

CNC Crosshole Deburring Book

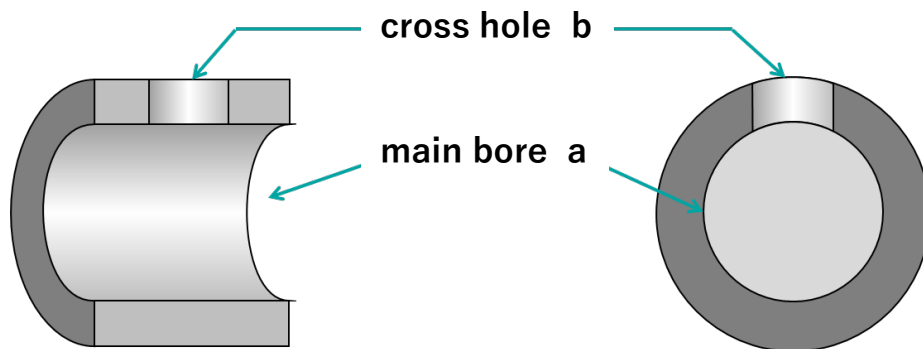


XEBEC[®]
BEAUTIFUL DEBURRING

XEBEC Technology

Definitions of Expressions

In this book, the shaft hole or the first hole drilled is referred to as the "**main bore**", and "**cross hole**" is defined as a hole that crosses the main hole.



In addition, when defining the cross hole in relation to the main bore, the ratio of diameters b/a is defined as the "**inner diameter ratio**".

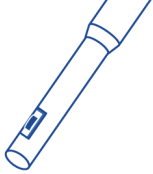

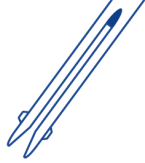


EXAMPLE:

Main bore diameter: 30mm

Cross hole diameter: 10mm

Inner Diameter Ratio (b/a) = $10/30 = 1/3$

Features and Performance of CNC Deburring Tools (Insertion from the Cross Hole)

		Blade Tool	Rotary Blade Tool	Clothes Pin Tool	ORBI Tool	XEBEC Back Burr Cutter & Path
Image						
Features		<ul style="list-style-type: none"> • Replaceable blades • Used in mass production of flat plate holes • C0.5mm chamfering possible 	<ul style="list-style-type: none"> • Spring-loaded blade • Beveling and chamfering of inclined surfaces, casting surfaces, and pipe holes 	<ul style="list-style-type: none"> • Deburring of drilled holes on flat plates, front and back • Re-grindable 	<ul style="list-style-type: none"> • Made of Carbide Cutter, Spring Steel, and Protective Disc • Valve holes 	<ul style="list-style-type: none"> • Cutter & Custom-made tool path (NC data set) • Deburring of 3D-curved cross holes • High quality (minimal secondary burrs and uniform edge profile)
Target Holes	Flat holes	○	○	○	○	○
	Cross hole Inner diameter ratio 1:3 or less	△	○	△	○	○
	Cross hole Inner diameter ratio 1:2 or less	—	○	—	○	○
	Cross hole Inner diameter ratio 1:1	—	—	—	—	○
	Off-center cross hole	—	—	—	—	○
	Angled cross hole	—	—	—	○	○
	Broken cross hole	—	—	—	—	○
	Slotted hole	—	—	—	△	○

○: Applicable △: May be applicable —: Not Applicable

Blade Tool



- Method: Insertion from the cross hole. Coaxial machining in one pass. Same rotation as the high-speed drill.
- Mechanism: Replaceable Blade
- Application: Mass production of flat plate holes, C0.5mm chamfering possible
- Tool size determined by the hole diameter

Rotary Blade Tool



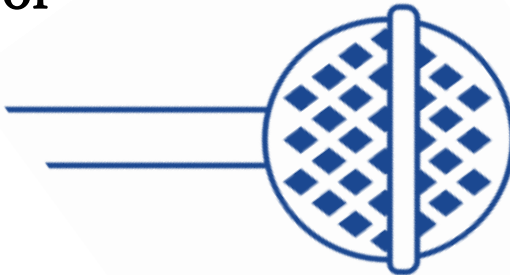
- Method: Insertion from the cross hole. CW rotation and feed.
- Mechanism: Spring loaded blade
- Application: Beveling and chamfering of inclined surfaces, casting surfaces, and pipe holes
- Application: Cross hole diameters ϕ 4.0-20mm. Inner diameter ratio of 1/2 or less and Inclination angle of 15° or less.
- Tool size determined by the hole diameter

Clothes Pin Tool



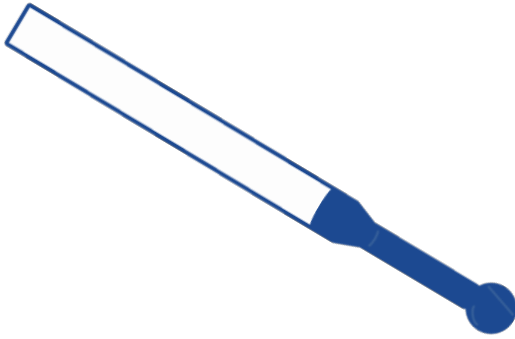
- Method: Insertion from the cross hole. CW rotation and feed.
- Mechanism: Split pin
- Application: Deburring of drilled holes on flat plates, front and back
- Target Holes: Cross holes with diameters of ϕ 0.8-20mm (popular for ϕ 2-10mm). Applicable inner diameter ratio of 1/12 or less (1/3 or less with customized order)
- Tool size determined by the hole diameter. Re-grindable

ORBI Tool



- Method: Insertion from the cross hole, helical processing (1500-2000min⁻¹)
- Mechanism: Carbide Cutter + Spring Steel + Protective Disc
- Application: Valve holes
- Target Hole: Cross hole diameters of ϕ 1.2-10mm. Length 60-150mm.
- Tool size determined by the hole diameter

XEBEC Back Burr Cutter and Path

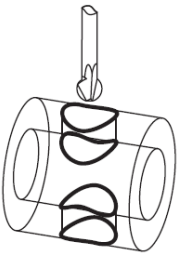


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01_0.20_EdgeBreakAmount - Notepad
File Edit Format View Help
(( INNER-1D31, -2D18, -T5.8-AR-90, -E0)
(EDGE BREAK AMOUNT 0.20)
(UPPER EDGE)
(INC)
(DOWN CUT)

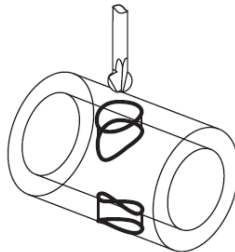
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X0.748Y0.202Z0.139
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X0.663Y0.338Z0.207
X0.612Y0.395Z0.224
X0.556Y0.446Z0.229
X0.498Y0.491Z0.225
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- Method: Insertion from the cross hole, rotate, and deburr (insertion from the main bore also possible depending the equipment)
- Mechanism: Cutter & Custom-made tool path (NC data set)
- Target hole: Cross hole diameter of ϕ 1.0mm and larger. Applicable with flat holes, tapped holes, angled cross holes, broken cross holes, and more.
- Surface Finish: High quality (Minimal secondary burrs and uniform edge profile)

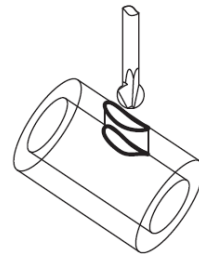
Applicable Holes



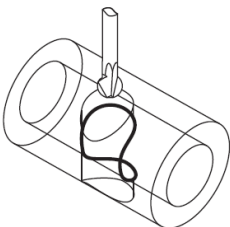
Orthogonal cross hole



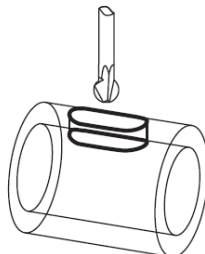
Off-center cross hole



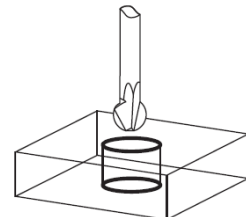
Angled cross hole



Broken cross hole


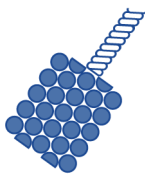



Slotted hole



Flat hole

Features of Inner Diameter Tools (Inserted from the Main Bore)

	Blade Tools with Internal Coolant Pressure System	Flexible Honing Tools	XEBEC Brush™ Crosshole
Image			
Features	<ul style="list-style-type: none"> • Internal coolant pressure system • Shafts, hydraulic and pneumatic parts, crankshafts, and pipe fittings 	<ul style="list-style-type: none"> • Nylon resin imbedded twisting rod and grindstone • Processing of inner diameters, except for blind holes. Crosshatch formation 	<ul style="list-style-type: none"> • Ceramic fiber brush • Applicable to a wide range of hole diameters as the brush diameter expands due to centrifugal force • Grinding power at the brush tip only • Capable of deburring multiple cross holes, irregular holes, and counterbore flat surfaces

Blade Tools with Internal Coolant System



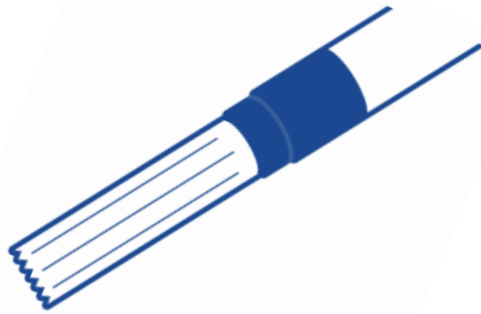
- Method: Insertion from the main bore. CW and CCW rotations.
- Mechanism: Internal coolant pressure system
- Application: Shafts, hydraulic and pneumatic parts, crankshafts, and pipe fittings
- Target Hole: Main bore diameters of ϕ 2.8mm and larger
- Tool size determined by the hole diameter. Build-to-order. Delivery in about 3 months.

Flexible Honing Tools



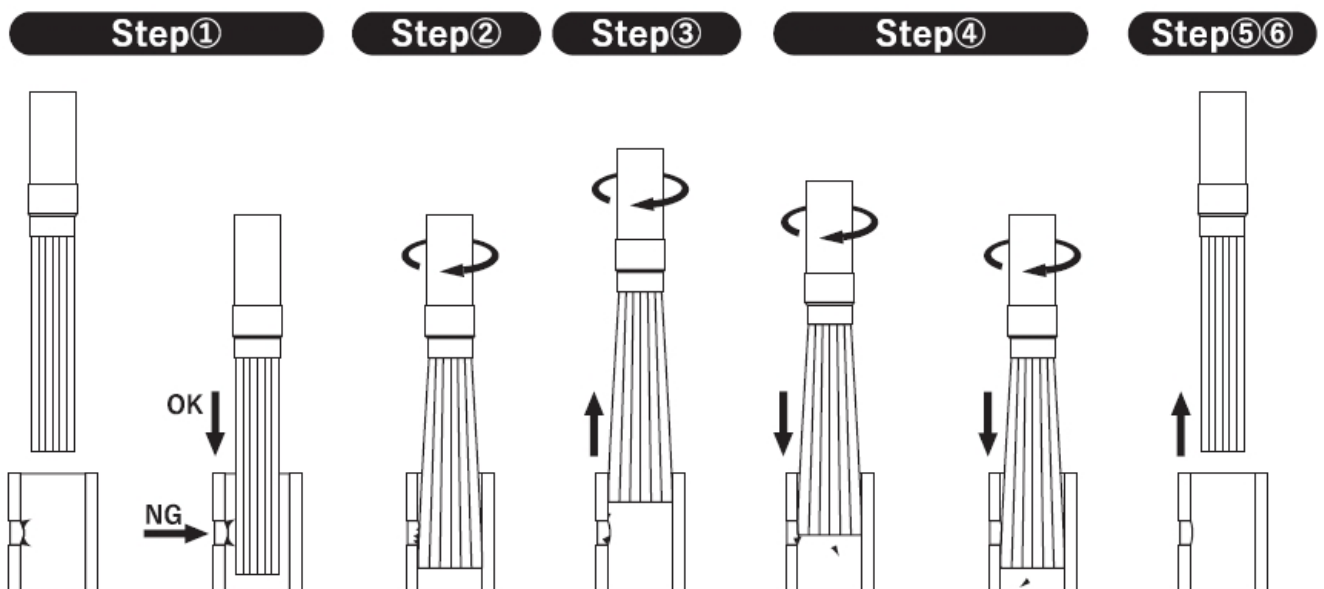
- Method: Insertion from the main bore. Rotate+ feed. Wet Machining
- Mechanism: Nylon resin imbedded twisting rod + grindstone
- Application: Processing of inner diameters, except for blind holes
- Target hole: Main bore diameter of ϕ 3.8mm and larger
- Surface Finish: Cross-hatch formation
- Tool size determined by the hole diameter

XEBEC Brush™ Crosshole



- Method: Insertion from the main bore. Start rotation after insertion.
- Mechanism: Applicable to a wide range of hole diameters as the brush diameter expands due to centrifugal force. Grinding power only at the brush tip.
- Application: Capable of deburring and polishing multiple cross holes, irregular holes, and counterbore flat surfaces
- Target Hole: Main bore diameters of ϕ 3.5-20mm
- Surface Finish: No secondary burrs, improved surface roughness (best achievable surface roughness of Ra0.1um or less)

How to Use Effectively



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