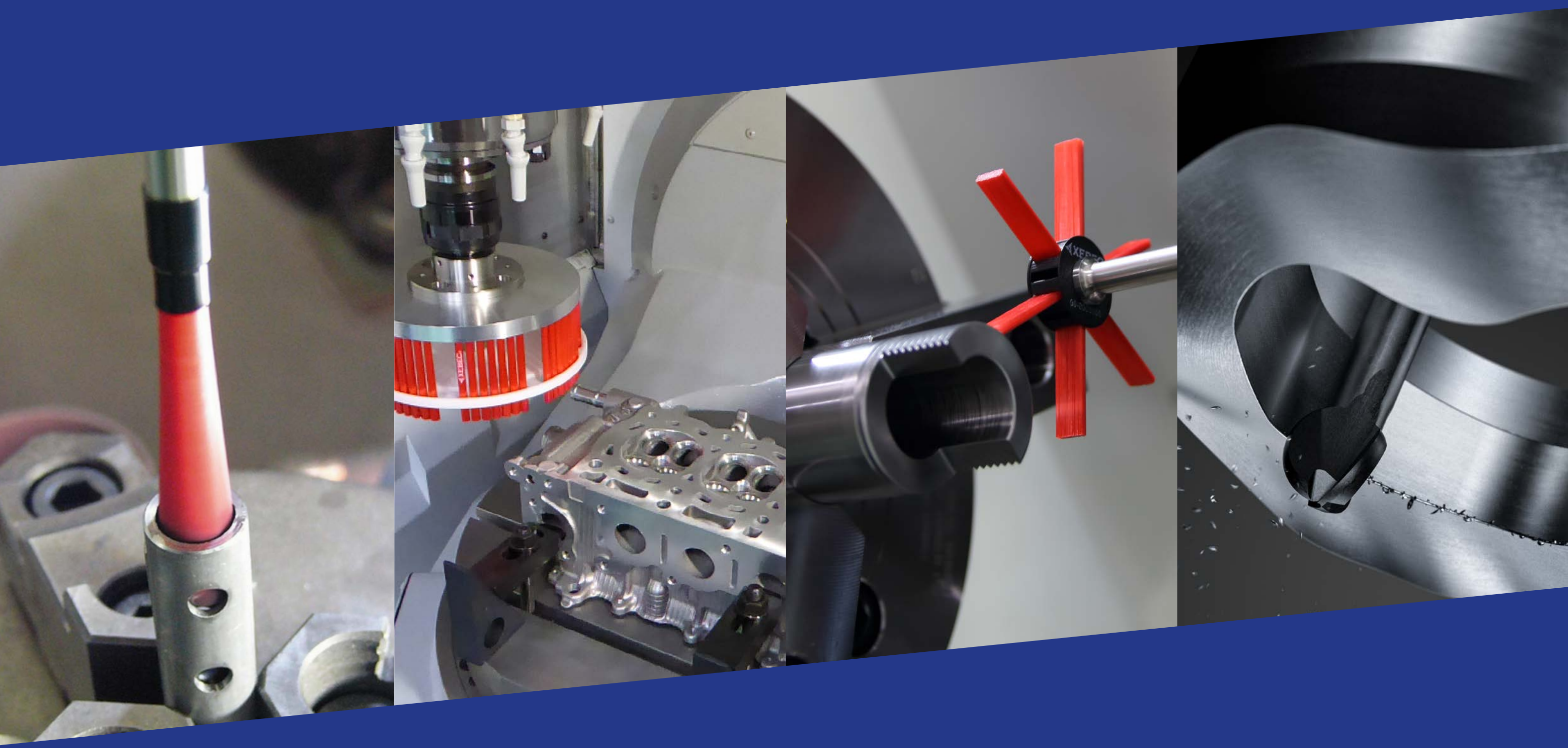
Kemet

Precision Lapping | Polishing | Cleaning | Materialography

DEBURRING & POLISHING TOOLS



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Contents

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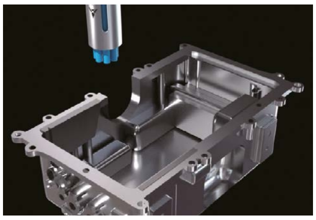
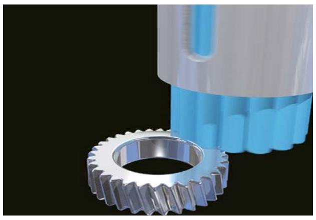
Automotive

CNC deburring of inverter case



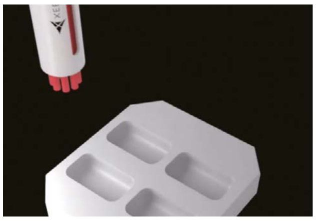
Material: ADC12
Follows: Face milling
Tool:
XEBEC Brush Surface
A32-CB25M, p. 1

CNC deburring of pinion gear



Material: S45C
Follows: Gear hobbing
Tool:
XEBEC Brush Surface
A32-CB40M, p. 1

CNC removal of coating on combustor part

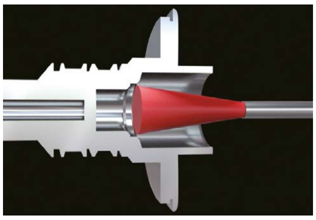


Material: Ceramics
Follows: Face milling
Tool:
XEBEC Brush Surface
A11-CB15M, p. 1

CNC polishing of metal mold for car body panel

Material: SKD11
Follows: End milling
Tool:
XEBEC Brush Surface
A32-CB25M & A11-CB25M, p. 1

CNC deburring of input shaft



Material: SCM
Follows: Drilling
Tool:
XEBEC Brush Crosshole
CH-A12-7M-TL, p. 8

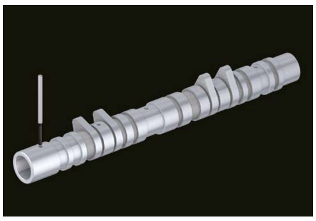
CNC deburring of yoke

Material: SCM
Follows: Drilling
Tool:
Back Burr Cutter & Deburring
Tool Path, XC-58-A, p. 19

Manual polishing of tire mold

Material: Aluminum
Follows: Ball end milling
Tool:
XEBEC Brush Surface End Type
A11-EB06M, p. 6

CNC deburring of camshaft

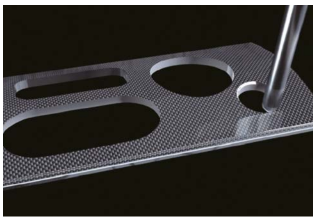


Material: FCD
Follows: Drilling
Tool:
Back Burr Cutter & Deburring
Tool Path, XC-38-A, p. 19

CNC deburring of differential case

Material: FCD
Follows: Drilling
Tool:
Back Burr Cutter & Deburring
Tool Path, XC-78-A, p. 19

Chamfering of exterior part

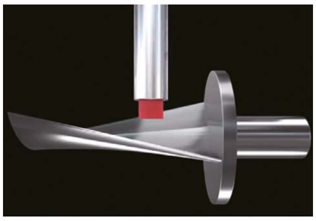


Material: CFRP
Follows: Tapping
Tool:
Burrless Chamfering Cutter
XC-C-06-N, p. 23

■ Material names are JIS. Common names are used when the JIS name is unavailable.

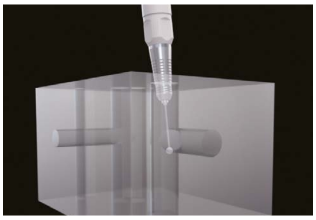
Aerospace

CNC polishing of turbine blade



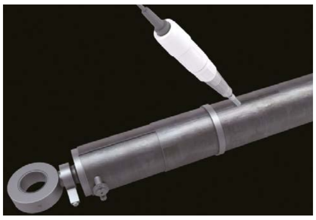
Material: SUS630
Follows: Ball end milling
Tool:
XEBEC Brush Surface
A32-CB25M &
A11-CB25M, p. 1

Manual deburring of hydraulic manifold



Material: Aluminum
Follows: Drilling
Tool:
XEBEC Stone Flexible Shaft
CH-PM-6B, p. 26

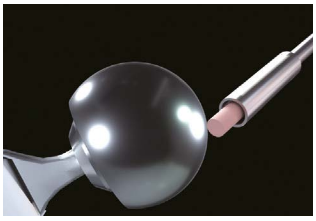
Manual deburring of shaft



Material: Aluminum
Follows: Casting
Tool:
XEBEC Stone Mounted Point
AX-PM-6T, p. 28

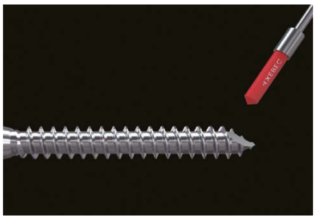
Orthopaedic Medical Devices

CNC polishing of artificial hip joint



Material: CoCrMo
Follows: Turning
Tool:
XEBEC Brush Surface
A13-CB06M, p. 1

CNC deburring of osteosynthesis screw



Material: Titanium
Follows: End milling
Tool:
XEBEC Brush Surface End Type
A11-EB06M, p. 6

CNC deburring of spinal implant

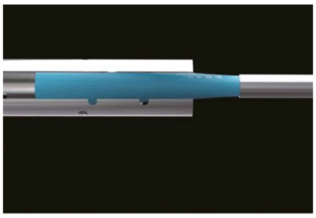
Material: PEEK resin
Follows: End milling
Tool:
Back Burr Cutter & Deburring
Tool Path, XC-18-A, p. 19

Industrial Machinery

CNC deburring of gearbox

Material: FC250
Follows: Face milling
Tool:
XEBEC Brush Surface
A32-CB60M, p. 1

CNC deburring of pipe

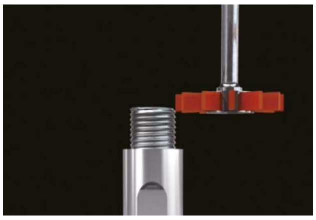


Material: Stainless steel
Follows: Drilling
Tool:
XEBEC Brush Crosshole
CH-A33-7M, p. 8

CNC deburring of slide cylinder

Material: Aluminum
Follows: End milling
Tool:
XEBEC Brush Surface
A21-CB25M, p. 1

CNC deburring of shaft



Material: SCM
Follows: Threading
Tool:
XEBEC Brush Wheel Type
W-A11-50, p. 13

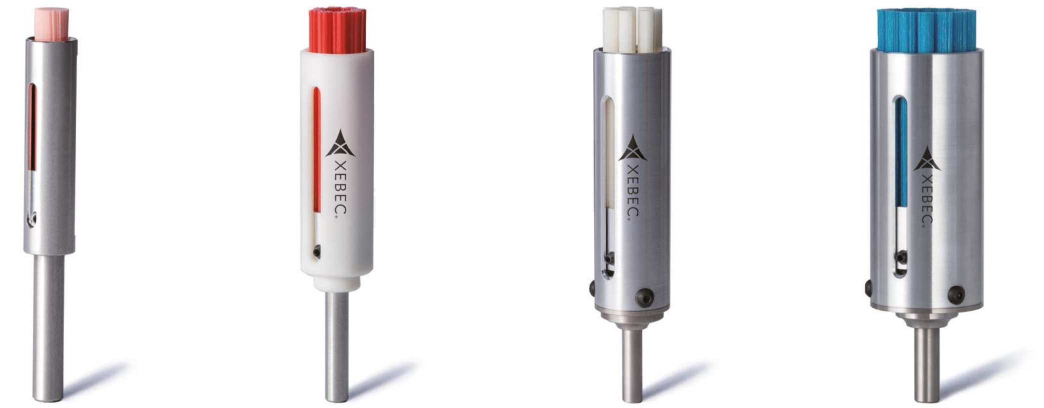
CNC roughing of brake disc

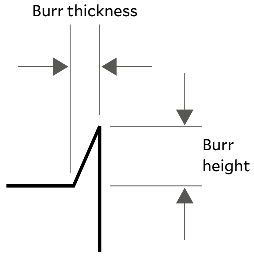
Material: SPHC
Follows: Turning
Tool:
XEBEC Brush Surface
A21-CB25M, p. 1

XEBEC Brush™ Surface (Patented)

Deburring, cutter mark removal, and surface polishing

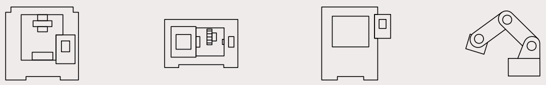
Applicable burr size
Burr thickness ≤ 0.2 mm
(Burrs this size can be bent by fingernails)





Applicable equipment

This tool can be mounted on equipment shown below.

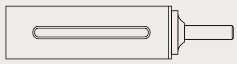


Machining center | Lathe (with live tools) | Dedicated machine | Robot

Tool composition

Brush and sleeve are sold separately.
Assemble brush and sleeve before use.

Brush



Sleeve

Brushes

Brush (color)	Product code	Brush diameter (mm)	Bristle length ℓ (mm)	Matching sleeve	Fig.
A13 (pink)	A13-CB06M	ϕ6	30	S06M	1
	A13-CB15M	ϕ15	50	S15M-P	1
A11 (red)	A11-CB06M	ϕ6	30	S06M	1
	A11-CB15M	ϕ15	50	S15M-P	1
	A11-CB25M	ϕ25	75	S25M	1
	A11-CB40M	ϕ40	75	S40M-SD10	1
	A11-CB60M	ϕ60	75	S60M	1
	A11-CB100M	ϕ100	75	S100M	1
A21 (white)	A21-CB06M	ϕ6	30	S06M	1
	A21-CB15M	ϕ15	50	S15M-P	1
	A21-CB25M	ϕ25	75	S25M	1
	A21-CB40M	ϕ40	75	S40M-SD10	1
	A21-CB60M	ϕ60	75	S60M	1
	A21-CB100M	ϕ100	75	S100M	1
A32 (blue)	A32-CB06M	ϕ6	30	S06M	1
	A32-CB15M	ϕ15	50	S15M-P	1
	A32-CB25M	ϕ25	75	S25M	1
	A32-CB40M	ϕ40	75	S40M-SD10	1
	A32-CB60M	ϕ60	75	S60M	1
	A32-CB100M	ϕ100	75	S100M	1

- Bristle bundles are embedded in a single line on the periphery (except for ϕ6 type).
- Brush size is approximate as the tip expands with rotation.

Fig. 1

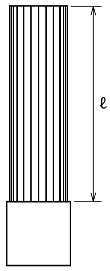
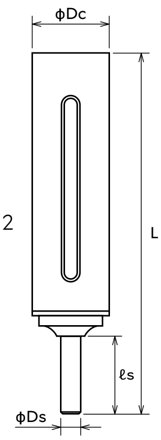


Fig. 2

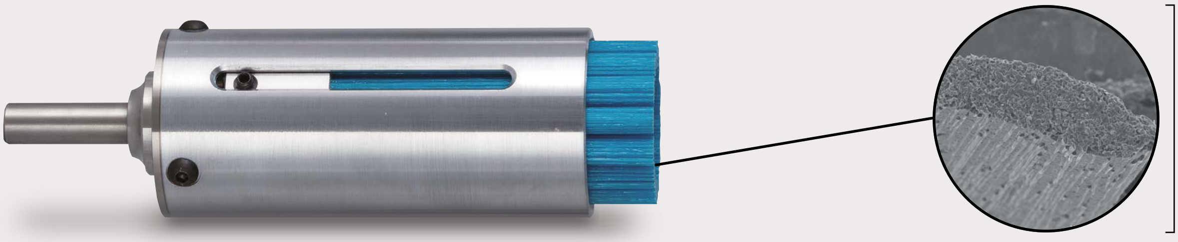


Sleeves

Product code	Brush dia. (mm)	External dia. Dc (mm)	Shank dia. Ds (mm)	Overall length L (mm)	Shank length ℓs (mm)	Matching brush	Fig.
S06M	ϕ6	ϕ10	ϕ6	70	29	A13/A11/A21/A32-CB06M	2
S15M-P	ϕ15	ϕ18.5	ϕ6	90	29	A13/A11/A21/A32-CB15M	2
S25M	ϕ25	ϕ30	ϕ8	140	30	A11/A21/A32-CB25M	2
S40M-SD10	ϕ40	ϕ45	ϕ10	140	30	A11/A21/A32-CB40M	2
S60M	ϕ60	ϕ65	ϕ12	150	35	A11/A21/A32-CB60M	2
S100M	ϕ100	ϕ110	ϕ16	162	40	A11/A21/A32-CB100M	2

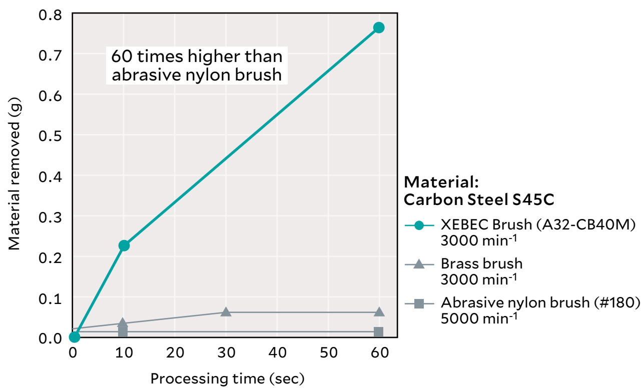
- Overall length L is sleeve length not including brush projecton.
- The case of the S15M-P is made of fiber-reinforced plastic (FRP).

XEBEC Brush uses unique abrasive ceramic fiber material instead of abrasive grain. Each bristle consists of 1,000 ceramic fibers that work as cutting edges. Overwhelming grinding power, consistent cutting performance, and no deformation enables CNC deburring immediately after machining operations inside the same machine tool.



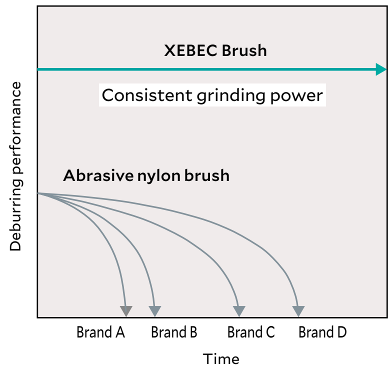
High grinding power

The content ratio of ceramic fiber is approximately 80%.
Cutting edges on the brush tips offer excellent grinding power.



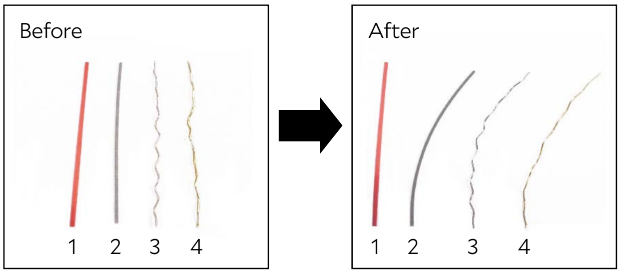
Consistent grinding performance

New cutting edges are always exposed. Consistent grinding performance throughout due to the uniform structure of the fiber.



No deformation

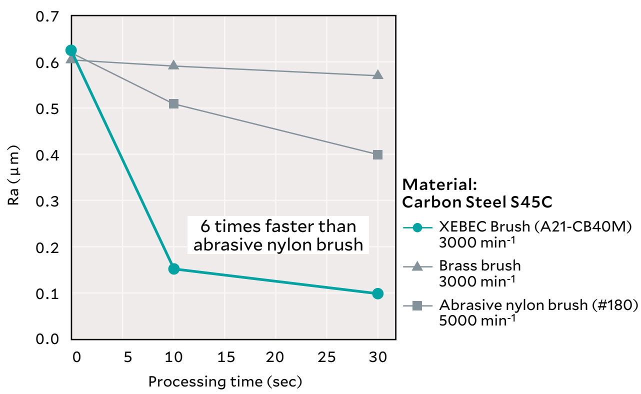
Maintains its straight shape and does not spread out like an old toothbrush. Easy to manage on mass production lines.



1. XEBEC Brush (A11 red bristle)
2. Abrasive nylon brush
3. Steel wire brush
4. Brass wire brush

Optimal for polishing

The high grinding power of ceramic fiber makes this tool optimal for polishing. Achievable surface roughness is Ra = 0.1 µm (Rz = 0.4 µm).

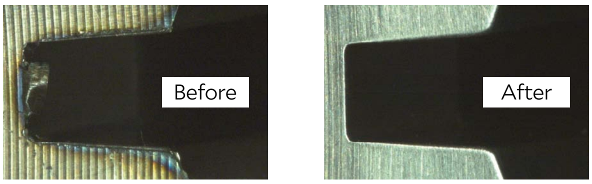


Brush selection

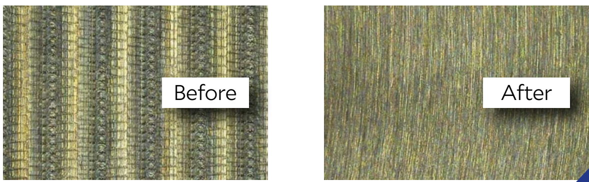
Workpiece material	Resin	Copper, Brass	Copper, Brass	Copper, Brass
		Aluminum	Aluminum	Aluminum
		Steel	Steel	Steel
				Stainless steel
				HRSA steel
				Cast iron
				Hard material
Burr size	Micro fine burrs	Micro fine burrs		
		Burr thickness (≤ 0.1 mm)	Burr thickness (≤ 0.1 mm)	
			Burr thickness (0.1 - 0.2 mm)	Burr thickness (0.1 - 0.2 mm)
Brush (color)	A13 (pink)	A11 (red)	A21 (white)	A32 (blue)
Grinding power	→	→	→	High

■ Not all brush colors are available in all sizes.
■ HRSA (heat resistant super alloy)

Deburring



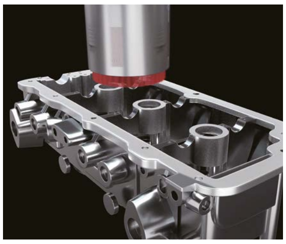
Polishing



Applications

Higher quality automated deburring

Cylinder head



Material: Aluminum
Follows: Face milling
Tool: A11-CB100M

Before

Abrasive nylon brush was used. It was time-consuming and not able to remove all burrs.

After

All burrs are removed by high grinding power. Quality is stable. The cycle time is shortened by a high feed rate.

Automation of time-consuming polishing

Metal mold

Material: Hard material
Follows: End milling
Tool: A11-CB25M

Before

40 minutes hand polishing per workpiece. Uneven quality resulted in complaints.

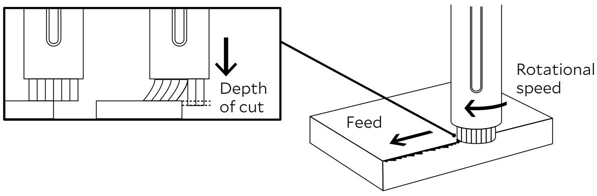
After

Shortened the polishing time to one minute per workpiece by automation. Achieved uniform polishing quality.

How to use

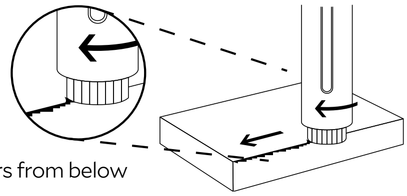
Rotational speed

Recommended parameters differ depending on brush size. Refer to the chart below for starting parameters for each brush size.



Rotational direction

Set the rotational direction so that the brush pushes the burrs up from below.



Upcut against burrs from below

Feed rate - Deburring

Burr thickness: 0.05 mm (Very easily bent by fingernails)	4000 mm/min
Burr thickness: 0.1 mm (Easily bent by fingernails)	2500 mm/min

Feed rate - Polishing

Cutter mark removal, polishing	250 - 850 mm/min

Depth of cut - Vertical burrs

Formed by end milling & drilling (Are vertical to brush tip)	0.5 mm

Depth of cut - Horizontal burrs

Formed by face milling (Are horizontal to brush tip)	1.0 mm

Depth of cut - Polishing

Cutter mark removal, polishing	0.3 - 0.5 mm

Starting parameters

Product code	Rotational speed (min^{-1})			Depth of cut (mm)			Feed rate (mm/min)			Brush protrusion (mm)	
	Deburring	Cutter mark removal, polishing	Maximum	Vertical burrs	Horizontal burrs	Cutter mark removal, polishing	Burr thickness 0.05 mm	Burr thickness 0.1 mm	Cutter mark removal, polishing	Deburring	Cutter mark removal, polishing
A13-CB06M A11-CB06M A21-CB06M	8000	10000	10000	0.5	0.5	0.3	4000	2500	250	10	10
A32-CB06M	8000	10000	10000	0.3	0.3	0.3	4000	2500	250	10	10
A13-CB15M	4800	6000	6000	1.0	1.0	0.5	4000	2500	450	10	10
A11-CB15M A21-CB15M A32-CB15M	4800	6000	6000	0.5	1.0	0.5	4000	2500	450	10	10
A11-CB25M A21-CB25M A32-CB25M	4000	5000	5000	0.5	1.0	0.5	4000	2500	700	15	10
A11-CB40M A21-CB40M A32-CB40M	2400	3000	3000	0.5	1.0	0.5	4000	2500	800	15	10
A11-CB60M A21-CB60M A32-CB60M	1600	2000	2000	0.5	1.0	0.5	4000	2500	850	15	10
A11-CB100M A21-CB100M A32-CB100M	960	1200	1200	0.5	1.0	0.5	4000	2500	850	15	10

■ Plastic workpieces may deform or discolor. If this occurs, reducing rotational speed to approximately 10% of the starting parameter may solve the problem.

XEBEC Brush™ Surface

How to select

Refer to the charts below and select the brush color based on the workpiece material, burr thickness and surface roughness.

Deburring

<table>
<tr><td rowspan="7">Workpiece material</td><td>Resin</td><td colspan="3">Copper, Brass</td></tr>
<tr><td></td><td colspan="3">Aluminum</td></tr>
<tr><td></td><td colspan="3">Steel</td></tr>
<tr><td></td><td></td><td></td><td>Stainless steel</td></tr>
<tr><td></td><td></td><td></td><td>HRSA steel</td></tr>
<tr><td></td><td></td><td></td><td>Cast iron</td></tr>
<tr><td></td><td></td><td></td><td>Hard material</td></tr>
<tr><td rowspan="3">Burr size</td><td colspan="2">Micro fine burrs</td><td></td><td></td></tr>
<tr><td></td><td colspan="2">Burr thickness (≤ 0.1mm)</td><td></td></tr>
<tr><td></td><td></td><td colspan="2">Burr thickness (0.1 - 0.2mm)</td></tr>
<tr><td>Brush (color)</td><td>A13 (pink)</td><td>A11 (red)</td><td>A21 (white)</td><td>A32 (blue)</td></tr>
<tr><td>Grinding power</td><td colspan="4">→ High</td></tr>
</table>

■ Not all brush colors are available in all sizes.
■ HRSA (heat resistant super alloy)

Cutter mark removal and polishing

<table>
<tr><td rowspan="7">Workpiece material</td><td colspan="4">Copper, Brass</td></tr>
<tr><td colspan="4">Aluminum</td></tr>
<tr><td></td><td colspan="3">Steel</td></tr>
<tr><td></td><td></td><td></td><td>Stainless steel</td></tr>
<tr><td></td><td></td><td></td><td>HRSA steel</td></tr>
<tr><td></td><td></td><td></td><td>Cast iron</td></tr>
<tr><td></td><td></td><td></td><td>Hard material</td></tr>
<tr><td rowspan="2">Achievable surface roughness</td><td colspan="2">≤ Ra 0.1 µm</td><td></td><td></td></tr>
<tr><td></td><td colspan="3">≥ Ra 0.1 µm</td></tr>
<tr><td>Brush (color)</td><td>A13 (pink)</td><td>A11 (red)</td><td>A21 (white)</td><td>A32 (blue)</td></tr>
<tr><td>Grinding power</td><td colspan="4">→ High</td></tr>
</table>

■ Not all brush colors are available in all sizes.
■ HRSA (heat resistant super alloy)

Machining adjustments - Burrs remain

Take the following actions, if burrs remain despite using the recommended depth of cut for the given burr size.

1. Increase rotational speed

Increase the rotational speed to the maximum.

Brush size (mm)	Product code	Initial rotational speed (min^{-1})	Maximum rotational speed (min^{-1})
φ6	A13-CB06M, A11-CB06M, A21-CB06M, A32-CB06M	8000	10000
φ15	A13-CB15M, A11-CB15M, A21-CB15M, A32-CB15M	4800	6000
φ25	A11-CB25M, A21-CB25M, A32-CB25M	4000	5000
φ40	A11-CB40M, A21-CB40M, A32-CB40M	2400	3000
φ60	A11-CB60M, A21-CB60M, A32-CB60M	1600	2000
φ100	A11-CB100M, A21-CB100M, A32-CB100M	960	1200
φ125	A11-CB125M, A21-CB125M, A32-CB125M	800	1000
φ165	A11-CB165M, A21-CB165M, A32-CB165M	600	750
φ200	A11-CB200M, A21-CB200M, A32-CB200M	480	600

2. Check the rotational direction of the brush

XEBEC recommends cutting upwards so that the bristles lift burrs up.

3. Change the brush color

Check whether the brush color is suitable for the workpiece material and burr size.
The grinding power of colors increases as follows: pink < red < white < blue.

Machining adjustments - Edges too rounded

It is not possible to remove burrs with brushes without rounding edges to some extent.
Take the following actions to improve edge sharpness.

1. Increase feed rate

To make a sharper edge, increase the feed rate in 1,000 mm/min increments within the range where burrs can be removed. Increasing the feed rate also helps reduce the cycle time.

2. Decrease rotational speed

Decrease rotational speed in 10 to 20 percent increments within the range where burrs can be removed.

3. Check the brush color

Check whether the brush color is suitable for the workpiece material and burr size.
Rounding of edges increases as follows: pink < red < white < blue.

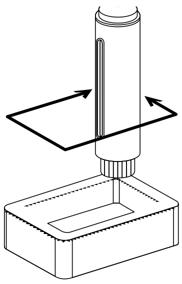
Reference data - Tool life

Example 1

Material	Aluminum die-casting
Follows	Face milling
Burr thickness	0.1 mm
Tool path length	1000 mm/piece

Tool	A11-CB25M
Rotational speed	4000 min^{-1}
Feed rate	2400 mm/min
Depth of cut	1 mm
Wear amount	50 mm out of 75 mm

Tool life	10 km (10000 pieces)

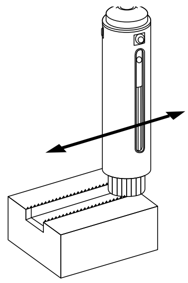


Example 2

Material	S45C
Follows	End milling
Burr thickness	0.1 mm
Tool path length	200 mm/piece

Tool	A21-CB25M
Rotational speed	4000 min^{-1}
Feed rate	2000 mm/min
Depth of cut	0.5 mm
Wear amount	50 mm out of 75 mm

Tool life	3 km (15000 pieces)



- Tool life varies greatly depending on the material, machining conditions, and burr size and direction.
- The above data is not guaranteed. Please use as a guide.

Machining adjustments - Surface roughness worsens

It may be possible to improve the surface finish. Try the following.

1. Check the brush color

The ability to improve surface roughness is inversely proportional to the grinding power, meaning that A13 (pink) achieves the best surface roughness, followed by A11 (red), A21 (white), and A32 (blue). Make sure to select the appropriate brush color based on the workpiece material and target surface roughness.

2. Wet machining

The brush can be used for both dry and wet (oil-based and water-soluble) machining. Wet machining may improve surface roughness and tool life.

3. Increase the number of passes

When comparing with the same cycle time, increasing the number of passes makes a bigger difference than decreasing the feed rate.

Example

Rotational speed	4000 min^{-1}
Depth of cut	0.5 mm
Feed rate	600 mm/min
Number of passes	1

▼

Rotational speed	4000 min^{-1}
Depth of cut	0.5 mm
Feed rate	1200 mm/min
Number of passes	2

Reference data - Surface roughness after deburring

Material	A11 (red)	A21 (white)	A32 (blue)
A5052	Approx. Ra 0.6 µm, Rz 5.0 µm		
S50C		Approx. Ra 0.2 µm, Rz 1.6 µm	
SUS304			Approx. Ra 0.3 µm, Rz 2.4 µm

XEBEC Brush™ Surface End Type

Cutter mark removal and polishing on sealing surfaces

Tip angle approx. 100 deg.

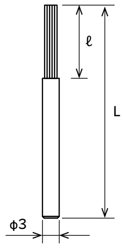


Fig. 3

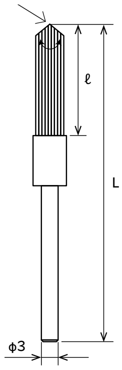
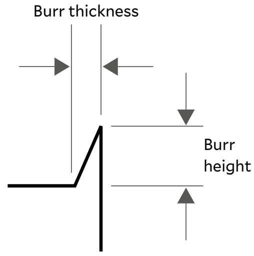


Fig. 4

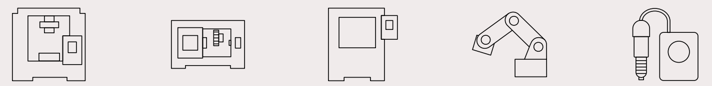
Applicable burr size

Burr thickness ≤ 0.1 mm
(Burrs this size can be easily bent by fingernails)



Applicable equipment

This tool can be used with equipment that controls rotational speed.



Machining center	Lathe (with live tools)	Dedicated machine	Robot	Rotary tool (electric)

Precautions for use

The grinding load must less be than 2 N for hand use.
The brush will break if:

- used beyond the maximum rotational speed
- used beyond the maximum indentation load
- used with a pneumatic rotary tool

Brushes

Brush (color)	Product code	Brush dia. (mm)	Shank dia. Dc (mm)	Bristle length ℓ (mm)	Overall length L (mm)	Standard rotational speed (min^{-1})	Maximum rotational speed (min^{-1})	Fig.
A13 (pink)	A13-EB01S	ϕ1	ϕ3	15	52	7000 - 12000	15000	3
	A13-EB015S	ϕ1.5	ϕ3	15	52	7000 - 12000	15000	3
	A13-EB02S	ϕ2	ϕ3	15	52	7000 - 12000	15000	3
	A13-EB025S	ϕ2.5	ϕ3	15	52	7000 - 12000	15000	3
	A13-EB03M	ϕ3	ϕ3	30	67	4000	6000	3
A11 (red)	A11-EB01S	ϕ1	ϕ3	15	52	7000 - 12000	15000	3
	A11-EB015S	ϕ1.5	ϕ3	15	52	7000 - 12000	15000	3
	A11-EB02S	ϕ2	ϕ3	15	52	7000 - 12000	15000	3
	A11-EB025S	ϕ2.5	ϕ3	15	52	7000 - 12000	15000	3
	A11-EB06M	ϕ5	ϕ3	20	57	7000	12000	4
A21 (white)	A21-EB06M	ϕ5	ϕ3	20	57	7000	12000	4
A32 (blue)	A32-EB06M	ϕ5	ϕ3	20	57	7000	12000	4

■ Brush size is approximate as the tip expands with rotation.

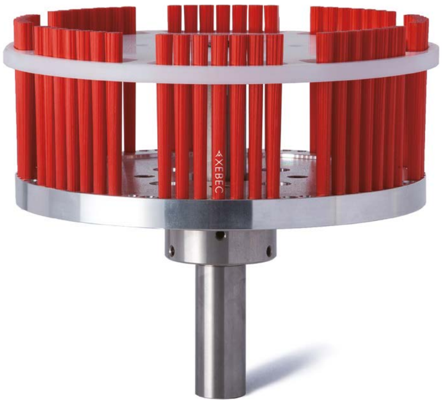
How to select

Refer to the chart below and select the brush color based on the workpiece material, burr thickness and surface roughness.

Workpiece material	Resin	Copper, Brass		
		Aluminum		
		Steel		
				Stainless steel
				HRSA steel
				Cast iron
				Hard material
Burr size	Micro fine burrs			
		Burr thickness (≤ 0.1mm)		
Achievable surface roughness	≤ Ra 0.1 µm			
		≥ Ra 0.1 µm		
Brush (color)	A13 (pink)	A11 (red)	A21 (white)	A32 (blue)
Grinding power	→ High			

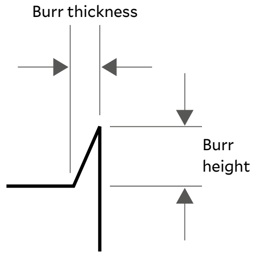
XEBEC Brush™ Surface Extra-Large (Patented)

Deburring, cutter mark removal, surface polishing (≥100 mm)



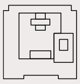
Applicable burr size

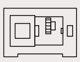
Burr thickness ≤ 0.2 mm
(Burrs this size can be bent by fingernails)

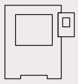


Applicable equipment

This tool can be mounted on equipment shown below.


Machining center

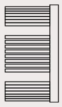

Lathe (with live tools)


Dedicated machine

Tool composition

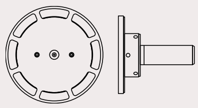
The brush main unit and slide ring are separate items.
Assemble the main unit and slide ring before use.

Brush



Slide ring

- Ring
- Base holder
- Shank



Brushes

Brush (color)	Product code	Brush diameter (mm)	Bristle length ℓ (mm)	Matching slide ring (Product code)	Fig.
A11 (red)	A11-CB125M	ϕ125	75	SR125M	5
	A11-CB165M	ϕ165	75	SR165M	5
	A11-CB200M	ϕ200	75	SR200M	5
A21 (white)	A21-CB125M	ϕ125	75	SR125M	5
	A21-CB165M	ϕ165	75	SR165M	5
	A21-CB200M	ϕ200	75	SR200M	5
A32 (blue)	A32-CB125M	ϕ125	75	SR125M	5
	A32-CB165M	ϕ165	75	SR165M	5
	A32-CB200M	ϕ200	75	SR200M	5

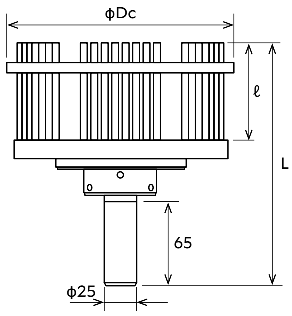
■ Brush size is approximate as the tip expands with rotation.

Slide rings

Product code	Brush diameter (mm)	Outer dia. Dc (mm)	Shank diameter (mm)	Overall length L (mm)	Fig.
SR125M	ϕ125	ϕ135	ϕ25	187	5
SR165M	ϕ165	ϕ176	ϕ25	187	5
SR200M	ϕ200	ϕ211	ϕ25	187	5

■ The slide ring consists of a ring, base holder and shank.
■ Base holder and shank sizes are the same for all brush diameters. Ring size varies with brush diameter.
■ Combined weights of brushes and slide rings are: ϕ125: 1920 g, ϕ165: 2320 g and ϕ200: 2750 g.

Fig. 5



Starting parameters

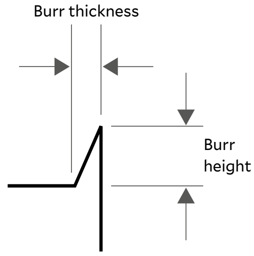
Product code	Rotational speed (min^{-1})			Depth of cut (mm)			Feed rate (mm/min)			Brush protrusion (mm)	
	Deburring	Cutter mark removal, polishing	Maximum	Vertical burrs	Horizontal burrs	Cutter mark removal, polishing	Burr thickness 0.05 mm	Burr thickness 0.1 mm	Cutter mark removal, polishing	Deburring	Cutter mark removal, polishing
A11-CB125M A21-CB125M A32-CB125M	800	1000	1000	0.5	1.0	0.5	4000	2500	700	15	10
A11-CB165M A21-CB165M A32-CB165M	600	750	750	0.5	1.0	0.5	4000	2500	700	15	10
A11-CB200M A21-CB200M A32-CB200M	480	600	600	0.5	1.0	0.5	4000	2500	650	15	10

XEBEC Brush™ Crosshole

Deburring, cutter mark removal, polishing on inner diameters & counterbores (≤ ϕ20 mm)

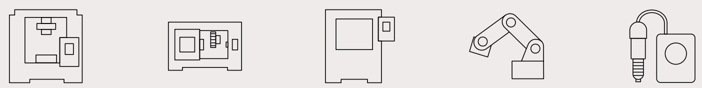
Applicable burr size

Burr thickness ≤ 0.1 mm
(Burrs this size can be easily bent by fingernails)



Applicable equipment

This tool is used on equipment with rotational speed control (> 6500 min^{-1}).



Machining center | Lathe (with live tools) | Dedicated machine | Robot | Rotary tool (electric)

Brushes

Brush (color)	Product code	Brush dia. (mm)	Shank dia. Dc (mm)	Shank dia. Ds (mm)	Bristle length ℓ (mm)	Overall length L (mm)	Maximum rotational speed (min^{-1})	Target hole diameter (mm)	Fig.
A12 (red)	CH-A12-1.5M	ϕ1.5	ϕ2.5	ϕ3	50	120	20000	ϕ3.5 – 5	6
	CH-A12-3M-TL	ϕ3	ϕ4	ϕ3	50	120	14000	ϕ5 – 8	6
	CH-A12-3L-TL	ϕ3	ϕ4	ϕ4	50	170	12000	ϕ5 – 8	6
	CH-A12-5M-TL	ϕ5	ϕ6	ϕ6	50	120	14000	ϕ8 – 10	6
	CH-A12-5L-TL	ϕ5	ϕ6	ϕ6	50	170	12000	ϕ8 – 10	6
	CH-A12-7M-TL	ϕ7	ϕ8	ϕ6	50	120	14000	ϕ10 – 20	6
	CH-A12-7L-TL	ϕ7	ϕ8	ϕ8	50	170	12000	ϕ10 – 20	6
	CH-A12-11M	ϕ11	ϕ12	ϕ12	50	120	14000	ϕ14 – 20	6
	CH-A12-11L	ϕ11	ϕ12	ϕ12	50	170	12000	ϕ14 – 20	6
A33 (blue)	CH-A33-3M	ϕ3	ϕ4	ϕ3	60	130	14000	ϕ5 – 8	6
	CH-A33-3L	ϕ3	ϕ4	ϕ4	60	180	12000	ϕ5 – 8	6
	CH-A33-5M	ϕ5	ϕ6	ϕ6	60	130	14000	ϕ8 – 10	6
	CH-A33-5L	ϕ5	ϕ6	ϕ6	60	180	12000	ϕ8 – 10	6
	CH-A33-7M	ϕ7	ϕ8	ϕ6	60	130	14000	ϕ10 – 14	6
	CH-A33-7L	ϕ7	ϕ8	ϕ8	60	180	12000	ϕ10 – 14	6
	CH-A33-11M	ϕ11	ϕ12	ϕ12	60	130	14000	ϕ14 – 20	6
	CH-A33-11L	ϕ11	ϕ12	ϕ12	60	180	12000	ϕ14 – 20	6

■ Brush size is approximate as the tip expands with rotation.

Precautions for use

The shank must be inserted ≥ 30 mm in the holder to secure it properly.

The brush will break if:
- used beyond the maximum rotational speed
- used with a pneumatic rotary tool
- rotated outside of the bore (outside workpiece)
- used with brush tip < 20 mm inside bore

The brush may break when used with:
- off-center or angled crossholes
- t-shaped holes, when secondary bore diameter ≥ main bore
- crossholes, when secondary bore diameter ≥ 70 % main bore

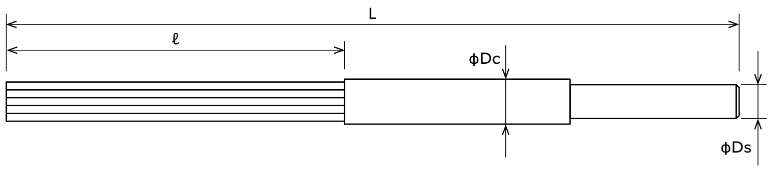
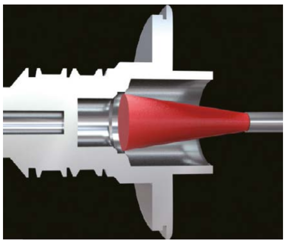


Fig. 6

Applications

Automation of crosshole deburring

Input shaft



Material: SCM
Follows: Drilling
Tool: CH-A12-7M-TL

Before

Manual deburring by abrasive nylon brush. Not all burrs were removed and output was low.

After

A dedicated machine is used to automate deburring. All burrs are removed by high grinding power. Quality is stable.

Automation of crosshole deburring

Valve case

Material: Resin
Follows: Drilling
Tool: CH-A12-5M-TL

Before

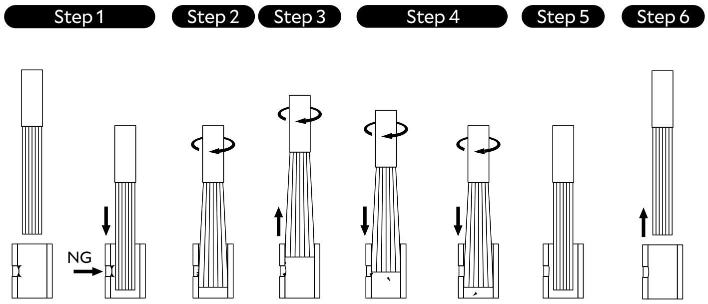
Manual deburring by cutter was time-consuming. Cutter left scratches on inner surface.

After

Deburring inside the machine reduced cycle time significantly. No scratching on inner surface and finish quality is stable.

How to use

Caution: Rotating the brush outside of the bore may damage the brush and cause injury to the operator.



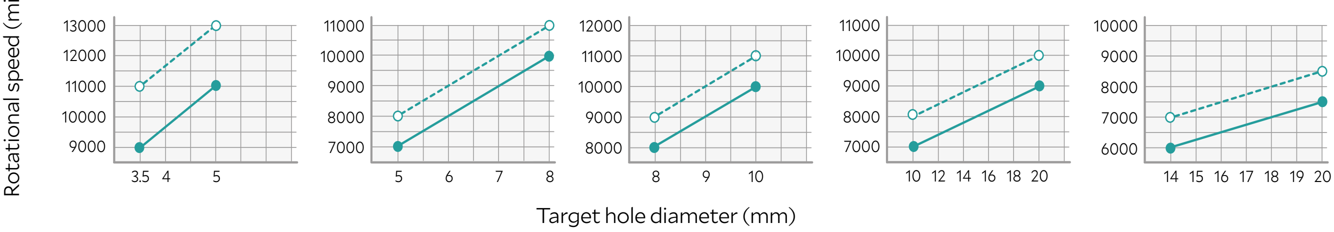
1. Insert the brush stationary into the bore.
2. Rotate the tool once past the crosshole.
3. Machine while pulling the brush back.
4. Machine while pushing the brush forward.
5. Stop the brush rotation.
6. Remove the brush when it is stationary.

Machining parameter adjustments

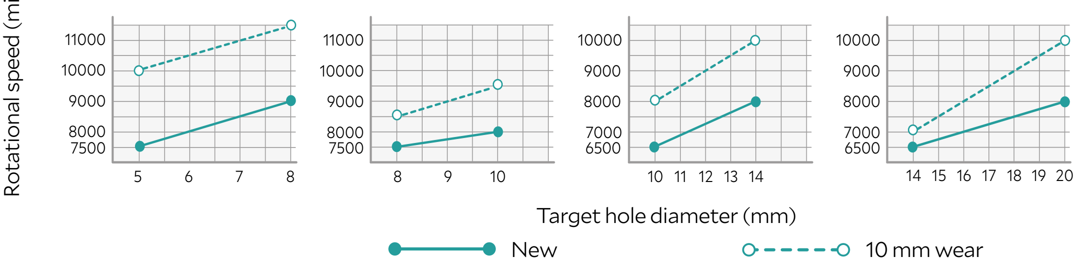
Rotational speed

Brush performance can be optimized by adjusting rotational speed in accordance with brush size, target hole diameter and brush wear. Refer below for recommended rotational speeds.

CH-A12-1.5M Hole dia.: ϕ3.5 – 5 mm
CH-A12-3M-TL/3L-TL Hole dia.: ϕ5 – 8 mm
CH-A12-5M-TL/5L-TL Hole dia.: ϕ8 – 10 mm
CH-A12-7M-TL/7L-TL Hole dia.: ϕ10 – 20 mm
CH-A12-11M/11L Hole dia.: ϕ14 – 20 mm



CH-A33-3M/3L Hole dia.: ϕ5 – 8 mm
CH-A33-5M/5L Hole dia.: ϕ8 – 10 mm
CH-A33-7M/7L Hole dia.: ϕ10 – 14 mm
CH-A33-11M/11L Hole dia.: ϕ14 – 20 mm



Feed rate

300 mm/min

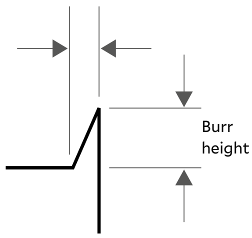
Rotational direction

Uniform deburring and edge quality can be achieved by rotating the tool in both clockwise and counter-clockwise directions.

XEBEC Brush™ Crosshole Extra-Large

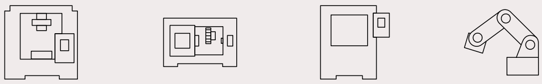
Deburring, cutter mark removal, polishing on inner diameters & counterbores (≥ ϕ20 mm)

Applicable burr size
Burr thickness ≤ 0.1 mm
(Burrs this size can be easily bent by fingernails)



Applicable equipment

This tool is used on equipment with rotational speed control (> 4000 min^{-1}).



Machining center | Lathe (with live tools) | Dedicated machine | Robot

Tool composition

Brush and shank are sold separately. Assemble before use.

Brush | Shank

Brushes

Brush (color)	Product code	Brush dia. (mm)	Bristle length ℓ (mm)	Shank insertion depth ds (mm)	Max. rotational speed (min^{-1})	Target hole diameter (mm)	Matching shank	Fig.
A34 (dark blue)	CH-A34-15	ϕ15	60	10	9000	ϕ20 – 25	CH-SH-6	7
	CH-A34-20	ϕ20	60	16	9000	ϕ25 – 30	CH-SH-8	7
	CH-A34-25	ϕ25	60	16	9000	ϕ30 – 35	CH-SH-8	7

■ Brush size is approximate as the tip expands with rotation.
■ Overall length of assembled brush and shank is 150 mm.

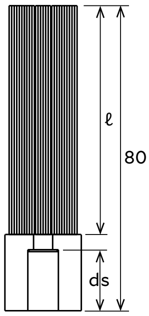


Fig. 7

Shanks

Product code	Shaft dia. Ds (mm)	Shank length ℓs (mm)	Matching brush	Fig.
CH-SH-6	ϕ6	80	CH-A34-15	8
CH-SH-8	ϕ8	86	CH-A34-20, CH-A34-25	8

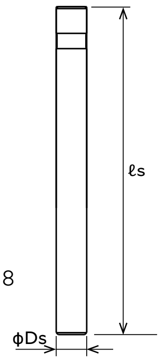


Fig. 8

Precautions for use

The shank must be inserted ≥ 30 mm in the holder to secure it properly.

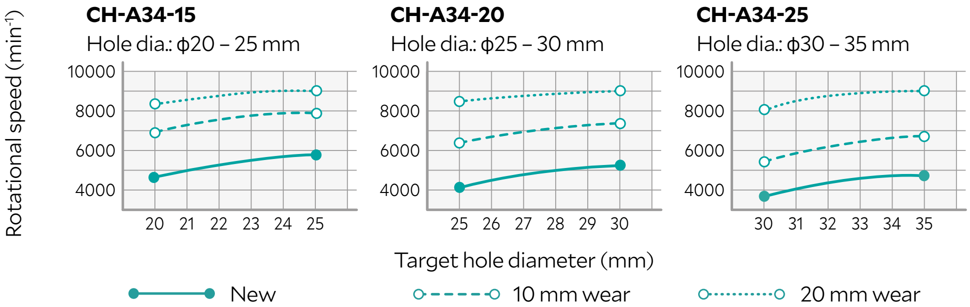
The brush will break if:
- used beyond the maximum rotational speed
- used with a pneumatic rotary tool
- rotated outside of the bore (outside workpiece)
- used with brush tip < 20 mm inside bore

The brush may break when used with:
- crossholes larger than ϕ12

Contact XEBEC technical support before using on crossholes > ϕ12.

Machining parameters

Brush performance can be optimized by adjusting rotational speed in accordance with brush size, target hole diameter, and brush wear. Refer below for recommended rotational speeds.



Rotational speed:
7000 min^{-1}
Feed rate:
300 mm/min
Rotational direction:
Uniform deburring and edge quality can be achieved by rotating the tool in both clockwise and counter-clockwise directions.
Applicable materials:
Plastics, nonferrous materials, steel, stainless steel.

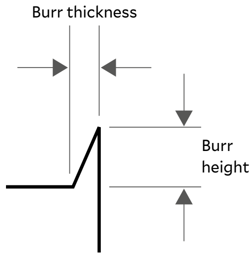
XEBEC Brush™ Crosshole Extra-Long (Patented)

Deburring, cutter mark removal, polishing on bores over ϕ150 mm in depth

Custom-made item

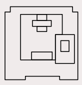

Applicable burr size

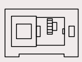
Burr thickness ≤ 0.1 mm
(Burrs this size can be easily bent by fingernails)

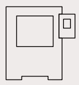


Applicable equipment

This tool is used on full cover type equipment with rotational speed control (> 6500 min^{-1}).


Machining center


Lathe (with live tools)


Dedicated machine

Tool composition

Brush, collar and shank are sold separately.
Assemble before use.

Brushes

Brush (color)	Product code	Brush diameter (mm)	Shank diameter Ds (mm)	Overall length L (mm)	Maximum rotational speed (min^{-1})
A12 (red)	*	ϕ3	ϕ4	400	12000
	*	ϕ5	ϕ6	400	12000
	*	ϕ7	ϕ8	400	12000
	*	ϕ11	ϕ12	400	12000
A33 (blue)	*	ϕ3	ϕ4	410	12000
	*	ϕ5	ϕ6	410	12000
	*	ϕ7	ϕ8	410	12000
	*	ϕ11	ϕ12	410	12000

■ This is a custom-made item. Contact XEBEC technical support for details.
■ Brush size is approximate as the tip expands with rotation.

Precautions for use

The brush will break if:
- used beyond the maximum rotational speed
- used with a pneumatic rotary tool
- rotated outside of the bore (outside workpiece)

The brush may break when used with:
- off-center or angled crossholes
- t-shaped holes, when the secondary bore diameter is > 50 % of the main bore
- crossholes, when the secondary bore diameter is > 25 % of the main bore

XEBEC Brush™ Crosshole

How to select

Refer to the chart below and select the brush color based on the workpiece material, burr thickness and surface roughness.

Workpiece material	Resin	Steel
	Copper, Brass	Stainless steel
	Aluminum	Aluminum
		HRSA steel
		Cast iron
		Hard material
Burr size	Micro fine burrs	
	Burr thickness (≤ 0.1mm)	Burr thickness (≤ 0.1mm)
Achievable surface roughness	≤ Ra 0.1 µm	
		≥ Ra 0.1 µm
Brush (color)	A12 (red)	A33 (blue)
		A34 (dark blue)
Grinding power	→	High

■ HRSA (heat resistant super alloy)

Machining adjustments - Burrs remain

Take the following actions, if burrs remain despite using the correct brush and rotational speed for the given burr size.

1. Check the brush color

2. Increase rotational speed to the maximum

3. Increase the number of passes

4. Decrease the feed rate

Machining adjustments - Extending tool life

Try the following, if tool life is short despite using the correct brush for the given burr size.

1. Decrease the rotational speed

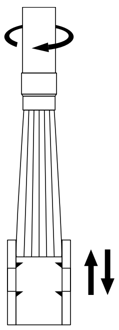
2. Increase the feed rate

Example

Material	S45C
Follows	Drilling
Burr thickness	0.1 mm
Main bore	ϕ10 mm
Crosshole	ϕ5 mm

Tool	CH-A12-5M-TL
Rotational speed	10000 min^{-1}
Feed rate	300 mm/min
Depth of cut	1 mm
Wear amount	10 mm out of 50 mm

Tool life	4500 holes

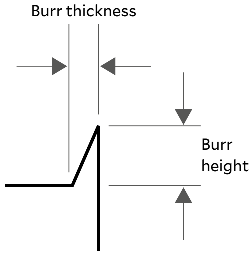


■ Tool life varies greatly depending on the material, machining conditions, and burr size and direction.
■ The above data is not guaranteed. Please use as a guide.

XEBEC Brush™ Wheel Type

Deburring, polishing on inner diameters, side walls, and outside diameter threads

Applicable burr size
Burr thickness ≤ 0.1 mm
(Burrs this size can be easily bent by fingernails)



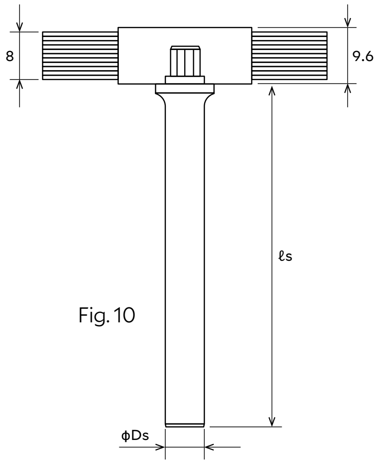
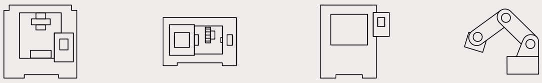


Fig. 10

Applicable equipment

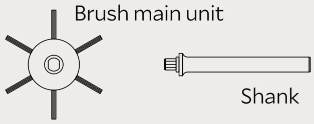
This tool can be mounted on equipment shown below.



Machining center	Lathe (with live tools)	Dedicated machine	Robot

Tool composition

Brush and shank are sold separately. Assemble before use.



Brushes

Brush (color)	Product code	Brush diameter (mm)	Number of bundles	Matching shank	Fig.
A11 (red)	W-A11-50	ϕ50	6	W-SH-M/L	9
	W-A11-75	ϕ75	6		

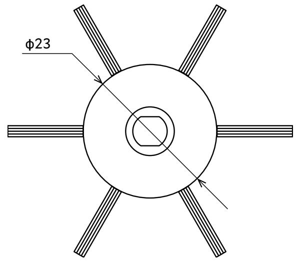


Fig. 9

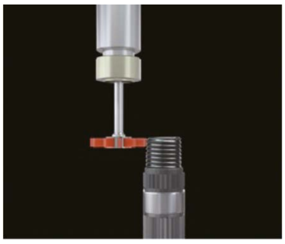
Shanks

Product code	Shank diameter Ds (mm)	Shank length ℓs (mm)	Fig.
W-SH-M	ϕ8	70	10
W-SH-L	ϕ12	150	10

Applications

Automation of thread deburring

Output shaft

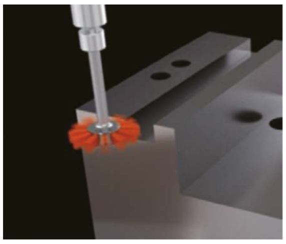


Material: SCM
Follows: Turning
Tool: W-A11-50

Before
A file was used to manually deburr the thread but failed to remove all burrs. Quality was unstable.

After
All burrs are removed and quality is stable.

Automated deburring of face



Material: S50C
Follows: End milling
Tool: W-A11-50

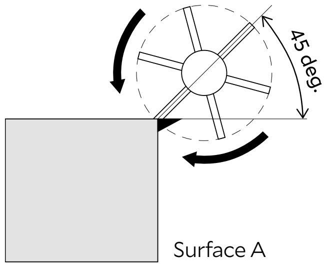
Before
Burrs formed on the face were removed manually.

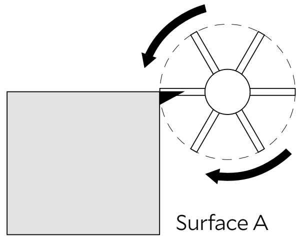
After
Burrs are completely removed inside the machining center.

How to use

As shown in the drawing at right, the best approach to removing burrs formed on surface A is to place the center of the brush at a 45-degree angle to the edge. Burrs are removed by rotating the brush both clockwise and counter-clockwise.

If this is not possible, position the brush as show at far right. The brush should also be rotated in both clockwise and counter-clockwise directions.





Machining parameters

Starting parameters

Product code	Cutting speed (m/min)	Rotational speed (min^{-1})	Feed per bundle (mm/bundle)	Depth of cut (mm)	Feed (mm/min)
W-A11-50	250	1600	0.5	0.2	4800
W-A11-75	250	1000	0.5	0.2	3000

Maximum parameters

Product code	Cutting speed (m/min)	Maximum rotational speed (min^{-1})	Feed per bundle (mm/bundle)	Depth of cut (mm)
W-A11-50 W-A11-75	150 - 350	3000	≤ 1.5	≤ 0.5

■ Bristle stiffness increases as brushes shorten with wear. Reduce the depth of cut if bristles break.

Machining adjustments - Burrs remain

Take the following actions, if burrs remain despite using the recommended depth of cut for the given burr size.

Increase the feed amount

Increase the feed amount in increments of 10 to 20 percent.

Machining adjustments - Extending tool life

Try the following, if tool life is short despite using the correct brush for the given burr size.

Increase the feed amount

Increase the feed rate in increments of 10 to 20 percent.

Reference data - Tool life

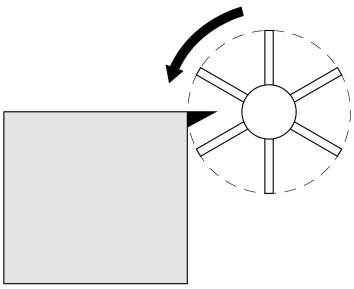
It is not possible to remove burrs with brushes without rounding edges to some extent. Take the following actions to improve edge sharpness.

Example

Material	S45C
Follows	End milling
Burr thickness	0.1 mm
Tool path length	120 mm/piece

Tool	W-A11-50
Cutting speed (Rotational speed)	250 m/min ($1600\ min^{-1}$)
Feed per bundle (Feed rate)	0.7 mm/bundle (7000 mm/min)
Depth of cut	0.2 mm
Wear amount	50 mm out of 75 mm

Tool life	600 m (5000 pieces)



■ Tool life varies greatly depending on the material, machining conditions, and burr size and direction.

■ The above data is not guaranteed. Please use as a guide.

XEBEC Floating Holder™ **Straight Shank Type** **BT Shank Type** Patented

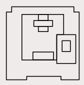
Straight Shank Type used with XEBEC Brush Surface (ϕ6 – 100)

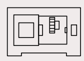
BT Shank Type used with XEBEC Brush Surface (ϕ6 – 25)

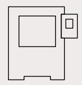
A built-in spring helps to maintain stable load, reducing the frequency of wear offsets and brush protrusion length adjustments.

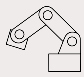

Applicable equipment [Straight Shank Type]

This holder can be used on equipment shown below.


Machining center


Lathe (with live tools)


Dedicated machine


Robot

Applicable equipment [BT Shank Type]

This holder can be used with machine tools that are compatible with BT30/40 shanks.

Straight Shank Type

Product code	Matching brush dia. (mm)	Sleeve shank diameter (mm)	Maximum rotational speed (min^{-1})	Attachments	Fig.
FH-ST12-SL10	ϕ6	ϕ6 (use with bush 1●)	10000	1. ϕ6 bush 2. ϕ8 bush 3. Low-pressure spring 4. Standard spring♦ 5. High-pressure spring	11
	ϕ15	ϕ6 (use with bush 1●)	6000		
	ϕ25	ϕ8 (use with bush 2●)	5000		
	ϕ40	ϕ10	3000		
FH-ST20-60	ϕ60	ϕ12	2000	ϕ12 bush	12
FH-ST20-100	ϕ100	ϕ16	1200	ϕ16 bush	12

♦ Installed when shipped.

● Attachments included when shipped.

■ Optional ϕ3 bush is available.

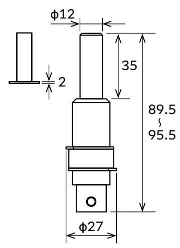


Fig. 11

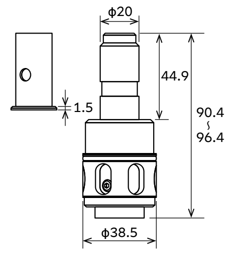


Fig. 12

BT Shank Type

Product code	Matching brush dia. (mm)	Sleeve shank diameter (mm)	Maximum rotational speed (min^{-1})	Length under gauge line (mm)	Fig.
FH-BT30	ϕ6	ϕ6 (with ϕ6 bush○)	10000	75	13
	ϕ15	ϕ6 (with ϕ6 bush○)	6000		
	ϕ25	ϕ8	5000		
FH-BT40	ϕ6	ϕ6 (with ϕ6 bush○)	10000	60	14
	ϕ15	ϕ6 (with ϕ6 bush○)	6000		
	ϕ25	ϕ8	5000		

○ ϕ6 bush sold separately.

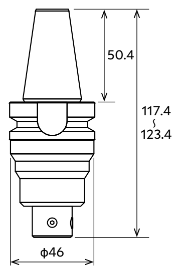


Fig. 13

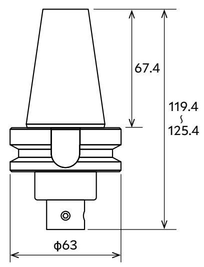


Fig. 14

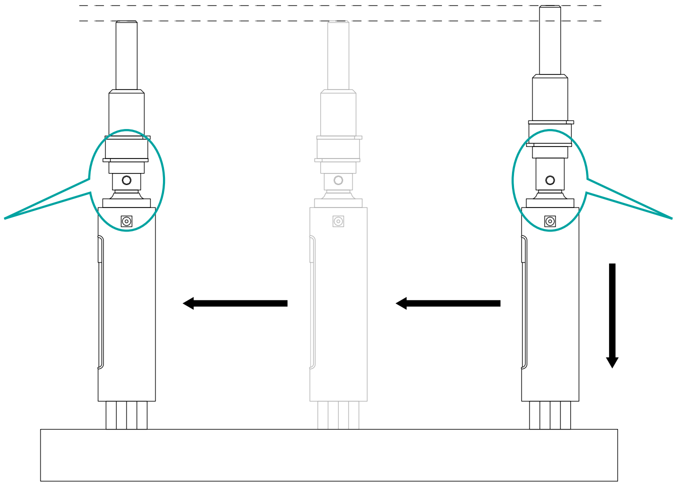
Precautions for use

- Lower the tool vertically onto the workpiece.
- The tool cannot be used on surfaces that are discontinuous or have protrusions.
- The tool may not function correctly on a horizontal machining center when spring load is low.

Mechanism

This tool has a built-in spring. The spring is compressed when the brush contacts the workpiece surface.

Built-in spring compressed

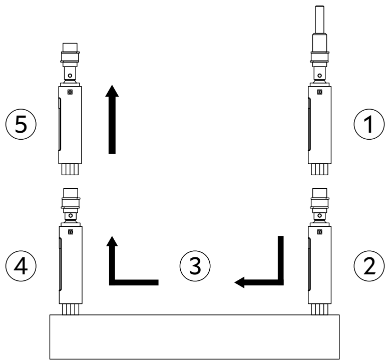


Lower the brush to compress the built-in spring. The spring contracts up to 6 mm.

Built-in spring without load

How to use

Product in use



The diagram to the left shows how to use the tool effectively.

1. Approach the workpiece surface from above without rotating the brush.
2. Set the depth of cut and compress the spring.
3. Rotate the brush and start feeding with the spring compressed.
4. Stop rotation and feed when finished machining.
5. Remove the brush upward from the workpiece surface.

Unacceptable workpiece shapes

Avoid cavities and protrusions to ensure proper operation of the floating mechanism.

FH-ST12-SL10

Spring type	Outer diameter (mm)	Spring constant (N/mm)	Overall length (mm)	Load by stroke (N)	
				0 mm	6 mm
Standard spring (installed)	ϕ10	0.30	40	4.5	6.3
Low-pressure spring (attachment)	ϕ10	0.30	30	1.5	3.3
High-pressure spring (attachment)	ϕ10	0.55	39	7.2	10.5
Maximum load spring (sold separately)	ϕ10	3.03	30	15.2	33.4

FH-ST20-60/100 FH-BT30/40

Load adjustment	Load by stroke (N)		Load adjustment screw position
	0 mm	6 mm	
Standard float	2	6	When load adjustment screw is flush with shaft end.
Higher float	6	10	When load adjustment screw is fully inside shaft.

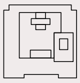
XEBEC Self-Adjusting Sleeve™ Patented

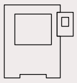
Used with
XEBEC Brush Surface (ϕ6 – 40)

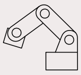
A built-in gear mechanism automatically adjusts brush protrusion length, reducing human error and providing consistent machining performance.

Applicable equipment

This tool is used on equipment capable of precise angular control of the sleeve.


Machining center

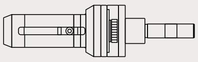

Dedicated machine


Robot

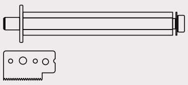
Tool composition

Consists of a sleeve and rack gear.
Brushes are sold separately.

Sleeve



Rack gear



Sleeves

Product code	Matching brush	Sleeve outer dia. Dc (mm)	Maximum outer dia. Df (mm)	Shank diameter Ds (mm)	Overall length L (mm)	Shank length ℓs (mm)	Main body mass (g)	Maximum rotational speed (min^{-1})	Fig.
XP-AUT06M	A13-CB06M A11-CB06M A21-CB06M A32-CB06M	ϕ14.2	ϕ37	ϕ10	124.1	35.0	220	10000	15
XP-AUT15M	A13-CB15M A11-CB15M A21-CB15M A32-CB15M	ϕ23.4	ϕ37	ϕ10	136.3	35.0	270	6000	15
XP-AUT25M	A11-CB25M A21-CB25M A32-CB25M	ϕ34.6	ϕ60	ϕ16	189.0	41.5	795	5000	15
XP-AUT40M	A11-CB40M A21-CB40M A32-CB40M	ϕ50.0	ϕ60	ϕ16	189.0	41.5	910	3000	15

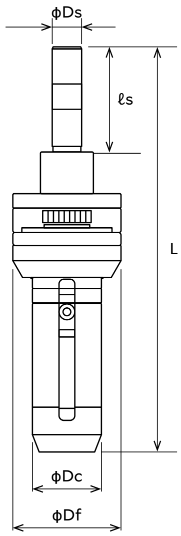
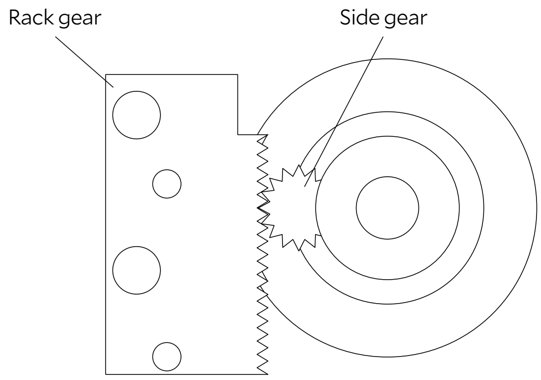


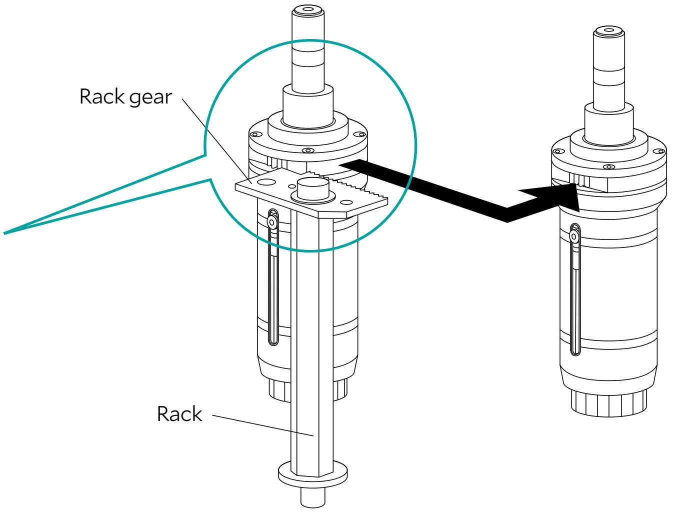
Fig. 15

How to use

Mount the rack gear inside the machine.
The brush protrusion length is adjusted by rotating the side gear built inside the sleeve with the rack gear.



The main body side gear and the rack gear are meshed.



As shown above, the main body passes through the rack.

Brush protrusion length

The brush protrusion length can be adjusted in increments of 0.05 mm.
It is possible to make an adjustment of up to 1 mm in a single pass. This allows adjustments to be made at a predetermined interval corresponding to tool wear.

XEBEC Short BT Holder™

Compact tool holder whose length under the gauge line is 23.5 mm (including bush flange thickness 1.5 mm). Optimal when space is limited.

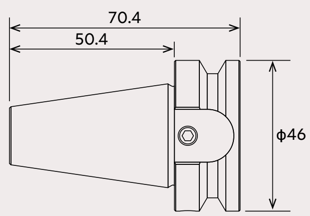
Used with
XEBEC Brush Surface
XEBEC Self-Adjusting Sleeve
XEBEC Floating Holder

- Only for use with XEBEC tools

Applicable equipment

This tool can be used with machine tools that are compatible with BT30 shanks.

Tool outline

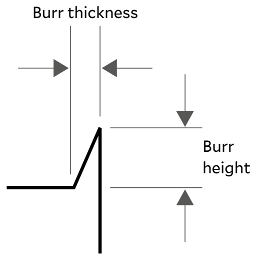


XEBEC Back Burr Cutter™

Ideal for deburring both front and back of drilled holes.

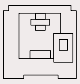
Applicable burr size

Burr thickness ≤ 0.2 mm
(Burrs this size can be bent by fingernails)

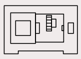


Applicable equipment

This tool is used on equipment with 3-axis simultaneous control.



Machining center



Lathe (with live tools)

Tool composition

Consists of a spherical deburring cutter and made-to-order tool path.

AlTiCrN coated

P: Steel | M: Stainless steel | K: Cast iron | S: Heat-resistant super alloy | N: Non-ferrous metal

Type	Product code	Cutter dia. Dc (mm)	Cutter rad. R (mm)	Neck dia. dn (mm)	Neck length L2 (mm)	Overall length L1 (mm)	Shank dia. Ds (mm)	Number of blades	Fig.
Short	XC-08-AS-3F	ϕ0.8	0.40	ϕ0.48	3.0	60	ϕ3.0	3	16
	XC-13-AS-3F	ϕ1.3	0.65	ϕ0.78	5.0	60	ϕ3.0	3	16
	XC-18-AS-3F	ϕ1.8	0.90	ϕ1.10	6.0	60	ϕ3.0	3	16
	XC-23-AS-3F	ϕ2.3	1.15	ϕ1.40	7.5	70	ϕ3.0	3	16
	XC-28-AS-3F	ϕ2.8	1.40	ϕ1.70	9.0	70	ϕ4.0	3	16
	XC-33-AS-3F	ϕ3.3	1.65	ϕ2.00	10.5	70	ϕ4.0	3	16
	XC-38-AS-3F	ϕ3.8	1.90	ϕ2.40	12.0	70	ϕ4.0	3	16
	XC-48-AS-3F	ϕ4.8	2.40	ϕ3.00	15.0	70	ϕ6.0	3	16
	XC-58-AS-3F	ϕ5.8	2.90	ϕ3.50	18.0	70	ϕ6.0	3	16
	XC-78-AS-3F	ϕ7.8	3.90	ϕ4.70	24.0	100	ϕ8.0	3	16
	XC-98-AS-3F	ϕ9.8	4.90	ϕ5.90	30.0	120	ϕ10.0	3	16
Regular	XC-08-A	ϕ0.8	0.40	ϕ0.48	5.0	60	ϕ3.0	2	16
	XC-13-A	ϕ1.3	0.65	ϕ0.78	8.0	60	ϕ3.0	2	16
	XC-18-A	ϕ1.8	0.90	ϕ1.10	10.0	60	ϕ3.0	2	16
	XC-23-A	ϕ2.3	1.15	ϕ1.40	12.5	70	ϕ3.0	2	16
	XC-28-A	ϕ2.8	1.40	ϕ1.70	15.0	70	ϕ4.0	2	16
	XC-33-A	ϕ3.3	1.65	ϕ2.00	17.5	70	ϕ4.0	2	16
	XC-38-A	ϕ3.8	1.90	ϕ2.40	20.0	70	ϕ4.0	2	16
	XC-48-A	ϕ4.8	2.40	ϕ3.00	25.0	70	ϕ6.0	2	16
	XC-58-A	ϕ5.8	2.90	ϕ3.50	30.0	70	ϕ6.0	2	16
	XC-78-A	ϕ7.8	3.90	ϕ4.70	40.0	100	ϕ8.0	3	16
	XC-98-A	ϕ9.8	4.90	ϕ5.90	50.0	120	ϕ10.0	3	16
Straight	XC-18-B	ϕ1.8	0.90	ϕ1.10	—	50	ϕ1.1	2	17
	XC-23-B	ϕ2.3	1.15	ϕ1.40	—	60	ϕ1.4	2	17
	XC-28-B	ϕ2.8	1.40	ϕ1.70	—	70	ϕ1.7	2	17
	XC-33-B	ϕ3.3	1.65	ϕ2.00	—	80	ϕ2.0	2	17
	XC-38-B	ϕ3.8	1.90	ϕ2.40	—	85	ϕ2.4	2	17
	XC-48-B	ϕ4.8	2.40	ϕ3.00	—	105	ϕ3.0	2	17
	XC-58-B	ϕ5.8	2.90	ϕ3.50	—	120	ϕ3.5	2	17
	XC-78-B	ϕ7.8	3.90	ϕ4.70	—	150	ϕ4.7	3	17
	XC-98-B	ϕ9.8	4.90	ϕ5.90	—	180	ϕ5.9	3	17

Uncoated

N: Non-ferrous metal | O: Resin

Type	Product code	Cutter dia. Dc (mm)	Cutter rad. R (mm)	Neck dia. dn (mm)	Neck length L2 (mm)	Overall length L1 (mm)	Shank dia. Ds (mm)	Number of blades	Fig.
Regular	XC-08-A-N	ϕ0.8	0.40	ϕ0.48	5.0	60	ϕ3	2	16
	XC-13-A-N	ϕ1.3	0.65	ϕ0.78	8.0	60	ϕ3	2	16
	XC-18-A-N	ϕ1.8	0.90	ϕ1.10	10.0	60	ϕ3	2	16
	XC-23-A-N	ϕ2.3	1.15	ϕ1.40	12.5	70	ϕ3	2	16
	XC-28-A-N	ϕ2.8	1.40	ϕ1.70	15.0	70	ϕ4	2	16
	XC-33-A-N	ϕ3.3	1.65	ϕ2.00	17.5	70	ϕ4	2	16
	XC-38-A-N	ϕ3.8	1.90	ϕ2.40	20.0	70	ϕ4	2	16
	XC-48-A-N	ϕ4.8	2.40	ϕ3.00	25.0	70	ϕ6	2	16
	XC-58-A-N	ϕ5.8	2.90	ϕ3.50	30.0	70	ϕ6	2	16
	XC-78-A-N	ϕ7.8	3.90	ϕ4.70	40.0	100	ϕ8	3	16
	XC-98-A-N	ϕ9.8	4.90	ϕ5.90	50.0	120	ϕ10	3	16

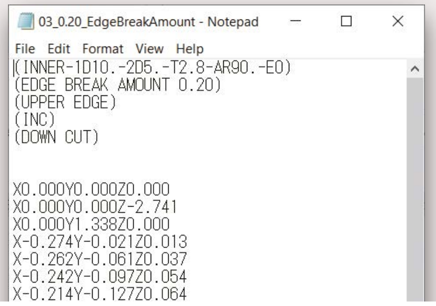
A solution combining a made-to-order tool path program with a dedicated cutting tool for high quality finish, extended tool life and the world's fastest automated deburring of drill holes. The ready-to-use CNC program is easy to install and greatly reduces programming time.

XEBEC Back Burr Cutter

This cutter is made of micro-grain cemented carbide for longer life. It is heat-resistant with a AlTiCrN coating and can be used with a wide range of materials including non-ferrous metals, such as aluminum alloy, and heat-sensitive materials such as titanium. Cutting performance is improved through optimal blade geometry that inhibits formation of secondary burrs.

XEBEC Deburring Tool Path

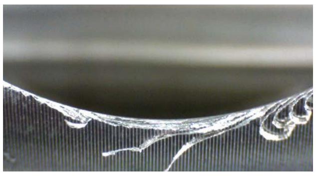
Made-to-order CNC tool path program



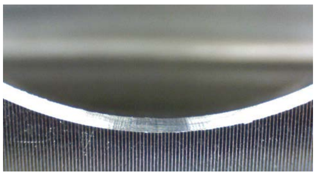
High quality

An optimized tool path and use of the ideal approach angle enables uniform break width on edges, while inhibiting formation of secondary burrs.

Before



After

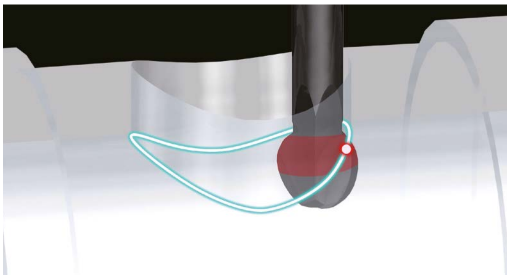


Five different tool paths provide a choice of edge break widths. (Refer to p. 29 for cutter diameters and corresponding edge break widths.)

Long tool life

Tool life is increased by continuous displacement of the cutter contact point.

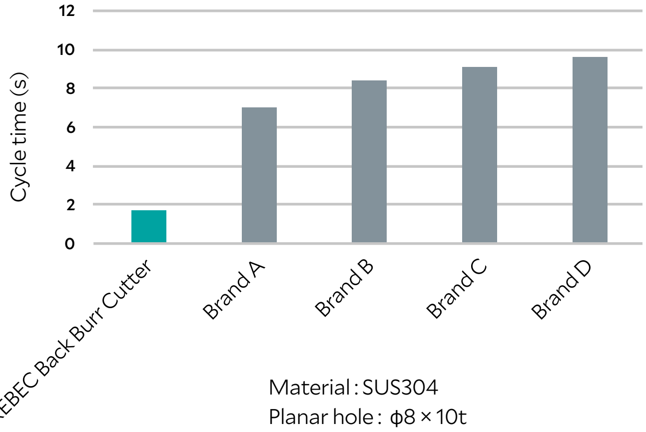
Area of tool used (contact range)



World's fastest deburring

Cycle time is reduced because there is no wasted motion in the cutter path. Cycle time is up 10 times faster than conventional deburring tools.

Deburring tool comparison

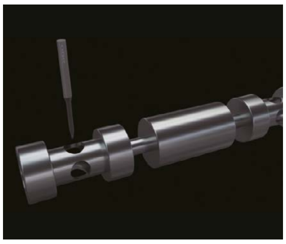


Material : SUS304
Planar hole : ϕ8 × 10t

Applications

Automation of deburring

Valve



Material: Free cutting steel
Follows: Drilling
Tool: XC-18-A

Before

Deburring was done in 3 steps (ϕ2 zero cut, nylon brush deburring, ϕ3 zero cut), with a different tool for each. This resulted in a long cycle time.

After

Deburring is performed with a single cutter. Cycle time is 9 seconds shorter and tool cost is reduced.

Automation of deburring

Industrial robot part

Material: SUS304
Follows: Tapping
Tool: XC-18-A

Before

A lengthy manual deburring was followed by a tap zero cut and air blow. This resulted in a very long cycle time.

After

XEBEC deburring tool path reduces the deburring time from 120 to 40 seconds. The workplace is safer as manual deburring is no longer used.

Starting parameters

AlTiCrN coated

P: Steel | M: Stainless steel | K: Cast iron | S: Heat-resistant super alloy | N: Non-ferrous metal

					Steel, SS, cast iron, HRSA		Non-ferrous metal	
Type	Product code	Cutter dia. Dc (mm)	Tool protrusion length (mm)	Number of blades	Rotational speed n (min-1)	Feed rate Vf (mm/min)	Rotational speed n (min^{-1})	Feed rate Vf (mm/min)
Short	XC-08-AS-3F	ϕ0.8	3Dc	3	20000	1080	20000	1170
	XC-13-AS-3F	ϕ1.3	3Dc	3	20000	1080	20000	1170
	XC-18-AS-3F	ϕ1.8	3Dc	3	20000	1080	20000	1170
	XC-23-AS-3F	ϕ2.3	3Dc	3	15000	1350	18000	1710
	XC-28-AS-3F	ϕ2.8	3Dc	3	12500	1800	15000	2520
	XC-33-AS-3F	ϕ3.3	3Dc	3	10600	1890	12700	2250
	XC-38-AS-3F	ϕ3.8	3Dc	3	9200	2160	11000	2880
	XC-48-AS-3F	ϕ4.8	3Dc	3	7200	1980	8500	2880
	XC-58-AS-3F	ϕ5.8	3Dc	3	6000	1620	7000	2160
	XC-78-AS-3F	ϕ7.8	3Dc	3	4500	1620	5400	1920
	XC-98-AS-3F	ϕ9.8	3Dc	3	3600	1320	4300	1560
Regular	XC-08-A	ϕ0.8	5Dc	2	20000	600	20000	650
	XC-13-A	ϕ1.3	5Dc	2	20000	600	20000	650
	XC-18-A	ϕ1.8	5Dc	2	20000	600	20000	650
	XC-23-A	ϕ2.3	5Dc	2	15000	750	18000	950
	XC-28-A	ϕ2.8	5Dc	2	12500	1000	15000	1400
	XC-33-A	ϕ3.3	5Dc	2	10600	1050	12700	1250
	XC-38-A	ϕ3.8	5Dc	2	9200	1200	11000	1600
	XC-48-A	ϕ4.8	5Dc	2	7200	1100	8500	1600
	XC-58-A	ϕ5.8	5Dc	2	6000	900	7000	1200
	XC-78-A	ϕ7.8	5Dc	3	4500	1350	5400	1600
	XC-98-A	ϕ9.8	5Dc	3	3600	1100	4300	1300
Straight	XC-18-B	ϕ1.8	10Dc	2	4400	220	4400	220
	XC-23-B	ϕ2.3	10Dc	2	3500	220	3500	220
	XC-28-B	ϕ2.8	10Dc	2	2800	220	2800	220
	XC-33-B	ϕ3.3	10Dc	2	2400	190	2400	190
	XC-38-B	ϕ3.8	10Dc	2	2000	160	2000	160
	XC-48-B	ϕ4.8	10Dc	2	1600	120	1600	120
	XC-58-B	ϕ5.8	10Dc	2	1300	100	1300	100
	XC-78-B	ϕ7.8	10Dc	3	650	70	650	70
	XC-98-B	ϕ9.8	10Dc	3	500	50	500	50

Fig. 16

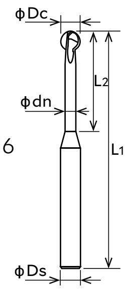
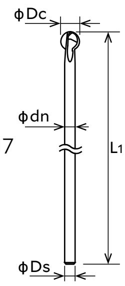


Fig. 17



Precautions for use

- XEBEC Back Burr Cutter is designed for CNC machines. Never use it as a hand tool.
- Turning on advanced preview control on the machine tool results in uniform edges.
- The machining error on holes must be kept as small as possible.

Uncoated

N: Non-ferrous metal | O: Resin

Type	Product code	Cutter dia. Dc (mm)	Tool protrusion length (mm)	Number of blades	Rotational speed n (min^{-1})	Feed rate Vf (mm/min)
Regular	XC-08-A-N	ϕ0.8	5Dc	2	20000	650
	XC-13-A-N	ϕ1.3	5Dc	2	20000	650
	XC-18-A-N	ϕ1.8	5Dc	2	20000	650
	XC-23-A-N	ϕ2.3	5Dc	2	18000	950
	XC-28-A-N	ϕ2.8	5Dc	2	15000	1400
	XC-33-A-N	ϕ3.3	5Dc	2	12700	1250
	XC-38-A-N	ϕ3.8	5Dc	2	11000	1600
	XC-48-A-N	ϕ4.8	5Dc	2	8500	1600
	XC-58-A-N	ϕ5.8	5Dc	2	7000	1200
	XC-78-A-N	ϕ7.8	5Dc	3	5400	1600
	XC-98-A-N	ϕ9.8	5Dc	3	4300	1300

Parameter adjustments

- Machining parameters will vary for the straight type when protrusion lengths other than 10D (shown in table) are used.
- Rotational speed and feed rates shown are intended as guides for setting starting parameters.
- In the event of abnormal vibration or noise, reduce the rotational speed and feed rate proportionally.
- If the maximum rotational speed and feed of the machine is below the starting parameters, reduce them both proportionally to the machine's capability.

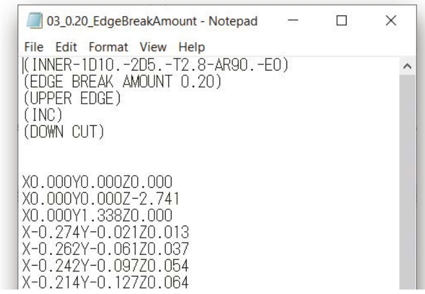
XEBEC Deburring Tool Path™ (Patented)

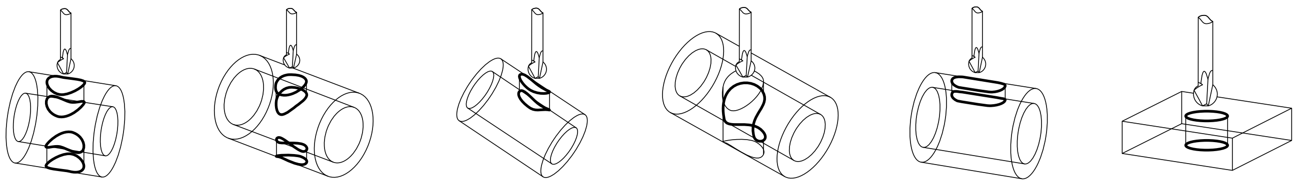
An integral component of this deburring solution, XEBEC Deburring Tool Path is a made-to-order CNC tool path program that ensures optimal performance of the XEBEC Back Burr Cutter.

Standard paths

Standard paths are readily available for the commonly encountered crosshole configurations shown below.

The same cutter can be used for many different types and sizes of hole. This reduces the number of tools in the ATC and the cycle time.





Orthogonal crosshole | Off-center crosshole | Angled crosshole | Broken crosshole | Slotted hole | Planar hole

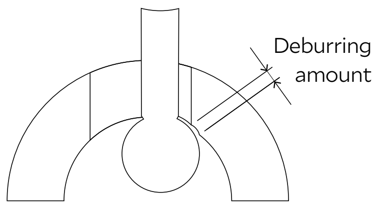
Deburring amount and allowable cumulative error

Product code	Cutter dia. Dc (mm)	Edge break length (mm)					Max. allowed accumulated variance (mm)
		1	2	3	4	5	
XC-08-AS-3F/A/A-N	ϕ0.8	0.02	0.04	0.06	0.08	0.10	0.03
XC-13-AS-3F/A/A-N	ϕ 1.3	0.04	0.06	0.08	0.10	0.12	0.05
XC-18-AS-3F/A/B/A-N	ϕ1.8	0.07	0.09	0.11	0.13	0.15	0.08
XC-23-AS-3F/A/B/A-N	ϕ2.3	0.07	0.09	0.11	0.13	0.15	0.09
XC-28-AS-3F/A/B/A-N	ϕ2.8	0.08	0.11	0.14	0.17	0.20	0.10
XC-33-AS-3F/A/B/A-N	ϕ3.3	0.08	0.11	0.14	0.17	0.20	0.11
XC-38-AS-3F/A/B/A-N	ϕ3.8	0.09	0.13	0.17	0.21	0.25	0.12
XC-48-AS-3F/A/B/A-N	ϕ4.8	0.10	0.15	0.20	0.25	0.30	0.15
XC-58-AS-3F/A/B/A-N	ϕ5.8	0.10	0.15	0.20	0.25	0.30	0.18
XC-78-AS-3F/A/B/A-N	ϕ7.8	0.10	0.15	0.20	0.25	0.30	0.18
XC-98-AS-3F/A/B/A-N	ϕ9.8	0.10	0.15	0.20	0.25	0.30	0.18

Standard Path for Tapped Holes

Tap size	Matching cutter product code	Cutter dia. Dc (mm)	Deburring amount (mm)
M3	XC-23-AS-3F/A/B/A-N	ϕ2.3	0.11
M4	XC-28-AS-3F/A/B/A-N	ϕ2.8	0.14
M5	XC-33-AS-3F/A/B/A-N	ϕ3.3	0.14
M6	XC-38-AS-3F/A/B/A-N	ϕ3.8	0.17
M8	XC-48-AS-3F/A/B/A-N	ϕ4.8	0.20
M10	XC-58-AS-3F/A/B/A-N	ϕ5.8	0.20
M12	XC-78-AS-3F/A/B/A-N	ϕ7.8	0.20
M16 - 24	XC-98-AS-3F/A/B/A-N	ϕ9.8	0.20

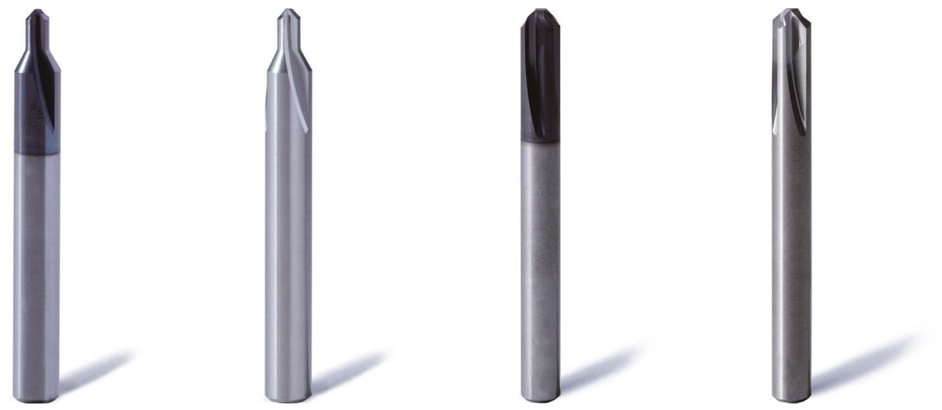
Standard paths are available for thread sizes from M3 to M24.



■ Deburring amount is the chamfer width after an edge is deburred.

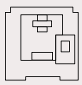
XEBEC Burrless Chamfering Cutter™ (Patented)

Burrless chamfering with world's first V-shaped blade

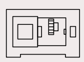


Applicable equipment

This tool can be mounted on equipment shown below.



Machining center



Lathe (with live tools)

AlTiCrN coated

P: Steel | M: Stainless steel | K: Cast iron | S: Heat-resistant super alloy | N: Non-ferrous metal

Product code	Chamfer alignment dia. Dc (mm)	Shank diameter Dcon (mm)	Overall length LF (mm)	Neck length L1 (mm)	Maximum depth of cut APMX (mm)	Cutting angle KAPR (deg.)	Number of blades	Chamfering size (mm)	Fig.
XC-C-03-M	ϕ2	ϕ6	50	5	1	45	3	C0.3 - C0.6	18
XC-C-06-M	ϕ4	ϕ6	60	—	2	45	4	C0.7 - C1.5	19

Uncoated

N: Non-ferrous metal | O: Resin

Product code	Chamfer alignment dia. Dc (mm)	Shank diameter Dcon (mm)	Overall length LF (mm)	Neck length L1 (mm)	Maximum depth of cut APMX (mm)	Cutting angle KAPR (deg.)	Number of blades	Chamfering size (mm)	Fig.
XC-C-03-N	ϕ2	ϕ6	50	5	1	45	3	C0.3 - C0.6	18
XC-C-06-N	ϕ4	ϕ6	60	—	2	45	4	C0.7 - C1.5	19

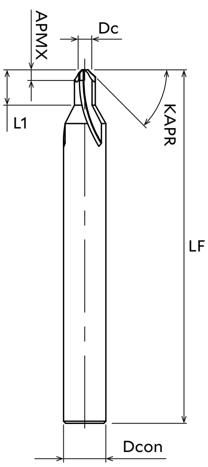


Fig. 18

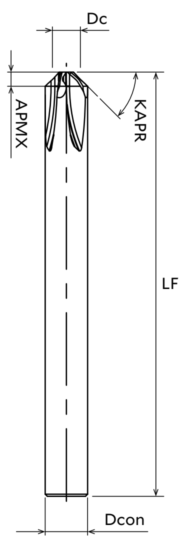
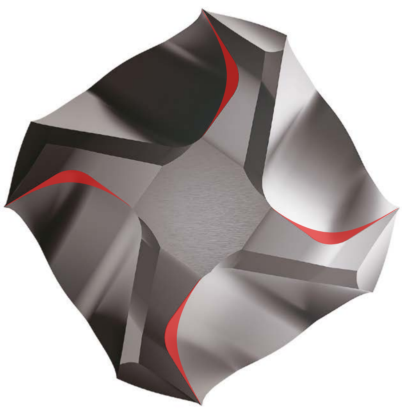


Fig. 19

The unique V-shaped blades eliminate the need for deburring after chamfering, reducing man-hours required for deburring, the cost of tools, and machining times.

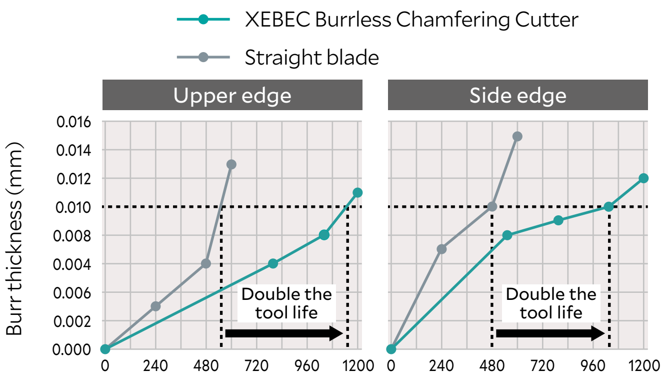
Reduction of deburring man-hours

The world's first V-shaped blades (patented) chamfer without creating secondary burrs, eliminating the need for deburring after chamfering.



Reduction of tool costs

This cutter has twice the tool life of conventional chamfering tools.



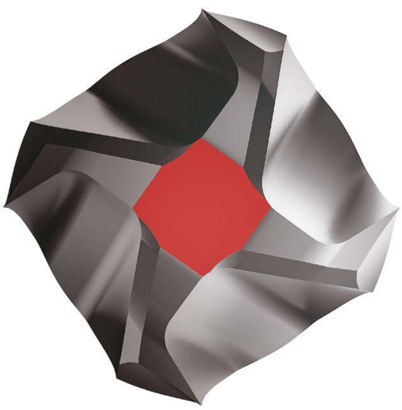
Material: SUS304 Cutting distance (m)

Reduced machining times

The multi-blade design enables high feed rates for reduced machining time.

Flat tip

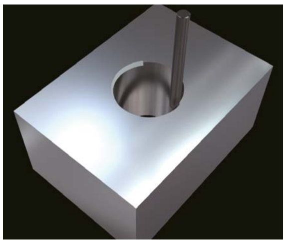
Flat tool tip prevents rounding and chipping of the tool tip, reducing tool length measurement errors and improving machining positional accuracy.



Applications

Automation of chamfering

Cooling water pipe block



Before

Burrs were formed when chamfering. Manual deburring was required.

After

Shortened the chamfering time. Manual deburring is no longer required after chamfering.

Material: SUS304
Follows: Drilling
Tool: XC-C-06-M

Automation of chamfering

Machine tool jig

Before

Oil stone was used to remove burrs after chamfering. However, it scarred the surface.

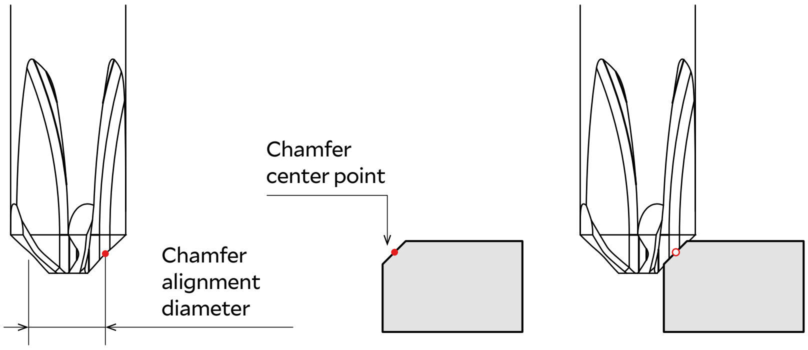
After

Oil stone is no longer needed and quality is improved.

Material: S50C
Follows: End milling
Tool: XC-C-06-M

How to use

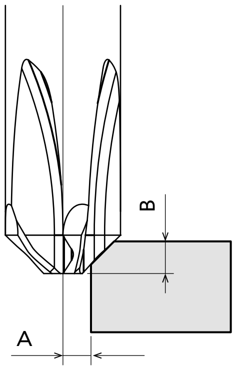
Position the chamfering alignment diameter at the chamfering center point of the workpiece.



Machining parameters

Offsets

Product code	Chamfering size (mm)	Offsets (mm)	
		A	B
XC-C-03-M/N	C0.3	0.85	0.65
	C0.4	0.80	0.70
	C0.5	0.75	0.75
	C0.6	0.70	0.80
XC-C-06-M/N	C0.7	1.65	1.35
	C0.8	1.60	1.40
	C0.9	1.55	1.45
	C1.0	1.50	1.50
	C1.1	1.45	1.55
	C1.2	1.40	1.60
	C1.3	1.35	1.65
	C1.4	1.30	1.70
	C1.5	1.25	1.75



Starting parameters

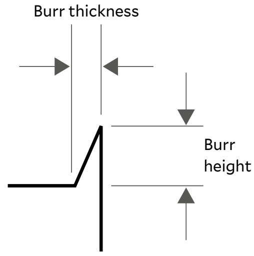
Product code	Workpiece material	Cutting speed (m/min)	Rotational speed (min^{-1})	Feed rate (mm/min)	Feed per tooth (mm/t)
XC-C-03-M	Steel	60 - 100	12000	1800	0.05
	Stainless steel	40 - 80	9000	1350	0.05
	64 titanium	45 - 60	8000	1200	0.05
	Inconel	20 - 30	4000	600	0.05
XC-C-03-N	Aluminum alloy	200 - 300	40000	6000	0.05
	Resin	60 - 100	12000	1800	0.05
XC-C-06-M	Steel	60 - 100	6300	1260	0.05
	Stainless steel	40 - 80	4800	960	0.05
	64 titanium	45 - 60	4000	800	0.05
	Inconel	20 - 30	2000	400	0.05
XC-C-06-N	Aluminum alloy	200 - 300	20000	4000	0.05
	Resin	60 - 100	6300	1760	0.07

XEBEC Stone™ Flexible Shaft (Patented)

Deburring and polishing front and back of crossholes, grooves and areas deep inside the workpiece. The spring steel shaft absorbs vibrations for a soft surface contact.

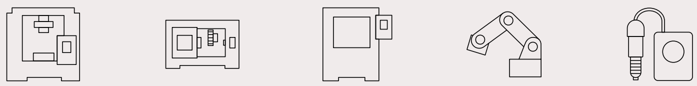
Applicable burr size

Burr thickness ≤ 0.2 mm
(Burrs this size can be bent by fingernails)



Applicable equipment

This tool is used on equipment with rotational speed control.



Machining center | Lathe (with live tools) | Dedicated machine | Robot | Rotary tool (electric)

Ball type

Equivalent grit (color)	Product code	Head size (mm)	Shaft dia. (mm)	Shank dia. (mm)	Overall length L (mm)	Standard rotational speed (min^{-1})	Maximum rotational speed (min^{-1})	Fig.
#800 (blue)	CH-PB-3B	ϕ3	ϕ1.5	ϕ3.0	70	5000 - 8000	15000	20
	CH-PB-4B	ϕ4	ϕ1.5	ϕ3.0	70	5000 - 8000	13000	20
	CH-PB-5B	ϕ5	ϕ1.5	ϕ3.0	70	5000 - 8000	12000	20
	CH-PB-6B	ϕ6	ϕ1.5	ϕ3.0	70	5000 - 8000	10000	20
#400 (orange)	CH-PO-3B	ϕ3	ϕ1.5	ϕ3.0	70	5000 - 8000	15000	20
	CH-PO-4B	ϕ4	ϕ1.5	ϕ3.0	70	5000 - 8000	13000	20
	CH-PO-5B	ϕ5	ϕ1.5	ϕ3.0	70	5000 - 8000	12000	20
	CH-PO-6B	ϕ6	ϕ1.5	ϕ3.0	70	5000 - 8000	10000	20
#220 (gray)	CH-PM-3B	ϕ3	ϕ1.5	ϕ3.0	70	5000 - 8000	15000	20
	CH-PM-4B	ϕ4	ϕ1.5	ϕ3.0	70	5000 - 8000	13000	20
	CH-PM-5B	ϕ5	ϕ1.5	ϕ3.0	70	5000 - 8000	12000	20
	CH-PM-6B	ϕ6	ϕ1.5	ϕ3.0	70	5000 - 8000	10000	20
	CH-PM-10B	ϕ10	ϕ1.5	ϕ3.0	70	4000 - 5000	6000	20
	CH-PM-3B-L	ϕ3	ϕ1.5	ϕ3.0	150	—	1000	20
	CH-PM-4B-L	ϕ4	ϕ2.3	ϕ2.3	150	—	3000	21
	CH-PM-5B-L	ϕ5	ϕ2.3	ϕ2.3	150	—	3000	21
	CH-PM-6B-L	ϕ6	ϕ2.3	ϕ2.3	150	—	3000	21
	CH-PM-10B-L	ϕ10	ϕ2.3	ϕ2.3	150	—	2000	21

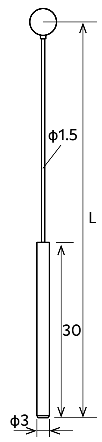


Fig. 20

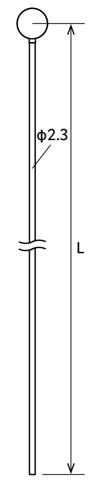


Fig. 21

CH-PM-4B-L
CH-PM-5B-L
CH-PM-6B-L
CH-PM-10B-L

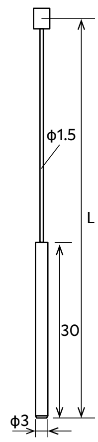


Fig. 22

Cylinder type

Equivalent grit (color)	Product code	Head size (mm)	Shaft dia. (mm)	Shank dia. (mm)	Overall length L (mm)	Standard rotational speed (min^{-1})	Maximum rotational speed (min^{-1})	Fig.
#800 (blue)	CH-PB-3R	ϕ3 × 3	ϕ1.5	ϕ3	70	5000 - 8000	15000	22
	CH-PB-4R	ϕ4 × 4	ϕ1.5	ϕ3	70	5000 - 8000	13000	22
	CH-PB-5R	ϕ5 × 5	ϕ1.5	ϕ3	70	5000 - 8000	12000	22
#400 (orange)	CH-PO-3R	ϕ3 × 3	ϕ1.5	ϕ3	70	5000 - 8000	15000	22
	CH-PO-4R	ϕ4 × 4	ϕ1.5	ϕ3	70	5000 - 8000	13000	22
	CH-PO-5R	ϕ5 × 5	ϕ1.5	ϕ3	70	5000 - 8000	12000	22
#220 (gray)	CH-PM-3R	ϕ3 × 3	ϕ1.5	ϕ3	70	5000 - 8000	15000	22
	CH-PM-4R	ϕ4 × 4	ϕ1.5	ϕ3	70	5000 - 8000	13000	22
	CH-PM-5R	ϕ5 × 5	ϕ1.5	ϕ3	70	5000 - 8000	12000	22
	CH-PM-5R-C01	ϕ5 x 10	ϕ1.5	ϕ3	70	5000 - 8000	12000	22

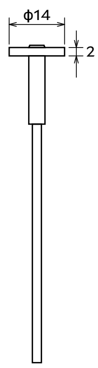


Fig. 23

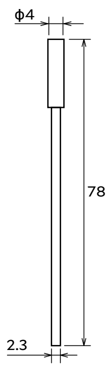


Fig. 24

Disc type - stone

Equivalent grit (color)	Product code	Head dia. x thickness (mm)	Max. rotational speed (min-1)	Fig.
#220 (gray)	CH-PM-14D	ϕ14 × 2	5000	23

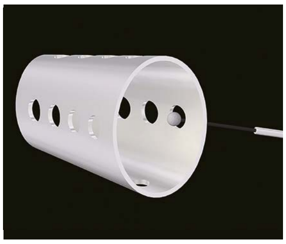
Disc type - shaft

Product code	Shaft dia. (mm)	Overall length (mm)	Mounting screw	Max. rotational speed (min^{-1})	Fig.
CH-D-SH	ϕ2.3	78	M2 × 6	5000	24

Applications

Deburring crosshole

Aircraft pipe part



Material: Stainless steel
Follows: Drilling
Tool: CH-PM-6B

Before

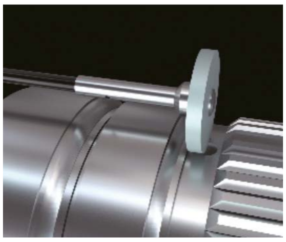
Deburring was carried out with a rubber grinding stone on a rotary tool. Finish quality varied depending on the workers' skill. 40 minutes was required to deburr 16 crossholes.

After

The tool is inserted in a crosshole and retracted gently while tracing around the hole edge. Quality of finish is uniform and less time is required for deburring.

Deburring groove hole

Shaft



Material: SCM
Follows: Drilling
Tool: CH-PM-145D

Before

An oil-impregnated grinding disc was used. The grinding stone shaft was short, making it difficult to access the deburring area. Tool life was poor.

After

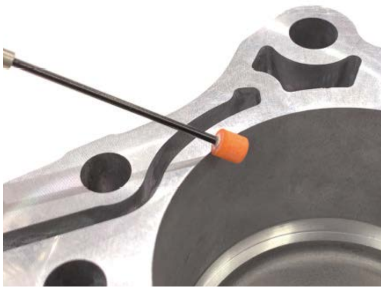
The longer shaft of the disc type grinding stone makes it easy to access the groove. The ceramic fiber stone is replaced less often because it has a longer tool life. The shaft is reusable. Only the grinding stone is replaced.

How to use

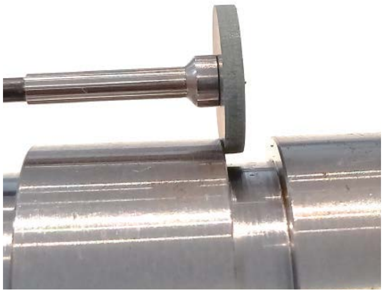
The entire surface of the ceramic stone is abrasive and therefore can be used for deburring and polishing.

Ball type

Cylinder type

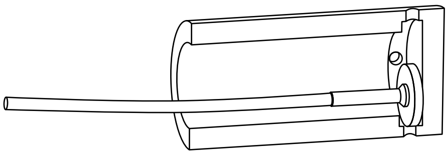


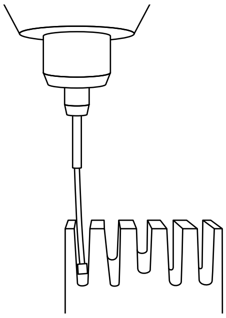
Disc type



Characteristics

The spring steel shaft absorbs vibrations for soft contact with the workpiece surface. The ceramic stone does not bounce around, thereby reducing the risk of scratching the workpiece. This makes this tool ideal for polishing and deburring areas that are deep inside the workpiece. The stone is safe to touch as it is not a cutting tool.





Trial set

This set includes a disc type stone and shaft.

Product code
CHPM14D-SET

ϕ2.3 to ϕ3 Collet Adapter

Adapts the ϕ2.3 shaft to fit on rotary tools with ϕ3 shanks.

Product code
RMP3024X

Precautions for use

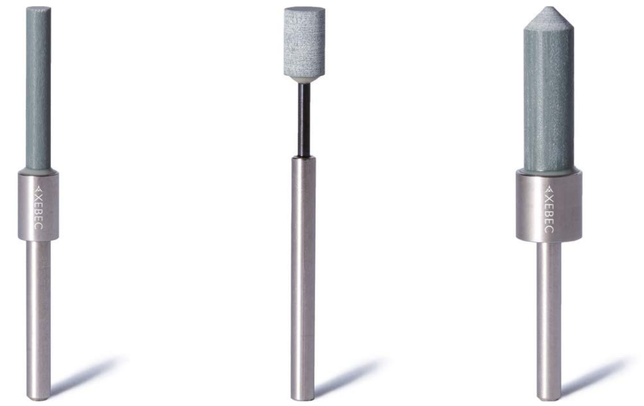
A ceramic stone tool will be damaged when:

- used beyond the maximum rotation speed
- used with a pneumatic rotary tool

Users of the disc type should be careful to use only normal (clockwise) rotation. Reverse (counter-clockwise) rotation may cause the screw to loosen and the head to fly off.

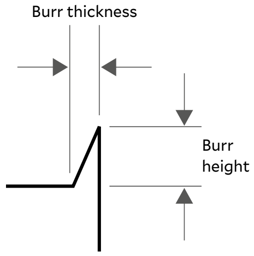
XEBEC Stone™ Mounted Point

Suitable for use with pneumatic rotary tools at high rotational speed



Applicable burr size

Burr thickness ≤ 0.2 mm
(Burrs this size can be bent by fingernails)



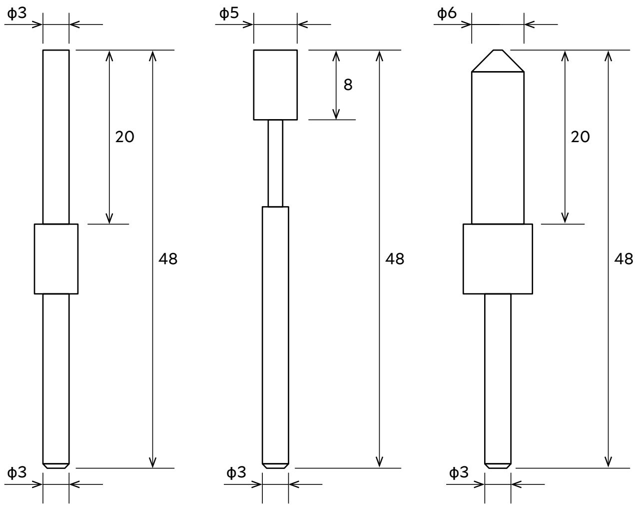
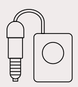


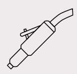
Fig. 25 Fig. 26 Fig. 27

Applicable equipment

This tool can be mounted on rotary tools.



Rotary tool (electric)

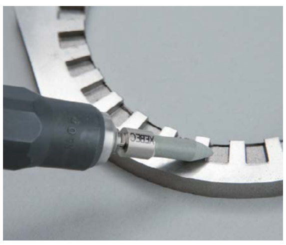


Rotary tool (pneumatic)

Equivalent grit (color)	Product code	Head size (mm)	Shank dia. (mm)	Head length (mm)	Overall length (mm)	Maximum rotational speed (min^{-1})	Fig.
#220 (gray)	AX-PM-3R	ϕ3	ϕ3	20	48	60000	25
	AX-PM-5RF	ϕ5	ϕ3	8	48	30000	26
	AX-PM-6T	ϕ6	ϕ3	20	48	60000	27

Applications

Deburring of edges



Material: Stainless steel
Tool: AX-PM-6T

Before

A file was used for deburring. However, it caused secondary burrs and a quality problem.

After

Secondary burrs are not formed and edge quality is improved.

Deburring of parting lines

Material: Aluminum
Tool: AX-PM-6T

Before

A rotary bar was used because the burrs were large. However, there was a safety problem.

After

The switch to abrasive stone makes the process safer to perform. The ceramic fiber stone's grinding power improves work efficiency.

How to use

All surfaces of the ceramic stone are abrasive and all of them can be used for deburring and polishing.
These ceramic stones are capable of withstanding high speed. As such they can be used with pneumatic rotary tools in addition to electric rotary tools.

XEBEC Brush Length Adjustment Tool™

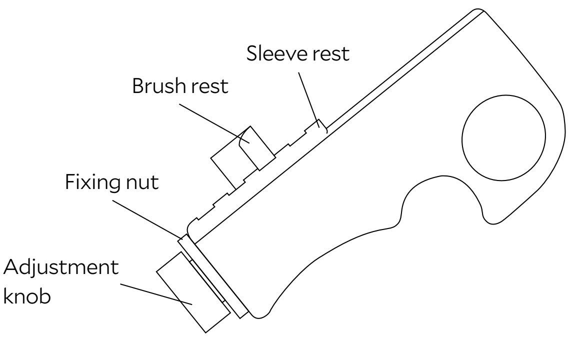
Used with
XEBEC Brush Surface (ϕ15 – 100)

A tool for quick in-machine brush length adjustment.

Product code	Matching brush diameter (mm)	Built-in hexagonal wrench size (mm)
XP-EZ-001	ϕ15 / ϕ25 / ϕ40 / ϕ60 / ϕ100	1.5, 2.0

How to use

- Move the brush rest using the adjustment knob to set the amount of brush protrusion.
- Tighten the fixing nut.
- Hold the unit in one hand and align the sleeve rest with the sleeve end.
- Loosen the adjustment screw on the sleeve to allow the bristles to drop to the brush rest.
- Tighten the adjustment screw to secure the brush in place.



Mobile Micromotor System

Battery-powered rotary tool for use at workstations where power supply is unavailable.
The handpiece is ultra-lightweight, ideal for manual operation without causing fatigue.

Product code	Matching shank diameter (mm)	Maximum rotational speed (min^{-1})	Standard components
M2P33STX	ϕ3 mm shank	30000	Handpiece with stand, controller, ON/OFF foot switch, power cable for charging

■ Capable of about 5 hours of continuous use on a single charge.

Xebec Ceramic Stone™ Meister Finish

- Excellent for mould polishing and deburring
- Uniform finishing attained by uniform fibre diameter
- High strength, not easy to break or tear
- Simple removal of troublesome fine burrs
- Higher finishing efficiency due to crystal structure of alumina fibres
- No dropping of abrasive grain particles that could create linear scratches
- Highly efficient finishing of coarse electro-discharge machining surfaces

Profile	Size (mm)	Red Grit 1200	White Grit 1000	Blue Grit 800	Black Grit 600	Orange Grit 400	Light Brown Grit 300	Dark Brown Grit 220	Purple Grit 120
	0.3 x 4 x 100	312862	312757	312943	312758	313024	313064	313105	-
	0.4 x 4 x 100	312863	312903	312944	312984	313025	313065	313106	-
	0.5 x 4 x 100	312610	312611	312612	312613	312614	312615	312616	-
	0.5 x 4 x 150	312864	312904	312945	312985	313026	313066	313107	-
	0.5 x 6 x 100	312617	312618	312619	312620	312621	312622	312623	-
	0.5 x 6 x 150	312865	312905	312946	312986	313027	313067	313108	-
	0.5 x 10 x 100	312866	312906	312947	312987	313028	313068	313109	-
	0.5 x 10 x 150	312698	312699	312700	312701	312702	312703	312704	-
	0.8 x 4 x 100	312624	312625	312626	312627	312628	312629	312471	-
	0.8 x 4 x 150	312718	312719	312720	312721	312722	312723	312724	-
	0.8 x 6 x 100	312630	312631	312632	312633	312634	312635	312636	-
	0.8 x 6 x 150	312867	312907	312948	312988	313029	313069	313110	-
	0.8 x 10 x 100	312637	312638	312639	312640	312641	312642	312643	-
	0.8 x 10 x 150	312868	312908	312949	312989	313030	313070	313111	-
	1 x 1 x 100	312869	312909	312950	312990	313031	313071	313112	-
	1 x 2 x 100	312870	312910	312951	312991	313032	313072	313113	313142
	1 x 4 x 100	312644	312645	312646	312647	312455	312452	312449	312740
	1 x 4 x 150	312725	312726	312727	312728	312729	312730	312731	313143
	1 x 6 x 100	312648	312649	312650	312651	312456	312453	312450	312741
	1 x 6 x 150	312871	312911	312952	312992	313033	313073	312752	313144
	1 x 8 x 100	312652	312653	312654	312655	312656	312657	312658	312742
	1 x 8 x 150	312872	312912	312953	312993	313034	313074	313114	313145
	1 x 10 x 100	312659	312660	312661	312662	312663	312454	312451	312743
	1 x 10 x 150	312873	312913	312954	312994	313035	313075	312465	313146
	1.5 x 1.5 x 100	312874	312914	312955	312995	313036	313076	313115	-
	1.5 x 4 x 100	312875	312915	312956	312996	313037	313077	313116	313147
	1.5 x 4 x 150	312876	312916	312957	312997	313038	313078	313117	313148
	1.5 x 6 x 100	312877	312917	312958	312998	313039	313079	312755	313149
	1.5 x 6 x 150	312878	312918	312959	312999	313040	313080	312734	313150
	1.5 x 10 x 100	312879	312919	312960	313000	313041	313081	313118	313151
	1.5 x 10 x 150	312880	312920	312961	313001	313042	313082	313119	313152
	2 x 2 x 100	312881	312921	312962	313002	313043	313083	313120	-
	2 x 4 x 100	312882	312922	312963	313003	312464	313084	313121	313153
	2 x 4 x 150	312883	312923	312964	313004	313044	313085	313122	313154
	2 x 6 x 100	312884	312924	312965	313005	313045	313086	313123	313155
	2 x 6 x 150	312885	312925	312966	313006	313046	313087	312753	313156
	2 x 10 x 100	312886	312926	312967	313007	313047	313088	313124	313157
	2 x 10 x 150	312887	312927	312968	313008	313048	313089	313125	313158
	3 x 4 x 100	312888	312928	312969	313009	313049	313090	313126	313159
	3 x 4 x 150	312889	312929	312970	313010	313050	313091	313127	313160
	3 x 6 x 100	312890	312930	312971	313011	313051	313092	313128	313161
	3 x 6 x 150	312891	312931	312972	313012	313052	313093	312754	313162
	3 x 10 x 100	312892	312932	312973	313013	313053	313094	313129	313163
	3 x 10 x 150	312893	312933	312974	313014	313054	313095	313130	313164

Profile	Size (mm)	Pink Grit 3000	Cream Grit 2000	Yellow Grit 1500
	1 x 1 x 100	313165	313167	313169
	1 x 2 x 100	313166	313168	313170
	1 x 4 x 100	-	-	313175
	1 x 6 x 100	-	-	313176
	1 x 10 x 100	-	-	313173

Xebec Ceramic Stone™ Meister Finish continued

Profile	Size (mm)	Red Grit 1200	White Grit 1000	Blue Grit 800	Black Grit 600	Orange Grit 400	Light Brown Grit 300	Gray Grit 220
●	Ø 1 x 50	312894	312934	312975	313015	313055	313096	313131
	Ø 1 x 100	312895	312935	312976	313016	313056	313097	313132
	Ø 1.5 x 50	312896	312936	312977	313017	313057	313098	313133
	Ø 1.5 x 100	312897	312937	312978	313018	313058	313099	313134
	Ø 2 x 50	312898	312938	312979	313019	313059	313100	313135
	Ø 2 x 100	312899	312939	312980	313020	313060	313101	313136
	Ø 2.34 x 50	312900	312940	312981	313021	313061	313102	313137
	Ø 2.34 x 100	312901	312941	312982	313022	313062	313103	313138
	Ø 3 x 50	312466	312467	312474	312468	312473	312469	312470
	Ø 3 x 100	312664	312665	312666	312667	312668	312669	312670
	Ø 3 x 150	312902	312942	312983	313023	313063	313104	313139
	Ø 6 x 50	-	-	-	-	-	-	313140
	Ø 6 x 100	-	-	-	-	-	-	313141

Xebec Ceramic Stone™ Heat-Resistant

The Heat-Resistant range of Xebec Ceramic Stones offer resistance to temperatures up to 200°C. Having the same performance as the MEISTER range of ceramic stones and are most suitable for removing EDM scales. The Heat-Resistant range has been developed for prolonged use with Ultrasonic Machines.

- Same performance as Xebec Meister Finish ceramic stones (Doesn't break, doesn't crack, excellent sharpness)
- Heat resistant up to 200°C
- Ideal for prolonged use with ultrasonic tools
- Suitable for removing EDM scales
- Can lap deep slits for ribs

Profile	Size (mm)	Purple Grit 120	Brown Grit 220	Orange Grit 400	Blue Grit 800	Red Grit 1200
▬	1 x 4 x 100	312744	312673	312854	312672	312671
▬	1 x 6 x 100	312745	312676	312855	312675	312674
▬	1 x 10 x 100	312705	312717	312856	312716	312715
■	2 x 4 x 100	312746	312679	312857	312678	312677
■	2 x 6 x 100	312747	312682	312858	312681	312680
■	2 x 10 x 100	312756	312706	312707	312708	312709

Xebec Ceramic Stone™ Diamond

- Efficiently and cleanly polishes materials harder than HRC57 such as cemented carbide and hardened steel (SKD, DC, STAVAX, HPM, ASP etc)
- Suitable for removing EDM scales, polishing ribs and deburring from edges and corners
- Both the Stick and the Rod types can be used to polish with the tip or the sides of the tools
- More efficient than electroplated diamond files and hand lappers
- Can polish efficiently wet or dry
- Can be used even more efficiently when attached to tools (electric, air or ultrasonic)
- Can be processed into the desired shape, such as a thinner tip

Profile	Size (mm)	Purple Grit 200	Brown Grit 400	Blue Grit 800	Red Grit 1200
▬	1 x 4 x 100	312687	312686	312685	312859
▬	1 x 6 x 100	312690	312689	312688	312860
▬	1 x 10 x 100	312693	312692	312691	312861
●	3 x 50	-	312696	-	-
	3 x 100	-	312697	-	-

Xebec Ceramic Stone™ Soft

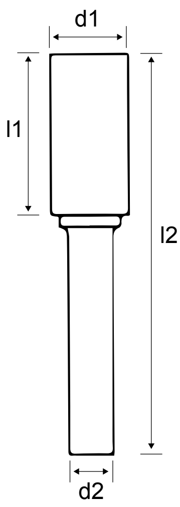
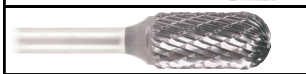
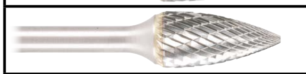
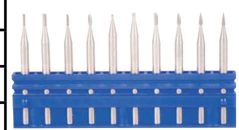
- Rubber binder allows soft contact and fits into a work-piece

Profile	Size (mm)	Grit 1200
■	2 x 6 x 100	312735
●	3 x 100	312750

Stone Holders

Holder Type		Description		Code
	Double Enders (Type B)	Will accommodate pencil stones as well as small round and square stones up to 6x6mm. Available in three colours (blue, black and red) that may be used to distinguish one grit or grade of stone from another. Set of three (Code: 311506) contains one of each colour. Measure 181mm overall length.		Blue - 311503
				Black - 311507
				Red - 311508
	Round Holder	For handheld work with ceramic stones. Available in 1, 2, 4, 6 and 10mm flat sizes, 3mm round or 0.5mm and 0.9mm square sizes. Measures approximately 336mm long.	3mm	311509
	Square Holder		0.5mm	311510
			0.9mm	311511
	Flat Holder 1-10mm		1mm	311512
			2mm	311513
			4mm	311514
			6mm	311515
			10mm	311516
	Super Stone Holder Kit	Set of 3 for Super Stones. 4, 6 and 10mm wide and from 0.8 - 2mm thick.		321511

Tungsten Carbide Rotary Burrs

Profile / Shape		Size (mm)				Type		Code	Set
		d1	l1	d2	l2				
		12.7	25.0	6.0	70.0	Brazed (Cut 5)		*	 Power Cut Burr Set 5pc (6mm Shank/Cut 5) Code: **321721**
		12.7	25.0	6.0	70.0			321726	
		12.7	25.0	6.0	70.0			321727	
		12.7	25.0	6.0	70.0			321728	
		12.7	32.0	6.0	77.0			321729	
		3.0	14.0	3.0	38.0		Solid (Cut 6)	321730	 Burr Set 10pc (3mm Shank/Cut 6) Code: **321722**
		3.0	14.0	3.0	38.0			321731	
		3.0	2.5	3.0	38.0			321732	
		3.0	6.0	3.0	38.0			321733	
		3.0	14.0	3.0	38.0			321734	
		3.0	14.0	3.0	38.0			321735	
		3.0	6.0	3.0	38.0			321736	
		3.0	14.0	3.0	38.0	Angle (8°)		321737	
		3.0	11.0	3.0	38.0	Angle (14°)		321738	
		3.0	4.0	3.0	38.0	Angle (10°)		321739	
		1.0	4.0	3.0	38.0			321740	 Micro Burr Set 10pc (3mm Shank/Cut 2 Micro) Code: **321723**
		1.5	4.0	3.0	38.0			321741	
		1.0	4.0	3.0	38.0			321742	
		1.5	4.0	3.0	38.0			321743	
		1.0	0.9	3.0	38.0		Solid (Cut 2)	321744	
		1.5	1.4	3.0	38.0			321745	
		1.5	4.0	3.0	38.0			321746	
		1.5	4.0	3.0	38.0	Angle (16°)		321749	

* Available in Power Cut Burr Set

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