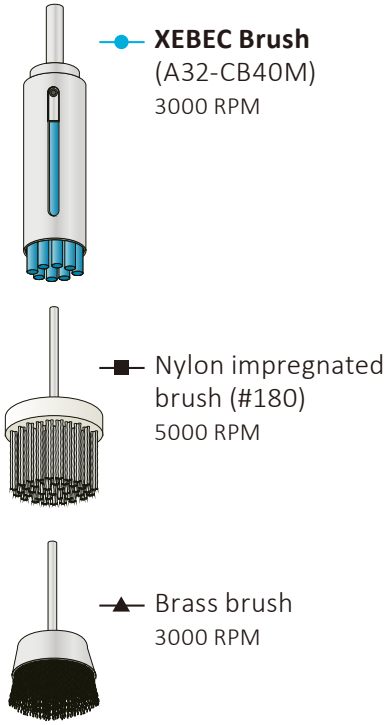


Flexibility and Grinding Power

All Xebec brushes are made from the same proprietary ceramic fibers manufactured into rods, or bristles, of different thicknesses. The greater the bristle thickness, the more aggressive the cutting action. Thicker bristles will remove more material, faster. Thinner bristles are more flexible and able to conform to the shape of the workpiece for finishing and polishing without altering part dimensions or features. Brush color indicates the relative thickness of the bristles.

The Advantages of Ceramic Fiber

Xebec Ceramic Fiber brushes remove more material faster than nylon impregnated or brass finishing brushes.

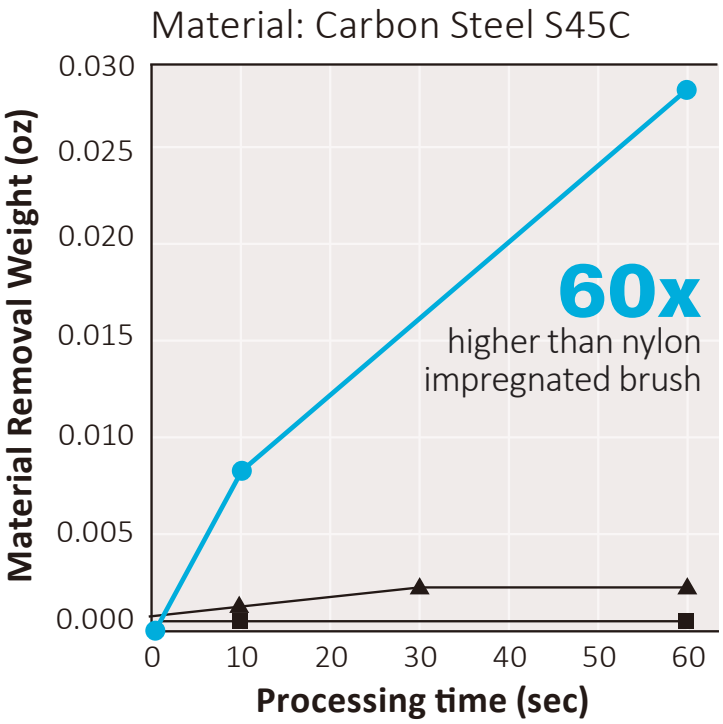


XEBEC Brush
(A32-CB40M)
3000 RPM

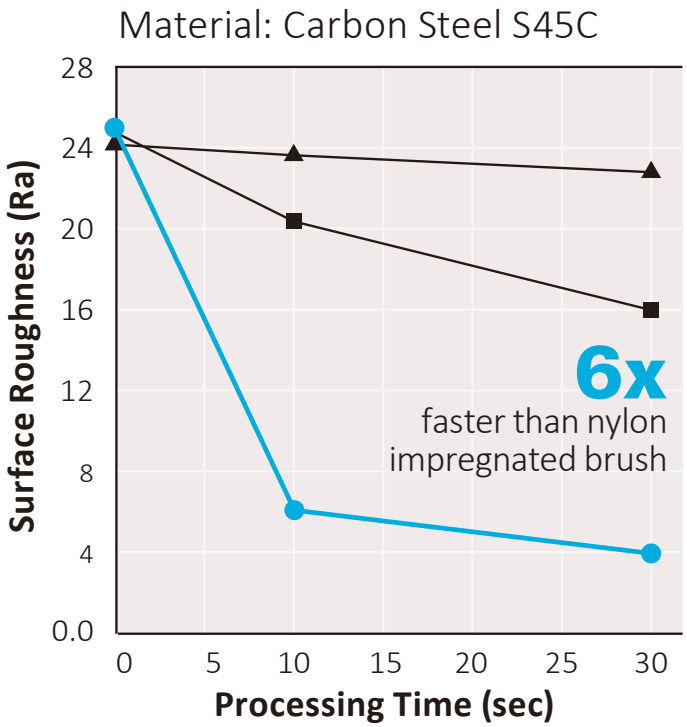
Nylon impregnated brush (#180)
5000 RPM

Brass brush
3000 RPM

Grinding power



Polishing capacity



Xebec Blows Away Nylon Brushes

YouTube Click to Play Video:
@ Xebec Deburring Technologies

All Xebec brushes are made from the same proprietary ceramic fibers which are manufactured into rods, or bristles of different thicknesses. **The greater the bristle thickness, the more aggressive the cutting action.**

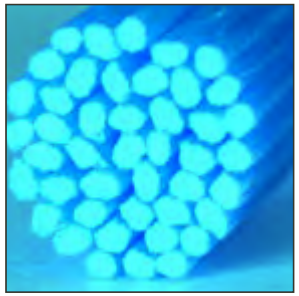
Brush Color

Signifies the relative thickness of the bristles

Will not change part dimensions or features

Will conform to slight workpiece variations

Able to run at higher speeds, extend tool life



3-4 times more aggressive than white

Aggressiveness

LEAST ⟷ MOST

Flexibility

Ability to conform to the work piece

Target Material

SOFTEST ⟷ HARDEST

- Resins, Plastics
- Aluminum, Copper, Brass, General Steel
- Cast Metal, Stainless, Heat-Resistant Steel

Target Burr Size

- Micro Fine
- up to 0.008”
- up to 0.004”

Target Finish

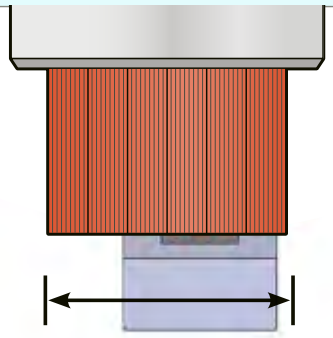
- 4 Ra or better
- Finish up to 4 Ra

Surface Deburring & Finishing Brushes

Choosing the Ideal Brush Size

Choose a brush 1.5 to 2 times wider than the width of the work piece surface.

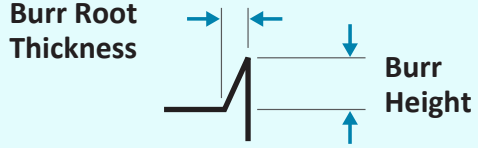
1.5-2x **larger than the surface width**



This allows the brush to engage the edge at 90° for optimal grinding power. Using a larger brush than the surface width will also require the fewest number of passes and minimize cycle time.

Target Burr Size

Burr Root Thickness of **0.008”** or less (Burrs are bent with a fingernail)



XEBEC™ Back Burr Cutter & Path

Spherical deburring Cutter with a custom-made tool Path. For CNC deburring of entry and exit holes in a single pass.

Spherical Cutting Tool

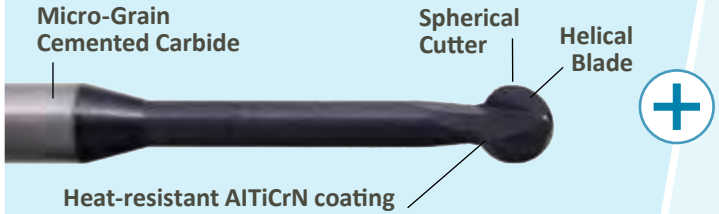
Custom Path Data

The tool can be mounted on machining center (XYZ-axis) or combined lathe (XZY or XZC-axis). 3-axis simultaneous control is required.

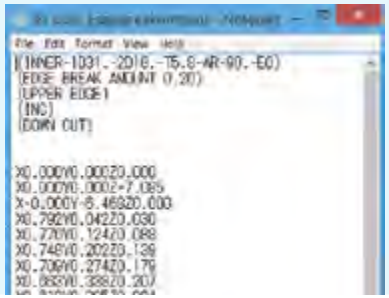
Machining Center

Combined Lathe

Xebec™ Back Burr Cutter



Xebec™ Generated Custom Tool Path



Custom Point Group Data

Up and Down Cutting Directions

Incremental and Absolute Modes

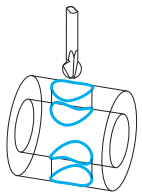
5 levels of Depth of Cut

Once approved, the Path Data is provided via email for immediate use on machine.

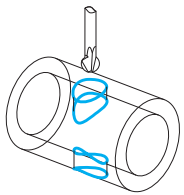
For a variety of edge shapes

One Cutter size supports various edges in different sizes and shapes.

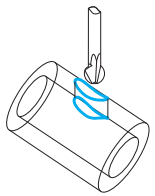
Orthogonal cross hole



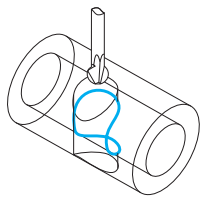
Off-center cross hole



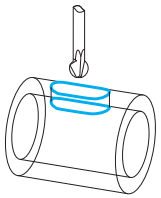
Angled cross hole



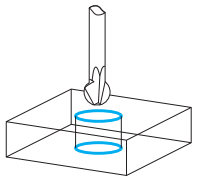
Broken cross hole



Slotted hole



Planar hole

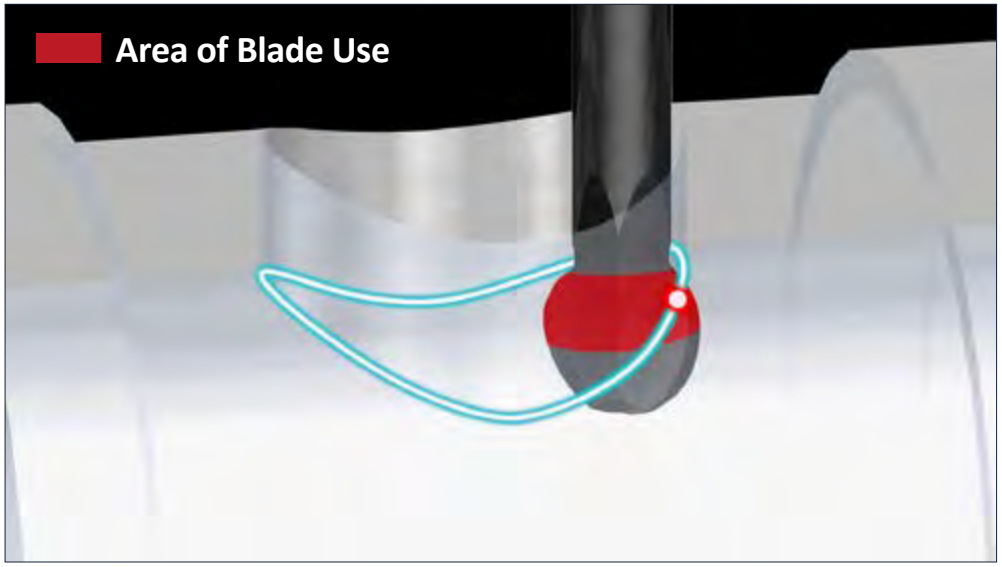


Custom Path Data

For complicated edge profiles

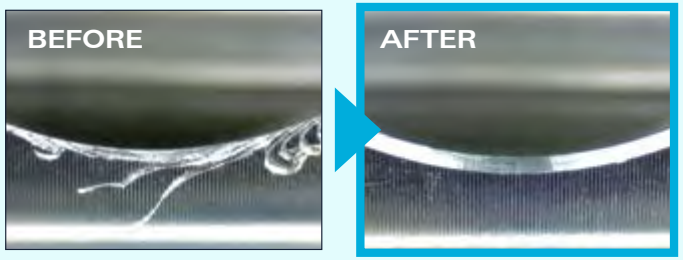
Longer Tool Life

Uses the entire cutting blade by constantly shifting the contact point

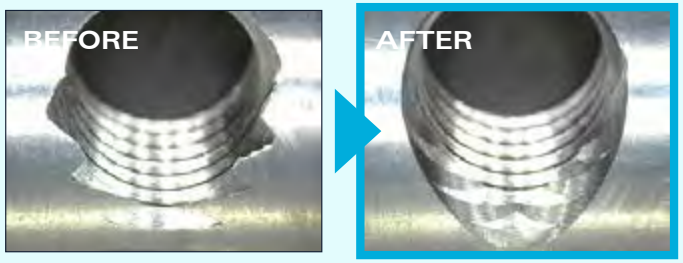


YouTube Click to Play Video:
@ Xebec Deburring Technologies

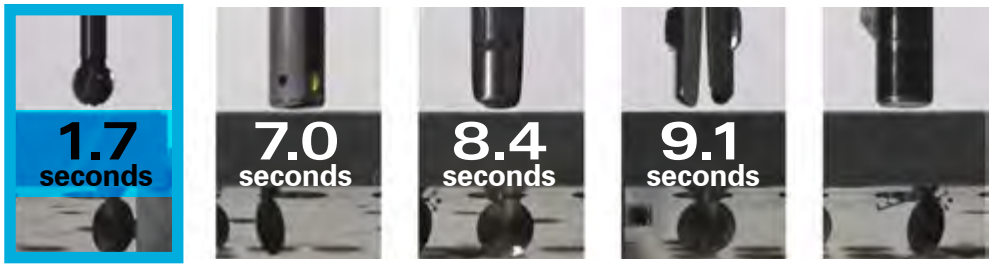
Stainless Steel



Tapped Holes



3 to 5 times Faster than Similar Tools



Back Burr Cutter & Path | Tool A | Tool B | Tool C

YouTube Click to Play Video:
@ Xebec Deburring Technologies

Uniform edge shape by consistent deburring amount

XEBEC Back Burr Cutter & Path Setup Guide

Glossary

XEBEC Back Burr Cutter (Cutter)

The spherical cutter specially designed for deburring

XEBEC Path (Path)

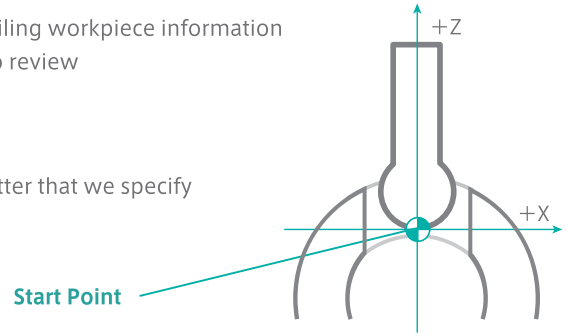
The custom-made NC data set (XYZ points' data) generated for optimal deburring

Path Code Sheet

The confirmation sheet detailing workpiece information and the Start Point for you to review

Start Point

The initial position of the Cutter that we specify



Product component

Path (delivered by email)

- Text data
- Instruction manual
- Path Code Sheet

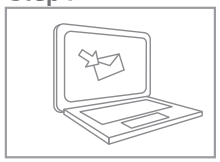
Cutter (sold separately)

Steps

Start

- Path delivered by email

Step1



Preparation

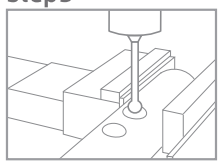
- Confirm the dimensions of the target edge
- Check the Cutter diameter
- Make sure there is no tool interference
- Check the machining conditions
- Select Cutter type (A/B) and order

Step2

Program Preparation

- Select the suitable Path data
  (INCREMENTAL/down cut data is recommended for the first try)
- Check the Start Point
- Copy and paste the Path data to the machine

Step3



Machining

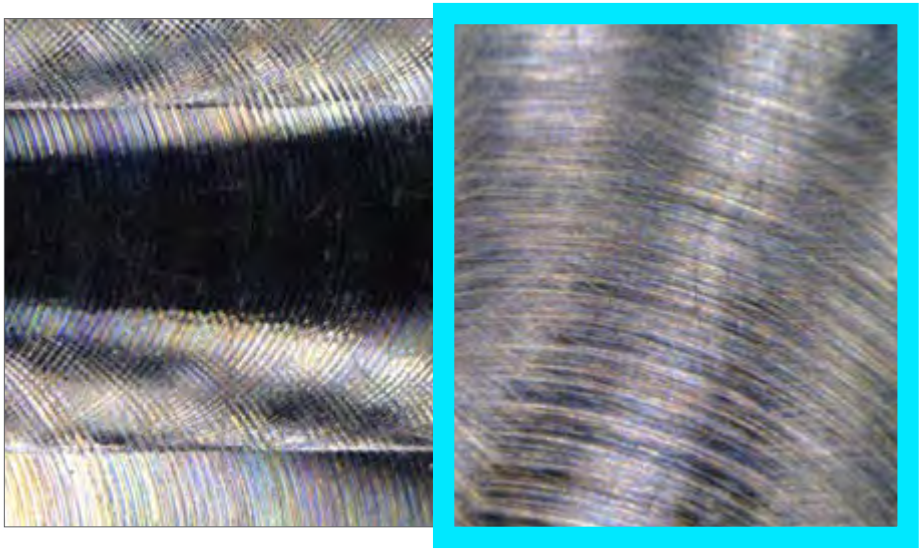
- Air cutting
- Actual machining
- Check the result

STAINLESS STEELS	**300 Series** **400 Series**	**PH Series**
LOW ALLOY STEELS	**Low Carbon** **Medium Carbon** **S45C**	**SCM**
HEAT RESISTANT ALLOYS	**Nickel Alloys** **Titanium Alloys**	**Inconel** **Tantalum**
HIGH HARDNESS STEELS	**High Carbon** **Tungsten** **Chromium**	**Molybdenum** **Cast Steel**
NON-FERROUS ALLOYS	**Aluminum Alloys** **Zinc Alloys** **Copper Alloys**	**Brass** **Bronze**
POLYMERS	**Plastics** **Resins**	**Composites**
CAST IRON	**Gray Cast** **Ductile Cast**	**Alloy Cast**

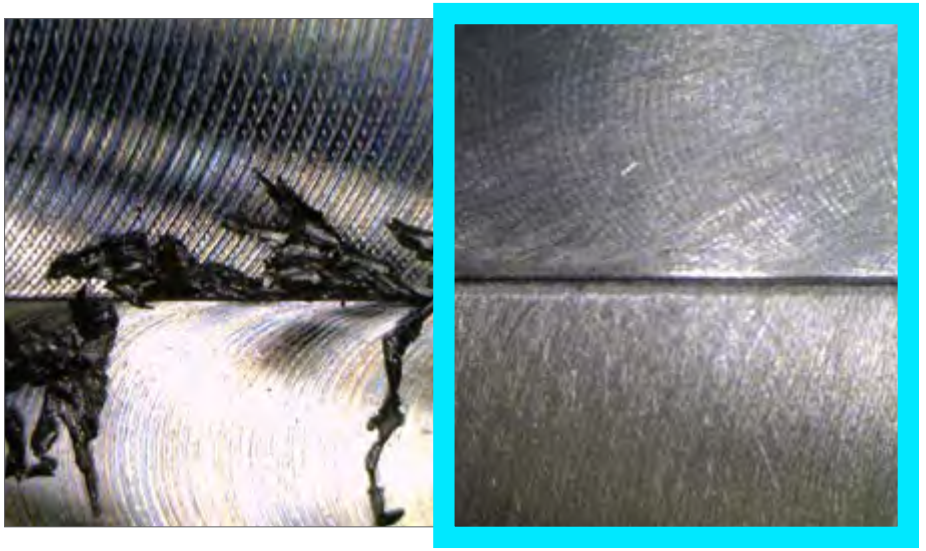
FOR A RANGE OF MATERIALS

up to 65 Rc

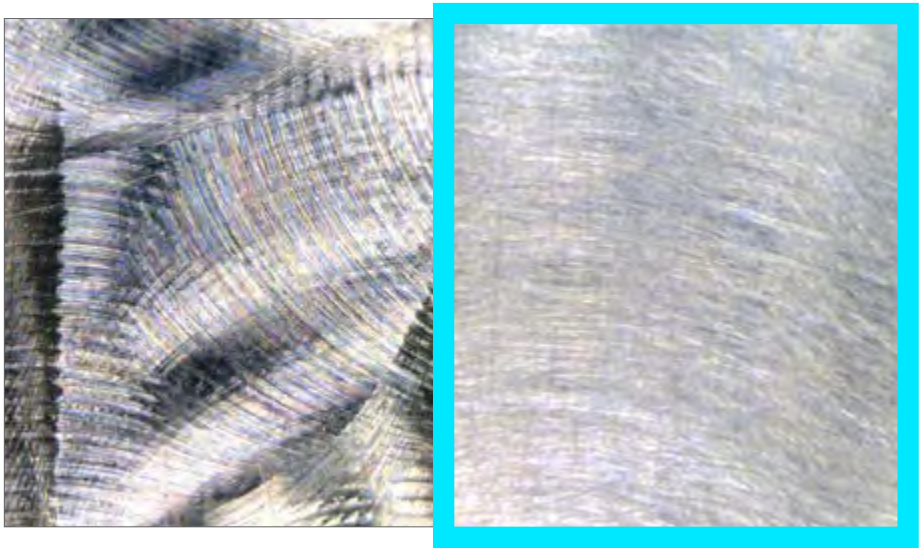
Deburring & Finishing Results



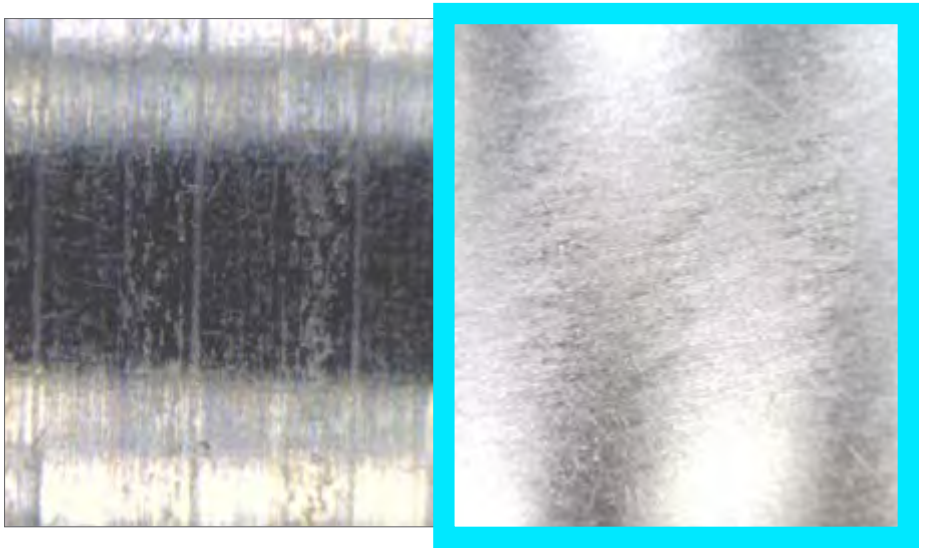
SURFACES



SURFACE FEATURES

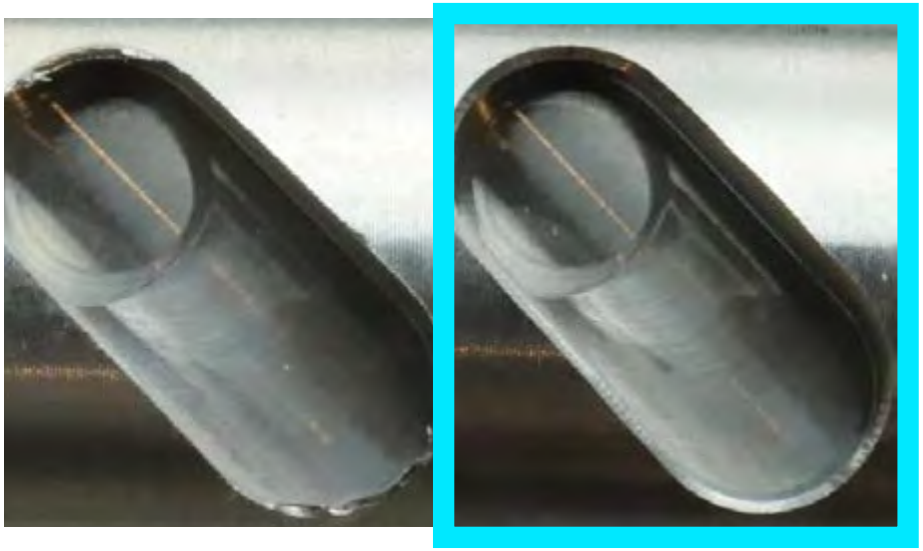


CUTTER MARK REMOVAL

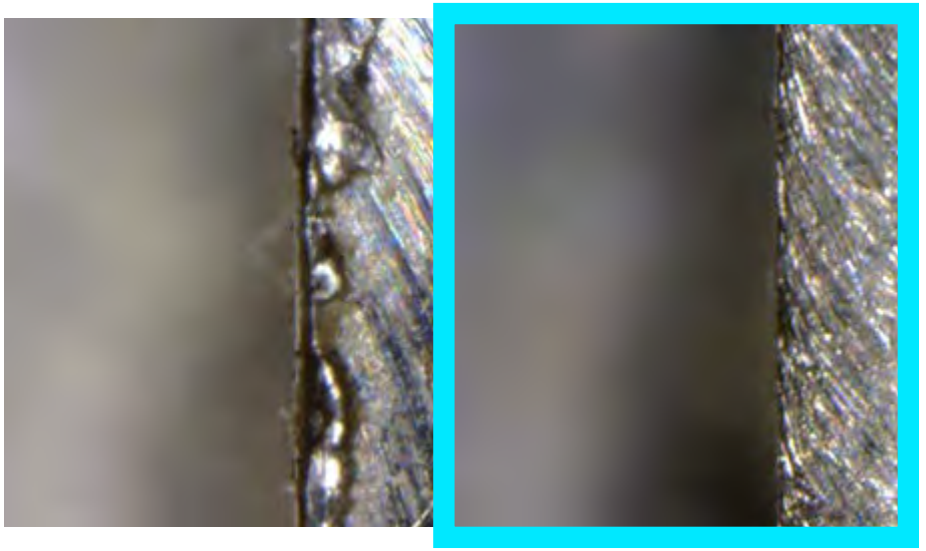


POLISHING

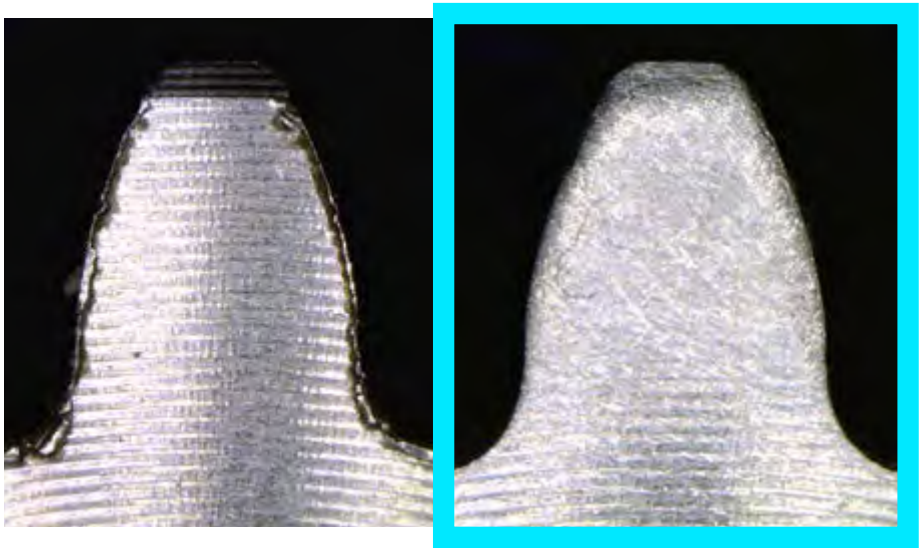
Deburring & Finishing Results



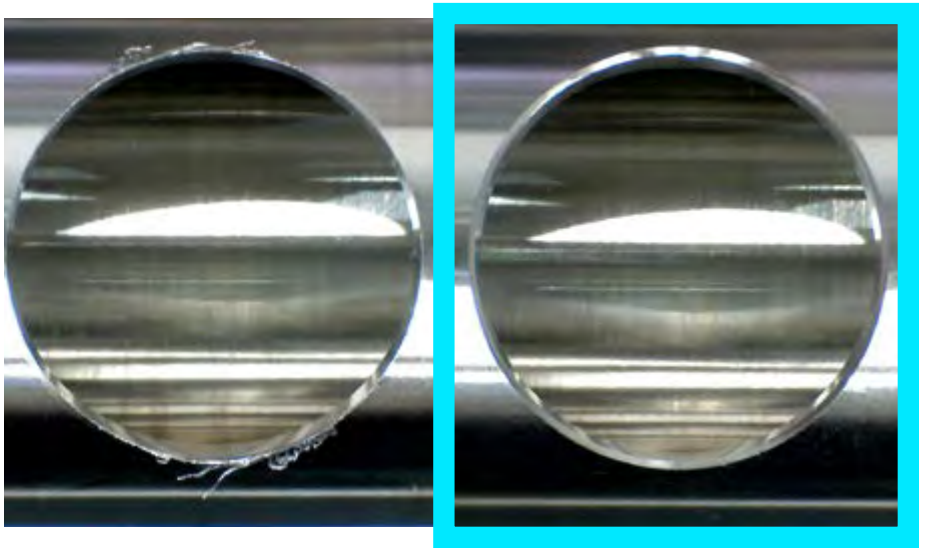
CHANNELED, BROKEN SURFACES



EDGES

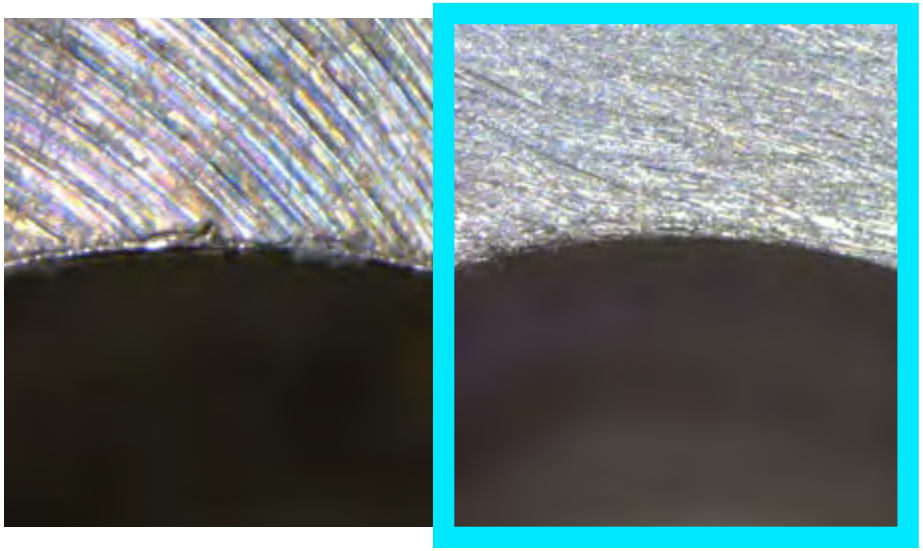


RADIUSED EDGE

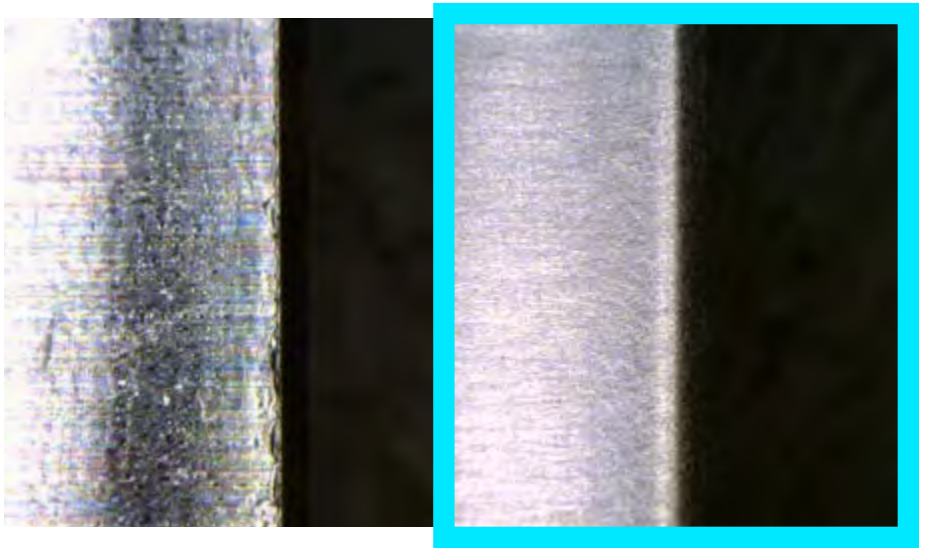


CHAMFERED EDGE

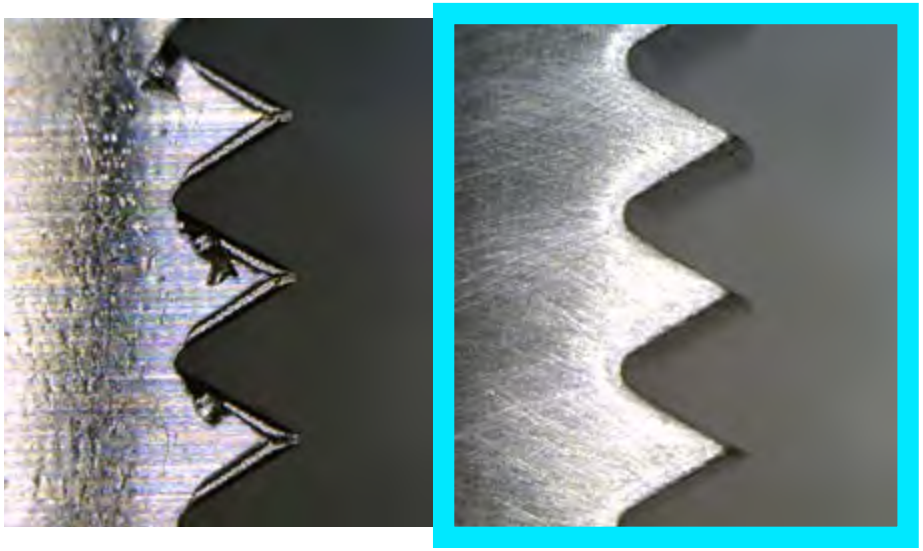
Deburring & Finishing Results



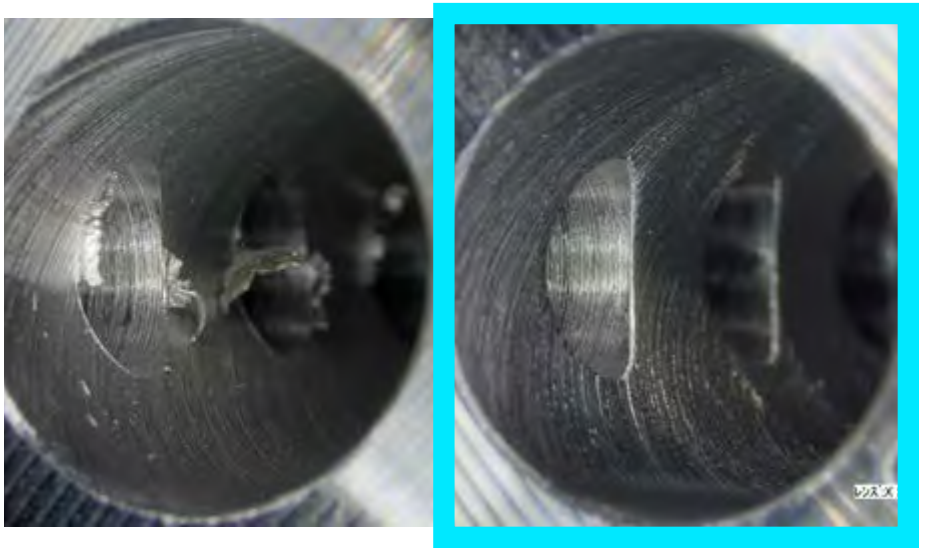
INNER WALL DIAMETERS



OUTER WALL DIAMETER



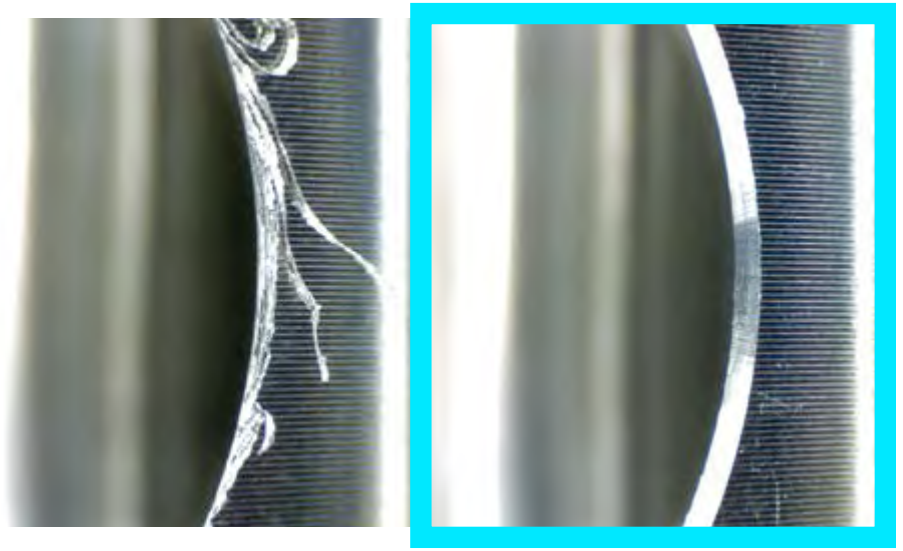
THREADED DIAMETERS



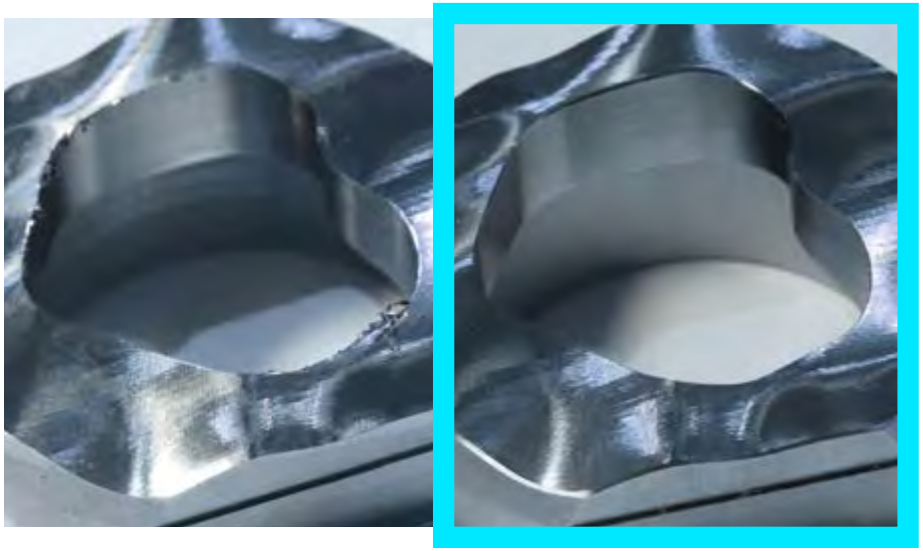
CROSS HOLES

Deburring & Finishing Results

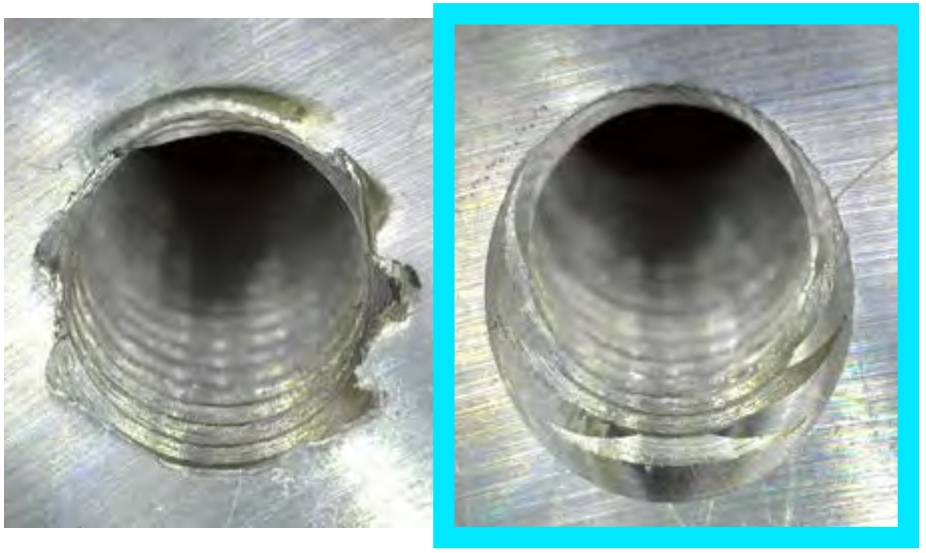
BORES



ELLIPTICAL HOLES

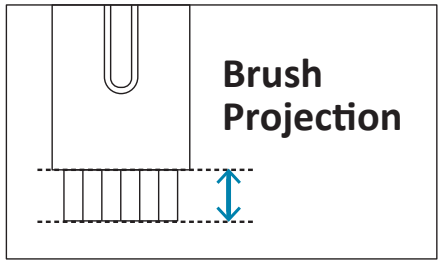


COMPLEX EDGE PROFILES



THREADED HOLES

Set Brush Projection

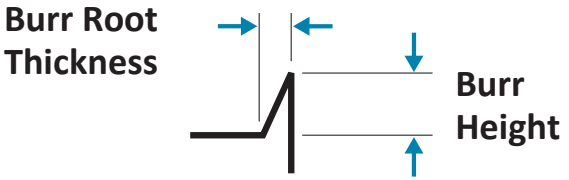


Brush Size Diameter	6 mm	15 mm	25 mm	40 mm	60 mm	100 mm
Brush Projection All Grades (in)	0.3125-0.375"	0.375-0.5625"	0.5-0.625"	0.5-0.625"	0.5-0.75"	0.5-0.75"

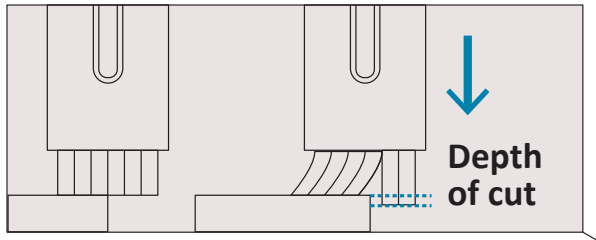
Brush projection below 0.2” increases grinding power and may affect finish

Target Burr Size

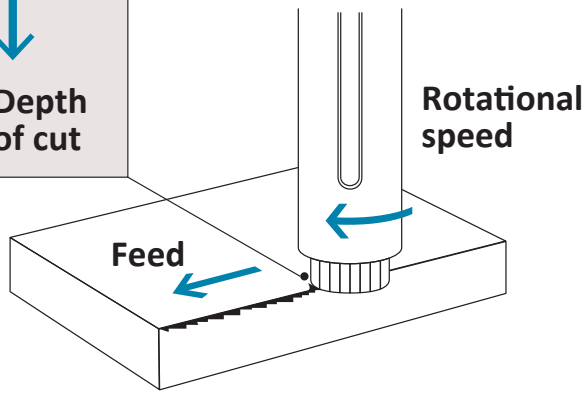
Burr Root Thickness of **0.008”** or less
(Burrs are bent with a fingernail)

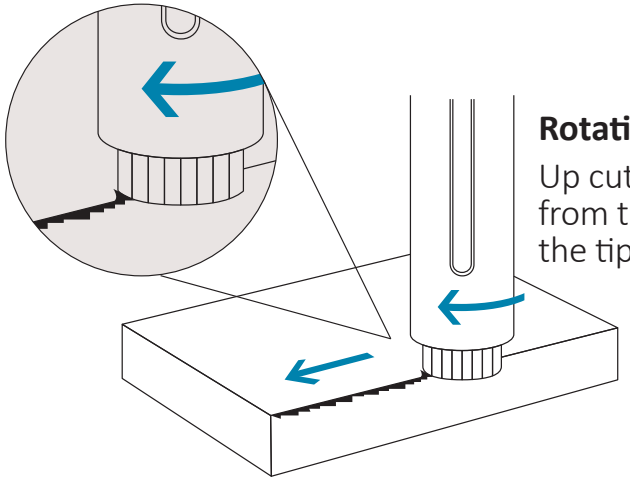


Workpiece Engagement



Engage part with the tip of the brush. Avoid contacting the side of the brush.





Rotation direction

Up cut against burrs from the bottom with the tip of the brush

Depth of Cut

All Brush Grades (Inches)

Polishing	Vertical Burr	Horizontal Burr	Heavy Burr
0.012”	0.020”	0.040”	0.060”

Tips for Maximizing Brush Performance

More than a brush - performs like a cutting tool.

Use of Coolant/Oil will optimize results

- **It will Extend Tool Life**
- **Improves Surface Finish**

MAXIMIZING DEBURRING OPERATION

1. Increase RPM to the maximum allowed
2. Decrease feed rate in 10% increments
3. Do not change original parameters, but increase number of passes
4. Try a more aggressive brush that will increase grinding power

MAXIMIZING TOOL LIFE

1. Decrease RPM in 10% increments
2. Increase feed rate by 10% increments
3. Try another brush color A13 Pink, A21 White, A11 Red, A32 Blue with the same parameters

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