XEBEC®
BEAUTIFUL DEBURRING

Advanced Deburring & Polishing Solutions

AEROSPACE

SEF Xebec

INDEX

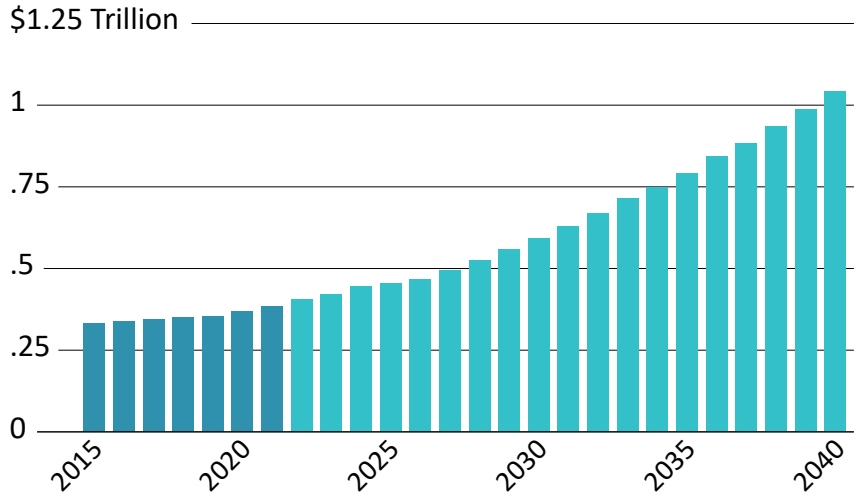
MARKET TRAJECTORY

To the Moon and The Stars

Demand for machined aerospace parts and components is skyrocketing. These parts will soon take us back to the moon. Then carry our brave men and women further out, to the surface of new planets, and bring those adventurers safely back home.
As man pushes the limits of aeronautics, space flight and communications, our brightest engineers are designing new processes to manufacture the parts and components that will build this future.

Projected Global Space Economy

Through 2040 (Trillions, US Dollars)

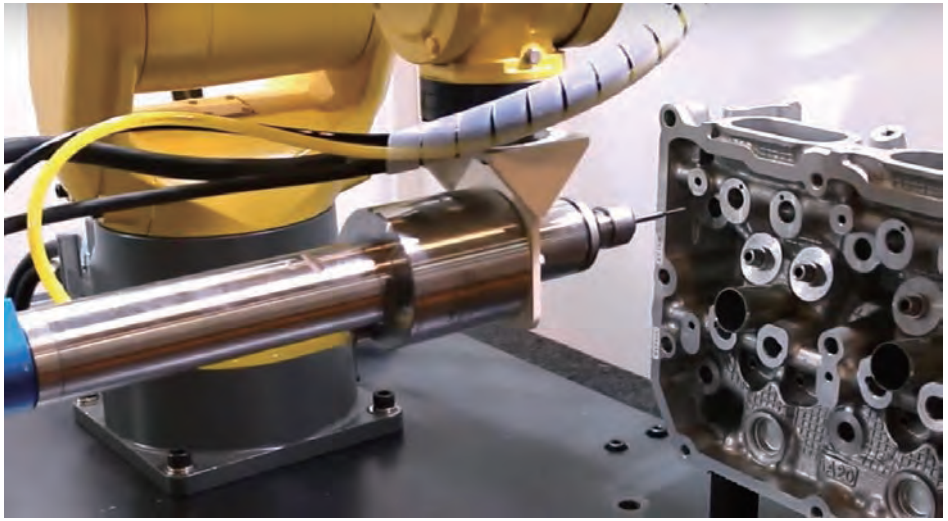


SOURCE: Haver Analytics, Morgan Stanley Research forecasts

Trajectory of the Aerospace Manufacturing Industry

By reengineering processes and upgrading machinery many manufacturers are modernizing operations to equip themselves for the demands of tomorrow.

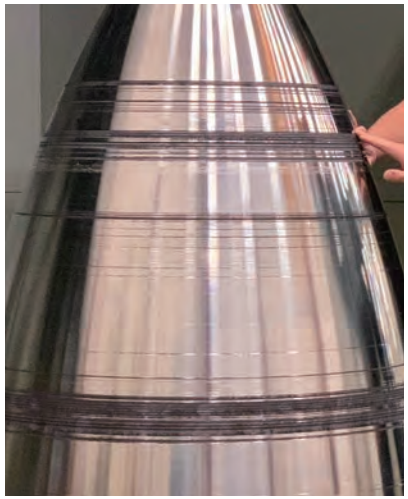
MEETING PRODUCTION GOALS



Are You Equipped to Meet Your Production Goals?

The current demand in aerospace manufacturing 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?

AEROSPACE QUALITY STANDARDS

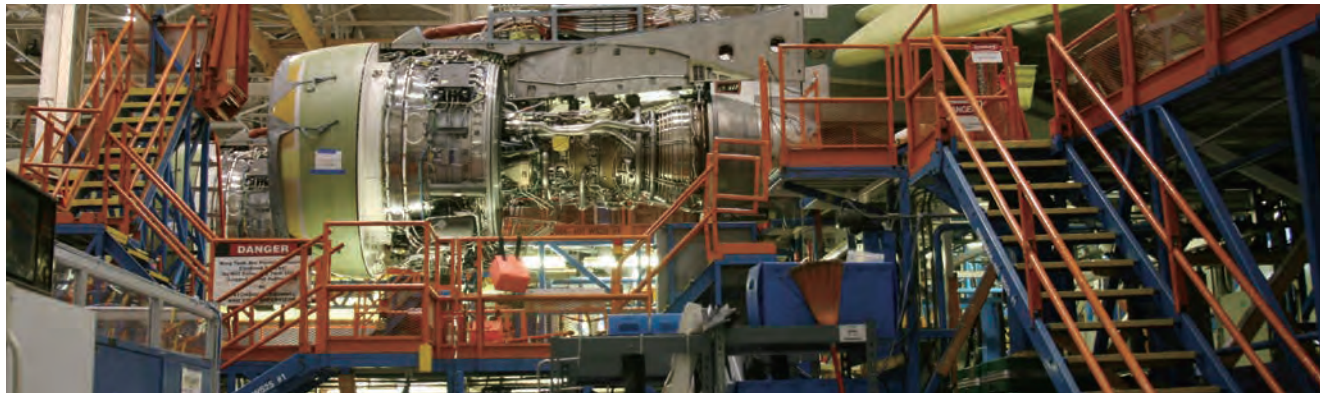


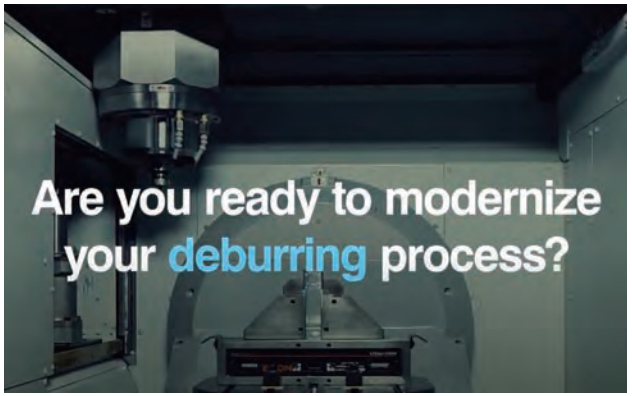
Quality Over Quantity. Do You Have to Choose?

Product quality is of particular concern in aerospace 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.

There's a Lot Riding on Your Precision Parts

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 can rise to meet the growing demand for your components by automating the finishing process - cutting production time, and ensuring consistent quality in your operations.





ELIMINATE SCRAP AND REWORK

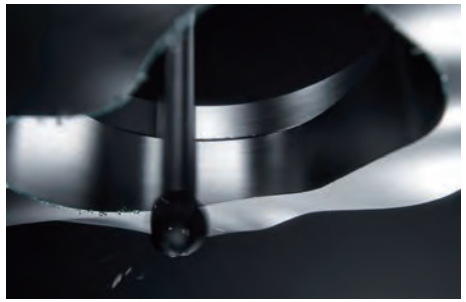
Inconsistencies in Manual Deburring Can Result in Rework and Scrapped Parts

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 Operation

ADVANCED MANUFACTURING TECHNOLOGIES



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.

Use XEBEC Brush in a Robotic Arm for Fast, Consistent Finishing

IMPROVING QUALITY

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

INCREASING PRODUCTIVITY

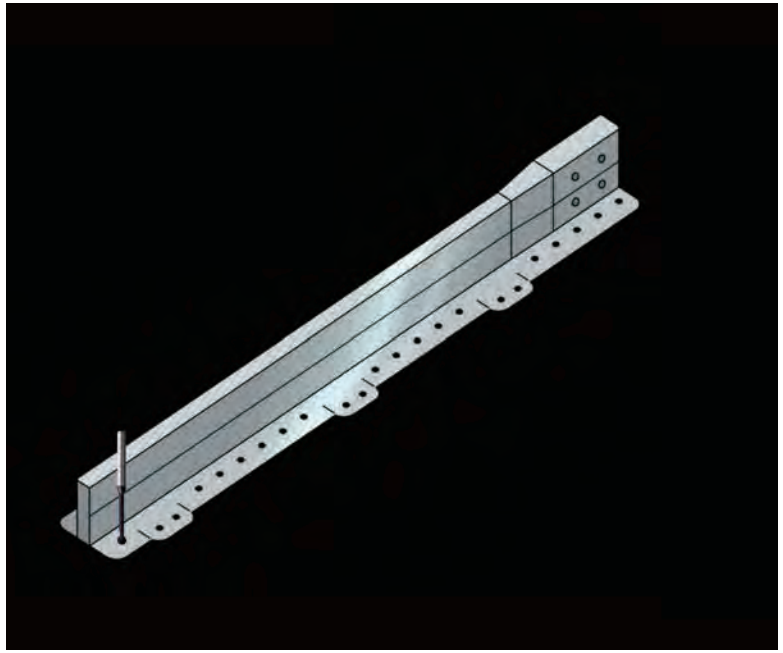
Innovative products for a wide range of manufacturing processes & products that decrease processing time and increase throughput.

REDUCING COSTS

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

FLOOR PANEL

Applicaton



Workpiece information

Industry	Aerospace
Part name	Floor panel
Material type	Titanium
Cutting process	Drilling, end-milling

Processing conditions

Tool	XEBEC Back Burr Cutter & Path (XC-58-A)
Processing detail	Deburring hole (front and back side) and edges after milling
Rotational Speed (min^{-1})	6,000
Feed Rate (mm/min)	900
Depth of cut (mm)	–

Before

Tool — Chamfering cutter

Problem — Due to the wide dimensional tolerance of the cutter, chamfering amount was unstable.

After

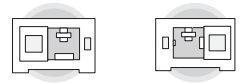
Tool — XEBEC Back Burr Cutter & Path (XC-58-A)

Result — The edges after XEBEC Back Burr Cutter are stable and uniform. High-quality finish is achieved.

Tool

XEBEC Back Burr Cutter and Path™

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

Brush Requires Brush Sleeve to Operate:

Spherical Cutting Tool **Custom Path Data**

Ideal for:

- Deburring Difficult Holes
- Inner and Outer Diameters

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

BLADE CASE

Applicaton

Workpiece information

Industry	Aerospace
Part name	Blade case
Material type	Titanium
Cutting process	Drilling

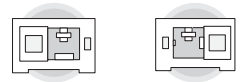
Processing conditions

Tool	XEBEC Back Burr Cutter & Path (XC-38-A/XC-58-A)
Processing detail	Deburring of hole (front and back) with angle head holder
Rotational Speed (min^{-1})	9,200/6,000
Feed Rate (mm/min)	1,200/900
Depth of cut (mm)	–

Tool

XEBEC Back Burr Cutter and Path™

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

Brush Requires Brush Sleeve to Operate:

Spherical Cutting Tool

Custom Path Data

Ideal for:

- Deburring Difficult Holes
- Inner and Outer Diameters

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

BEARING CAGE

Applicaton

Workpiece information

Industry	Aerospace
Part name	Bearing cage
Material type	Alloy steel
Cutting process	Turning and drilling

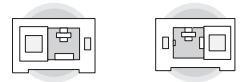
Processing conditions

Tool	XEBEC Back Burr Cutter & Path (XC-58-A)
Processing detail	Deburring hole (front and back side) and edges
Rotational Speed (min^{-1})	2,000
Feed Rate (mm/min)	250
Depth of cut (mm)	–

Tool

XEBEC Back Burr Cutter and Path™

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

Brush Requires Brush Sleeve to Operate:

Spherical Cutting Tool

Custom Path Data

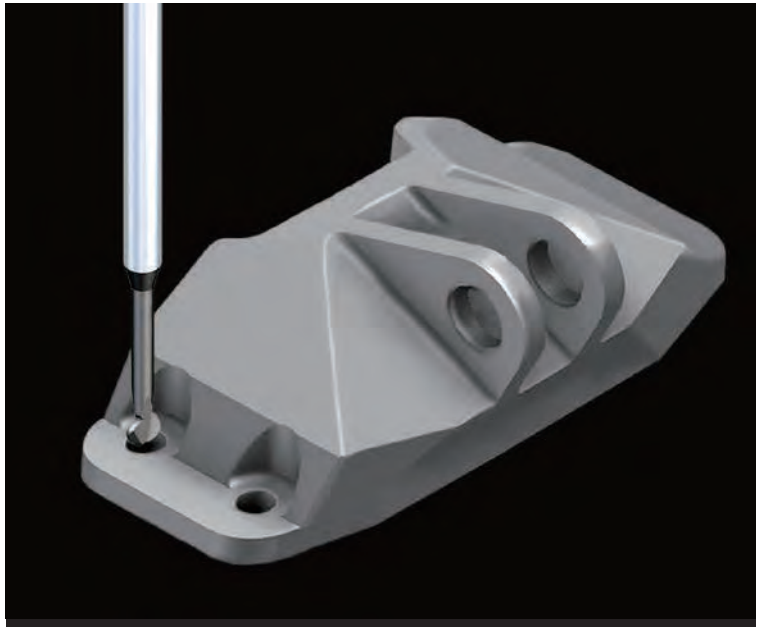
Ideal for:

- Deburring Difficult Holes
- Inner and Outer Diameters

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

ENGINE BRACKET

Applicaton



Workpiece information

Industry	Aerospace
Part name	Engine Bracket
Material type	Titanium Alloy
Cutting process	Crosshole Deburring

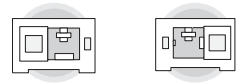
Processing conditions

Tool	XEBEC™ Back Burr Cutter (XC-98-A)
Processing detail	Deburring inside and outside edges of holes with chamfered edges.

Tool

XEBEC Back Burr Cutter and Path™

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

Brush Requires Brush Sleeve to Operate:

Spherical Cutting Tool

Custom Path Data

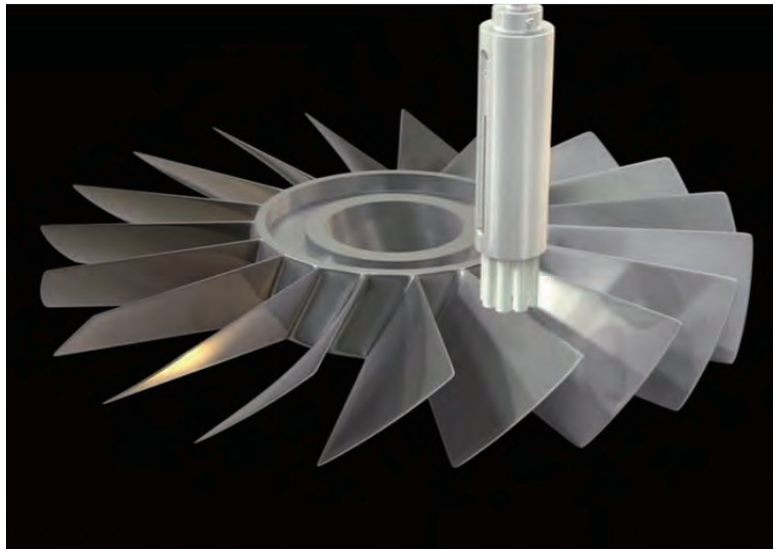
Ideal for:

- Deburring Difficult Holes
- Inner and Outer Diameters

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

BLISK

Applicaton



Workpiece information

Industry	Aerospace
Part name	Blisk
Material type	Inconel
Cutting process	Ball end mill processing

Processing conditions

Tool	XEBEC Brush Surface (A21-CB25M)
Processing detail	Deburring after ball-end milling process
Rotational Speed (min^{-1})	4,000
Feed Rate (mm/min)	2,400
Depth of cut (mm)	0.5

Before

Tool: Grindstone

Problem: It took time for deburring due to the complicated design of workpiece. Resulted in unstable edge quality.

After

Tool: XEBEC Brush Surface (A21-CB25M)

Result: By the introduction of automated deburring, 1 operator can operate the multiple machining centers.

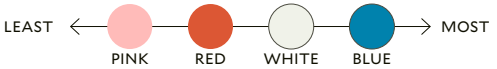
Tool

XEBEC Brush™ Surface

Available in Diameters:

6, 15, 25, 40, 60, 100 mm

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:

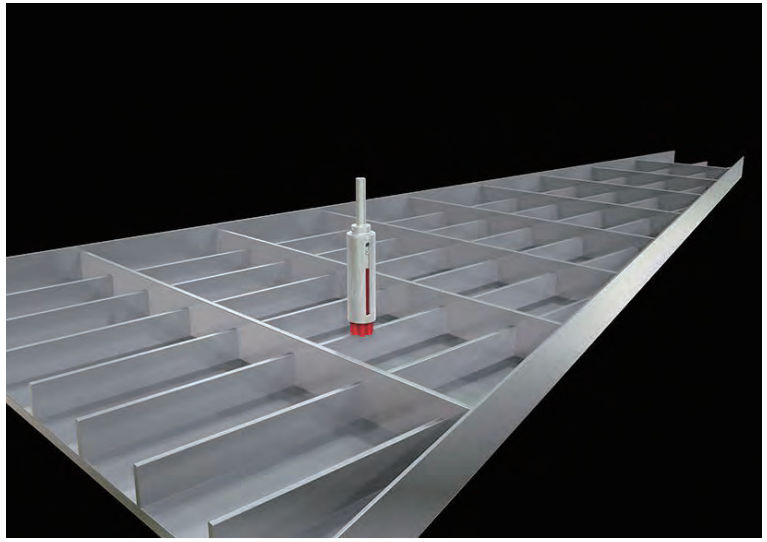
Ideal for:

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

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

WING RIB

Applicaton



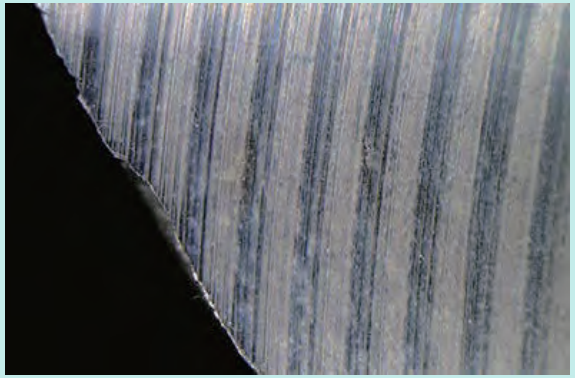
Workpiece information

Industry	Aerospace
Part name	Wing rib
Material type	Aluminum
Cutting process	End mill processing

Processing conditions

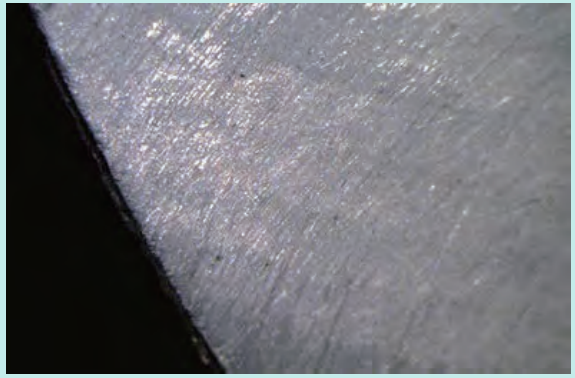
Tool	XEBEC Brush Surface (A11-CB25M)
Processing detail	Deburring after end milling process
Rotational Speed (min^{-1})	4,000
Feed Rate (mm/min)	800
Depth of cut (mm)	0.7

Before



Tool	Belt sander
Problem	It took time for deburring due to large workpiece.

After



Tool	XEBEC Brush Surface (A11-CB25M)
Result	By the introduction of automated deburring, stable quality realized in a shorter cycle time.

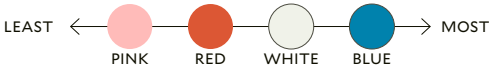
Tool

XEBEC Brush™ Surface

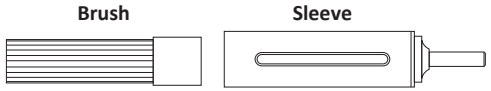
Available in Diameters:

6, 15, 25, 40, 60, 100 mm

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:



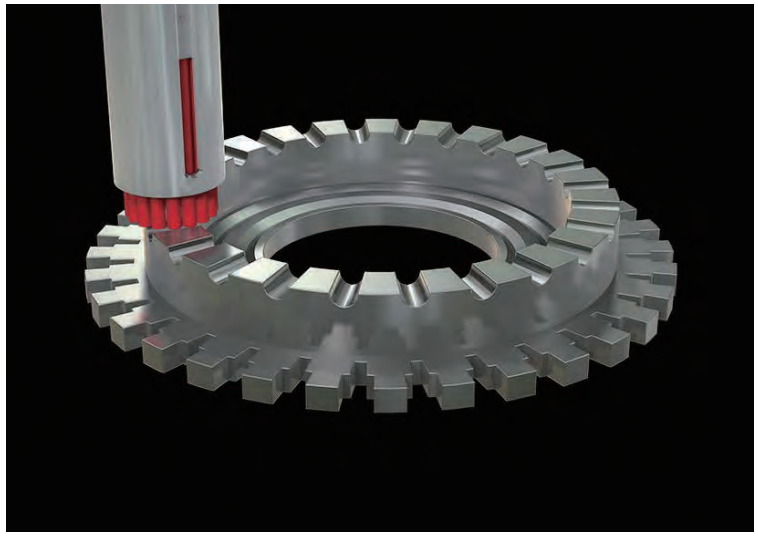
Ideal for:

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

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

TURBINE DISK

Applicaton



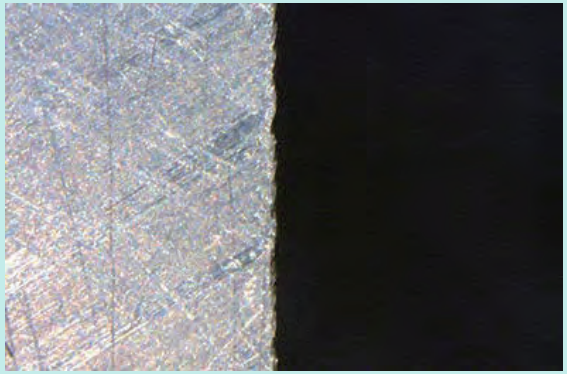
Workpiece information

Industry	Aerospace
Part name	Turbine disk
Material type	Inconel
Cutting process	Others

Processing conditions

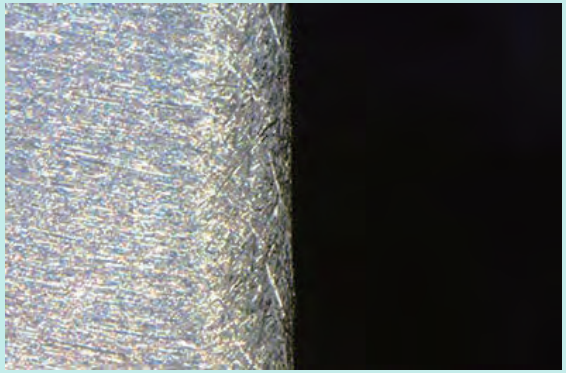
Tool	XEBEC Brush Surface (A11-CB40M)
Processing detail	Deburring after grinding process
Rotational Speed (min^{-1})	1,500
Feed Rate (mm/min)	2,400
Depth of cut (mm)	0.5

Before



Tool	Grindstone
Problem	Burrs remained and edge quality was inconsistent.

After



Tool	XEBEC Brush Surface (A11-CB40M)
Result	Achieved full automation with machining center. No burrs left and quality stabilized.

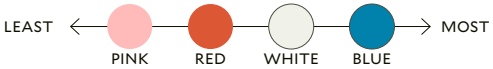
Tool

XEBEC Brush™ Surface

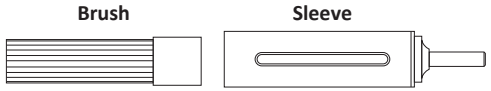
Available in Diameters:

6, 15, 25, 40, 60, 100 mm

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:



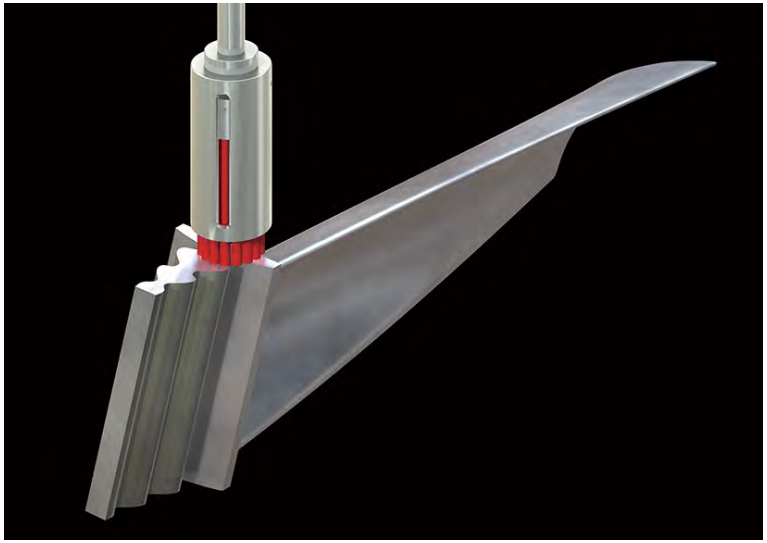
Ideal for:

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

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

TURBINE BLADE

Applicaton



Workpiece information

Industry	Aerospace
Part name	Turbine blade
Material type	SUS316
Cutting process	Ball end mill processing

Processing conditions

Tool	XEBEC Brush Surface (A11-CB25M)
Processing detail	Deburring after ball-end milling process
Rotational Speed (min^{-1})	1,000
Feed Rate (mm/min)	1,000
Depth of cut (mm)	0.3

Before

Tool	File
Problem	Deburring caused unstable edge quality. Recovering process was required.

After

Tool	XEBEC Brush Surface (A11-CB25M)
Result	By the introduction of automated deburring, stable quality with even edge shape realized.

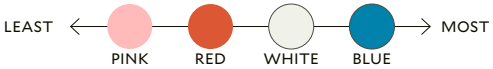
Tool

XEBEC Brush™ Surface

Available in Diameters:

6, 15, 25, 40, 60, 100 mm

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:

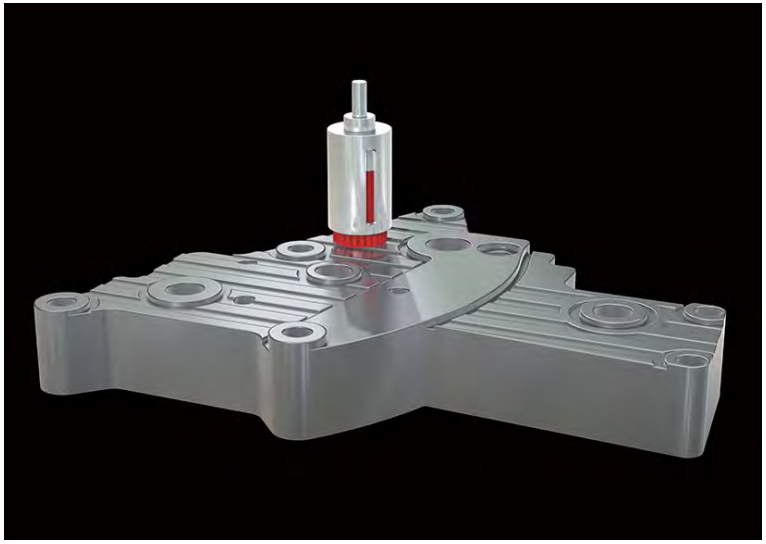
Ideal for:

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

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

LANDING GEAR

Applicaton



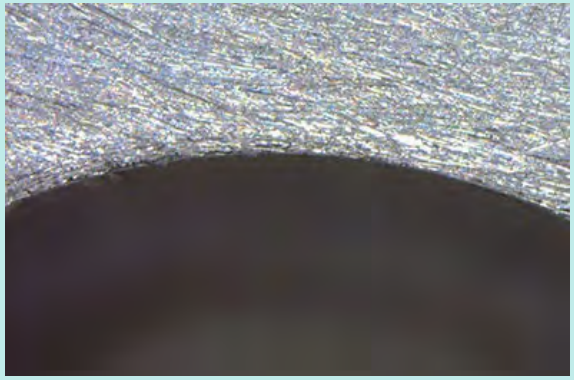
Workpiece information

Industry	Aerospace
Part name	Landing gear parts
Material type	Aluminum
Cutting process	Front cutter processing

Processing conditions

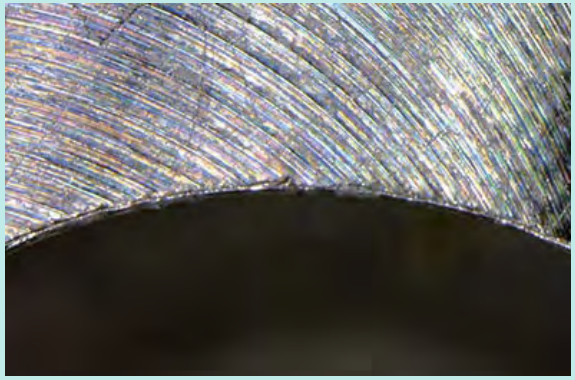
Tool	XEBEC Brush Surface (A11-CB100M)
Processing detail	Deburring the edge face after milling process
Rotational Speed (min^{-1})	3,000
Feed Rate (mm/min)	2,000
Depth of cut (mm)	0.7

Before



Tool	File
Problem	Manual deburring caused unstable quality and long processing time required.

After



Tool	XEBEC Brush Surface (A11-CB40M)
Result	Deburring is fully automated and consistent finish achieved.

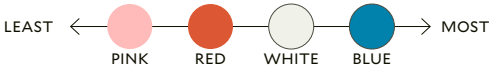
Tool

XEBEC Brush™ Surface

Available in Diameters:

6, 15, 25, 40, 60, 100 mm

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:

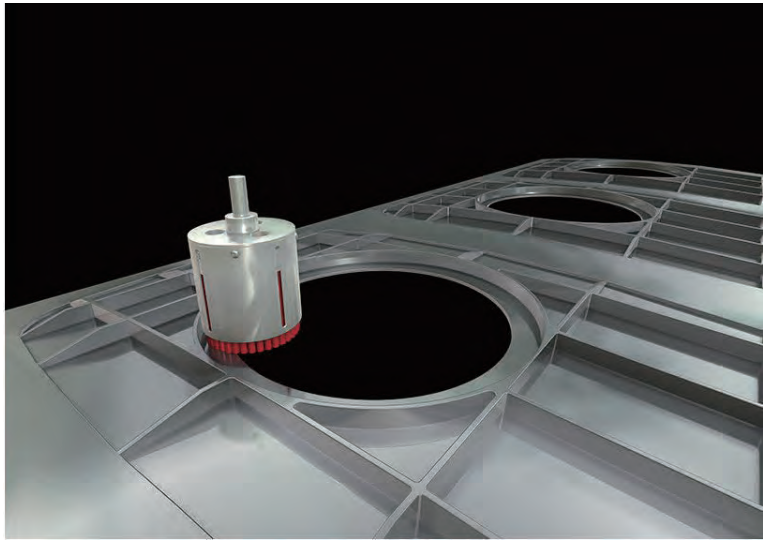
Ideal for:

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

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

AIRCRAFT BODY

Applicaton



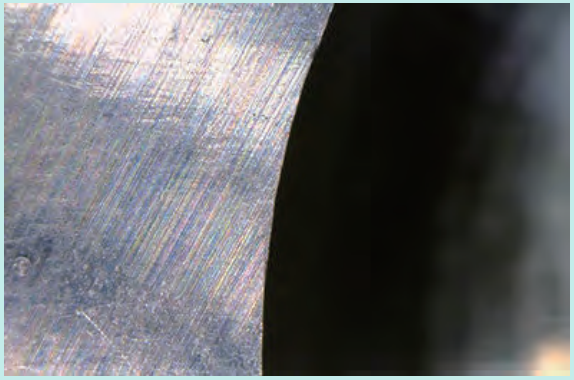
Workpiece information

Industry	Aerospace
Part name	Aircraft body
Material type	Aluminum alloy
Cutting process	Front cutter processing

Processing conditions

Tool	XEBEC Brush Surface (A11-CB100M)
Processing detail	Deburring the edge face after milling process
Rotational Speed (min^{-1})	960
Feed Rate (mm/min)	500
Depth of cut (mm)	0.3

Before



Tool	Belt sander
Problem	It took time for deburring due to the large workpiece.

After

Tool	XEBEC Brush Surface (A11-CB100M)
Result	Deburring is fully automated. Consistent finish and cut-down of machining time achieved.

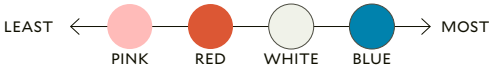
Tool

XEBEC Brush™ Surface

Available in Diameters:

6, 15, 25, 40, 60, 100 mm

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:

Ideal for:

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

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

ENGINE SHELL NOZZLE

Applicaton

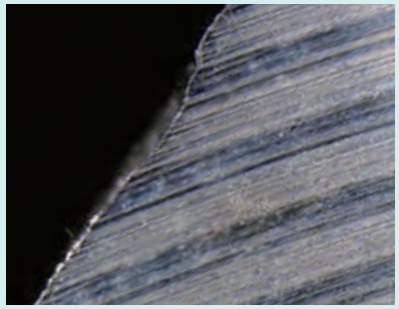
Workpiece information

Industry	Aerospace
Part name	Nozzle
Material type	Aluminum Alloy
Cutting process	Surface Finishing

Processing conditions

Tool	XEBEC™ Brush Surface Extra-Large (A32-CB200M)
Processing detail	Deburring and finishing of edges and large surface area
Rotational Speed (min^{-1})	550
Feed Rate (mm/min)	2,500

Before



After

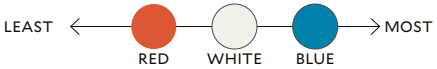
Tool

XEBEC Brush™ Surface Extra-Large

Available in Diameters:

125, 165, 200 mm

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:

Ideal for:

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

For large parts with surface widths greater than 100mm. Deburring & finishing following face-milling, end-milling & drilling.

ENGINE COMPRESSOR SHAFT

Applicaton

Workpiece information

Industry	Aerospace
Part name	Engine Compressor Shaft
Material type	Hastelloy
Cutting process	Surface Finishing

Processing conditions

Tool	XEBEC™ Brush End Type (A11-EB06M)
Processing detail	Deburring and finishing of curved surface features and radial edges..
Rotational Speed (min^{-1})	550
Feed Rate (mm/min)	2,500

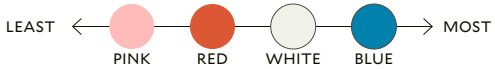
Tool

XEBEC Brush™ Surface End Type

Available in Diameters:

1, 1.5, 2, 2.5, 3, 5 mm

Aggressiveness indicated by Color:



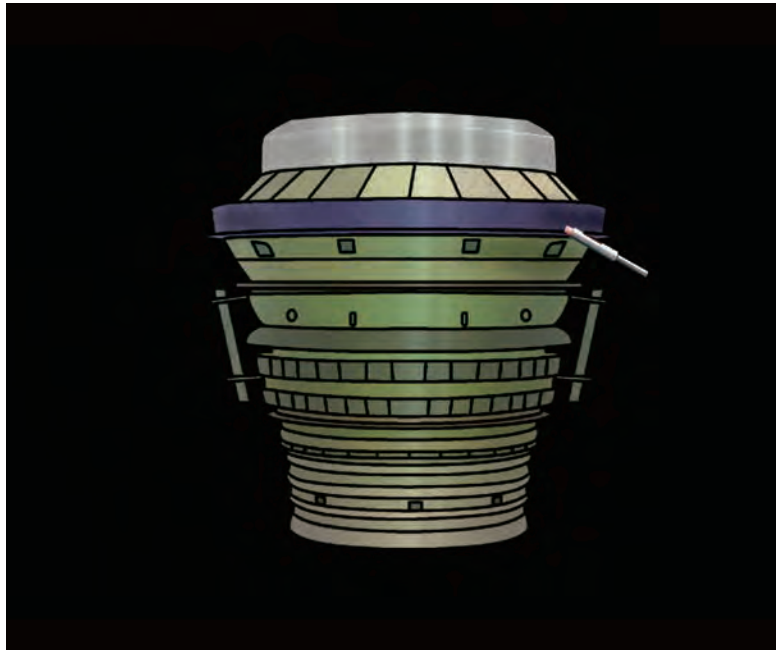
Ideal for:

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

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

COMPRESSOR CASE

Applicaton



Workpiece information

Industry	Aerospace
Part name	Intermediate compressor case
Material type	Titanium
Cutting process	End-milling

Processing conditions

Tool	XEBEC Brush Surface (A11-CB06M)
Processing detail	Robot arm grips Brush and moves along the edges
Rotational Speed (min^{-1})	3,600
Feed Rate (mm/min)	1,800
Depth of cut (mm)	0.5

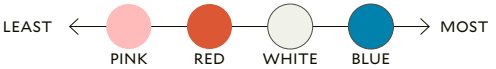
Tool

XEBEC Brush™ Surface

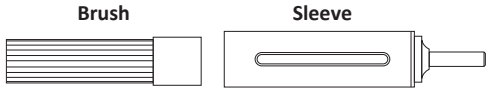
Available in Diameters:

6, 15, 25, 40, 60, 100 mm

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:



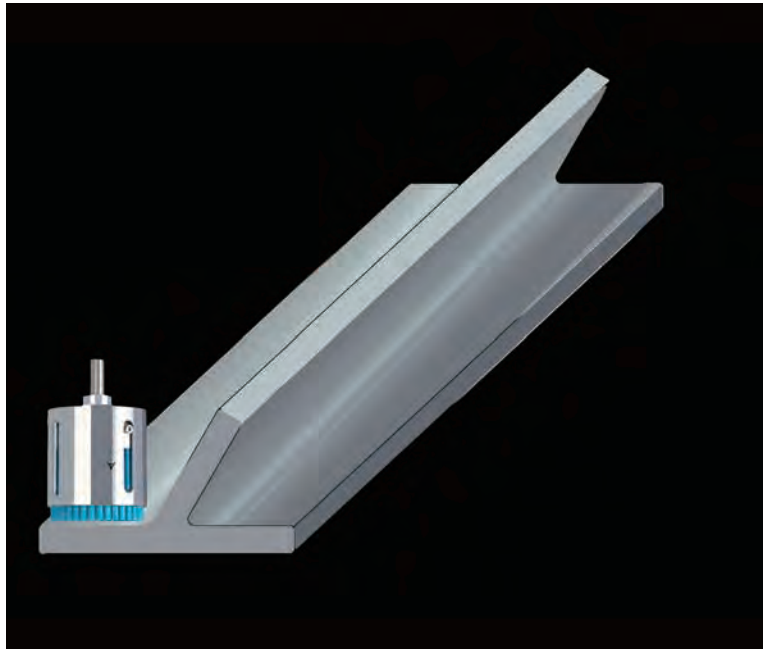
Ideal for:

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

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

WING COMPONENT

Applicaton



Workpiece information

Industry	Aerospace
Part name	Component of wings
Material type	Aluminum
Cutting process	End-milling

Processing conditions

Tool	XEBEC Brush Surface (A32-CB60M/ A32-CB100M)
Processing detail	Cutter mark removal and removal of mismatches
Rotational Speed (min^{-1})	2,000/1,200
Feed Rate (mm/min)	850
Depth of cut (mm)	0.5

Before

Tool Disc grinder

Problem It took an hour per part to remove tool marks and mismatches. Only the experienced worker handled the task. Due to his retirement, there was an urgent need to semi-automate the manual process.

After

Tool XEBEC Brush Surface (A32-CB60M/A32-CB100M)

Result Flat surfaces are now processed in CNC but some parts including R-shaped corner still require manual finishing but time for manual process is reduced by half.

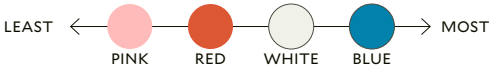
Tool

XEBEC Brush™ Surface

Available in Diameters:

6, 15, 25, 40, 60, 100 mm

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:

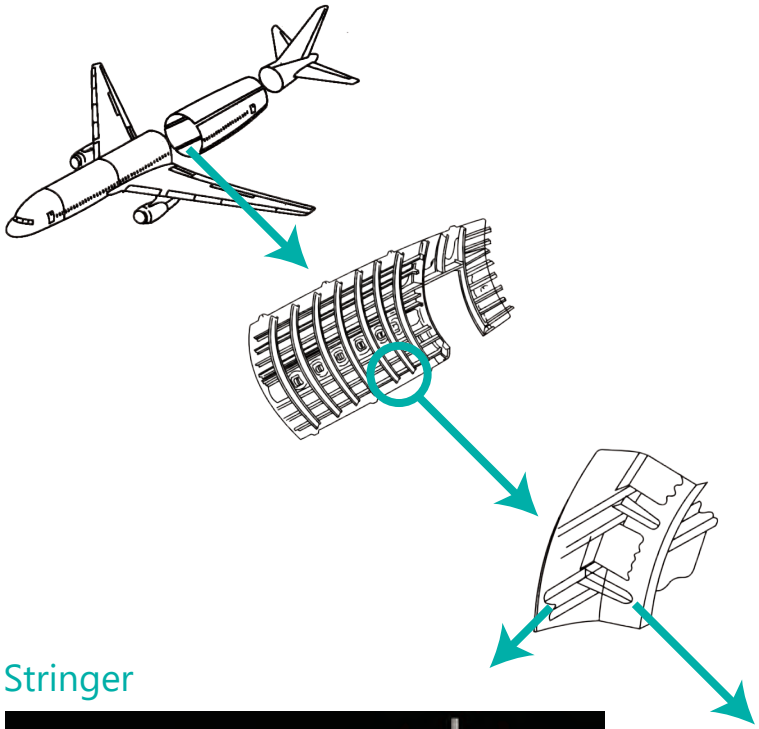
Ideal for:

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

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

STRINGER, STRINGER CLIP

Applicaton



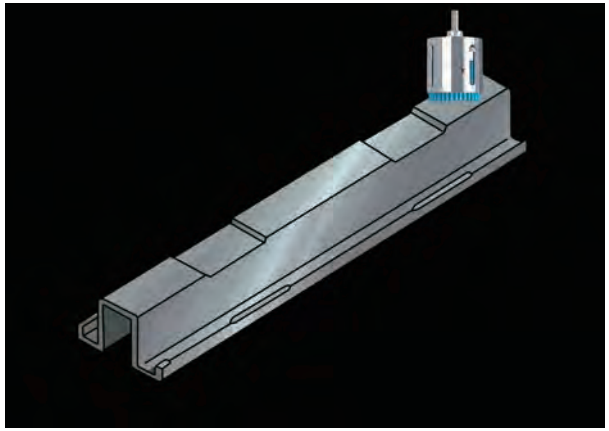
Workpiece information

Industry	Aerospace
Part name	Compressor case
Material type	Aluminum
Cutting process	End-milling

Processing conditions

Tool	XEBEC Brush Surface (A32-CB60M/ A21-CB25M)
Processing detail	Deburring after end milling and scratch removal
Rotational Speed (min^{-1})	1,600/4,000
Feed Rate (mm/min)	1,800/2,500
Depth of cut (mm)	0.5

Stringer



Stringer clip

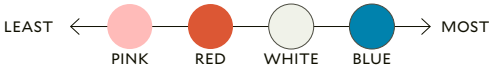
Tool

XEBEC Brush™ Surface

Available in Diameters:

6, 15, 25, 40, 60, 100 mm

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:

Ideal for:

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

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

PIPE FITTING

Applicaton

Workpiece information

Industry	Aerospace
Part name	Pipe Fitting
Material type	Titanium Alloy
Cutting process	Crosshole Deburring

Processing conditions

Tool	XEBEC™ Brush Crosshole (CH-A33-7L)
Processing detail	Deburring and finishing inner wall diameter
Rotational Speed (min^{-1})	8,000
Feed Rate (mm/min)	300

Tool

XEBEC Brush™ Crosshole

Available in Diameters:

1.5, 3, 5, 7, 11, 15, 20, 25 mm

Aggressiveness indicated by Color:

Length:

Standard and Extended Lengths

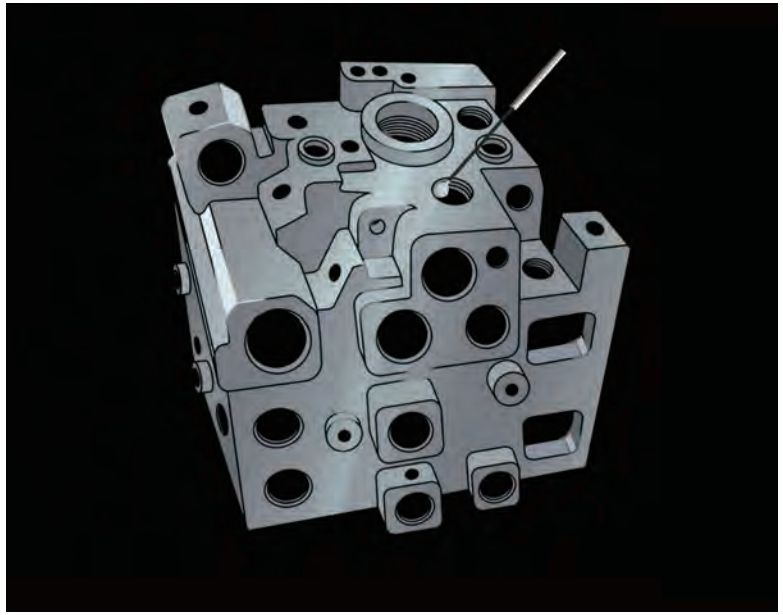
Ideal for:

- Cross Hole Deburring
- Inner Walls of Cylinders

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

HYDRAULIC PARTS

Applicaton



Workpiece information

Industry	Aerospace
Part name	Hydraulic parts
Material type	Aluminum
Cutting process	Drilling

Processing conditions

Tool	XEBEC Stone Flexible Shaft CH-PM-3B/4B/5B/6B/10B CH-PO-4B/5B/6B CH-PB-4B/5B/3R CH-PM-3B-L CH-PM-6B-L
Processing detail	Deburring after end milling and scratch removal

Before

Tool — Cutting tool

Problem — Manual deburring took 11 hours per workpiece. Due to roughness requirement, scratches by cutting tool were not allowed. The workers had to process it delicately and it was inefficient.

After

Tool — XEBEC Stone Flexible Shaft

Result — Secondary burrs are not generated. Efficiency is significantly improved.

Tool

XEBEC Stone™ Flexible Shaft

Head Styles:

Cylinder **Sphere**

Available in Diameters:

3, 4, 5, 6, 10 mm

Stone color and grit:

Blue #800 **Orange** #400 **Gray** #220

Ideal for:

- Deburring Cross Holes
- Soft Contact
- Suppresses Vibrations

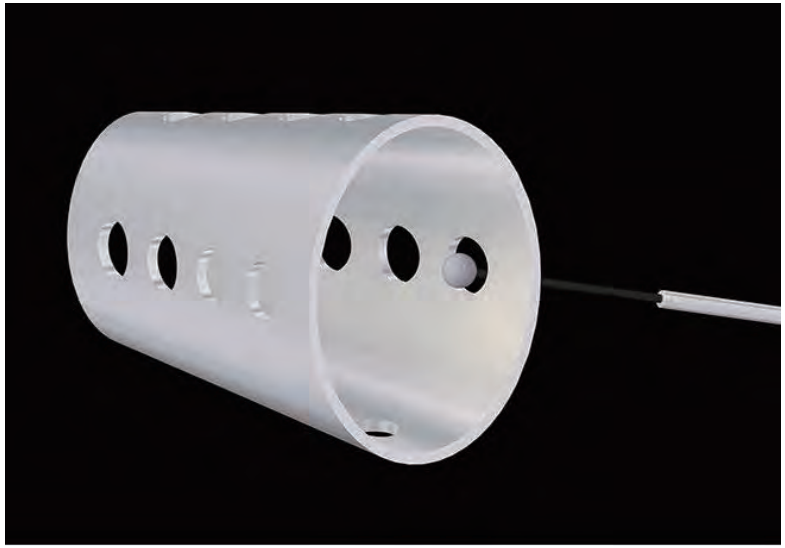
Available styles:

- Extended Flexible Shaft
- Cylinder or Sphere Heads

Deburring both the front and back of a drilled hole.

PIPE PART

Applicaton



Workpiece information

Industry	Aerospace
Part name	Pipe parts for aircrafts (Cross hole)
Material type	SUS
Cutting process	Drilling

Processing conditions

Tool	XEBEC Stone Flexible Shaft Type (CH-PM-6B)
Processing detail	Cross hole deburring (back burr) after drilling process
Rotational Speed (min^{-1})	2,000
Feed Rate (mm/min)	—
Depth of cut (mm)	—
Machining time (sec)	30sec/hole

Before

Tool — Rubber grindstone in the rotating tool

Problem — Finish quality varied from the skill of workers. It took around 40 minutes to deburr 16 holes (150 seconds/hole).

After

Tool — XEBEC Stone Flexible Shaft Type (CH-PM-6B)

Result — Insert the spherical grinding stone with the cross hole and contour the edge while pulling the tool lightly. Stable quality with shorter cycle time realized.

Tool

XEBEC Stone™ Flexible Shaft

Head Styles:

Cylinder **Sphere**

Available in Diameters:

3, 4, 5, 6, 10 mm

Stone color and grit:

Blue #800 **Orange** #400 **Gray** #220

Ideal for:

- Deburring Cross Holes
- Soft Contact
- Suppresses Vibrations

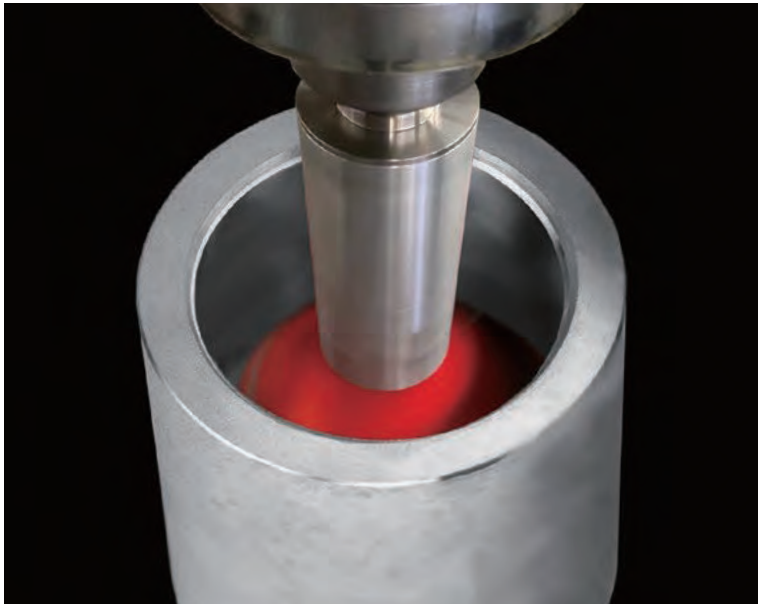
Available styles:

- Extended Flexible Shaft
- Cylinder or Sphere Heads

Deburring both the front and back of a drilled hole.

LARGE INNER DIAMETER

Applicaton



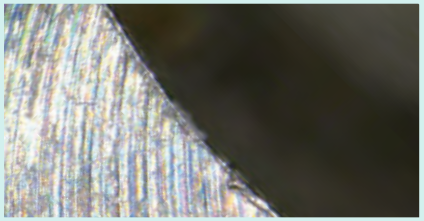
Workpiece information

Industry	Aerospace
Part name	Large Diameter Cross Hole
Material type	17-4 Stainless Steel
Cutting process	Deburring ID Hole

Processing conditions

Tool	XEBEC™ Brush Surface (A11-CB25M)
Processing detail	Deburring of large inner diameter of hole.
Rotational Speed (min^{-1})	2,800
Brush Projection Specified for Inner Diameter Application	80mm
Flared Target Diameter	115mm

Before



After

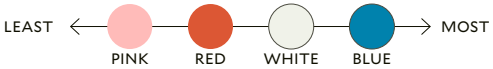
Tool

XEBEC Brush™ Surface

Available in Diameters:

6, 15, 25, 40, 60, 100 mm

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:

Ideal for:

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

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

THREADED DIAMETER

Applicaton

Workpiece information

Industry	Aerospace
Part name	Threaded Diameter
Material type	Aluminum Alloy
Cutting process	Surface Finishing

Processing conditions

Tool	XEBEC™ Wheel Brush (W-A11-75)
Processing detail	Deburring and finishing of threaded diameter of inner wall.
Rotational Speed (min^{-1})	1,900
Feed Rate (mm/min)	3,000

Tool

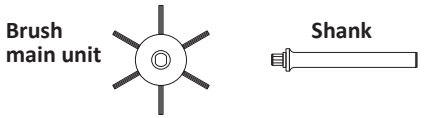
XEBEC Brush™ Wheel Type

Available in Diameters:

50, 75 mm

Requires reusable Shank to operate

70 or 150 mm Shank lengths



Available Colors (Aggressiveness):

Red

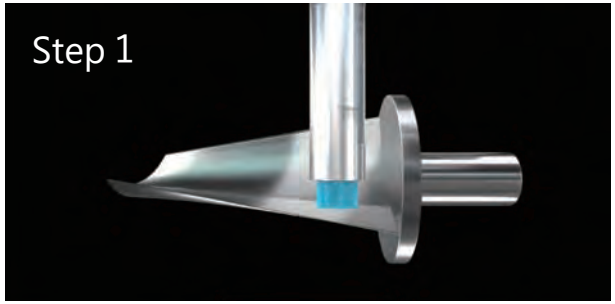
Ideal for:

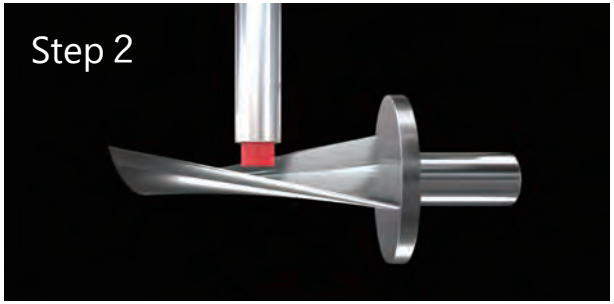
- Deburring and Polishing
- Side Surfaces
- Inner and Outer Diameters

Can be used in CNC and robotic machines.

TURBINE BLADE

Applicaton





	Step 1	Step 2
Processing details	XEBEC Brush Surface（A32 Blue） Ra5.0 ⇒ Ra0.34	XEBEC Brush Surface（A11 Red） Ra0.34 ⇒ Ra0.16
Machining time	4.5min	

Effect

	After ball end milling	After semi finishing	After finishing
convex surface	Ra 4.912 Rz 21.181	Ra 0.336 Rz 2.974	Ra 0.159 Rz 1.557
concave surface	Ra 5.024 Rz 20.763	Ra 0.245 Rz 2.180	Ra 0.100 Rz 0.856

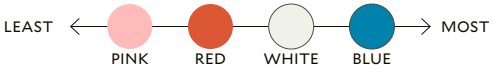
Tool

XEBEC Brush™ Surface

Available in Diameters:

6, 15, 25, 40, 60, 100 mm

Aggressiveness indicated by Color:



Brush Requires Brush Sleeve to Operate:

Ideal for:

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

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

INNOVATIVE DEBURRING & FINISHING TOOLS

Surface Deburring & Finishing

- 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

- 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

- 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.

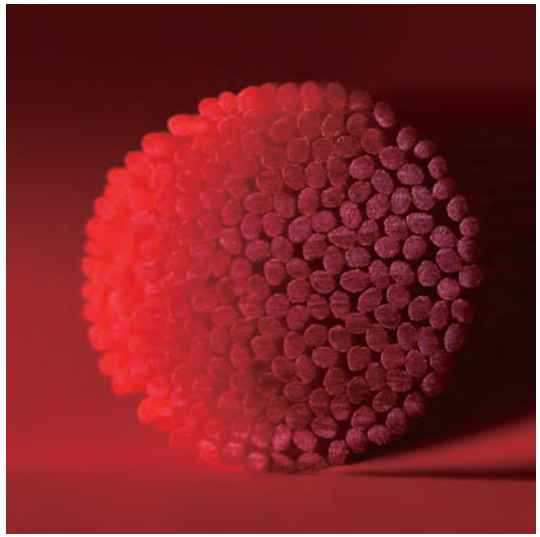
XEBEC® Ceramic Fiber

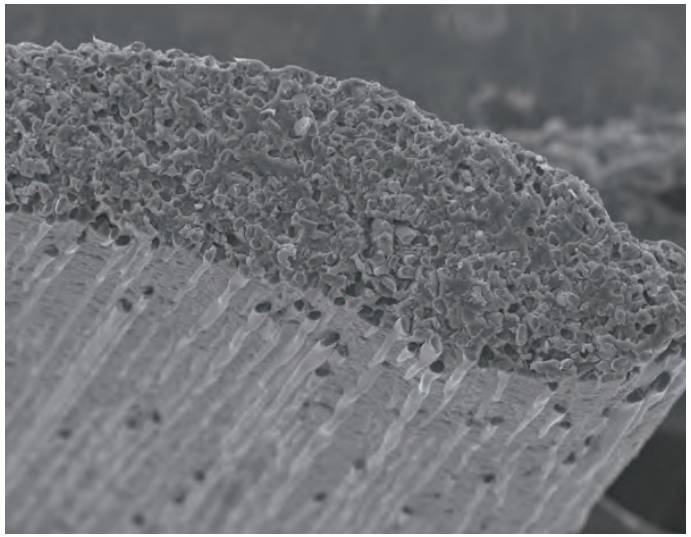
The ceramic fibers are woven to create self-sharpening filaments that maintain consistent cutting action on the tips. Unlike wire and abrasive impregnated nylon brush filaments, the unique design of the XEBEC fiber rod maintains its shape with no deformation even after repeated use. This leads to consistent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

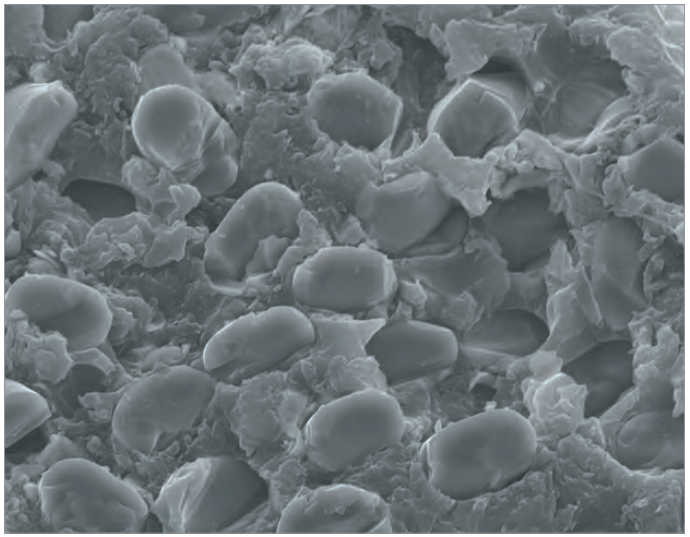
FINE FINISHING
up to
Ra 0.1 µm

More than a brush - performs like a cutting tool.

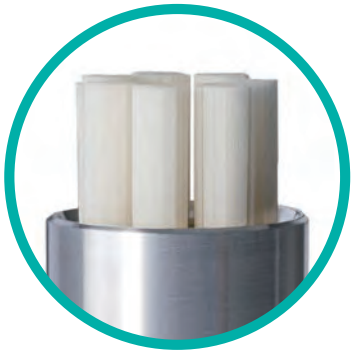
Continuous Ceramic Fibers







CONTINUOUS CERAMIC FIBER DEBURRING & FINISHING TOOLS



FLEXIBLE BRISTLES

XEBEC Brush™

Ceramic Fibers are formed into bristles to produce tip cutting Brushes

Cuts from the tip

SOLID

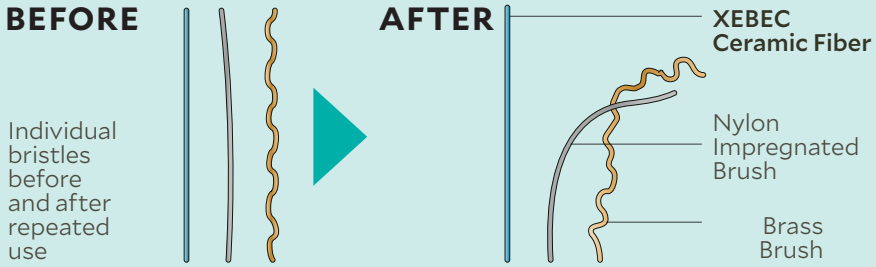
XEBEC Stone™

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

Cuts on all sides

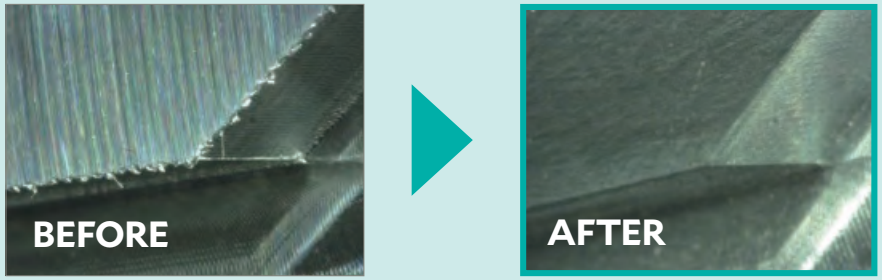
No Deformation

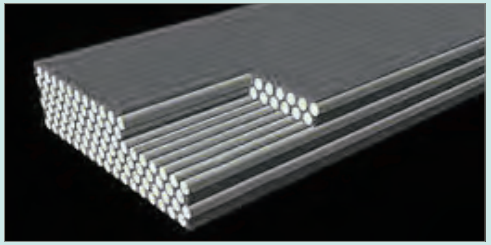
Bristles made from XEBEC™ ceramic fiber filament maintain their shape even after repeated use. Which means the grinding power is not diminished over time and performance quality is consistently fine.



Self-Sharpening Effect

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



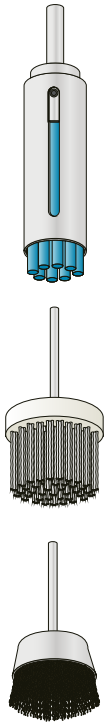


Flexibility and Grinding Power

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.

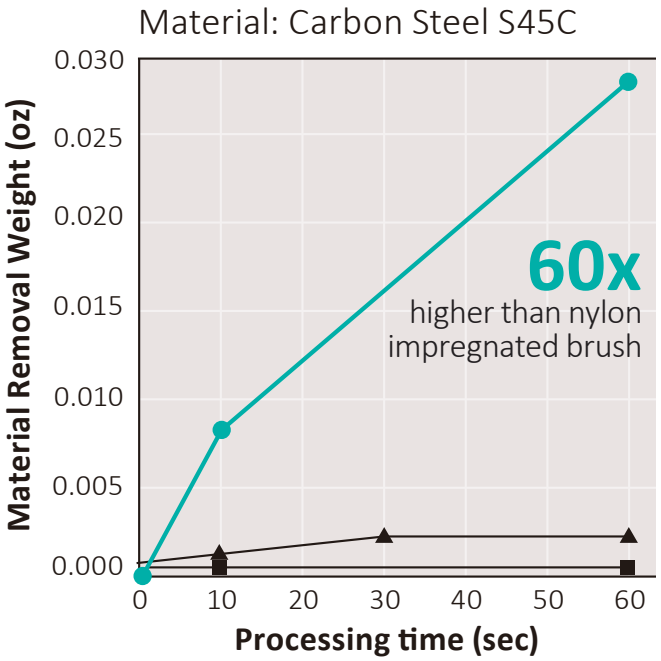


XEBEC Brush
(A32-CB40M)
3000 min^{-1}

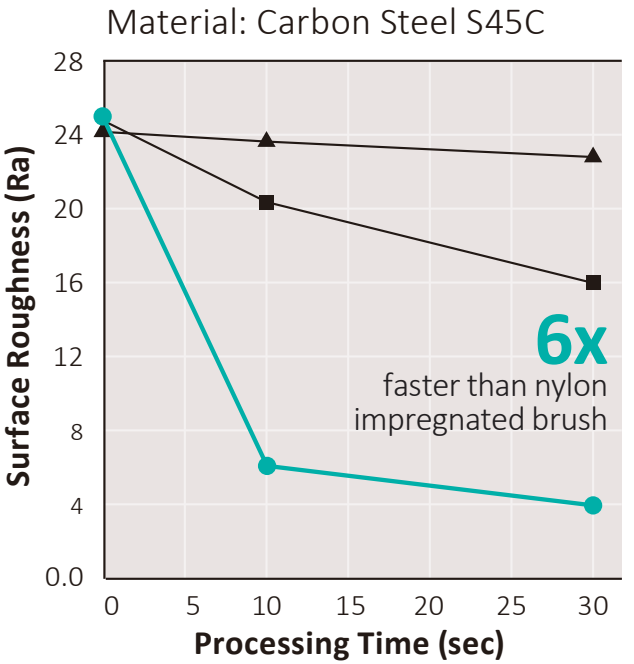
Nylon impregnated brush (#180)
5000 min^{-1}

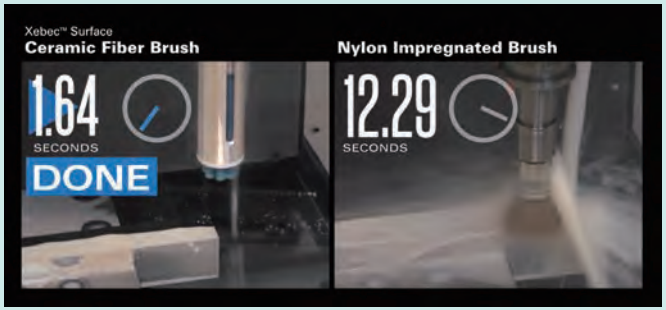
Brass brush
3000 min^{-1}

Grinding power



Polishing capacity





XEBEC Blows Away Nylon Brushes

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.

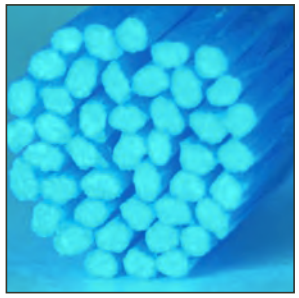
Brush Color

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

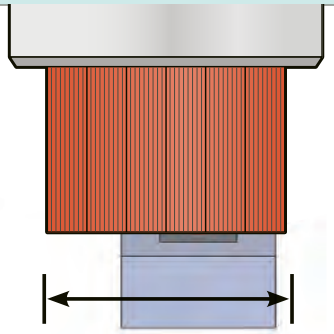
- Micro Fine
- up to 0.2mm
- up to 0.1mm

SURFACE DEBURRING & FINISHING BRUSHES

Choosing the Ideal Brush Size

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

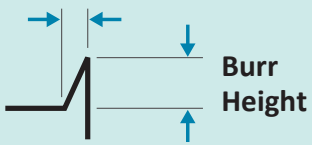
1.5-2x **larger than the surface width**



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 **up to 0.2mm** or less (Burrs are bent with a fingernail)



XEBEC Back Burr Cutter & Path™

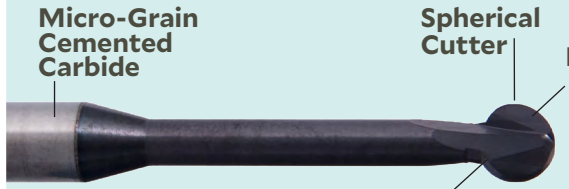
Spherical deburring Cutter with a custom-made tool Path. For CNC deburring of entry and exit holes in a single pass.


Machining Center


Combined Lathe

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

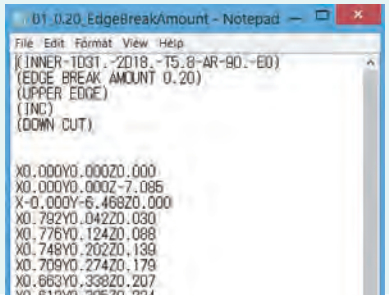
XEBEC Back Burr Cutter™



Heat-resistant AlTiCrN coating

Performs well in all materials including Titanium and Inconel

XEBEC Path™

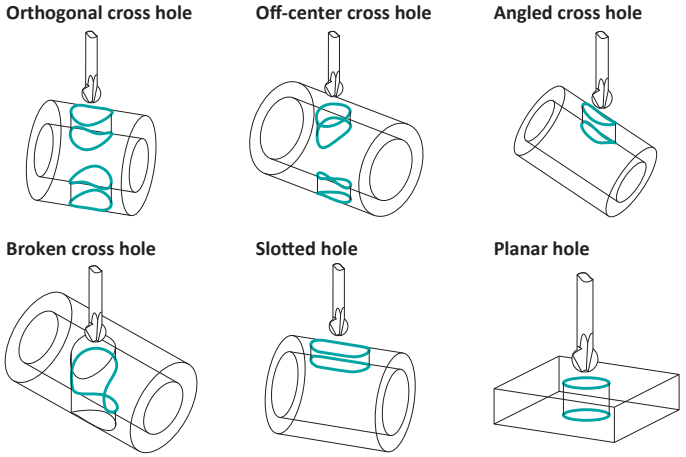


Custom Point Group Data

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.

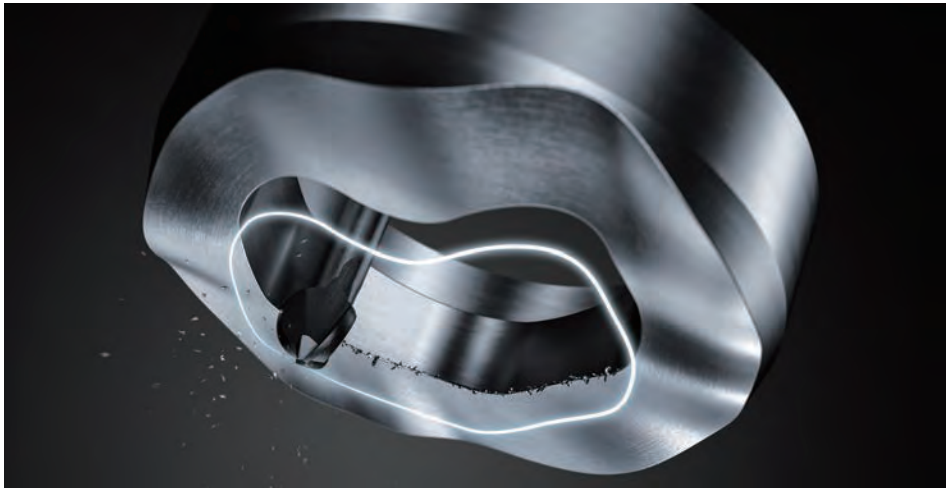
For a variety of edge shapes

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



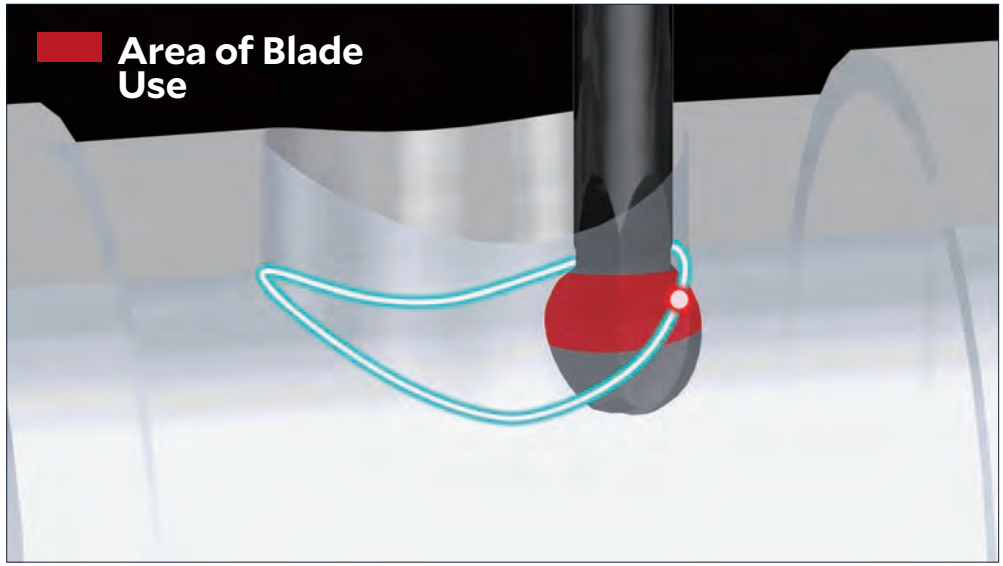
Custom Path Data

For complicated edge profiles

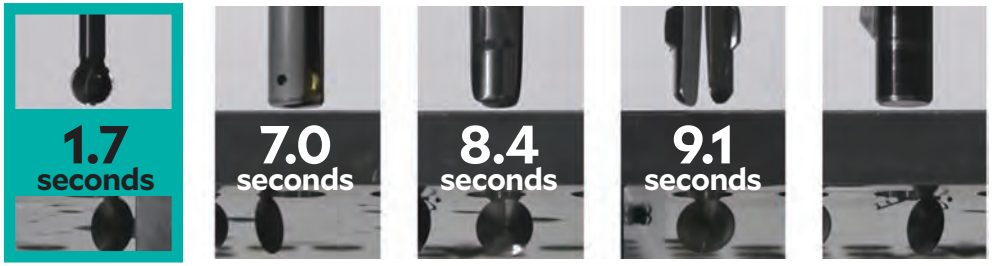


Longer Tool Life

Uses the entire cutting blade by constantly shifting the contact point

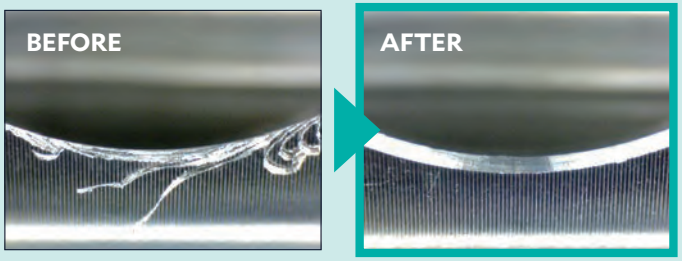


3 to 5 times Faster than Similar Tools

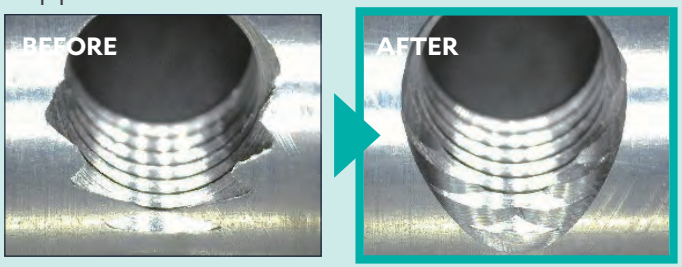


Back Burr Cutter & Path | Tool A | Tool B | Tool C

Stainless Steel



Tapped Holes



Uniform edge shape by consistent deburring amount

Applicable Edges

XEBEC Back Burr Cutter & Path Setup Guide

Glossary

XEBEC Back Burr Cutter (Cutter)

The spherical cutter specially designed for deburring

XEBEC Path (Path)

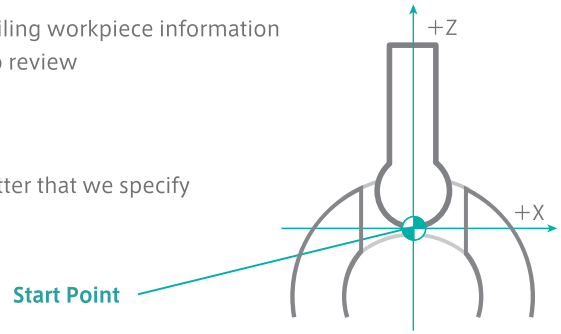
The custom-made NC data set (XYZ points' data) generated for optimal deburring

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

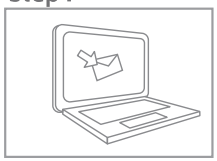
Cutter (sold separately)

Steps

Start

- Path delivered by email

Step1



Preparation

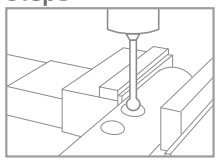
- Confirm the dimensions of the target edge
- Check the Cutter diameter
- Make sure there is no tool interference
- Check the machining conditions
- Select Cutter type (A/B) and order

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

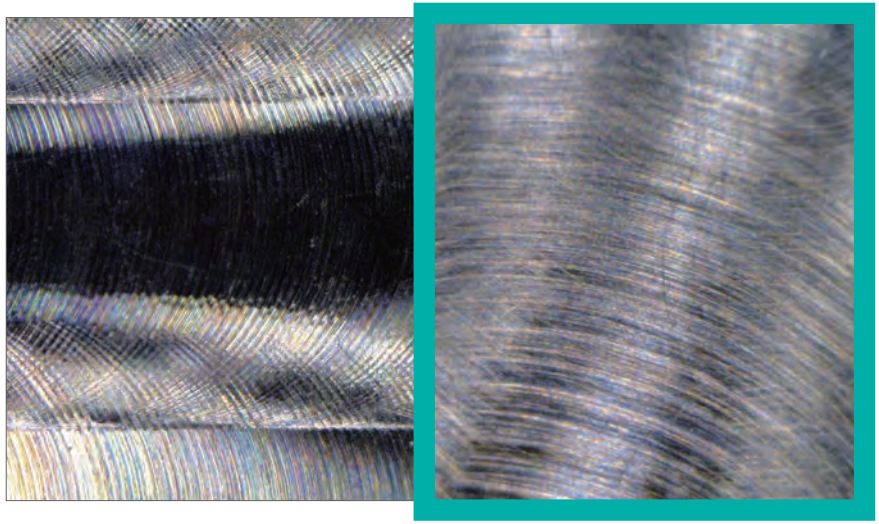
- Air cutting
- Actual machining
- Check the result

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
NON-FERROUS ALLOYS	High Carbon Tungsten Chromium	Molybdenum Cast Steel
HIGH HARDNESS STEELS	Aluminum Alloys Zinc Alloys Copper Alloys	Brass Bronze
POLYMERS	Plastics Resins	Composites
CAST IRON	Gray Cast Ductile Cast	Alloy Cast

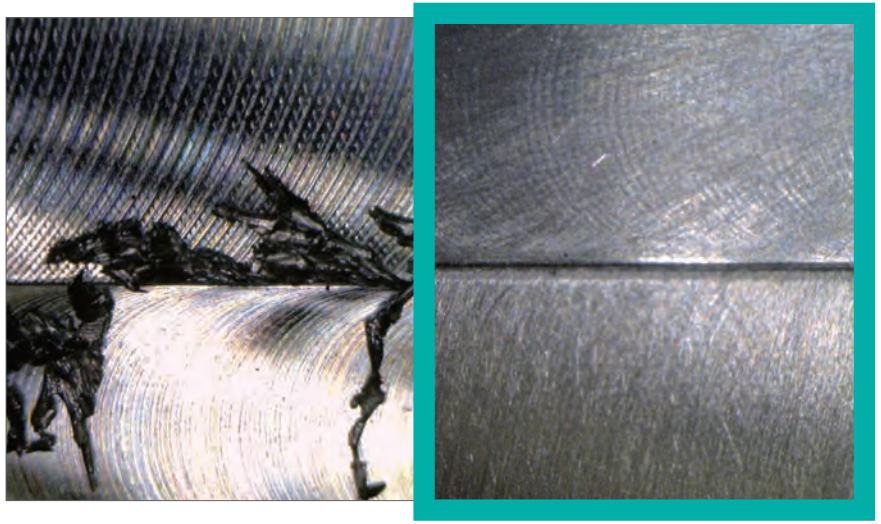
FOR A RANGE OF MATERIALS

up to HRC 65

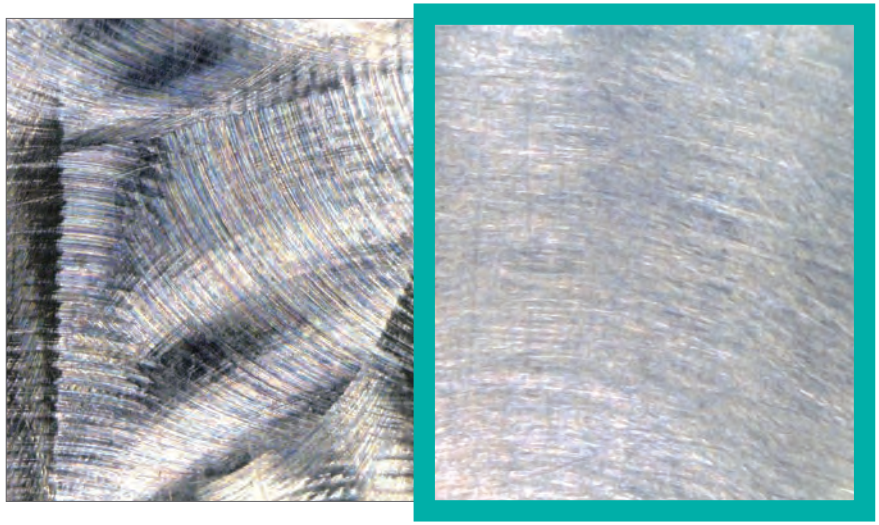
DEBURRING & FINISHING RESULTS



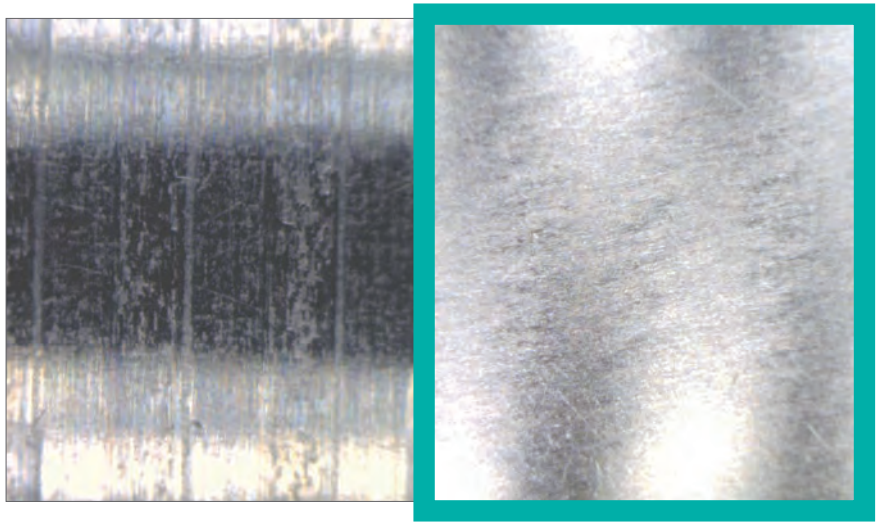
SURFACES



SURFACE FEATURES

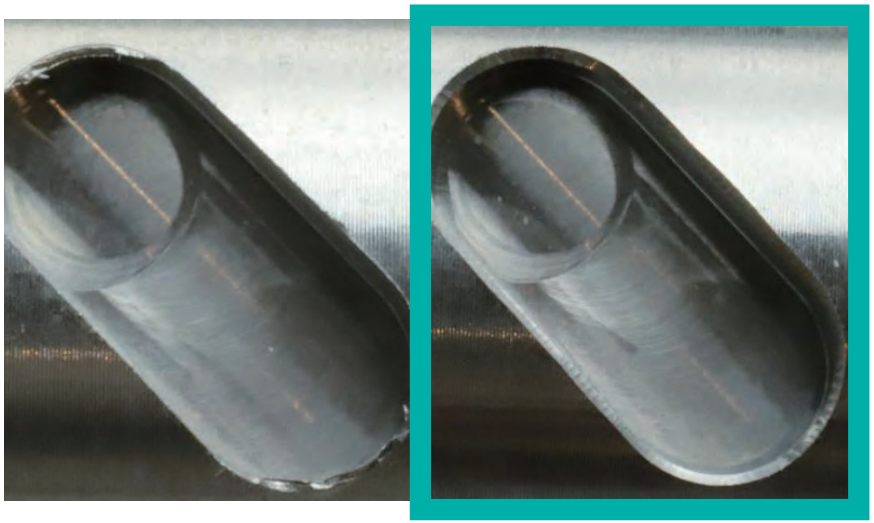


CUTTER MARK REMOVAL

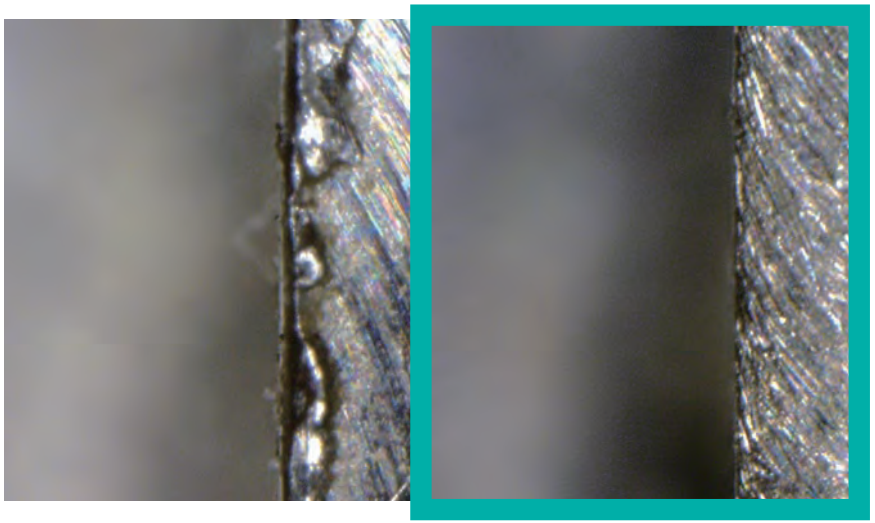


POLISHING

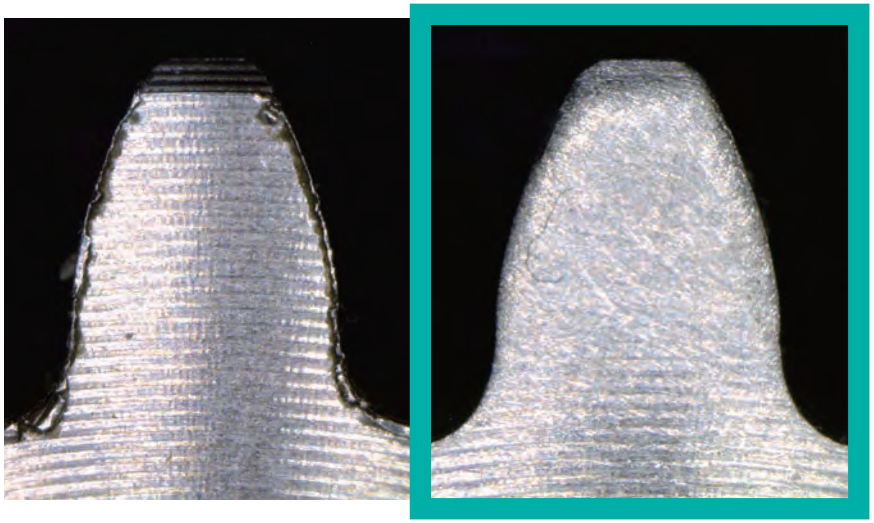
DEBURRING & FINISHING RESULTS



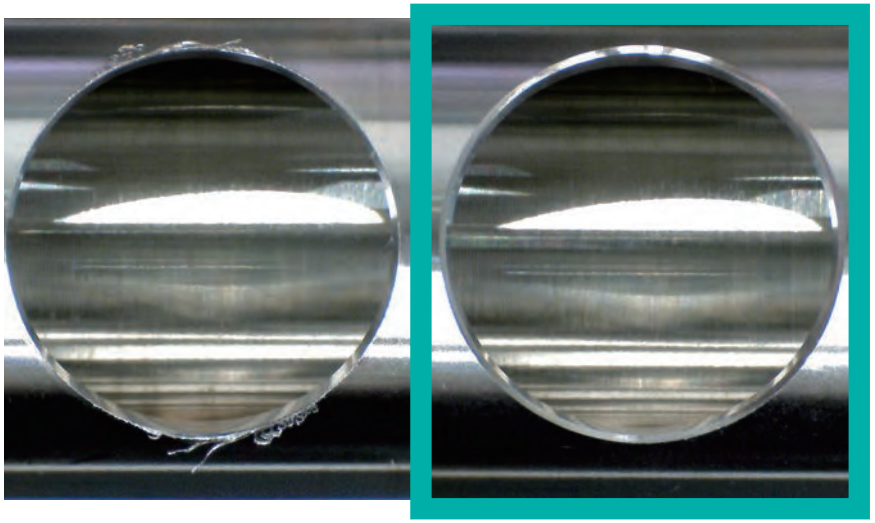
CHANNELED, BROKEN SURFACES



EDGES

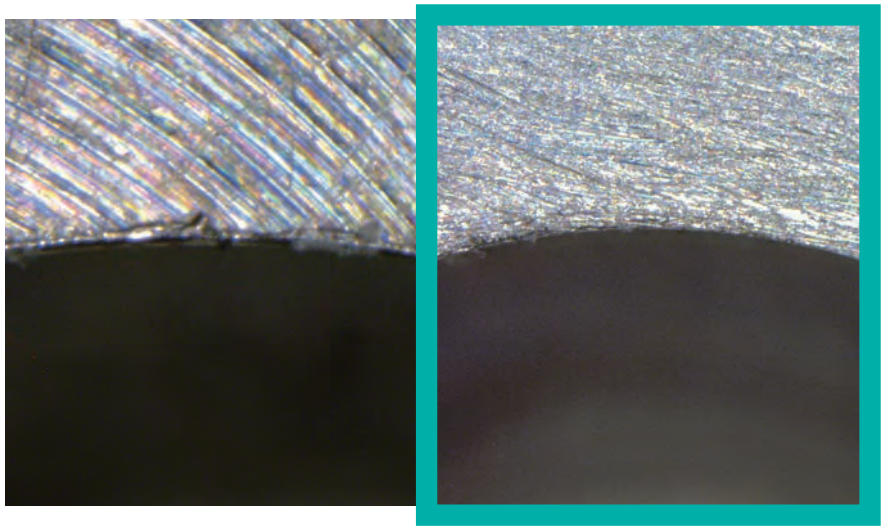


RADIUSED EDGE

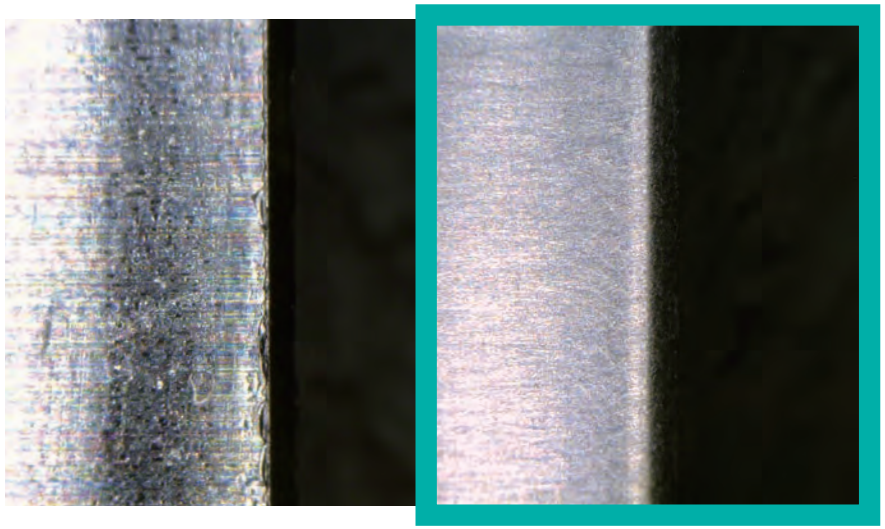


CHAMFERED EDGE

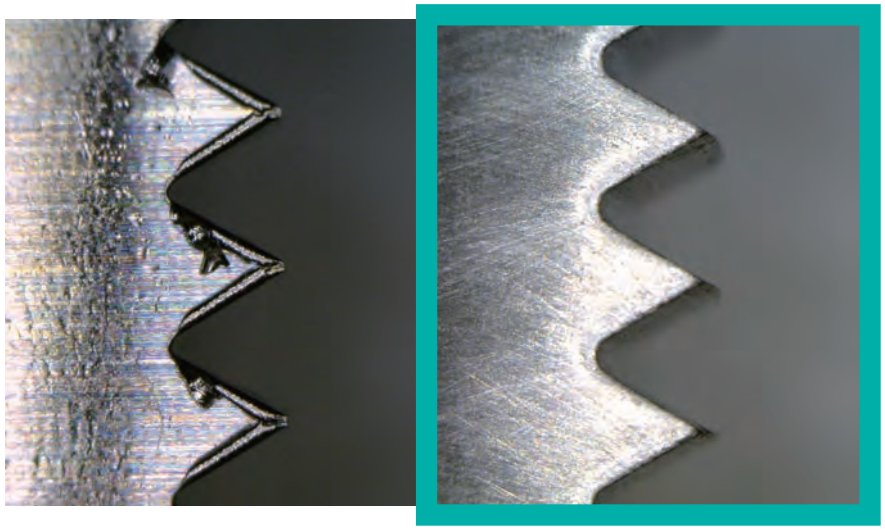
DEBURRING & FINISHING RESULTS



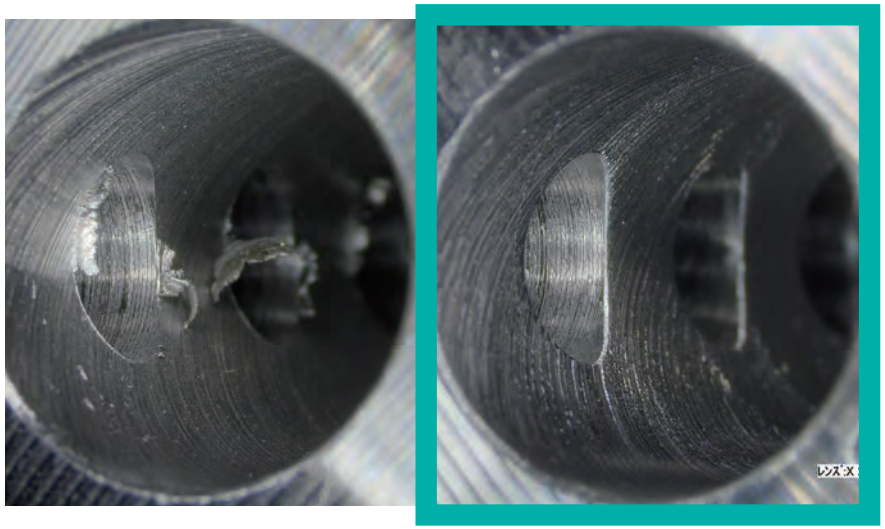
INNER WALL DIAMETERS



OUTER WALL DIAMETER



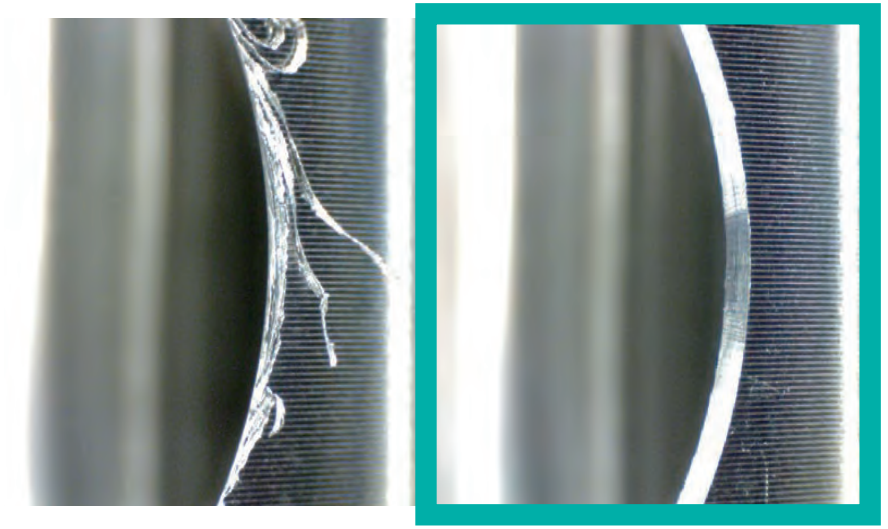
THREADED DIAMETERS



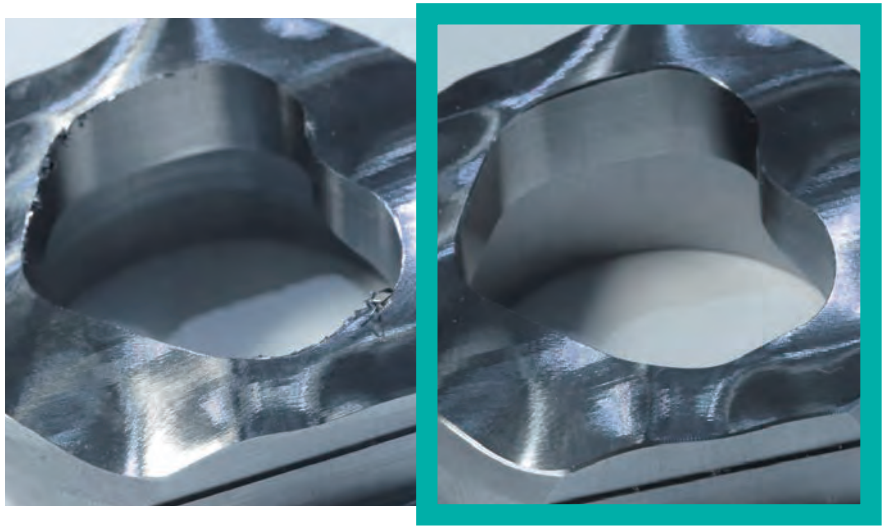
CROSS HOLES

DEBURRING & FINISHING RESULTS

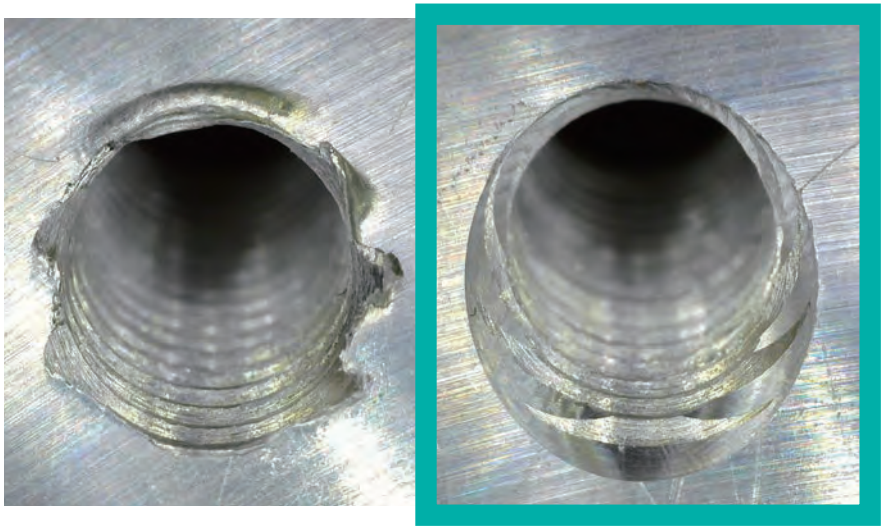
BORES



ELLIPTICAL HOLES



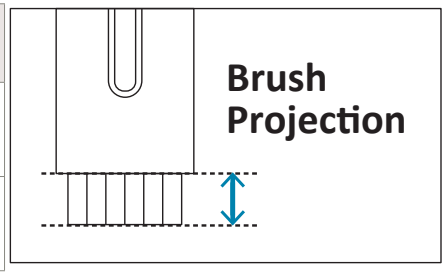
COMPLEX EDGE PROFILES



THREADED HOLES

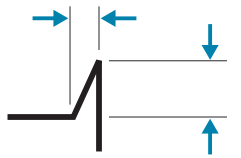
SET BRUSH PROJECTION

Brush Size Diameter	6 mm	15 mm	25 mm	40 mm	60 mm	100 mm
Deburring (mm)	10	10	10	15	15	15
Polishing (mm)	10	10	10	10	10	10

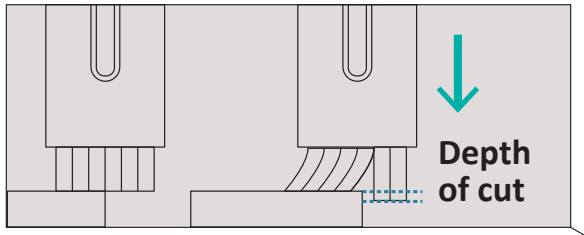


Target Burr Size

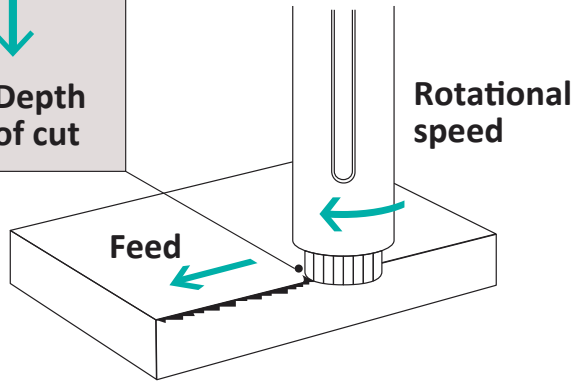
Burr Root Thickness of **up to 0.2mm** or less (Burrs are bent with a fingernail)

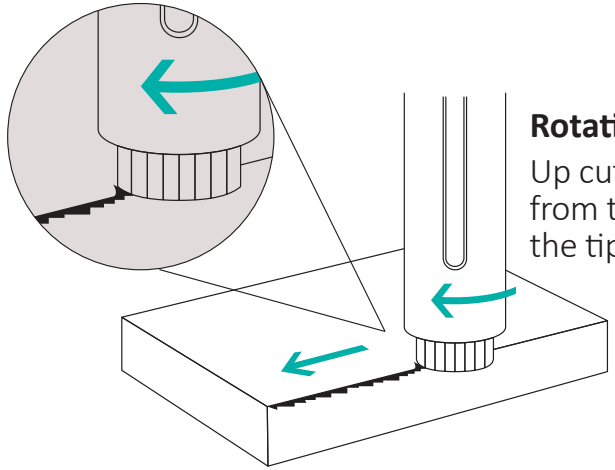


Workpiece Engagement



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

(mm)

Polishing	Vertical Burr	Horizontal Burr
0.3 - 0.5mm	**0.5mm**	**1.0mm**

Depth of cut depends on the Brush diameter

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 rotational speed 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 rotational speed 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

XEBEC®
BEAUTIFUL DEBURRING

MECCANOTECNICA

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