



Special deburring cutter and made-to-order tool path

XEBEC Back Burr Cutter and Deburring Tool Path™

“There must be a way to automate crosshole deburring!”

Our efforts to automate deburring made us aware of other problems requiring innovative solutions. We started developing a means to remove somewhat larger burrs from the edges of complex shaped workpieces, without scratching adjacent surfaces. The result was a product that combines optimal tool geometry for deburring with tool paths that inhibit burr formation. It was also symbolic of our approach to development— drawing from whatever field necessary to solve a problem.

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.

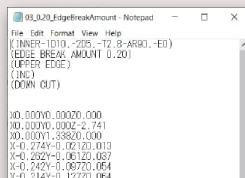
XEBEC Back Burr Cutter

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



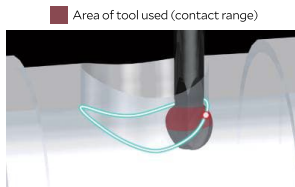
After



Five different tool paths provide a choice of edge break widths. (Refer to p.33 for cutter diameters and corresponding edge break widths.)

Long tool life

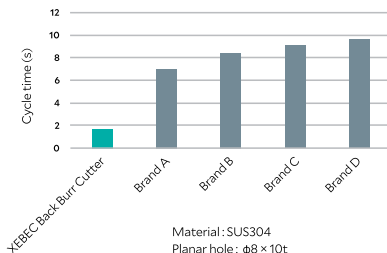
Tool life is increased by continuous displacement of the cutter contact point.



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



XEBEC Back Burr Cutter™

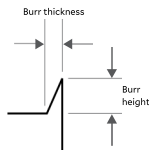
Ideal for deburring both front and back of drilled holes.



VIDEO

Applicable burr size

Burr thickness ≤ 0.2 mm
(Burs 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. Refer to p. 33 - 34 for information on the made-to-order tool path (CNC machining program).

AITiCrN 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-A-S-3F	φ0.8	0.40	φ0.48	3.0	60	φ3.0	3	16
	XC-13-A-S-3F	φ1.3	0.65	φ0.78	5.0	60	φ3.0	3	16
	XC-18-A-S-3F	φ1.8	0.90	φ1.10	6.0	60	φ3.0	3	16
	XC-23-A-S-3F	φ2.3	1.15	φ1.40	7.5	70	φ3.0	3	16
	XC-28-A-S-3F	φ2.8	1.40	φ1.70	9.0	70	φ4.0	3	16
	XC-33-A-S-3F	φ3.3	1.65	φ2.00	10.5	70	φ4.0	3	16
	XC-38-A-S-3F	φ3.8	1.90	φ2.40	12.0	70	φ4.0	3	16
	XC-48-A-S-3F	φ4.8	2.40	φ3.00	15.0	70	φ6.0	3	16
	XC-58-A-S-3F	φ5.8	2.90	φ3.50	18.0	70	φ6.0	3	16
	XC-78-A-S-3F	φ7.8	3.90	φ4.70	24.0	100	φ8.0	3	16
Regular	XC-98-A-S-3F	φ9.8	4.90	φ5.90	30.0	120	φ10.0	3	16
	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
Straight	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
	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

Applications

Automation of deburring

Valve



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

Before

Deburring was done in 3 steps ($\phi 2$ zero cut, nylon brush deburring, $\phi 3$ 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

AITiCrN coated

P: Steel

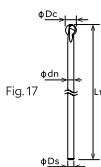
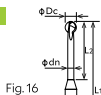
M: Stainless steel

K: Cast iron

S: Heat-resistant super alloy

N: Non-ferrous metal

Type	Product code	Cutter dia. Dc (mm)	Tool protrusion length (mm)	Number of blades	Steel, SS, cast iron, HRSA		Non-ferrous metal	
					Rotational speed n (min ⁻¹)	Feed rate Vf (mm/min)	Rotational speed n (min ⁻¹)	Feed rate Vf (mm/min)
Short	XC-08-A-S-3F	$\phi 0.8$	3Dc	3	20000	1080	20000	1170
	XC-13-A-S-3F	$\phi 1.3$	3Dc	3	20000	1080	20000	1170
	XC-18-A-S-3F	$\phi 1.8$	3Dc	3	20000	1080	20000	1170
	XC-23-A-S-3F	$\phi 2.3$	3Dc	3	15000	1350	18000	1710
	XC-28-A-S-3F	$\phi 2.8$	3Dc	3	12500	1800	15000	2520
	XC-33-A-S-3F	$\phi 3.3$	3Dc	3	10600	1890	12700	2250
	XC-38-A-S-3F	$\phi 3.8$	3Dc	3	9200	2160	11000	2880
	XC-48-A-S-3F	$\phi 4.8$	3Dc	3	7200	1980	8500	2880
	XC-58-A-S-3F	$\phi 5.8$	3Dc	3	6000	1620	7000	2160
	XC-78-A-S-3F	$\phi 7.8$	3Dc	3	4500	1620	5400	1920
Regular	XC-98-A-S-3F	$\phi 9.8$	3Dc	3	3600	1320	4300	1560
	XC-08-A	$\phi 0.8$	5Dc	2	20000	600	20000	650
	XC-13-A	$\phi 1.3$	5Dc	2	20000	600	20000	650
	XC-18-A	$\phi 1.8$	5Dc	2	20000	600	20000	650
	XC-23-A	$\phi 2.3$	5Dc	2	15000	750	18000	950
	XC-28-A	$\phi 2.8$	5Dc	2	12500	1000	15000	1400
	XC-33-A	$\phi 3.3$	5Dc	2	10600	1050	12700	1250
	XC-38-A	$\phi 3.8$	5Dc	2	9200	1200	11000	1600
	XC-48-A	$\phi 4.8$	5Dc	2	7200	1100	8500	1600
	XC-58-A	$\phi 5.8$	5Dc	2	6000	900	7000	1200
Straight	XC-78-A	$\phi 7.8$	5Dc	3	4500	1350	5400	1600
	XC-98-A	$\phi 9.8$	5Dc	3	3600	1100	4300	1300
	XC-18-B	$\phi 1.8$	10Dc	2	4400	220	4400	220
	XC-23-B	$\phi 2.3$	10Dc	2	3500	220	3500	220
	XC-28-B	$\phi 2.8$	10Dc	2	2800	220	2800	220
	XC-33-B	$\phi 3.3$	10Dc	2	2400	190	2400	190
	XC-38-B	$\phi 3.8$	10Dc	2	2000	160	2000	160
	XC-48-B	$\phi 4.8$	10Dc	2	1600	120	1600	120
	XC-58-B	$\phi 5.8$	10Dc	2	1300	100	1300	100
	XC-78-B	$\phi 7.8$	10Dc	3	650	70	650	70
	XC-98-B	$\phi 9.8$	10Dc	3	500	50	500	50



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.



MANUAL

Uncoated

N: Non-ferrous metal

O: Resin

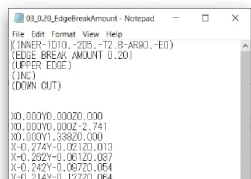
Type	Product code	Cutter dia. Dc (mm)	Tool protrusion length (mm)	Number of blades	Rotational speed n (min ⁻¹)	Feed rate Vf (mm/min)
Regular	XC-08-A-N	$\phi 0.8$	5Dc	2	20000	650
	XC-13-A-N	$\phi 1.3$	5Dc	2	20000	650
	XC-18-A-N	$\phi 1.8$	5Dc	2	20000	650
	XC-23-A-N	$\phi 2.3$	5Dc	2	18000	950
	XC-28-A-N	$\phi 2.8$	5Dc	2	15000	1400
	XC-33-A-N	$\phi 3.3$	5Dc	2	12700	1250
	XC-38-A-N	$\phi 3.8$	5Dc	2	11000	1600
	XC-48-A-N	$\phi 4.8$	5Dc	2	8500	1600
	XC-58-A-N	$\phi 5.8$	5Dc	2	7000	1200
	XC-78-A-N	$\phi 7.8$	5Dc	3	5400	1600
	XC-98-A-N	$\phi 9.8$	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

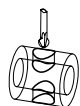
An integral component of this deburring solution, XEBEC Deburring Tool Path is a made-to-order CNC tool path program that ensures optimal performance of the XEBEC Back Burr Cutter.



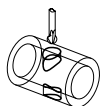
Standard paths

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

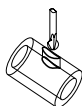
The same cutter can be used for many different types and sizes of hole. This reduces the number of tools in the ATC and the cycle time.



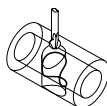
Orthogonal crosshole



Off-center crosshole



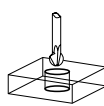
Angled crosshole



Broken crosshole



Slotted hole



Planar hole

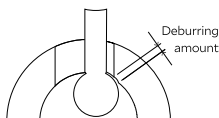
Deburring amount and allowable cumulative error

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	φ1.3	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

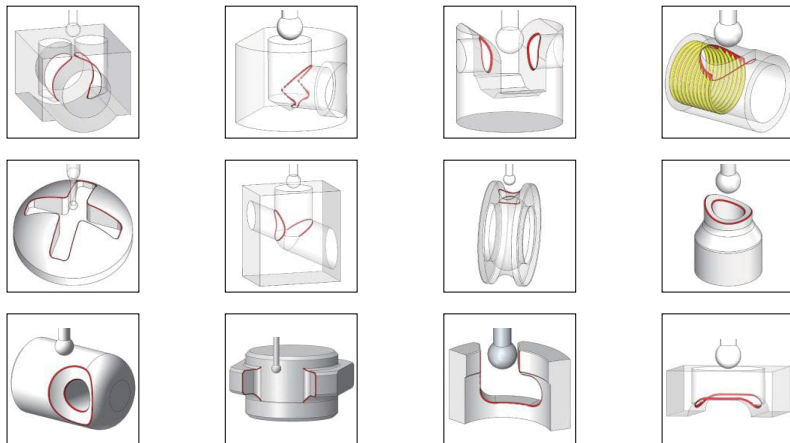
Standard paths are available for thread sizes from M3 to M24.



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

XEBEC Deburring Tool Path All Edges

A customized tool path for extremely complex edge profiles.



How to order standard paths

A made-to-order tool path for commonly encountered crosshole configurations.

STEP 1

Free assessment

You check whether the XEBEC Back Burr Cutter and Deburring Tool Path can be used with your workpiece and machine. The result is available immediately.

STEP 2

Quotation

You receive a quotation by submitting your contact information.

STEP 3

Order

Send your order to the XEBEC distributor in your region after confirming the details.

Online Application Form

All you need to do is to enter a few dimensions including hole diameters and to specify the orientation of the workpiece inside the machine.

Visit the special website below to conduct a self-assessment and submit a request for quotation.

<https://xebec-backburr-cutter.com>



WEBSITE

Ordering XEBEC Deburring Tool Path All Edges

Please contact XEBEC directly to request XEBEC Deburring Tool Path All Edges, a customized solution for deburring paths which do not belong to the six standard types shown on p. 33.

Burrless chamfering with the world's first V-shaped blade

XEBEC Burrless Chamfering Cutter™

"Let's make a chamfering tool that only XEBEC would think of."

At the time, we were looking for additional ways to automate the deburring process and reduce the burden on users. The tools we offered could not provide an exact chamfer. In many cases, users had to alter break edge instructions on drawings to permit edge blending. After much consideration, we came up with the concept of a chamfering tool that does not produce secondary burrs. And settled on the world's first V-shaped blades as the optimal choice for this best-in-category tool.

WINNER 2023

